1st Annual Report

CARE

Coordinated Accelerator Research in Europe

Integrating Activity

implemented as

Integrated Infrastructure Initiative

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Project Co-ordinator: Roy ALEKSAN

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A. ACTIVITY REPORT

B. MANAGEMENT REPORT

1. Progress report

1.1 Summary of the activities and major achievements

The CARE project includes three networking activities ELAN, BENE, HHH, and four joint research activities SRF, PHIN, HIPPI and NED. The first year of the project has permitted the following major achievements.

1.1.1 Networking Activities

CARE Management Activity

- Recognition of the CARE activity for the accelerator research and development, by the directorate of the main European accelerator centres, CERN and DESY.
- Release of the CARE publication policy and CARE publication data base (March 2004)
- Organisation of the CARE general meeting CARE04 (DESY-Hamburg, November 2004)

N1 Electron Linear Accelerator Network (ELAN)

- The organisation of the first plenary ELAN meeting at INFN-LNF Frascati (May 2004).
- The ELAN network was significantly involved in the preparation of the EUROTEV European Design Study, which has been approved in the summer 2004.
- The release of the publication web-base for ELAN documents, allowing a wide and flexible dispersion of the knowledge across the ELAN network.
- The organisation of the workshop dedicated to the collection of the European contribution to the ILC project and its presentation at the first ILC workshop at KEK.

N2 Beams in Europe for Neutrinos Experiment (BENE)

- The organization of the “Physics with a multi MegaWatt proton source” Workshop at CERN, May 24-26; in short, the MMW Workshop. This is likely to prove a significant turning point for EU initiative in our sector.
- A Summary Report of the MMW Workshop and nine talks delivered by BENE to the strategic CERN SPSC meeting in Villars (France). This recognized the strategic interest of accelerator neutrino physics. In December, the Chair of the SPSC presented its recommendations to the CERN Scientific Policy Committee (SPC) and in turn the Chair of the SPC presented them to the CERN Council.
- The BENE network was significantly involved in the preparation of the Beta Beam Work Package of the EURISOL European Design Study, which has been approved in the summer 2004.

N3 High Energy High Intensity Hadron Beams (HHH)

- Organization of the WAMS2004 Workshop on *Accelerator Magnet Superconductors*, held on 22-24 March at Archamps (France). About 100 specialists attended the workshop, including representatives of the leading European firms for both Low Tc and High Tc superconducting materials, representatives of the leading European laboratories and universities active in the field, and representatives from US-LHC Accelerator Research Programme and from Japan.
- Discussions with the CERN management for the organization of a structured working group aimed at the improvement of the LHC accelerator complex,

1.1.2 Joint Research Activities

JRA1 Superconducting Radio Frequency (SRF)

- Scientific investigations on coated Niobium films by the "vacuum arc method" have shown that the superconducting properties, i.e. T_c and Δ T, are the same as in bulk Niobium.
- The technological progress with the preparation of cavities by electro-polishing and moderate bake out give hope, that this method results in high performance cavities, i.e. accelerating gradients above 30 MV/m with quality factors above 10^10.
- The remarkable progress in the design of a new tuner system by partners from Poland, Italy, France and Germany demonstrated professional cooperation and communication in a high-tech area by a European consortium.
- The recommendation by the International Technology Recommendation Panel in favor of superconducting RF technology for the International Linear Collider project.

JRA2 Charge Production in Photo-Injectors (PHIN)

- The demonstration of a high charge (0.5nC) mono-energetic 170 MeV ± 20 MeV electron beam in the laser plasma accelerator concept has been achieved, a result published in Nature and other journals.
- Experiments on pulse shaping with the acousto-optic modulator (Dazzler) achieving the required laser pulse characteristics before the amplifier system.
- The progress in the design of a superconducting RF photo-injector.

JRA3 High Intensity Pulsed Proton Injector (HIPPI)

- The adaptation of the tasks concerning normal conducting accelerating structures to complement the work done in the three parallel projects supported by the ISTC (International Science and Technology Centre) in Moscow (Russia) for the CERN project (Linac4).
- The high accelerating gradient of a superconducting cavity achieved in both vertical and horizontal cryostat tests.

JRA4 Next European Dipole (NED)

- The first design of an 88 mm aperture 15 Tesla dipole magnet.
- The award of contracts for Nb3Sn conductor development to Alstom/MSA (France) and SMI (The Netherlands).

1.2 Management Activity

- Installation of the CARE Web site http://esgard.lal.in2p3.fr/Project/Activities/Current/ (CEA, CNRS).
- Installation of the CARE Publication Database accessible from the Web site http://dphs10.saclay.cea.fr/Doc/Care/care_index.php (CEA).
- Evaluation and purchase of the accounting software VIT@MIB aimed at consolidating the financial expenses and manpower efforts of the CARE contractors (CEA)
- Edition of the "CARE Management Directory" including the CARE coordinators, the team leaders and administrative officers, the CARE activity coordinators and work package leaders, under http://esgard.lal.in2p3.fr/Project/Activities/Current/Organisation/management-network.xls

- Release of the first and second activity intermediate reports, available on the CARE web site.

The following table lists all the management meetings as well as the general annual meeting CARE 04 organised by the management team.

Date	Title/subject of meeting	Location	Number of attendees	Website address
23 Feb. 2004	CARE Steering Committee	Paris	13	http://esgard.lal.in2p3.fr/Project/Activities/Current/CAREmeetings/Management/Steering/
24 Feb. 2004	CARE Dissemination Board	Paris	13	http://esgard.lal.in2p3.fr/Project/Activities/Current/CAREmeetings/Management/Dissem/
24 June 2004	CARE Steering committee	Warsaw	14	http://esgard.lal.in2p3.fr/Project/Activities/Current/CAREmeetings/Management/Steering/
25 June 2004	CARE Dissemination Board	Warsaw	13	http://esgard.lal.in2p3.fr/Project/Activities/Current/CAREmeetings/Management/Dissem/
20 Oct. 2004	VIT@MIB Accounting Meeting	Paris	17	
2-5 Nov. 2004	General meeting CARE04	DESY (Hamburg)	203	http://care04.desy.de/
05 Nov. 2004	CARE Collaboration Council	DESY (Hamburg)	~50	http://esgard.lal.in2p3.fr/Project/Activities/Current/CAREmeetings/Management/Council/
05 Nov. 2004	CARE Governing Board Meeting	DESY (Hamburg)	~25	http://esgard.lal.in2p3.fr/Project/Activities/Current/CAREmeetings/Management/Governing/
05 Nov. 2004	CARE Joint Steering Committee and Dissemination Board	DESY (Hamburg)	17	http://esgard.lal.in2p3.fr/Project/Activities/Current/CAREmeetings/Management/Steering/

1.3 NETWORKING ACTIVITIES (other than Management)

1.3.1 N1 : Electron Linear Accelerator Network (ELAN)

ELAN is the CARE network for Electron Linear Accelerators. It comprises 11 countries plus CERN. The list of participants and their implication in the ELAN Work Packages (**C**: Coordination, X: Participation) is given in the table below. The overall management is done by CNRS-Orsay and CERN.

Number	Participant	WP1 LTECNC	WP2 LTECSC	WP3 BDYN	WP4 INSTR	WP5 ANAD
1	**CEA**		X	X	X	
3	**CNRS**	X	X	X	X	**C**
	CNRS-Orsay		X	X		
	CNRS-CPHT					X
	CNRS-LULI					X
	CNRS-LAPP	X			X	
	CNRS-LOA	X			X	X
	CNRS-LPGP					**C**
	CNRS-LPCO	X				
6	**DESY**		**C**	X	X	
7	**FZJ**				X	
9	**FZR**	X	X		X	
10	**INFN**	X	X		X	
	INFN-LNF	X			X	
	INFN-LNL		X			
	INFN-Mi		X			
	INFN-Na		X			
	INFN-Ro2		X			
11	**TEU**				X	
12	**TUL**		X			
13	**IPJ**		X			
14	**WUT-ISE**		X			
16	**CSIC**		X	X		
	CIEMAT		X			
	LEII		X			
17	**CERN**	**C**		**C**	X	
19	**PSI**				X	
20	**CCLRC**	X	X	X	X	X
21	**ICL**			X	X	X
22	**UMA**			X	**C**	

The full start of the ELAN Network has occurred with the workshop held in Frascati (May 2004). This meeting has been the occasion for the conveners and for the participants to develop useful connections and to inventory the ongoing work in their fields. The

presentations given at this workshop were followed by ELAN-Documents describing the status of the art and the plans in several forefront activities.

A specific feature of ELAN is the connection between the accelerator specialists and the ANAD community on new techniques for acceleration. ELAN intends to define new initiatives for European R&D in this field with the available tools of FP6.

Also useful was the connection to the 2 CARE JRA connected to ELAN, PHIN (talk of A. Ghigo (INFN-LNF) at the Frascati meeting) and SRF (talk of D. Proch (DESY) at the Frascati meeting), where we tried to define our respective roles to avoid duplication of efforts.

During 2004, there were two major events:

- The approval of Design Study EUROTeV
- The technology recommendation for the International Linear Collider ILC

Both events will greatly influence ELAN in the near future. During the recent plenary meeting of CARE in DESY, ELAN has organized a preparatory meeting for the first ILC meeting held at the KEK laboratory in Japan.

N1.1 MEETINGS

Two general ELAN meetings took place in 2004.

The ELAN workshop at Frascati (May 4-6 2004)

This Workshop was hosted by the INFN-LNF. The program of this workshop and a copy of the talks given can be found at http://www.lnf.infn.it/conference/elan/index.html

There were 79 participants registered with almost all contractors represented. The meeting took place during 2.5 days with one day in parallel for the Work Packages.
There were:
- 16 plenary and 27 parallel talks
- 11 JRA SC/SRF talks
- 3 talks in the common session between warm (NC) and cold technology (SC)
- 5 talks between NC and ANAD
- 4 talks between BDYN and ANAD
- 5 talks between BDYN and INSTR

The ELAN workshop at DESY (2-3 November 2004)

This meeting was hosted by DESY in Hamburg. The program for ELAN can be found in http://care04.desy.de/
There were 87 participants from ELAN.

There were 3 sessions in parallel:

- For the supraconducting RF technology there was a review followed by a discussion mainly focused on the impact of the technology choice for ILC.
- For beam dynamics 5 talks followed by a discussion on ILC.
- For new techniques of acceleration there were 6 talks followed by a discussion on electron sources and, the following day, on EU instruments to be used (RTN and NEST) to develop this activity.

This was followed by an ELAN plenary meeting. A large fraction of the plenary meeting was devoted to the preparation of the first ILC workshop at KEK (November 13-15 2004) and, in particular, to collect the possible contribution of European laboratories to the ILC project and prepare its presentation.

Participation of ELAN to the first ILC workshop at KEK (November 13-15 2004)

ELAN was able to finance 10 European participants for the first workshop ILC at KEK. There are 3 ELAN-Documents in preparation which will cover this meeting.

N1.2 PUBLICATIONS

The list of **ELAN-Documents** can be found in:
http://esgard.lal.in2p3.fr/Project/Activities/Current/Networking/N2/ELAN/index.php .

Each work package convener has produced an **ELAN-Document** which contains a summary of his session in the Frascati workshop.

This format was defined to accommodate documents directly submitted under the responsibility of their authors. This flexible system was very useful but it soon became obvious to the Dissemination Board of CARE that these documents were of high quality and of general interest. It was therefore decided to promote them, when agreed between the ELAN Coordinator and the Dissemination Board, to the level of **CARE-Notes**.

N1.3 WEB SITES

A central web page for ELAN was created and web pages for the work packages can be reached at http://esgard.lal.in2p3.fr/Project/Activities/Current/Networking/N2/ELAN/ .
The work package websites are collecting the relevant information connected to their activities and the connections to regularly updated websites in the field.
Also available at this web page are the names of participants to ELAN (249 names with e-mail addresses and work package identification available from the web site)

Code Repository

A code repository has been constituted containing the simulation codes with critical documentation:
http://hepwww.ph.qmul.ac.uk/~white/accodes/

N1.4 ACTIVITIES OF ELAN IN 2004

The year 2004 has been a very active year in the field of electron linacs. Creating the tools (publications, web sites) for an efficient networking and organizing the 2 meetings has been the task of the ELAN Steering Committee which has held regularly phone conferences.

ELAN has also participated actively in setting the organization of the European Design Study EUROTEV. The coordinator of ELAN is representing CARE in the Steering Committee of EUROTeV.

The 5 following tables highlight the progress of work planned in the year 2004 for each work package by listing the lowest level subtasks of the ELAN detailed implementation plan. No major deviations are reported with the exception of WP4 on Instrumentation. While this work package could be present and active at the Frascati meeting, the convener, S. Smith (CCLRC-DL) could not fulfil the tasks initially planned. A replacement, G. Blair (RHUL, associated to UMA), has been found at the end of this year.

One may also note that WP1 and WP5 had initially planned to launch new EU initiatives within FP6 but found out that they would not be viable before FP7 and therefore are looking for alternatives.

Work Package 1: Normal Conducting Linac Technology (LTECNC)

	Title	Original begin date (Annex 1)	Original end date (Annex1)	Estimated Status	Revised end date
WP1	**Normal Conducting Technology**				
1.1	CTF3 Review	Jan. 2004	July 2005	65 %	
1.2	MS Workshop	Nov. 2004	Nov. 2004	100 %	
1.3	ID Proceedings	Jan. 2004	Dec. 2004	100 %	
1.4	Review of available data	Jan. 2004	May 2004	100 %	
1.5	Identification of topics	Jan. 2004	May 2004	100 %	
1.6	Identification of synergy with WP2	Jan. 2004	May 2004	100 %	
1.7	ID: Document		June 2004	100 %	
1.8	Identification of benchmarks	Jan. 2004	Dec. 2004	100 %	
1.9	ID: work plan		Dec. 2004	100 %	
1.10	Proposal for complementary JRA	Jan. 2004	June 2005	0 %	No prospect in FP6

Work Package 2: Super Conducting Linac Technology (LTECSC)

	Title	Original begin date (Annex 1)	Original end date (Annex1)	Estimated Status	Revised end date
WP2	**Superconducting Linac Technology**				
2.1	Coordination of R&D	Jan. 2004	July 2005	65 %	
2.2	MS: Workshop	Nov. 2004	Nov. 2004	100 %	
2.3	Data base for RF	Jan. 2004	June 2005	In Progress	
2.4	Cavity Reliability roadmap	Jan. 2004	June 2005	In Progress	
2.5	Surface treatment / Klystron	Jan. 2004	June 2005	In Progress	
2.6	Evaluation of quality control	Jan. 2004	June 2005	In Progress	
2.7	Evaluation of cleaning methods	Jan. 2004	June 2005	In Progress	
2.8	Evaluation stand. methods vs. alternat.	Jan. 2004	June 2005	In Progress	
2.9	MS: Workshop	Jan. 2004	Nov. 2004	On Time	
2.10	Evaluation of thin film methods	Jan. 2004	June 2005	In Progress	
2.11	Alternative cavity feasibility study	Jan. 2004	June 2005	In Progress	
2.12	Comparison of power sources	Jan. 2004	June 2005	In Progress	

Work Package 3: Beam Dynamics (BDYN)

	Title	Original begin date (Annex1)	Original end date (Annex1)	Estimated Status	Revised end date
WP3	**Beam Dynamics**				
3.1	Review status of beam studies	Jan. 2004	May 2004	100 %	
3.2	MS: Preliminary ident. of highest priorities	May 2004	May 2004	100 %	
3.3	Identify important remaining studies	May 2004	Nov. 2004	100 %	
3.4	Identify required instrumentation	May 2004	Nov. 2004	In Progress	Continued process
3.5	Identify possible benchmarks	Jan. 2004	End 2004	In Progress	January 2005
3.6	Workshop	Nov. 2004	Nov. 2004	100 %	
3.7	Prepare repository	Jan. 2004	May 2004	100 %	
3.8	ID: Repository site established	May 2004	May 2004	100 %	
3.9	Identify required interfaces	May 2004	Dec. 2004	100 %	
3.10	Collect codes	May 2004	Dec. 2005	100 %	Continued process
3.11	ID: Repository functional	Dec. 2004	Dec. 2004	100 %	

Work Package 4: Instrumentation (INSTR)

	Title	Original begin date (Annex1)	Original end date (Annex1)	Estimated Status	Revised end date
WP4	**Instrumentation**				
4.1	Creation of web site		June 2004	100%	
4.2	D: web site		June 2004	100%	
4.3	ID: report		June 2004	0%	June 2005
4.4	Implementation of data base		Dec. 2004		delayed
4.5	D: data base		Dec. 2004		delayed
4.6	ID: document		Dec. 2004		delayed
4.1O	Coordination of R&D goals				ongoing
4.11	Promote collaboration				ongoing
4.12	Coordinate prototype R&D				ongoing
4.13	Cross checks and benchmarks				ongoing

Work Package 5: Advanced and Novel Accelerator Development (ANAD)

	Title	Original begin date (Annex1)	Original end date (Annex1)	Estimated Status	Revised end date
WP5	**Advanced and Novel Accelerator Development**				
5.1	Ultra short pulse injectors	Jan. 2004	June 2005	In Progress	
5.2	MS: Workshop on injectors	Nov. 2004	Nov. 2004	100 %	
5.3	Plasma wave studies	Jan. 2004	June 2005	100 %	
5.4	Identify diagnostics for plasma wave acceleration	Jan. 2004	June 2005	In Progress	
5.5	MS: Workshop on diagnostics	Nov. 2004	Nov. 2005	Abandoned	Wait for WP4
5.6	Electron beam focusing	Jan. 2004	June 2005	In Progress	
5.7	MS: Workshop on beam focusing	Nov. 2004	Nov. 2004	Delayed	
5.8	Prepare integrated experiment	Jan. 2004	June 2007	In Progress	June 2005
5.9	Prospective ideas for DS	Jan. 2004	June 2005	Not started	New ideas (NEST) Apr. 05
5.10	MS: Workshop on DS	Dec. 2004	Dec. 2004	Delayed	NEST

N1.5 Significant Achievements

- Organisation of the workshop (ELAN meeting, 3 Nov. 2004) dedicated to the collection of the European contribution to the ILC project and its presentation at the first ILC workshop at KEK.

N1.6 List of all milestones and deliverables (D) during the reporting period

Deliverable/ Milestone No	Deliverable/Milestone Name	Workpackage /Task No	Lead Contractor(s)	Planned (in months)	Achieved (in months)
D	**ELAN Web site**	All WPs	CNRS-Orsay	4	4
D	**Annual meeting**	All WPs	CNRS-Orsay, INFN-LNF	11	5
1.2	CTF3 workshop	WP1	CERN	11	11
1.3	Proceedings CTF3 workshop	WP1	CERN	12	12
1.7	Document on synergy with WP2	WP1	INFN-LNF	5	5
1.9	tification of benchmarks	WP1	CERN	12	12
2.2	Workshop	WP2	DESY	11	11
2.9	Workshop	WP2	DESY	11	11
3.2	Preliminary identification of the highest priorities	WP3	CERN	5	5
3.8	Repository site established	WP3	CERN	5	5
D 3.11	**Repository site functional**	WP3	CERN	12	12
D 4.2	**Web site**	WP4	CCLRC	6	?
4.3	Report	WP4	CCLRC	6	?
D 4.5	**Data base of test facilities**	WP4	CCLRC	12	?
4.6	Document	WP4	CCLRC	12	?
5.2	Workshop on injectors	WP5	CNRS-LPGP	11	11
5.5	Workshop on diagnostics	WP5	CNRS-LPGP	11	Delayed
5.7	Workshop on beam focusing	WP5	CNRS-LPGP	11	Delayed
5.10	Workshop on Design Study	WP5	CNRS-LPGP	12	Delayed

N1.7 List of major meetings organized under ELAN during the reporting period

Date	Title/subject of meeting /workshop	Location	Number of attendees	Website address
4-6 May 2004	First ELAN meeting	Frascati (Italy)	79	http://www.lnf.infn.it/conference/elan/index.html
25-29 Oct. 2004	Experimental mini Workshop on CTF3 operation	CERN (Switerland)	8	
2-3 Nov. 2004	Second ELAN meeting	DESY (Hamburg)	87	http://care04.desy.de
22-24 Nov. 2004	CTF3 Collaboration Meeting	CERN (Switzerland)	~70	http://ctf3.home.cern.ch/ctf3/New_collab_meet.htm

1.3.2 N2 : Beams in Europe for Neutrino Experiments (BENE)

BENE is the CARE network for Beams for European Neutrino Experiments. It comprises 13 countries. The table of the participants and their implication in the BENE Work Packages is given in the table below. The overall management is done by INFN-Na, the Deputy Coordinator is from UNI-GE.

Participant number	Participant	PHYSICS	DRIVER	TARGET	COLLECTOR	NOVEL NEUTRINO BEAMS
1	**CEA**	X	**C**	X	X	**C**
2	**UCLN**	X				X
3	**CNRS**	X			**C**	X
	CNRS-Orsay	X			**C**	X
	CNRS-LPNHE	X			X	
	CNRS-CENBG	X				
	CNRS-IPNL	X			X	
	CNRS-LPSC					X
4	**GSI**					X
7	**FZJ**		X	X		
8	**TUM**	X				X
10	**INFN**	**C**	X	X	X	X
	INFN-LNF	X				X
	INFN-Ba	X				X
	INFN-Ge					X
	INFN-GS	X				
	INFN-LNL	X	X			X
	INFN-Mi	X				X
	INFN-Na	X				X
	INFN-Pa	**C**				X
	INFN-Pi	X				
	INFN-Tr	X				X
	INFN-Ro3	X				X
	INFN-To	X				
16	**CSIC**	X				
	UBa	X				
	IFIC	X				
	UAM	X				
17	**CERN**	X	X	X	X	**C**
18	**UNI-GE**	X		X	X	X
19	**PSI**			X		
20	**CCLCR**	X	X	**C**	X	**C**
	CCLRC-RAL	X	X	**C**	X	**C**
21	**ICL**	X		X		X

The BENE Network has come promptly into existence in 2004, aiming from its start at a clear presentation, to our particle physics peer community, of

1) the physics interest of superior accelerator neutrino beams (superbeams, betabeams, neutrino factories)

2) the promising on-going developments of accelerator technology that will make them possible

3) the opportunities that exist to plan, fund and realize, on a realistic time scale, a much enhanced European accelerator neutrino complex .

The key event was the "Physics with a multi MegaWatt proton source" Workshop at CERN, May 24-26; in short, the MMW Workshop. A MMW proton source (driver) is decisive for all present and future options of neutrino beams and the establishment of its physics case was naturally to be the first major BENE initiative. The BENE coordinator was co-chairman and many others in BENE were essential: the MMW Workshop was organized in strict cooperation with the management of the EURISOL project, whose nuclear physics scientific program calls for a MMW driver similar and compatible with the one of a neutrino complex and for the construction of infrastructures which is also indispensable for neutrino betabeams.

The Workshop was organized in view of the special "strategic" Cogne IX session of the CERN SPSC (Super Proton Synchrotron Committee) that was held in Villars, CH, Sep 22-28, with the explicit goal of examining prospects for the future of European fixed target particle physics. A Summary Report (140 page) of the MMW Workshop and nine talks were delivered by BENE in Villars. Before that, the coordinator gave additional presentations to two ordinary SPSC sessions in March and July. Thanks to the Workshop BENE established direct contact with the new CERN management, that has welcome warmly the initiative and its follow ups.

In Villars, the SPSC recognized the strategic interest of accelerator neutrino physics and

1) identified the possibility a construction window, roughly in the decade 2010-20, after LHC and before CLIC, for a new European accelerator neutrino complex at the frontier of the field;
2) endorsed the strategic importance of a MMW proton driver for neutrino physics and for other aspects of fixed target particle physics;
3) recommended that, in the immediate future, CERN and European agencies reinforce and support the R&D necessary for a future initiative.

During the year, the coordinator and A. Blondel, a senior member of BENE, gave several reports also to the CERN SPC (Scientific Policy Committee) and to the sessions of ECFA and RECFA.

In December, the Chair of the SPSC presented its recommendations to the SPC and the Chair of the SPC presented its recommendations to the CERN Council.

BENE must provide in 2005 clear indications to the management of CERN and EU funding agencies. R&D activities that deserve priority must be clearly presented, approved and launched, in view of a first round of proposals for new investments in research infrastructures, which the CERN management may present to the CERN Council in 2006.

The largest coordination among different communities is needed. The task ahead is indeed the one to design the optimal evolution of the CERN proton complex. This will have to be capable to provide competitive performance for physics programs as different as the ones of the upgraded LHC, neutrino oscillations, other fixed target particle physics experiments, Eurisol and possibly more.

N2.1 MEETINGS

The major events so far organized or co-organized by BENE were:

1) the 1st BENE Week Feb 18-21. This was the regular week of meetings of BENE related work packages, study groups and R&D projects.

2) the 2nd regular BENE Week of meetings of study groups and R&D projects in May the week at CERN. This was reduced in length, to leave space to hold

3) the "Workshop on Physics at a Multi Mega Watt Proton Source", May 25-27. This international meeting had about 150 participants and is likely to prove an important milestone in our progress towards a new European Neutrino Complex.

4) the Nufact04 International Workshop on Neutrino Factory and Superbeams in Osaka. This Workshop is the annual world-wide forum in our sector. BENE participated in its preparation and contributed to the sessions. So it did for the associated NuFact04 School. The proposal to hold NUFact05 in Europe was presented and approved.

5) a joint Workshop of WP1 (PHYSICS) and WP5 (NovelNeutrinoBeams), "Exploring the impact of new neutrino beams", that took place in Trento, with the patronage of ECT, October18-22, devoted to explore the comparative merits of the different options.

6) the 3rd general BENE meeting in DESY, that was a mini-Workshop BENE04 on "The future of accelerator neutrino physics in Europe", Nov 2-3., during the general CARE04 meeting.

We will also mention MICE Proto-Collaboration Meetings at the end of March at CERN, in Osaka immediately after NuFact04 and at Rutherford Lab at the end of October (BENE is fostering the success of this international effort, a Muon Ionization Cooling Experiment, proposed to RAL/UK where MICE passed the decisive Gateway on December 23. Proto-Collaboration Meetings of a Target Test Area Experiment, based at CERN (BENE is fostering also the success of this international effort, headed to approval too).

In addition, BENE was present to all major neutrino events in the year. In 2004 we wil mention only the most important and representative event, Neutrino 2004. Held on even years, this XXI International Conference on Neutrino Physics and Astrophysics was in Paris, June 14-19. It was attended by a significant BENE delegation and we had several speakers in many of the sessions, only plenary, by invitation only, of the conference.

BENE is also often present at regular ECFA meetings in the year and reports periodically to meetings of the CERN scientific committees (SPC, SPSC) and to the CERN Directorate.

N2.2 Publications

An overview of BENE documents and publications can be found in:
http://bene.web.cern.ch/bene/publications/
From there one can link to the documents created by each work package. They are structured in the same way as it is proposed for the general CARE publication policy, i.e. CARE-Note/Report/Conf/Pub/Document.
The database of publications is regularly updated by the BENE deputy coordinator and the work package convenors.

N2.3 Web Sites

The BENE Main Web Page is http://bene.na.infn.it/.
It displays the general plan of BENE activities for about 1 year ahead. Basic informations are kept up to date. BENE federates several pre-existing working groups and relies on their several pre-existing Web sites
http://muonstoragerings.web.cern.ch/muonstoragerings/Welcome.html
http://nfwg.home.cern.ch/nfwg/nufactwg/nufactwg.html
http://beta-beam.web.cern.ch/beta-beam/

The process of re-organization into a unitary site, in tune with the BENE federative process, is in progress. In each BENE WP Web page, the fraction of the material relevant to the scope of WP is being reorganized in a coherent set of links.

A Mailing List of members, bene@cern.ch, is operational. In addition there exist mailing lists of each work packages. (hep-mgt-betabeam@cern.ch, hep-mgt-bene-collector@cern.ch, hep-mgt-bene-drivers@cern.ch, hep-mgt-bene-muend@cern.ch, hep-mgt-bene-mufront@cern.ch,

hep-mgt-bene-physics@cern.ch, hep-mgt-bene-target@cern.ch). Other lists of more loosely connected colleagues are also maintained.

N2.4 Activities of BENE in 2004

The coming into existence of BENE in 2004 meant an important acceleration of initiative in the sector of accelerator neutrinos. Our Steering Committee has created the necessary networking tools for this and organized the 3 main meetings and the other events. Regular phone-conferences are the main tool of coordination in the interval between meetings.
BENE has also been the promoter of a European Design Study (DS) of a Neutrino Factory & Superbeam complex. Our SG has been the kernel of the team preparing the DS Proposal in view of the expected March 2005 deadline, according to the priorities set by ESGARD. After the cancellation of this DS call, work continues very actively, always under the coordination of R. Edgecock, aiming at the first FP7 deadline. For FP6, instead, we have recently identified the possible objective of a I3, specifically integrating EU infrastructures related to accelerator neutrinos. Though a strong burst of activity is in progress, we are not yet sure to match the fast approaching application deadline.

The Betabeam team is participating to the Eurisol DS, whose WP11 will be a Betabeam work package, for which about 1 M Euros was requested and approved, after submission of the DS Proposal on the March 4, 2004 deadline. This will focus on reacceleration and storage of neutrino beta-emitting ions. Notice that also some most promising DRIVER and TARGET concepts, common to EURISOL and neutrino factory & superbeam applications, are also subject of the Eurisol DS. The coordinators of BENE and HIPPI represent CARE in the governing board of the EURISOL DS.

The following five tables highlight the progress of work planned for the year 2004 for each work package by listing the lowest level subtasks of the BENE detailed implementation plan. No major deviations are reported.

Concerning WP2, the discussion of criteria of comparison of SCL and RPS has to be enlarged in consultations with other communities of potential users of the proton driver. It is therefore likely to last longer than expected. The benefit of the larger consultation will largely compensates the additional effort, as the choice of the appropriate proton driver is a corner stone of the future of particle physics in Europe.

Work Package 1: PHYSICS

	Title	Original begin date (Annex 1)	Original end date (Annex1)	Estimated Status	Revised end date
WP1	**PHYSICS**				
1.1	Development of the WP Web Site	Jan. 2004	Mar 2004	85%	Continuously improved
1.2	WP Spring Meeting	Feb. 2004	Feb 2004	100 %	
1.3	WP Summer Meeting	May 2004	May2004	100 %	
1.4	WP Fall Meeting	Nov. 2004	Nov 2004	100 %	
1.5	Plan strategy of unambiguous measurement of all oscillation parameters	Jan. 2004	Nov 2004	85 %	Being refined
1.6	MS: Topical Physics Workshop (proceedings within months)	Oct. 2004	Oct 2004	100 %	
1.7	Assess potentials of different beam baseline detector configurations	Dec. 2004	Jun 2005	10 %	In progress

Work Package 2: DRIVER

	Title	Original begin date (Annex 1)	Original end date (Annex1)	Estimated Status	Revised end date
WP2	**DRIVER**				
2.1	Development of the WP Web Site	Jan 2004	Mar. 2004	85%	Continuously improved
2.2	WP Spring Meeting	Feb. 2004	Feb. 2004	100 %	
2.3	WP Summer Meeting	May2004	May 2004	100 %	
2.4	WP Fall Meeting	Nov. 2004	Nov. 2004	100 %	
2.5	Define criteria of SPL vs RCS. Perform comparison. Identify R&D plans beyond HIPPI.	Jan 2004	Jun. 2005	50 %	In progress (almost) as expected

Work Package 3: TARGET

	Title	Original begin date (Annex 1)	Original end date (Annex1)	Estimated Status	Revised end date
WP3	**TARGET**				
3.1	Development of the WP Web Site	Jan. 2004	Mar. 2004	50%	Acceleration in progress
3.2	WP Spring Meeting	Feb. 2004	Feb. 2004	100 %	
3.3	WP Summer Meeting	May 2004	May 2004	100 %	
3.4	WP Fall Meeting	Nov 2004	Nov 2004	100 %	
3.5	Review present status of high power target studies.	Jan 2004	Feb. 2005	100 %	

Work Package 4: COLLECTOR

	Title	Original begin date (Annex 1)	Original end date (Annex1)	Estimated Status	Revised end date
WP4	**COLLECTOR**				
4.1	Development of the WP Web Site	Jan. 2004	Mar. 2004	85%	Continuously improved
4.2	WP Spring Meeting	Feb. 2004	Feb. 2004	100 %	
4.3	WP Summer Meeting	May 2004	May 2004	100 %	
4.4	WP Fall Meeting	Nov. 2004	Nov. 2004	100 %	
4.5	Evaluate progress: power supplies, irradiation, mechanical and thermal stresses	Jan 2004	Feb 2005	90 %	
4.6	MS: WP Spring Meeting hosting Int. Workshop on Targets & Collectors (proceedings within months)	Mar 2005	Mar 2005	0 %	Meeting planned as expected. Workshop postponed.
4.7	Assess merits of different collector schemes	Feb 2005	Jun 2005	10 %	Planned as expected
4.8	WP Summer Meeting	Jun 2005	Jun 2005	0 %	Planned as expected
4.9	MS: WP Interim Report for NuFact05	Jun 2005	Jun 2005	0 %	Planned as expected

Work Package 5: NOVEL NEUTRINO BEAMS

	Title	Original begin date (Annex 1)	Original end date (Annex1)	Estimated Status	Revised end date
WP5	**NOVEL NEUTRINO BEAMS**				
5.1	Development of the WP Web Sites for the three areas of interest of the WP	Jan 2004	Mar 2004	85%	Continuosly improved
5.2	Review of existing designs for NuFact (both front & back end) and Betabeams.	Jan 2004	Jun 2005	60 %	
5.3	Define, implement and perfect dissemination mechanisms	gio 01/01/04	Jun 2005	60 %	
5.4	WP Spring Meeting	Feb 2004	Feb 2004	100 %	
5.5	WP Summer Meeting	May2004	May2004	100 %	
5.6	MS: WP Fall Meeting hosting Betabeam Workshop (proceedings within months)	Fall 2004	Fall 2004	100 %	Meeting and Workshop held separately in the end

N2.5 SIGNIFICANT ACHIEVEMENTS

- Organization of the "Physics with a multi MegaWatt proton source" Workshop at CERN, May 24-26; in short, the MMW Workshop. This is likely to prove a significant turning point for EU initiative in our sector.
- A Summary Report of the MMW Workshop and nine talks delivered by BENE to the strategic CERN SPSC meeting in Villars (France). This recognized the strategic interest of accelerator neutrino physics. In December, the Chair of the SPSC presented its recommendations to the CERN Scientific Policy Committee (SPC) and in turn the Chair of the SPC presented them to the CERN Council.
- Approval of the Beta Beam Work Package of the EURISOL DS.

N2.6 List of all milestones and deliverables (D) during the reporting period

Deliverable/ Milestone No	Deliverable/Milestone Name	Workpackage /Task No	Lead Contractor(s)	Planned (in months)	Achieved (in months)
D	**BENE Web Site**	All WPs	INFN-Na	4	4
D	**BENE Annual Report**	All WPs	INFN-Na, Uni-Ge	11	12
D	**BENE Physics Web Site**	WP1 / 1.1	INFN-Pa, CERN	3	3

N2.7 List of major meetings organized under BENE during the reporting period

Date	Title/subject	Location	Number of participants	Web Site Address
16-19 Feb 2004	BENE Week	CERN	50	http://muonstoragerings.web.cern.ch/muonstoragerings/Events/200402/agenda.html
24-28 May 2004	BENE Week	CERN	50	http://people.na.infn.it/%7epalladin/bene/Events/200405/Agenda.html
25-27 May 2004	MMW Workshop	CERN	150	http://physicsatmwatt.web.cern.ch/physicsatmwatt/
26-31 Jul. 2004	NuFact04 International Workshop	Osaka (Japan)	155	http://www-kuno.phys.sci.osaka-u.ac.jp/%7enufact04/
Oct. 18-22 2004	WP1 & WP5 joint Workshop	Trento (Italy)	25	http://newbeams.in2p3.fr/
2-3 Nov. 2004	Workshop "The future of Accelerator Neutrino Physics"	DESY	60	http://care04.desy.de

1.3.3 N3 : High-Energy High-Intensity Hadron Beams (HHH)

The official activities of the CARE-N3 Network, renamed CARE-HHH, started in March 2004 and almost all the expected initiatives were launched on time. Indeed, after ten months, we are collecting tangible results for each of the three HHH work-packages as well as for the overall Network organization, well in line with the proposed planning.
The list of participants and their implication in the HHH Work Packages (**C**: Coordination, X: Participation) is given in the table below. The overall management is done by CERN.

Number	Participant	WP1 AMT	WP2 ABI	WP3 APD
1	**CEA**	X		
4	**GSI**	X	X	X
6	**DESY**		**C**	X
10	**INFN**	X		X
	INFN-Ge	X		
	INFN-LNF			X
	INFN-Mi	X		
	INFN-Na			X
	INFN-Sal			X
11	**TEU**	X		
15	**WUT**	X		
16	**CSIC**			X
	CIEMAT	X		
	LEII			X
17	**CERN**	**C**	**C**	**C**
19	**PSI**		X	
20	**CCLRC**	X		

N3.1 OVERALL NETWORK ORGANISATION AND MAIN ACTIVITIES

- Management: Coordinator: F. Ruggiero (CERN), Deputy: W. Scandale (CERN)
- Goal/keywords:
  - High-Energy High-Intensity Hadron Beams facilities for Europe,
  - Establish a roadmap for future accelerator R&D and experimental studies,
  - Set-up or reinforce links with high-energy experimental-physics community,
  - Coordinate and document international collaboration,
  - Upgrade of existing European accelerator infrastructure,
  - LHC luminosity and energy upgrade.
- Network web site: http://care-hhh.web.cern.ch/care-hhh/,
  - Set-up with the help of a CERN summer student: Amelia Schultheis.
  - Presently maintained by Per Hagen at CERN.
  - From there, the web pages of each Work Package, to be considered as an integral part of the HHH web site itself, can be easily accessed.
- CARE-HHH Meetings:
  - First CARE-HHH Network Steering Committee meeting on 9 February 2004 at CERN.

  - First activity report by W. Scandale on 23 February 2004 at the CARE Steering Committee meeting in Paris.
  - Second activity report by W. Scandale on 24 June 2004 at the CARE Steering Committee meeting in Warsaw. Role and importance of CARE and of the HHH Network for the LHC Upgrade explicitly recognized by the CERN Director General.
  - Second CARE-HHH Network Steering Committee meeting on 25 October 2004 at CERN.
  - First Annual CARE-HHH Network general meeting on 11 November 2004 at CERN (with about 50 participants).

- Joint activity with US-LHC Accelerator Research Programme (US-LARP):
  - Review of US-LARP collaboration on 26-27 February 2004 at Fermilab (Chicago, USA) (see web site at http://www-td.fnal.gov/LHC/USLARP.html). The scope was to discuss FY2005-06 plans, Super-Conducting Magnets, Beam Instrumentation and diagnostics for the LHC commissioning, Accelerator Physics, and Hardware Commissioning. CERN participants associated to CARE-HHH: R. Ostojic, F. Ruggiero, and H. Schmickler.
  - Active contribution to the steering of the US-LARP collaboration by the introduction of "task sheets" describing agreed milestones and deliverables. Video-conference meeting on 1st July 2004 of the US-CERN Committee for the LARP (see H. Schmickler's presentation at http://www-td.fnal.gov/LHC/USLARP/USLARP_20040701/LARP_Jul_04.html).
  - Review of the US-LARP collaboration, 19-23 October 2004 at Napa (USA), see various presentations on e-cloud effects, beam-beam compensation and beam instrumentation on the web site: http://bc1.lbl.gov/CBP_pages/CBP/workshops/uslarp/041019/.
- Joint activity with experimental physicists of ATLAS and CMS for the LHC luminosity upgrade:
  - Discussions with a steering group chaired by Stefan Tapprogge set up by Peter Jenni in ATLAS for R&D on a detector upgrade.
  - F. Ruggiero presented LHC upgrade scenarios at an ATLAS meeting the 23 September 2004.
  - Further discussions with an extended steering group including ATLAS and CMS physicists on super-bunches, event pile-up in the detectors, longitudinal bunch profile and extent of the luminous region in view of an LHC upgrade.
- Joint activity with INFN experimental physicists for neutrinos and fixed target physics beams:
  - Active discussions about the logics and merits of a possible upgrade of the LHC injector chain, from a PS Super-Booster to a Super-PS and a Super-SPS, partly in the framework of the existing CERN High Intensity Proton working group coordinated at CERN by R. Garoby (and focused on the proposal of a new Linac4 and a Super-conducting Proton Linac).
  - Intense contacts with INFN to define the needs of High Intensity Physics experiments in view of an upgraded version of the LHC complex and contribution to the organization of the *High Intensity Frontier Workshop* (HIF04), Isola d'Elba, Italy, 5–8 June 2004 (see http://www.pi.infn.it/pm/2004/).
  - Presentation by W. Scandale in June 2004 on *LHC luminosity improvement and CERN accelerator complex*, including a possible upgrade of the LHC injector chain, from a PS Super-Booster to a Super-PS and a Super-SPS, compatible

with high intensity for neutrino factory, neutrino experiments and fixed target physics.

- Discussions with the CERN management for the organization of a structured working group aimed at the improvement of the LHC accelerator complex, compatible with high intensity for neutrino factory, neutrino experiments and fixed target physics: mandate in preparation.
- Financial issues: The budget spending started somewhat `adiabatically' in 2004, partly as a consequence of the delay in signing the CARE consortium agreement and in setting-up adequate accounting structures at CERN and in other partner institutions. As a consequence of this, the global expenditure of the year was slowed down and delayed to some extent and could not exhaust the available budget. It has to be mentioned that CERN set-up `team-accounts' for CARE activities only on 7 May 2004 (CERN-CARE-HHH temporary Team Code: T874300, later converted to the final Team Code: 60723).
- Temporary staff issues: A CERN Summer Student (Amelia Schultheis) prepared in July and August 2004 the interactive CARE-HHH Network web site and some computer tools for a common repository of computer codes for advanced beam dynamics simulations, synchrotron and possibly magnet design.

The following table highlights the progress of work planned in the year 2004 for the HHH Management by listing the lowest level subtasks of the HHH detailed implementation plan.

Title	Original begin date (Annex1)	Original end date (Annex1)	Estimated Status	Revised end date
Management				
MS: kick-off meeting	T4-2003	T4-2003	100 %	On time
Establish connections with Labs and Universities	T4-2003	T4-2003	100 %	On time
Organization of all WP	T4-2003	T4-2003	100 %	On time
Assess state-of-the-art Technologies	T1-2004	T1-2004	100 %	T2-2004
MS: annual HHH meeting	T4-2004	T4-2004	100 %	On time
ID: HHH Annual Report	T4-2004	T4-2004	100%	Jan 2005

N3.2 Work Package 1: Advancements in Accelerator Magnet Technologies (AMT)

Coordinator: L. Rossi (CERN), deputy: L. Bottura (CERN).

Keywords: Stability & Quench Limit of LHC,
Pulsed magnets for an SPS (and GSI) upgrade,
Magnets for booster ring, High Field Magnet Design,
Optimisation of the overall cost.

Kick-off meeting of the CARE-HHH-AMT (WP1) on 9 December 2003 at CERN, see web site http://amt.web.cern.ch/amt/activities/meetings/2004-kickoff/AMT_Kick-off.html.

CARE-HHH-AMT web site: http://amt.web.cern.ch/amt/.

Organization of the WAMS2004 Workshop on *Accelerator Magnet Superconductors*, held on 22-24 March at Archamps (France). The presentations are available on the web at WAMS2004. About 100 specialists attended the workshop, including representatives of the leading European firms for both LTc and HTc superconducting materials, representatives of the leading European laboratories and universities active in the field, and representatives from US-LARP programme and Japan. The aims of the workshop were:

- Review the status of the world R&D on superconducting materials and cables for high field magnets (B > 10 T), with particular focus on needs on the NED program (Nb_3Sn),

- Review the capabilities of European industries and European laboratories in support of the superconductor R&D,
- Identify needs and define directions of development for industry and laboratories.

On 25 March a general meeting of HHH-AMT was held to evaluate the impact of the outcomes of the workshop on the network activity and to steer the program of all topics.
The proceedings for the workshop have been edited and refereed by L. Bottura and T. Taylor from CERN, and will be published as a CERN and CARE report. They are presently in press.
Publication of an EPAC04 paper in collaboration with CARE-HHH-APD (WP3) on *Performance Limits and IR Design of a Possible LHC Luminosity Upgrade Based on Nb-Ti SC Magnet Technology*, by F. Ruggiero, O. Brüning, R. Ostojic, L. Rossi, W. Scandale, and T. Taylor, CERN, and A. Devred, CEA-Saclay and CERN. Although several aspects related to the energy deposition by particle collision debris and to the thermal modelling of the IR magnets remain to be further investigated, an upgrade of the low-beta quadrupoles based on classical NbTi technology may be compatible with ß* = 0.25 m for a baseline 'large bore' triplet configuration with individual quadrupoles of optimized length and aperture. This is a possible option for the first phase of an LHC luminosity upgrade or for an intermediate phase, should the need for reducing ß* be felt earlier than it is possible to complete the Nb_3Sn magnet R&D.

Intense contacts and discussions with US colleagues about:

- Limits/constraints on power deposition and modelling limits.
- Critical review of previous work on cryo-magnets at LASA, Saclay/CERN, and Fermilab,
- Active contribution to US-LARP collaboration steering. Thanks to our action the following changes have been implemented in the American program:
    - Approval and funding by DOE of an SBIR project on Nb-Ti-Ta, attributed to the Ohio State University
    - Steering of LARP magnet research program toward:
        - More emphasis on quadrupoles versus dipoles (since dipoles is investigated by CARE-NED)
        - Anticipation of the construction of a long (3-4 m minimum) magnet rather than emphasizing on R&D for very short model. This should help in proving NbSn as a viable technology for real size system. This long model is now foreseen by 2006.

Activity in conjunction with the Fusion community

- Support to European Fusion community in the pre-design phase for the EFDA high field dipole for ITER cable testing. This activity started with the massive participation of Fusion community to WAMS2004 and continued with exchange of ideas and experience on conductor.
- Throughout HHH-AMT the American labs (in particular LBNL) has given a contribution to the EFDA dipole project.
- CERN has organized a meeting on 22 October 2004 where the HEP type dipole and conductors have been compared to the ITER type cable and dipole.

Activity on Low Field (pulsed or D.C.) magnets for GSI and LHC injector upgrade:

- Definition of common R&D area on pulsed magnets for LHC and GSI injectors;
- Implication of Russian Institutes in the networking activity, mainly for low field, very fast ramp magnets with preliminary cost estimate;

- Generation of a focus by CERN management on this subject with possible formation of a special CERN working group to define officially the upgrade of the LHC injector chain;
- Idea of starting investigating on the possible use of HERA magnets and/or Tevatron magnets for the CERN SPS-LHC transfer lines.

General CARE-HHH-AMT meeting held at CERN on 12 November 2004. Main goals:

- State-of-the-art for EFDA dipole
- LARP and US high field magnet advancement
- New ideas toward an energy tripler for LHC with very high field (B > 20 T) dipole magnets
- Road Map for European conductor
- Roadmap for superconducting pulsed dipoles
- Roadmap for NED dipole
- Effect of beam loss and usefulness of open gap dipoles. In this frame the necessity of a dedicated workshop to assess the real limit of the nominal and ultimate LHC performance has been evidenced. This workshop will be organised in spring 2005.

The development of the web-based database for SC cables and magnets has been somewhat delayed. The first ID (first report on web based database) is expected to be ready by the end of June 2005. The main reason of the delay is that the budget to hire a dedicated fellow was not yet available in 2004.

The following table highlights the progress of work planned in the year 2004 for the work package WP1 by listing the lowest level subtasks of the HHH detailed implementation plan.

Title	Original begin date (Annex1)	Original end date (Annex1)	Estimated Status	Revised end date
WP1: Advancements in Accelerator Magnet Technologies (AMT)				
AMT web site	T1-2004	T2-2004	100 %	On time
Web-based database for SC cable and magnets	T3-2004	T4-2006	10 %	Delayed to T4-2007
Catalog of numerical codes for AMT1 and AMT4	T1-2004	T1-2004	20 %	Delayed to T4-2005
Comparison of codes for AMT1 and AMT4	T1-2004	T2-2004	20 %	Delayed to T2-2005
Identifications of main limiting issues	T2-2004	T4-2004	20 %	Delayed to T2-2005
Proposal for integration of AMT1 and AMT4 in the international framework	T4-2004	T4-2004	100 %	On time
MS: first topical workshop on superconductors	T3-2004	T3-2004	100 %	T1-2004
ID: report on AMT organization and conductor development	T4-2004	T4-2004	80 %	Delayed to T1-2005
Comparative studies of alternatives using low field magnets for AMT2 and AMT3	T3-2004	T4-2004	30 %	Delayed to T3-2005
Identification of general issues relevant for magnet design for AMT5	T3-2004	T4-2004	10 %	Delayed to T4-2005
MS: reporting of the AMT activities in the first general CARE meeting	T4-2004	T4-2004	100 %	On time
Review of the development in US and for ITER on conductors and magnet technology relevant for AMT1 and AMT2	T4-2004	T1-2005	90 %	On time
Comparative studies for alternatives using low field magnets for AMT2 and AMT3	T4-2004	T2-2005	20 %	Delayed to T4-2005
Determination of scaling law for magnets and cryogenic cost for AMT5	T4-2004	T2-2005	20 %	Delayed to T3-2005

N3.3 Work Package 2: Novel Methods for Accelerator Beam Instrumentation (ABI)

Coordinator: H. Schmickler (CERN), Deputy: K.Wittenburg (DESY)

Keywords: Tools & diagnostic systems for luminosity,
Wire for beam-beam compensation,
Advanced transverse beam diagnostics,
Feedback loops for orbit, chromaticity and coupling,
Advanced beam halo diagnostics,
Remote diagnostics and maintenance of instrumentation.

CARE-HHH-ABI: web site: http://desyntwww.desy.de/mdi/ABI_new.html

Active collaboration/coordination on Beam Instrumentation issues has been established with the US-LARP programme and H. Schmickler has attended a coordination meeting at Fermilab on 26-27 February 2004.

Organization of a workshop on *Trajectory and Beam position measurements using digital techniques*, held in Aumuehle (near Hamburg), on 22-23 June 2004. The presentations are available on the web at http://care-hhh.web.cern.ch/care-hhh/events/CARE-HHH-ABI-Aumuehle-Agenda.htm and proceedings are in preparation. The aim of this workshop was to understand specific problems of implementing new digital technologies for beam orbit and position measurements in hadron machines. The new digital methods have already been successfully implemented in various synchrotron light sources. In these applications submicron resolution and long-term stability over days, even independent of seasonal changes, are the most important design criteria. The digital solutions profit from the electron beams being fully relativistic (no change of revolution frequency) and from the very small variation of bunch intensities. Proposing similar digital technologies for hadron machines confronts the designers with several additional problems:

- A large variation in bunch intensities and filling patterns,
- Change of harmonic numbers with beam in the machine,
- Varying revolution frequency,
- Demands for multi-bunch and multi-turn data.

The purpose of the workshop was also to bring together people with experience from digital orbit systems in Synchrotron Light Sources and people who intend to implement this technology in hadron machines (GSI and CERN). During the three half-day sessions the following was done:

- Review of performance and design issues in light source implementation,
- Review of specifications for hadron machines,
- Attempt of technical solutions and proposal of test measurements.

The workshop had found interest in related industrial partners and those visited the workshop at their own cost. About 20 people from the following labs participated: ESRF, PSI, DESY, GSI, CERN, COSY, TU Darmstadt (plus Bergoz company and i-tech company). Proposed subjects for upcoming CARE-HHH-ABI events include

- Halo measurements (profiles down to 10^{-5}),
- Lifetime (100 h within 1 sec),
- (PLL) tune tracking, including chromaticity and coupling,
- Longitudinal density monitor (within 10^{-4}),
- Profiles in high density beams.

Workshop held in Lyon on 1 and 2 December 2004, with about 10 participants. The title is 'Fast beam current measurements and beam loss monitors for machine protection' and the presentations are in the web site:
http://desyntwww.desy.de/mdi/CARE/Lyon/ABI-Lyon.htm.
During the workshop the presently available technologies were reviewed. It became clear, that for the LHC the demands on signal to noise ratio for the beam current measurements (in particular in order to calculate beam lifetimes from the difference of two consecutive beam current measurements) are such, that the present technology based on magnetic modulators is missing almost an order of magnitude. There is almost no hope to gain this factor from a sequence of small improvements. For the case of the LHC a solution can be found by using the magnetic modulator for standard beam current measurements, but for the more demanding beam life time measurements an un-calibrated system based on bunch to bunch measurements will be used.
For the upcoming FAIR project it is likely that due to the high pick currents a magnetic modulator can not be used at all. GSI has launched an R&D program to search for alternatives.

The Work Package ABI actively contributed to US-LARP collaboration meeting on Beam Instrumentation issues.

The following table highlights the progress of work planned in the year 2004 for the work package WP2 by listing the lowest level subtasks of the HHH detailed implementation plan.

Title	Original begin date (Annex1)	Original end date (Annex1)	Estimated Status	Revised end date
WP2: Novel Methods for Accelerator Beam Instrumentation (ABI)				
Establish the list of priorities relevant for ABI and selection of the first topic	T1-2004	T1-2004	100 %	On time
Study of the first topic after identification of its main limiting issues	T2-2004	T4-2004	100 %	T2-2004
MS: first ABI topical workshop	T3-2004	T3-2004	100 %	June 2004
ID: proceedings of the first ABI topical workshop	T4-2004	T4-2004	70 %	Delayed to T1-2005
Study of the second topic after identification of its main limiting issues	T4-2004	T3-2005	100 %	T4-2004
MS: second ABI topical workshop	T1-2005	T1-2005	100 %	Dec 2004
MS: Reporting of the ABI activity at the first general CARE meeting	T4-2004	T4-2004	100 %	On time

N3.4 Work Package 3: Accelerator Physics and Synchrotron Design (APD)

Coordinator: F. Ruggiero (CERN), deputy: F. Zimmermann (CERN)

Keywords: LHC Interaction Region Design,
Optics design for booster synchrotron,
Impedance calculations,
Structured list of intensity limits,
Electron cloud effects, Beam measurements,
Advanced theoretical studies.

CARE-HHH-APD: web site: http://care-hhh.web.cern.ch/care-hhh/

Active contribution of several CARE-HHH-APD members to the 31st ICFA Advanced Beam Dynamics Workshop ECLOUD04 on *Electron-Cloud Effects*, held at Napa, California, 19-23 April 2004. Co-organized by LBNL (M. Furman) and CERN (F. Zimmermann), with review of Electron Cloud effects at the LHC and at several other accelerators, contribution to

simulation code comparisons and benchmarking, Presentations are available on the web at http://icfa-ecloud04.web.cern.ch/icfa-ecloud04/ and proceedings are almost ready for publication.

Subsequent initiatives relevant for electron-cloud investigations are:

- Common effort by F. Zimmermann (CERN) and M. Furman (LBNL), following the ECLOUD04 workshop, to revive the international and inter-laboratories comparison of electron-cloud simulation codes. Concrete results include an expanded version of web site for the code comparison available at http://wwwslap.cern.ch/collective/ecloud02/ecsim/index.html,
- Publication of a joint EPAC04 paper on *Review and Comparison of Simulation Codes Modelling Electron-Cloud Build Up and Instabilities*, by E. Benedetto, F. Ruggiero, D. Schulte, F. Zimmermann, CERN; M. Blaskiewicz, L. Wang, BNL; G. Bellodi, RAL/ASTeC; G. Rumolo, GSI; K. Ohmi, S.-S. Win, KEK; M. Furman, LBNL; Y. Cai, M. Pivi, SLAC; V. Decyk, W. Mori, UCLA; A.F. Ghalam, T. Katsouleas, USC
- Further electron-cloud research within the US-LARP and CARE-HHH programmes, in particular the US LARP proposal includes the following passage: "Measurements, simulations and analytical work will contribute to a better understanding of the electron cloud effect. Conversely, the ongoing efforts at CERN to describe and model electron-cloud effects will benefit present and future US collider performance."

Publication of an EPAC04 paper in collaboration with HHH-AMT (WP1) on *Performance limits and IR design of a possible LHC luminosity upgrade based on Nb-Ti SC magnet technology*.

A CARE-HHH-APD workshop on *Beam Dynamics in Future Hadron Colliders and Rapidly Cycling High-Intensity Synchrotrons* (HHH-2004) was organized at CERN from 8 to 11 November 2004. The scope includes beam optics and Interaction Region magnet layout, beam intensity limitations, and duty cycle limitations in connection with LHC upgrade and GSI project. The presentations are available on the web site: http://care-hhh.web.cern.ch/care-hhh/hhh-2004/. The proceedings are in progress. Goals of the workshop were:

- Identify critical items for LHC luminosity improvements and for high intensity proton rings based on fast cycling SC magnets,
- Sketch scenarios for an upgrade of the LHC IR regions and injectors,
- Discuss benchmarking and common repository of simulation and design tools,
- Launch a critical analysis of alternative scenarios for LHC upgrade; establish a list of pros and cons including beam dynamics and technology constraints, to narrow down the choice of the best scenario.

The following table highlights the progress of work planned in the year 2004 for work package WP3 by listing the lowest level subtasks of the HHH detailed implementation plan.

Title	Original begin date (Annex1)	Original end date (Annex1)	Estimated Status	Revised end date
WP3 : Accelerator Physics and Synchrotron Design (APD)				
Development of the APD web site	T1-2004	T2-2004	100 %	T3-2004
Establish a catalog of existing simulation codes for APD1-APD7	T1-2004	T2-2004	100 %	On time
Comparison of alternative synchrotron and IR design	T1-2004	T2-2004	75 %	Delayed to T2-2005
Determination of beam dynamics studies and experiments to validate different options (APD1-2 and APD6-7)	T1-2004	T2-2004	100 %	On time

Studies relevant for APD3, APD4 and APD6	T1-2004	T2-2004	100 %	On time
MS: General APD meeting	T3-2004	T3-2004	100 %	On time
Identification of beam intensity limitation and determination of a roadmap for Synchrotron and IR design	T2-2004	T4-2004	100 %	On time
MS: topical APD workshop on optics and collective effects	T4-2004	T4-2004	100 %	On time
ID: interim report for APD activity and reporting at the general CARE meeting	T4-2004	T4-2004	100 %	On time
ID: proceedings of the first APD workshop	T1-2005	T1-2005	30 %	
MS: meeting on simulation code benchmarking and web based code repository	T1-2005	T1-2005	100 %	Nov 2004

N3.6 Significant Achievements

Nothing to report.

N3.7 List of all milestones and deliverables (D) during the reporting period

Deliverable/ Milestone No	Deliverable/Milestone Name	Workpackage /Task No	Lead Contractor(s)	Planned (in months)	Achieved (in months)
0.1	MS: kick-off meeting	All WPs	CERN	1	2
D 0.2	**HHH Web Site**	All WPs	CERN	12	9
0.3	MS: annual HHH meeting	All WPs	CERN	12	11
0.4	ID : HHH Annual Report	All WPs	CERN	12	13
1.1	MS: first AMT topical workshop on superconductors	WP1	CERN	9	3
1.2	ID: report on AMT organization and conductor development roadmap	WP1	CERN	12	15
1.3	MS: reporting of the AMT activities in the first general CARE meeting	WP1	CERN	12	11
2.1	MS: first ABI topical workshop	WP2	CERN, DESY	9	6
2.2	ID: proceedings of the first ABI topical workshop	WP2	CERN, DESY	12	15
2.3	MS: Reporting of the ABI activity at the first general CARE meeting	WP2	CERN, DESY	12	11
D 3.1	**APD Web Site**	WP3	CERN	6	9
3.2	MS: General APD meeting	WP3	CERN	9	11
3.3	MS: topical APD workshop on optics and collective effects	WP3	CERN	12	11
3.4	ID: interim report for APD activity and reporting at the general CARE meeting	WP3	CERN	12	11

N3.8 List of major meetings organized under HHH during the reporting period

Date	Title/subject of meeting /workshop	Location	Number of attendees	Website address
9 Dec 2003	HHH-AMT kick-off meeting	CERN (Switzerland)	About 25	http://amt.web.cern.ch/amt/
9 Feb 2004	1st HHH-steering meeting	CERN (Switzerland)	About 10	http://care-hhh.web.cern.ch/care-hhh/
22-24 Mar 2004	1st HHH-AMT workshop	Archamps (France)	About 100	http://amt.web.cern.ch/amt/events/workshops/WAMS2004/wams2004_index.htm
25 Mar 2004	General Meeting HHH-AMT	CERN (Switzerland)	About 20	http://amt.web.cern.ch/amt/
22-23 Jun 2004	1st HHH-ABI workshop	DESY-Hamburg (Germany)	About 20	http://care-hhh.web.cern.ch/care-hhh/events/CARE-HHH-ABI-Aumuehle-Agenda.htm
22 Oct 2004	HHH-AMT Topical meeting on ITER	CERN	About 25	
8-11 Nov 2004	1st HHH-APD workshop	CERN (Switzerland)	About 90	http://care-hhh.web.cern.ch/care-hhh/hhh-2004/
11 Nov 2004	1st HHH annual meeting	CERN (Switzerland)	About 50	http: //care-hhh.web.cern.ch/care-hhh/HHH-2004/general-HHH-meeting.html
12 Nov 2004	2nd HHH-AMT workshop	CERN (Switzerland)	About 50	http://amt.web.cern.ch/amt/events/meetings/meetings.htm
1-2 Dec 2004	2nd HHH-ABI workshop	Lyon (France)	About 15	http://desyntwww.desy.de/mdi/CARE/Lyon/ABI-Lyon.htm

1.5 JOINT RESEARCH ACTIVITIES

1.5.1 JRA1: Superconducting Radio Frequency (SRF)

The list of participants and their implication in the SRF Work Packages (**C**: Coordination, X: Participation) is given in the table below. The overall management is done by DESY and CNRS-Orsay.

Number	Participant	WP1 M&C	WP2 ISCF	WP3 SCP	WP4 TFCP	WP5 SP	WP6 MA	WP7 COUP	WP8 TUN	WP9 LLRF	WP10 CIT	WP11 BD	Person-months
1	**CEA**					X			X		**C**	X	59.4
3	**CNRS**	**C**						**C**	X		X		119
	CNRS-Orsay	**C**						**C**	X		X		119
6	**DESY**	**C**	X	**C**		**C**	X			**C**			176(26)
10	**INFN**		**C**	X	X	X	**C**		X			**C**	69 (34)
	INFN-LNF											**C**	
	INFN-LNL		X	X		X	**C**						28 (15)
	INFN-Mi		**C**						X				30 (16)
	INFN-Ro2				X								11 (3)
12	**TUL**								**C**	X			42 (35)
13	**IPJ**		X		**C**								83 (4)
14	**WUT-ISE**									X			29 (14)
19	**PSI**									X			14

The aim of the JRA on Superconducting RF Technology is to improve the quality and performance of the superconducting test accelerator TTF (Tesla Test Facility), a unique test facility to explore operating conditions of a high gradient superconducting accelerator, at DESY. This installation combines an RF electron gun, 5 superconducting accelerating units, beam diagnostics and undulators for FEL operation.
The ultimate objectives of this research activity are: to increase the accelerating gradient from 25 to 35 MV/m; to increase the quality factor from 5×10^9 to 2×10^{10}; to improve the reliability, operating performance and availability of the superconducting accelerating system; to achieve a cost reduction of the SRF cavities and their associated components.

JRA1.1 Work Package 1: Management and Communication

JRA1.1.1 Start-up, communication, financial issues, accounting

The CARE project and thus the JRA-SRF started on 01.01.2004. After the global CARE kick off meeting in November 2003 we had our JRA-SRF kick off meeting at the end of January 2004. It was combined with the TESLA collaboration meeting at Zeuthen. This made it possible for all work-package leaders and several task leaders to be present at the workshop. The major task was to give an overview about all activities in the different work-packages of the JRA-SRF. Furthermore, organizational, financial and accounting issues were explained and discussed.

JRA1.1.1 Late arrival of EU support at participating institutes

The EC support was transferred to many of the contracting participants around the end of May 2004. The Polish partners received the support later around June 2004. In most cases this late arrival of EC support resulted in a general delay in the spending of project money and in the

hiring of non-permanent staff. In particular, subcontracts to industry were delayed. These contracts represent a considerable part of the planned early spending. This resulted in a considerable under-spending of the EC financial support and some delay in several planned activities. It is likely, however, that most of this delay can be reduced during the next reporting period.

JRA1.1.3 Status of milestones and deliverables

As mentioned above, there is some delay in schedule mostly due to the late arrival of EC financial support. Therefore some milestones and one deliverable are delayed. At the end of December 2004 the situation is as follows (see Section JRA1.12):

- 14 milestones finished in 2004.
- 13 milestones not finished in 2004 with an average delay of 5 months.
- 1 deliverable not finished in 2004, delayed by 5 months.

JRA1.1.4 Use and Dissemination of knowledge

Contributions of JRA-SRF members were given to several conferences and meetings, the major ones being as follows:

- The European Particle Accelerator Conference (EPAC 2004), Lucerne, Switzerland
- The International Linear Accelerator Conference (Linac 2004), Lübeck, Germany
- E-Beam Welding Technology 2004, Reno, USA
- The First ILC (International Linear Collider) meeting, Tsukuba, Japan
- Workshop on pushing the limits of SRF technology, Chicago, USA
- WILGA meeting on fast electronics, Wilga, Poland

There is strong interconnection between the R&D activities in JRA-SRF and the X-FEL project. The latter project is in a preparatory phase and many results of the JRA-SRF activities are of direct benefit to the X-FEL design.
Following the conclusion of the International Technical Recommendation Panel (ITRP) the planning for the organization of the International Linear Collider ILC is moving forward. The first technical meeting was held in Japan during the middle of November 2004. Members of the JRA-SRF community made there essential contributions to the technical issues concerning a superconducting collider.
In addition there is growing interest of industry in the technology of SRF cavities. JRA1 members were asked to give review talks at the “International Conference on High Power Electron Beam Technology”, Reno, Oct. 17-19, 2004. It is the interest of industry to learn about the specific metallurgical properties of Niobium for superconducting cavities in order to prepare the production facilities for the needs of large accelerator projects like the X-FEL and the ILC.

JRA1.2 Work Package 2: Improved Standard Cavity Fabrication

JRA1.2.1 Reliability analysis

For what concerns the reliability task, the analysis of the data coming from the experience of the TTF modules has been started and data relative to modules 1, 2, 3, 1*, and partially for 4 and 5, have been reviewed and correlations between cavity performances and assembly procedure have been analyzed.

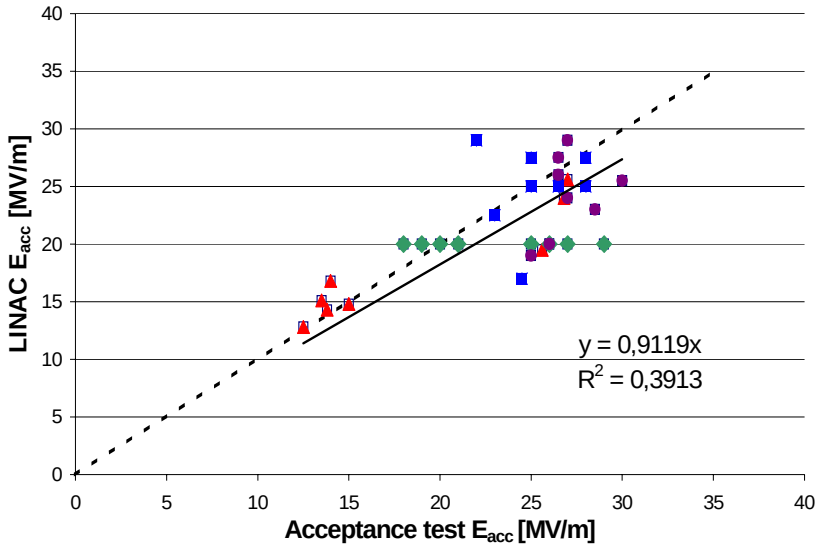


Fig.JRA1.2.1 Comparison of cavity gradients in module vs. vertical tests

Frequently, cavity performances are poorer in module operation. As an example, the figure JRA1.2.1 shows the differences between the cavities performances during vertical tests with respect to those in the module. Different points, with the same colour, represent the different cavities in the same module, while different colours indicate different modules. The dotted line represents the ideal behaviour for the vertical test and the module operation (same performances).

Preliminary results indicate that the reduction of the number of "difficulties" and problems during the assembly is correlated with the reduction of the difference between the cavity performances during the vertical test and the behaviour in the string.

JRA1.2.2 Improved component design

Bibliographic research concerning about the state of the art on ancillaries and experience of various laboratories involved in SCRF is an important tool to highlight different designs and technological solutions. Information about principal ancillaries such as the He vessel, flanges, stiffening, etc., have been collected and organized in a database for systematic studies. As an example, the next figures JRA1.2.2-3 show the database information for TESLA and SNS relative to stiffening and fast tuners.

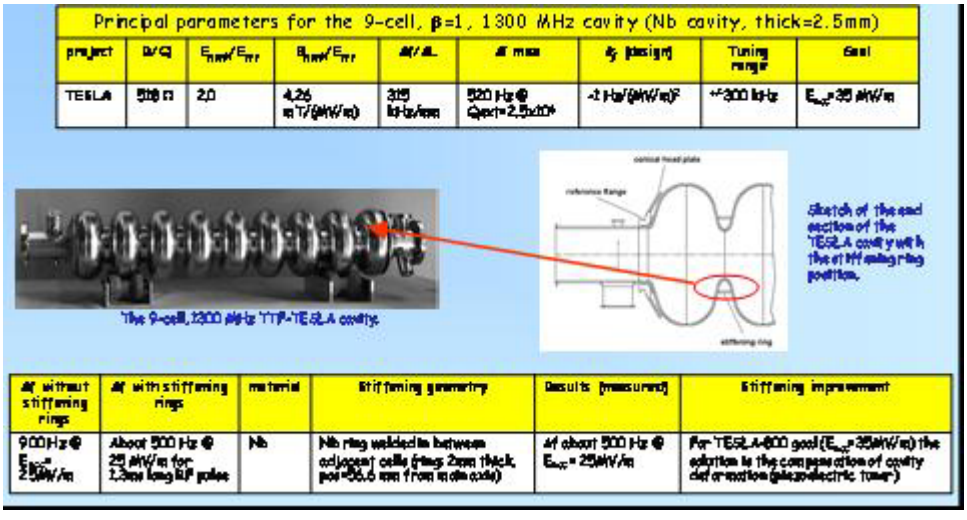


Fig.JRA1.2.2: TESLA cavity stiffening and fast tuner data retrieving.

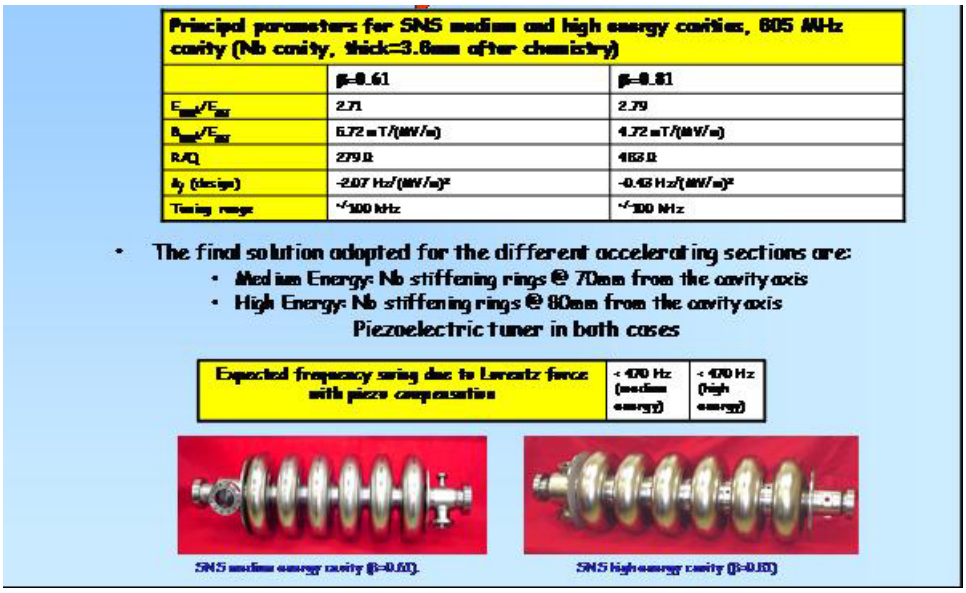


Fig.JRA1.2.3: SNS cavity stiffening and fast tuner data retrieving.

Different designs of cold flanges have been compared and a preliminary analysis of the behaviour of the seal is in progress using a Finite Element Analysis (FEA) code.

The TTF cavity cold flange behaviour, calculated using the FEA code, during tightening at room temperature is shown in the following figures. Figure JRA1.2.4 shows the compression curve of the aluminium seal: compression vs. displacement. Figure JRA1.2.5 is the FEA analysis of the plastic deformation of the seal after tightening of the flange.

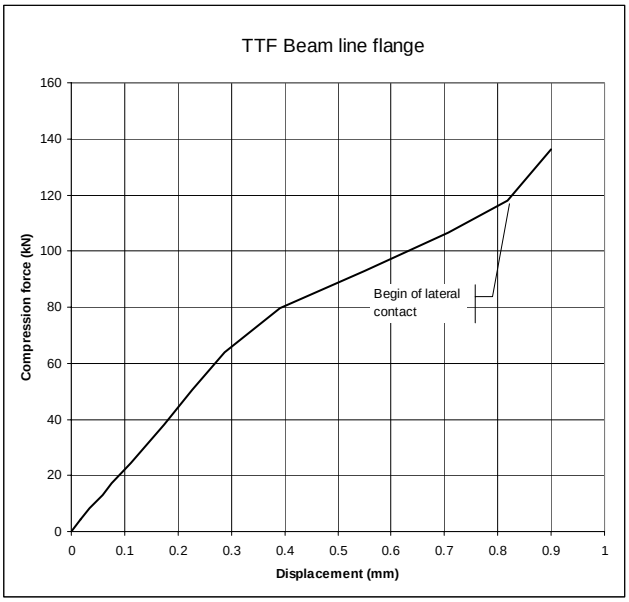


Fig.JRA1.2.4 Calculated compression vs. displacement curve for the TTF cavity flange

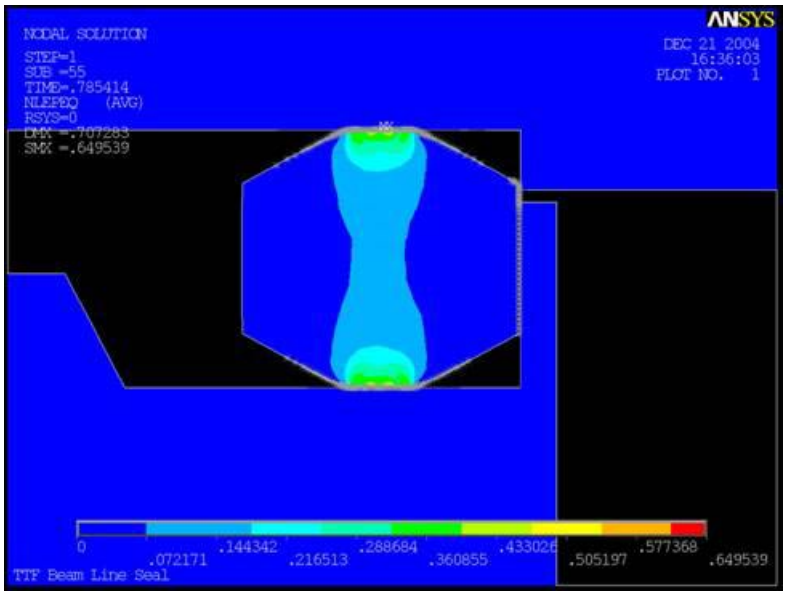


Fig.JRA1.2.5: Plastic deformation of the Al seal after tightening of the flange. The displacement is 0.7 mm.

JRA1.2.3 EB welding

JRA1.2.3.1 Electron beam welding machine for ultra pure Niobium- and Niobium/Titanium-devices under high vacuum conditions

The standard electron beam welding machines in industry supply vacuum conditions up to a maximum of 10^{-5} mbar. These pressures can be achieved with ordinary oil diffusion pumps and in general standard vessels. They are used for example in the automobile industry for bulk production and are optimized on maximum efficiency. Cleanliness and final pressure are less important.

Fig.JRA1.2.6: Front side of the EB-Machine

To investigate the influence of the residual gases on the equator and iris seams of the niobium cavities, DESY has developed, in collaboration with a manufacturer of EB-welding machines,

a new machine with the highest ever performance regarding cleanliness and pressure. This concept includes an optimised oil free pumping system, a UHV-compatible chamber and an oil free motion unit with a rotation and a linear axis.

Fig.JRA1.2.7: Oil free fine vacuum pumping station

Fig.JRA1.2.8: Cryogenic pumping station with 20.000 l/s

Along with the manufacturer we have developed a method to optimise the vacuum conditions in the gun. Furthermore, we restricted the welding process to the materials Niobium and Titanium to avoid contamination with vapour of other materials.
Before welding, the work-pieces have to be etched and handled under UHV conditions. The obtained vacuum levels in our 7 m^3 DESY chamber are a factor 1000 better than in a standard machine.

Fig.JRA1.2.9: Opened chamber with the working disc

The acquirable final pressures of 5×10^{-8}mbar and oil free residual gases allow us to examine the effects of different residual gases on welding seams and on the heating around the penetration zone.

Fig.JRA1.2.10: Working disc

JRA1.2.3.2 Status of task EB-welding

In the first design stage we have built up the requirements for preparing and welding single cell, 2-cell and spun cavities. Furthermore we are able to weld flange connections on multicell cavities with the titanium tank connected.

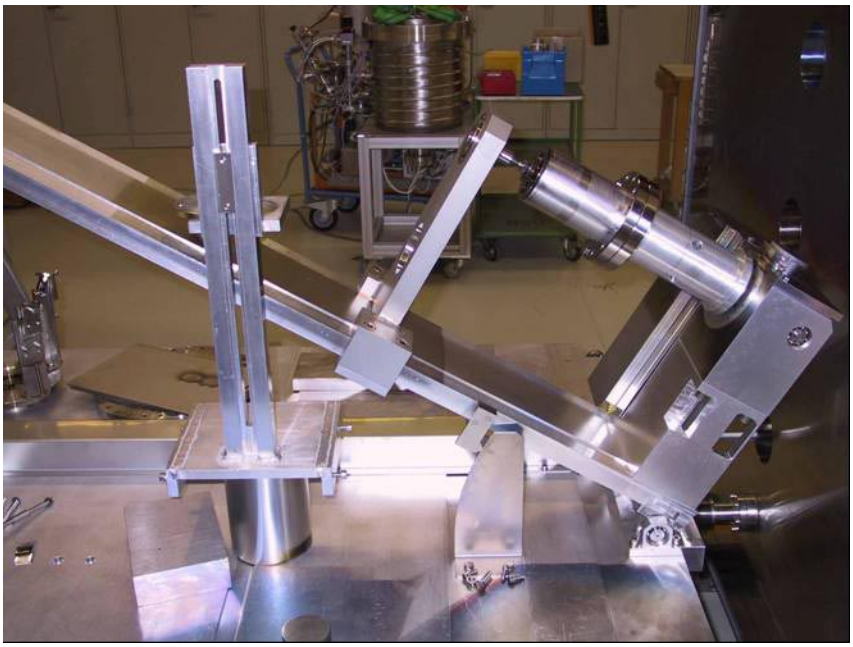


Fig.JRA1.2.11: Welding fixture for flange-tube connections

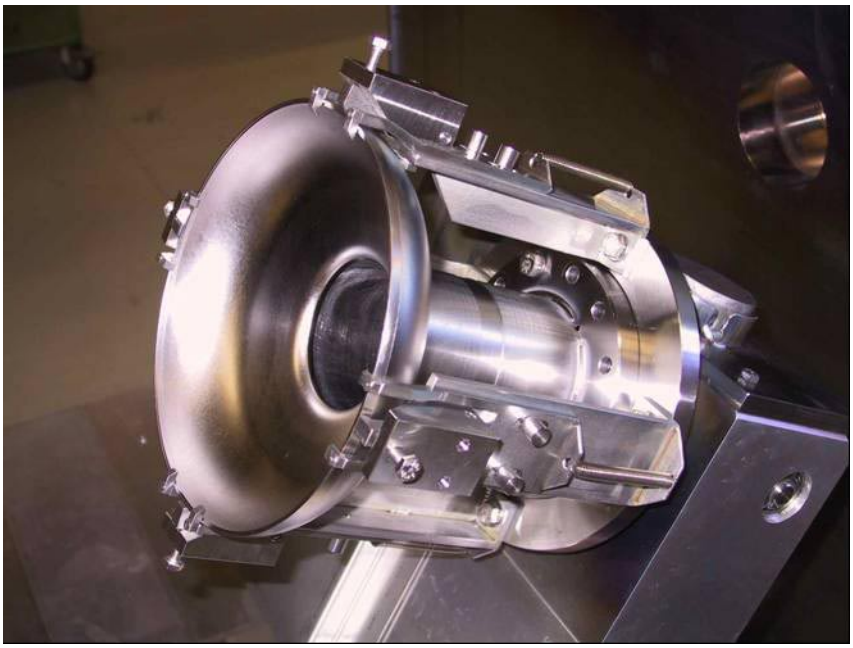


Fig.JRA1.2.12: Welding fixture for the iris seam

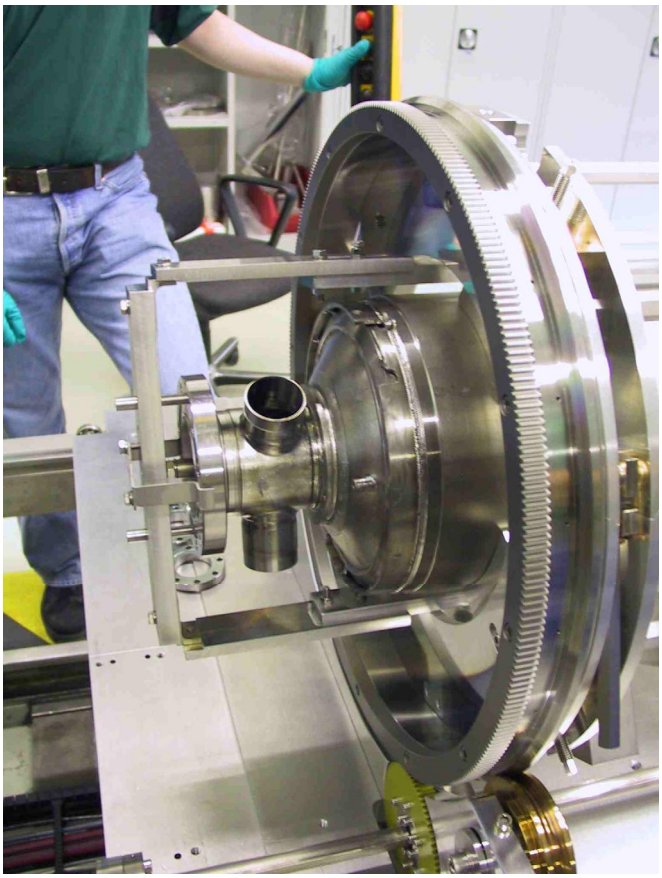


Fig.JRA1.2.13: Welding fixture for flanges on multicell cavities with titanium tank connected

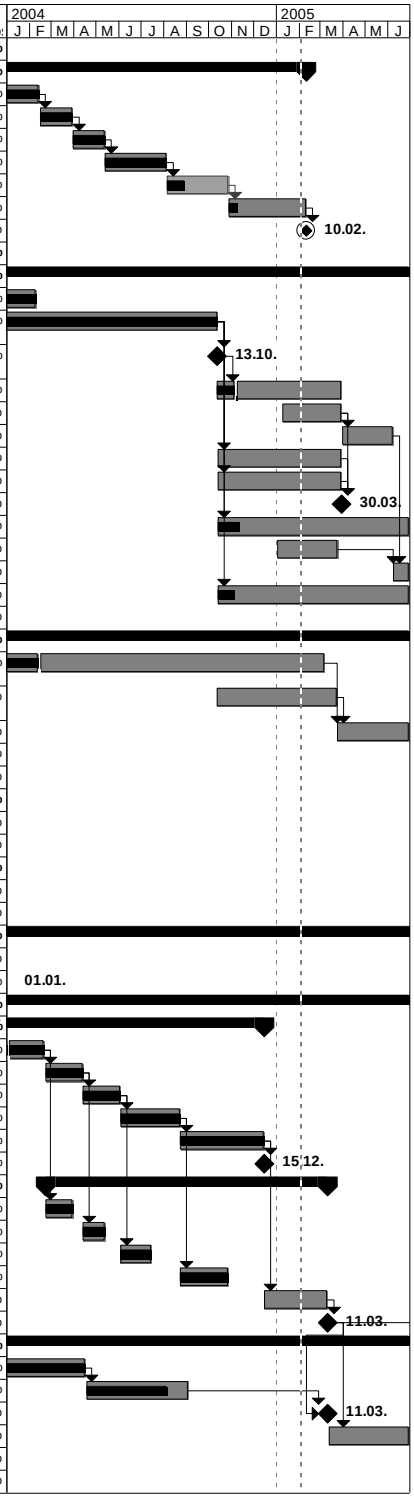
JRA1.2.3.2 Motivation for enhancing the capability of the manipulation unit

The basic idea of our machine as compared to standard machines is to install all electrical drives for the manipulation unit outside the chamber. This system is unfortunately not very secure because of the long mechanical transmission path. This problem raises the risk of a failure in the welding seam.
A second problem is the absence of a third axis in the manipulation unit, which significantly limits the area of operations. We plan to add a second linear transversal axis next to the existing rotation and linear longitudinal axis. The outlines of the welding seam require such a third axis in many cases. This feature was not necessary in the first machine we developed. One example of such an application is the end group of a nine cell cavity.
1st Stage of extension
The consequence is that we have to install a motor for the rotation drive in the vacuum chamber, which accomplishes the ultra high vacuum conditions. To avoid frequent venting of the motor with the large surface during the exchange of work-pieces, it will be enclosed in an evacuated housing which only contains a simple rotation feed-through.
2nd Stage of extension
The second linear axis drive should be fully metal sealed and located in the chamber. The motion drive of this axis should be installed on the work table of the first linear axis.

JRA1.2.4 Overall Progress of Work Package 2

The following table highlights the progress of work planned in the year 2004 for the Work Package WP2 by listing the lowest level subtasks of the SRF detailed implementation plan.

N°	Task Name	Milestones	Main Deliverables	Contractor	% schlo:
2	**WP 2 IMPROVED STANDARD CAVITY FABRICATION**				**22%**
2.1	**Reliability Analysis**			**DESY**	**62%**
2.1.1	Review of data bank: cavity fabrication			**DESY**	100%
2.1.2	Review of data bank :cavity treatment			**DESY**	100%
2.1.3	Review of data bank: cavity VT performance			**DESY**	100%
2.1.4	Review of data bank: string assembly			**DESY**	100%
2.1.5	Review of data bank: string performance			**DESY**	27%
2.1.6	Establish correlations			**DESY**	10%
2.1.7	**Final report on reliability issue**		**Final Report**	**DESY**	0%
2.2	**Improved component design**			**INFN-Mi**	**12%**
2.2.1	**Documentation retrieving**			**INFN-Mi**	**21%**
2.2.1.1	Start up meetings			**INFN-Mi**	100%
2.2.1.2	Access and study of Jlab, DESY, LLAN, KEK experience			**INFN-Mi**	100%
2.2.1.3	**Summary report on the status of the ar on ancillaries**	**Summary Report**		**INFN-Mi**	100%
2.2.1.4	Sealing material and shape design			**INFN-Mi**	15%
2.2.1.5	Flange preliminary design			**INFN-Mi**	0%
2.2.1.6	Material and geometric compatibility			**INFN-Mi**	0%
2.2.1.7	Final assembly design			**INFN-Mi**	0%
2.2.1.8	End plate preliminary design			**INFN-Mi**	0%
2.2.1.9	**Report about new design for compone**	**Design Report**		**INFN-Mi**	0%
2.2.1.10	Stiffness optimization			**INFN-Mi**	8%
2.2.1.11	Manufacturing procedure analysis			**INFN-Mi**	0%
2.2.1.12	Final assembly design			**INFN-Mi**	0%
2.2.1.13	Other ancillaries design			**INFN-Mi**	6%
2.2.1.14	**Final Report for new components**	**Report**		**INFN-Mi**	0%
2.2.2	**Review of criticality in welding procedures**			**INFN-Mi**	**5%**
2.2.2.1	Review of available parameters on vendor welding machine			**INFN-Mi**	10%
2.2.2.2	Definition of prototype requirements for tests			**INFN-Mi**	0%
2.2.2.3	Welding test on specimens			**INFN-Mi**	0%
2.2.2.4	Analysis of the results			**INFN-Mi**	0%
2.2.2.5	**Report about welding parameters**	**Report**		**INFN-Mi**	0%
2.2.3	**Finalize new component design**			**INFN-Mi**	**0%**
2.2.3.1	Do drawings			**INFN-Mi**	0%
2.2.3.2	**New components design finished**	**Design report**		**INFN-Mi**	0%
2.2.4	**Finalize new cavity design**			**INFN-Mi**	**0%**
2.2.4.1	Make drawings			**INFN-Mi**	0%
2.2.4.2	**New cavity design finished**	**Design report**		**INFN-Mi**	0%
2.2.5	**Fabrication of new cavity**			**INFN-Mi**	**0%**
2.2.5.1	Fabrication			**INFN-Mi**	0%
2.2.5.2	New cavity finished		**Cavity Protot**	**INFN-Mi**	33%
2.3	**EB welding**			**DESY**	**33%**
2.3.1	**Design tooling**			**DESY**	**100%**
2.3.1.1	Tools for flange welding			**DESY**	100%
2.3.1.2	Tools for pipe welding			**DESY**	100%
2.3.1.3	Tools for stiffening rings			**DESY**	100%
2.3.1.4	Tools for single cell welding			**DESY**	100%
2.3.1.5	Tools for 9-cells			**DESY**	100%
2.3.1.6	**Tools design finished**	**Design report**		**DESY**	100%
2.3.2	**Tools production**			**DESY**	**67%**
2.3.2.1	Tools for flange welding			**DESY**	100%
2.3.2.2	Tools for pipe welding			**DESY**	100%
2.3.2.3	Tools for stiffening rings			**DESY**	100%
2.3.2.4	Tools for single cell welding			**DESY**	100%
2.3.2.5	Tools for 9-cells			**DESY**	0%
2.3.2.6	**Tools fabrication finished**	**Tools Ready**		**DESY**	0%
2.3.3	**Welding**			**DESY**	**13%**
2.3.3.1	Commissioning welding machine			**DESY**	100%
2.3.3.2	Test welding			**DESY**	79%
2.3.3.3	**Start production welding of component**	**Commissioning**		**DESY**	0%
2.3.3.4	Single cell welding			**DESY**	0%
2.3.3.5	Multicell welding			**DESY**	0%
2.3.3.6	**Welding of prototypes of components f**		**Prototypes**	**DESY**	0%



Task 2.1: Delay due to late arrival of the information about TTF 2 cryomodule operating conditions (unexpected long shut down during summer 2004).
Task 2.2: Delay due to late arrival of EC support and following late hiring of additional staff.
Task 2.3: On time.

JRA1.3 Work Package 3: Seamless Cavity Production

JRA1.3.1: Seamless cavities by spinning

Both the design and the construction of a spinning machine for producing seamless multi-cell resonators starting from a tube have been completed. The spinning is done by an external firm that already owns a lathe currently used for spinning resonators. The actual machine has been

built by upgrading an existing machine that in the original configuration was not powerful enough and not properly suitable for the spinning operation. Indeed, the main problem was the following: in all standard commercial machines the revolving turret supporting rollers would move back and forward along a direction that is approximately 45 degrees from the cavity axis. It would move forward in order to have rollers applying a radial force to the tube that must be plastically deformed. It would move backward in order to retract the roller after the deformation in order to shift from deforming one point to another. During this latter operation, the pressure is released and there would no possibility to apply any plastic deformation. Due to the peculiar shape of the cavity in each dumbbell, the standard machines could spin only the half cell that is encountered along the roller's rectilinear path. In order to spin the other half-cell, the cavity should be dismounted from the lathe together with the internal mandrel. All is then turned through 180 degrees, and the half-cell that was previously untouched by the roller then becomes the part that must be plastically deformed. This operation, which is repeated several times up to the moment when the full dumbbell is finished, is the procedure adopted at the present time for producing spun, seamless multi-cell resonators. However, it is impractical, risky and time consuming. Not only can the piece be damaged during the operation of dismounting from lathe headstock, or during turning and remounting, but also the collapsible mandrel can move from the correct position. Furthermore, the lathe is not long enough for spinning a nine cell TESLA cavity and the pressure between headstock and tailstock is insufficient.
Therefore we adapted a standard machine designing some modified parts to add to the existing machine. All the work done is reported in the following:

- As reported above, a new turret has been designed. The turret will work in the opposite direction and on the other side of the already existing one.
- The hydraulic plant will be implemented and valves will be added, in order to achieve a pressure of 120 bar.
- Since the increase in pressure will be too large for the existing headstock configuration, and since the maximum rotation speed will be of 2000 rpm, the bearings supporting the headstock will be changed adopting forced lubrication bearings with the related pump and ancillaries
- The headstock will also be consequently lengthened by 100 mm and it has been designed to be of a more robust construction.
- The lathe base and carriage appear more solid in the new design. The base will be lengthened by 200 mm.
- The lathe tailstock has been enforced also in order to support the higher pressure we need to apply between headstock and tailstock when spinning the parts.
- A new motor has been adopted. It will have 18 kW of power, with an output speed of 8000/min and a speed reducer of 1:4

Status of milestones

The design was finished in July 2004 and the machine has just been built and delivered, in advance of the milestone of three months. For work package 3.1 then, the milestones have been fully respected. We will invest the few months gained in building the machine in a time that will be spent for the machine commissioning, which, being a very delicate operation, is a critical phase that will certainly benefit from a few months additional time.

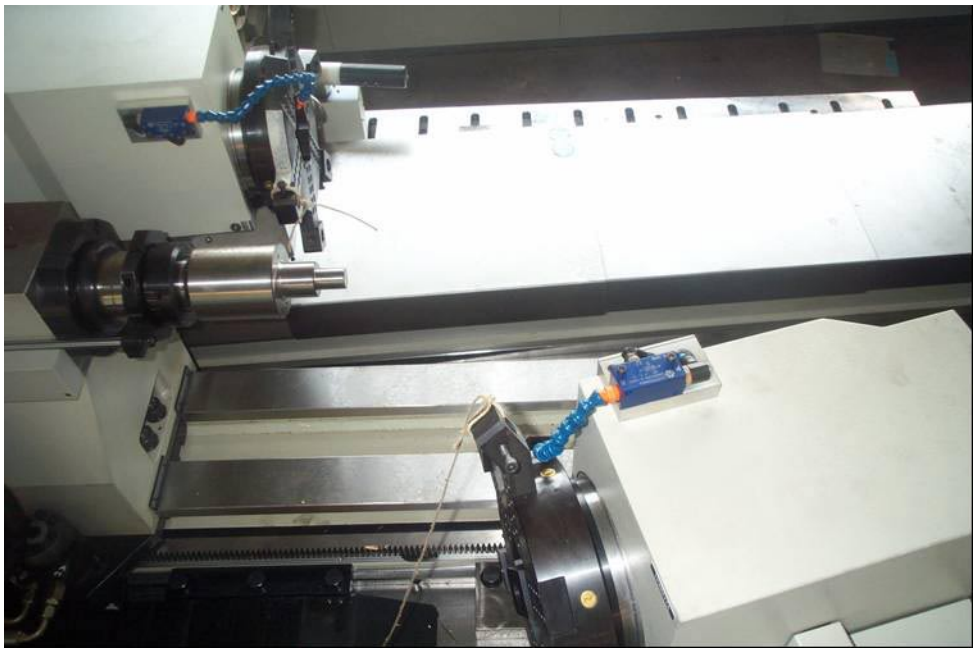


Fig.JRA1.3.1: The new spinning machine (just delivered): the two spinning turrets work one against each other.

JRA1.3.2: Seamless by hydroforming

The fabrication by hydro-forming of a seamless niobium cavity of TESLA shape, with a ratio of equator diameter to iris diameter of about three, is a challenging task and requires a special development.

One starts with a tube of diameter intermediate between that of the iris and equator. The forming procedure includes two stages; reduction of the tube diameter in the iris area and then expansion of the tube in the equator area.

The hydroforming experiment itself consists generally of three steps:-Determination of the strain-stress properties of the tube material, computer simulation of the forming and finally the hydro forming test itself.

During hydro-forming experiments an internal pressure is applied to the tube and, simultaneously, an axial displacement, forming the tube into an external mould (see Fig.JRA1.3.2).

The experiments will be done with a machine for hydroforming built earlier within the scope of the TESLA collaboration. In the frame of task 3.2 the machine was provided with new moulds for fabrication of multi cells and also with water hydraulic system for the internal pressure in the tube and with an oil hydraulic system for the cylinder movements. The computer control system developed for the hydroforming allows the hydraulic expansion in stepwise as well as in a continuous regime.

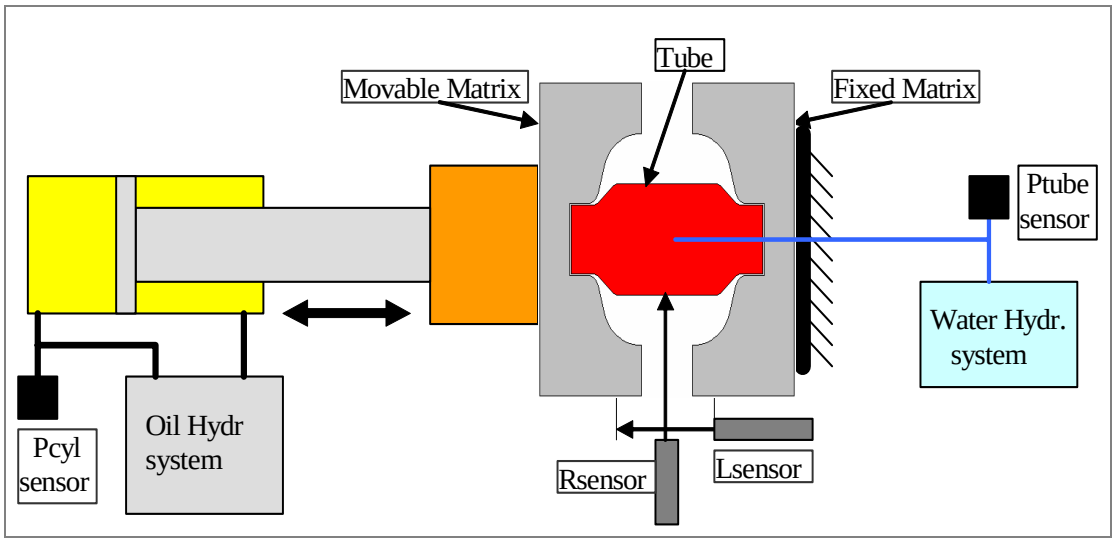


Fig.JRA1.3.2 Schema of the hydroforming machine

A design of the necking mechanism has been developed. It is based on a new idea using a profile ring for necking (Fig. 2). A concept for the software has been developed and is being implemented. Construction of the tube necking machine is in progress. Some components are ready. Preliminary experiments have shown that the reduction of the tube diameter can be done not only at the tube ends but also in the iris region of future cavities. This is decisive for the fabrication of multi cell cavities.

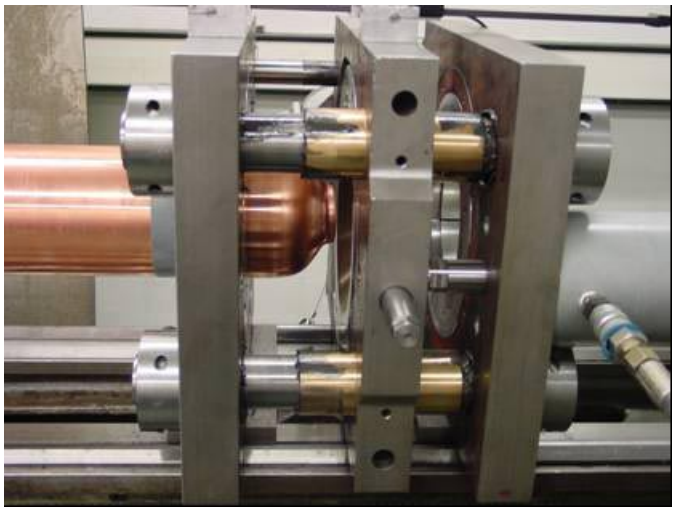


Fig.JRA1.3.3 Necking mechanism

Fabrication of seamless tubes suitable for hydro-forming is one of main problems. The required elongation at fracture (larger than 30%) and achieving a small and uniform grain in the final shape are the main challenges.

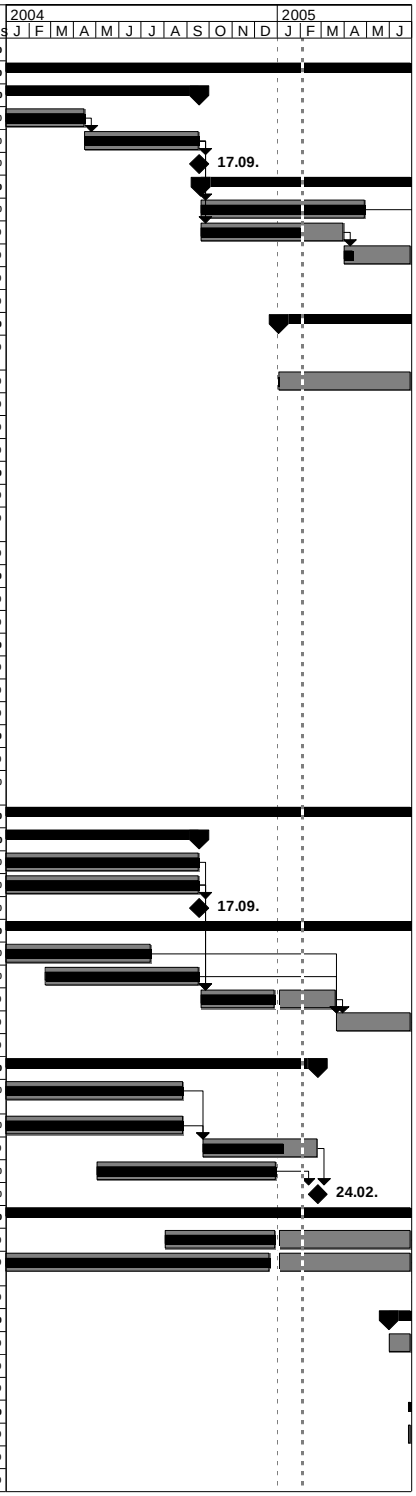
For the choice of the initial tube diameter two aspects should be taken into consideration. On the one hand the work hardening at the equator should be moderate and in any case remain below the tensile strength of the material. That is why the higher the initial tube diameter is, the easier is the second stage of hydro-forming. On the other hand, enlargement of the tube diameter increases the roughness at the iris area. A tube diameter between 130 and 150 mm, according to our experience, is close to optimal. The multi cell seamless cavities are planned to be fabricated starting both from ID=130 mm and ID=150 mm.

Specific methods for the production of seamless Nb tubes for hydro-forming such as flow forming and deep drawing are in development in cooperation with scientific institutes and industrial companies.

JRA1.3.3 Overall Progress of Work Package 3

The following table highlights the progress of work planned in the year 2004 for the Work Package WP3 by listing the lowest level subtasks of the SRF detailed implementation plan.

N°	Task Name	Milestones	Main Deliverables	Contractor	% schlos
3	**WP3 SEAMLESS CAVITY PRODUCTION**				**45%**
3.1	**Seamless by spinning**			**INFN-LNL**	**30%**
3.1.1	**Design spinning machine**			**INFN-LNL**	**100%**
3.1.1.1	Drawings of the matrices			**INFN-LNL**	100%
3.1.1.2	Drawings of the support system			**INFN-LNL**	100%
3.1.1.3	**Drawings of spinning machine finished**	**Design report**		**INFN-LNL**	100%
3.1.2	**Fabrication of spinning machine**			**INFN-LNL**	**58%**
3.1.2.1	Fabrication of machine parts			**INFN-LNL**	100%
3.1.2.2	Software for the machine			**INFN-LNL**	70%
3.1.2.3	Assembly of machine			**INFN-LNL**	10%
3.1.2.4	Commissioning of the machine			**INFN-LNL**	0%
3.1.2.5	**Spinning machine ready**	**Commissioning**	**Machine read**	**INFN-LNL**	0%
3.1.3	**Evaluation of spinning parameters**			**INFN-LNL**	**1%**
3.1.3.1	Drawings of the support system and turning mechanism			**INFN-LNL**	0%
3.1.3.2	Drawings of the necking mechanism			**INFN-LNL**	1%
3.1.3.3	Fabrication of the tube necking machine			**INFN-LNL**	0%
3.1.3.4	Commissioning of the machine			**INFN-LNL**	0%
3.1.3.5	**Spinning parameters defined**		**Design Repo**	**INFN-LNL**	0%
3.1.4	**Spinning of 1-celll cavities**			**INFN-LNL**	**0%**
3.1.4.1	Material and fabrication of bulk Nb test tubes			**INFN-LNL**	0%
3.1.4.2	Material and fabrication of bimetallic NbCu test tubes			**INFN-LNL**	0%
3.1.4.3	**1-cell spinning parameters defined**		**Design Repo**	**INFN-LNL**	0%
3.1.5	**Extension of spinning apparatus to multicel**			**INFN-LNL**	**0%**
3.1.5.1	Computer simulation of the necking			**INFN-LNL**	0%
3.1.5.2	**Start of Multi-cell spinning**	**Start spinning**		**INFN-LNL**	0%
3.1.6	**Spinning of multi-cell cavities cavities**			**INFN-LNL**	**0%**
3.1.6.1	Computer simulation of the hydro forming			**INFN-LNL**	0%
3.1.6.2	Hydro forming of bulk Nb 9-cell cavities			**INFN-LNL**	0%
3.1.6.3	**Parameters of multi-cell spinning defin**	**Design report**		**INFN-LNL**	0%
3.1.7	**Series production of multi-cell cavities**			**INFN-LNL**	**0%**
3.1.7.1	Spinning			**INFN-LNL**	0%
3.1.7.2	**Multi-cell cavities finished**		**Final report, Cavity**	**INFN-LNL**	100%
3.2	**Seamless by hydroforming**			**DESY**	**52%**
3.2.1	**Design hydro forming machine**			**DESY**	**100%**
3.2.1.1	Drawings of the matrices			**DESY**	100%
3.2.1.2	Drawings of the support system			**DESY**	100%
3.2.1.3	**Drawings matrix & support finished**	**Design report**		**DESY**	100%
3.2.2	**Construction of hydro forming machine**			**DESY**	**73%**
3.2.2.1	Hydraulic for machine			**DESY**	100%
3.2.2.2	Software for the machine			**DESY**	100%
3.2.2.3	Machine fabrication			**DESY**	56%
3.2.2.4	Commissioning of the machine			**DESY**	0%
3.2.2.5	**Hydro forming machine ready**	**Commissioning**		**DESY**	0%
3.2.3	**Construction of tube necking machine**			**DESY**	**95%**
3.2.3.1	Drawings of the support system and turning mechanism			**DESY**	100%
3.2.3.2	Drawings of the necking mechanism			**DESY**	100%
3.2.3.3	Fabrication of the tube necking machine			**DESY**	70%
3.2.3.4	Software for the tube necking machine			**DESY**	100%
3.2.3.5	**Construction tube necking machine fini**	**Design report**		**DESY**	100%
3.2.4	**Development of seamless tubes for 9-cell c**			**DESY**	**58%**
3.2.4.1	Material and fabrication of bulk Nb test tubes			**DESY**	45%
3.2.4.2	Material and fabrication of bimetallic NbCu test tubes			**DESY**	66%
3.2.4.3	**Seamless tubes ready**	**Design report**			0%
3.2.5	**Development of tube necking**			**DESY**	**0%**
3.2.5.1	Computer simulation of the necking			**DESY**	0%
3.2.5.2	Experiments on tube necking at iris			**DESY**	0%
3.2.5.3	**Tube necking machine operational**	**Commissioning**		**DESY**	0%
3.2.6	**Hydro forming of seamless cavities**			**DESY**	**0%**
3.2.6.1	Computer simulation of the hydro forming			**DESY**	0%
3.2.6.2	Hydro forming of bulk Nb 9-cell cavities			**DESY**	0%
3.2.6.3	**Hydro formed 9-cell cavities ready**		**Cavity Protot**	**DESY**	0%



WP3: In schedule

JRA1.4 Work Package 4: Thin Film Cavity Production

JRA1.4.1 Linear arc cathode coating

The task WP4.1 is focused on the development of an UHV cathode-arc system with a linear (cylindrical) configuration. The idea of a cavity coating by means of a linear (cylindrical) arc discharge is presented in Fig.JRA1.4.1

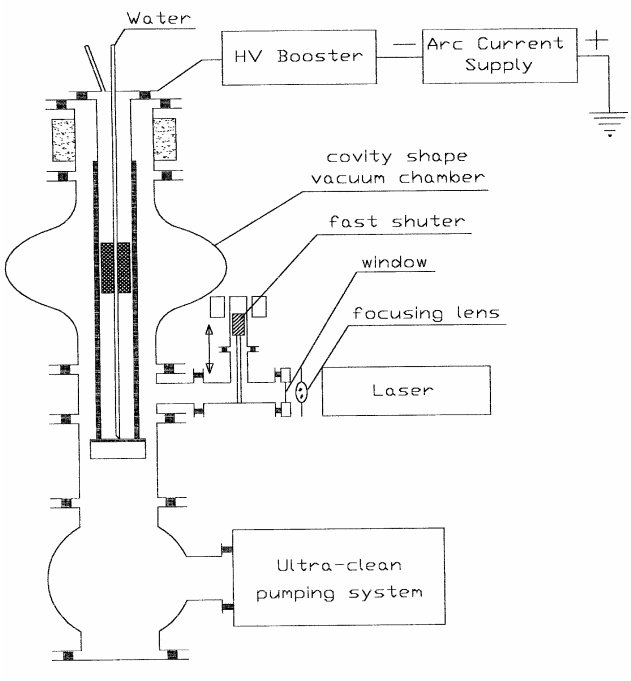


Fig.JRA1.4.1: UHV facility designed for the linear-arc cathode coating.

Since cleanliness of the deposition process plays a crucial role during the formation of thin superconducting niobium layers, to achieve good superconducting film properties the partial pressures of water, nitrogen, oxygen, CO_2, hydro-carbides etc., must remain well below 10^{9} hPa. Therefore, the pumping system must be totally oil-free and all parts of the deposition system must be designed and built in accordance with UHV technology requirements.
Some preliminary efforts to achieve the required UHV conditions were undertaken before starting the CARE project. A prototype set-up with a linear (cylindrical) cathode, designed especially for the deposition of niobium films, was constructed and put into operation in the mid 2003. The ultimate pressure in that system was equal to $2x10^{-8}$ mbar, i.e. it was 1-2 orders of magnitude higher than the value required. A thorough modernization of that set-up has been planned in a frame of CARE project, according to a scheme shown in Fig.JRA1.4.2.
The operation of the modified prototype facility, as designed for the coating of single cells, has been delayed in a comparison with the planned time-schedule, due to a large delay in the transfer of CARE funds to Poland. It was impossible to buy and install the required durable equipment before July 2004. In order to increase the manpower committed to WP4, a young engineer (MScEE Pawel Strzyzewski) has been employed under a contract until September 1, 2005.

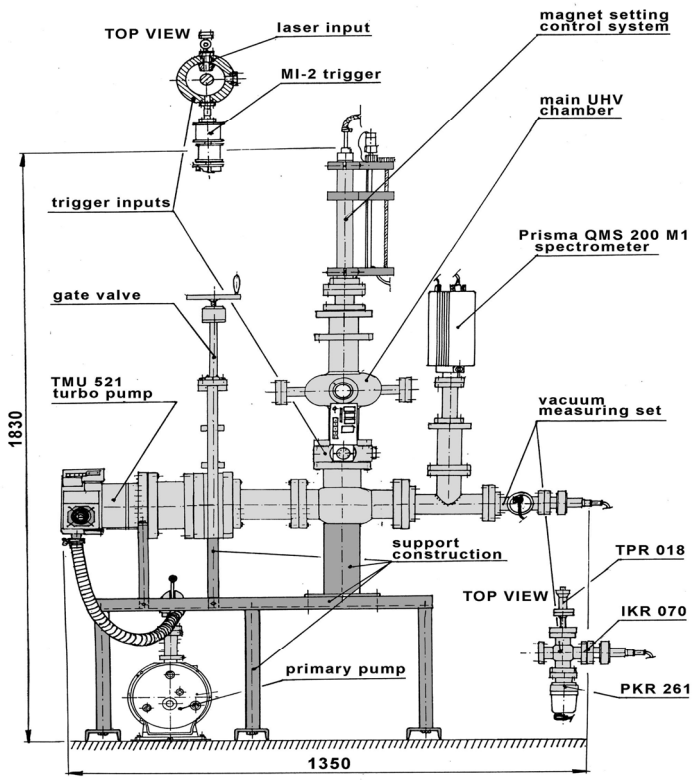


Fig.JRA1.4.2: Modified UHV stand equipped with the linear-cathode arc system.

The modification of the prototype facility included an exchange of the whole pumping system. Since September 2004:

- a new turbo-molecular pump (of the TMU 521 type) has been installed;
- a new dry-piston pump (of the Xtradry.150-2 type) has been installed as a roughing-pump;
- new UHV gauges have been applied;
- a modern gas analyzer (of the QMS 200 Prisma type) has been installed;
- important improvements in the control unit have been made;
- and a new baking system has been designed and installed.

The modified system was ready for operation on October 11, 2004. Due to the modifications it was possible to improve the ultimate vacuum conditions considerably, and to reduce the final background pressure within the main experimental chamber down to values below 10^{-10} mbar. A typical mass spectrum of residual gasses within the chamber (after its 30-hour baking at temperature of 150^0C) is shown in Fig.JRA1.4.3.

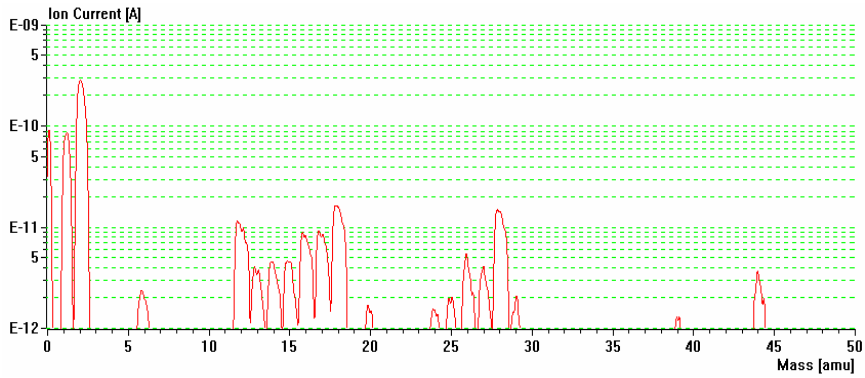


Fig.JRA1.4.3: Mass-spectrum of residual gases, recorded at the final pressure p = 1.5×10^{-10} mbar, as achieved after 180-hour pumping and 30-hour backing at $T_b = 150^o$C.

The triggering of arc discharges often creates many problems, even in industrial arc-based devices. With UHV conditions these problems are multiplied. A triggering system for the arc deposition of superconducting Nb-films must be infallible, and it must not produce any impurities. Various ignition techniques have been tested from the point of view of their operational reliability and purity. On the basis of optimization tests three independent triggering systems have been chosen and applied in the modified set-up described above. They use:

- a Nd:YAG laser of energy 100 mJ, emitting 10-ns pulses at the repetition rate up to 20 Hz;
- a modified mechanical trigger, using a movable high-voltage (HV) electrode;
- a ruby laser of energy of 0.7 J, producing 50-ns pulses at the repetition of 1 shot/min.

These techniques ensure 100% probability of the arc ignition. The location of the triggering systems is shown in Fig.JRA1.4.4.

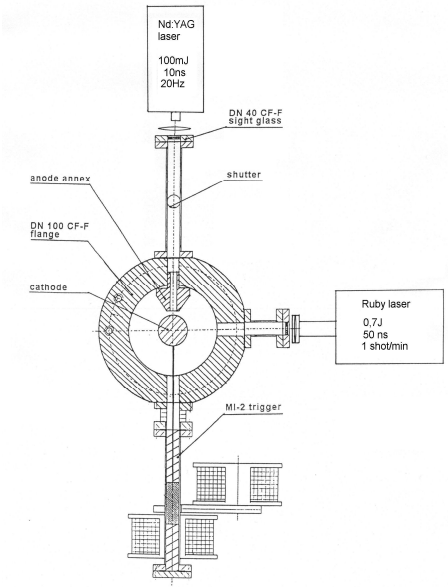


Fig.JRA1.4.4: Arrangement of the arc triggering systems.

A general view of the modified mechanical trigger system, which was optimized in 2004, is shown in Fig.JRA1.4.5.

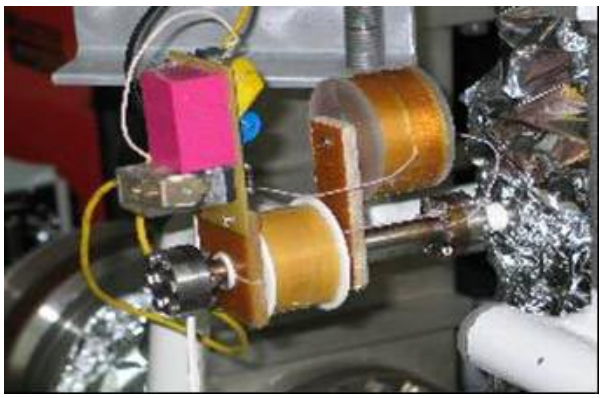


Fig.JRA1.4.5: Modified mechanical trigger system equipped with separate driving coils.

The whole experimental facility, which was equipped with the linear (cylindrical) cathode, is shown in Fig.JRA1.4.6.

Fig.JRA1.46: General view of the modified UHV system with supply and control units.

The modified prototype facility, designed for the coating of single cells, has been tested, and an example of a stable arc discharge is shown in Fig.JRA1.4.7.

Fig.JRA1.4.7: Picture of the linear-arc discharge upon the cylindrical cathode surface, as observed at the base pressure of $4x10^{-10}$ mTorr, arc current of 40 A, the action lasting 1 mn.

Recently, a prototype of a high-current pulse generator has been commissioned and research on the arc current reduction and stabilization has been started. The optimization of the power system is in progress, and the prototype facility should be ready for coating of a single cell by the end of February, 2005, as planned in the up-dated time-schedule.

JRA1.4.2 Planar-Arc Cathode Coating

The task WP4.2 concerns the development of a UHV cathode-arc system with the planar configuration. In 2004 the UHV facility, which was equipped with the planar cathode, was modified on the basis of experience gained with an earlier version. That facility was built, assembled and commissioned according to the planned time-schedule. The UHV chamber has been pumped down to 10^{-10} Torr by means of an oil-free pumping system, consisting of a membrane backing-pump and a turbo-molecular pump. The conical cathode has been made of a high purity Nb-rod fixed to a water-cooled Cu-support. An interposed Ga-In eutectic

mixture has ensured a good thermal contact between the Nb and Cu parts. A conical vacuum chamber (surrounding the Nb cathode) has been manufactured from a single stainless-steel rod. A schematic drawing of the described system is shown in Fig.JRA1.4.8.

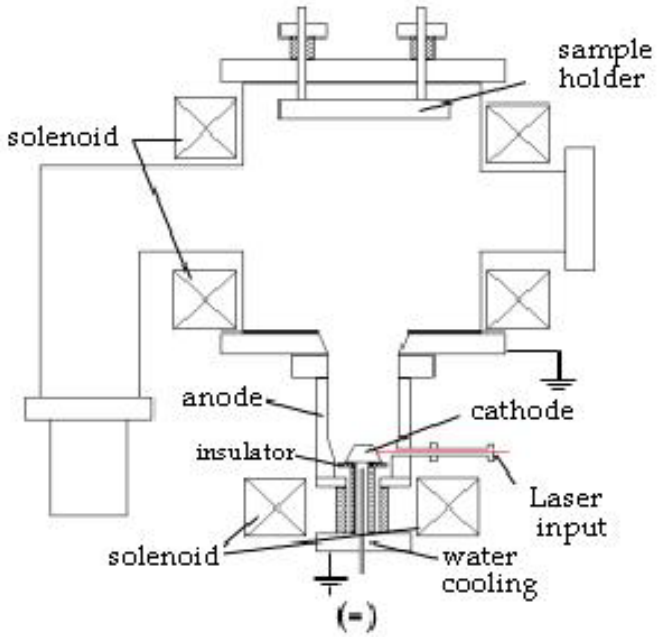


Fig.JRA1.4.8: Scheme of the UHV system designed for a planar-arc coating.

A sample holder, consisting of a massive Cu flange placed at a distance of about 50 cm from the cathode, could be used to hold several samples. It has been insulated electrically, and can be biased negatively in order to avoid excessive heating of samples by plasma electrons. The holder has been equipped with a rotating shutter, which allows coating of a single sample during a chosen discharge. More details can be found in papers published this year (see the list below).

A sub-task, concerning the development and optimization of the arc triggering system, has been completed according to schedule. It has been found that the best, most reliable and completely clean method to ignite the UHV arc discharges is by laser ablation of the cathode, which might be achieved by a laser beam introduced through a vacuum window and focused onto the cathode surface.

In order to eliminate micro-particles emitted from the cathode surface, a prototype of a magnetic filtering system has been assembled and tested (somewhat earlier than it was scheduled). The system consists of an elbow-shaped vacuum channel surrounded by several coils, which produce a guiding magnetic field. Such a field guides electrons and ions through the channel, while macro-particles (moving along almost straight lines) are stopped upon the channel walls. Pictures of the facility with and without the magnetic filter are shown in Fig.JRA1.4.9.

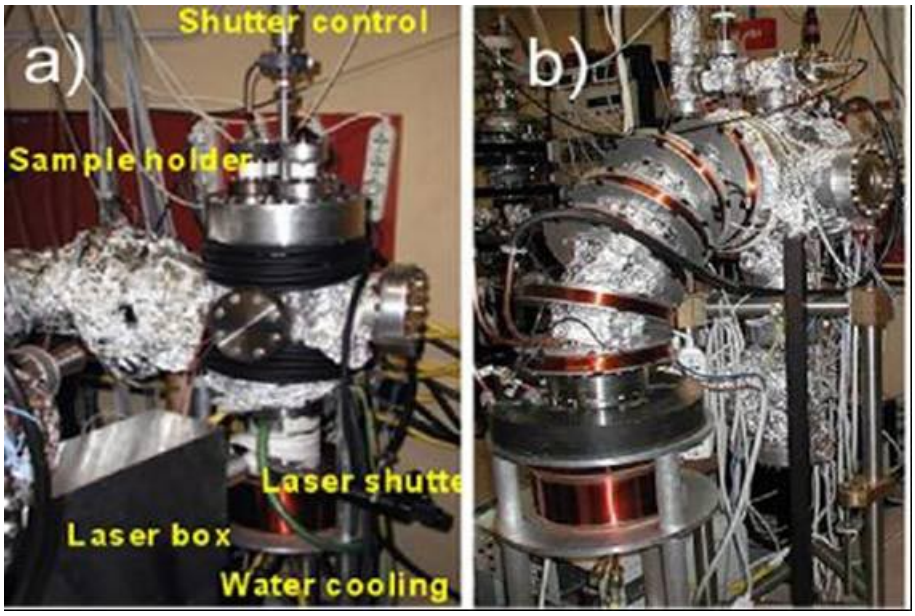


Fig.JRA1.4.9: General view of the UHV planar-arc facility without any magnetic filter (a), and that equipped with the elbow-shaped magnetic filtering system (b).

Quantitative analysis of samples, as regards the numbers and dimensions of macro-particles deposited on samples at different experimental conditions (for the unfiltered and filtered arcs), have been started. The samples were coated at several values of the arc current, and their electronic and structural properties have been analyzed. Substrates were mostly made of the sapphire, but some Cu ones were also investigated. It has been found that the RRR value (a parameter very sensitive to impurities) ranges from 10 to 80 with excellent reproducibility. Such RRR values are more than twice those (from 5 to 10), which are usually obtained by the magnetron sputtering technique. Critical current density (J_c) and superconducting critical temperature (T_c) of the deposited Nb-film have also been measured using an inductive method. Typical results, which appear to be in a good agreement with data for the bulk Nb (T_c = 9.26 K, ΔT_c < 0.01 K), are shown in Fig.JRA1.4.10.

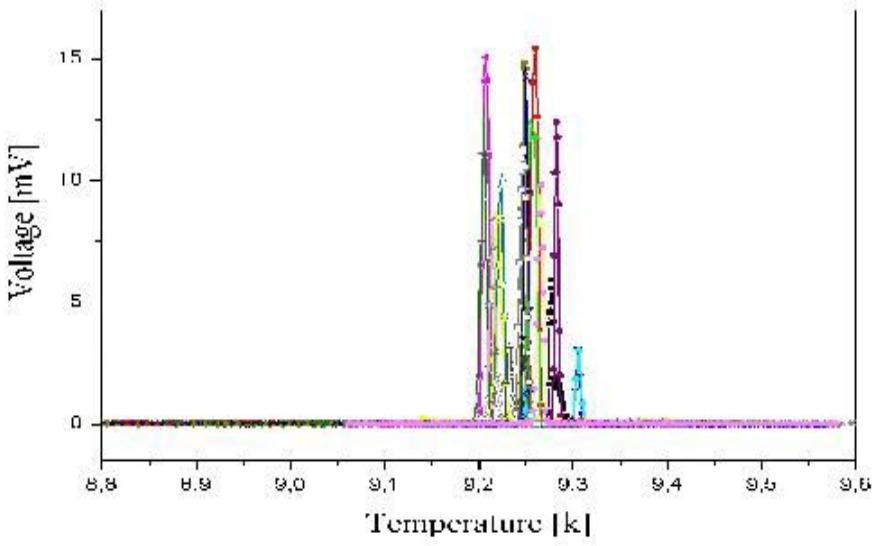


Fig.JRA1.4.10: Transition curves of several Nb-films deposited upon copper and sapphire substrates. T_c = 9.25 K with 0.05 K accuracy, and transition widths are smaller than 0.02 K.

The obtained transition widths which are very narrow (0.01–0.02 K), prove that the deposited films are homogeneous. The structure of the first Nb film samples has also been investigated

by means of the X-ray diffraction and atomic force microscopy (AFM). The results, which indicate lower stresses and narrower widths of the diffraction peak than those observed for Nb-films sputtered onto Cu-substrates, are consistent with the T_c measurements. The AFM pictures show that an average size of the Nb grains is about 200 nm. The roughness of Nb-films deposited onto Cu-substrates is comparable to that of the Cu sample itself. The roughness of Nb-films deposited on sapphire substrates is much smaller. In some cases the growth of column like structures (at the bottom and walls of a crater left by a larger micro-droplet) can be observed, as shown in Fig.JRA1.4.11.

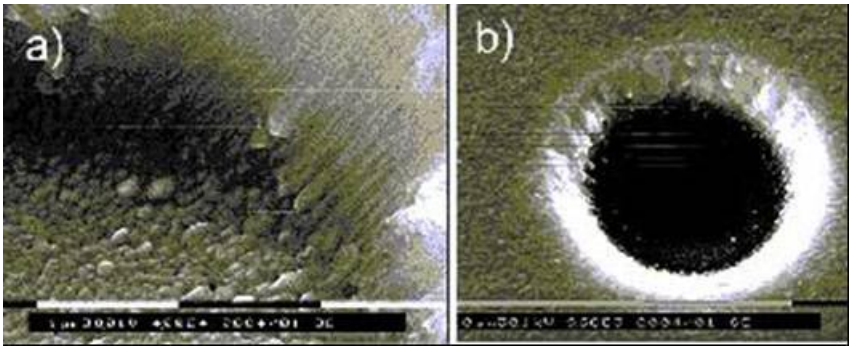


Fig.JRA1.4.11: Germs of crystallites formed at the bottom of a crater (a), which was left after the removal of a micro-droplet from the deposited Cu-substrate (b). The column like crystallites on the crater walls are about 1.5 μm in height.

The Nb-coated samples have been investigated by means of optical- and electron-microscopes in order to determine the surface density and dimensions of deposited micro-droplets. The roughness of the deposited Nb-layers has also been measured as a function of the arc discharge parameters. The data collected so far have shown that, at the normal cathode temperature, the lowest number of the deposited micro-droplets can be obtained at the maximum arc current of about 130 A. The surface density and size of the micro-droplets, as measured upon the samples obtained with an unfiltered arc discharge, is shown in Fig.JRA1.4.12.

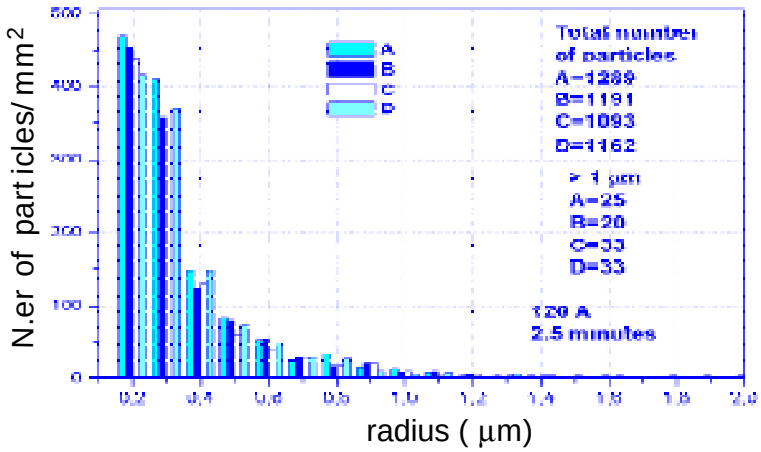


Fig.JRA1.4.12.Characteristics of the micro-droplets measured upon 4 different samples.

The effectiveness of the micro-droplet filtering can be illustrated by a comparison of microscope images of the samples obtained with and without the magnetic filter, as shown in Fig.JRA1.4.13.

Fig.JRA1.4.13: Microscope pictures of the identical regions (250x190 μm^2) of the sample coated without magnetic filter (left) and that produced with the active filter (right).

In order to characterize properties of the Nb-coated samples some preliminary RF measurements have been performed at INFN Napoli, as shown in Fig.JRA1.4.14.

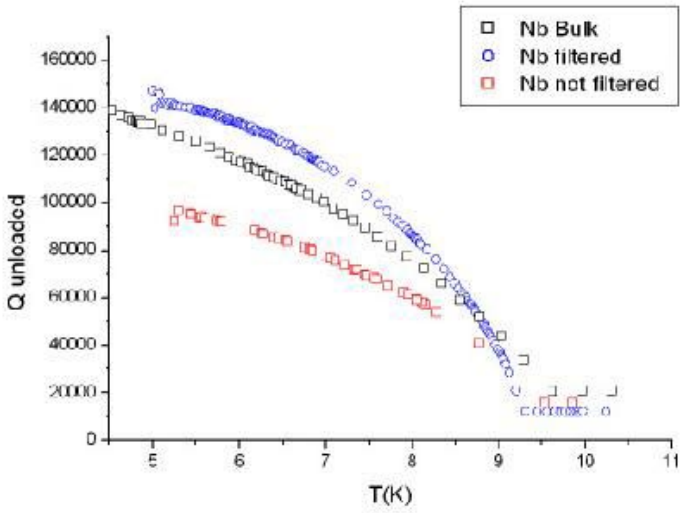


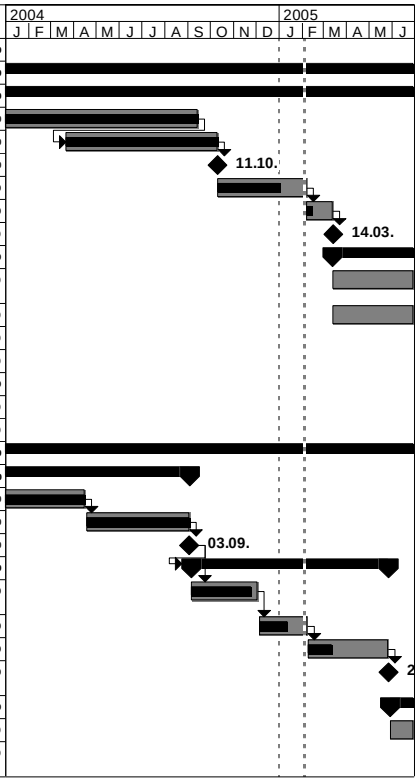
Fig.JRA1.4.14: Comparison between the quality factors of bulk Nb and Nb-film samples.

The most important result was the demonstration that the Nb-coated samples show the same behavior as the bulk Nb, and the Nb-layers obtained with the magnetic filtering appear to be the best ones.

JRA1.4.3 Overall Progress of Work Package 4

The following table highlights the progress of work planned in the year 2004 for the Work Package WP4 by listing the lowest level subtasks of the SRF detailed implementation plan.

N°	Task Name	Milestones	Main	Contractor	%
4	**WP4 THIN FILM CAVITY PRODUCTION**				**27%**
4.1	**Linear-arc cathode coating**			**IPJ**	**24%**
4.1.1	**Installation & commissioning of coating app**			**IPJ**	**32%**
4.1.1.1	Modification of a prototype facility for single c			**IPJ**	100%
4.1.1.2	Optimization of a triggering system			**IPJ**	100%
4.1.1.3	**Prototype facility ready**	**Commissioning**		**IPJ**	100%
4.1.1.4	Study of arc current reduction and stabilizatio			**IPJ**	70%
4.1.1.5	Optimization of pow ering system			**IPJ**	20%
4.1.1.6	**Coating apparatus operational**	**Apparatus ready**		**IPJ**	0%
4.1.1.7	**Coating single cells**			**IPJ**	**0%**
4.1.1.7.1	Coating of single cells w ithout micro droplet filtering			**IPJ**	0%
4.1.1.7.2	Design and construction of a micro drop			**IPJ**	0%
4.1.1.7.3	**Droplet filter ready**	**Hardware ready**		**IPJ**	0%
4.1.1.7.4	Coating of single cell w ith micro droplet f			**IPJ**	0%
4.1.2	**Coating multi-cell**			**IPJ**	**0%**
4.1.2.1	Design and commissioning			**IPJ**	0%
4.1.2.2	First multicell coating			**IPJ**	0%
4.2	**Planar-arc cathode coating**			**INFN-Ro2**	**31%**
4.2.1	**Modification of a planar-arc & trigger system**			**INFN-Ro2**	**100%**
4.2.1.1	Modification			**INFN-Ro2**	100%
4.2.1.2	Optimization of the laser triggering system			**INFN-Ro2**	100%
4.2.1.3	**Planar arc system fully tested**	**Status Report**		**INFN-Ro2**	100%
4.2.2	**Routine Operation of planar arc system**			**INFN-Ro2**	**58%**
4.2.2.1	Characterization of samples coated at different conditions			**INFN-Ro2**	90%
4.2.2.2	Characterization of Nb-coated sapphire			**INFN-Ro2**	60%
4.2.2.3	Characterization of Nb-coated copper sa			**INFN-Ro2**	30%
4.2.2.4	**Summary report on quality of planar arc coating**	**Status Report**		**INFN-Ro2**	75%
4.2.3	**Studies of other HTC superconducting coati**			**INFN-Ro2**	**0%**
4.2.3.1	Study of superconducting properties			**INFN-Ro2**	0%
4.2.3.2	**Report on quality of superconducting properties**		**Final Report**	**INFN-Ro2**	0%



WP4: In schedule

JRA1.5 Work Package 5: Surface Preparation

JRA1.5.1 Electropolishing (EP) on single cells

A report on a method of surface characterization has been submitted. The gloss measurement of the surface turns out to be a good indication of surface characterization besides the standard roughness measurement. Due to a relocation of the group working on the activity, the activity was stopped and accumulated some delay. The EP setup is in its final design phase. The single-cell production could be started only recently.

JRA1.5.2 Electropolishing (EP) on multi-cells

The improved gas cleaning system is installed. Due to some problems with the EP setup currently a delay of about one month has been accumulated. It was still feasible to electro-polish 10 cavities this year. The results are rather mixed. Field emission turned out to be the most crucial problem. This could not be clearly identified as a problem of the EP system. It might be caused rather by the following high pressure rinsing and the final assembly steps before the tests.

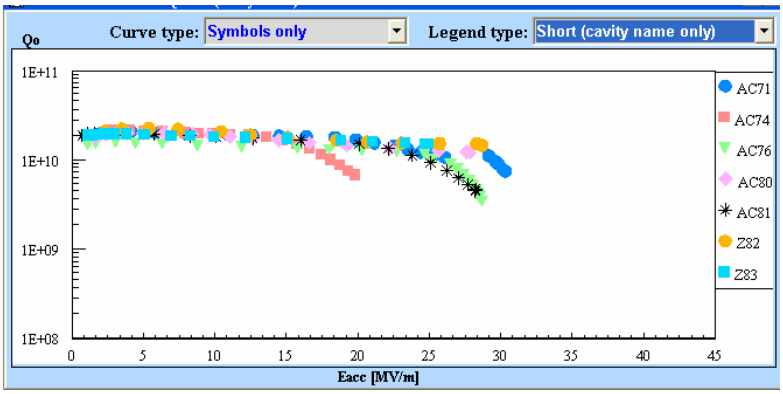


Figure JRA1.5.1: Results of the tests on cavities electro-polished at DESY. The performance is limited by field emission in most cases.

Nonetheless one of the last cavities achieved a gradient of 38 MV/m. After maintenance of the clean room installation a consolidation of results is expected.

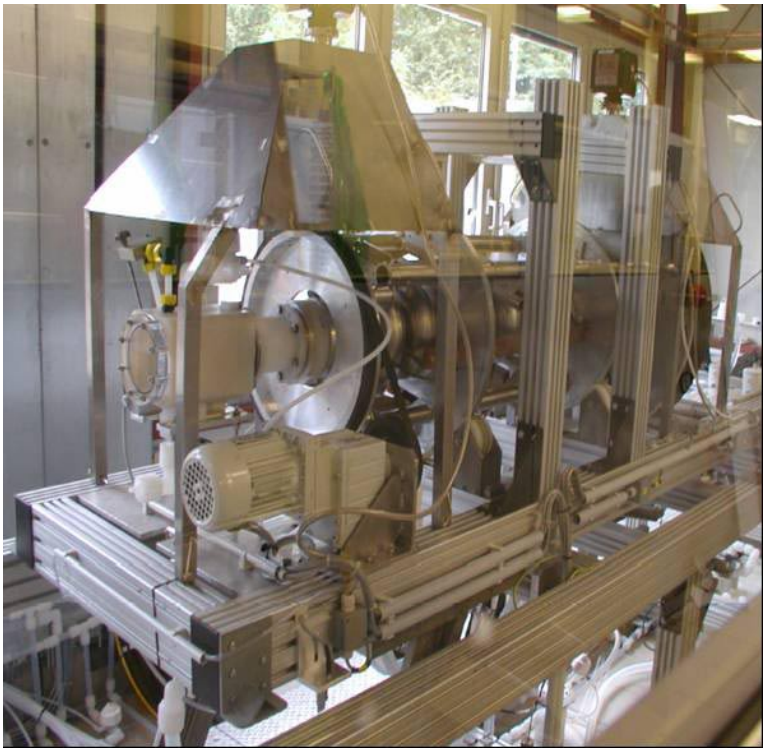


Figure JRA1.5.1: Electropolishing setup at DESY

The hot water rinsing experiment on multi-cells is on hold as single cell cavity tests give no sufficient confidence that an improvement of cavity performance can be achieved.
Preparation of the chemical lab is finished. First results confirm the assumption that the most crucial component is the content of the hydrofluoric acid that determines the process parameters. A report is under preparation.
New computer software for electrode design has been evaluated. The price is too high for the allocated money of this part of the project and a decision is needed whether this part of the project can be continued.
The laser roughness measurement is being evaluated further. There is not definite conclusion yet.

JRA1.5.3 Automated EP

The automated EP system is complete. The full system has been tested with copper models including the PLC and slow control software. The slow control can be logged to the optimum working point of an EP system. Several test setups for EP samples with different geometries have been built and will be evaluated. This might complement (or even replace) the computer software for electrode design referred to in the activity 5.2. Work on a high pressure rinsing system is underway.

JRA1.5.4 Dry-ice cleaning

Both, for carbon dioxide and for nitrogen an ultra pure gas supply system was integrated and tested in the existing clean-room. The main activity was the construction and test assembly of the moving system. First tests showed the need for further improvement of some critical components. Therefore the final assembly is delayed by 6 weeks due to the un-availability of parts. The control system is still under construction. The delay is caused by man-power problems originating from the shut-down work at the DESY accelerators in summer 2004. The CO2 purifier/cooler unit has been delivered mid of December, representing a delay of 8 weeks. Integration into the existing gas supply system started recently. Furthermore additional tests with a prototype system were performed to determine a better parameter set for the upcoming commissioning. From August, 1st a contract technician started to support and accelerate the installation of the system.

Figure JRA1.5.2: Nozzle system for cavity cleaning

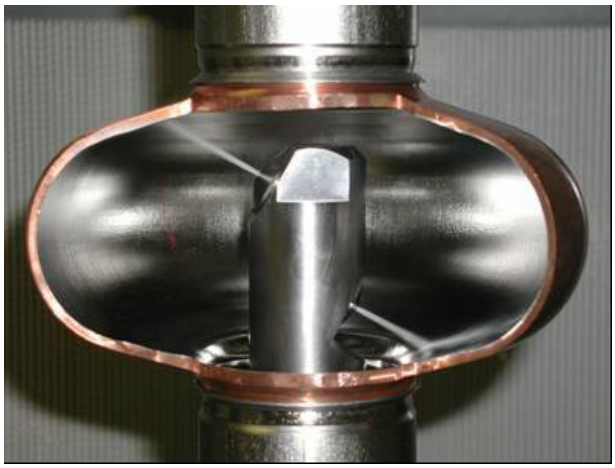


Figure JRA1.5.3: Test of the nozzle system in a cut cavity

So far, the most successful cleaning has resulted in the achievement of a gradient of more than 30 MV/m. The cavity is still limited by field emission but a significant improvement can be observed (see Fig.JRA1.5.4).

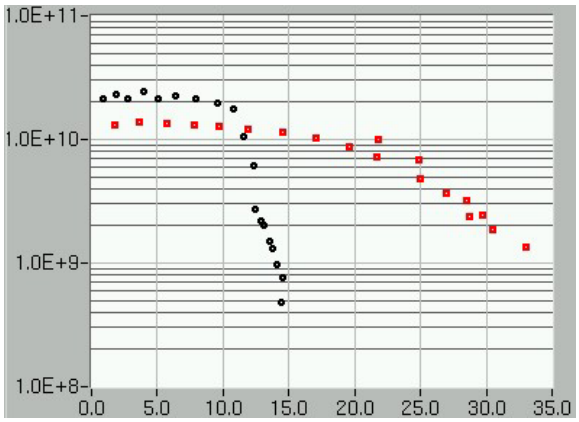
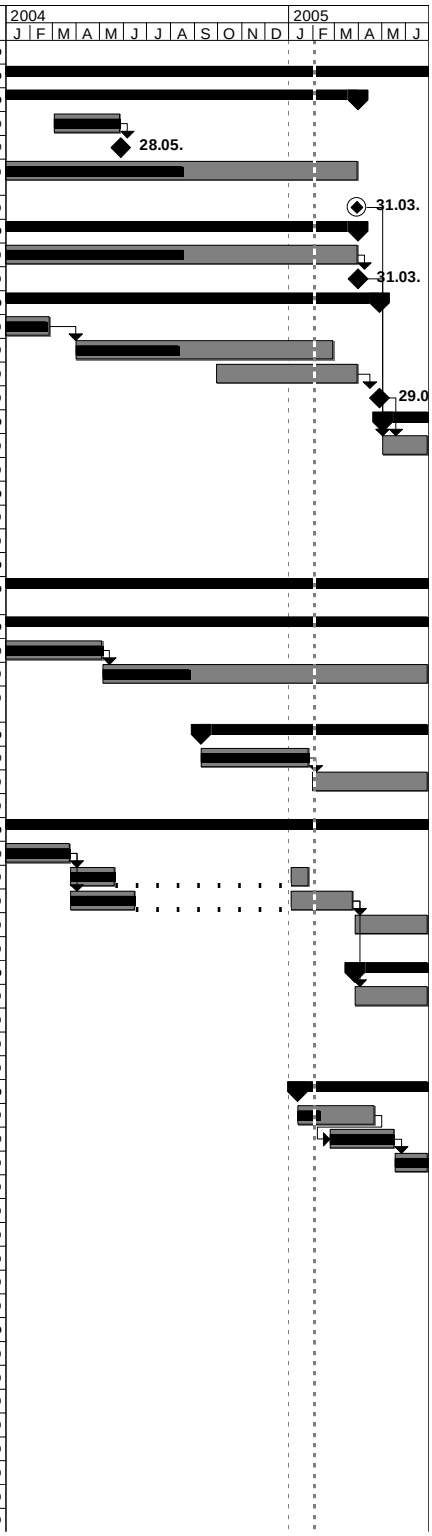


Figure JRA1.5.4: Improvement of a field emission loaded single-cell cavity (black) after dry-ice cleaning (red).

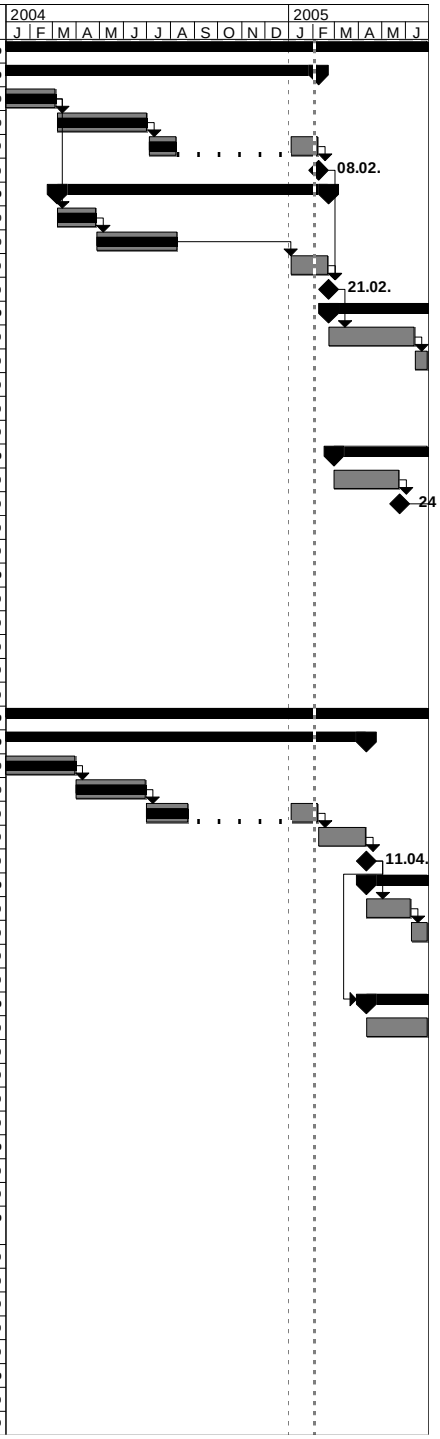
JRA1.5.5 Overall Progress of Work Package 5

The following table highlights the progress of work planned in the year 2004 for the Work Package WP5 by listing the lowest level subtasks of the SRF detailed implementation plan.

N°	Task Name	Milestones	Main	Contractor	%
5	**WP5 SURFACE PREPARATION**				**22%**
5.1	**EP on single cells**			**CEA**	**29%**
5.1.1	**EP on samples**			**CEA**	**58%**
5.1.1.1	Establishing method of surface characterizat			**CEA**	100%
5.1.1.2	**Surface characterization fixed**	**Design Report**		**CEA**	100%
5.1.1.3	Series of EP with samples for surface investigations			**CEA**	50%
5.1.1.4	**Best EP parameters**		**Final Report**	**CEA**	0%
5.1.2	**Single cell cavities**			**CEA**	**50%**
5.1.2.1	Order Nb and fabricate 3 cavities			**CEA**	50%
5.1.2.2	**3 cavities fabricated**	**Cavities ready**		**CEA**	0%
5.1.3	**Build EP chemistry for single cells**			**CEA**	**32%**
5.1.3.1	Design of EP set-up			**CEA**	90%
5.1.3.2	Fabrication of EP set-up			**CEA**	40%
5.1.3.3	Commissioning of EP set-up			**CEA**	0%
5.1.3.4	**First operation of EP set-up**	**Commissioning**		**CEA**	0%
5.1.4	**Operation of single cell EP**			**CEA**	**0%**
5.1.4.1	Continous single cell operation			**CEA**	0%
5.1.4.2	**Define working parameters for single c**	**Design Report**		**CEA**	0%
5.1.5	**Continuous operation, search for best para**			**CEA**	**0%**
5.1.5.1	Parametrising EP procedure			**CEA**	0%
5.1.5.2	**EP parameters fixed**		**Final report**	**CEA**	0%
5.2	**EP on multi-cells**			**DESY**	**25%**
5.2.1	**Transfer of parameters from 1 cell to multi cell equipment**			**DESY**	**45%**
5.2.1.1	**Finish EP setup nine-cells at DESY**			**DESY**	**42%**
5.2.1.1.1	Improved gas cleaning system			**DESY**	100%
5.2.1.1.2	Design for hot water rinsing			**DESY**	26%
5.2.1.1.3	**Proof-of-Principle experiment hot water rinsing**	**Status Report**		**DESY**	0%
5.2.1.2	**Optimize electrode shape**			**DESY**	**45%**
5.2.1.2.1	Develop computer model / Evaluate softw			**DESY**	100%
5.2.1.2.2	Design improved electrode			**DESY**	0%
5.2.1.2.3	**Electrode design fixed**	**Design report**		**DESY**	0%
5.2.1.3	**Fix process parameters/ Quality control**			**DESY**	**49%**
5.2.1.3.1	Setup chemical lab			**DESY**	100%
5.2.1.3.2	Bath aging			**DESY**	70%
5.2.1.3.3	Bath mixture			**DESY**	50%
5.2.1.3.4	Alternative (salt) mixtures			**DESY**	0%
5.2.1.3.5	**Process parameters fixed**		**Final report**	**DESY**	50%
5.2.2	**Laser roughness**			**DESY**	**0%**
5.2.2.1	Evaluate existing systems			**DESY**	0%
5.2.2.2	Specify laser system			**DESY**	0%
5.2.2.3	Built laser system			**DESY**	0%
5.2.2.4	**Roughness measurement finished**	**Equipment ready**		**DESY**	0%
5.2.3	**Oxipolishing as final chemical cleaning**			**DESY**	**35%**
5.2.3.1	Laboratory studies			**DESY**	30%
5.2.3.2	Design of OP system			**DESY**	100%
5.2.3.3	Setup one-cell system			**DESY**	90%
5.2.3.4	**Proof-of-Principle experiment Oxipolish**	**Status Report**		**DESY**	0%
5.2.3.5	Design OP for nine-cells			**DESY**	0%
5.2.3.6	Build OP for 9-cells			**DESY**	0%
5.2.3.7	**OP for 9-cells ready**	**Commissioning**		**DESY**	0%
5.2.3.8	Study op with 9-cell cavities			**DESY**	0%
5.2.3.9	Evaluate experiments		**Status Repor**	**DESY**	0%
5.2.4	**Transfer Electropolishing technology to ind**			**DESY**	**0%**
5.2.4.1	Qualify industry with one-cells			**DESY**	0%
5.2.4.2	Industrial design study on setup for multi-cel			**DESY**	0%
5.2.4.3	**Report on industrial design**	**Report**		**DESY**	0%
5.2.4.4	Fabricate EP multi-cell industrial prototype			**DESY**	0%
5.2.4.5	Commission EP multi-cell industrial prototype			**DESY**	0%
5.2.4.6	**EP multi-cell industrial prototype ready**	**Commissioning**		**DESY**	0%
5.2.4.7	Operate EP multi-cell industrial prototype			**DESY**	0%
5.2.4.8	**Final report on industrial EP**		**Final report**	**DESY**	0%



N°	Task Name	Milestones	Main	Contractor	%
5.3	**Automated EP (AEP)**			**INFN-LNL**	**24%**
5.3.1	**Prototype EP installation**			**INFN-LNL**	**86%**
5.3.1.1	Design installation			**INFN-LNL**	100%
5.3.1.2	Fabricate/ order components			**INFN-LNL**	100%
5.3.1.3	Assemble EP installation			**INFN-LNL**	50%
5.3.1.4	**First operation of automated EP**	**Commissioning**		**INFN-LNL**	0%
5.3.2	**EP computer control**			**INFN-LNL**	**76%**
5.3.2.1	Design control architecture			**INFN-LNL**	100%
5.3.2.2	Developed softw are			**INFN-LNL**	100%
5.3.2.3	Test of softw are			**INFN-LNL**	0%
5.3.2.4	**Software ready**	**Status Report**		**INFN-LNL**	0%
5.3.3	**Operation of AEP prototype**			**INFN-LNL**	**0%**
5.3.3.1	Correlate surface finish/ conductance			**INFN-LNL**	0%
5.3.3.2	Determine optimum conductance			**INFN-LNL**	0%
5.3.3.3	Optimize automated operation			**INFN-LNL**	0%
5.3.3.4	Design report on AEP			**INFN-LNL**	0%
5.3.3.5	**Automated EP is defined**		**Final Report**	**INFN-LNL**	0%
5.3.4	**Alternative electrolytes**			**INFN-LNL**	**0%**
5.3.4.1	Review of EP chemistry			**INFN-LNL**	0%
5.3.4.2	**Proposal for alternative electrolytes**	**Report**		**INFN-LNL**	0%
5.3.4.3	Experiments w ith alternative electrolytes			**INFN-LNL**	0%
5.3.4.4	**Conclude experimental results**	**Status Report**		**INFN-LNL**	0%
5.3.5	**Define best AEP**			**INFN-LNL**	**0%**
5.3.5.1	Compare standard/new electrolyte method			**INFN-LNL**	0%
5.3.5.2	Modify AEP installation for best electrolyte			**INFN-LNL**	0%
5.3.5.3	Operate modified AEP			**INFN-LNL**	0%
5.3.5.4	Design report on best AEP			**INFN-LNL**	0%
5.3.5.5	**Conclude on best electrolyte**		**Final Report**	**INFN-LNL**	0%
5.4	**Dry ice cleaning**			**DESY**	**10%**
5.4.1	**Installation of full system for 1-3 cell cavities**			**DESY**	**70%**
5.4.1.1	Installation of CO2 piping			**DESY**	100%
5.4.1.2	Installation of motion system			**DESY**	100%
5.4.1.3	Installation of control system			**DESY**	60%
5.4.1.4	Commissioning			**DESY**	0%
5.4.1.5	**Installation finished**	**Commissioning**		**DESY**	0%
5.4.2	**Optimization of cleaning parameters**			**DESY**	**0%**
5.4.2.1	Sample cleaning			**DESY**	0%
5.4.2.2	1-cell cavity cleaning			**DESY**	0%
5.4.2.3	Fix best cleaning parameters			**DESY**	0%
5.4.2.4	**Cleaning parameters fixed**		**Final Report**	**DESY**	0%
5.4.3	**VT 9-cell cleaning apparatus**			**DESY**	**0%**
5.4.3.1	Design 9-cell apparatus VT			**DESY**	0%
5.4.3.2	Fabricated 9-cell apparatus			**DESY**	0%
5.4.3.3	Installation of 9-cell apparatus			**DESY**	0%
5.4.3.4	Commissioning of 9-cell apparatus			**DESY**	0%
5.4.3.5	**VT Cleaning Installation finished**	**Commissioning**		**DESY**	0%
5.4.4	**VT Cleaning of 9-cell cavities**			**DESY**	**0%**
5.4.4.1	Continuous cleaning			**DESY**	0%
5.4.4.2	**Evaluation of experimental results**		**Final Report**	**DESY**	0%
5.4.5	**Design & construction of H 9-cell cleaning apparatus**			**DESY**	**0%**
5.4.5.1	Design 9-cell apparatus VT			**DESY**	0%
5.4.5.2	Fabricated 9-cell apparatus			**DESY**	0%
5.4.5.3	Installation of 9-cell apparatus			**DESY**	0%
5.4.5.4	Commissioning of 9-cell apparatus			**DESY**	0%
5.4.5.5	**Start H 9-cell cleaning**	**Commissionning**		**DESY**	0%
5.4.6	**Cleaning of horizontal nine-cell cavity**			**DESY**	**0%**
5.4.6.1	Continuous cleaning			**DESY**	0%
5.4.6.2	**Evaluation of experimental results**		**Final Report**	**DESY**	0%



WP5.1.1: On schedule.
WP5.1.2: Slight delay in ordering material due to late arrival of EC support.
WP5.1.3: Delayed, because the installation of this chemical facility inside the lab will ask big changes, in particular reconstruction of lab hoods. Security procedures inside the lab have to be revised and accepted by the authority concerned. It will be difficult to get the functioning authorization before the end of 2004.
WP5.2: Operational delay of electro-chemical investigations due to components brake down (leaks in chemical valves, contamination in high purity water system, enhanced heating in the electro-chemical bath).

JRA1.6 Work Package 6: Material Analysis

JRA1.6.1 Development of SQUID based equipment for detection of defects in Nb

The reachable field strength in superconducting resonators is limited by surface defects or inclusions of unwanted elements. Since the manufacturing of Nb resonators is very expensive, it is reasonable to check the Nb sheets prior to fabrication of resonators.
A system is in construction for non-destructive inspection of niobium sheets, based on the eddy current effect. To receive the necessary detection sensitivity a SQUID sensor for measuring the local eddy current density is used.

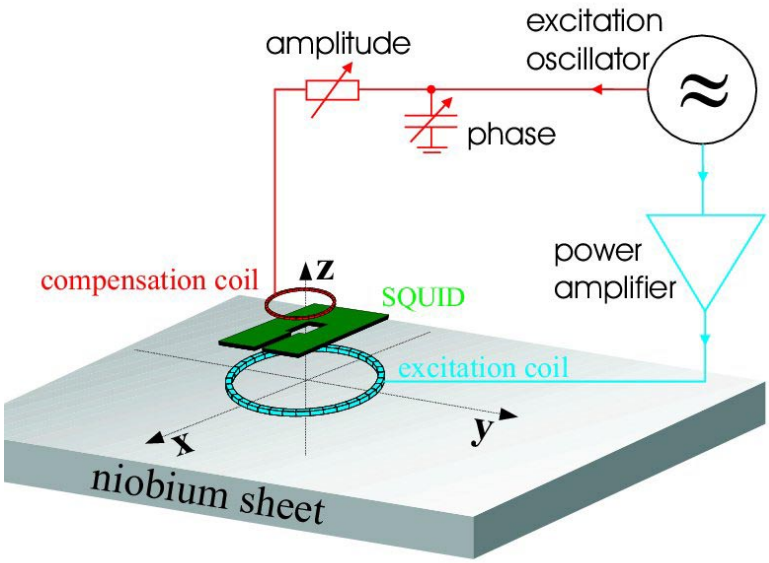


Fig.JRA1.6.1: Principle of the SQUID system for Eddy current testing of niobium sheets. An excitation coil produces Eddy currents in the sample, whose magnetic field is detected by the SQUID. A compensation coil close to the SQUID cancels the excitation field at the SQUID.

Fig.JRA1.6.1 shows the principle of eddy current testing of niobium sheets. A circular coil, usually with a diameter of a few mm generates eddy currents in the niobium sheet. Inhomogeneities of materials having a conductivity different from that of niobium lead to a distortion of the eddy current flow, and thus to a change in the eddy current field, which will be detected by scanning the sheet with a SQUID. In order to minimise the excitation field at the location of the SQUID, usually a gradiometric excitation coil is used, having the shape of a double D. However, since we expect the material inclusions to be only very small, a relatively small double-D coil must be used to maximize the eddy current density at the location of the inclusion. Making small double-D coils with many turns and high symmetry is not easy. Instead, one can use an electrical compensation scheme in which the field of the circular excitation coil is compensated electronically at the location of the SQUID by feeding part of the excitation current through the modulation coil used to flux lock the SQUID. By carefully adjusting the amplitude and phase of the compensation current, the excitation field at the SQUID can be compensated by a factor of 1000.
The sensitivity will be demonstrated on specially prepared niobium test sheets with tantalum inclusions of 50 - 100µm size.

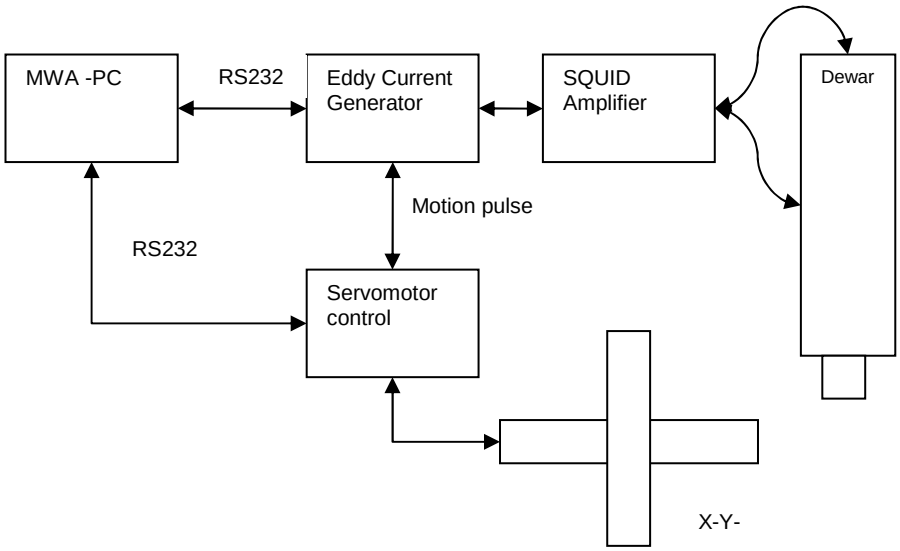


Fig.JRA1.6.2 Concept of a SQUID scanning system

The concept of the measurement system is shown in Fig.JRA1.6.2. It will be based on an xyz table with ca. 300mm x 300m travel area. The Nb sheets are fixed by a vacuum sample holder in order to keep them as flat as possible. The SQUID sensor is electronically controlled by a flux modulation and control loop, in order to keep the magnetic flux through the SQUID constant. Compensation current is controlled by the flux measurement. The amount of compensation current necessary to keep the SQUID's flux constant is then taken as measurement value from the control loop. This signal is then processed by a lock-in amplifier to eliminate noise with a spectral density apart from the excitation frequency. Different filters are implemented into the lock in amplifier to improve the Signal/Noise ratio. The system works in a non-shielded environment. With a sheet size of about 300x300mm² and a line width of 1mm a scan of one sheet will take about 10-15min.
The production of Nb sheets with artificially prepared surface defects is finished. Production of Nb sheets with artificially prepared bulk defects is in the final stage. Pure tantalum is chosen for foreign material inclusions. Some tantalum particles with smallest size of ca. 50 µm are implanted in the niobium sheet.
The design of components of the SQUID scanner is in work. One of the possible solutions for the scanning table design is finished.

JRA1.6.2 Flux gate magnetometry

We are designing and building a flux gate scanning apparatus whose application is two-fold: (i) we will execute a tomography of the electrolytic cell, in order to configure the effect of cathode geometry on electropolishing, (ii) we will distinguish niobium having different RRR by relative measurements of conductivity by detecting the eddy current decay.
Referring to this point we have designed a cavity shaped electrolytic cell having the possibility to test different cathode shapes. The goal is to design the experiment to monitor two different kinds of defected samples:

- Physical defects like surface scratches and foreign particle embedded onto niobium
- Samples with degraded RRR to distinguish from samples with RRR 300.

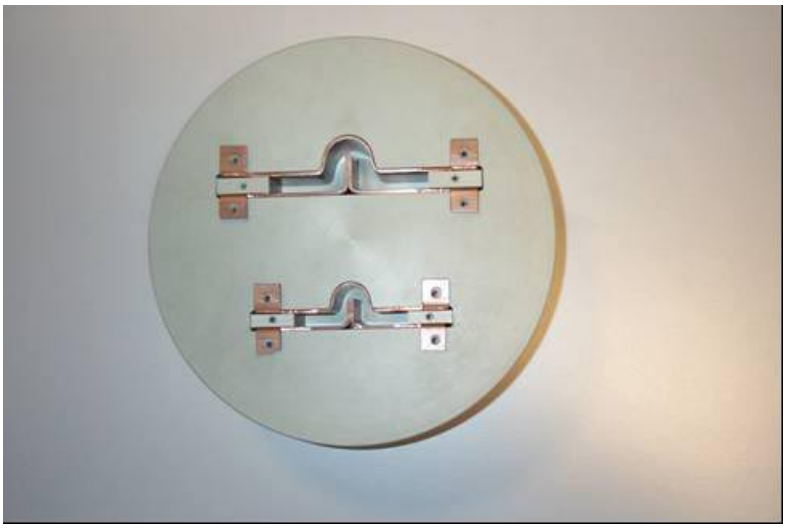


Fig.JRA1.6.3: Magnetometry arrangement. The picture shows a simulation of a cavity and cathode geometry for electro-polishing. Scanning by flux gate technology will deliver a tomography of the electro-polishing conditions.

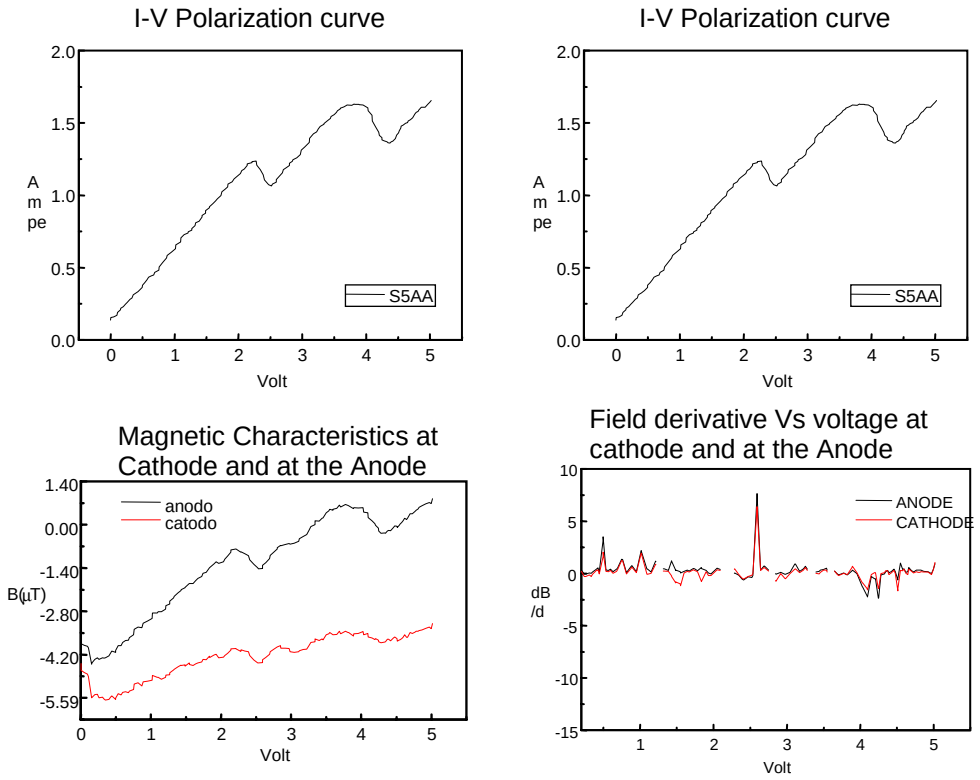


Fig.JRA1.6.4: Comparison of the U/I characteristic (upper pictures) with magnetometer diagnostics (lower pictures; left direct signal, right after derivative of measured signal)

JRA1.6.3 DC field emission scanning

A new staff member, Ms. Arti Dangwal from the Indian Institute of Technology, has been employed on July, 1st 2004 and permanently attached to the group of Prof. Müller at the University of Wuppertal to perform the DC field emission measurements.

A series of ten high-purity Nb samples (RRR=300) of 28 mm diameter have been fabricated and mechanically polished. A dedicated specimen holder for electro-polishing, high pressure rinsing and dry-ice cleaning experiments has been constructed. The first Nb samples as well as Cu samples have been prepared for quality control scans relevant for electro-polished Nb and RF-gun cavities.

In order to increase the scanning speed for the systematic testing of numerous samples the field emission scanning microscope (FESM) has been modernized with the LabVIEW software package. The programming of the stepper-motor driven xyz-stages, Keithley Picoamperemeter and FUG high voltage power supply has been completed, and the first FE current and regulated voltage scans will be started soon. Further programming will be required for local measurements.

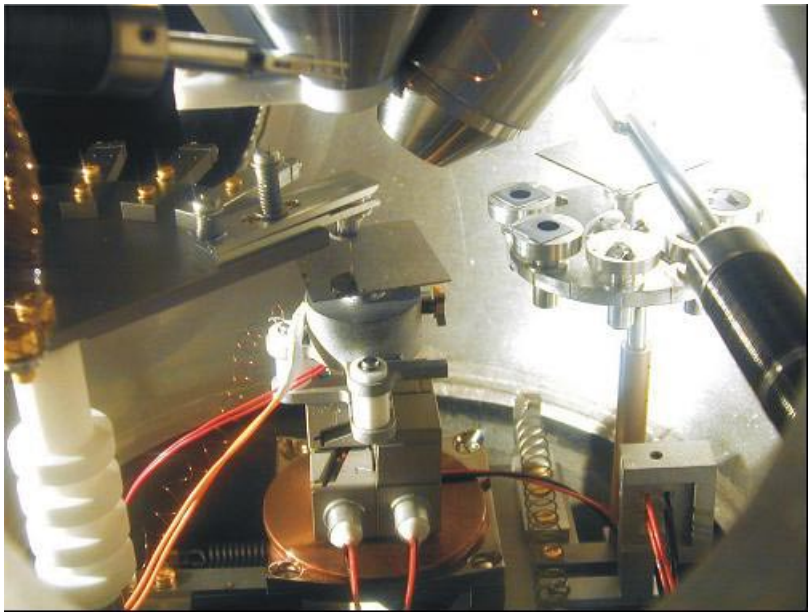
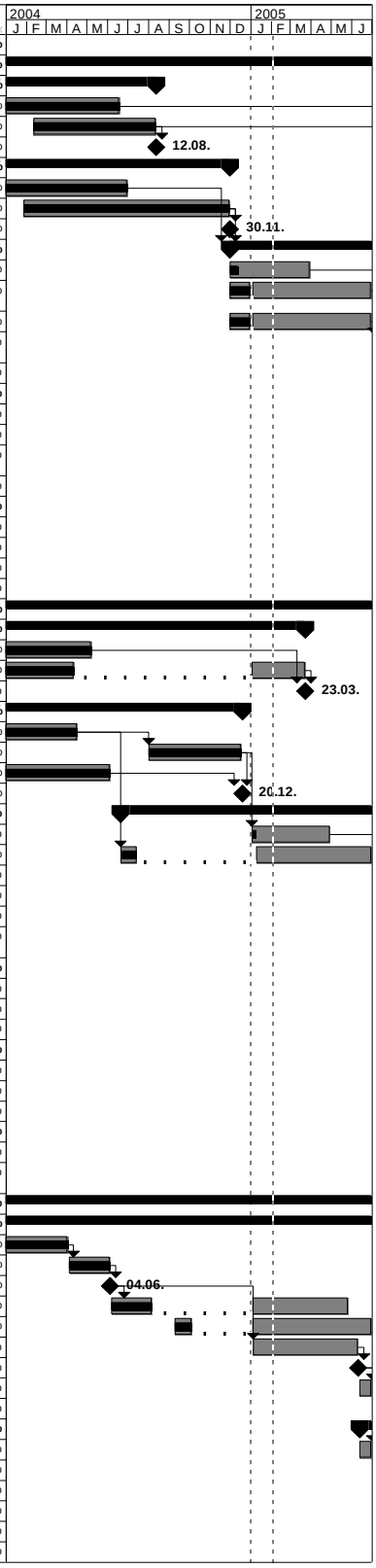


Fig.JRA1.6.5: View into the centre of the FESM: The sample holder can be seen in the middle of the picture. Above this table the fork system of the scanning needles (with different tip size) is installed.

JRA1.6.4 Overall Progress of Work Package 6

The following table highlights the progress of work planned in the year 2004 for the Work Package WP6 by listing the lowest level subtasks of the SRF detailed implementation plan.

N°	Task Name	Milestones	Main Deliverables	Contractor	% schlo
6	**WP6 MATERIAL ANALYSIS**			**DESY**	**21%**
6.1	**SQUID scanning**			**DESY**	**37%**
6.1.1	**Produce calibration defects**			**DESY**	**100%**
6.1.1.1	Production of surface defects			**DESY**	100%
6.1.1.2	Production of bulk defects			**DESY**	100%
6.1.1.3	**Calibration defects finished**	**Status Report**		**DESY**	100%
6.1.2	**Design components of Squid scanner**			**DESY**	**100%**
6.1.2.1	Design of the scanning table and support			**DESY**	100%
6.1.2.2	Design of the SQUID cooling system			**DESY**	100%
6.1.2.3	**Design Scanner finished**	**Design report**		**DESY**	100%
6.1.3	**Construction of scanning apparatus**			**DESY**	**11%**
6.1.3.1	Fabrication of the SQUID			**DESY**	10%
6.1.3.2	Fabrication and purchase of components for SQUID apparatus			**DESY**	15%
6.1.3.3	Software for the SQUID scanner			**DESY**	15%
6.1.3.4	Commissioning and calibration of scanning apparatus			**DESY**	0%
6.1.3.5	**Scanning apparatus operational**	**Commissioning**		**DESY**	0%
6.1.4	**Scanning of sheets with artificial defects**			**DESY**	**0%**
6.1.4.1	Scanning of sheets with artificial surface def			**DESY**	0%
6.1.4.2	Scanning of sheets with artificial bulk defects			**DESY**	0%
6.1.4.3	Development of algorithm for material defects classification			**DESY**	0%
6.1.4.4	**Classification of defects finished**	**Status Report**		**DESY**	0%
6.1.5	**Scanning of production sheets**			**DESY**	**0%**
6.1.5.1	Scanning of sheets of different producers			**DESY**	0%
6.1.5.2	Identification of defects by (EDX, SURFA etc			**DESY**	0%
6.1.5.3	Conclusive comparison with eddy current da			**DESY**	0%
6.1.5.4	**Final report on SQUID scanning**		**Final Report**	**DESY**	0%
6.2	**Flux gate magnetometry**			**INFN-LNL**	**31%**
6.2.1	**Produce calibration defects**			**INFN-LNL**	**74%**
6.2.1.1	Production of surface defects			**INFN-LNL**	100%
6.2.1.2	Production of bulk defects			**INFN-LNL**	55%
6.2.1.3	**Calibration defects finished**	**Status Report**		**INFN-LNL**	0%
6.2.2	**Design components of flux gate head**			**INFN-LNL**	**100%**
6.2.2.1	Design electronics			**INFN-LNL**	100%
6.2.2.2	Design of flux gate head			**INFN-LNL**	100%
6.2.2.3	Design of operations software			**INFN-LNL**	100%
6.2.2.4	**Design flux gate head finished**	**Design report**		**INFN-LNL**	100%
6.2.3	**Fabrication of flux gate detector**			**INFN-LNL**	**7%**
6.2.3.1	Fabrication of flux gate head			**INFN-LNL**	6%
6.2.3.2	Fabrication of mechanics			**INFN-LNL**	12%
6.2.3.3	Implementation of software			**INFN-LNL**	0%
6.2.3.4	Commissioning of flux gate detector			**INFN-LNL**	0%
6.2.3.5	Calibration of flux gate detector			**INFN-LNL**	0%
6.2.3.6	**Flux gate detector operational**	**Design report, start operation**		**INFN-LNL**	0%
6.2.4	**Commissioning of flux gate detector**			**INFN-LNL**	**0%**
6.2.4.1	Operational tets tests			**INFN-LNL**	0%
6.2.4.2	Evaluation of test results			**INFN-LNL**	0%
6.2.4.3	**Flux gate scanner commissioned**	**Status Report**		**INFN-LNL**	0%
6.2.5	**Operation of flux gate detector**			**INFN-LNL**	**0%**
6.2.5.1	Regular operation			**INFN-LNL**	0%
6.2.5.2	Report of operation			**INFN-LNL**	0%
6.2.5.3	**Conclusion of flux gate scanning operat**	**Status Report**		**INFN-LNL**	0%
6.2.6	**Comparison with SQUID scanner**			**INFN-LNL**	**0%**
6.2.6.1	Compare measurements			**INFN-LNL**	0%
6.2.6.2	**Conclude SQUID scanner vs. flux gate detector**		**Final Report**	**INFN-LNL**	0%
6.3	**DC field emission studies of Nb samples**			**DESY**	**6%**
6.3.1	**Quality control scans**			**DESY**	**14%**
6.3.1.1	Modification of Scanning apparatus			**DESY**	100%
6.3.1.2	Calibration of Scanning apparatus			**DESY**	100%
6.3.1.3	**Start scanning activity**	**Start Operation**		**DESY**	100%
6.3.1.4	BCP and HPR samples			**DESY**	30%
6.3.1.5	EP and HPR samples			**DESY**	10%
6.3.1.6	BCP/EP and DIC samples			**DESY**	0%
6.3.1.7	**First report on BCP/EP and DIC surface**	**Interim Report**		**DESY**	0%
6.3.1.8	Continue QA scanning			**DESY**	0%
6.3.1.9	**Evaluation of scanning results**		**Final Report**	**DESY**	0%
6.3.2	**Detailed measurements on strong emitters**			**DESY**	**0%**
6.3.2.1	Calibrate apparatus for high current			**DESY**	0%
6.3.2.2	**Start strong emitter evaluation**	**Start Measureme**		**DESY**	0%
6.3.2.3	I/V curves and current limits			**DESY**	0%
6.3.2.4	SEM and AES			**DESY**	0%
6.3.2.5	Influence of heat treatment and ion impact			**DESY**	0%
6.3.2.6	**Evaluate strong emitter investigations**		**Final Report**	**DESY**	0%



WP6.1: 0n schedule

WP6.2: Some delay due to late hiring of additional staff (late arrival of EC support and some additional administrative difficulties)

WP6.3: Scanning apparatus is operational, but due to problems with the electro-polishing (see WP 5.2) installation the sample delivery started late.

JRA1.7 Work Package 7: Couplers

JRA1.7.1 New prototype coupler

We have designed two new-proto-types named TTF-5 and TW60 respectively. The RF design of these couplers was completed in the first part of 2004 and a description of the proto-types is available in the first quarterly report of the JRA1. The mechanical conception is now complete and a full set of engineering drawings exists for each proto-type (see figure JRA1.7.1). The drawings are available from LAL under the references ITA0E0251-C (TTF-V) and ITE0EE002-A (TW60). These drawings will be used in tender exercises so that the couplers can be built in industry during 2005.
In addition to these proto-types, we have purchased two couplers from industry which, from a radio-frequency point of view, are of the type TTF-III currently used on the TESLA Test Facility. The two new couplers are manufactured, however, in a different way as certain TIG and/or electron-beam welds are replaced by brazing operations. These prototypes will allow us to perform conditioning studies (task 7.3) in 2005, ahead of the original schedule.

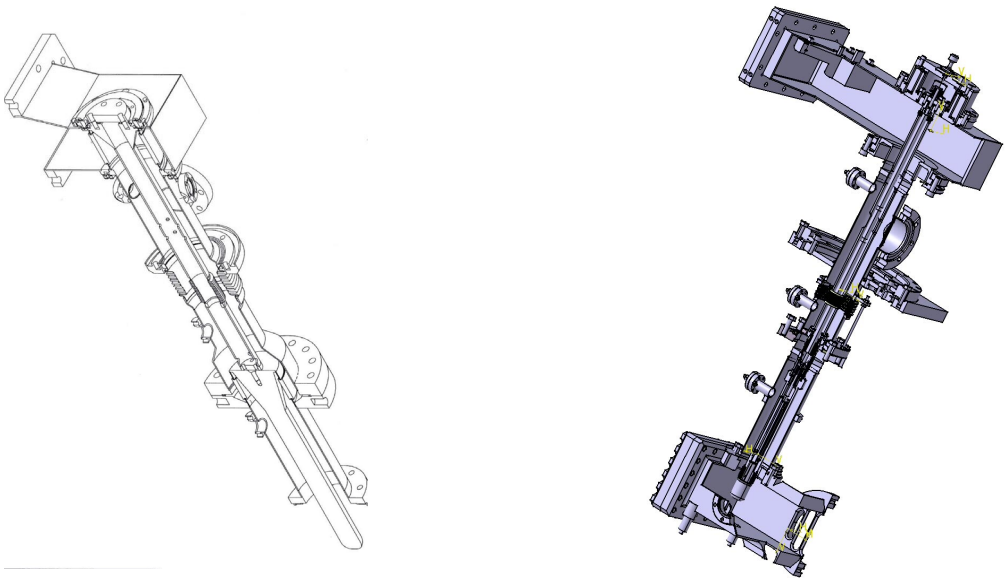


Fig.JRA1.7.1 CAD views of the TTF-V (left) and TW60 (right) couplers.

JRA1.7.2: Fabrication of TiN coating system

Task 7.2 should normally begin in January of 2005. However we have already begun to perform some bibliographic research on coating benches. A preliminary technical specification of the bench we wish to build is given in an internal note (Conception et fabrication d'un banc de dépôt de nitrure de titane pour traitement de surfaces de céramiques et de coupleurs – reference TESLA-COU-CDC-TiN-01).

JRA1.7.3 Conditioning studies of proto-type couplers

Task 7.3 concerns conditioning studies which normally should begin in 2006. However, while awaiting the construction of the prototypes we have began to put in place many of the tools which will be required for their reception and preparation before conditioning. In particular we have been developing the control system, hardware and software, necessary for automatic conditioning of the couplers. The "loan" of TTF-III couplers from our JRA partner, DESY, has allowed us to obtain invaluable experience with this system prior to delivery of the new prototypes. An example of a conditioning cycle for a TTF-III coupler is shown in the figure JRA1.7.2.

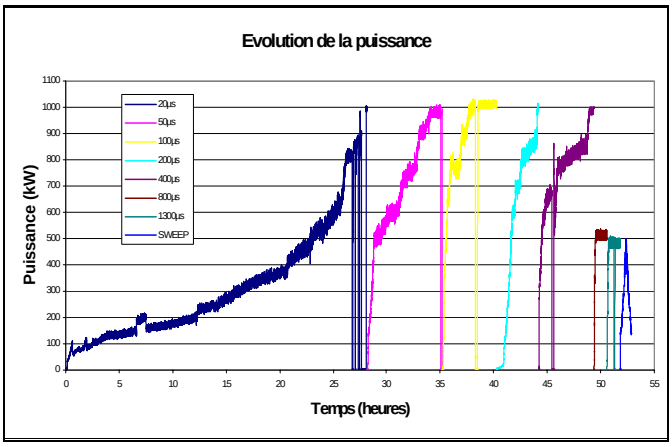
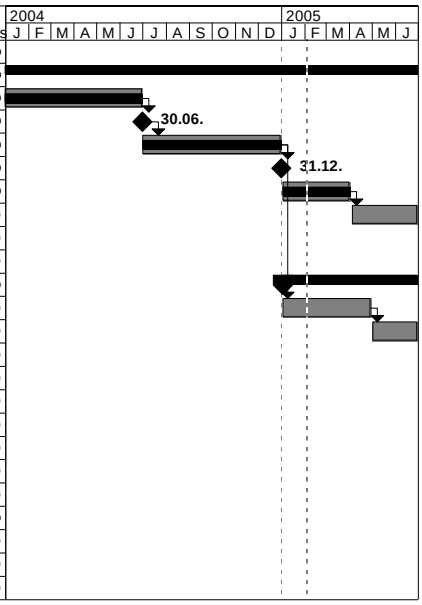


Fig.JRA1.7.2: History of the first coupler conditioning: as one can see, the first power rise up to 900 kW went smoothly and within 27 hours.

JRA1.7.4 Overall Progress of Work Package 7

The following table highlights the progress of work planned in the year 2004 for the Work Package WP7 by listing the lowest level subtasks of the SRF detailed implementation plan.

N°	Task Name	Milestones	Main Deliverables	Contractor	% schlos
7	**WP7 COUPLERS**				**13%**
7.1	**New Prototype Coupler**			**CNRS-Orsay**	**50%**
7.1.1	RF Simulations of Coupler			**CNRS-Orsay**	100%
7.1.2	Report on Simulation			**CNRS-Orsay**	100%
7.1.3	Detailed Engineering Drawings			**CNRS-Orsay**	100%
7.1.4	Engineering complete			**CNRS-Orsay**	100%
7.1.5	Call for tenders			**CNRS-Orsay**	100%
7.1.6	Prototype Fabrication in Industry			**CNRS-Orsay**	0%
7.1.7	Low Power tests			**CNRS-Orsay**	0%
7.1.8	**Ready for High Power Tests**	**Coupler Prototyp**		**CNRS-Orsay**	0%
7.2	**Fabrication of TiN Coating System**			**CNRS-Orsay**	**0%**
7.2.1	Mechanical design of vacuum chamber			**CNRS-Orsay**	0%
7.2.2	Fabrication drawings			**CNRS-Orsay**	0%
7.2.3	Construction of vacuum chamber			**CNRS-Orsay**	0%
7.2.4	Define vacuum needs			**CNRS-Orsay**	0%
7.2.5	Appropriation of vacuum equipment			**CNRS-Orsay**	0%
7.2.6	Design of electronic circuitry			**CNRS-Orsay**	0%
7.2.7	Fabrication of electronics in industry			**CNRS-Orsay**	0%
7.2.8	Installation and Test at Orsay			**CNRS-Orsay**	0%
7.2.9	**First Window Coating**	**Commissioning**		**CNRS-Orsay**	0%
7.3	**Conditioning Studies of Proto-type Couplers**			**CNRS-Orsay**	**0%**
7.3.1	Conditioning of couplers			**CNRS-Orsay**	0%
7.3.2	Evaluate conditioning results			**CNRS-Orsay**	0%
7.3.3	**Final report on conditioning**		**Final report**	**CNRS-Orsay**	0%



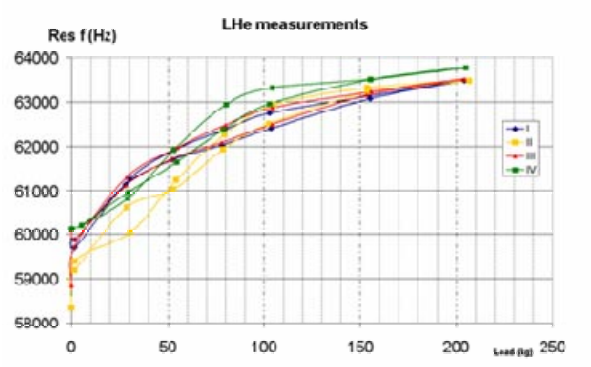
WP7: On schedule

JRA1.8 Work Package 8:

JRA1.8.1 UMI Tuner (INFN-Mi)

A prototype DSP board for piezo control is now working. The new cryogenic load cells are arrived and are under test in our facility. Many piezo from different (PI, EPCOS, Noliac) firms have been tested to act as force sensors in LHe. Other Piezos with higher blocking force from Noliac and PiezoJena are arriving to be tested in LHe in order to try to increase the linearity in the pre-load detection, and will be tested in the near future.

Some new phenomena concerning the preload force detection at 2K is already studied with cooperation with TUL, DESY and IPN laboratories. It base mainly on the detection of resonance position which shift, when the preload force is changing. The resonance frequency versus applied load is presented in figure below. The detailed description is found in “Piezo Impedance measurements” report and “Static absolute force measurement for preloaded piezoelements used for active Lorentz force detuning system” paper.



JRA1.8.1: Resonance frequency versus applied load

A simple structural model of the coaxial blade tuner has been done and analysed with finite elements programs (see Fig.JRA1.8.2).

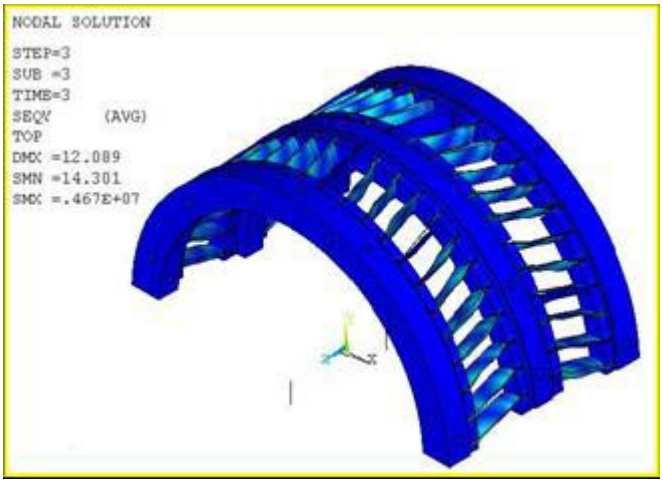


Fig.JRA1.8.2: Stress distribution (FEM simulation)

JRA1.8.2 Magnetostrictive tuner (TUL)

The technical specification and the concept design were performed. The sample of magnetostrictive tuner is available (see figure JRA1.8.3). Nevertheless to reduce cost other magnetostrictive rods (made of GalFeNOL instead of KELVIN ALL®) will be investigated in future.

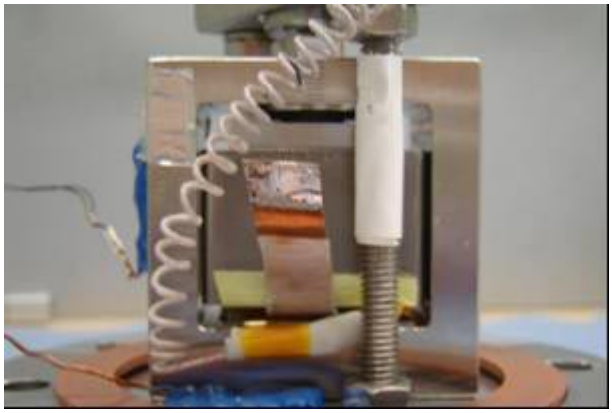


Fig.JRA1.8.3 Sample of magnetostrictive tuner

The electronic driver for the magnetostrictive element was designed and tested. The current solution is based on continuous amplifier APEX PA93. It can supply current up to 8Amps. It

has a bandwidth of 2 kHz. To improve amplifier parameters a PWM-based solution is currently investigated.

An experiment to validate the prototype of magnetostrictive tuner was proposed. All components necessary for it were prepared and assembled. The experiment was performed at DESY. The magnetostrictive tuner was run successfully. The calculated displacement versus applies current is presented below in the figure JRA1.8.4. The shown data are not precise because the stiffness of the system was unknown.

A detailed characterization of magnetostrictive tuner will be performed in March, 2005.

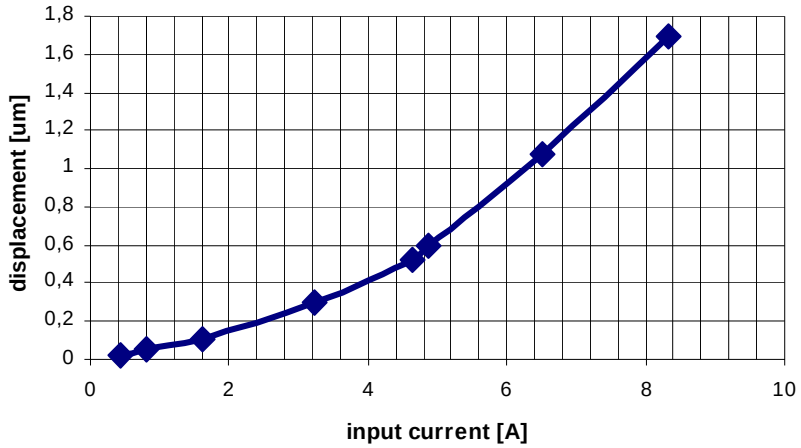


Fig.JRA1.8.4: First results of displacement of magnetostrictive tuner versus applied current.

JRA1.8.3 CEA tuner (CEA)

The pre-studies of the piezo tuner were finished and the drawings for realization were sub contracted (see figure below). During the cooperation some new ideas were developed and implemented (i.e. piezo support). As a consequence the final tuner will be more compact and robust.

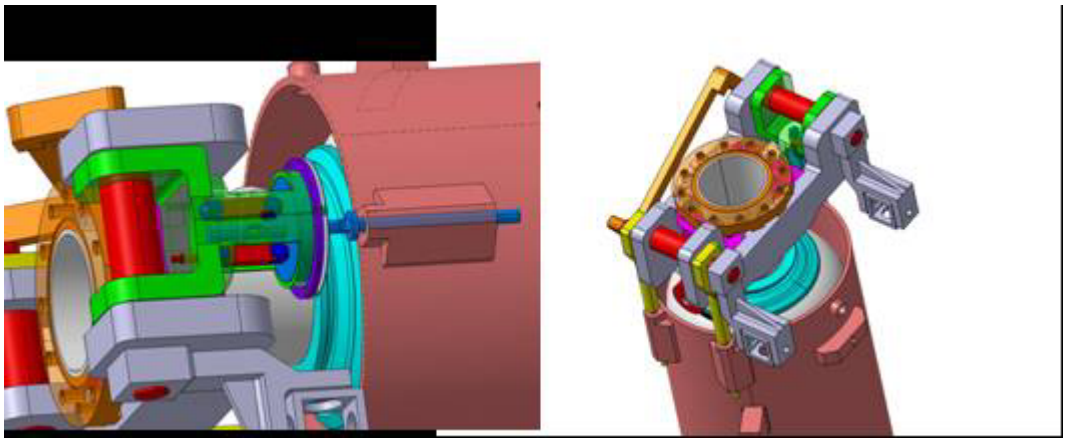


Fig.JRA1.8.5: Drawings of new CEA mechanical tuner

The piezo support is designed to mount two lengths of piezo: 30 and 36 mm (i.e. Noliac and PI one).The tuner will be realized at the beginning of 2005. The proper tests will have place in new horizontal cryostat CRYHOLAB using the TTF cavity (obtained from DESY). The tools to install the cavity equipped in the cryostat are already investigated.

Work on the piezo electronics for the tests will begin in January 2005.

Twelve NOLIAC 30mm long piezo actuators and 2 stepping motors were bought. The PI piezo-crystals are taken from IPN Orsay for tests. Several NOLIAC piezo-crystals are sent to IPN for low temperature characterization and radiation tests.

JRA1.8.4 IN2P3 activities (CNRS-Orsay)

The task of CNRS-Orsay institute is characterization of piezoelectric actuators at low temperature (i.e. 1.8 K- 300 K), perform radiation hardness tests of these components with fast neutrons at low temperature (liquid helium temperature = 4.2 K), contribute to the study of their integration in a piezo-tuner and participate to the tests of the final device inside the horizontal cryostat CRYHOLAB in close collaboration with CEA institute (DSM/DAPNIA).

All the components needed (test-chamber, sensors and associated electronics) for piezoelement characterization at low temperature experiment were designed and ordered for were fabricated, delivered to CNRS-Orsay (IPN) and assembled.

The thermometers for piezoelectric actuators tests were calibrated in the temperature range 1.6 K-300K at CNRS-Orsay (IPNO).

Ten piezoelectric actuators from the PI company were delivered with a delay and tested at room temperature (acceptance tests): the measured capacitance of these component are in good agreement with the expected nominal value.

The low temperature full characterization of piezo-element from PIEZOSYSTEM JENA using the first facility was continued and preliminary room temperature tests of a new experiment (piezoelement as force sensor) were successfully performed leading to very interesting results. The results were presented during the CARE Annual Meeting.

To automate the acquisition process for piezoelectric actuators tests, a new LabView application was developed (see Fig.JRA1.8.6).

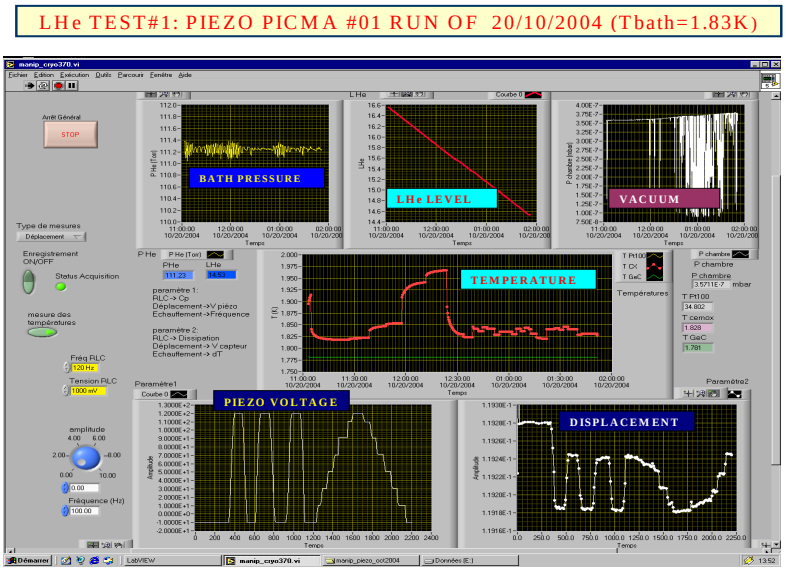


Fig.JRA1.8.6: LabView application dedicated to piezo characterization tests

The new test facility developed for the full characterization of prototypes of piezoelectric actuators (from PI and NOLIAC companies) at low temperature was successfully operated in the temperature range of 1.8K-300K during October 2004 in liquid helium and liquid nitrogen.

Six NOLIAC piezo-stacks were delivered to CEA Saclay and given to CNRS-Orsay (IPN) for low temperature tests (two of them) and radiation hardness experiment (four of them).

The first test of the piezo-stack from PI and NOLIAC was performed in November 2004 (sample of results are presented in figure JRA1.8.7)

The technical report on low temperature characterization of piezo-stacks is expected for the beginning of January 2005.

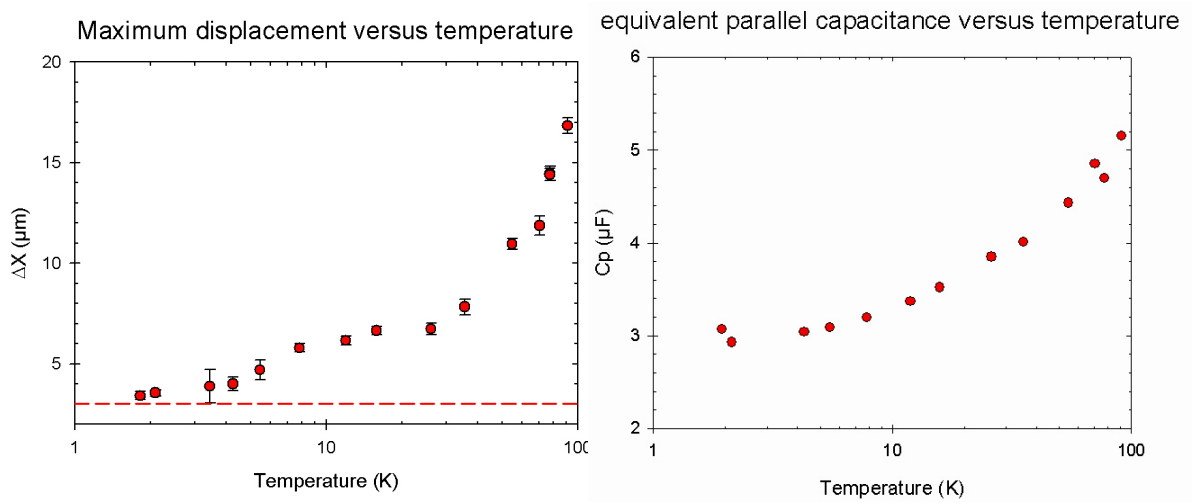


Fig.JRA1.8.7: Maximum displacement and equivalent parallel capacitance versus temperature for PI piezos

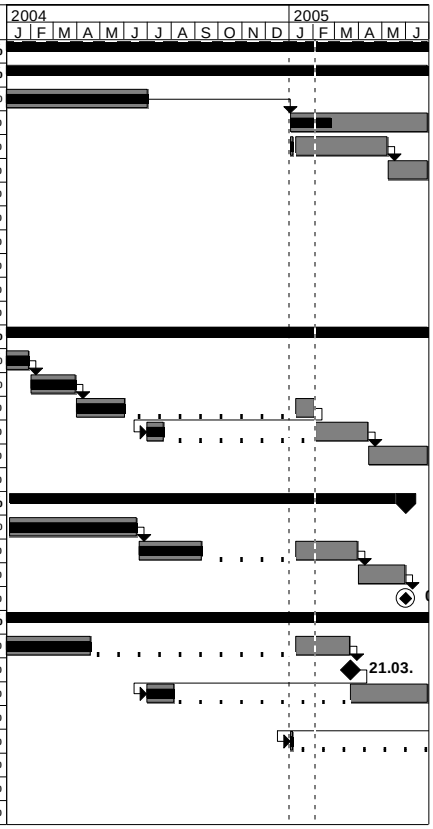
The preparation of the radiation hardness experiment is well in progress: The experiment at CERI is already scheduled and accepted by partner laboratory. The electronics needed for this experiment were received and successfully used in low temperature characterization tests of piezoelectric actuator from PI. The detailed drawings of the irradiation test-chamber are finished and fabricated by industry. The calculation concerning material activation and radiations hazards were performed in close collaboration with radioprotection group at IPN Orsay. A mechanical system dedicated to handling the irradiation cryostat in front of the beam line was designed, delivered, assembled at Orsay, and will be soon installed at CERI Orléans.

A research assistant (Guillaume MARTINET, 12 months contract: September 2004-September 2005) and an engineer (Aurélia OLIVIER, 4 months contract: November 2004-February 2005) are now working at IPN Orsay in the frame of the CARE-SRF project WP8. Undergraduate and graduated students will be soon hired for working on the piezoelement characterization subject.

JRA1.8.5 Overall Progress of Work Package 8

The following table highlights the progress of work planned in the year 2004 for the Work Package WP8 by listing the lowest level subtasks of the SRF detailed implementation plan.

N°	Task Name	Milestones	Main	Contractor	%
8	**WP8 TUNERS**				**23%**
8.1	**UMI TUNER**			**INFN-Mi**	**13%**
8.1.1	Control electronics			**INFN-Mi**	100%
8.1.2	Mechanical tuner design, leverage system/motor			**INFN-Mi**	20%
8.1.3	Integration piezo design			**INFN-Mi**	5%
8.1.4	Choice of transducer/actuator			**INFN-Mi**	0%
8.1.5	**Report UMI tuner**	**Design report**		**INFN-Mi**	0%
8.1.6	Tuner fabrication			**INFN-Mi**	0%
8.1.7	Piezo fabrication and bench tests			**INFN-Mi**	0%
8.1.8	Cavity-tuner-coupler integration			**INFN-Mi**	0%
8.1.9	Pulsed RF tests			**INFN-Mi**	0%
8.1.10	**Evaluation of tuner operation**		**Final report**	**INFN-Mi**	0%
8.2	**Magneto-strictive Tuner**			**TUL**	**31%**
8.2.1	Complete specification			**TUL**	100%
8.2.2	Conceptual design			**TUL**	100%
8.2.3	Prototype and performance evaluation			**TUL**	70%
8.2.4	Finalize tuner and drive electronics design			**TUL**	25%
8.2.5	Test of tuner			**TUL**	0%
8.2.6	**Report on magneto-strictive Tuner**	**Status report**		**TUL**	0%
8.3	**CEA Tuner**			**CEA**	**63%**
8.3.1	Design Piezo + Tuning System			**CEA**	100%
8.3.2	Fabrication			**CEA**	50%
8.3.3	Installation RF			**CEA**	0%
8.3.4	**Start of Integrated Experitments**		**Tuner Protot**	**CEA**	0%
8.4	**IN2P3 Activity**			**CNRS-Orsay**	**21%**
8.4.1	Characterize actuators/piezo-sensors at low temp			**CNRS-Orsay**	60%
8.4.2	Report on actuator/piezo sensor			**CNRS-Orsay**	0%
8.4.3	Test radiation hardness of piezo tuners			**CNRS-Orsay**	20%
8.4.4	Report on radiation hardness tests			**CNRS-Orsay**	0%
8.4.5	Integration of pieco and cold tuner			**CNRS-Orsay**	5%
8.4.6	Cryostat tests			**CNRS-Orsay**	0%
8.4.7	Tests with pulsed RF			**CNRS-Orsay**	0%
8.4.8	**Report on IN2P3 tuner activities**		**Final Report**	**CNRS-Orsay**	0%



WP8: First experiments with laboratory type of tuners uncovered mechanical problems at cryogenic temperatures, e.g. piezo tuner lost the required mechanical pre-stress after cool down. This resulted in a need for a new mechanical design and subsequent shift of schedule in WP 8.2, WP 8.3 and WP 8.4. It is expected that the delay in this work package can be made up by additional engineering effort.

JRA1.9 Work Package 9: Low Level RF (LLRF)

JRA1.9.1 Operability and technical performance

JRA1.9.1.1 Transient detector

Progress: In line with schedule.

A fast noise RF vector detector with low noise floor based on microwave hybrids and Schottky detector diodes, has been designed and implemented. With the new detector single bunch transients have been observed but interpretation of the signal has been problematic due to sharp spikes induced directly by the bunch in the probe coupler. In addition, softwares with algorithms for unfolding phase and amplitude information have been written to simplify the data analysis.

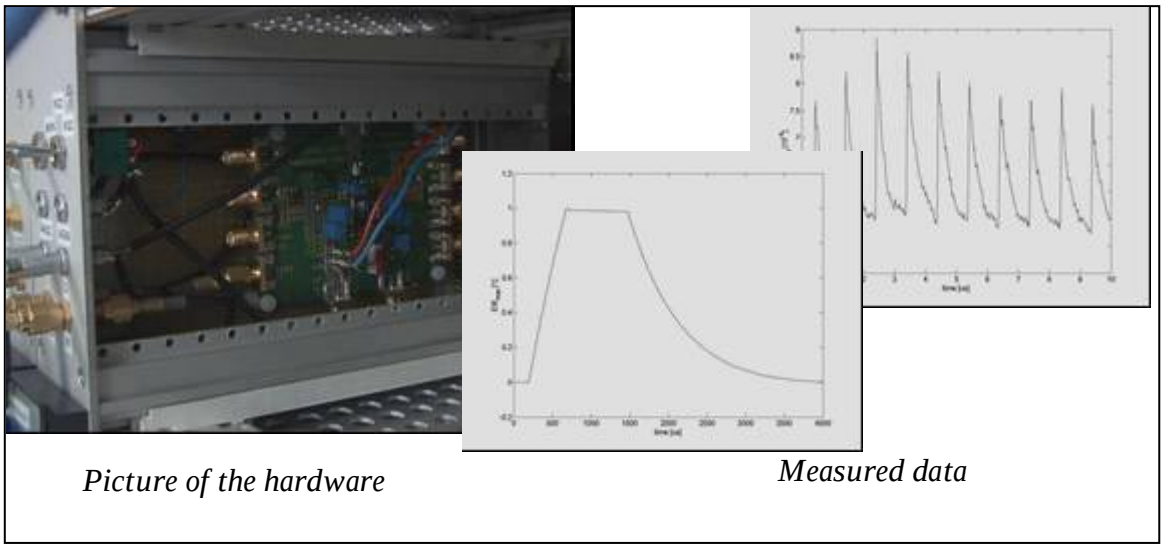


Figure JRA1.11.1: Transient detector hardware and first measurements with beam

Significant achievements and impact: Developed low noise detector suitable for single bunch measurement
Deviations from plan: Sharp spikes induced from the bunch directly in the probe coupler are not completely understood and require further studies including measurements and simulation.

JRA1.9.1.2 LLRF Automation

Progress: In line with schedule.
The detailed specification for the klystron/modulator state machine has been developed. A state machine has been designed in the state flow (matlab/simulink) environment and correct functionality in this environment has been verified. A klystron state machine in DOOCS which is now ready for tests in step mode has been implemented.
Significant achievements and impact:
The klystron state machine has been implemented in DOOCS and ready for test in the accelerator.
Deviations from plan: None

JRA1.9.1.3 Control Optimization

Progress: In line with schedule.
The residual amplitude and phase errors as a function of noise sources (beam, microphonics, lorentz force detuning) and errors in the vector-sum calibration have been studied. Criteria for requirements on feedback gain and precision of feed-forward have been developed. It was concluded that optimal controller will use a combination of feedback and feed-forward.
Significant achievements and impact:
The understanding of error sources and control performance of feedback and feedforward.has been developed. This will lead to conceptual design of optimal controller.
Deviations from plan: None

JRA1.9.2 LLRF cost and reliability

JRA1.9.2.1 Cost and reliability study

Progress: In line with schedule with reliability studies.
Data on reliability of the LLRF systems installed in VUV-FEL have been accumulated. Failure modes and identifying major contributors to downtime have been studied.
Significant achievements and impact:
VUV-FEL LLRF system has been commissioned and is in operation. First data on reliability have been obtained.

Deviations from plan: None

JRA1.9.2.2 Radiation damage study

Progress: In line with schedule.
An SRAM based radiation monitor has been installed close to magnet power supplies in the VUV-FEL tunnel near the undulator to investigate why some of the power supply controllers have failed. In addition bubble dosimeters, TLDs and an ionisation chamber provide the necessary calibration of the neutron and gamma dose. Requirements for DOOCS interface for on-line readout have been developed.
Significant achievements and impact:
SRAM based radiation monitors are installed to study degradation of power supply controllers in the VUV-FEL tunnel.
Deviations from plan: None

JRA1.9.3 Hardware

JRA1.9.3.1 Multichannel downconverter

Progress: In line with schedule.
Detailed noise studies on 250 kHz down converters have been performed. Results show that the actual noise is 10-100 times higher than the specification of critical components in data sheet. The reason is external noise sources and design flaws. A proposal for a new low noise down converter has been made. Linearity of down converter if used for 81 MHz IF has been measured and is of the order of 10e-3. The actual requirements for the control of the vector-sum are evaluated.

Picture of 3rd generation downconverter.

- 8 in/output channels, 1 LO input
- Linearity <-50dB
- Crosstalk between channels <-50dB
- LO leakage <-50dB @ 1.3GHz
- LO stability –15dB - –5dB

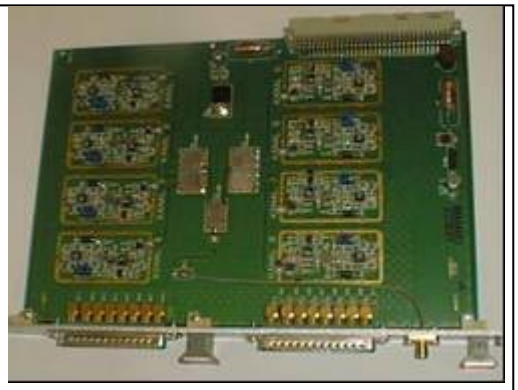


Figure JRA1.11.2: Downconverter design and measured parameters.

Significant achievements and impact:
Noise sources in VUV-FEL down converters have been analysed and are understood.
Deviations from plan: None

JRA1.9.3.2 Third generation RF control

Progress: In line with schedule.
Mezzanine board with 8 ADCs, 4 DACs and Virtex II FPGA has been debugged and performance has been evaluated. Noise level of 4 mV rms will be reduced further in the next version of the design. Presently the controls software for one superconducting cavity has been developed and the system will be tested with a cavity in Chechia by end of this year.
Significant achievements and impact:
The third generation RF system is ready for testing with a superconducting cavity in Chechia.
Deviations from plan: None

JRA1.9.3.3 Stable frequency distribution

Progress: In line with schedule.
The performance of fiber optic monitoring system in climate chamber has been evaluated. Interferometric measurement with an optical phase shifter based controller guarantees system stability of better than one picosesond. The Master Oscillator phase noise close to carrier is about 10 dB higher than specified mainly due to excessive phase noise of the MTI reference oscillator which does not meet the specification in their datasheet. We will need to replace the reference oscillator with one from Wenzel.

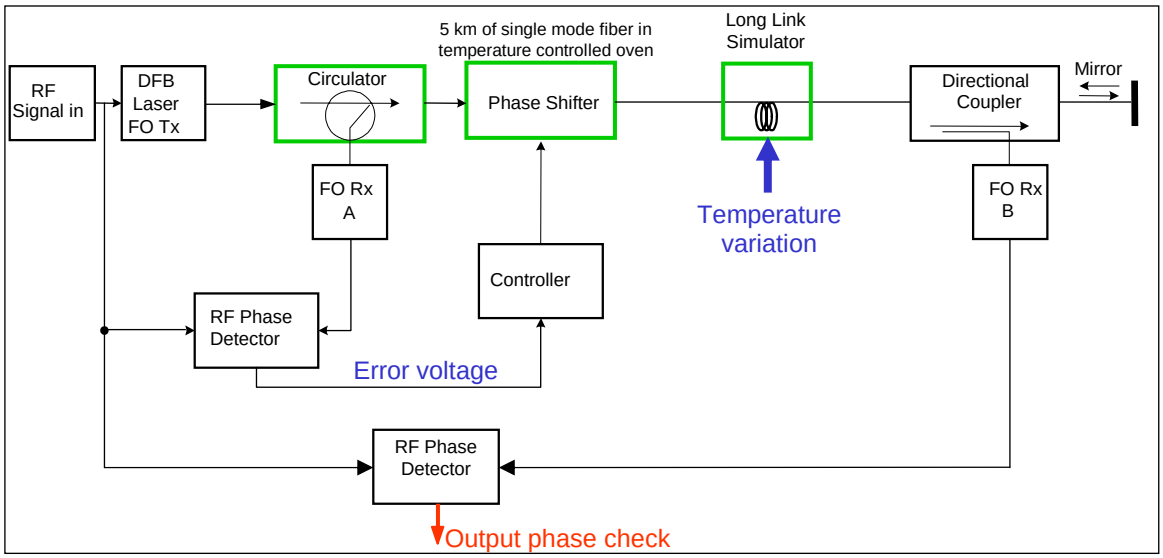


Figure JRA1.11.3: Schematic of fiber optic RF distribution for monitoring long term drift.

Significant achievements and impact:
Demonstrated stability of fiber optic reference distribution (for monitoring) of better than 1 ps over 5 km fiber.
Deviations from plan: None

JRA1.9.4 Software

JRA1.9.4.1 Data management development

Progress: In line with schedule.
The requirements document for the database has been developed and most of the required features have been implemented in DOOCS. Database will be ready for testing at the beginning of next year.

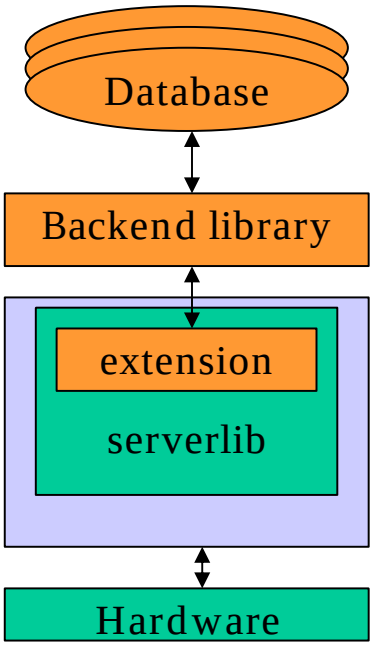


Figure JRA1.11.4: Concept for data management

Significant achievements and impact:
Developed requirement document for database
Deviations from plan: None

JRA1.9.4.2 RF Gun control

Progress: In line with schedule.
The RF gun without probe has been operated with stability of better than 2 degrees in phase and 1% in amplitude with control of forward power only. The system which calculates filed field from forward and reflected power ahs been designed. Plan is to test performance of the field calculation with beam at the beginning of next year.

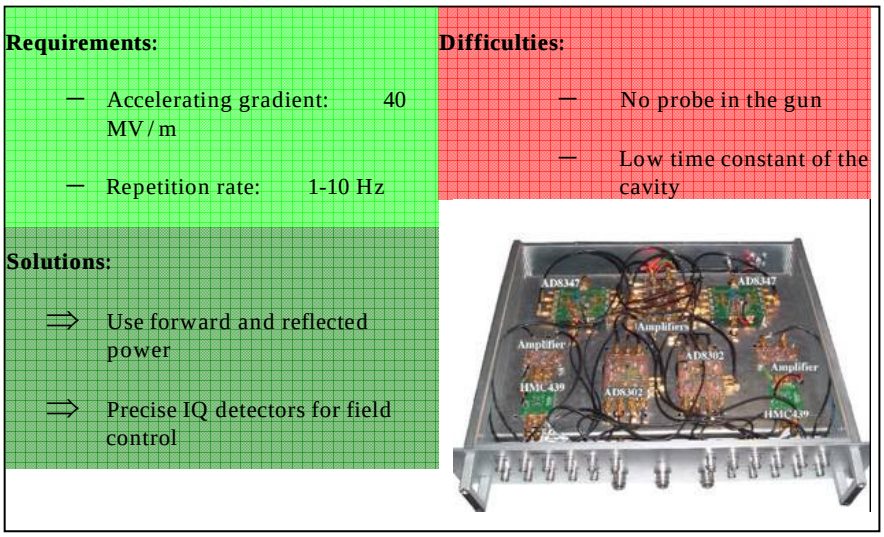


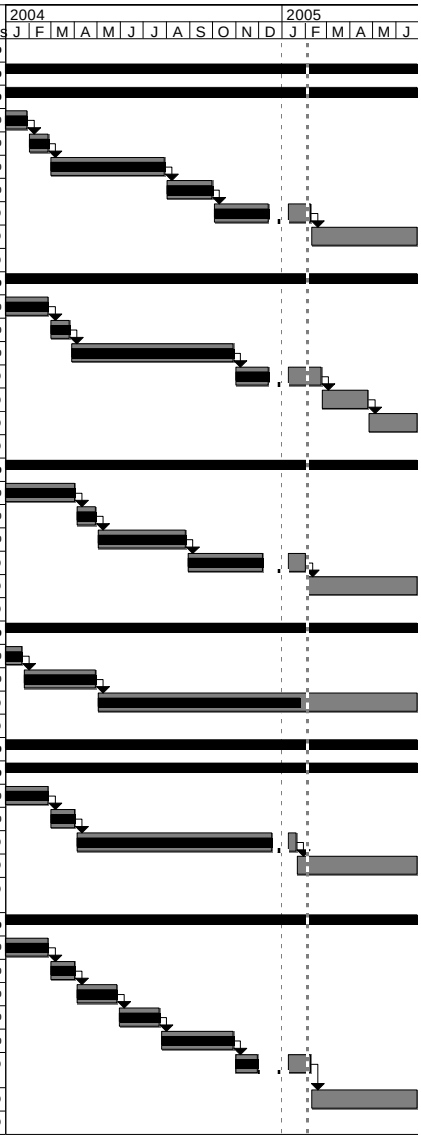
Figure JRA1.11.5: RF Gun Control

Significant achievements and impact:
A stability of better than 2 degrees in phase and 1% in amplitude has been achieved with control of forward power (no probe signal provided by gun).
Deviations from plan: None

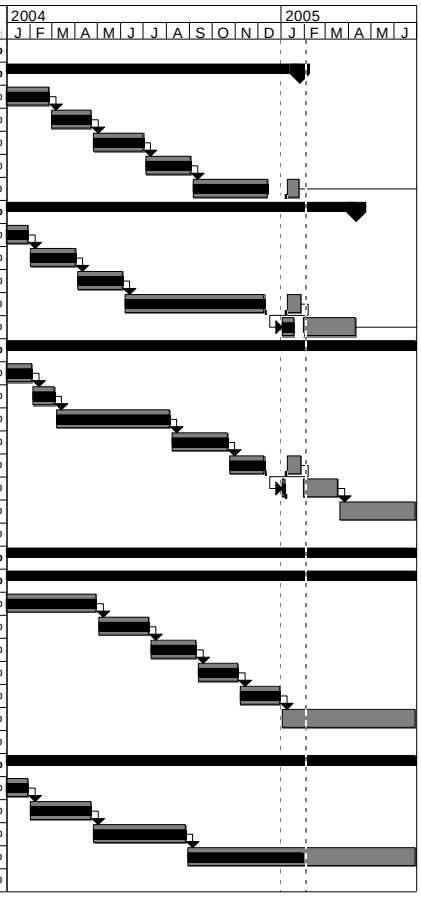
JRA1.9.3 Overall Progress of Work Package 9

The following table highlights the progress of work planned in the year 2004 for the Work Package WP9 by listing the lowest level subtasks of the SRF detailed implementation plan.

N°	Task Name	Milestones	Main Deliverables	Contractor	% schlos
9	**WP9 LOW LEVEL RF (LLRF)**				**57%**
9.1	**Operability and technical performance**			**DESY**	**51%**
9.1.1	**Transient detector**			**DESY**	**47%**
9.1.1.1	Define requirements			**DESY**	100%
9.1.1.2	Electronics design			**DESY**	100%
9.1.1.3	Build prototype and evaluate			**DESY**	100%
9.1.1.4	Final design of detector			**DESY**	100%
9.1.1.5	Installation and commissioning			**DESY**	70%
9.1.1.6	Test with beam			**DESY**	0%
9.1.1.7	**Report on transient detector test**	**Status Report**		**DESY**	0%
9.1.2	**LLRF Automation**			**DESY**	**52%**
9.1.2.1	Dialogue with industrial experts			**DESY**	100%
9.1.2.2	Develop full specification			**DESY**	100%
9.1.2.3	Implement FMS for subsystems			**DESY**	100%
9.1.2.4	Test and evaluation			**DESY**	50%
9.1.2.5	Implement improvements			**DESY**	0%
9.1.2.6	Evaluation and acceptance by operators			**DESY**	0%
9.1.2.7	**Report on LLRF atomization design**	**Status Report**		**DESY**	0%
9.1.3	**Control optimization**			**DESY**	**44%**
9.1.3.1	Specification of system			**DESY**	100%
9.1.3.2	Conceptual design of controller			**DESY**	100%
9.1.3.3	Performance simulation			**DESY**	100%
9.1.3.4	Implementation in DSP hardware			**DESY**	80%
9.1.3.5	Implementation and tests on TTF			**DESY**	0%
9.1.3.6	**Evaluation of test results**	**Status report**		**DESY**	0%
9.1.4	**Exceptional handling routines**			**DESY**	**64%**
9.1.4.1	Specification			**DESY**	100%
9.1.4.2	Design of exceptional handler			**DESY**	100%
9.1.4.3	Implementation and test on TTF			**DESY**	55%
9.1.4.4	**Report on exceptional handler operatio**	**Status Report**		**DESY**	0%
9.2	**LLRF cost and reliability study**			**TUL**	**56%**
9.2.1	**Cost and reliability study**			**TUL**	**56%**
9.2.1.1	Identify cost drivers of present LLRF			**TUL**	100%
9.2.1.2	Develop cost reduction ideas			**TUL**	100%
9.2.1.3	Build prototypes and evaluate			**TUL**	95%
9.2.1.4	Final design of LLRF system			**TUL**	0%
9.2.1.5	**Complete design of LLRF system for reduced cost**	**Status Report**		**TUL**	0%
9.2.2	**Radiation damage study**			**TUL**	**56%**
9.2.2.1	Identify critical electronics issues			**TUL**	100%
9.2.2.2	Evaluate TESLA radiation			**TUL**	100%
9.2.2.3	Develop tests for components			**TUL**	100%
9.2.2.4	Procure and assembles test set up			**TUL**	100%
9.2.2.5	Data acquisition from radiation tests			**TUL**	100%
9.2.2.6	Analyze results and develop countermeasures			**TUL**	50%
9.2.2.7	Implement countermeasures and verify			**TUL**	0%
9.2.2.8	**Report on radiation damage studies**	**Status Report**		**TUL**	0%



N°	Task Name	Milestones	Main Deliverables	Contractor	% schlo
9.3	**Hardware**			**WUT-ISE**	**67%**
9.3.1	**Multichannel downconvertor**			**WUT-ISE**	**95%**
9.3.1.1	Study and compare technologies			**WUT-ISE**	100%
9.3.1.2	Select optimum PCB design			**WUT-ISE**	100%
9.3.1.3	Build prototype and evaluate			**WUT-ISE**	100%
9.3.1.4	Finalize multichannel dow nconverter			**WUT-ISE**	100%
9.3.1.5	Determine characteristics			**WUT-ISE**	85%
9.3.2	**Third generation RF control**			**WUT-ISE**	**80%**
9.3.2.1	Integrate system generator w ith VHDL			**WUT-ISE**	100%
9.3.2.2	Complete specification			**WUT-ISE**	100%
9.3.2.3	Demonstrate simulator			**WUT-ISE**	100%
9.3.2.4	Final design of RF electronic board			**WUT-ISE**	90%
9.3.2.5	Evaluate performance			**WUT-ISE**	20%
9.3.3	**Stable frequency distribution**			**WUT-ISE**	**45%**
9.3.3.1	Complete specification			**WUT-ISE**	100%
9.3.3.2	Concept ional design of frequency			**WUT-ISE**	100%
9.3.3.3	Build prototype and evaluate			**WUT-ISE**	100%
9.3.3.4	Final design			**WUT-ISE**	100%
9.3.3.5	Procurement and assembly of subsystems			**WUT-ISE**	70%
9.3.3.6	Installation and commissioning			**WUT-ISE**	10%
9.3.3.7	Performance test w ith beam			**WUT-ISE**	0%
9.3.3.8	**Report on new LLRF hardware compon**		**Final Report**	**WUT-ISE**	0%
9.4	**Software**			**WUT-ISE**	**58%**
9.4.1	**Data management development**			**WUT-ISE**	**59%**
9.4.1.1	Specification			**WUT-ISE**	100%
9.4.1.2	Conceptional design w ith DOOCS			**WUT-ISE**	100%
9.4.1.3	Prototype			**WUT-ISE**	100%
9.4.1.4	User evaluation			**WUT-ISE**	100%
9.4.1.5	Finalize design			**WUT-ISE**	100%
9.4.1.6	Implementation in TTF			**WUT-ISE**	0%
9.4.1.7	**Report on data management developme**		**Final report**	**WUT-ISE**	0%
9.4.2	**RF gun control**			**WUT-ISE**	**58%**
9.4.2.1	Write specification			**WUT-ISE**	100%
9.4.2.2	Design of controller			**WUT-ISE**	100%
9.4.2.3	Procurement and assembly			**WUT-ISE**	100%
9.4.2.4	Installation and test			**WUT-ISE**	35%
9.4.2.5	**Report on RF gun control tests**		**Final Report**	**WUT-ISE**	0%



WP 9: On schedule

JRA1.10 Work Package 10: Integrated RF tests in a horizontal cryostat

JRA1.10.1 Adaptation of CryHoLab

Cry-Ho-Lab, the RF test facility in a horizontal cryostat has been suggested for testing components developed within the Joint Research Activity “Superconducting RF”, in parallel with other tests carried out for the JRA “HIPPI”.

The different components for JRA-SRF (high power coupler, cold tuners and low level RF system) will be previously designed in work packages WP7, WP8 and WP9. These tests could be planned at full RF power (1.5 MW pulsed – 1 ms – 10 Hz) on a fully equipped 9-cell cavity (1300 MHz). Thirty weeks, with helium production, are foreseen for these tests and scheduled according to each work package agreement. The manpower required is 3.8 man-years and the estimated cost for the helium is 650 k€, based on 5 €/liter, including helium losses and operating costs for the cryogenic generator.

Before starting the tests it is necessary to ensure the 9-cell cavity is running correctly, at 2K and at full RF power. In that context, the following mechanical adaptations on the Saclay infra-structures have been necessary:

- Trolleys for cavity handling in clean room and transport to CryHoLab,
- Mechanical parts to insert and to support the cavity in the cryostat,
- Flange to connect high power coupler to CryHoLab vacuum vessel,
- Connections to the helium pipe, thermal sensors, super-insulation.
- Wave guide connection between klystron 1.3 GHz and CryHolab

For that purpose we have collected cavity and coupler drawings from DESY and we have determined the right position of the cavity inside CryHoLab. It will be necessarily shifted off the main axis of the cryostat.

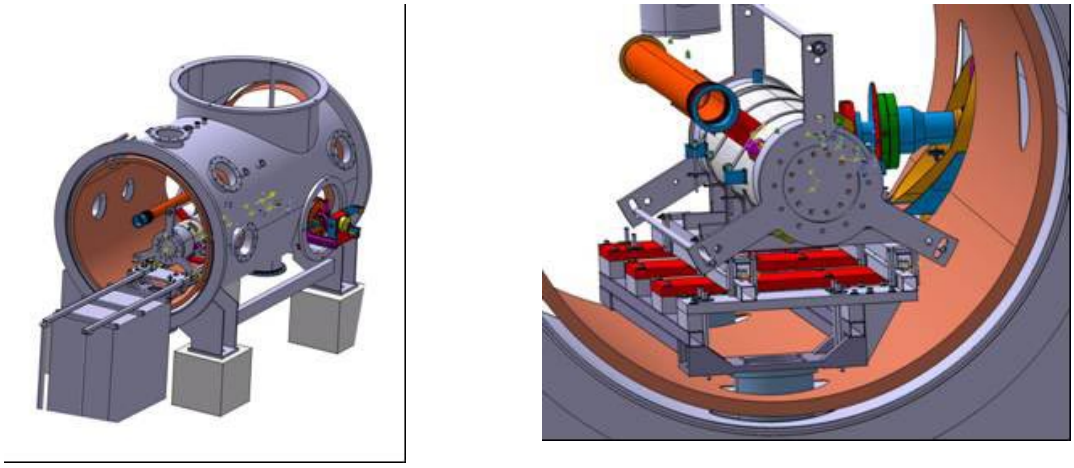


Fig.JRA1.10.1: 3D-drawings showing the mechanical support of the cavity and the coupler connection to CryHoLab.

The mechanical adaptations were designed in June and received from manufacturers at the end of September. The 9-cell cavity (C45 - E_{acc}=20 MV/m) and the high power coupler (TTF-III unconditioned) have been transferred to CEA/Saclay from DESY and CNRS-Orsay (LAL). These elements, although readily available, do not exhibit the best performance and are not the final tests ones. However they were satisfactory for the first feasibility test. The whole system was assembled to check for correct positioning in CryHoLab. Some finishing touches have been nevertheless necessary.
The definitive assembly of the cavity (equipped with thermal sensors, super-insulation), coupler and RF wave guide has been realized and the first cool down of the cryostat has taken place.

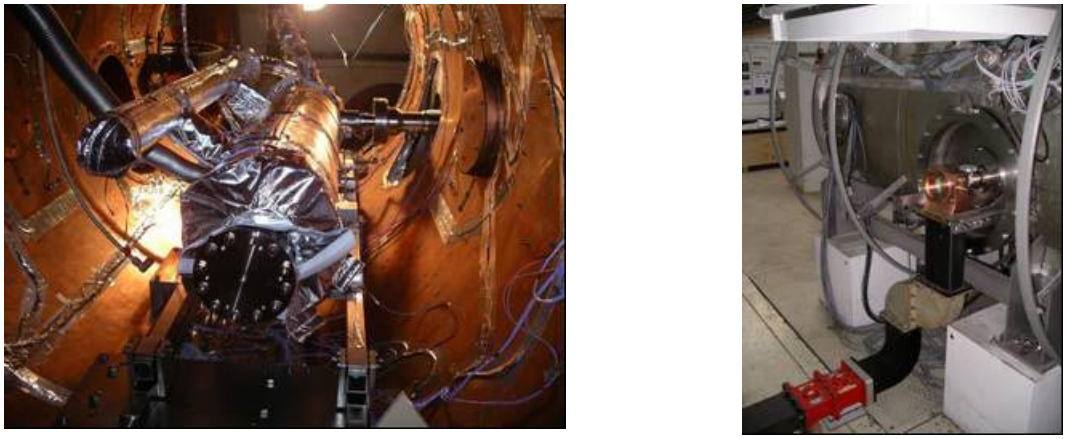


Fig.JRA1.10.2: Pictures showing the cavity installation in CryHoLab and the coupler connection to the RF wave guide.

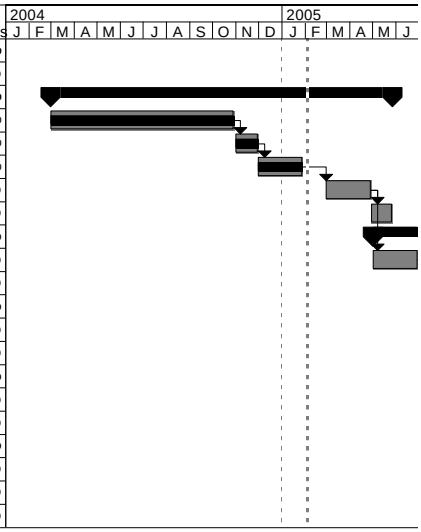
The objective of this test (first part) is to check all the potential cryogenic problems (helium tank filling, coupler cool down, temperature measurements and helium bath pumping…) and to measure the static helium consumption at 4.2 and 1.8 K. The second part of the test, planned in March 2005, will be to check the cavity running at high RF power with a conditioned coupler. The real test planed in the CARE proposal will begin only after qualification of “cavity-coupler-CryHoLab” system, probably in April 2005 with the installation and the test of the new CEA-Tuner.

In the CARE proposal, we have stated that it was necessary to displace CryHoLab from "l'Orme des Merisiers" area to the main CEA/Saclay Center and scheduled this action over duration of 6 months. The transfer should take place before the RF tests and should have been started during the first part of 2004, and then again between November 2004 and May 2005. In fact for technical reasons this transfer will not be possible before September 2005. Nevertheless this delay for the CryHoLab displacement has no consequences for the RF tests because all the preliminary actions (adaptation to 9-cell cavity, cryogenic and high power validation tests) are undertaken at the present time.

JRA1.10.2 Overall Progress of Work Package 10

The following table highlights the progress of work planned in the year 2004 for the Work Package WP10 by listing the lowest level subtasks of the SRF detailed implementation plan.

N°	Task Name	Milestones	Main Deliverables	Contractor	% schlos
10	**WP10 CRYOSTAT INTEGRATION TESTS**				**36%**
10.1	Displace CRYHOLAB			**CEA**	0%
10.2	**CRYHOLAB adaption to 9 cell**			**CEA**	**78%**
10.2.1	Mechanical adaption			**CEA**	100%
10.2.2	Low performance cavity and coupler			**CEA**	100%
10.2.3	Assembly in CRYHOLAB and cryogenic test			**CEA**	100%
10.2.4	High performance coupler - High pow er pulsed te			**CEA**	0%
10.2.5	High performance cavity transfered from DESY			**CEA**	0%
10.3	**Integration tests in cryostat (1st test)**	**Status report**		**CEA**	**0%**
10.3.1	CEA could tuning system			**CEA**	0%
10.3.2	Evaluate experimental results			**CEA**	0%
10.4	**Integration tests in cryostat (2nd test)**	**Status report**		**CEA**	**0%**
10.4.1	Magnetostrictive tuner			**CEA**	0%
10.4.2	Evaluate experimental results			**CEA**	0%
10.5	**Integration tests in cryostat (3rd test)**			**CEA**	**0%**
10.5.1	Piezoelectric tuner			**CEA**	0%
10.5.2	Evaluate experimental results			**CEA**	0%
10.6	**Integration tests in cryostat (4th test)**			**CEA**	**0%**
10.6.1	New coupler from LAL			**CEA**	0%
10.6.2	Evaluation of results			**CEA**	0%
10.6.3	**Final evaluation**		**Final Report**	**CEA**	0%



WP 10: On schedule

JRA1.11 Work Package 11: Beam Diagnostics

JRA1.11.1: Beam position monitor (CEA)

The activity of this year has been to install one monitor (BPM) inside the ACC1 cryostat, check the behaviour under cooling at 2 K, and measure the beam-induced signals. Another part of the activity has been to start designing a new version of the monitor.

JRA1.11.1.1 Monitor installed in beam line

The first milestone (Present BPM installed in TTF module) has been met. Figure JRA1.11.1 shows this unit before insertion into the cryomodule.

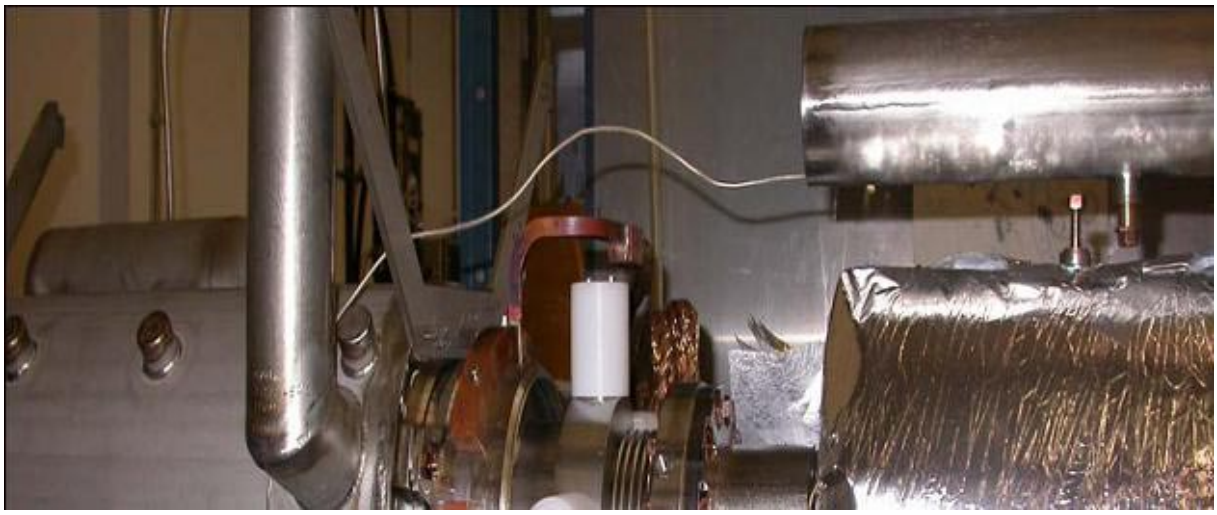


Fig.JRA1.11.1: BPM insert before installation inside tunnel, adjacent to the accelerating cavity. Four antennas are protected by plastic cylinders during mounting.

A critical point was the feedthrough fragility, 50% of the feedthroughs had to be rejected. Finally no leak or anomalous heat dissipation have been reported during cooling down and later functionning. Another issue is the lengthy cleaning of the unit. It took several days before the dust particle counter went down to the tolerable level. Finally the cleaning has been efficient. Both issues will be addressed for the next BPM version.
The first measurements with beam show clean BPM signals and are shown on Fig.JRA1.11.2. The connection of the diagnostic to the control system will only be operational after fixing the (reused) processing electronics. Two people from CEA are working on this. This causes a 3-month delay with respect to the schedule, without consequences to the rest of the planning.

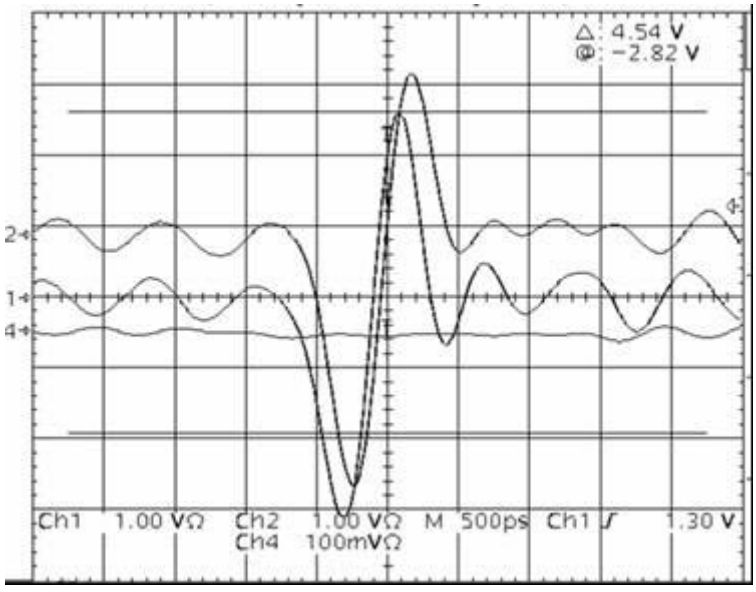


Fig.JRA1.11.2: BPM signals (channel 1 and 2) for a 1 nC 100 MeV beam. They are measured with an oscilloscope directly connected to the antennae, without the processing electronics.

JRA1.11.1.2 Design of a new monitor version

Studies are going on to optimize the position of the antennae with an RF simulation code. Fig.JRA1.11.3 is a quarter of a BPM cavity with two of the antennae, showing the RF field distribution. The main optimization parameter is the longitudinal position of the antennae. The criteria are the dipole mode sensitivity and separation from the monopole mode.

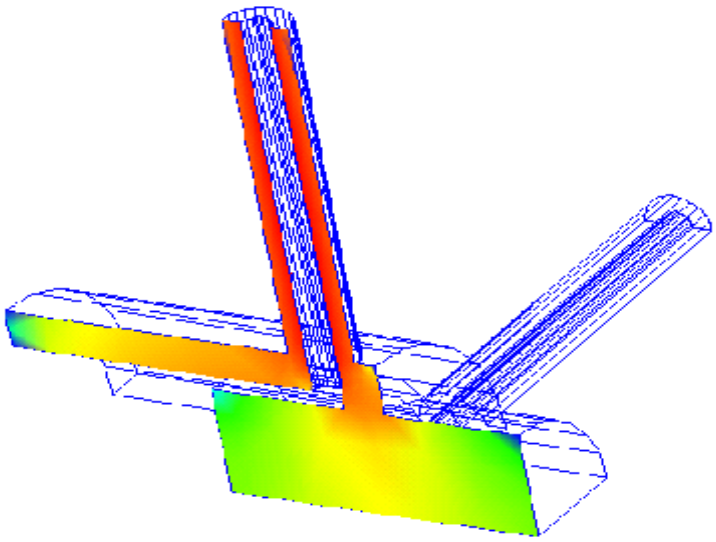


Fig.JRA1.11.3: BPM cavity simulation showing the RF field distribution. The beam axis is the rotational symmetry axis. A quarter of the cavity and 2 antenna pickups are shown.

A new person has been hired to improve this RF design, which causes delay on the mechanical design of the next BPM unit. More delay was caused by discussions on the mechanical interfacing to the neighbouring quadrupole. CONFLAT flanges will be used until the quadrupole final design is agreed. A decision was taken to have separate experiments for cryogenic tests without beam and warm beam tests.
The design of new feedthroughs is continuing after an off-the-shelf design has been considered and rejected.

JRA1.11.2 Beam Emittance Monitor

The first year of activity was mostly dedicated to a simulation of the measurement, in order to define the parameters of the diffraction screen, of the optics and of the imaging device.
Due to the delay in the recruitment of the required additional personnel, we concentrated our effort in the simulation of the preliminary measurement that can be performed with the present lower TTF energy. For the nominal 1 GeV final energy, we only checked that qualitatively the results were what we expected from approximated analytical expressions. An example is shown if Fig.JRA1.11.4 in which the angular distribution of Diffraction Radiation at 800 nm, produced by a 1 GeV beam with normalized emittance of 5 x10-6 m-rad and a transverse dimension of 50 μm (rms), passing through a 1 mm slit is represented.

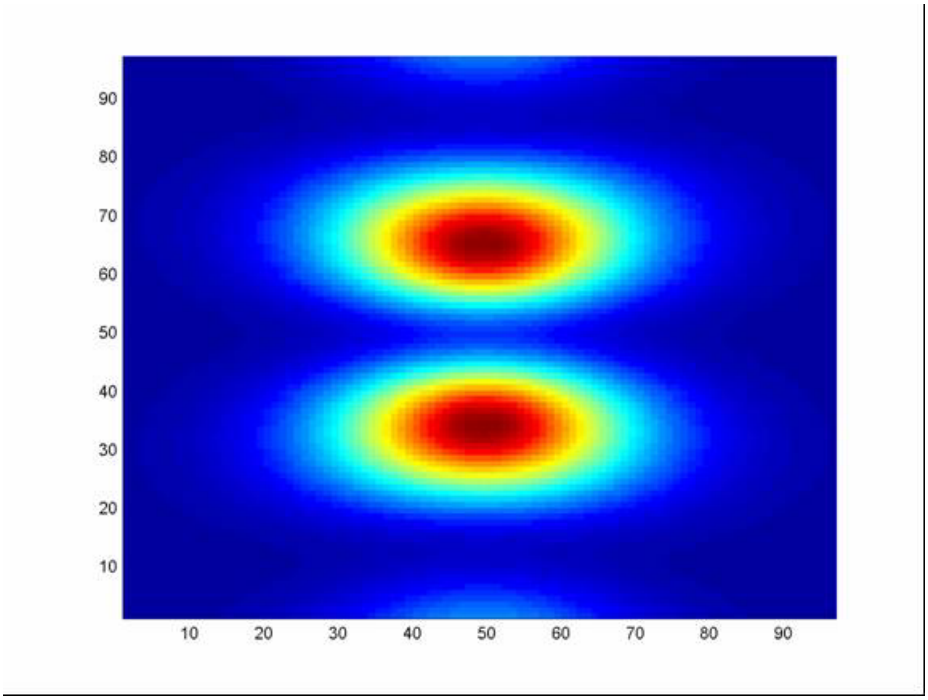


Fig.JRA1.11.4: Diffraction Radiation angular distribution for a 1 GeV beam.

At the lower energy of 500 MeV, there is the problem of the low level of radiation intensity, which can only be increased by decreasing the slit aperture and increasing the wavelength. In any case we are limited to 0.5 mm for the slit width by the beam size, and, for the wavelength, by the requirement to remain in the visible range. The use of a high sensitivity camera, possibly cooled to minus 30-40 degrees Celsius, should allow a first measurement.
It will be difficult, for the low S/N ratio, to obtain the required resolution of the image, but it will be sufficient for testing the hardware, verifying the principle of the measurement and, of great importance, to verify the effect of beam halo, dark current and the synchrotron radiation background.
Some of the results are shown in Figs.JRA1.11.5-6. In all pictures, the beam has a normalized emittance of 5×10^{-6} mrad and the slit has 0.5 mm width. The beam size is 50 μm in Fig.JRA1.11 and, 100 μm in Fig.JRA1.11.7.

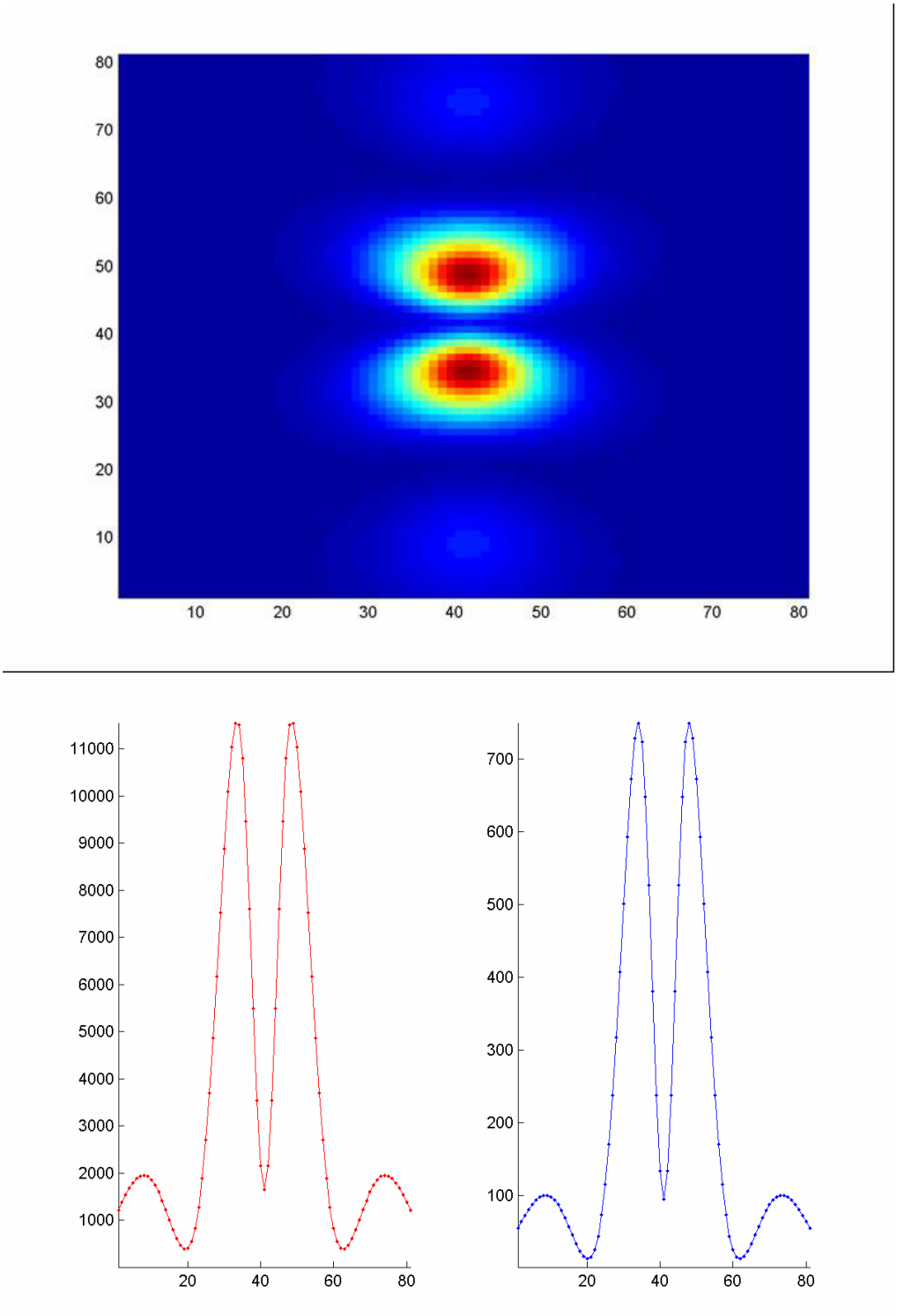


Fig.JRA1.11.5: Angular distribution at 500 MeV and vertical distributions (Total vertical distribution and central line distribution). The beam size is 50 µm.

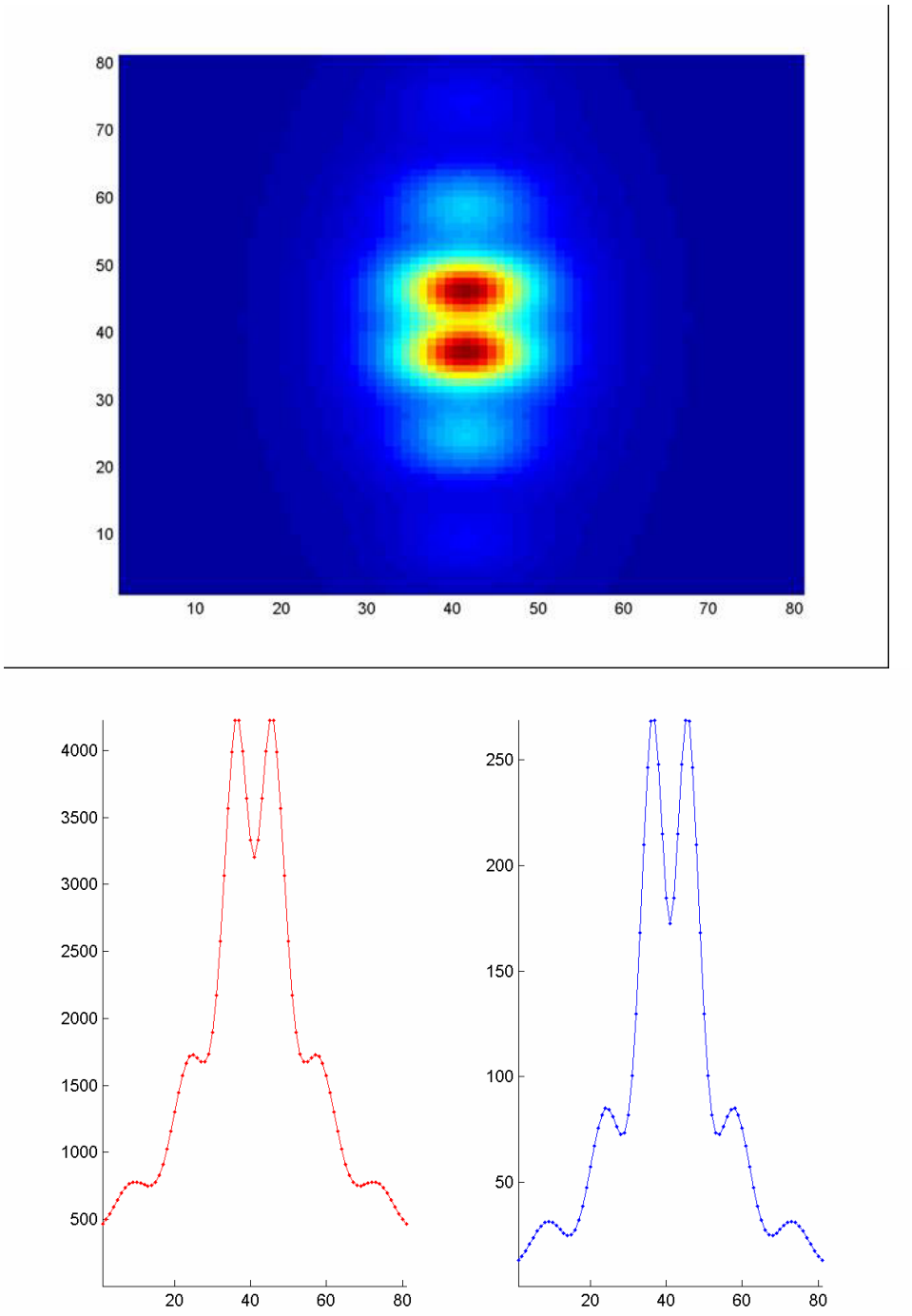


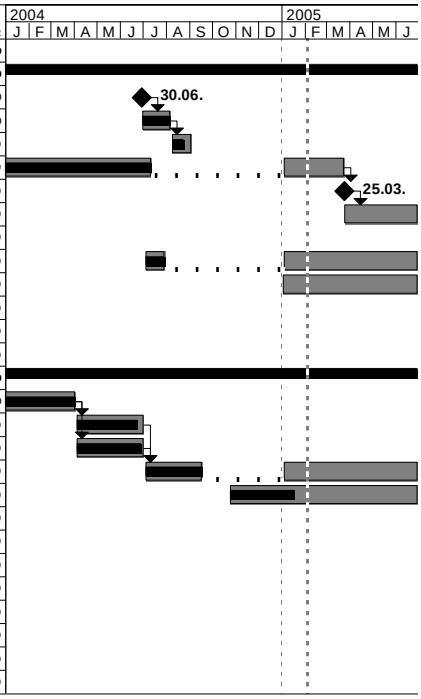
Fig.JRA1.11.6: same Angular distribution at 500 MeV and vertical distributions (Total vertical distribution and central line distribution). The beam size is equal to100 µm.

After these simulations, we have frozen the design of the diffraction screen and of the mechanical actuator, and ordered them. We still need some time to completely define the optics and the camera.

JRA1.11.3 Overall Progress of Work Package 11

The following table highlights the progress of work planned in the year 2004 for the Work Package WP11 by listing the lowest level subtasks of the SRF detailed implementation plan.

N°	Task Name	Milestones	Main Deliverables	Contractor	% schlo
11	**WP 11 BEAM DIAGNOSTICS**			**CEA**	**19%**
11.1	**Beam position monitor**			**CEA**	**16%**
11.1.1	**Present BPM installed in TTF module**	**Start Measureme**		**CEA**	100%
11.1.2	Cryogenic measurements on BPM			**CEA**	100%
11.1.3	Beam tests of BPM on TTF			**CEA**	60%
11.1.4	Design of BPM Cavity			**CEA**	70%
11.1.5	Design of BPM cavity ready			**CEA**	0%
11.1.6	Fabrication of BPM Cavity			**CEA**	0%
11.1.7	BMP cavity ready			**CEA**	0%
11.1.8	Development of new hybrid coupler and electronic			**CEA**	10%
11.1.9	Design of Digital Signal Processing			**CEA**	0%
11.1.10	**New BPM ready for Installation**		**BPM Prototyp**	**CEA**	0%
11.1.11	Beam Tests with new BPM			**CEA**	0%
11.1.12	**Evaluation of BPM operation**		**Final report**	**CEA**	0%
11.2	**Beam Emittance Monitor**			**INFN-LNF**	**22%**
11.2.1	Slit width simulations			**INFN-LNF**	100%
11.2.2	Slit design			**INFN-LNF**	90%
11.2.3	Optics simulations			**INFN-LNF**	95%
11.2.4	Optics appropriations			**INFN-LNF**	25%
11.2.5	System assembly and tests			**INFN-LNF**	25%
11.2.6	Mechanical assembly at TTF			**INFN-LNF**	0%
11.2.7	Optical assembly at TTF			**INFN-LNF**	0%
11.2.8	Integration of controls into TTF			**INFN-LNF**	0%
11.2.9	**Ready for beam test in TTF**	**Start Measureme**		**INFN-LNF**	0%
11.2.10	Beam tests at TTF			**INFN-LNF**	0%
11.2.11	Evaluate first beam test result	**Status Report**		**INFN-LNF**	0%
11.2.12	Successive measurements			**INFN-LNF**	0%
11.2.13	**Final evaluation**		**Final Report**	**INFN-LNF**	0%



WP11.1: Delay in the design of BPM cavity (Task 11.1.4) due to mechanical interface problems with the neighbouring quadrupole.
WP11.2: On schedule

JRA1.12 Significant Achievements

- Scientific investigations on coated Niobium films by the “vacuum arc method” have shown that the superconducting properties, i.e. T_c and Δ T, are the same as in bulk Niobium.
- Progress in the design of a new tuner system by partners from Poland Italy, France and Germany demonstrated professional cooperation and communication in a high-tech area by a European consortium.

JRA1.13 List of all milestones and deliverables (D) during the reporting period

Deliverable / Milestone No	Deliverable (D) / Milestone (M) Name		WP / Task No	Lead Contractor	Planned (in months)	Achieved (in months)
1	Final report on reliability issues	D	2.1.7	DESY	9	14
2	Summary report on the status of the art on ancillaries on the experience of various laboratories involved in SCRF	M	2.2.1.3	INFN-Mi	7	10
3	Report about new design for components	M	2.2.1.9	INFN-Mi	12	15
4	Tools design finished	M	2.3.1.6	DESY	12	12
5	Seamless by spinning:Design finished	M	3.1.1.3	INFN-LNL	9	9
6	Seamless by hydroforming:Design finished	M	3.2.1.3	DESY	9	9
7	Linear-arc cathode coating: Prototype ready	M	4.1.1.3	IPJ	7	10
8	Linear-arc cathode coating:Start of coating	M	4.1.1.6	IPJ	12	15
9	Planar-arc cathode coating: Prototype ready	M	4.2.1.3	INFN-Ro2	9	9
10	Surface characterization fixed	M	5.1.1.2	CEA	5	5
11	EP on single cells:Best EP parameters	D	5.1.1.4	CEA	12	15
12	EP on single cells:3 cavities fabricated	M	5.1.2.2	CEA	12	15
13	EP on single cells:First operation of EP set up	M	5.1.3.4	CEA	12	16
14	EP on multi-cells:Proof-of-Principle experiment hot water rinse	M	5.2.1.1.3	DESY	9	19
15	Automated EP (AEP): EP installation ready	M	5.3.1.4	INFN-LNL	9	14
16	Automated EP (AEP): Software ready	M	5.3.2.4	INFN-LNL	9	14
17	Dry ice cleaning: Installation finished	M	5.4.1.5	DESY	12	16
18	SQUID scanning: Calibration defects finished	M	6.1.1.3	DESY	8	8
19	SQUID scanning:Design Scanner finished	M	6.1.2.3	DESY	11	11
20	Flux gate magnetometry:Calibration defects finished	M	6.2.1.3	INFN-LNL	7	15
21	Design flux gate head finished	M	6.2.2.4	INFN-LNL	9	12
22	DC field emission: Start scanning activity	M	6.3.1.3	DESY	6	6
23	Report on simulation	M	7.1.2	CNRS-Orsay	6	6
24	Engineering completed	M	7.1.4	CNRS-Orsay	12	12
25	Report on actuator/piezo sensor	M	8.4.2	CNRS-Orsay	7	15
26	Report on radiation hardness tests	M	8.4.4	CNRS-Orsay	12	20
27	Beam position monitors: Present BPM installed in TTF	M	11.1.1	INFN-LNF	6	6
28	Design of BPM cavity ready	M	11.1.5	INFN-LNF	10	15

JRA1.14 List of major meetings organized under SRF during the reporting period

Date	Title/Subject	Location	Number of attendees	Website address
21-23 Jan. 2004	SRF kick-off meeting during TESLA Meeting	DESY (Zeuthen)	30	http://jra-srf.desy/e24/e26/index_eng.html
3 Feb. 2004	Meeting WP 3,5,7,8,10	Orsay (France)	25	
12 Feb. 2004	Meeting WP 5, 6	INFN (Legnaro)	15	
12 Feb. 2004	Meeting WP 8	DESY (Hamburg)	10	http://tesla.desy.de/~sekalski/
9 Sept. 2004	SRF plenary, during TESLA Meeting	Orsay (France)	21	
3 Nov. 2004	SRF plenary, during CARE04 Meeting	DESY (Hamburg)	210	http://care04.desy.de/

1.5.2 JRA2: Charge Production with Photo-Injectors (PHIN)

The list of participants and their implication in the PHIN Work Packages (**C**: Coordination, X: Participation) is given in the table below. The overall management is done by INFN-LNF and by CERN.

Number	Participant	WP1 M&C	WP2 CP	WP3 LASER	WP4 GUN	Person-months
3	**CNRS**	X	X	X	X	77.9
	CNRS-Orsay	X	X	X	**C**	51.5
	CNRS-LOA		X		X	26.4
9	**FZR**	X			X	34.5 (10.5)
10	**INFN**	**C**		X	X	39 (13)
	INFN-LNF	**C**		X	X	22 (8)
	INFN-Mi			X		17 (5)
11	**TEU**		X	X		2.3
17	**CERN**	**C**	X	X	**X**	21.2 (2)
20	**CCRLC**	X		**C**		8.6
	CCLRC-RAL	X		**C**		8.6

JRA2.1 Work Package 1: Management and Communication

JRA2.1.1 Meetings

Three PHIN Collaboration Meetings were held. The first one took place on November 19th 2003 at CERN; the second on May 5th in Frascati, in parallel with the ELAN Collaboration Meeting and the third on November 3rd, in parallel with the CARE Annual Meeting.

Three PHIN Steering Committee Meetings were organized in 2004: the first on February 3rd in Paris, the second on May 6th in Frascati, in parallel with the ELAN Collaboration Meeting and the third on November 3rd in Hamburg, in parallel with the CARE Annual Meeting.

Two meetings took place at CERN where PHIN issues were discussed: the first on 18th June between CEA/DAPNIA, CNRS-LAPP and CERN and, the second one on December 17th between CEA/DAPNIA and CERN.

Three video conferences were held on May 26th, 14th July and October 11th between CERN and CCLRC-RAL where progresses on laser issues were analyzed.

Seven video conferences were held on March 3rd , March 30th , April 28th , May 26th , June 23rd , July 14th and September 15th between CERN and CNRS-Orsay where progresses on RF guns issues were analyzed.

Joint Meetings with other Collaborations include the Photogun Collaboration Meeting, held in Dresden on September 29th, the Gun Diagnostics Meeting held in Berlin on October 27th and the CTF3 Collaboration Meeting that took place at CERN on November 23rd-25th.

JRA2.1.3 Web sites

A PHIN web page has been set up at http://www.infn.it/phin/. This page shows the institutions participating to the JRA and provides links to their web sites. General documentation such as the PHIN proposal and reports on the various activities is accessible.

The web page contains also a report on the PHIN Collaboration Meeting, which took place in Frascati on May 5th 2004. In particular, all the presentations given at the meeting are accessible.
Every Work Package has a dedicated section which includes reports on their activities and other specific documents. The web site is continuously maintained in order to provide up-to-date information on PHIN activities.

FZR, together with CERN and Twente University, is organizing a web page for a photocathode data base. An overview of the existing knowledge on photocathodes for RF photoelectron injectors and, the status of the research and development of the Work Package on Charge Production are given. The first draft version of this web site is available at http://www.fz-rossendorf.de/projects/CARE/index.html

JRA2.1.3 External Scientific Advisory Committee

The composition of the PHIN External Scientific Advisory Committee includes

- Roberto Corsini, CERN
- Klaus Floettmann, DESY
- Paolo Michelato, INFN Milano - LASA
- Ingo Will, Max Born Institute, Berlin

The report from the ESAC, following the presentations given at the second PHIN Collaboration meeting on May 5th, 2004 in Frascati can be found on the PHIN website

JRA2.2 Work Package 2: Charge Production

JRA2.2.1 Description of the work

Data on the lifetime and quantum efficiency of photocathodes used in recent experiments have been collected and statistical analysis has been performed. The lifetime studies and measurements of the most promising photocathodes are in progress. A large part of the year was dedicated to the recovery of the photoemission lab. After more than 10 operational years most vacuum flanges of the preparation chamber were worn and have to be changed. A new bake out equipment, clean room compatible, has been defined and bought and will be installed at the beginning of 2005. All the vacuum transfer equipments were maintained and realigned. The installation of a new co-evaporation setup is current. In the context of Dissemination, a new informal collaboration was setting up with the CEA-SP2A (CEA, Bruyères-le-Châtel, F) to study and to exchange new photocathodes Secondary Emission Enhanced (SEE) proposed by BNL (Upton NY, USA). (CERN)

A report on photocathode experience in the Twente University photoinjector (a Los Alamos design) has been prepared. An exchange of expertise with the CERN and FZR institutes on quantum efficiency and lifetime versus cathode material thickness and purity, vacuum and operating conditions has begun. (TEU)

The characteristics of more than 30 photocathodes, including preparation conditions, quantum efficiency measurements, operating laser wavelength, life time, vacuum conditions, etc. were collected and compared in a report (available on PHIN web page). The data collection has been actualized and extended during the last six months. (CERN, FZR-ELBE, TEU)

A web-page based presentation (photo cathode data base) of the collected data on photo cathodes has been developed and will be available in its first draft version at begin of 2005. (CERN, FZR-ELBE, TEU)

The design of the cathode transfer system and preparation chamber for the SRF-Gun is complete. The fabrication of the parts of the new photocathode preparation equipment is

finished. The assembling of the new photo cathode preparation equipment at FZR is under way. Most of the functional and vacuum components are delivered. The new 10 mW UV laser system for the quantum efficiency measurements in the preparation system is installed and first functional tests have been carried out. The installation work of the control electronics has been started and the PC software is under development. The old preparation equipment will not be longer used and further studies of photo cathodes for the SC RF gun will be continued after finishing the new preparation system. (FZR-ELBE)

Preparations are being made for setup of diagnostic methods to characterizing photo cathodes. A flexible elipsometry setup is designed and parts are ordered. Research on Magnesium cathodes for applications in photo injector for Laser Wake Field Accelerators is started. A temporary preparation chamber is being modified to handle the preparation of these photo cathodes. Diagnostics for monitoring cathodes during the preparation process are under evaluation. (TEU)

In collaboration with the LPC, a review of the cathode preparation chamber has been done. A modified drawing to make easier the construction of the chamber and the cathode production is under way. (CNRS-Orsay)

Measurements of the energy and quality of the electron beam produced from a laser-driven plasma have recently been performed using existing hardware. 3D simulations on particle production by the laser-plasma interaction have been developed, and measurements have been made of electron beam quality versus gas jet pressure. Plasma channelling has been also studied to achieve improved performance. Studies of the characteristics and specifications for the 1 GeV spectrometer are in progress. The first demonstration of monoenergetic electron beam in the laser plasma accelerator concept has been achieved. A new compact electron spectrometer design is under study. (CNRS-LOA)

JRA2.2.2 Overall Progress of Work Package 2

The following table highlights the progress of work planned in the year 2004 for the Work Package WP2 by listing the lowest level subtasks of the PHIN detailed implementation plan.

WP2	Title	Original begin date	Original end date	Estimated Status	Revised end date
2.1	**High efficiency photocathode for 3 GHz RF gun**				
	High efficiency photocathode comparison	Jan. 2004	Nov. 2005	50 %	
	Photocathode preparation equipment construction	Jan. 2004	June 2005	60 %	
2.2	**Photocathode for SC cavity**	May 2004	June 2006	20 %	
	Photocathode preparation equipment upgrade	Jan. 2004	Mar. 2005	50 %	
2.3	**Laser driven plasma source**				
	High energy plasma source design	May 2004	Oct. 2004	20 %	
	100 MeV laser driven plasma source R&D	Nov 2004	Dec. 2007	80 %	

JRA2.3 Work Package 3: LASER

JRA2.3.1 Description of the work

High power diode-pumped solid-state (DPSS) laser science is a rapidly advancing area and during the project's first year it was necessary to review and update the proposed programme in several ways to take advantage of the latest developments

It was originally planned to build a high power laser oscillator but, between the proposal and the start of the project, CW oscillator/amplifier combinations with the required properties became commercially available. With a view to reducing the project risk a specification for a

commercial system was prepared and a call for tenders was completed in August. After visits to the manufacturers a 10 W, 1.5 GHz system from HighQ Lasers was chosen. This is due for delivery in February 2005.

Detailed design of the high power pulsed amplifiers was carried out, concentrating on issues which included thermal lensing, thermal fracture, pulse energy stability and related feedback and control. The design was modified to allow operation at 50Hz (compared with the 5 Hz envisaged at the proposal stage). This required re-balancing the thermal loads on the Nd:YLF amplifier rods to avoid thermal fracture. A group at the Technical University of Vienna has experience in this area and is collaborating with a Russian company who use ion-exchange techniques to improve Nd:YLF's thermal shock resistance. CERN and RAL are considering the possibiliy to have some Nd:YLF samples treated and tested by them.

A nominal design for the amplifier heads has been produced. This is substantially simpler than the unit built for the PILOT programme and promises to be more reliable and easier to work with.

The laser diodes needed to pump the amplifiers will consume a significant fraction of the project budget, so their specification has been prepared with some care and has involved direct consultation with manufacturers. An initial call for tender went out in November and the responses will be considered in January 2005.

Towards the end of the year extra staff effort was transferred to the project and preliminary work has begun on the design of the macropulse slicing and feedback control systems. (CCLRC-RAL)

The main piece of work under WP3 has been the specification for a picosecond pulsed UV laser for NEPAL photoinjector. This was completed during 2004 and is now in the hands of the administration in view of a call to tender. Four firms have been contacted (CNRS-Orsay)

First experiments on pulse shaping with the acousto-optic modulator (Dazzler) have been performed in collaboration with Politecnico di Milano, achieving pulse characteristics meeting the required target before the amplifier system.

Simulations on transverse pulse shaping have been carried out in order to optimize the amplitude uniformity of the laser spot on the cathode.

Studies of the laser – photoinjector optical transfer line pointing stability are in progress.

To obtain the required flat top pulse in the temporal domain the DAZZLER acousto-optic (AO) filter has been tested at the Source Development Laboratory of the Brookhaven National Laboratory. The capabilities of the AO shaper were tested with an amplified Ti:Sa laser system. The filter has been mounted at the exit of the oscillator before the chirped pulse amplification. The characterization of the shaped pulse has been carried out using a ps streak camera and a high resolution spectrometer. A flat top pulse with 2 ps rise and fall time and negligible ripple has been obtained after the compressor at the fundamental wavelength. Preliminary measurements have been conducted on the effect of the third harmonics generation on the temporal profile of the laser pulse.

During 2004 five main areas have been addressed:

1. A study of the physics and the technology of laser pulse-shaping and of relevant systems.
2. The development of computer codes for algorithms to driving the pulse-shaping systems.
3. The development in the Milano lab of a Nd:YAG laser as a tool for investigation of pulse-shaping.
4. Carrying out the first tests on the behaviour of a computer-programmable LCM-CP liquid crystal light modulator.

5. Participating in the tests of the DAZZLER pulse-shaping system

In the first two areas we have written three published articles (listed elsewhere). We have reported the power of the genetic algorithm we have developed in providing, with a particular mask, a rectangular waveform. We have also described a new conceptual design of a shaping system for providing relatively long rectangular pulses, or other different profiles. Finally we have published a design for the pulse shaping system we propose for the SPARC project.

Concerning the hardware we have developed in our lab (CCLRC-RAL) we have delivered the following:
1. a stable 90 ps, 100 MHz, 3 W mode-locked Nd:YAG laser, followed by an optical fibre which increases the bandwidth from 0.02 nm to ~1.5 nm,
2. a beam profiler with associated software for on-line data acquisition,
3. a high resolution spectrum analyser, with data acquisition software via LabView,
4. an autocorrelator with a scan-rate of ~1 Hz, again with a LabView data acqusition system.

A 4f-system has been assembled inside the SLM-mask and work on pulse formation is under way. So far we have done the following:
1. tests of pulse compression imposing a parabolic chirp,
2. tests on the generation of pairs of pulses with different time intervals,
3. implementation of a genetic algorithm in a system with feedback, with the aim of driving the system to a definite pulse length.

(INFN-LNF, INFN-MI)

JRA2.3.2 Overall Progress of Work Package 3

The following table highlights the progress of work planned in the year 2004 for the Work Package WP3 by listing the lowest level subtasks of the PHIN detailed implementation plan.

WP3	Title	Original begin date (Annex 1)	Original end date (Annex1)	Estimated Status	Revised end date
3.1	**Laser System**				
3.1.1	High power oscillator design	Jan. 2004	June 2004	100%	
3.1.2	High power oscillator construction	Jun. 2004	Jan. 2005	90%	Feb. 2005 delivery
3.1.3	High power amplifier design	Jan. 2004	Sep. 2004	70%	Feb. 2005
3.1.4	High power amplifier construction	Sep. 2004	July 2005	10%	
3.2	**Pulse shaping (PS)**				
3.2.1	PS Simulation and design	Jan. 2004	June 2004	85%	
3.2.2	Phase mask acquisition and test	Jun. 2004	Apr. 2005	30%	
3.2.3	Dazzler acquisition and test	Jan. 2004	May 2005	80%	
3.3	UV generation and feedbacks				
3.3.1	UV harmonic generator R&D	Jan. 2004	June 2004	80%	Jan 2005
3.3.2	UV harmonic generator test	Jun. 2004	Apr. 2005	20%	July 2005
3.3.3	Laser-RF feedback development	Jan. 2004	Jun. 2005	20%	July 2005

JRA2.4 Work Package 4: RF GUN and Beam Dynamics

JRA2.4.1 Description of the work

The design work for the SRF gun is completely finished and the final mechanical drawings of all subsystems are ready: cavity with RF ports, choke filter and helium vessel, cavity tuners, photo cathode, photo cathode cooling system, photo cathode transfer system, photo cathode storage and transport chamber, cryomodule with liquid nitrogen and magnetic shield, ports for liquid nitrogen and helium (a view of the cryomodule design is visible in Fig.JRA2.4.1). The simulations (RF fields and particle tracking) necessary for the gun cavity design has been

finished and published. The specification for the new helium transfer line between SRF gun and cryo-plant has been worked out and the tender can be placed.

The fabrication of the tuners is finished. A photocathode cooling system was delivered but the company could not fulfill the specifications. The test bench for photocathode cooling tests is ready and the measurements can be started after delivery of the system. A second test bench for RF measurements of the gun cavity (bead pull system) is under construction.

The schedule for the niobium cavity treatment after delivery in January 2005 is fixed (technology decisions, preparation steps and collaboration, measurements, warm tuning) and the necessary tools and equipments will be available. (FZR-ELBE)

The CTF3 gun was designed with 2D and 3D RF simulation codes. The found electric field was used to perform numerical simulations of the beam dynamics. The results were in agreement with the technical specifications of CTF3. In May and June 2004, the symmetry of the RF fields in the third cell of the photo-injector was investigated. According to the H. Braun calculations one could obtain a strong degradation of the beam emittance due to the quadrupolar component resulting from the amplitude difference of the electric field in the two orthogonal transverse directions. The solution at this problem was to modify the shape of the third cell. Thanks to a racetrack shape, the asymmetry of the RF fields was reduced by a factor 10 with respect to the cylindrical design. The vacuum quality was improved with a modification of mechanical design. We decided to drill 42 holes in the photo-injector walls which are connected to an envelope around the gun. The inner surface of the envelope is coated with NEG pumping. The calculations showed a reduction by a factor 2 of the residual pressure in the gun. RF simulations gave no evidence of a degradation of the gun performances due to the holes in the photo-injector walls. However, due to this new feature, the diameter of the photo-injector is slightly bigger. So, we studied the design of the magnetic coils which were foreseen to be installed around the gun in order to compensate the emittance growth due to the space charge forces. The simulations with a 2D code allowed us to find that it is impossible to use only 2 magnetic coils side by side on the gun because it would exceed the current density limitations in the copper. Hence, in principle, we should put a third coil after the waveguide to enhance the magnetic field and reduce the power supply requirement. But vacuum considerations led us to use only 2 coils: one bucking coil to keep zero amplitude on the photo-cathode and the focusing coil placed just after the waveguide. In this design, the emittance is almost the same and it leaves enough space to connect bigger vacuum pipes to the external envelop for a lower residual pressure. Now, all the simulations are finished and the technical drawings too. First, we plan to order 2 prototypes: one for the RF tuning of the structure and the other for vacuum studies.

In parallel, we are preparing the construction of a small accelerator with the same photo-injector at LAL. Technical drawings of the preparation chamber are almost finished and the technical specifications document for the laser was written and is being reviewed by the financial service of the IN2P3. (CNRS-Orsay)

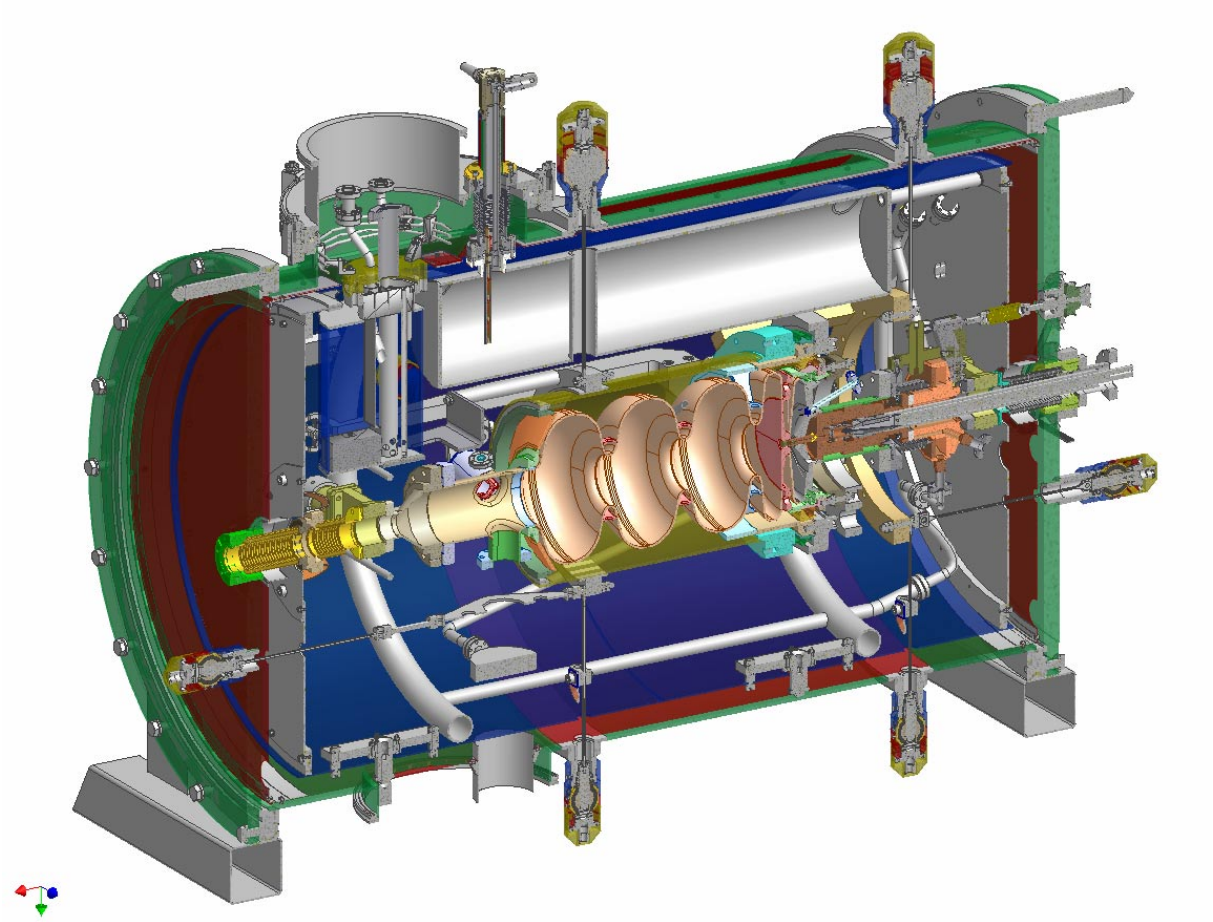


Fig.JRA2.4.1: Cryomodule design of the SRF Gun

As suggested by members of the last review committee, we have carefully checked the possibility to use a coaxial coupler to feed the RF gun instead of our tow ports coupler. HFSS simulations have indicated that, for our conditions of input RF power induced by heavy electric charges, the level of the field is too high on the tip of antenna to have a safe operation; consequently we have abandoned this option.

In the goal to have a field-symmetry in the coupler cavity as high as possible, we have decided to eliminate undesirable quadripolar effects by using a racetrack-geometry for this volume. After a long simulation work, the determination of dimensions is now completed. The best field compensation is obtained for a space between axes of the tow cylindrical parts of only 0.6 mm.

The vacuum level is a critical issue for this project, particularly in cathode cavity. We have planned to increase the pumping speed to pump not only by the axial channel but also by 44 holes distributed in the half-cavity and the second cavity and connected to an integrated coaxial NEG pump. Because of the mechanical complexity of this scheme, this solution will be adopted only if present simulations give a vacuum limit greater than 50%.

To preserve the quality of copper surface after backing a oxygen free silvered copper (copper C10700) is considered, the OFS is in balance with the conventional OFHC copper which have a better brazing property.

The increase of specifications in terms of field symmetry and speed pumping in regard of initial ones have a little bit delayed the final design, now we have an operational design.

Without waiting the final drawing a quotation of the mechanical part of the RF gun is under way.

During this period, 5 regular videoconferences with our CERN partners have been held with usually 4 members of each institute. A specific meeting at CERN has been organized to compare RF simulations.

The work on the radioprotection design of the RF gun electrons line is in progress.

JRA2.4.2 Overall Progress of Work Package 4

The following table highlights the progress of work planned in the year 2004 for the Work Package WP4 by listing the lowest level subtasks of the PHIN detailed implementation plan.

WP4	Title	Original begin date (Annex 1)	Original end date (annex1)	Estimated Status	Revised end date
4.1	**SC RF gun**				
4.1.1	Technology development	Jan. 2004	Oct. 2004	100 %	
4.1.2	SC RF gun simulation optimization	Jan. 2004	Dec. 2004	100 %	
4.2	**3 GHz RF gun**				
4.2.1	3 GHz RF gun design	Jan. 2004	Dec. 2004	80%	
4.3	**Spectrometer for e- beam**				
4.3.1	1-50 MeV spectrometer design	Jan. 2004	Mar. 2004	80%	Mar. 2005
4.3.2	1-50 MeV spectrometer construction	Mar. 2004	Dec. 2005	0%	

JRA2.5 Significant Achievements

- The first demonstration of a high charge (0.5nC) mono-energetic 170 MeV ± 20 MeV electron beam in the laser plasma accelerator concept has been achieved, a result published in Nature and other journals.
- Experiments on pulse shaping with the acousto-optic modulator (Dazzler) achieving the required laser pulse characteristics before the amplifier system.
- The progress in the design of a superconducting RF photo-injector

JRA2.6 List of all milestones and deliverables (D) during the reporting period

Deliverable/ Milestone No	Deliverable/Milestone Name	Workpackage /Task No	Lead Contractor(s)	Planned (in months)	Achieved (in months)
1	High efficiency photocathode comparison	WP2 / 2.1	CERN, FZR	12	12
2	High energy plasma source design report	WP2 / 2.3	CNRS-LOA	10	delayed
3	High power oscillator design report	WP3 / 3.1	CCLRC	6	6
4	Amplifier design report	WP3 / 3.1	CCLRC	8	14
5	Pulse shaping simulation and design: intermediate report	WP3 / 3.2	INFN-Mi INFN-LNF	6	18
6	UV harmonic generator R&D: intermediate report	WP3 / 3.3	CNRS-Orsay	6	19
7	SC RF gun design report	WP4 / 3.1	FZR	12	12
8	3 GHz RF gun design report	WP4 / 4.2	CNRS-Orsay	12	12
9	1-50 MeV spectrometer design report	WP4 / 4.3	CNRS-LOA	3	rescoped*

* following the successful plasma acceleration of an electron beam at 170 MeV, the low energy spectrometer design effort redirected towards the high energy spectrometer design and construction.

JRA2.7 List of major meetings organized under SRF during the reporting period

Date	Title/subject	Location	Number of participants	Website Address
3 Feb. 2004	1st PHIN Steering Committee	Paris (France)		
5 May 2004	2nd PHIN Collaboration Meeting	INFN (Frascati)	12	http://www.infn.it/phin/PHIN_Coll_Meeting-2004-05-05.html
6 May 2004	2nd PHIN Steering Committee	INFN (Frascati)		
18 June 2004	DAPNIA/LAPP/CERN Meeting	Geneva (Switerland)		
29 Sept. 2004	Photo-Gun Collaboration Meeting	Dresden (Germany)	25	
27 Oct. 2004	Gun Diagnostics Meeting	Berlin (Germany)	25	
3 Nov. 2004	3rd PHIN Collaboration Meeting	DESY (Hamburg)	12	
4 Nov. 2004	3rd Steering Committee Meeting	DESY (Hamburg)		
21 Dec. 2004	Meeting on SRF Gun-Cavity preparation	Dresden (Germany)	10	

1.5.3 JRA3: High Intensity Proton Pulsed Injector (HIPPI)

The list of participants and their implication in the HIPPI Work Packages (**C**: Coordination, X: Participation) is given in the table below. The overall management is done by CERN.

Number	Participant	WP1 M&C	WP2 NC	WP3 SC	WP4 CHOP	WP5 BD	Person-months
1	**CEA**	X	X	**C**	X	X	26.6
3	**CNRS**	X	**C**	X	X	X	16
	CNRS-Orsay			X			5.5
	CNRS-LPSC	X	**C**	X	X	X	10.5
4	**GSI**	X				**C**	38
5	**IAP-FU**		X	X		X	36 (24)
7	**FZJ**			X		X	34.6
10	**INFN**			X		X	18 (6)
	INFN-Mi			X		X	18 (6)
17	**CERN**	**C**	X		**C**	X	90.6 (21)
20	**CCLRC**		X		X	X	21.6
	CCLRC-RAL		X		X	X	21.6

JRA3.1 Work Package 1: Management and Communication

The participating laboratories have acknowledged reception of 75 % of the E.U. allocation for the first 18 months. Efforts are being made to organize accounting in a convenient way, both for the laboratories and the activity coordinator who has to integrate the information.

One quarterly and three intermediate activity reports have been published since the beginning of the year (http://mgt-hippi.web.cern.ch/mgt-hippi/activity_reports/activity_reports.html)

The External Scientific Advisory Committee (ESAC) members have been nominated and the yearly HIPPI event is now organized (http://hippi04.web.cern.ch/hippi04/index.htm).

Between end 2003 and end 2004, i.e. after the HIPPI approval, the ISTC (International Science and Technology Center) in Moscow has approved three projects for the construction in Russia of prototypes of normal conducting accelerating structures for the CERN project (Linac4). Two of these prototypes concern structures planned to be studied in WP2 of HIPPI. Therefore, to avoid duplication of efforts, the management of HIPPI negotiated the adaptation of the contributions of the CNRS-LPSC, CEA and CERN to complement the ISTC projects. Exchange of information between HIPPI and the ISTC projects is encouraged, but teams, work plan and resources will remain separate. Russian institutions will be only financed by the ISTC.

In the frame of the ISTC project #2888, a full scale DTL Alvarez prototype will be built in Russia. It is worth mentioning that, although some work was foreseen on this subject inside WP2, such a realization was not possible with the resources in HIPPI. The quadrupoles in the drift tubes will use permanent magnets. However, only a single drift tube will be equipped with a quadrupole; the others being “dummy”. Magnetic measurements will be performed at CERN. (More details are given in sections 4.2 and 4.3). The high power waveguide coupler will be jointly designed by the CEA and CNRS-LPSC (sub-task 1.1.2: “Development of critical DTL components”). Because of the unexpectedly high cost of the 700 MHz klystron

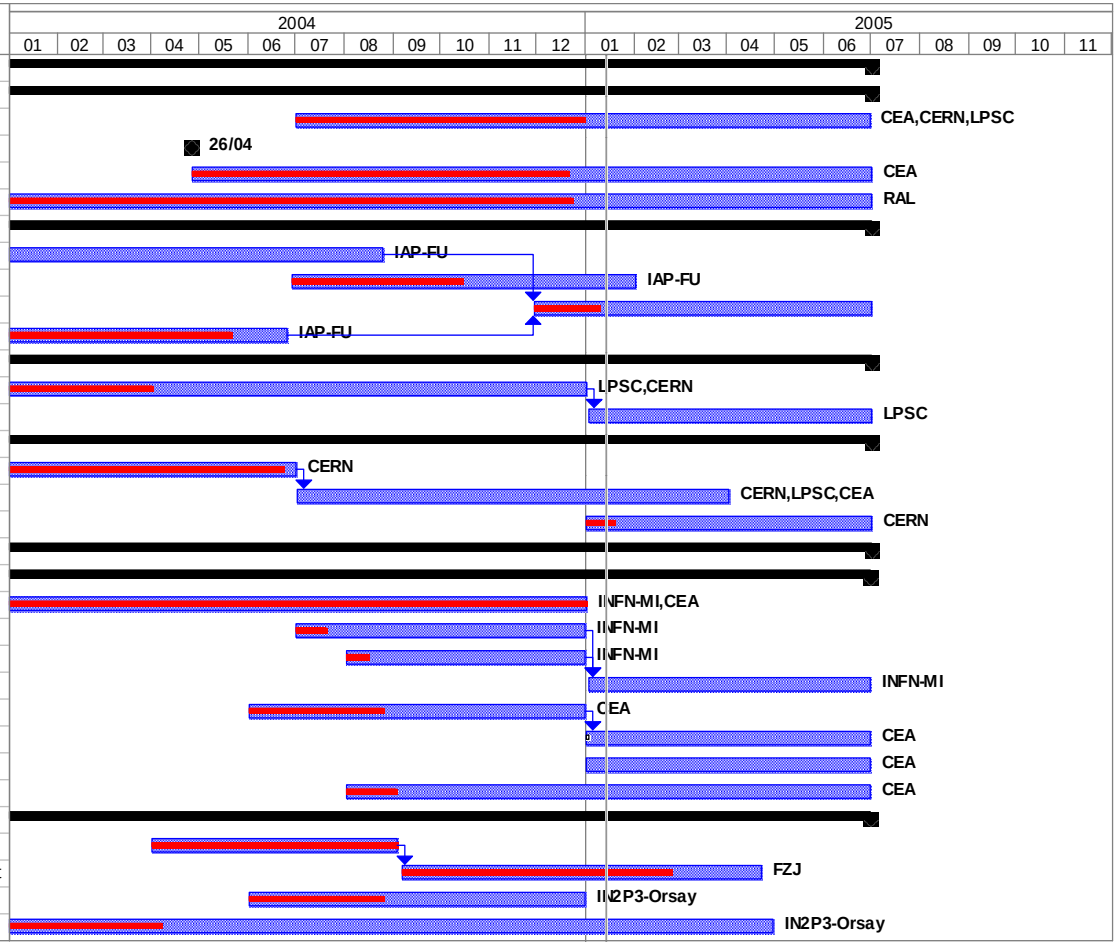
needed for the high power test place at CEA-Saclay, this will be the only contribution of the CEA to the Alvarez DTL developments. High power RF tests will be done at CERN.

In the frame of the ISTC project #2875, a CCDTL prototype will be built. It will be the device foreseen in WP2 - task 1.4.2 (Prototype design, construction, and test). The preliminary design will be done inside HIPPI, while detailed design and construction will be delegated to the Russian laboratories. Testing will be done at CERN, again inside HIPPI.

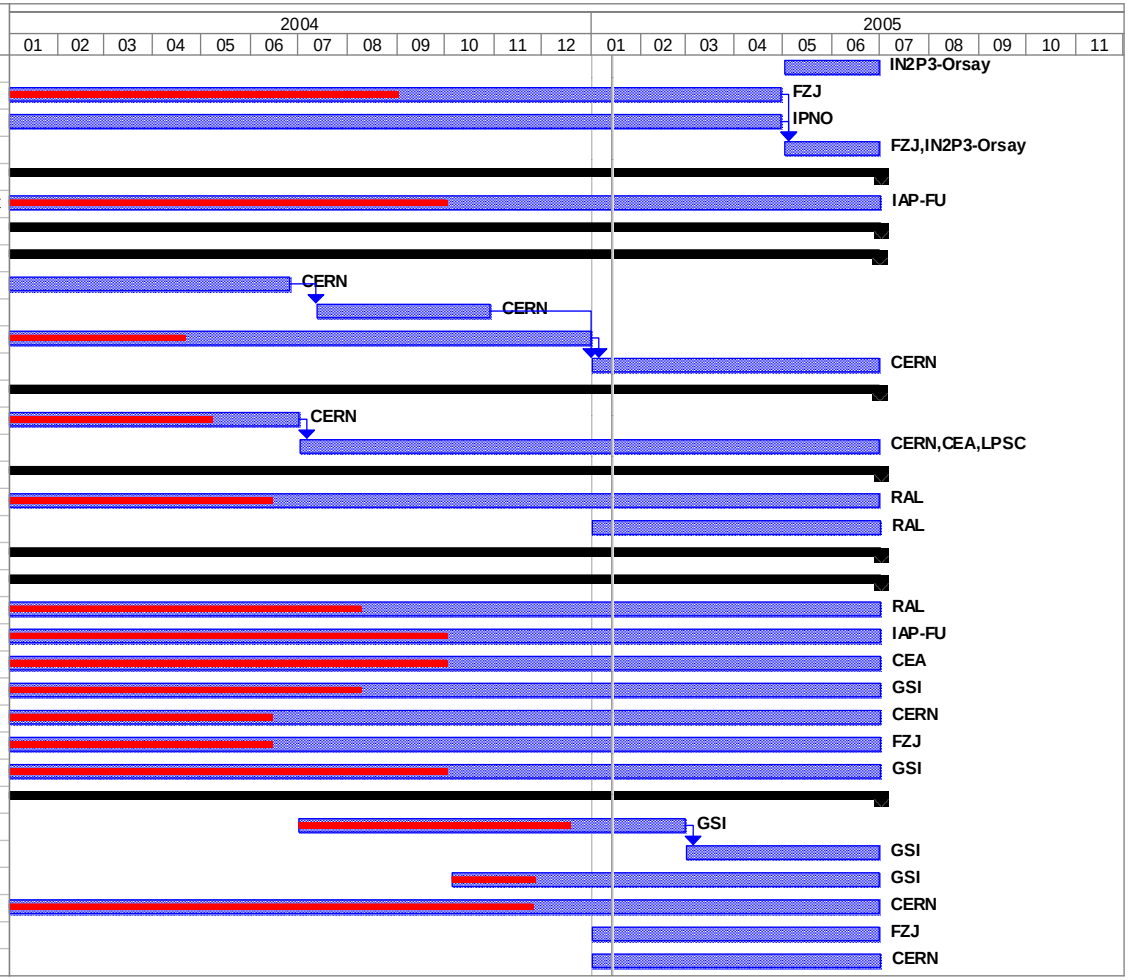
JRA3.1.1 Overall Progress of the Activity

The overall progress of the HIPPI activity is described in the following Gantt chart which specifies the involvement of each contractor in the work packages and tasks.

ID	Task Name	Deliverables
1	**WP2: NORMAL CONDUCTING STRUCTURES**	
2	**2.1 Drift Tube Linac**	
3	2.1.1 DTL design	
4	2.1.2 Decision on prototyping	
5	2.1.3 Prototype component development	
6	2.1.4 DTL beam dynamics design	
7	**2.2 H-mode Drift Tube Linac**	
8	2.2.1 RF model CH tank1 RF design	
9	2.2.2 RF cold model design & construction	
10	2.2.3 RF model construction	
11	2.2.4 Beam dynamics design CH tank1	06/05 Design report
12	**2.3 Side Coupled Linac**	
13	2.3.1 RF model RF design	
14	2.3.2 RF model mechanical design	
15	**2.4 Cell Coupled Drift Tube Linac**	
16	2.4.1 Pre-prototype construction	
17	2.4.2 Pre-prototype high-power RF tests	06/05 Report
18	2.4.3 Prototype mechanical design	
19	**WP3: SUPERCONDUCTING STRUCTURES**	
20	**3.1 ELLIPTICAL CAVITIES**	
21	3.1.1 Cavity A vertical tests	12/04 Report
22	3.1.2 Mechanical design of tuner, leverage system, m	12/04 Design report
23	3.1.3 Integration of piezo design	
24	3.1.4 Tuner construction	
25	3.1.5 Design cavity B	
26	3.1.6 Construction cavity B	
27	3.1.7 Power coupler design & engineering	
28	3.1.8 RF source order & preparation	
29	**3.2 SPOKE CAVITIES**	
30	3.2.1 Test stand preparation at FZJ	
31	3.2.2 Evaluation of 700 MHz resonator in vertical cry	03/05: Evaluation report
32	3.2.3 Evaluation of 352 MHz 2-gap res. in vertical cry	
33	3.2.4 Design of coupler prototype	



ID	Task Name	Deliverables
34	3.2.5 Test of coupler prototype	
35	3.2.6 Design of 352 MHz multi-gap resonator	05/05 Design report
36	3.2.7 Design of coupler and tuner	
37	3.2.8 Engineering of resonator, coupler and tuner	
38	**3.3 CH RESONATOR**	
39	3.3.1 Study of tuning system	06/05 Conceptual report
40	**WP4: CHOPPING**	
41	**4.1 CHOPPER STRUCTURE A**	
42	4.1.1 Pre-prototype construction	03/05 report
43	4.1.2 Pre-Prototype testing	06/05 Design report
44	4.1.3 Driver construction, testing	
45	4.1.4 Full scale prototype design	
46	**4.2 CHOPPER LINE**	
47	4.2.1 Dump design	06/05 Report
48	4.2.2 Dump construction	
49	**4.3 CHOPPER STRUCTURE B**	
50	4.3.1 Pre-prototype design and test	06/05 Report
51	4.3.2 Prototype design	
52	**WP5: BEAM DYNAMICS**	
53	**5.1 Code development**	
54	5.1.1 Preparation 3D space charge routines, testing	
55	5.1.2 LORASR development	
56	5.1.3 Transport in 3D map implementation	
57	5.1.4 Improvement, modelling high current	
58	5.1.5 Code preparation for 3 MeV test stand	
59	5.1.6 Codes preparation for SC linacs	
60	**5.2 Experiment at UNILAC preparation, simulations**	
61	**5.3 Diagnostics and collimation**	
62	5.3.1 Profile measurement prototype design, construc	
63	5.3.2 Profile measurement testing	
64	5.3.3 Non-interceptive bunch measurement design	
65	5.3.4 Halo meas. device design, construction	
66	5.3.5 Beam profile monitor design	
67	5.3.6 Collimators design	



JRA3.2 Work Package 2: Normal Conducting Accelerating Structures

The work done during 2004 differs slightly from the original work planned at the beginning of HIPPI. The differences come from some adjustment of the tasks within the collaboration (e.g: DTL) and from some delays due to external constraints (e.g: H mode DTL), or to local difficulties (e.g: lack of doctoral student for SCL at LPSC). The Russian contribution via the ISTC projects is now well coordinated with the work taking place inside HIPPI, and duplications are carefully avoided.

JRA3.2.1 Drift Tube Linac (DTL)

JRA3.2.1.1 DTL and coupling port design

The sharing of work between the laboratories has been defined. CERN will take care of the magnetic measurements, using internal resources (from the AT Department) that are not integrated into HIPPI.
The Russian team [ITEP (Moscow) + VNIIEF (Sarov)] is progressing in the design of the DTL full prototype that will use the coupler designed and built inside HIPPI. Investigations are being made in Russia (Sarov) on laser welding techniques for DTL drift tubes.
The input coupler will be designed and built (operating prototype) by CEA and CNRS-LPSC. CEA will do the RF design, CNRS-LPSC will follow with the thermal design in collaboration with CEA, and finally CNRS-LPSC will produce the prototype. A sketch of the coupling scheme is shown in Figure JRA3.2.1. A preliminary RF design has been done. After reception of precise parameters (from the Russian team), the final RF design has started.

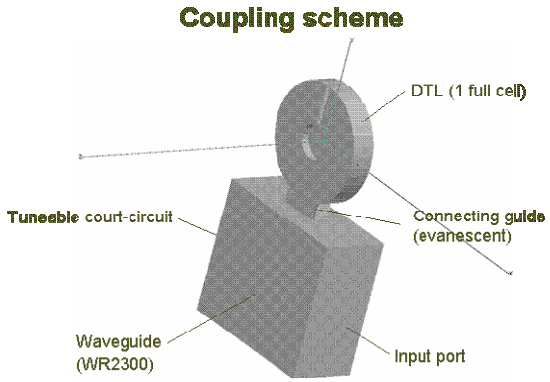


Figure JRA3.2.1: DTL coupling scheme

The tunability of the system has been studied on the preliminary design. Figure JRA3.2.2 shows the external quality factor achieved versus the position of the short circuit. A range of about •100mm is required. These data have to be adjusted following the final RF design.

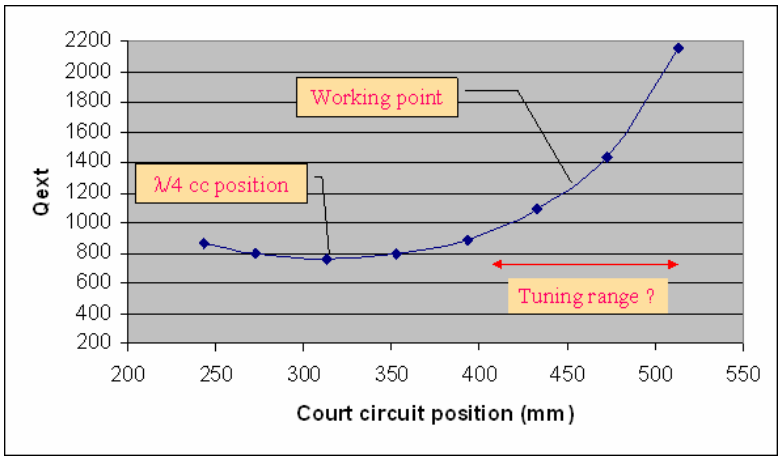


Figure JRA3.2.2: Coupling range

JRA3.2.1.2 DTL beam dynamics

Theoretical work: A study on the influence of statistical quadrupole gradient errors in high-intensity hadron machines has been made and published in PRSTAB [1]. This study shows that parametric particle-core resonances can be triggered not only by initial mismatch but also by statistical errors and thus contribute to the development of beam halo.

In a joint effort between CERN and CCLRC-RAL, the current Linac4 design has been refined and simulated with PATH at CERN and with IMPACT at CCLRC-RAL. It was found that the energy spread of the source has a significant influence on the emittance growth in the DTL. While both codes show the same general trends, the estimated amount of losses in the MEBT scraper differ slightly (Figure JRA3.2.3). The results were presented at the LINAC04 conference [2].

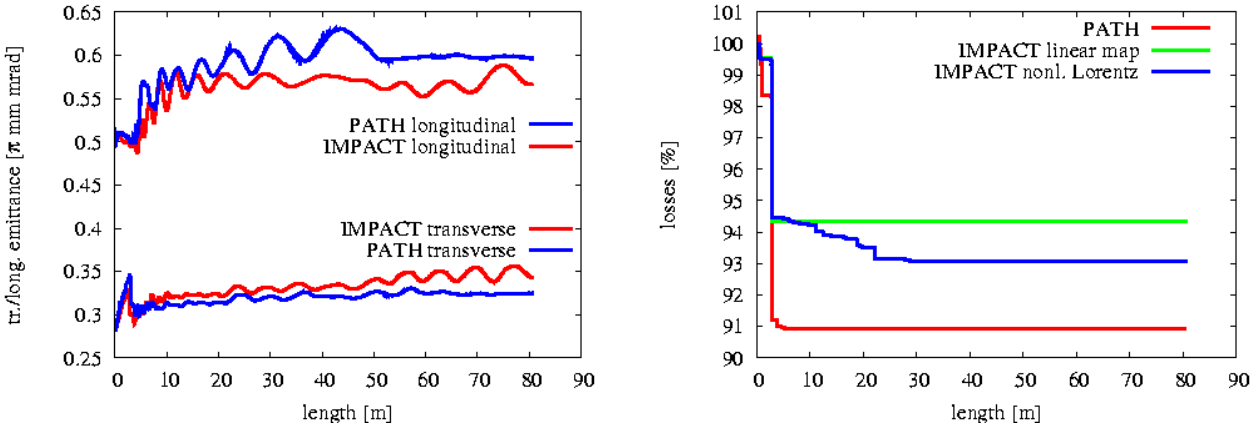


Figure JRA3.2.3: Linac4 simulation results

Conversion scripts have been developed to simplify the comparison between codes. So far conversions can be done from Trace3D to IMPACT, IMPACT to Trace3D, MAD8 to Trace3D, TraceWin to IMPACT. A number of bash/python scripts and fortran routines have been written to simplify the submission and evaluation of a large number of IMPACT simulations with different error sets, involving gradient, alignment, rotation, and RF errors. These have been used in [1], [2], and [3], and they are used right now in an effort to specify error tolerances for Linac4. A python script to use genetic algorithms for beam matching has been written that uses IMPACT as tracking code. First results are encouraging but further work is needed.

JRA3.2.1.3 DTL design

A 180 MeV H^- linac for upgrades of the ISIS accelerator at RAL has been designed. It is based on 7 DTL tanks, operating at 234.8 MHz, which accelerate the beam to an energy of 90 MeV. Beyond this energy, the CERN SCL linac section (used in Linac4), operating at 704.4 MHz, is assumed for acceleration up to 180 MeV. The DTL was designed with SUPERFISH and the beam dynamics were simulated with IMPACT. The motivation for the design as well as technical details, were presented at EPAC04 [3]. It was shown that the triple frequency jump is possible, but that the matching at this transition deserves more work. Future work should also include a new chopper line design that will evolve from the ESS design. A possible site layout is shown in Figure JRA3.2.4.

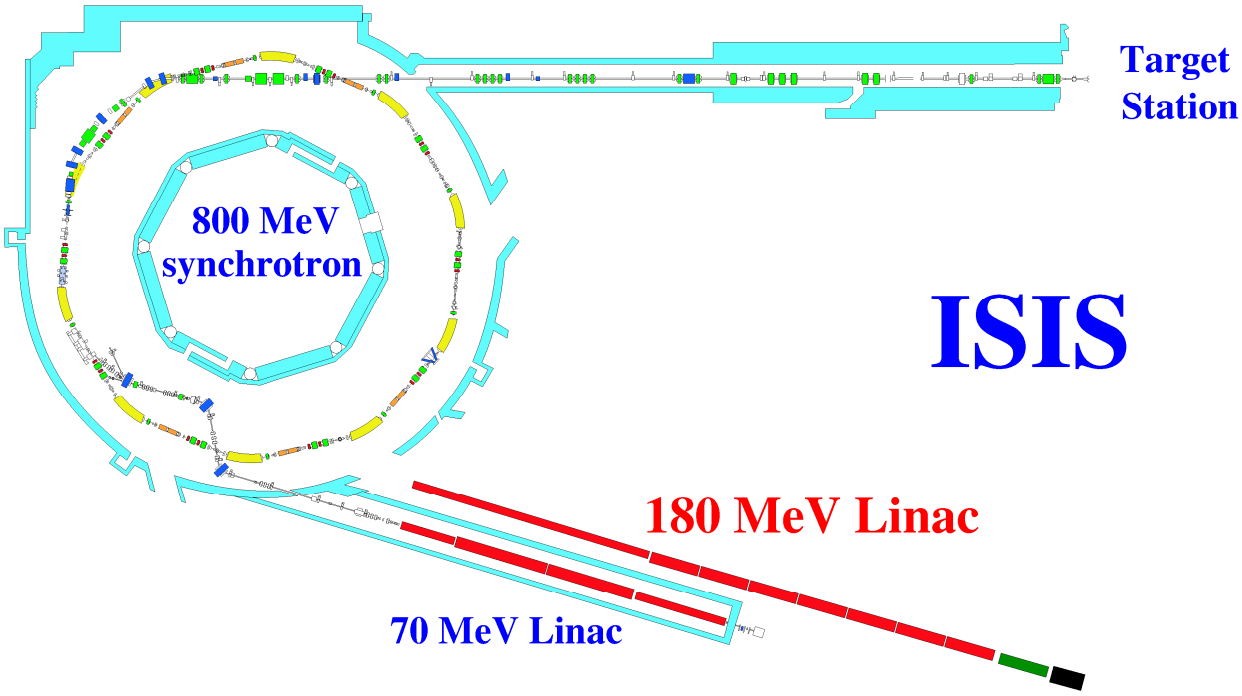


Figure JRA3.2.4: Accelerators layout on the RAL site

A re-assessment of the possible frequency choices for the new ISIS has started in view of the planned front-end test stand at RAL. A 200 MHz front-end would make use of existing knowledge at RAL on 200 MHz RF sources and RFQs, while 234.8 or 352.2 would fit better into the HIPPI context [4].

Additional staff for Rutherford Laboratory

A HIPPI position has been advertised and interviews have been held. Two candidates were chosen as suitable and an offer is made to the preferred one. The person should start working in the first quarter of 2005.

References for JRA3.2.1 section

[1] F Gerigk, “Beam halo in high-intensity hadron accelerators caused by statistical gradient errors”, PRSTAB, 7, 064202 (2004), CARE-PUB-04-001
[2] F Gerigk, E Benedico Mora, A Lombardi, E Sargsyan, M Vretenar, “Beam dynamics for a new 160 MeV H- linac at CERN (Linac4)”, LINAC04, CARE-Conf-04-0014-HIPPI
[3] F Gerigk, talk+paper “A new 180 MeV H- linac for upgrades of ISIS”, EPAC04, CARE-Conf-04-002-HIPPI
[4] F Gerigk, “Arguments to choose the frequency for a new 180 MeV linac and the associated front-end test stand at RAL”, technical note: FETS-TN-04-001.

JRA3.2.2: H-mode DTL

The design work on beam dynamics for the GSI Proton Linac of the FAIR facility is completed and the basic parameters (number of tanks, choice of the front end option) are defined.
As an intermediate step during the beam dynamics design procedure, different matching schemes between RFQ and the first CH-DTL tank have been investigated.
The main alternatives were:

- A very compact MEBT with no external buncher cavity between RFQ and CH-DTL, and with quadrupole triplet lenses integrated into the first CH cavity.

- A more conventional design, including an external MEBT buncher cavity and consisting of "short", multicell CH-DTL's without integrated quadrupole triplet lenses.

The second option was finally favoured, because it increases the system flexibility with respect to changes in the beam out of the RFQ (i.e. beam current, phase space distributions).
An intermediate design has been presented at the 2004 LINAC Conference.

The delay in the beam dynamics design activities has resulted from the following events:

- The design current for the DTL section was redefined from 70 to 90 mA.
- RFQ design results (simulated output beam parameters) for the GSI Proton Linac were not available before September 2004, and had to be carefully used to optimize the RFQ-DTL matching section and to minimize emittance growth along the DTL.
- The multi turn injection scenarios into the synchrotron are still discussed, with impact on the beam requirements at the DTL exit.

The design of the 352 MHz room temperature CH-DTL cavity has progressed along the following steps:

- Optimization with Microwave Studio^{TM} (single cell cross section optimization for low velocities, as well as multi cell cavity numerical simulations).
- In-house development of concepts for technical design alternatives.
- Commissioning of a design and fabrication study by industry (company "NTG"). The study has been completed in October 2004. The results (including definite recommendations on manufacturing techniques and tools) are presently discussed and will be utilized for fixing the final CH prototype design.

Cavity construction is based on a double walled tank with stems welded directly to the inner wall (no common carrying girder needed any more). Stems have an integrated cooling channel. The half drift tubes are press-fitted into a central bore hole (Figure JRA3.2.5).

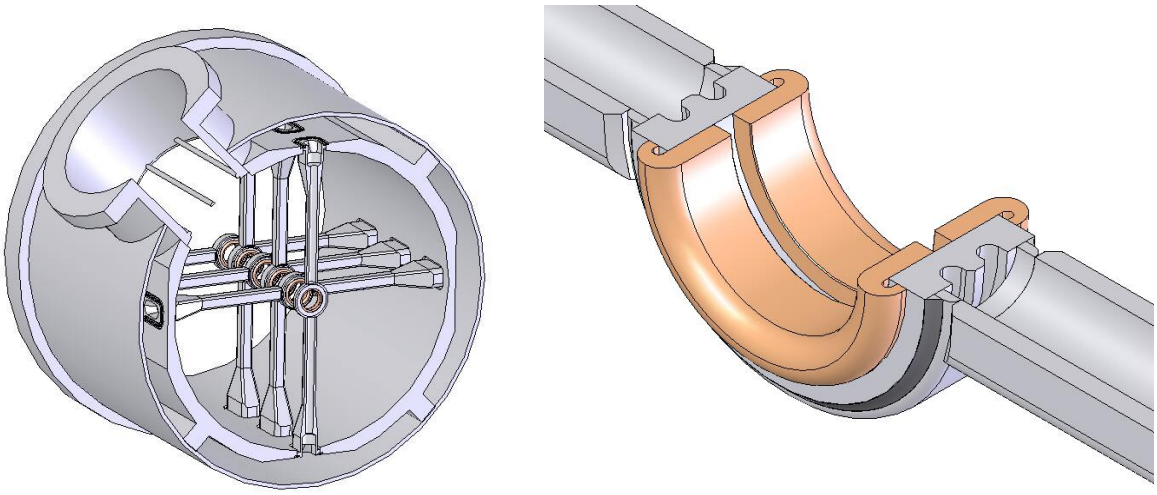


Figure JRA3.2.5: Favoured CH-DTL mechanical design option

Based on the preparatory work (beam dynamics and cavity mechanical design) the technical design work on the CH prototype cavity has now begun.
***Cold model issue**:* A cold model was initially foreseen in the case of a sophisticated, long cavity with integrated triplets, to gain confidence for the prototype cavity and with the hope to reuse the main part of the existing sc CH model (the project budget is quite tight).
Meanwhile the design of the room temperature CH has evolved noticeably from the existing model. Besides, the cavity being shorter in the new design and without integrated lenses,

simulation can more safely be trusted. This is why the decision has been made to measure directly the frequency and to tune the field flatness on the prototype cavity.
In addition, a stainless steel multicell model cavity is presently built at IAP-FU, in order to investigate manufacturing and assembly details on a sample resonator. For the room temperature CH-DTL, there is no experience available by now with respect to these issues.
This shows that the cold model tasks were shifted from RF aspects to the investigation of mechanical design and fabrication options.

JRA3.2.3 Side Coupled Linac

A Side Coupled Linac (see basic sketch in Figure JRA3.2.6) is a good solution for the 90-160 MeV part of pulsed proton linacs like LINAC4 at CERN or for the high energy part of the ISIS upgrade linac. Advantages are: easy machining, compactness, high shunt impedance, absence of parasitic modes, well established tuning procedures, existing experience at CERN (LIBO prototype, 3 GHz, for medical purposes).
The 90-160 MeV part of LINAC4 will be made of 5 modules, 4 tanks per module, 11 accelerating cells per tank. The accelerating gradient will be 4 MV/m, and the power 3 MW per klystron.

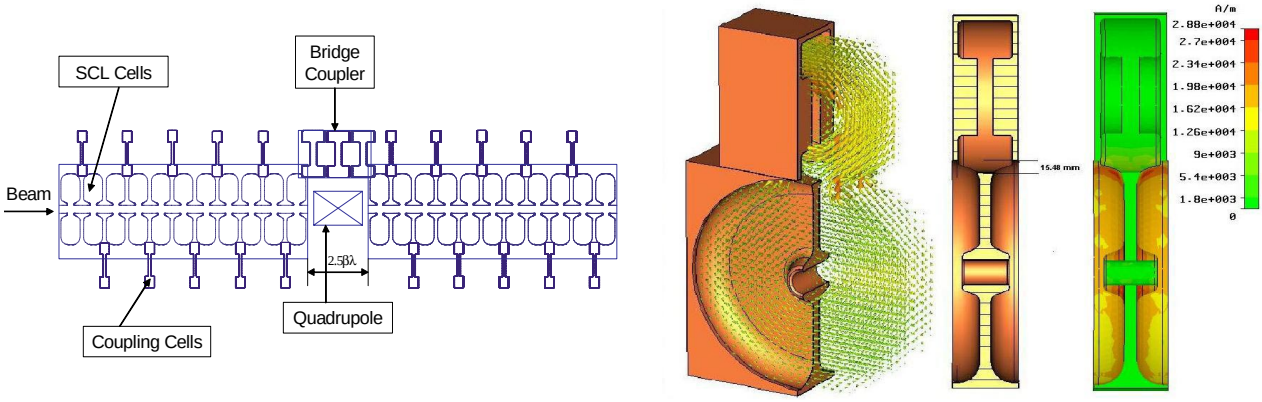


Figure JRA3.2.6: SCL tank overview (left) and 3D RF simulations of the cavities (right)

Studies started in collaboration between CERN and CNRS-LPSC on the basis of a CERN design. It is a new field of activity for CNRS-LPSC. They include the study of RF analytical models, the mechanical design and 3D RF simulations of the cavities. The objective is to build a “cold” multi-cell model for low RF level studies (like tuning procedures) and to perform technological studies.
At CERN, an equivalent circuit analysis for a complete SCL module is in preparation, in order to optimize the value of the cell-to-cell coupling coefficient. The RF design of the bridge couplers is almost finished.
At CNRS-LPSC, a study is also performed to optimize the coupling coefficient “k”, via an analytical model of the system. This model will be used to define the mechanical tolerances versus the significant parameters (e.g.: number of cells, coupling factor etc), and the tuning procedures. In particular, a compromise has to be made between a high value of k (less strong mechanical tolerances, better field uniformity) and a high-enough quality factor. In parallel to the analytical studies, and for the same goals, the development of associated simulation tools is done by using MAPLE. A preliminary drawing of the cavity has been made and sent to the Russian ISTC team in BINP (Novosibirsk) to start the technological studies (Figure JRA3.2.7).
The major difficulty encountered at CNRS-LPSC is the missing doctoral student and this may lead to some delays. Some alternative solutions have to be considered with permanent staff members.

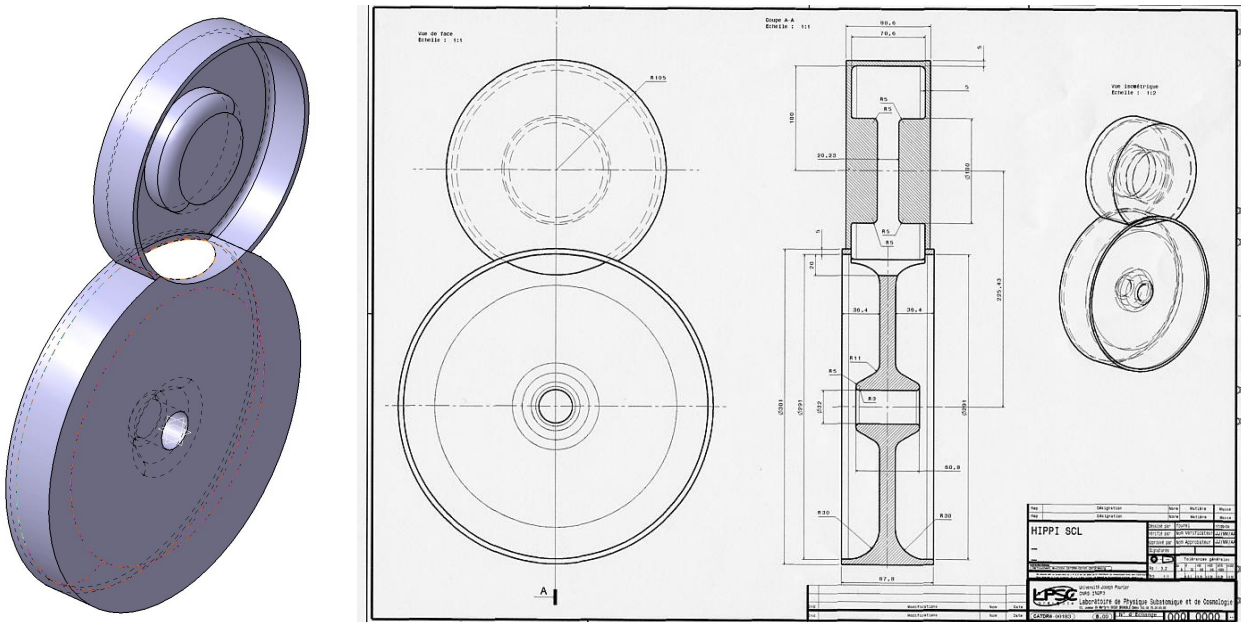


Figure JRA3.2.7: Preliminary design of the cells (acceleration and coupling)

JRA3.2.4 Cell Coupled DTL

The CCDTL pre-prototype being built at CERN has required an unexpected effort during the year 2004, which led to some delay in the construction. However, this is not going to delay the high power tests at CERN, which are still foreseen to start in April 2005. A 3D representation of the assembled pre-prototype is shown in Figure JRA3.2.8.

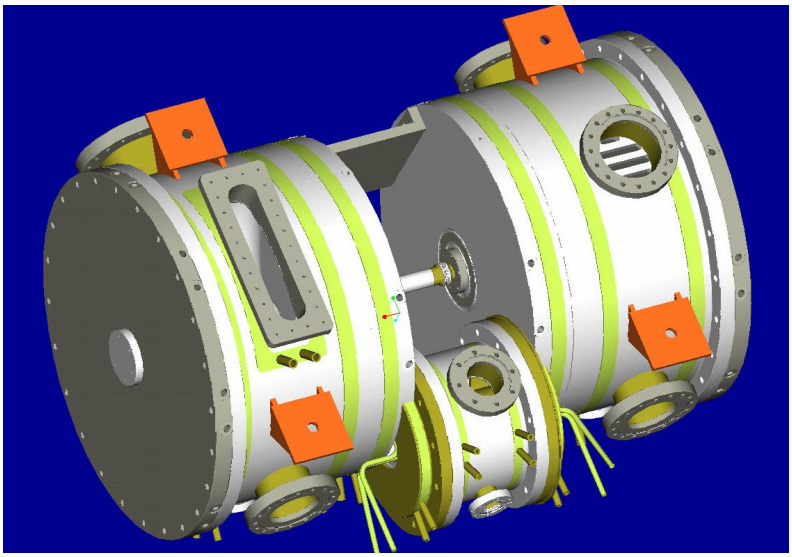


Figure JRA3.2.8: CCDTL pre-prototype (CERN built)

The main difficulty encountered during production was due to porosities at the location of the electron beam weld, probably because of impurities in the stainless steel. Repair involved local re-machining and re-welding. In parallel with the construction of the pre-prototype, all the ancillary equipment needed for the tests (waveguide connection, support, vacuum seals, cooling circuitry, etc.) has been designed and ordered. The last component still to build is the waveguide connection, foreseen to go into production in the first months of 2005. This component is needed only for the high power tests. After repair of the welds, the CERN CCDTL pre-prototype has successfully passed a complete vacuum test, indicating that the problems have been solved and that the work can proceed.

The preparation of the copper plating for this device has started in September. The plating procedure has been defined and a set of tools for supporting the parts in the electrolysis baths has been designed and built. The first Nickel bath will be applied during the months of December.

In the mean-time, three theoretical studies have been performed, to prepare the measurements on the prototype and to support the design of the new prototype that is being designed and built in Russia (ISTC project #2875). A new series of extensive 3D RF simulations for the calculation of the RF coupling coefficient has been launched, backed by measurements on a small test cavity at 3 GHz, to assess the reliability of the simulation tools. Calculations, which have an estimated accuracy of 10 %, predict a coupling coefficient of 1.2, for a required value between 1 and 2. Therefore, the present design of the input coupler is already in production. After a calculation of the effect of alignment errors, an alignment strategy for a full CCDTL module has been defined. Finally, an analysis of the equivalent electrical circuit of a CCDTL module has shown that the foreseen 0.8% cell-to-cell coupling is sufficient for tuning and stabilization of the structure.

The design of the second prototype, to be built in Russia as part of the ISTC project #2875, has started in 2004, with the definition of final dimensions and type and size of ports and openings. The mechanical design and the construction of this prototype will be done at BINP (Novosibirsk) and at VNITEF (Snezinsk). The general mechanical drawing has been finalized during fall 2004, and the execution drawings will be made at the beginning of 2005. The copper plating procedure for this prototype has been defined at Snezinsk.

JRA3.2.5 Overall Progress of Work Package 2

The following table highlights the progress of work planned in the year 2004 for the Work Package WP2 by listing the lowest level subtasks of the HIPPI detailed implementation plan (cf. section JRA3.1).

WP2	Title	Original begin date	Original end date	Estimated Status	Revised end date
2.1	**Drift Tube linac**				
2.1.1	DTL Design	July 2004	June 2007	On time	unchanged
2.1.2	Decision on prototyping	Apr. 2004	April 2004	100 %	Sept. 2004
2.1.3	Prototype component development	May 2004	June 2007	On time	unchanged
2.1.4	DTL beam dynamics design	Jan. 2004	June 2008	On time	unchanged
2.2	**H mode DTL**				
2.2.1	RF model CH tank 1, RF design	Jan. 2004	Aug. 2004	*See note*	
2.2.2	RF cold model design & construction	Jan. 2004	Jan. 2005	50%	Dec. 2005
2.2.3	RF model construction	Dec. 2004	June 2005	20%	June 2006
2.2.4	Beam dynamics design CH tank 1	Jan. 2004	June 2004	80%	June 2005
2.3	**Side Coupled Linac**				
2.3.1	RF model, RF design	Jan. 2004	July, 2004	~25%	*delayed*
2.3.2	RF model mechanical design	July 2004	Dec. 2004		*probably delayed*
2.4	**Cell Coupled DTL**				
2.4.1	Pre-prototype construction	Jan. 2004	June 2004	95 %	Nov. 2004
2.4.2	Pre-prototype high power RF tests	July 2004	March 2005	Start delayed to March2005	Oct. 2005
2.4.3	Prototype mechanical design	Jan. 2005	Dec. 2005	10%	On time

Note: RF measurements will be done directly on the prototype cavity. Refer to the “cold model issue” in the JRA3.2.2 paragraph.

JRA3.3 Work Package 3: Superconducting Accelerating Structures

The first annual HIPPI-WP3 meeting was held on June 7-8 in Saclay (CEA). Presentations and minutes are on the HIPPI-WP3 web site http://hippiwp3.in2p3.fr/ .

JRA3.3.1 Activities at INFN-Milano

JRA3.3.1.1 Cavity A vertical test (task 3.1.1)

The so-called cavity A (the elliptical cavity Z502 designed by INFN-Mi and fabricated by ZANON under the TRASCO/ADS Program) has been pre-tuned in Milano at 5% field flatness and leak-checked to prepare for the vertical tests. It then has been shipped to CEA-Saclay where the preparation and RF tests have been performed. Figure JRA3.3.1 shows the cavity being prepared for the vertical test, together with the experimental data of the quality factor Q_0 as a function of the accelerating field.

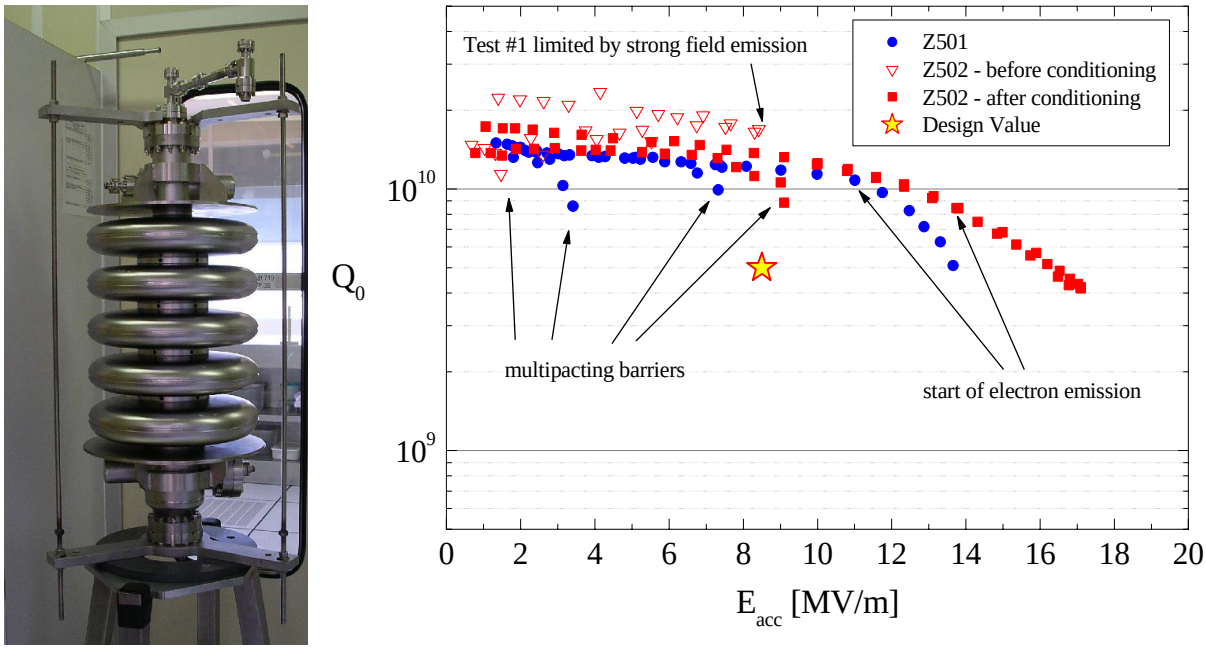


Figure JRA3.3.1: Cavity A

JRA3.3.1.2 Mechanical design of tuner and Integration of piezo design (task 3.1.5)

The investigations of the tuner design and of the helium tank have started by a suitable scaling of the coaxial tuner originally proposed for the TTF/TESLA cavities. The tuner is a completely flexural system that is made-up of two annular rings attached to the cavity helium tank and connected by means of thin angled blades to a central ring which is free to rotate azimuthally. A motor controls, through a leverage system the azimuthal motion of the central ring. This rotation is changed by the tuner into a longitudinal force between the two portions of the cavity tank which are welded to the cavity tube and connected through a short bellow. The concept is illustrated pictorially in Figure JRA3.3.2.

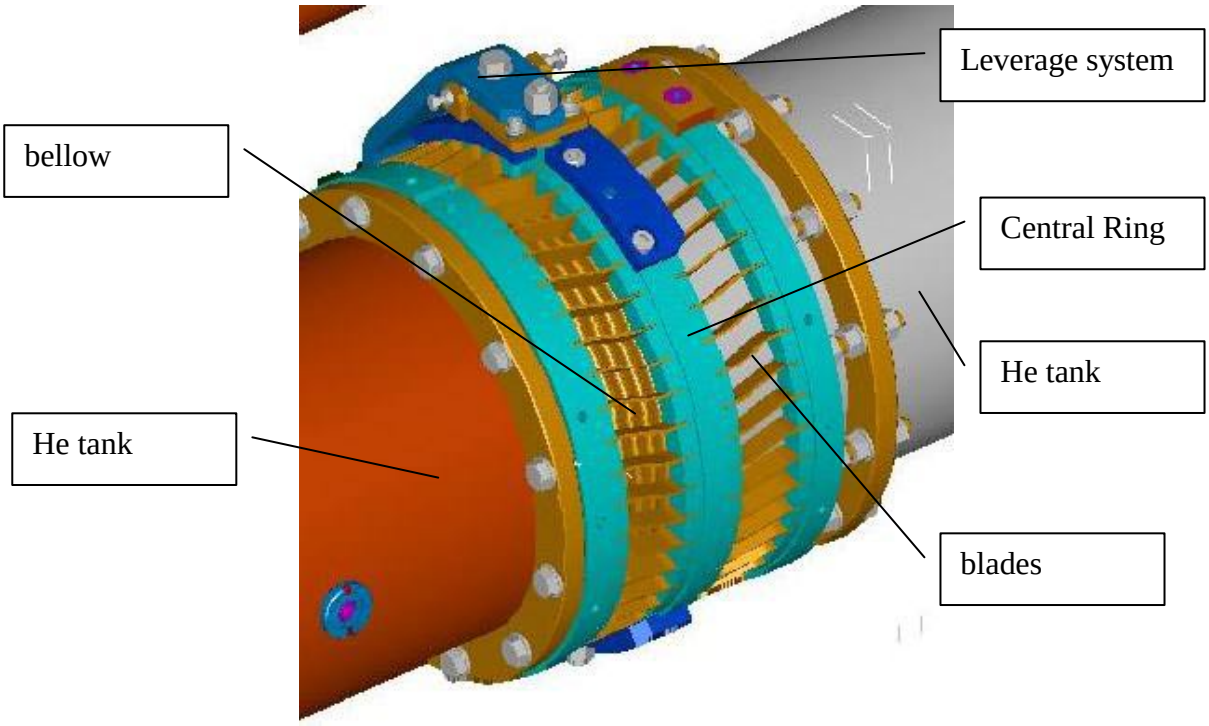


Figure JRA3.3.2: Tuner design

The work is aimed at the coupled analysis (mechanical-electromagnetic) of the tuner-cavity system, in order to provide slow and fast tuning capabilities and to allow Lorentz forces compensation at the design accelerating gradient. The tuner design will be defined for the end of the year 2005, in order to start detailed planning of its engineering and construction. The Engineer hired in July under CARE (85% on JRA1 budget and 15% on JRA3 budget) is fully dedicated to the tuner design, in both JRA1/JRA3 versions. The tuner work has been concentrated until now on the JRA1 (TTF/TESLA cavity) geometry, where we have clearer requirements from the RF point of view.
A geometric scaling of the tuner assembly will be made for the application in HIPPI, and by a fine optimization of the blades angle, the longitudinal excursion of the tuner will be adapted to meet the tuning requirements. For the HIPPI case, there is still no complete linac/RF system design to fully constrain the analysis. A project working point will instead be defined in term of accelerating field, Q_{ext}, allowed frequency shift for Lorentz Force Detuning, etc. All these should come from a "system" analysis and depend on details of the linac RF distribution and control schemes, etc. A detailed analysis of these design choices is planned in 2005, and will provide the final constraints on the tuner design for HIPPI. As a starting point, due to the similar operating parameter, we can assume a Q_{ext} in the range from $5\ 10^5$ to 10^6, and a piezo compensated frequency swing smaller than 300 Hz.
Due to administrative delays inside the INFN, the tuner work has started in July 2004 and will end in December 2005.

JRA3.3.2 CEA-Saclay Activities

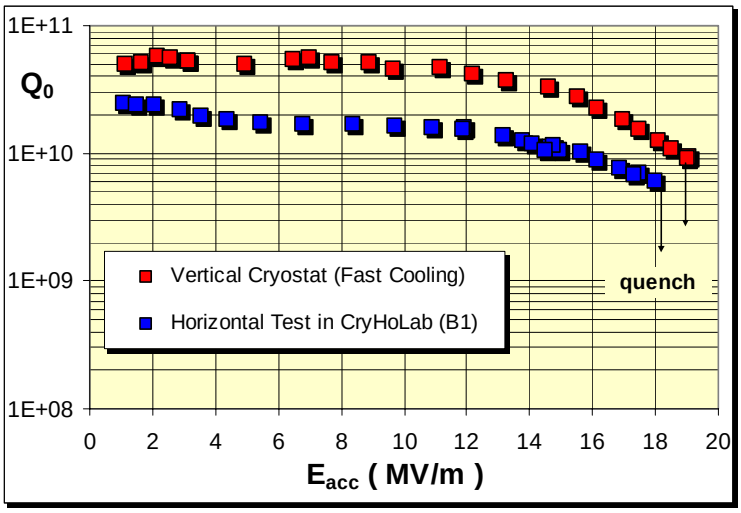
Coordination of the Work Package: organization of the first annual HIPPI-WP3 meeting held on June 7-8 at CEA-Saclay, preparation of the WP3 session of the annual HIPPI'04 meeting.

JRA3.3.2.1 Preparation of the 700 MHz test stand (task 3.1.8)

The first half of the year has been dedicated to the preparation and adaptation of the test stand "CryHoLab" which is a master piece of the program. This test stand (Figure JRA3.3.3 – left) includes the horizontal cryostat itself, the liquefier, the compressor and the GHe pumping

system in order to operate at 1.8 K. As both “HIPPI” and “SRF” programs will use this test stand for cavity measurements, the 700 MHz low power RF equipments needed for HIPPI can be switched to the other similar 1300 MHz RF equipments required for SRF.
We performed the test of a 704 MHz beta=0.65 5-cells cavity (Figure JRA3.3.3 – right), which is not a cavity of the HIPPI program though it could be used for higher energy part of high intensity proton superconducting linacs. The good performances of this cavity (17 MV/m with a Qo above 510^9) showed that the test bench is now fully operational for measuring the 700 MHz cavities of the HIPPI program. The whole installation (cryostat, cryogenic system and RF equipments) will have to move to a new experimental hall in second half of 2005.

View of the test stand CryHoLab



Performance of a 704 MHz beta=0.65 5-cells cavity (Variation of Qo is due to the residual magnetic field)

Figure JRA3.3.3: CryHoLab photograph and measurement results at CEA-Saclay

In two years from now, the 700 MHz high power plant has to be ready to allow testing fully equipped 700 MHz cavities (cavity A from INFN-Mi and cavity B from Saclay). Study has started of the upgrade of an existing HV modulator. The commercial procedures for the purchase of the 1 MW klystron and the circulator are already launched, the goal being to receive the material in the first half of 2006. The klystron specifications are as follows:

- frequency: 704.4 MHz (-0.7dB bandwidth ± 1 MHz)
- minimum peak power: 1 MW
- minimum average power: 100 kW (d.c. 10% ; 50 Hz - 2 ms)
- RF power output: WR 1150 or WR1500
- maximum cathode high voltage: 95 kV
- maximum current: 22 A

This power plant will be connected either to the horizontal cryostat for testing a cavity or to a coupler bench for testing and processing the high power couplers developed in the program. The work on this bench is very preliminary. The aim is to define, at the beginning of 2005, the general concepts required to start studies and drawings. The data acquisition and monitoring system needed for coupler processing is under development.

JRA3.3.2.2 Cavity A vertical test (task 3.1.1)

In parallel, work has started on the elliptical cavities. The so-called cavity A (the elliptical cavity Z502 designed by INFN-Milano) has been prepared and tested at Saclay. Some mechanical adaptations (protection flanges, trolley, and cryostat set-up) were necessary. A BCP chemical treatment (100 microns + 20 microns) has been performed as well as the usual high pressure rinsing for this kind of cavity (June 2004). Once mounted in the vertical cryostat, the cavity showed a leak requiring permanent pumping during the test at 1.7K. The cavity quenched several times at an intermediate gradient (7 MV/m), but, after some processing, it reached 16 MV/m with a Qo value of 5.10^9, limited by field emission. The Lorentz forces detuning coefficient was found to be in the range 20 and 33 $Hz/(MV/m)^2$, higher than the calculated value. In a joint action, CEA & INFN-Mi will design and fabricate stiff mechanical pieces to keep constant the cavity length during the cold RF power test (second part of the program).

JRA3.3.2.3 Design of cavity B (task 3.1.5)

Cavity B, the second elliptical cavity of the program, is presently being designed. It is also a 5-cell 704.4 MHz with a beta=0.47. Since the coupling port has to host a 100 mm diameter power coupler, the beam tube has been widened on the coupler side to a diameter of 130 mm, making the cavity asymmetric. The RF parameters computed for the optimal beta of 0.51 are Epk/Eacc = 5.52, Bpk/Eacc = 3.33 mT/(MV/m) and r/Q = 183 Ohms. Stiffeners are under study to increase the mechanical resistance to He pressure bursts and minimize the dynamic Lorentz detuning in pulsed mode operation. The use of two series of stiffening rings greatly improves the mechanical behaviour of the cavity while maintaining a wide tuning range. Cavity construction is now planned to begin half a year later than initially foreseen, without consequence on the delivery date which is kept in June 2006.

JRA3.3.3 FZJ Activities

JRA3.3.3.1 Test stand preparation (task 3.2.1)

The test stand for superconducting cavities could be completed. Suitability has been tested by performing some measurements on other superconducting resonators.

JRA3.3.3.2 Evaluation of 700 MHz resonator (task 3.2.2)

Although major problems occurred with the electron beam welding machine in FZJ, causing a delay of about 3 months, the 760 MHz beta=0.2 triple spoke resonator could finally be completed (Figure JRA2.3.4). The last weld is done and the resonator has passed the vacuum test successfully. Any further unexpected difficulties in the following preparation steps will definitely cause a delay of this subtask. The chemical treatment at Saclay is scheduled for early 2005, immediately followed by measurements on the test stand in FZJ. Test couplers are available. Presently this activity is on time. An intermediate report is due in March 2005.

Triple spoke Nb cavity without endcaps

Complete triple spoke Nb cavity

Figure JRA3.3.4: Triple spoke cavity built for FZJ

JRA3.3.3.3 RF design of 352 MHz multi-gap resonator (task 3.2.6)

For the 352 MHz beta=0.48 superconducting triple spoke resonator, the design is fairly advanced. Minor adjustments are still needed for the RF design. Niobium sheets have been ordered which shall be delivered at the end of 2004. The second wall for the liquid Helium containment is being optimized for stability of the whole system. This second wall would allow the resonator to be tested in the Orsay cryogenic test facility. Copper prototypes for the end-caps and for the cylindrical surface of the cavity have been delivered and are being optimized. The corresponding geometrical parameters of the resonator have been frozen. Present considerations address the analysis of mechanical eigenmodes of the cavity. The issue of RF coupler is worked upon in close collaboration with IPN Orsay. Two access ports are planned, one for a 100 mm coupler, the other for a 56 mm coupler. Presently this activity is on time. A design report concerning the RF design is due in May 2005.

JRA3.3.4 CNRS-Orsay Activities

JRA3.3.4.1 Evaluation of 352 MHz 2-gap prototypes (task 3.2.3)

The beta 0.15, 352 MHz, 2-gap Spoke Resonator is now fabricated (without its Stainless Steel helium vessel). A checking procedure before delivery is foreseen the 14 December 04. The cavity will then be delivered on December 20, 2004, and the cold test is planned to start in February 2005. A 3D drawing is shown in Figure JRA3.3.5.

A beta 0.35, 352 MHz, 2-gap Spoke Resonator was tested last May and showed very good performance (indeed a record) by reaching the accelerating gradient of 16.2 MV/m with $Q_0 > 10^9$. We are studying the possibility of adding a helium tank in Titanium. Technical consultations with industries have begun.

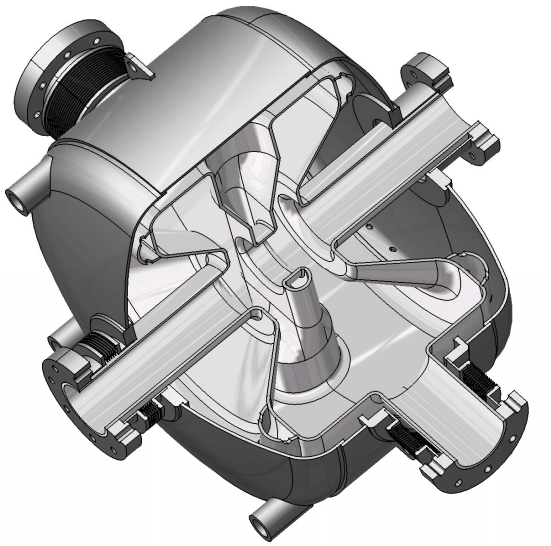


Figure JRA3.3.4: Single spoke cavity at CNRS-Orsay

JRA3.3.4.2 Design of coupler prototype (task 3.2.4)

The prototype power coupler is in the design phase. An RF comparative study of the ceramic window design (disc or cylinder) has been performed. The drawings for the ceramic window block are presently in progress. Industry consultations will start in January 05. The window block will be ordered beginning of 2005. The coupler prototype should be ready at the end of 2005. The preliminary tests of the prototype will start at beginning of 2006.

JRA3.3.4.3 RF design of multigap spoke resonator (task 3.2.6)

Cross-check modeling calculations of the preliminary multigap spoke FZJ design started in September 2004.

JRA3.3.5 IAP-FU Activities

JRA3.3.5.1 CH resonators (task 3.3)

The CH-cavity is a good candidate for a High-Intensity-Pulsed-Proton-Injectors (HIPPI). To demonstrate the promising properties obtained by simulations, a 19-cell superconducting CH-prototype cavity has been designed. It is a non-scaled cavity with a frequency of 350 MHz with a beta of 0.1. The cavity has been fabricated and is ready to be treated chemically to clean the surface. Figures JRA3.3.5a to JRA3.3.5d illustrate the fabrication process history of ACCEL©, Bergisch-Gladbach.

Fig. JRA3.3.5a: Some Niobium parts of a sc. CH-prototype for HIPPI. Tank end cell (left), two girders (right) and one drift tube part (middle)

Fig. JRA3.3.5b: Welded Niobium girder + stem part of the sc CH-cavity for HIPPI

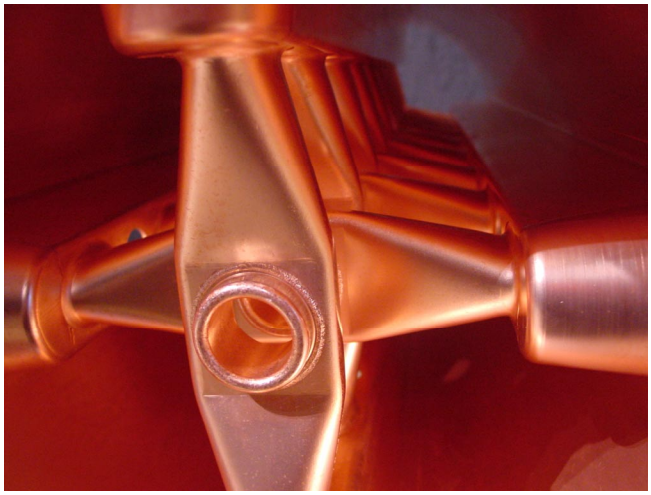


Fig. JRA3.3.5c: Niobium girder + stem part welded in the resonator of the sc CH-cavity

Fig. JRA3.3.5d: The superconducting Niobium CH-prototype cavity before the final welding of the end cells.

Recently low level RF measurements have been performed to measure the field distribution. Figure JRA3.3.6 shows a comparison between the bead pull measurement and MicrowaveStudio simulations. The agreement is excellent and a flat field distribution has been obtained in a superconducting multi cell H-mode cavity.

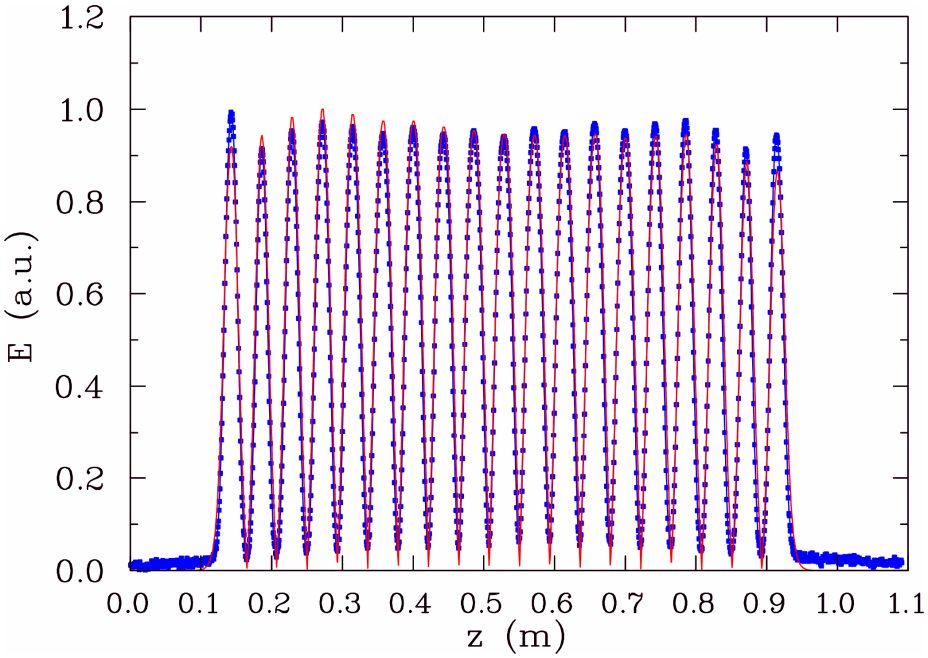


Fig.JRA3.3.6: Measured (blue) and simulated field distribution of the CH-prototype cavity.

In a next step the cavity will be conditioned at room temperature to process possible multipacting levels. End of the year 2004 and begin of 2005, the first cold tests will start in the new cryogenic laboratory in Frankfurt. This laboratory has already been put successfully into operation during the year 2004. A superconducting 176 MHz Half-Wave-Resonator has been tested several times. The infrastructure like cryostat, helium recovery system, pumping and the control system, which has been developed at the IAP-FU worked very well. Figure JRA3.3.7 shows the cryogenic laboratory during the first cold tests.

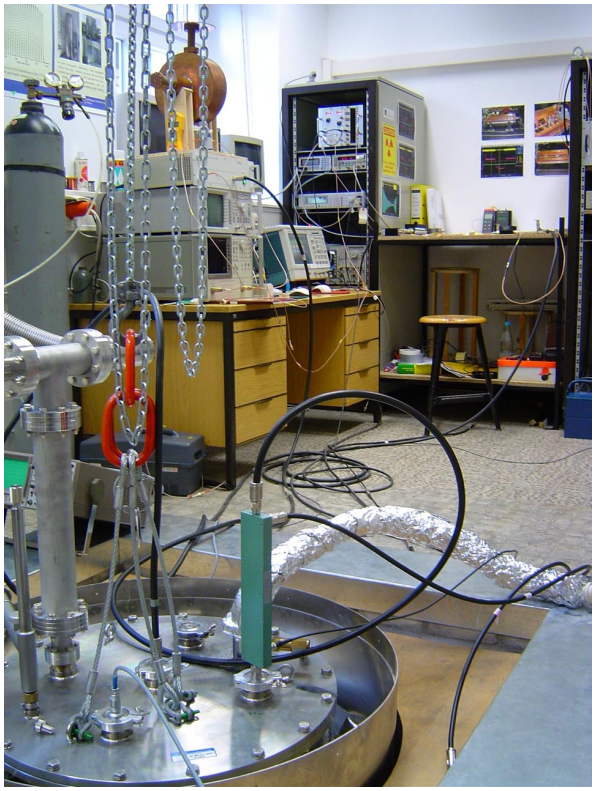


Fig.JRA3.3.7: The cryogenic laboratory during a test of a superconducting Half Wave Resonator

RF coupling to the cavity is a very important topic. Different methods have been investigated: inductive coupling with a loop and capacitive coupling with an antenna. The external Q-value, which measured the coupling strength, has been simulated and then measured with our modified room temperature copper model. It was possible to determine the coupling strength over several orders of magnitude with very good accuracy. Figure JRA3.3.8 shows the position of the capacitive coupler (top) and the external Q-value as a function of the coupler position (measurement and simulation, bottom).

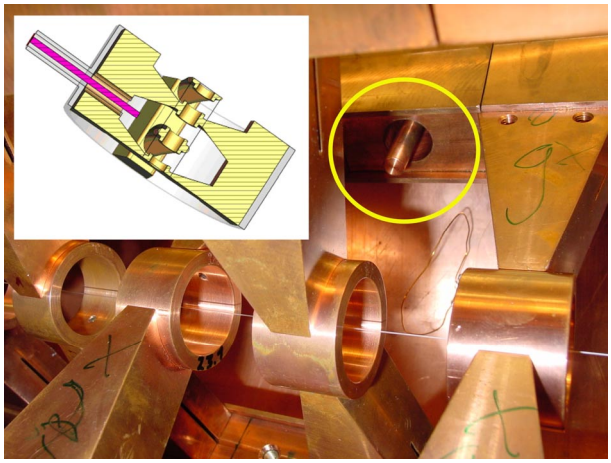
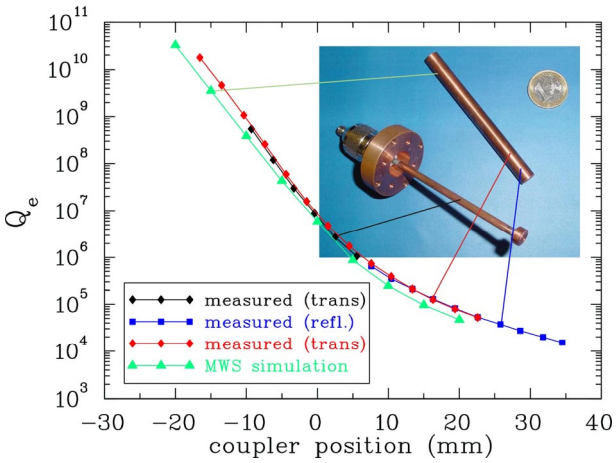


Fig. JRA3.3.8a: Position of the capacitive coupler, which will be used for the cold tests of the CH-cavity



JRA3.3.8b: Comparison of the external Q-value (coupling-strength) between measurements and simulations

JRA3.3.5.2 Study of tuning system (task 3.3.1)

Microwave Studio simulations are being used to investigate different tuning methods for SC CH cavities. Figure JRA3.3.9a shows tuning cylinders, which can be welded into the girders after the cavity production (static tuning). A small height of the cylinder increases the frequency due to the decreased inductance. For a certain height the tuner decreases the frequency because of the increased capacitance. Figure JRA3.3.9b shows the frequency as function of the tuner height. These cylinders can also be used to optimize the field distribution.

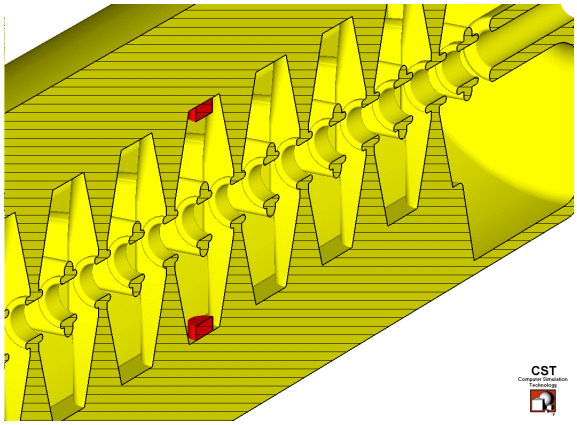


Fig. JRA3.3.9a: Tuning cylinder can be used to tune the frequency and the field distribution

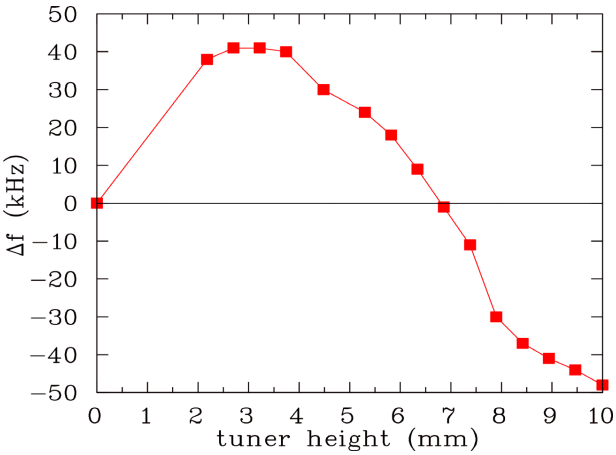


Fig. JRA3.3.9b: With MWS® simulated frequency shift of the cavity as function of the height of the tuning cylinders.

Another tuning method is to stretch and to squeeze the cavity end cells by a slow and fast mechanical tuner. Figure JRA3.3.10 shows the frequency shift by changing the length of the end cells. The typical frequency shift is about 190 kHz/mm.

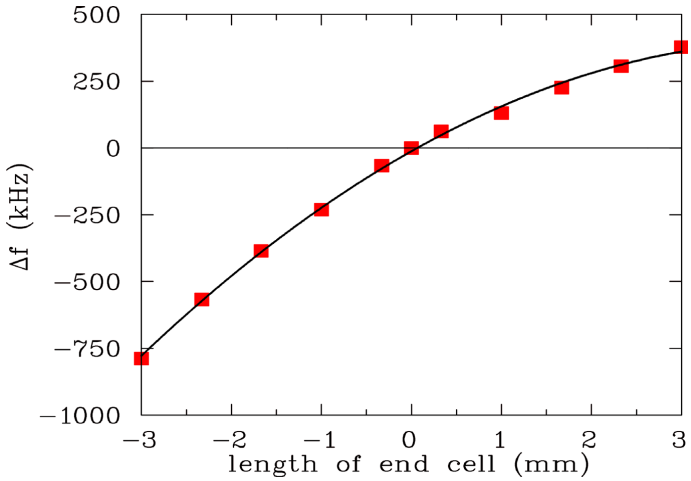


Fig. JRA3.3.10: MWS® simulated frequency shift as function of the length of the end cells

JRA3.3.5.3 Conclusion and future work

Up to the begin of 2005 a superconducting 352 MHz CH-structure will be redesigned with Microwave Studio, including the beta profile obtained from LORASR® particle dynamics simulations and aiming for the best beam matching between possible parts of an injector. With a frozen beta profile it is necessary to re-optimize the cavity with respect to field flatness, total RF power consumption, RF power peak densities, and mechanical stability and Lorentz forces due to the pulsed operation mode of a HIPPI facility.

During the year 2004 the superconducting CH-prototype cavity has reached the final stage of production and the first low power measurements have been performed very successfully. The cryogenic laboratory in Frankfurt has been put into operation, the infrastructure and the control system worked very well. First comparisons of the static tuning sensitivity between MWS© simulations and corresponding bead-pull measurements of a 19-cell 310 MHz copper model at the IAP showed a good agreement. For a more precise check the copper model must be modified. This will be finished at the beginning of 2005. In addition, the development of a mechanical tuner for the superconducting CH-cavity has been started (since March 2004) simultaneously with a structural analysis using the program ANSYS© at GSI (since November of 2004). They will be finished at the beginning of 2005 and the technical design stage, including detailed construction drawings will be started at March 2005.

JRA3.3.6 Overall Progress of Work Package 3

The following table highlights the progress of work planned in the year 2004 for the work package WP3 by listing the lowest level subtasks of the HIPPI detailed implementation plan (cf. section JRA3.1).

WP3	Title	Contractors	Original begin date	Original end date	Estimated Status	Revised end date
3.1	**Elliptical cavities**					
3.1.1	Cavity A vertical tests	INFN-Mi, CEA	Jan. 2004	Dec. 2004	100%	On time
3.1.2	Mechanical design of tuner	INFN-Mi	July 2004	Dec. 2004	10%	12/2005
3.1.3	Integration of piezo design	INFN-Mi	July 2004	Dec. 2004	10%	12/2005
3.1.5	Design cavity B	CEA	July 2004	Dec. 2004	40%	06/2005
3.1.8	RF source order and preparation	CEA	July 2004		10%	On time

3.2	**Spoke cavities**					
3.2.1	Test stand preparation at FZJ	FZJ	April 2004	Sept. 2004	100%	
3.2.2	Evaluation of 700 MHz prototype	FZJ	Sept. 2004	May 2005	75 %	On time
3.2.3	Evaluation of 352 MHz 2gaps-prototype	CNRS-Orsay	June 2004	Dec. 2004	40 %	06 / 2005
3.2.4	Design of coupler prototype	CNRS-Orsay	Jan. 2004	April 2005	20 %	12 / 2005
3.2.6	RF design of 352 MHz multigaps-prototype	FZJ, CRNS-Orsay	Jan. 2004	April 2005	50 %	On time
3.2.7	Design of coupler and tuner	FZJ, CNRS-Orsay	Jan. 2004	April 2005		
3.3	**CH resonators**					
3.3.1	Study of tuning system	IAP-FU	Jan. 2004		50 %	On time

JRA3.4 Work Package 4: Beam Chopping

The WP4 has a web-site (http://hadorn.home.cern.ch/hadorn/My_Webs/WP4main.htm maintained by Beatrice.Hadorn@cern.ch) where all the relevant information is kept up to date.

The goal of WP4 is the assessment of two different devices (Chopper A and Chopper B) to provide a deflecting voltage sufficient to selectively remove micro-bunches at energy of a few MeV and at a frequency of 350 MHz with a repetition rate of 40 MHz. This operation is needed to prepare a high intensity pulsed beam for the injection in a circular machine.

The two approaches described in the HIPPI proposal have been developed independently in CCLRC-Rutherford Appleton Laboratories and at CERN. The work is proceeding in parallel with frequent and fruitful exchanges of information and expertise. The progress of the work of WP4 is steady in both laboratories. In particular the collaboration between the two institutions (CERN and RAL) involved in this working package has been strengthening throughout the year with fruitful results for both parties. At CERN there have been some difficulties due to lack of support from the drawing office (low priority with respect to other projects) which have produced some delay in the delivery of the chopper plates. Notwithstanding these delays, most of the milestones for the year 2005 can be probably met on time. The work at each laboratory will be detailed further on.

At two occasions during the year 2004, all the WP4 participants met together: during the WP4 yearly meeting at CERN (10-11 May) and at the HIPPI04 meeting in Frankfurt (30 Sep-1 Oct).

The WP4 yearly meeting for 2004 took place at CERN on May 10 and 11. A total of 10 people (2 from RAL, 8 from CERN) participated full-time. Discussions were focused on the following issues: chopper structure, chopper drivers, dump, beam dynamics and also chopper tests with and without beam. The highlight of the workshop was that the chopper structure developed at RAL has evolved considerably and can now be fitted in a quadrupole, as the CERN structure. The beam dynamics in the two proposed chopper lines has been compared with two codes (at RAL and at CERN) giving similar results. Finally, discussion started on the possibility of testing the RAL chopper in the 3MeV chopper line developed at CERN.

During the general meeting of HIPPI04 the participants of WP4 could exchange ideas also with the participants of WP5, and therefore complete the picture of the chopper line as an integral part of a chain of accelerators. This synergy is very important and therefore it was decided to hold next year meeting together with WP5 (hosted by RAL at Cosener's House near Oxford, April 13-15, 2005).

Several papers have been published. An important one, summarizing the joint efforts of the participants, is an invited talk at LINAC04 titled “REVIEW OF FAST BEAM CHOPPING “.

One position was advertised on the CARE web site offering a three year tem contract to work on chopper related issue at CERN. The contract was assigned on May 25, 2004. The selected candidate has started on July 1, 2004 in the AB division / ABP group, under the supervision of A. Lombardi. This person has reported about the progress of his work at HIPPI04,

The progress of the work for each subtask in the two laboratories is detailed below.

JRA3.4.1 CERN Activities

JRA3.4.1.1 Chopper structure (task 4.1.1)

A technical solution for the ceramic plate has been successfully tested at CERN, and the result of the work presented at EPAC04. The completion of the drawing for execution has been farmed out to industry due to the overload of the CERN drawing office. The preliminary drawings were sent out by in November. After checking, construction will start and should be finished 6 weeks later. In the first quarter of 2005 the prototype is expected to be ready for laboratory testing (vacuum and electrical tests).

JRA3.4.1.2 Chopper driver (task 4.1.3)

Optimization of the driver amplifiers towards the target values continued during the all time although the work on the driver was stopped for 2 months due to the unavailability of the CERN staff member having started the project, and to the summer holidays. A system providing 70% of the needed voltage and rise-time is available thus allowing preliminary tests of the chopper structure. It is estimated that with the current availability of manpower a system proving the required outputs in terms of Voltage and rise time will be probably realized by the end of 2005. A measured response of the amplifier is shown in Figure JRA3.4.1.

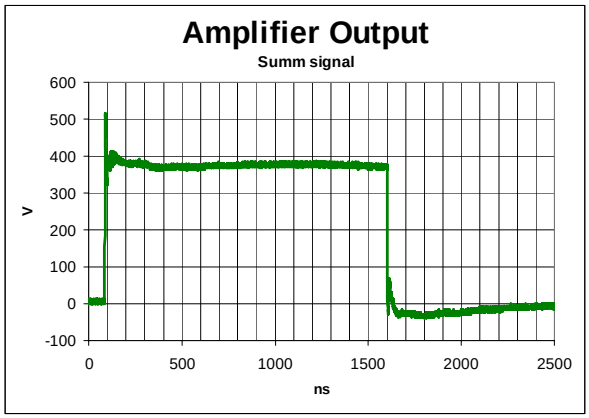


Figure JRA3.4.1: Measured amplifier output for chopper structure

JRA3.4.1.3 Beam Dump (task 4.2.1)

The conceptual design is finished. Integration in the beam-line has to be finalized before the construction of the dump can start. It is nevertheless expected that the deadline for end of construction could be maintained (June 2005).

JRA3.4.2 CCLRC-RAL Activities

The prototype fast transition time / short duration pulse generator has been delivered to RAL, and has been the subject of extensive acceptance testing (part of subtask 4.3.1). These tests have shown that the pulse generator meets all key specifications except the requirement for pulse droop. The problem has been discussed with the manufacturer, and has involved an extensive search for a specialized ferrite component. Samples of these components have now been tested, and a bulk order has been placed with the supplier. These components were delivered to RAL in June 04, and tested. As the results of these tests were successful, the original 18 pulse generator cards have been retro-fitted with new higher permeability ferrite cores. A further 18 pulse generator cards have been manufactured and these have also been fitted with the upgraded ferrite parts. The upgraded pulse generator will produce positive, and negative polarity pulses with amplitudes of ~ 1.4 kV, transition times of ~ 2 ns, and pulse widths of up to ~ 15 ns. Preliminary acceptance measurements on the phase 2 design, carried out at the manufacturer's premises (Kentech Instruments) on 4th October indicated that the key pulse droop specification had now been met. The phase 2 pulse generator was delivered to RAL on Tuesday 26th October, for final acceptance testing.

The prototype slower transition time, high voltage pulse generator modules were developed at RAL (part of subtask 4.3.1). The electronics design has been developed and checked using a 'SPICE' based circuit simulator (MicroCap 7™). These fan cooled high voltage modules must fit in a confined space, and so the design is challenging. Specialized parts with long lead times, have been delivered to RAL, and detailed drawings have been through several modification and checking cycles, and are now ready for manufacture. A high voltage 'dummy' load module will be used to simulate the inductive and capacitive loads of up to four adjacent 'slow' chopper electrodes, and a 3D CAD drawing and a set of detailed 2D drawings for manufacture, have been completed. The design of additional support modules (ancillary power supplies and a cooling module) are at an advanced stage.

Discussions on the possibility of modifying the design of the RAL slow wave electrode structure C (Figure JRA3.4.2), for installation and testing on the CERN Linac front-end test facility are at a preliminary stage.

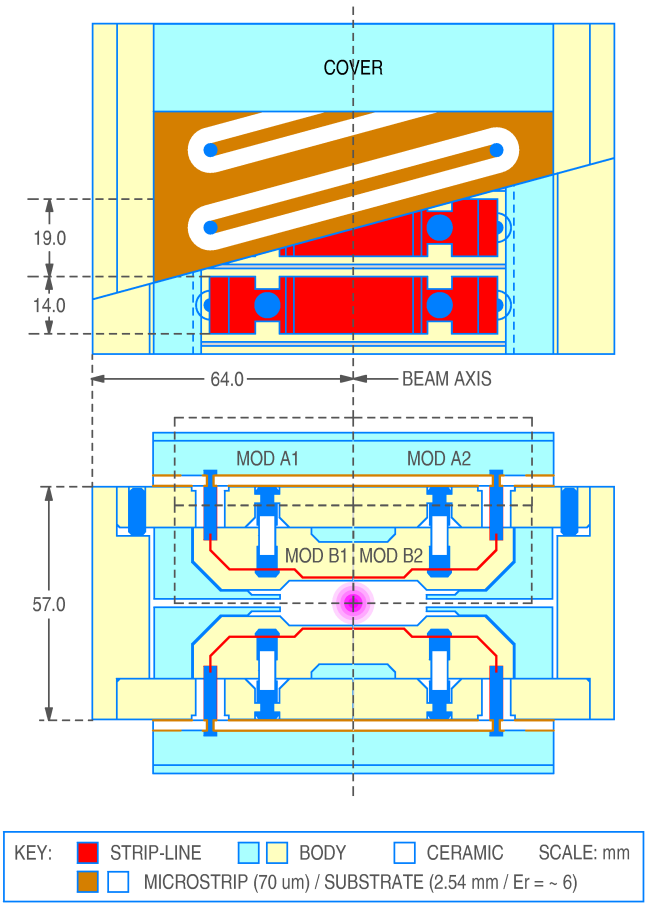


Fig. JRA3.4.2: Slow wave electrode structure C. Version integrable in the CERN 3 MeV test line

JRA3.4.3 Overall Progress of Work Package 4

The following table highlights the progress of work planned in the year 2004 for the work package WP4 by listing the lowest level subtasks of the HIPPI detailed implementation plan (cf. section JRA3.1).

WP4	Title	Contractors	Original begin date	Original end date	Estimated Status	Revised end date
4.1	**Chopper structure A**					
4.1.1	Pre-prototype construction	CERN	Jan. 2004	June 2004	Start delayed to November 2004	Jan. 2005
4.1.2	Pre-prototype testing	CERN	July 2004	Nov. 2004	Start delayed to January 2005	June 2005
4.1.3	Driver construction & testing	CERN	Jan. 2004	Dec. 2004	30 %	June 2005
4.2	**Chopper line**					
4.2.1	Dump design	CERN	Jan. 2004	June 2004	70 %	Dec. 2004
4.2.2	Dump construction	CERN	July 2004	June 2005	Start delayed	
4.3	Chopper structure B					
4.3.1	Pre-prototype design and test	CCLRC-RAL	Jan. 2004	June 2005	30 %	On time

JRA3.5 Work Package 5: Beam Dynamics

JRA3.5.1 Joint Code Benchmarking Project

In the framework of the code benchmarking subtask in WP5, a 3D linac code comparison and benchmarking program have been initiated. In the first part the validation of the space charge solvers, comparing the calculated electric field of a common initial distribution with a semi-analytical solution, was carried out with mutual exchange of data between the participating partners. In order to study the effects of numerical noise on the single particle dynamics first, the calculated single particle tunes have been compared with an analytical prediction. Five codes have been used so far: IMPACT, DYNAMION, TOUTATIS, PARMILA and HALODYN. Other codes, already available like PARMELA and PATH as well as under development at the IAP-FU and at the FZJ will be included in the near future. Details about the code benchmarking project can be found in: http://www-linux.gsi.de/_franchi/HIPPI/code_benchmarking.html and in a paper by A. Franchi et al., *Benchmarking Linac Codes for the HIPPI Project*, presented at the ICFA-HB2004 workshop in Bensheim, October 18-22, 2004. Particle tracking in the lattice of the UNILAC DTL section is under preparation for validation with experimental emittance measurements to be carried out in 2005/06 (see some results illustrated in Figure JRA3.5.1).

Numerical tune shift (at bunch center) generated by different codes and for three different mesh resolutions (grids with 32, 64 and 128 cells). The three considered odes behave similar and suggest a "universal" dependence on mesh size ~ •$x^{3/2}$. Consequences of this and other scaling laws will enter into later code optimization.

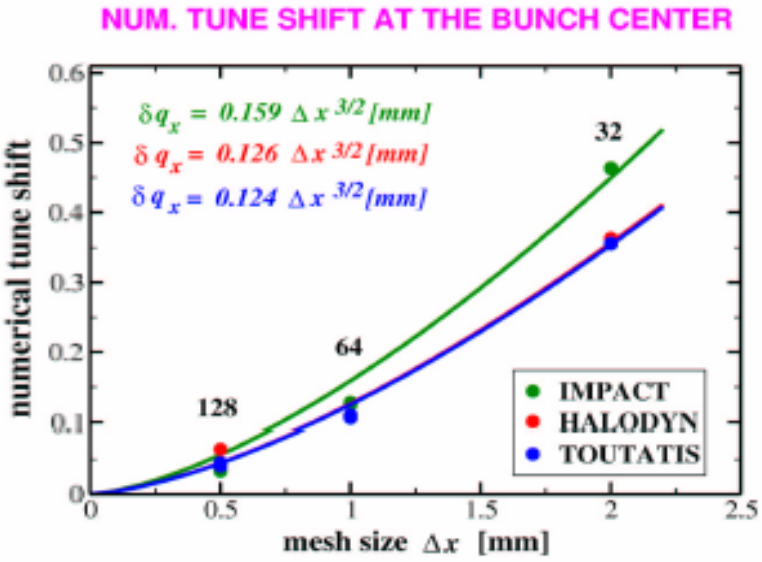


Figure JRA3.5.1: Numerical tune shift at the bunch centre

JRA3.5.2 CEA Activities

JRA3.5.2.1 ECR source modeling

A Finite Difference Time Domain solver to simulate the propagation of the EM waves in the ECR box is under development (with the possibility to integrate the motion of electrons and ions in the box; coupling between the plasma and the wave by including current and charge densities in the FDTD solver; include collision effects). Results have been presented at HIPPI04.

JRA3.5.2.2 Beam space charge neutralization study

First calculations for a simple drift using a PIC method shows a good agreement with theoretical predictions for the rise time of a continuous beam in CW (~20 ms) (for IPHI

LEBT and MEBT lines); for bunched beams a very different behavior is found with incomplete neutralization (15%). Results have been presented at HIPPI04.

JRA3.5.2.3 Code comparison

Comparison of Poisson solvers has been progressing with TOUTATIS, and results were included into the *Code Benchmarking Project.*

JRA3.5.3 CERN Activities

JRA3.5.3.1 Simulation of the 3 MeV line

The code with all the elements of the line has been made ready and validated and the diagnostic of the line has been added. A simulation of the commissioning of the line has been carried out: it gives guidelines on setting the buncher phase to an appropriate value by beam measurements, energy and energy spread measurements and emittance measurements via quadrupole scan.

JRA3.5.3.2 End-to-end simulations for LINAC4

They have been carried out and shown 75% emittance growth from the source to 160 MeV/u. Longitudinal emittance growth was traced back to mismatch effects in the DTL. Code comparisons with TRACEWIN, PATH, TOUTATIS and IMPACT have been initiated and first results were presented at HIPPI04 (PATH – IMPACT).

JRA3.5.3.3 Halo measurement device: design and construction

All the components are in house. The vacuum chamber for the final assembly is not ready yet. The detector will be assembled by the end of the year.

JRA3.5.4 FZJ Activities

JRA3.5.4.1 Code development

In order to compare the analytical model for space charge development with simulation results the beam dynamics was simulated in a periodical transport channel. At the same time the behavior of the space charge dominated beam in dependence on particle distribution was investigated. The obtained results were consistent with the analytical approach and with the general conception. Active participation in the *Code Benchmarking Project* has been initiated.

JRA3.5.4.2 Beam profile monitor

For beam profile measurements based on light radiation of atoms excited by a particle beam a test chamber was developed and installed in cooperation with JINR Dubna in the COSY-JESSICA beam-line to test the efficiency of visible light production of different gases and vapors. The test chamber was successfully tested. Furthermore, the fast electronics for the multi-anode photomultiplier tubes were developed and first tests were performed.

JRA3.5.5 GSI Activities

JRA3.5.5.1 Preparation of the Benchmarking Experiment in the UNILAC Alvarez DTL

Simulations in preparation of the experimental proposal to carry out benchmarking experiments for high intensity beams and comparison with computer codes have been performed. First measurements using the so far available diagnostics in the UNILAC Alvarez-DTL have been evaluated in this preparation campaign. The request for official experimental beam time in 2005/06 for an *"Experimental study of high-intensity effects on beam quality in the DTL section of the UNILAC"* has been submitted to the GSI Experimental Committee in the name of the WP5 participants, and approval of the requested beam time has meanwhile been confirmed.

JRA3.5.5.2 Code Benchmarking Project

For this joint undertaking of WP5/beam dynamics the necessary development of analytical space charge solvers as reference solutions was carried out. Algorithms to evaluate the quality of different electric field solvers (Poisson solvers) have been developed and implemented. Static comparisons for several participating codes were carried out (see also under *JRA3.5.5.1*)

JRA3.5.5.3 Fluorescence Beam Profile Monitor

Due to the lack of non-destructive standard methods, first studies have been performed concerning the method of fluorescence detection from the residual gas in the 400 nm wavelength range, using an image amplified CCD camera. At an external beam dump behind the UNILAC facility the method was tested with a preliminary experimental set-up detecting one transverse plane only. This activity is continuing with the installation of an improved system behind the last module of the UNILAC for both transverse planes, and the development of the data acquisition and presentation systems which are needed for the planned prototype.

JRA3.5.6 IAP-FU Activities

The development of the LORASR-code is presently driven by current applications, e.g. the design of the GSI Proton Linac, as well as by the WP5 *code benchmarking project* (Alvarez calculation implementation). The main activities related to common code development have been: (a) development of a complete new graphical input version; (b) Increasing the particle number in the simulations up to 10^5; (c) faster PIC implementation. The main activities related to the Alvarez DTL test simulations for code benchmarking have been: (a) calculation of "Alvarez-type" gap field distributions for "norm gaps" by Microwave Studio™ simulations and parameterization of the approximated Ez(ri,z) distributions along different radial positions; (b) adaptation of the LORASR gap transformation subroutine to the Alvarez DTL.

JRA3.5.7 RAL Activities

The IMPACT code has been used to study the effect of gradient errors on the beam dynamics performance. It was found that the effect of errors is enhanced by space charge. In the code comparison PATH-IMPACT initial discrepancies could be reduced and better agreement achieved. Remaining differences are due to the integration with nonlinear Lorentz forces.

JRA3.5.8 Overall Progress of Work Package 5

The following table highlights the progress of work planned in the year 2004 for the work package WP5 by listing the lowest level subtasks of the HIPPI detailed implementation plan (cf. section JRA3.1).

WP5	Title	Original begin date	Original end date	Estimated Status	Revised end date
5.1	**Code development**				
5.1.1	Preparation, Dev. of 3D space charge routines, Testing	Jan. 2004	June 2006	40 %	On time
5.1.2	LORASR development	Jan. 2004	Dec. 2005	50 %	On time
5.1.3	Transport in 3D map implementation	Jan. 2004	Dec. 2005	50%	On time
5.1.4	Improvement, modeling high current	Jan. 2004	June 2006	40%	On time
5.1.5	Codes preparation for 3 MeV test stand	Jan. 2004	Dec. 2006	50 %	On time
5.1.6	Codes preparation for SC linacs	Jan. 2004	Dec. 2006	30 %	On time
5.2	**Experiment at UNILAC: preparation & simulations**	Jan. 2004	June 2006	25 %	On time
5.3	**Diagnostics and collimation**				
5.3.1	Profile measurement prototype design and	July 2004	Feb. 2005	70%	On time

	construction (GSI)				
5.3.3	Non-interceptive bunch measurement design (GSI)	Oct. 2004		20%	On time
5.3.4	Halo measurement device design & construction (CERN)	Jan. 2004	June 2005	70 %	On time

JRA3.6 Significant Achievements

Nothing to report.

JRA3.7 List of all milestones and deliverables (D) during the reporting period

Deliverable/ Milestone No	Deliverable/Milestone Name	Workpackage /Task No	Lead Contractor(s)	Planned (in months)	Achieved (in months)
1	Cavity A vertical tests	3.1.1	INFN-Mi, CEA	12	13
2	Mechanical design of tuner	3.1.2	INFN-Mi	12	24

JRA3.8 List of major meetings organized under HIPPI during the reporting period

Date	Title/subject	Location	Number of attendees	Website address
8-10 Mar. 2004	ISTC projects # 2875	CERN (Switzerland)	11	https://edms.cern.ch/file/489417/2/Summary_meeting_10_03_04.pdf
29 Mar. -2 Apr. 2004	ISTC projects # 2888 nd 2889	Moscow (Russia)	23 27	https://edms.cern.ch/file/474222/1/ITEP_March04.pdf https://edms.cern.ch/file/474208/1/IHEP_April04.pdf
3-4 May 2004	Workshop of HIPPI WP2	CNRS-LPSC Grenoble (France)	About 10	http://hippiwp2.in2p3.fr/liste%20meeting%20minute.htm
10-11 May 2004	Workshop of HIPPI WP4	CERN (Switzerland)	About 10	http://lombarda.home.cern.ch/lombarda/WP4/WP4-Chopper/programme.htm
13-14 May 2004	ISTC projects # 2888 and 2889	CERN (Switzerland)	15	https://edms.cern.ch/file/474241/1/CERN_May04.pdf
25-27 May 2004	Physics with a Multi-MW proton source	CERN (Switzerland)	About 120	http://physicsatmwatt.web.cern.ch/physicsatmwatt/
4 June 2004	Workshop of HIPPI WP5	GSI –Darmstadt (Germany)	18	http://www-w2k.gsi.de/Ihofmann/HIPPI%20WP5/WP%205%20main%20page.html
6-7 June 2004	Workshop of HIPPI WP3	CEA-Saclay (France)	17	http://hippiwp3.in2p3.fr/Liste%20fichier%20meeting%20minutes.htm
29 Sept.–1 Oct. 2004	HIPPI annual meeting	Frankfurt University (Germany)	38	http://hippi04.web.cern.ch/hippi04/index.htm

1.5.4 JRA4: Next European Dipole (NED)

The list of participants and their implication in the NED Work Packages (**C**: Coordination, X: Participation) is given in the table below. The overall management is done by CEA and TEU.

Number	Participant	WP1 M&C	WP2 TSQP	WP3 CD	WP4 IDI	WG MDO[a)]	Person-months
1	**CEA**	**C**	X	X	X	X	14
10	**INFN**	X	**C**	X			11 (1)
	INFN-Ge	X		X			0
	INFN-Mi	X	**C**	X			11 (1)
11	**TEU**	X		X			2.3
15	**WUT**	X	X				7.8 (4)
16	**CSIC**	X				**C**	18
	CIEMAT[b)]	X				X	18[b)]
17	**CERN**	X		**C**		X	4.8 (0)
20	**CCLRC**	X	X		**C**	X	9
	CCLRC-RAL	X	X		**C**	X	9

[a)] The Working Group on Magnet Design and Optimisation (WGMDO) is an extension of scope with respect to CARE Annex 1.
[b)] CIEMAT has joined the NED collaboration on January 1st, 2004 and has agreed to contribute 18 person-months of manpower as its own expenses.

JRA4.1 Work Package 1: Management and Communication (M&C)

JRA4.1.1 Overall Coordination

The NED JRA is coordinated by A. Devred (CEA), helped by A. den Ouden (TEU).

The NED Steering Committee (SC) has met four times (8 January, 25 March, 8 July and 29 October), while the NED External Scientific Advisory Committee (ESAC) has met once (24 March) and has produced a report.

The NED work breakdown structure has been implemented by E. Deluncige (CERN) into the CERN Engineering Data and Management Service (EDMS): https://edms.cern.ch under CERN/AT Department/CARE. This service is used to release, circulate, track and store documents. Access is restricted to members of the NED collaboration (as identified in EDMS 547908).

A dedicated web page has been set up by A. den Ouden (TEU): http://lt.tnw.utwente.nl/project.php?projectid=9. The webpage is updated regularly with all information pertinent to the NED and it is accessible by the general public.

Detailed implementation plans of the three technical Work Packages (Thermal Studies and Quench Protection or TSQP, Conductor Development or CD, and Insulation Development and Implementation or IDI) have been established and launched and all collaborators have started their activities. In addition, the Activity scope has been extended, thanks to the setting up of a Working Group on Magnet Design and Optimization (WGMDO), supported by CCLRC and by additional resources from CEA, CERN and CIEMAT, a CARE Associated Laboratory who has decided to join the NED collaboration.

Two intermediate status reports have been produced:
- 2nd quarter of 2004: EDMS 548027
- 3rd quarter of 2004: EDMS 548028

The following actions have been carried out and/or are foreseen:

- 19–21 November 2003: participation of A. Devred (CEA) and A. den Ouden (TEU) to CARE Kick Off meeting at CERN
- 13 January 2004: visit of A. Devred (CEA) to INFN-Ge
- 16 January 2004: visit of P. Védrine (CEA) and A. Devred (CEA) to CIEMAT
- 27 January 2004: visit of A. Devred (CEA) to TEU
- 13 February 2004: A. Devred (CEA), P. Lebrun and L. Rossi (CERN) to INFN-Mi
- 23–24 February 2004: participation of A. Devred (CEA) to 1st CARE Steering Committee and Dissemination Board meetings in Paris, France
- 19 March 2004: visit of F. Rondeaux and P. Védrine (CEA), A. Devred (CEA) to CCLRC
- 22–24 March 2004: participation to Workshop on Accelerator Magnets Superconductor (WAMS) organized within the framework of AMT Work Package of HHH Network Activity
- 13 April 2004: visit of A. Devred (CEA) and M. Pojer (CERN) to INFN-Ge
- 2–3 June 2004: visit of B. Baudouy and F. Michel (CEA), A. Devred (CEA), R. Van Weelderen (CERN) to WUT
- 24–25 June 2004: participation of A. Devred (CEA) and A.den Ouden (TEU) to 2nd CARE Steering Committee and Dissemination Board meetings in Warsaw, Poland
- 24 August 2004: visit of M. Chorowski (WUT) to CEA/Saclay
- 2–5 November 2004: participation of A. Devred (CEA) to 1st CARE general meeting at DESY
- 11-12 November 2004: participation of a number of NED collaborators to the HHH/AMT network meeting organised at CERN.

JRA4.1.2 Meetings

JRA4.1.2.1 Steering Committee Meetings

The oversight of the NED JRA is ensured by a Steering Committee (SC) composed of:

- E. Baynham (CCLRC)
- A. Devred (CEA), Chairman
- D. Leroy (CERN)
- J.M. Rifflet (CEA)
- G. Volpini (INFN-Mi)
- A. den Ouden (TEU), Secretary

SC meetings are held every three months. Available copies of the presentations and minutes of the meetings have been loaded into EDMS and are posted on the NED website.

The following actions have been carried out and/or are foreseen:

- 8 January 2004: meeting at CERN. Participants: E. Baynham (CCLRC), A. Devred (CEA), D. Leroy, L. Oberli and O. Vincent-Viry (CERN), P. Fabbricatore (INFN-Ge), G. Volpini (INFN-Mi), A. den Ouden (TEU); special guests: L. Rossi (CERN), H. ten Kate (CERN&TEU); agenda+talks: EDMS 548032; also available on NED website
- 25 March 2004: meeting at CERN. Participants: B. Baudouy and J.M. Rifflet (CEA), A. Devred (CEA), D. Leroy and R. van Weldeeren (CERN), F. Toral (CIEMAT), G. Volpini (INFN-Mi), E. Baynham and S. Canfer (CCLRC), A. den Ouden (TEU); special guests: A. Yamamoto (KEK), S. Gourlay (LBNL)**;** agenda+talks: EDMS 548033; also available on NED website
- 8 July 2004: meeting at CERN. Participants: E. Baynham and S. Canfer (CCLRC), A. Devred (CEA), F. Rondeaux and P. Védrine (CEA), T. Boutboul, D. Leroy, L. Oberli,

V. Previtali, O. Vincent-Viry, R. van Weldeeren (CERN), P. Fabbricatore and S. Farinon (INFN-Ge), M. Sorbi (INFN-Mi), A. den Ouden (TEU)**;** agenda+talks: EDMS 548034; also available on NED website

- 29 October 2004: meeting at CEA/Saclay. Participants: S. Canfer (CCLRC), A. Devred (CEA), H. Felice, L. Quettier, J.M. Rifflet, F. Rondeaux, P. Védrine (CEA), T. Boutboul, D. Leroy, L. Oberli, V. Previtali, R. van Weldeeren (CERN), M. Greco (INFN-Ge), D. Pedrini, M. Sorbi, G. Volpini (INFN-Mi), A. den Ouden (TEU), M. Chorowski, J. Polinski (WUT); special guests: R. Aleksan (CPPM), P. Debu, M. Durante (CEA), B. Adamowicz (Kryosystem)**;** agenda+talks: 548035; also available on NED website
- next meetings: 20 January and 14 April 2005 at CERN

JRA4.1.2 External Scientific Advisory Committee Meetings

2004 Summary: The NED JRA Coordinator is assisted by an External Scientific Advisory Committee (ESAC). The charges and composition of the committee are defined in EDMS 548039. The committee is made up of:

- J.L. Duchateau (CEA)
- P. Lebrun (CERN)
- L. Rossi (CERN)
- R.M. Scanlan (formerly LBNL, retired)
- J.B. Strait (FNAL), Chairman
- H.H.J. ten Kate (CERN&TEU)

The following actions have been carried out and/or are foreseen:

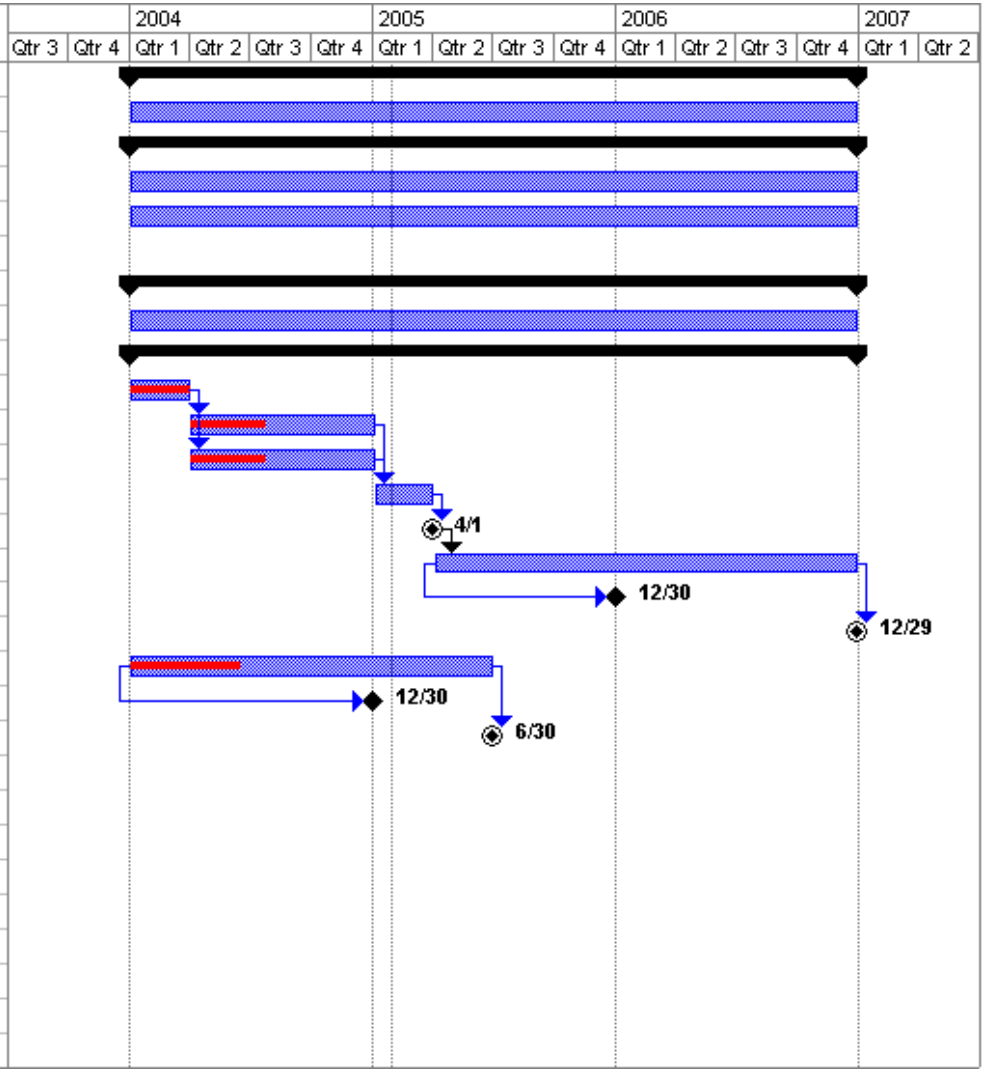
- 24 March 2004: first meeting at CERN; agenda: EDMS 548039; presentations available on NED website
- 29 March 2004: first ESAC report (EDMS 548041); agenda+talks: 548035; also available on NED website
- next meeting: fall of 2005

JRA4.1.4 Overall Progress of the Activity

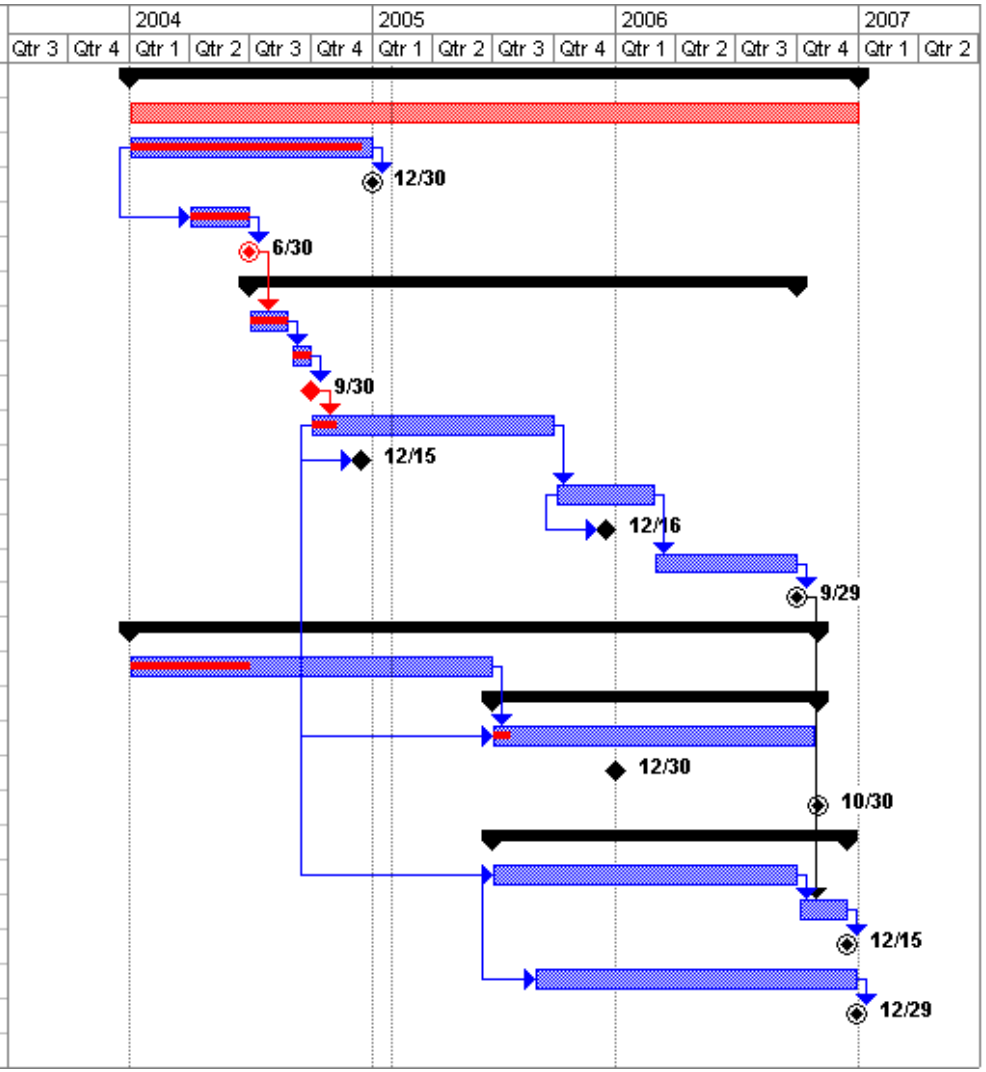
The overall progress of the NED activity is described in the following Gantt chart which specifies the involvement of each contractor in the work packages and tasks.

Updated implementation plan (Gantt chart) for the NED/JRA as described in the Technical Annex of CARE Contract

Next European Dipole Joint Research Activity
1 Management and Communication (M&C)
1.1 Activity Coordination
1.2 Meetings
1.2.1 Steering Committee Meetings
1.2.2 External Scientific Advisory Committee Meetings
2 Thermal Studies and Quench Protection (TSQP)
2.1 Work Package Coordination
2.2 Heat Transfer Measurements
2.2.1 Drafting of Test Facility Specifications
2.2.2 Cryostat Design and Fabrication
2.2.3 Cryogenic Module Design and Fabrication
2.2.4 Facility Integration and Qualification
Commisioning of Heat Transfer Facility (deliverable)
2.2.5 Measurements and Analyses
Interim Report on Heat Transfer Measurements (milestone)
Final Report on Heat Transfer Measurements (deliverable)
2.3 Quench Protection Computation
Interim Report on Quench Performance (milestone)
Final Report on Quench Protection (deliverable)

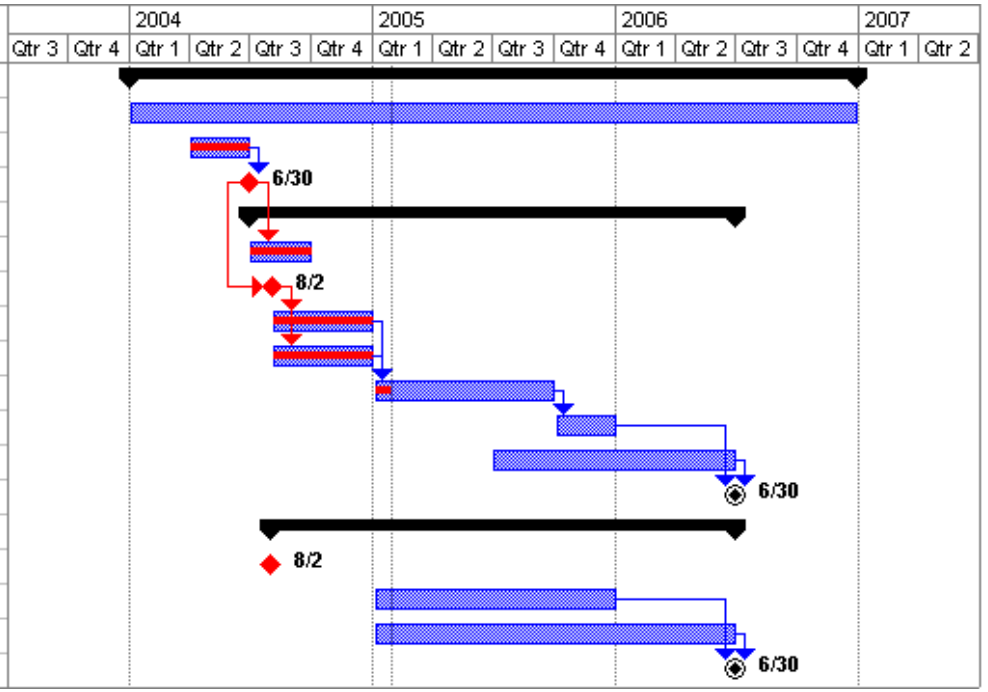


Next European Dipole Joint Research Activity
3 Conductor Development (CD)
3.1 Work Package Coordination
3.2 Cable Definition from Field Computations of a 15 T Dipole Magnet
Design of a 15T Dipole Magnet (deliverable)
3.3 Specifications' Drafting
Specifications on Wire and Cable (deliverable)
3.4 Wire Development
3.4.1 Call for tender
3.4.2 Contracts preparation
Contract Signature
3.4.3 Step 1
Progress Report (milestone)
3.4.4 Step 2
Progress Report (milestone)
3.4.5 Final production
Final Wire Production (deliverable)
3.5 Wire Characterization
3.5.1 Definition of Measuring Procedures
3.5.2 Wire Ic Measurements
3.5.3 Wire Magnetization Measurements
Interim Report on Wire Characterization (milestone)
Final Report on Wire Characterization (deliverable)
3.6 Cable Development
3.6.1 Cabling Trial
3.6.2 Final Production
Final Cable Production (deliverable)
3.7 Cable Characterization
Report on Cable Performance (deliverable)



NB: the CARE Annex I milestone entitled “First Results on Wire Development” that was due on 30 June 2005 has been split into two “Status Reports” due on 15 December 2004 and 15 December 2005.

Next European Dipole Joint Research Activity
4 Insulation Development and Implementation (IDI)
4.1 Work Package Coordination
4.2 Specifications' Drafting
Report Specifications for Conductor Insulation (milestone)
4.3 Implementation Study of Conventional Solution
4.3.1 Litterature Survey
Definition of the Test Programme (milestone)
4.3.2 Tooling Preparation
4.3.3 Component Supply
4.3.4 Iterative Tests
4.3.5 Data Analysis
4.3.6 Irradiation Tests
Report on Conventional Insulation (deliverable)
4.4 Implementation Study of Innovative Solution
Definition of the Test Programme
4.4.1 Tape Weaving Trial
4.4.2 Characterization Tests
Report on Innovative Insulation (deliverable)



NB:

- Task 4.3.6 is an extension of scope with respect to CARE Annex I,
- The scope of Task 4.4.2 has been modified with respect to CARE Annex I.

JRA4.2 Work Package 2: Thermal Studies and Quench Protection (TSQP)

The fabrications of the cryostat and of the cryogenic modules of the Heat Transfer Facility are proceeding as planned under the supervision of WUT and the hardware is expected to be delivered to CEA in January/February 2005.

After completing a literature survey of relevant material properties (EDMS 555753), INFN-Mi has carried out detailed quench computations based on the 88-mm-aperture, cos•-layer design chosen as a reference for NED in conclusion of Task 3.2. The computations, summarized is an interim report (EDMS 555756), deal with two magnet lengths (1 m and 5 m) and include the effect of quench protection heaters.

JRA4.2.1 TSQP Work Package coordination

The TSQP Work Package is articulated around two main tasks: Heat Transfer Measurements (2.2) and Quench Computation (2.3). Task 2.2 is coordinated by B. Baudouy (CEA), while Task 2.3 is coordinated by G. Volpini (INFN-Mi). The task leaders report to the NED Steering Committee and ultimately to the NED coordinator.

JRA4.2.2 Heat Transfer Measurements

The following actions have been carried out and/or are foreseen:

JRA4.2.2.1 Drafting of Test Facility Specifications

- 28 January 2004: preparatory meeting at CEA/Saclay. Participants: B. Baudouy, P. Chesny, B. Hervieu, F. Michel and J.M. Rifflet (CEA), A. Devred (CEA)
- 27 February 2004: programme proposal issued by B. Baudouy (CEA; EDMS 548123)
- March 2004: review of programme proposal by P. Lebrun and D. Leroy (CERN) and approbation by SC meeting
- 4 May 2004: cryostat specification issued by B. Baudouy, B. Hervieu and F. Michel (CEA; EDMS 548129V1)
- May 2004: specification submitted for review to P. Lebrun and R. Van Weelderen (CERN) and M. Chorowski (WUT)
- 8 June 2004: final cryostat specification issued by B. Baudouy, B. Hervieu and F. Michel (CEA; EDMS 548129V2)

Sub-Task completed

JRA4.2.2.2 Cryostat Design and Fabrication

- 3 June 2004: preparatory visit to Kryosystem (Poland). Participants: B. Baudouy, F. Michel (CEA), A. Devred (CEA) R. van Weelderen (CERN), M. Chorowski, J. Fydrych and J. Polinski (WUT), B. Adamowicz, G. Michalski and G. Strychalski (Kryosystem)
- July 2004: start of technical design at WUT
- July 2004: start of tendering procedure
- 10 August 2004: redefinition of WUT budget allocation
- August 2004: contract attribution to Kryosystem
- 29 Ooctober 2004: Production Readiness Review at CEA Saclay. Participants: B. Baudouy, F. Michel (CEA), R. van Weelderen (CERN), M. Chorowski, J. Polinski (WUT), B. Adamowicz (Kryosystem); report: EDMS 548154)
- 17 November 2004: hiring of Grzegorz Michalski and Maciej Matkowski at WUT (additional staff; till 30 June 2005)
- Mid February 2005: completion of manufacturing
- Late February 2005: reception test at WUT
- Late February 2005: shipment to CEA/Saclay

JRA4.2.2.3 Cryogenic Module Design and Fabrication

- 22 June 2004: design specifications issued by B. Baudouy and F. Michel (CEA; EDMS 548139, based on design study reviewed in EDMS 548137)
- 1st July 2004: call for tender issued by F. Michel (CEA)
- 15 July 2004: reception of answers to call for tender
- 17 September 2004: purchase requisition to be issued by F. Michel (CEA)
- 10 October 2004: contract awarded to Kryosystem.
- Mid February 2005: completion of manufacturing

JRA4.2.2.4 Facility Integration and Qualification

Not started

JRA4.2.2.5 Measurements and Analyses

Not started

JRA4.2.3 Quench Protection Computation

The following actions have been carried out and/or are foreseen

- 5 March 2004: draft computation programme issued by M. Sorbi and G. Volpini (INFN-Mi; EDMS 555747)
- March 2004 SC meeting: discussion of computation programme
- April–June 2004: compilation of material properties (EDMS 555753)
- June-October 2004: first computation on baseline (88-mm-aperture, cosθ, layer design) magnetic configuration
- November-December 2004: extended computation on baseline magnetic configuration
- 25 November 2004: hiring of Valeria Granata by INFN-Mi (additional staff for 6 months)
- Early February 2005: interim report (INFN-Mi; EDMS 555756); EU milestone
- December 2004-April 2005: cross-calibration of computation codes
- January-June 2005: computation on other magnetic configurations
- 30 June 2005: final report (INFN-Mi); EU deliverable

JRA4.2.4 Overall Progress of Work Package 2

The following table highlights the progress of work planned in the year 2004 for the work package WP2 by listing the lowest level subtasks of the NED detailed implementation plan.

WP2	Title	Original begin date	Original end date	Estimated Status	Revised end date
2.1	TSQP WP Coordination				
2.2	Heat Transfer Measurements				
2.2.1	Drafting of Test Facility Specifications	1 Jan. 2004	31 Mar. 2004	Completed	June 2004
2.2.2	Cryostat Design and Fabrication	1 Apr. 2004	31 Dec. 2004	40%	Feb. 2005
2.2.3	Cryogenic Module Design and Fabrication	1 Apr. 2004	31 Dec. 2004	40%	Feb. 2005
2.3	Quench Protection Computation	1 Apr. 2004	30 June 2005	30 %	On time

JRA4.3 Work Package 3: Conductor Development (CD)

2004 Summary

CERN has investigated two different magnetic designs, referred to as cosθ layer design and cosθ block design and has considered 3 apertures: 88 mm, 130 mm and 160 mm. These investigations, described in a report (EDMS 555826), led to the definition of wire and cable parameters used as a basis for conductor specifications. The 88 mm aperture, cosθ layer design has been chosen as the baseline for NED (EDMS 555825).

After writing comprehensive wire and cable specifications and a detailed technical questionnaire (EDMS 475443), CERN has carried out a call for tender and has selected Alstom/MSA, in France, and Shape Metal Innovation (SMI), in the Netherlands, to be the main wire and cable contractors. The two companies have established a development plan, which has been agreed upon by CERN, and have started the procurements of raw materials.

A Working Group on Wire Characterization (WGWC) made up of representatives from CEA, CERN, INFN-Mi, INFN-Ge and chaired by A. den Ouden (TEU) has been set to oversee the wire IC and magnetization measurements. The Working Group has initiated a cross-calibration of the various test facilities that will be used to perform these measurements.

JRA4.3.1 Work Package Coordination

The CD Work Package is articulated around three main poles: conductor development (encompassing Tasks 3.2, 3.3, 3.4 and 3.6), conductor characterization (encompassing Tasks 3.5 and 3.7), and mechanical studies (extension of scope with respect to CARE Annex I, initiated by INFN-Ge and partially supported by CERN).

The conductor development pole is coordinated by D. Leroy (CERN). A working Group on Wire Characterization (WGWC), chaired by A. den Ouden (TEU) has been set up to coordinate the conductor characterization efforts, while S. Farinon (INFN-Ge) is the principal investigator on the mechanical model. The pole coordinators report to the NED Steering Committee and, ultimately to the NED Coordinator.

JRA4.3.2 Design of a 15 T Dipole Magnet

The following actions have been carried out:

- September 2003–July 2004: preliminary design computations carried out by O. Vincent-Viry (CERN) under D. Leroy supervision (CERN)
- November 2003: report on 2D magnetic induction analytical calculation issued by O. Vincent-Viry (CERN; EDMS 431540)
- January 2004 SC meeting: first presentation of preliminary design computations by O. Vincent-Viry (CERN)
- 4 May 2004: meeting at CEA to review magnetic configurations and choice of 88-mm-aperture, cos• layer, baseline design (EDMS 555825). Participants: H. Félice, L. Quettier, J.M. Riflet, P. Védrine (CEA), A. Devred (CEA), D. Leroy and O. Vincent-Viry (CERN)
- 2 August 2004: seminar at CERN by O. Vincent-Viry (CERN) on preliminary magnet designs
- Early February 2005: final report (CERN; 555826); NED EU deliverable

Sub-Task near completion

JRA4.3.3 Specifications on Wire and Cable

The following actions have been carried out:

- 11 May 2004: first draft specification issued by D. Leroy (CERN) and communicated to A. Devred (CEA)
- 14 May 2004: first draft reviewed by A. Devred (CEA)
- 18 May 2004: second draft specification issued by D. Leroy and communicated to A. Devred (CEA) and A. den Ouden (TEU)
- 1 June 2004: third draft specification issued by D. Leroy and communicated to the NED Steering Committee
- 4 June 2004: Specification Committee Meeting at CERN. Participants: T. Boutboul, P. Bryant (Chairman), P. Lebrun, D. Leroy, L. Oberli, L. Rossi (CERN), H.H.J. ten Kate (CERN&TEU)
- 18 June 2004: final specification and technical questionnaire issued by D. Leroy (CERN; EDMS 475443); EU deliverable

Sub-Task completed

JRA4.3.4 Wire Development

The following actions have been carried out and/or are foreseen

- 12 December 2003: preparatory visit to Alstom/MSA participants: A. Devred (CEA), D. Leroy, T. Boutboul and L. Oberli (CERN)•
- 15 December 2003: preparatory visit to EAS
- participants: A. Devred (CEA), D. Leroy and L. Oberli (CERN) + SMI representative
- 27 January 2004: preparatory visit to SMI participants: A. Devred (CEA), D. Leroy, T. Boutboul, L. Oberli and A. Unervick (CERN) + EAS representatives
- 21 June 2004: call for tender issued to the companies Alstom/MSA, EAS, OK Cu, OK SI and SMI
- 20 August 2004: meeting at CERN with SMI and EAS to prepare answer to call for tender
- 23 August 2004: meeting at CERN with OK to prepare answer to call for tender
- 24 August 2004: meeting at CERN with Alstom to prepare answer to call for tender
- 6 September 2004: tenders' opening at CERN; selection of Alstom/MSA and SMI
- 24 September 2004: sending of orders to CERN Finance Division
- 15 November 2004: contracts' signature by Alstom/MSA and SMI
- 15 December 2004: first progress reports issued by Alstom/MSA and SMI (restricted access)
- 15 December 2005: second progress reports issued by Alstom/MSA and SMI
- 30 September 2006: final wire production; NED EU deliverable

JRA4.3.5 Wire Characterization

The following actions have been carried out and/or are foreseen:

JRA4.3.5.1 Definition of Measurement Procedures

- March 2004: setting up of Working Group on Conductor Characterization, chaired by A. den Ouden (TEU); WGCC charges and composition: EDMS 548084
- 19 May 2004: first Working Group meeting at CERN. Participants: L. Quettier (CEA), V. Previtali (CERN), P. Fabbricatore and M. Greco (INFN-Ge), D. Pedrini, G. Volpini (INFN-Mi), A. den Ouden (TEU)
- June 2004-October 2004: first round of test wires for cross-calibration purposes
- 28 October 2004: second Working Group meeting at CEA. Participants: L. Quettier (CEA), V. Previtali, T. Boutboul (CERN), M. Greco (INFN-Ge), D. Pedrini, G. Volpini (INFN-Mi), A. den Ouden (TEU)

- November 2004-January 2005: second round of test wires for cross-calibration purposes; next Working Group meeting: 4 February 2005 at INFN-Mi
- 30 June 2005: end of cross-calibration program
- 31 December 2004: first interim report on wire characterization; NED milestone
- 31 December 2005: second interim report on wire characterization; NED milestone
- 31 October 2006: final report on wire characterization; NED deliverable

JRA4.3.5.2 Wire I_C Measurements at CEA

- June 2004-June 2005: cross-calibration program

JRA4.3.5.3 Wire I_C Measurements at INFN-Mi

- June 2004-June 2005: cross-calibration program

JRA4.3.5.4 Wire I_C Measurements at TEU

- June 2004-June 2005: cross-calibration program

JRA4.3.5.5 Wire Magnetization Measurements at INFN-Ge

- 21 January 2004: preparatory meeting at CERN. Participants: A. Devred (CEA), D. Leroy (CERN) and P. Fabbricatore (INFN-Ge).
- 23 March 2004: first report on preliminary measurements issued by P. Fabbricatore and M. Greco (INFN-Ge).
- 23 March 2004–13 April 2004: review of preliminary measurements by A. Devred (CEA) and D. Leroy (CERN).
- June 2004-June 2005: participation to cross-calibration program defined by WGCC.

JRA4.3.6 Cable development and manufacturing

Not started

JRA4.3.7 Cable Characterization

Not started

JRA4.3.8 Mechanical Studies

These studies are an extension of scope with respect to CARE Annex I and are supported by additional resources provided by INFN-Mi and CERN.

The following actions have been carried out and/or are foreseen:

- 28 January 2004: parameters of mechanical model for 19-subelement, internal tin wire issued by A. Devred (CEA; EDMS 548087)
- 30 January 2004: mesh proposal issued by S. Farinon (INFN-Ge)
- Early February 2004: review of mesh proposal by A. Devred (CEA), D. Leroy (CERN) and C. Verwaerde (Alstom/MSA)
- February 2004–present: review of material properties
- 25 March 2004: informal discussion of preliminary computation results. Participants: A. Devred (CEA), D. Leroy (CERN), S. Farinon (INFN-Ge), C. Verwaerde and P. Mocaer (Alstom/MSA)•
- 9 June 2004: meeting at CERN to review material properties and discuss computation results. Participants: A. Devred (CEA), T. Boutboul, P. Fessia, D. Leroy and S. Sgobba (CERN), S. Farinon and R. Musenich (INFN-Ge), P. Loverage (CCLRC)
- 7 July 2004: meeting at CERN to review material properties and discuss computation results. Participants: A. Devred (CEA), T. Boutboul, P. Fessia, L. Oberli M. Pojer and S. Sgobba (CERN), P. Fabbricatore and S. Farinon (INFN-Ge)
- September 2004: contract issued to EIAJ to perform nano-indentation measurements on an un-reacted, internal-tin wire cross-section

- 14 October 2004: visit to EIAJ, Le Locle (CH). Participants: T. Boutboul, C. Scheuerlein, S. Sgobba (CERN); trip report: EDMS 520095
- 29 October 2004: first report issued by EIAJ on nano-indentation measurements (EDMS 548100)
- 11 November 2004: meeting at CERN to review nano-indentation measurements performed at EIAJ. Participants: A. Devred (CEA), T. Boutboul, P. Fessia, D. Leroy, L. Oberli, V. Previtali, D. Richter and S. Sgobba (CERN), P. Fabbricatore and S. Farinon (INFN-Ge)
- 11 November 2004: first report issued by C. Scheuerlein (CERN) on micro-hardness measurements at CERN (EDMS 548116)
- 22 November 2004: meeting at CERN to review micro-hardness measurements. Participants: A. Devred (CEA), T. Boutboul, C. Scheuerlein, S. Sgobba and W. Scandale (CERN)
- next discussion: at the January 05 Steering Committee meeting

JRA4.3.9 Overall Progress of Work Package 3

The following table highlights the progress of work planned in the year 2004 for the work package WP3 by listing the lowest level subtasks of the NED detailed implementation plan.

WP3	Title	Original begin date	Original end date	Estimated Status	Revised end date
3.1	CD WP Coordination				
3.2	Design of a 15 T Dipole Magnet	1 Jan. 2004	31 Dec. 2004	95%	Jan. 2005
3.3	Specifications on Wire and Cable	1 Apr. 2004	30 June 2004	Completed	On time
3.4	Wire Development	1 July 2004	30 June 2006	Started	Sept. 2006
3.8	Mechanical Studies [a)]	1 Jan. 2004	31 Dec. 2005	25%	-

a) Extension of scope with respect to CARE Annex I.

JRA4.4 Work Package 4: Insulation Development & Implementation (IDI)

2004 Summary

CCLRC and CEA have written an engineering specification for the NED conductor insulation (EDMS 548037) and a coordinated Test Programme for the conventional and innovative insulations (EDMS 548038).

CCLRC has started investigations on glass fiber sizings and epoxy resin fillers and is developing an experimental set up to perform fracture tests.

The start of the work on Innovative Insulation at CEA (Task 4.4) has been delayed, pending the hiring of a permanent staff to support the activity of the chemistry laboratory.

JRA4.4.1 Work Package Coordination

The IDI Work Package is coordinated by E. Baynham (CCLRC). The conventional Insulation Task (4.3) is headed by S. Canfer (CCLRC) while the Innovative Insulation Task (4.4) is headed by F. Rondeaux (CEA). The work-package and task leaders report to the NED Steering Committee and, ultimately, to the NED Coordinator.

JRA4.4.2 Specification Drafting

The following actions have been carried out:

- 6 May 2004: draft specifications issued by S. Canfer (CCLRC)
- 11 May 2004: conference call on insulation specifications. Participants: S. Canfer and J. Greenhalgh (CCLRC), F. Rondeaux (CEA), A. Devred (CEA), A. den Ouden (TEU)
- 11 May 2004: Version 2 of specifications issued by S. Canfer (CCLRC; EDMS 548037V1)

- 25 May 2004: Version 2.2 of specifications issued by S. Canfer (CCLRC; EDMS 548037V2)
- 1 June 2004: Version 2.3 of specifications issued by S. Canfer (CCLRC; EDMS 548037V3)
- 23 June 2004: Version 2.3b of specifications issued by S. Canfer (CCLRC; EDMS 548037V4)
- 16 July 2004: final specifications (EDMS 548037V5); NED EU milestone.

Sub-Task completed

JRA4.4.3 Conventional Insulation

The following actions have been carried out and/or are foreseen:

- 27 July 2004: first draft of conventional insulation Test Programme (EDMS 548038V1)
- 12 August 2004: second draft of conventional insulation Test Programme
- 27 October 2004: final insulation Test Programme (including Test Programme for innovative insulation; EDMS 548038V2); EU milestone
- 30 September 2004: completion of Literature Survey (Sub-Task 4.3.1)
- 30 November 2004: completion of Tooling Preparation (Sub-Task 4.3.2)
- 31 December 2004): completion of Component Supply (Sub-Task 4.3.3)
- 1 January 2005 – 30 September 2005: Iterative Tests (Sub-Task 4.3.4)
- 1 October 2005 – 31 December 2005: Data Analysis (Sub-Task 4.3.5)
- 1 July 2005 – 30 June 2006: Irradiation Tests (extension of scope with respect to CARE Annex I)
- 30 June 2006: final report on conventional insulation; NED EU deliverable

JRA4.4.4 Innovative Insulation

The following actions have been carried out and/or are foreseen

- 6 May 2004: preparatory meeting at CEA. Participants: J.M. Rifflet, F. Rondeaux and P. Védrine (CEA), A. Devred (CEA); conclusions of this meeting are reported above
- 30 August 2004: first draft of innovative insulation Test Programme
- September 2004: final innovative insulation Test Programme (added to EU milestone on conventional insulation Test Programme)
- 1 January 2005 – 31 December 2005: Tape Weaving Trial (Sub-Task 4.4.1)
- 1 January 2005 – 30 June 2006: Characterization Tests (Sub-Task 4.4.2; scope has been modified with respect to CARE Annex I)
- 30 June 2006: final report on innovative insulation; NED EU deliverable

JRA4.4.5 Overall Progress of Work Package 4

The following table highlights the progress of work planned in the year 2004 for the work package WP4 by listing the lowest level subtasks of the NED detailed implementation plan.

WP4	Title	Original begin date	Original end date	Estimated Status	Revised end date
4.1	IDI WP Coordination				
4.2	Specifications' Drafting	1 Apr. 2004	30 June 2004	Completed	22 July 2004
4.3	Conventional Insulation				
4.3.1	Literature Survey	1 July 2004	30 Sept. 2004	Completed	On time
4.3.2	Tooling Preparation	1 Oct. 2004	30 Oct. 2004	Completed	31 Dec. 2005
4.3.3	Component Supply	1 Oct. 2004	31 Dec. 2004	Completed	On time
4.4	Innovative Insulation				
4.4.1	Tape Weaving Trial	1 July 2004	31 Dec. 2004	Not started	31 Dec. 2005
4.4.2	Characterization Tests[b)]	1 July 2004	30 June 2005	Not started	30 June 2006

[a)] Extension of scope with respect to CARE Annex I.
[b)] Modification of scope with respect to CARE Annex I.

JRA4.5 Working Group Magnet Design and Optimisation

CCLRC, CEA, CERN and CIEMAT have decided to join forces in order to create an informal Working Group on Magnet Design and Optimization (WGMDO), whose charges and composition are defined in EDMS 547882.

The Working Group is made up of :

- H. Félice (CEA)
- P. Fessia (CERN)
- P. Loveridge (CCLRC)
- J. Rochford (CCLRC)
- S. Sanz (CIEMAT)
- F. Toral-Fernandez (CIEMAT), Technical Secretary
- P. Védrine (CEA), Chairman

This Working Group is an extension of scope with respect to CARE Annex 1. It is supported by CCLRC (whose contribution foreseen to Task 3.2 has been shifted to this end) and by additional resources from CEA, CERN and CIEMAT.

The following actions have been carried and/or are foreseen

- 19 May 2004: brainstorming session at CEA/Saclay. Participants: H. Felice, L. Quettier and P. Védrine (CEA), A. Devred, (CEA), P. Fessia (CERN), S. Sanz and F. Toral (CIEMAT), P. Loveridge and J. Rochford (CCLRC); preparatory document: EDMS 547883; Minutes: EDMS 547884
- 23 November 2004: meeting at CERN to discuss CCLRC computations on NED baseline (88-mm-aperture, cosθ, layer) design. Participants: D.E. Baynham and P. Loveridge (CCLRC), A. Devred, (CEA), D. Leroy (CERN)
- 17 December 2004: meeting at CIEMAT to review 2-D magnetic designs. Participants: P. Loveridge, J. Rochford (CCLRC), H. Felice, P. Védrine (CEA), A. Devred (CEA), S. Sanz, F. Toral (CIEMAT); minutes: EDMS 547885
- 27 January 2005: visit of P. Loveridge (CCLRC) to CEA
- 13 April 2005: interim meeting at CERN
- 14 June 2005: meeting at CCLRC to review 2-D mechanical designs
- 28 December 2005: review of 3-D configurations

JRA4.6 Significant Achievements

- Preliminary design of 88 mm aperture, 15 Tesla dipole magnet
- Award of contracts for conductor development to Alstom/MSA (France) and SMI (The Netherlands)

JRA4.7 List of all milestones and deliverables (D) during the reporting period

Deliverable/ Milestone No	Deliverable/Milestone Name	Workpackage /Task No	Lead Contractor(s)	Planned (in months)	Achieved (in months)
2.1	Interim Report on Quench Protection	WP2 : TSQP	INFN-Mi	12	13
3.1	Status Report on Conductor Development[b)]	WP3 : CD	CERN	-	3
D 3.2	**Final Report on Wire and Cable Specifications**	WP3 : CD	CERN	6	6
D 3.3	**Design Report on 15 T Dipole Magnet**	WP3 : CD	CERN	12	13
4.1	Report on Specifications for Conductor Insulation	WP4 : IDI	CCLRC	6	7
4.2	Report on Definition of the Test Programme for Conductor Insulation[a)]	WP4 : IDI	CCLRC, CEA	7	10

[a)] The milestone entitled "First Results on Wire Development" that was due on 30 June 2005 has been split into two "Status Reports" due on 15 December 2004 and 15 December 2005.
[b)] Scope of report has been extended to include test programme on innovative insulation (Task 4.4).

JRA4.8 List of major meetings organized under NED during the reporting period

Date	Title/subject of meeting /workshop	Location	Number of attendees	Website address
8 Jan. 2004	NED Steering Committee	CERN (Switzerland)	10	http://lt.tnw.utwente.nl/eu/care_ned/public/SC%20080104/agenda.htm
24 Mar. 2004	NED ESAC	CERN (Switzerland)	15	http://lt.tnw.utwente.nl/eu/care_ned/public/ESAC240304/ESAC240304pres.htm
25 Mar. 2004	NED Steering Committee	CERN (Switzerland)	12	http://lt.tnw.utwente.nl/eu/care_ned/public/SC250304/A&P%20SC250304.htm
19 May 2004	NED WG: Conductor Characterization	CERN (Switzerland)	7	http://lt.tnw.utwente.nl/eu/care_ned/public/WGCC190504/presentations.htm
19 May 2004	NED WG: Magnet Design and Optimization	CEA-Saclay (France)	9	http://lt.tnw.utwente.nl/eu/care_ned/public/MDO190504/presentations.htm
8 July 2004	NED Steering Committee	CERN (Switzerland)	15	http://lt.tnw.utwente.nl/eu/care_ned/public/SC080704/agenda%20and%20presentations.htm
28 Oct. 2004	NED WG: Conductor Characterization	CEA-Saclay (France)	7	
29 Oct. 2004	NED Steering Committee	CEA-Saclay (France)	23	http://lt.tnw.utwente.nl/eu/care_ned/public/SC291004/agenda%20and%20presentations.htm
17 Dec. 2004	NED WG: Magnet Design and Optimization	CIEMAT-Madrid (Spain)	7	http://lt.tnw.utwente.nl/eu/care_ned/public/MDO%20171204/Agenda%20and%20presentations.htm

2. List of deliverables

The following table provides a consolidated list of all deliverables planned and/or achieved during the reporting period.

Activity	Deliverable No	Deliverable Name	Workpackage /Task No	Delivered by Contractor(s)	Planned (in months)	Achieved (in months)
NA1	1	ELAN web site	All WPs	CNRS-Orsay	4	4
NA1	2	ELAN Annual Meeting	All WPs	CNRS-Orsay, INFN-LNF	11	5
NA1	3	Code repository site functional	WP3 / 3.11	CERN	12	12
NA1	4	Instrumentation web site	WP4 / 4.2	CCLRC,UMA	6	delayed
NA1	5	Instrumentation data base	WP4 / 4.5	CCLRC,UMA	12	delayed
NA2	6	BENE web site	All WPs	INFN-Na	4	4
NA2	7	BENE Annual report	All WPs	INFN-Na, Uni-Ge	11	5
NA2	8	BENE Physics web site	WP1 / 1.1	INFN-Pa, CERN	3	3
NA3	9	HHH web site	All WPs	CERN	12	9
NA3	10	APD web site	WP3 / 3.1	CERN	6	9
JRA1	11	Final report on reliability issues	WP2 / 2.1.7	DESY	9	delayed, 14
JRA1	12	EP on single cells: best EP parameters	WP5 / 5.1.1.4	CEA	12	delayed, 15
JRA4	13	Final report on wire and cable specifications	WP3 / 3.2	CERN	6	6
JRA4	14	Design report on 15 T dipole magnet	WP3 / 3.3	CERN	12	13

3. Use and dissemination of knowledge

The CARE dissemination board includes the seven activity deputy coordinators and is chaired by the CARE deputy coordinator. The dissemination of knowledge activity focused on the publication of scientific articles presenting work partially funded by the CARE activity, on establishing Web sites and on promoting the CARE results at accelerator conferences.

3.1 Publications

The CARE dissemination board established 5 categories of scientific articles according to the following table:

Publication category	Type of publication and Responsibility	Reviewing	Storage and numbering
CARE/Activ Document-year-number	Technical documents Responsibility of the authors	No review	Stored locally in NA/JRA web sites Numbering by NA/JRA coordinators
CARE-Pub-year-number	Journal publications CARE responsibility	Internal review	Stored in CARE web site Central numbering
CARE-Report-year-number	Covers yearly reports, intermediate and final reports to Brussels CARE responsibility	Submitted to EU commission	Stored in CARE web site Central numbering
CARE-Conf-year-number-Activ	Conference proceedings NA/JRA responsibility	Abstract approved by NA/JRA coordinators Internal review	Stored in CARE web site Central numbering
CARE-Note-year-number-Activ	CARE workshops and reviewed papers not aimed at publication CARE responsibility	Internal review	Stored in CARE web site Central numbering

The dissemination board agreed upon attempting to enforce the following CARE publication policy:

CARE/Activity Documents: responsibility of the authors, no review but approval by the activity coordinators is implicit for the paper to be stored in the activity web site.

CARE Journal Publications: the scientifically highest category of publication. The peer review is organized prior to the journal submission and includes a review of the author list and of the scientific content of the paper. The peer review is done by a reading committee of 2 members, one chosen by the activity coordinator and one by the dissemination board. The criteria for a positive review could be for the paper to be:

1. pertinent to the JRA
2. consistent with CARE politics, presenting no problems with authors - colleagues

3. original (not published before, apart internal notes)
4. of sufficiently high scientific level
5. written in a decent form (no evident errors in English, readable figures, etc.).

CARE Reports: this category is intended for the intermediate and annual CARE Networking Activity and Joint Research Activity reports as well as for the CARE annual report.

CARE Conference Proceedings: conference papers often written at the last minute. The abstract AND the paper must be approved by the activity coordinators before their respective submission deadlines.

CARE Notes: well written papers of general interest, but not necessarily with a scientific content suitable for a journal publication. The paper must be approved by the activity coordinator and by the dissemination board. As consequence, corrections to the paper may be required before its publication.

EU acknowledgment:

All the papers should acknowledge the EU funding in the following way:

We acknowledge the support of the European Community-Research Infrastructure Activity under the FP6 "Structuring the European Research Area" programme (CARE, contract number RII3-CT-2003-506395).

Referencing:

All the papers should be sent to the dissemination board (Catherine.Desailly@cea.fr) which provides their reference number.

Publication Web Repository:
All CARE papers belonging to the last four categories are stored and are publicly available on web based publication repository http://dphs10.saclay.cea.fr/Doc/Care/care_index.php . This repository is regularly updated. It also provides templates for the CARE-Activity Document and the CARE note categories.

The following table records the number of CARE scientific articles issued by the different activities (NA and JRA) in each category.

	Journal Publications	Reports	Conferences Proccedings	Notes
ELAN	0	1	0	26
BENE	0	0	1	5
HHH	0	1	8	0
SRF	1	1	18	6
PHIN	2	1	6	2
HIPPI	1	1	19	0
NED	0	1	2	0
TOTAL	**4**	**6**	**54**	**33**

Publication lists for 2004:

The list of CARE papers can be directly uploaded from the following Web pages:

- CARE Journal Publications: http://dphs10.saclay.cea.fr/Doc/Care/care-pub-index-2004.php
- CARE Reports: http://dphs10.saclay.cea.fr/Doc/Care/care-rapport-index-2004.php
- CARE Conference Proceedings: http://dphs10.saclay.cea.fr/Doc/Care/care-conf-index-2004.php

- CARE Notes:
    - ELAN: http://dphs10.saclay.cea.fr/Doc/Care/care-note-elan-index-2004.php
    - BENE: http://dphs10.saclay.cea.fr/Doc/Care/care-note-bene-index-2004.php
    - HHH: none existing
    - SRF: http://dphs10.saclay.cea.fr/Doc/Care/care-note-srf-index-2004.php
    - PHIN: http://dphs10.saclay.cea.fr/Doc/Care/care-note-phin-index-2004.php
    - HIPPI: http://dphs10.saclay.cea.fr/Doc/Care/care-note-hippi-index-2004.php
    - NED: none existing

3.2 Web Sites

A central CARE Web site has been released and is regularly updated at the following address http://esgard.lal.in2p3.fr/Project/Activities/Current/ . It includes, among other things:

- Links to the seven activity (NA and JRA) Web sites
- CARE official documents (Consortium agreement, Annex I, etc…)
- The CARE management network and directory
- The calendar of CARE meetings
- Links to Publication repository
- Advertisements for vacant CARE funded temporary positions.

All seven activity Web sites are active and regularly updated by the corresponding activity management. Most of these Web sites provide access to informative Work Package Web pages.

3.3 Conference Presentations

The following table lists the presentations at major accelerator conferences and workshops, excluding the ones organized under CARE, of the scientific results obtained within the CARE collaboration.

Activity	Subject	Speaker/Lab	Event	Date
ELAN	High charge monoenergetic electron beams generated by 30 fs laser pulses	J. Faure / CNRS	31st EPS Conference on Plasma Physics	28/06-02/07/04 London (GB)
ELAN	A Review of Laser Guiding Experiments	S. M. Hooker / University of Oxford	11th Advanced Accelerator Concepts Workshop	21-26/06/04 Stony-Brook (USA)
ELAN	Laser guiding for high energy plasma accelerators	B. Cros / CNRS	Workshop on Theoretical Plasma Physics	5-16/07/04, Trieste (It)
ELAN	Generating mono-energetic electron beams using ultrashort and ultraintense lasers	J. Faure / CNRS	28th ECLIM Conference on Laser Interaction with Matter	6-10/09/04, Roma (It)
ELAN	Intense laser guiding in capillary tubes and applications	B. Cros / CNRS	3rd workshop on Laser Acceleration, Osaka.	Nov 29
HHH	Beam dynamics challenges for future circular colliders	F. Zimmermann / CERN	9th European Particle Accelerator Conference, EPAC'04	5-9/07/2004 Lucerne (CH)
HHH	LHC luminosity improvement and CERN accelerator complex	W. Scandale / CERN	High Intensity Frontier Workshop	5-8/06/04 Isola d'Elba (It)
SRF	Field Emission Overview: Cleanliness and Processing	D. Reschke / DESY	Pushing the Limits of RF Superconductivity Workshop	22-24/09/04 Argonne (USA)
SRF	R&D activities in CARE JRA/SRF	D. Proch / DESY	Pushing the Limits of RF Superconductivity Workshop	22-24/09/04 Argonne (USA)
SRF	Overview of Surface Measurements	C. Antoine / CEA	Pushing the Limits of RF Superconductivity Workshop	22-24/09/04 Argonne (USA)
SRF	Industrial Involvement in EC supported Accelerator R&D in the 6th Framework Programme and in preparing large Scale Accelerator Projects (TESLA)	D. Proch / DESY	9th European Particle Accelerator Conference, EPAC'04	5-9/07/2004 Lucerne (CH)

Activity	Subject	Speaker/Lab	Event	Date
PHIN	Technology Challenges for High Brightness Photo-injectors	G. Suberlucq / CERN	9th European Particle Accelerator Conference, EPAC'04	5-9/07/2004 Lucerne (CH)
PHIN	Development of a Superconducting RF Gun in Rosendorf	D. Janssen / FZR	26th International Free-Electron Laser Conference, FEL 2004	29/08-03/09/04 Trieste (It)
PHIN	Recent LOA results on electron and Xray beams produced by compact laser.	V. Malka / CNRS	1st International Conference on Ultrahigh Intensity Lasers	4-7/09/04 Lake Tahoe CA (USA)
PHIN	Laser generated particle beams : A new tool for science	V. Malka / CNRS	APS 46th Annual Meeting of the Division of Plasma Physics	15-19/11/04 Savannah (USA)
PHIN	Medical applications of particles beam produced by lasers	V. Malka / CNRS	23rd Annual ESTRO Meeting	24-28/11/04 Amsterdam (PB)
PHIN	Applications of electrons and protons beams produced by compact lasers	V. Malka / CNRS	Workshop on Laser Nuclear Physics	12-15/09/04 Karlsruhe (D)
PHIN	Production of electron and proton beams from relativistic laser plasma interaction with 30fs laser pulses	V. Malka / CNRS	10th Workshop on Targetry and Target Chemistry	13-15/06/04 Wisconsin (USA)
PHIN	High Charge (0.5nC) monoenergetic 170 MeV+-20 MeV electrons beam generated by a compact 30 fs laser.	V. Malka / CNRS	11th Advanced Accelerator Concepts Workshop	21-26/06/04 Stony-Brook (USA)
HIPPI	The SPL at CERN	R. Garoby / CERN	33rd Advanced Beam Dynamics Workshop	18-22/10/04 Bernsheim (D)
HIPPI	The 70MeV p-Injector Design for FAIR	U. Ratzinger / IAP-FU	33rd Advanced Beam Dynamics Workshop	18-22/10/04 Bernsheim (D)
HIPPI	RAL proton drivers and ISIS upgrade plans	C. Prior / RAL	33rd Advanced Beam Dynamics Workshop	18-22/10/04 Bernsheim (D)
HIPPI	Benchmarking linac codes for the HIPPI project	G. Franchetti/ GSI	33rd Advanced beam Dynamics Workshop	18-22/10/04 Bernsheim (D)
HIPPI	High Intensity Beams at CERN and the SPL Study	M. Vretenar/ CERN	DAE Symposium on Nuclear Physics	6-10/12/04 Varanasi (IN)

Annexes

Annex 1 – Summaries and main conclusions of the General Meetings

The CARE general meeting, CARE04, took place at DESY-Hamburg (Germany) on Nov.2-5. The meeting Web site http://care04.desy.de/ provides the information concerning the participation, the scientific program and the presentations. An overview of the program is given on the next page. The general meeting included two days parallel sessions where the networking activities ELAN and BENE, and the Joint Research Activities SRF and PHIN, hold their second annual meetings in the year 2004. The other activities have held their annual meeting at other times and other places.

The most important part of the program was the plenary session on November 4 dedicated to the summary talks of the seven CARE activity coordinators. They all reported on the remarkable commitment of the institutes and their scientists towards the CARE programme and the objectives of the CARE activities. They also reported on the impressive amount of scientific and technical work already accomplished. While some significant results have already been obtained, outlined elsewhere in this document, no significant delays or difficulties appeared in their respective programme. In general, the progress of the first year of the CARE project has been quite satisfactory.

	Tuesday, November 2		Wednesday, November 3		Thursday, November 4		Friday, November 5
08:00	*Registration*						
09:00	**PLENARY (Auditorium)**	09:00	**PARALLEL**	09:00	**PLENARY (Auditorium)**	09:00	**PLENARY (Auditorium)**
	Introduction session **Chair: D. Trines**		**Networking/Joint Research Activities**		**JRA Activity Reports** **Chair: O. Napoly**		**Special Sessions** **Chair: M. Spiro**
10 30+10 30+10 10	Welcome - From the Lab. Director hosting the general CARE meeting (A. Wagner) CARE General Status & Plans - by CARE coordinator (R. Aleksan) CARE Dissemination Activities - by Dissemination Board Chair (O. Napoly) Organizational issues (D. Proch)		BENE Workshop (parallel WP1/2) BENE Workshop (parallel WP3/4) BENE Workshop (parallel WP5) HHH SRF see room planning, agenda	40 + 5 40 + 5	Report on SRF Activities (D.Proch/T. Garvey) Report on PHIN Activities (A. Ghigo)	20 + 5 20 + 5 20 + 5 20+10	LC Technology (J.E. Augustin) Summary EUROTeV kick-off (E. Elsen) ECFA views on Accelerator Activities in Europe and the World (B. Foster) CARE Outlooks (R. Aleksan)
						10:45	**Adjourn CARE General meeting**
10:30	*Coffee Break*	10:30	*Coffee Break*	10:30	*Coffee Break*	10:45	*Coffee Break*
11:00	**PARALLEL**	11:00	**PARALLEL**	11:00	**PLENARY (Auditorium)**	11:00	**CARE Governing Board**
	Networking Activities ELAN (3 sessions in parallel) BENE Workshop HHH see room planning, agenda		**Networking/Joint Research Activities** BENE Workshop (parallel WP1/2) BENE Workshop (parallel WP3/4) BENE Workshop (parallel WP5) HHH SRF see room planning, agenda	40 + 5 40 + 5	**JRA Activity Reports** **Chair: R. Aleksan** Report on HIPPI Activities (R. Garoby) Report on NED Activities (A. Devred)		**CARE governing Board meeting** **(representatives of the contracting institutes)**
12:30	*Lunch*	12:30	*Lunch*	12:30	*Lunch*	13:30	*Lunch*
14:00	**PARALLEL**	14:00	**PARALLEL**	14:00	**PLENARY (Auditorium)**	14:30	**CARE management meetings** **Joint CSC+CDB meeting**
	Networking Activities ELAN (3 sessions in parallel until 15:00) ELAN(plenary) BENE Workshop (plenary) HHH see room planning, agenda		**Networking/Joint Research Activities** BENE Workshop (plenary) HHH SRF PHIN HIPPI see room planning, agenda	40 + 5 40 + 5 40 + 5	**Networking Activity Reports** **Chair: B. Foster** Report on ELAN Activities (F. Richard) Report on BENE Activities (V. Palladino) Report on HHH Activities (F. Ruggiero)		Joint CSC+CDB meeting
16:00	*Coffee Break*	16:00	*Coffee Break*	16:15	*Coffee Break*	16:00	
16:30	**PARALLEL**	16:30	**PARALLEL**	16:30	*CARE Collaboration Council Meeting*		
	Networking Activities ELAN (Plenary) BENE Workshop (plenary) HHH see room planning, agenda		**Networking/Joint Research Activities** BENE Workshop (plenary) HHH SRF PHIN HIPPI see room planning, agenda		**CARE Collaboration Issues:** **CARE Status and Plan** **Dissemination Activities** **Management issues** **Publication policy**		*And* Auditorium Blg 5 *SR1* Seminar Room 1 Blg 1 *SR2* Seminar Room 2 Blg 2 *SR3* Seminar Room 3 Blg 1b *SR4* Seminar Room 4 Blg 1b *SR5* Seminar Room 5 Blg 1b *GSR* Gaestespeiseraum Blg 9 *456/25f* room 456, Building 25f (Hasylab)
18:30	*Adjourn*	18:30	*Adjourn*	18:30	*Adjourn*		
19:00	*CARE Welcome*			19:00	*CARE Dinner*		

B. MANAGEMENT REPORT (FINANCIAL INFORMATION)

1. Justification of the resources deployed

Contract N°	RII3-CT-2003-506395	Project acronym	CARE
Participant N°	1	Participant short name	CEA

		N0-Management	
		Total effort in person-months [1]	28,6
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)	
Personnel cost [2]	**197 556,14**	Permanent personnel for CARE management : CARE coordinator and deputy coordinator, financial assistant, EU contract assistant, secretary, accounting office.	
Durable equipment	**0**		
Consumable and prototyping	**10 032,31**	Purchasing of a 1 year licence for VITAMIB accounting software; 1 color printer	
Travel	**8 141,93**	Participation in the: BENE meeting, CERN, Geneva (1 person), CARE Annual meeting CARE'04, Hamburg (3 persons); CARE Steering committees 1st, Paris (1 person), 2nd Warsaw (2 people); VIT@MIB meeeting, Paris (1 person); Meeting in Brussels (1 person); Meeting in Pisa (1 person).	

		N1-ELAN - Electron Linear Accelerator Network	
		Total effort in person-months [1]	
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)	
Personnel cost [2]	**0**		
Durable equipment	**0**		
Consumable and prototyping	**0**		
Travel	**4 379,55**	Participation in the ELAN meeting, Frascati (1 person), the CARE Annual meeting, Hamburg (2 persons), EuroTeV meeting, Daresbury (1 person).	

		N2-BENE - Beam for European Neutrino Experiments	
		Total effort in person-months [1]	
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]	**0**		
Durable equipment	**0**		
Consumable and prototyping	**0**		
Travel	**6 733,68**	Participation in the CARE'04 and CARE'04-BENE meetings, Hamburg (7 people).	

		N3-HHH - High Energy High Intensity Hadron Beams	
		Total effort in person-months [1]	
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]	**0**		
Durable equipment	**0**		
Consumable and prototyping	**0**		
Travel	**3 235,99**	HHH-AMT kick-off meeting, Archamps (5 people); NED meeting at CERN (1 person)	

		R1-SRF - Superconduting Radio Frequency	
		Total effort in person-months [1]	59,4
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]	**310 181,99**	Permanent and additional personnel for WP5 (Surface Preparation), Task 5.1 (EP for single cell): EP studies on Nb samples, mechanical design and fabrication of EP set-up, specification and appropriation for 3 single cell cavities. Permanent and additional personnel for WP8 (Tuners): Task 8.3 (CEA tuner) - mechanical design, drawings and appropriation of tuners including motors and gear-boxes. WP10 (Tests in CRYHOLAB) project management, engineering drawings for adaptation of CRYHOLAB. Permanent and additional personnel for WP11 (Beam Diagnostics), Task 11.1: mechanical design for beam position monitor cavity, including feedthroughs and mechanical adaptation to TTF cryomodule cleaning conditions; RF studies of the BPM cavity.	
Durable equipment	**0**		
Consumable and prototyping	**69 466,85**	WP5: purchasing of electropolishing set-up, 3 single cell cavities, chemical products and tanks; WP8 : purchasing of 2 tuner motors, gear boxes and 12 piezo-actuators, one LabView license; WP10 : mechanical adaptation of CRYHOLAB	
Travel	**2 320,31**	Participation in the CARE'04 meeting, Hamburg (1 person). WP5 Surface preparation-Electro Polishing, CERN (3 people)	

		R3- HIPPI - High Intensity Pulsed Proton Injector	
		Total effort in person-months [1]	26,6
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]	**143 147,00**	Permanent personnel for WP2 (Normal Conducting Accelerating Structures): participation to WP2-ISTC rescoping. Permanent personnel for WP3 (Superconducting Accelerating Structures): project management; Task 3.1 :Elliptical cavities: preparation fo 700 MHz test stand, INFN-Cavity A test in CRYHOLAB, design of cavity B. Permanent personnel for WP5 (Beam Dynamics): ECR ion source modelling, beam space charge neutralization; code comparison.	
Durable equipment	**0**		
Consumable and prototyping	**44 144,47**	WP3: INFN-Cavity test in CRYHOLAB: purchasing of chemical products and tanks; cavity carriage and mechanical adaptation of CRYHOLAB.	
Travel	**6 624,62**	HIPPI'04 annual workshop in Frankfurt (3 persons); WP2 : ISTC Meeting at CERN (1 person) and in Grenoble (1 person); WP3 : Meeting at CERN (3 persons); WP5 - Meeting Darmstadt (2 persons)	
		R4- NED - Next European Dipole	
		Total effort in person-months [1]	14
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]	**82 160,45**	Permanent personnel for the Activity management and coordination; Permanent personnel for WP2 (Thermal Studies and Quench Protection) : design and technical specifications of the test cryostat and heat exchanger fabricated in Wroclaw; Permanent personnel for WP3 (Conductor Development): measurement of critical current;	
Durable equipment	**0**		
Consumable and prototyping	**23 418,91**	WP2: purchasing of a temperature regulator, an optical endoscope, hardware and software instrumentation of the test cryostat; WP3: purchasing of mechanical parts fo the wire sample holder.	
Travel	**10 063,02**	Participation in the CARE'04 meeting, Hamburg (1 person); CARE 2nd steering committee, Warsaw (1 person); NED steering committee: CERN-Geneva (7 persons); WP2 Wroclaw (3 persons); WP3: Twente (1 person); WP4: RAL-Didcott (3 persons);	
Total direct eligible costs	**921 607,22**		
Total indirect costs	**539 590,43**		
Total costs [3]	**1 461 197,65**	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	
Justify any deviations with respect to the planned budget			

Contract N°	RII3-CT-2003-506395	Project acronym	CARE
Participant N°	2	Participant short name	UCLN

N2-BENE - Beam for European Neutrino Experiments	
Total effort in person-months (1)	**0.3**

Cost category	Actual direct eligible costs (€)	Justification of costs *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*
Personnel cost (2)		
Durable equipment		
Consumable and prototyping		
Travel	584.21	Participation to the BENE workshop, Hamburg, 1-4 Nov 2004

Total direct eligible costs	**584.21**		
Total indirect costs	**116.84**		
Total costs (3)	**701.05**	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	1900

Justify any deviations with respect to the planned budget

Impossibility to attend more meetings and with other participants

(1) AC contractors must include both the total estimated human effort (including permanent staff) and, in brackets, additional staff only.
(2) For TA activities excluding the effort charged under the user fees if the UF cost model is used.
(3) Totals should correspond to the respective figures on FORM C - Financial Statement

Participant N°	3	Participant short name	CNRS
		N1-ELAN - Electron Linear Accelerator Network	
		Total effort in person-months [1]	6
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	4 326.58	Participation in the ELAN meeting, Frascati (4 people).	
		R1-SRF - Superconduting Radio Frequency	
		Total effort in person-months [1]	99 (LAL), 20 (IPNO)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]	375 479.92 (LAL), 72 120.32 (IPNO)	Permanent personnel for WP7 (couplers), Task 7.1 (proto-types) - RF design calculations, mechanical and vacuum conception, engineering drawings, critical review meetings, calls for tenders. Additional (temporary) personnel for drawings of new TTF-III proto-types. Task 7.2 (TiN coating bench) - preparation of technical specification. Task 7.3 (Conditioning studies) - personnel for reception, control, clean room preparation and mounting of couplers for RF conditioning. Improvements in automated conditioning procedure, studies of bake-out and vacuum handling procedures, documentation of these procedures. Analysis of conditioning data. Operation of high power test equipment. Dissemination of information on coupler WEB page and preparation of communications to CARE meetings. Project management of WP7. Permanent personnel (IPNO) for WP8 (tuners). Task 8.4 (IN2P3 tuner) - design and appropriation of sensors and electronic equipment. Calibration of thermometers. Automation of Labview data acquisition system.Test of piezo-electric actuators.Additional (temporary) personnel for experiments on piezo-electric elements and radiation hardness tests of piezo-electric cel	
Durable equipment	1 376.35 (LAL), 7 913 (IPNO)	WP7 - Ion pumps, vacuum gauges, Profibus control card, WP8 - electronics, desk-top computer, software licences. Note that the cost figure given corresponds only to the depreciation value calculated for the equipment up to the end of 2004.	
Consumable and prototyping	9 755.80 (LAL), 512 (IPNO)	WP7 - Filters, needle valves, communications card, clean room table, fluid resistivity meter, detergent, power supplies, printed circuits, electro-valve, power table, operational amplifier, WP8 - Hard disk, nickel sheets, springs.	
Travel			

		R2-PHIN - Photo Injector	
		Total effort in person-months [1]	51.5 (Orsay), 26.4 (LOA).
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, ...)*	
Personnel cost [2]	232 400.94 (Orsay), 121 865.00 (LOA).	Permanent personnel (Orsay) for WP4. Task 4.2 - Design of RF gun: RF simulations, engineering drawings, conception of vacuum chamber, design of magnetic focusing elements and beam dynamics calculations. Dissemination of information. Project management. Collaboration meetings with CERN on CTF3. Also, design of photo-cathode preparation chamber. Contacts with industry for acquisition of laser. Document preparation for call for tenders. Administrative work for approval for beam tests in NEPAL laboratory. Permanent personnel (LOA) for task 4.3 - design of low and high energy spectrometers. Experiments on laser-plasma acceleration.	
Durable equipment			
Consumable and prototyping	5 408.00	WP-4, task 4.3 - Permannent magnets, vacuum equipment	
Travel			

		R3- HIPPI - High Intensity Pulsed Proton Injector	
		Total effort in person-months [1]	10.5 (LPSC), 5.5 (IPNO)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, ...)*	
Personnel cost [2]	25 319.51 (IPNO), 44 511.50 (LPSC)	Permanent personnel (IPNO) for activities of WP3. RF simulations and mechanical design of superconducting cavities. Design of input coupler. Tests on 700 MHz proto-type "spoke" cavity at cryogenic temperature. Permanent personnel LPSC for WP2 - RF design work, and WP3 cavity and coupler design.	
Durable equipment			
Consumable and prototyping			
Travel	1 404.46	Participation in CARE annual meeting (1 person). Collaboration meeting, Frankfurt (1 person).	

Total direct eligible costs	902 393,38		
Total indirect costs	180 478,68		
Total costs [3]	1 082 872,06	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	

Justify any deviations with respect to the planned budget

In general, the late arrival of the funding within CNRS laboratories (mid-July 2004) has been responsible for delays in the PHIN and SRF JRA's. In addition, a review of the requirements of CERN for the RF gun (WP3 of PHIN) has led to a delay of ~ 6 months in beginning fabrication. Administrative problems for calls for tenders have also meant delays in WP7 of SRF

Participant N°	4	Participant short name	GSI

		N2-BENE - Beam for European Neutrino Experiments	
		Total effort in person-months [1]	2,5
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	669	1 person (CARE04@DESY, Nov. 04, WP3), 1 person (work meeting, Abrigdon, Dec. 04, WP3)	

		N3-HHH - High Energy High Intensity Hadron Beams	
		Total effort in person-months [1]	2,5
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	3507	2 persons (work meeting, Hamburg, Jun. 04, WP2), 3 persons (work meeting, Lyon, Nov. 04, WP2), 2 persons (HHH04@CERN, Nov. 04, WP3)	

		R3- HIPPI - High Intensity Pulsed Proton Injector	
		Total effort in person-months [1]	38
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]	137 706	WP5 exclusively: non-distr. transv. profile meas. (prototyping): 3,0 person-month PM non-distr. long. bunch struct. meas.: 1,0 PM on-line transmission control: 1,0 PM preparation of UNILAC experiment: 4,5 PM simulation of UNILAC experiment: 3,0 PM high current modelling, code improvement: 22,5 PM WP management: 3,0 PM	
Durable equipment	159	MatLab software license (amortisation) WP5, PC-hardware (amortisation) WP5	
Consumables and prototyping			
Travel	2 875	1 person (CARE04@DESY, Nov 04, WP5), 1 person (HIPPI04@Frankfurt, Sep 04, WP5), 1 person (ICFA04@Bensheim, Sep 04, WP5)	

Total direct eligible costs	144 916		
Total indirect costs	52 449		
Total costs [3]	197 365	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	

Travel expenses were significantly lower, as inter-European trips were presumed, but most trips were to German destinations in 2004. Cost estimates for durable equipment were based on total investments. EU-regulations allow only for amortisation as eligible costs. Therefore, reported costs will stay significantly lower for the whole period.

Contract N°	RII3-CT-2003-506395	Project acronym	CARE
Participant N°	5	Participant short name	IAP-FU

R3- HIPPI - High Intensity Pulsed Proton Injector	
Total effort in person-months [1]	36 (24 = 11 university + 13 HIPPI EU)

Cost category	Actual direct eligible costs (€)	Justification of costs *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*
Personnel cost [2]	61905	3 additional staff members (scientists/researchers), 2 of them with contracts starting in May 2004, working in WP2 and WP5 (LORASR code development: programming + simulation studies; CH cavity design : design work) and the 3'rd starting in October 2004, working in WP3 and WP5 (LORASR code benchmarking : simulation studies; SC CH cavity tuner design : design work).
Durable equipment	--	
Consumable and prototyping	--	All costs accrued in 2004 were financed with own resources, for example: WP2 - CH prototype design : A design and fabrication study was commissioned to an industrial contractor.
Travel	2960	Participation to the HIPPI Work Package meetings (3.5.-5.5. WP2, Grenoble, France, 1 person; 6.6.-8.6., Gif sur Yvette, France, 1 person) and the general CARE annual meeting (3.11.-5.11., Hamburg, Germany, 1 person), as well as the attendance to the LINAC 2004 Conference (15.8.-20.8., Lübeck, Germany, 1 person) and the ICFA 2004 Workshop (20.10.-22.10., Bensheim, Germany, 2 persons).

Total direct eligible costs	64865		
Total indirect costs	12973		
Total costs [3]	77838	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	240000

Justify any deviations with respect to the planned budget

According to our declaration in the Contract Preparation Form A3.2a, the estimated grant to the budget for the reporting period 1.2004 to 12.2004 was 75000 €. This number fits quite well to the requested EU financial contribution (77492 €).
However, the breakdown of costs between personnel and consumables is rather one-sided.
The reasons are: During the design phase, the manpower need is enhanced. On the other hand, during the construction phase starting basically in 2005, the amount of investment costs (prototype cavity!) will be increased. This will lead to a balance of the single items.

[1] AC contractors must include both the total estimated human effort (including permanent staff) and, in brackets, additional staff only.
[2] For TA activities excluding the effort charged under the user fees if the UF cost model is used.
[3] Totals should correspond to the respective figures on FORM C - Financial Statement

Participant N°	6	Participant short name	DESY

		N1-ELAN - Electron Linear Accelerator Network	
		Total effort in person-months [1]	2,0 (0)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	20 174,74	First ELAN workshop in Frascati to gather all participants, launch the network activities, have a common reflection, coordinate the efforts, exchange information and discuss the improvement of the existing infrastructures; WP LTECSC (6 physicists), WP BDYN (2 physicists). TESLA Meeting in Orsay: Scientific experience exchange between CARE and TESLA community, coordination of SRF activities, discussion of experimental results; WP LTECSC (10 physicists). Workshop on "Pushing the limits of SRF technology" in Argonne Laboratory, Chicago; WP LTECSC (3 physicists). CARE annual meeting in Hamburg: Review and report of ELAN activities; WP LTECSC (2 physicists). Conference on "Electron beam melting technology", Denver, Col.; Experience exchange with industry about Niobium quality requirements for SRF application; WP LTECSC (2 physicists). First ILC Workshop at KEK: Initiate design effort after the ITRP technology decision;	

		N3-HHH - High Energy High Intensity Hadron Beams	
		Total effort in person-months [1]	0,6 (0)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	2 366,83	Workshops of WP ABI (Hamburg): Discussion of specific problems of implementing new digital technologies for beam orbit and position measurements in hadron machines; WP ABI (1 physicist). Workshop of ABI (Lyon): Design issues of fast beam current measurements and beam loss monitors for machine protection; WP ABI (5 physicists)	

		R1-SRF - Superconduting Radio Frequency	
		Total effort in person-months [1]	176 (26)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, ...)*	
Personnel cost [2]	106884,67	WP 1 Management: Administrative tasks (1 scientist 5 person-month); Task 3.2 Seamless cavities: design of hydro forming machine (2 scientist, total 8 person- months); Task 5.2 Electro polishing: installation of gas cleaning system(1 technician 2 person-months); Task 5.4 Dry ice cleaning: Installation of cleaning system (1 technician 3 person-months); Task 6.1 Design of Squid scanning system: Layout of scanning apparatus (1 scientist 2 person-months; Task 6.3 DC field emission scanning: Calibration and automization of scanning apparatus (1 scientist 3 person-months); Task 9.1 Low level RF control: Design of stable reference line (1 engineer person-3 months)	
Durable equipment	0,00		
Consumable and prototyping	97091,25	Task 3.2 Seamless cavity production: Various parts for high pressure hydraulic circuit, Niobium material for hydro forming tests; Task 5.2 Installation of gas cleaning system: Chemicals, chemical pumps, process control units; Task 5.4:installation of dry ice cleaning device: Installation material for high purity gas circuits, production unit of high purity dry ice supply circuit; Task 6.1 Design of squid scanning system: First rate of subcontract for industrial development of squid scanning apparatus; Task 6.3: DC field emission scanning: GPIB bus control equipment, various sealing materials.	
Travel	7574,08	WP 1 Management: CARE steering committee meetings in Paris (2 persons), February and Warsaw (1 person), June; Vitamib meeting in Paris, September (2 persons); Cooperation meeting with associated partner from industry, February, Bensberg; Briefing meeting with JRA1 partners: INFN-LNL, February (1 person) and CEA, April (1 person), WUT and TUL in Warsaw and Lodz, December (1 person); VITAMIB meeting in Paris, September (2 persons); International advisory committee, CARE annual meeting, November (5 persons, members of the international advisory committee); WP 5.4 Dry ice cleaning: Discussion with Fraunhofer Institute, Stuttgart, May and August (2 persons); WP 6.3: DC scanning, calibration of scanning apparatus at Wuppertal University, July and November (1 person); WP 9.1 Low level RF control: Coordination meeting with WUT and TUL partners (1 person).	

Total direct eligible costs	234 091,57		
Total indirect costs	41 288,31		
Total costs [3]	275 379,88	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	1 025 380

Justify any deviations with respect to the planned budget

There is considerable under spending in the first year in JRA1 and the attached Networks. Spending in JRA1 is 42 % of received support. This is mainly due to 1) late arrival of EC support and subsequent late hiring of additional man power (especially in WP6.3 "DC field emission studies"); 2) schedule shift of subcontracts due to late evaluation of present accelerator performance (unscheduled long shut down of TTF accelerator) in WP2.1 "Reliability Analysis"; 3) Operational delay of electro-chemical investigations due to components brake down in WP5.2.1.3 2 "Fix parameters and quality control"; 4) Administrative delay in ordering seamless Niobium tubes in WP3.2.4; Delay in operation of welding machine due to technical problems in establishing ultra high vacuum conditions in WP2.3.3; Delay of design and installation of the control system for dry ice cleaning in WP5.4. Spending in ELAN is 52 % of received support mainly due to the fact, that the annual CARE meeting was held at DESY, furthermore several late travels in November and December will be accounted to the 2005 budget. Spending in HHH is 50% of received support mainly due to very late travel and subsequent accounting to the next year.

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[2] For TA activities excluding the effort charged under the user fees if the UF cost model is used.
[3] Totals should correspond to the respective figures on FORM C - Financial Statement

Participant N°	7	Participant short name	FZJ
		N1-ELAN - Electron Linear Accelerator Network	
		Total effort in person-months [1]	1
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	1 022	1 person Frascati (I) WP4 INSTR, 1 person Moskwa (RU) working session for WP4 INSTR	
		N2-BENE - Beam for European Neutrino Experiments	
		Total effort in person-months [1]	5
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	4 198	3 persons Hamburg (D) CARE04, 1 person Cracow (PL) working session for WP TARGET, 2 persons Bensheim (D) ICFA HB'04, 1 person Geneve (CH) Joint ECFA/BENE Study Week	
		R3- HIPPI - High Intensity Pulsed Proton Injector	
		Total effort in person-months [1]	34.6
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]	209 881	permanent personnel salary for work on WP3 SC spoke and for work on WP5 BD. Electrodynamics simulation of cavities, construction work on 352 MHz cavity, coupler design, investigation of beam dynamics issues, code development for cavity comparison	
Durable equipment			
Consumable and prototyping	25 189	material and components for WP3 SC spoke cavity construction and test stand. Material for tests, metal forming, electron beam welding	
Travel	3 249	3 persons Saclay (F) WP3 meeting, 1 person Lucerne (CH) EPAC04, 2 persons Darmstadt (D) WP5 meeting, 4 persons Frankfurt (D) HIPPI-04, 1 person Paris (F) working session for WP3	

Total direct eligible costs	243 539		
Total indirect costs	171 146		
Total costs [3]	414 685	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	

Justify any deviations with respect to the planned budget

Comment on costs for HIPPI:

Total eligible cost for first 18 months was 663 kEuro, so 12 months correspond to 442 kEuro. We spent 415 kEuro.

The difference is due to delayed Niobium delivery (about 40 kEuro) which was scheduled for Dec 2004.

Money allocated in 2004 for temporary staff was shifted to 2005 because in 2005 it is more helpful than it would have been in 2004.

This shift does not show up in the total cost because FZJ was able to cover the necessary work by permanent staff.

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[2] For TA activities excluding the effort charged under the user fees if the UF cost model is used.
[3] Totals should correspond to the respective figures on FORM C - Financial Statement

Participant N°	8	Participant short name	TUM
		N2-BENE - Beam for European Neutrino Experiments	
		Total effort in person-months (1)	0.5

Cost category	Actual direct eligible costs (€)	Justification of costs *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*
Personnel cost (2)		
Durable equipment		
Consumable and prototyping		
Travel	743	workshop 'physics with multi MW proton source', CERN (1 person) and CARE annual meeting, Hamburg (1 person)

Total direct eligible costs	743		
Total indirect costs	149		
Total costs (3)	892	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	5000

Justify any deviations with respect to the planned budget

N/A

(1) AC contractors must include both the total estimated human effort (including permanent staff) and, in brackets, additional staff only.
(2) For TA activities excluding the effort charged under the user fees if the UF cost model is used.
(3) Totals should correspond to the respective figures on FORM C - Financial Statement

Participant N°	9	Participant short name	FZR

		N1-ELAN - Electron Linear Accelerator Network	
		Total effort in person-months [1]	1.2 (0.0)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	1 975,64	Participation in the ELAN meeting, Frascati (2 persons) and the CARE Annual meeting, Hamburg (2 persons)	

		R2-PHIN - Photo Injector	
		Total effort in person-months [1]	34.5 (10.5)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]	38 306,77	additional staff (temporary contracts), in 2004: 1 scientist working in WP 2, photocathode know-how, photocathode preparation equipment for 5.5 months, 1 scientist working in WP4, SC RF gun, for 5 months	
Durable equipment			
Consumable and prototyping	42 691,59	WP 2, photocathode preparation equipment: consumables for the installation of new equipment at FZR, WP 4, SC RF gun: purchase orders for design and construction work for cryomodule components (cathode and cathode tranfer system) and fabrication of cathode assembly sample, consumables for cathode cooler test bench	
Travel	2 270,59	WP 1: participation in the JRA R2-PHIN steering commitee meeting in Paris (1 person) and CARE VIT@MIB meeting in Paris(1 person), WP 4: SC RF gun: meeting on gun cavity preparation (DESY, FZR) in Dresden (1 invited guest from Hamburg)	

Total direct eligible costs	85 244,59		
Total indirect costs	17 048,92		
Total costs [3]	102 293,51	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	227000

Justify any deviations with respect to the planned budget

The difference between planned budget and total costs in 2004 of about 20 % is mainly due to the delay in personal recruitment which could not be started before April 2004.

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[2] For TA activities excluding the effort charged under the user fees if the UF cost model is used.
[3] Totals should correspond to the respective figures on FORM C - Financial Statement

Participant N°	10	Participant short name	INFN

		N1-ELAN - Electron Linear Accelerator Network	
		Total effort in person-months [1]	3,0
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	2095,77	Organization of ELAN meeting at Frascati (2 persons), participation (LNF: 9 persons, MI: 6, Ro2:1)	

		N2-BENE - Beam for European Neutrino Experiments	
		Total effort in person-months [1]	3,0
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	1768,19	CARE SG meeting in Paris (coordinator). Organization and participation (NA 1 person, Trieste 1 person have claimed reimbursement so far) to BENE meeting at CERN in the spring.	

		N3-HHH - High Energy High Intensity Hadron Beams	
		Total effort in person-months [1]	
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	0,00		

		R1-SRF - Superconduting Radio Frequency	
		Total effort in person-months [1]	69 (34) [INFN-LNF: 0 (0) ; INFN-Mi: 30 (16); INFN-LNL: 28 (15) ; INFN-Ro2: 11 (3)]
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]	76500,78	Additional staff- **MI**: 2 scientists ad 1 mechanical engineer (85 %) working on WP2 (information retrieving) and WP8 (cavity tuners) for about 5.5 months. LNL: 2 persons for 6 months, 1 person for 3 months working in WP5.3 on the automated EP, in the mechanichal Workshop for the fabrication of components for WP3.1 on Spinninng seamless cavities, WP5.3 and WP6.2 on Flux gate magnetometry. Ro2:1 scientist for 3 months working on vacuum arc apparata design, operation, upgrade and maintenance.	
Durable equipment	57,80	LNL: acquisition of a supply for the automated Electropolishing	
Consumable and prototyping	61239,34	LNL: new turret for spinning a seamless cavity both sides without turning it at each cell spun. Ro2: Purchase of UHV materials and components for the planar arc systems upgrade, spares, materials and fabrication of filtered arc prototype and laser trigger set-up, rearrangement of laboratory layout. Film characterisation by external Laboratory (Naples University).	
Travel	3629,68	CARE meeting at DESY (MI:1 person), Ro2: CARE Ann.Meet. preparatory meet., Paris (Fr) (1 person).	

		R2-PHIN - Photo Injector	
		Total effort in person-months [(1)]	39 (13) [INFN-LNF: 22 (8) ; INFN-Mi: 17 (5)]
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, ...)*	
Personnel cost [(2)]	30913,42	Additional staff - LNF: 1 post-doc scientist working in WP3 in diagnostics for picosecond laser, beam profile distribution reconstruction, RF synchronization system prototype; in WP1 web page set up and mantainance. Mi: 1 person for developing a fast monitor for the picosecond laser pulse, a tuning rf system for the mode-locker of the laser, the electronic control of the stepping motor of the autocorrelator and to design a stabilization system of the Nd:YAG laser with the aim of obtaining a laser suitable for pulse shaping research (WP2).	
Durable equipment	0,00		
Consumable and prototyping	7747,18	LNF: WP3 - Optical mounts; Motorized translation stages; Drivers and ancillary mechanics. MI: WP2 - Mechanical and optical components of diagnostics equipments for laser pulse manipulation, software for the on-line control of the laser and mask output signals.	
Travel	7566,41	WP 1: participation in the JRA R2-PHIN coordinators meeting at CERN (1 person) and PHIN web site configuration (1 person), WP 3: laser diagnostics and laser- beam synchronization work at CERN (1person); Training for additional staff hired (1 person).	

		R3- HIPPI - High Intensity Pulsed Proton Injector	
		Total effort in person-months [(1)]	INFN-Mi: 18 (6)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, ...)*	
Personnel cost [(2)]	11326,57	Additional staff (temporary contracts): 1 scientist working on WP3 and WP5 (cavity design and beam dynamics) for about 5.5 months; 1 mechanical engineer (15 %) working on tuner design for 5 months.	
Durable equipment	0,00		
Consumable and prototyping	0,00		
Travel	1299,67	HIPPI annual meeting at Frankfurt (1 person)	

		R4- NED - Next European Dipole	
		Total effort in person-months [(1)]	11 (1) [INFN-Mi: 11 (1) ; INFN-Ge: 0 (0)]
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, ...)*	
Personnel cost [(2)]	2319,77	Additional staff: 1 post-doc working on WP4, sub-task 4.2.4, Quench Protection Computation. Adaptation to NED dipole of a numerical code for the study of the quench propagation, in order to devise a specific solution for the protection.	
Durable equipment	0,00		
Consumable and prototyping	4381,88	WP3, Conductor Development, sub-task 4.3.5, Wire Characterization: preparation of sample holders and ancillary mechanical equipment for Critical Current measurement on Nb3Sn samples.	
Travel	2668,84	WP 1: participation in the CARE steering commitee meetings at CERN on Jan 8, Mar 25, Jul 8 and at CEA on Oct 29. Total attendance: 10 people, with partial financial contribution from INFN.	

Total direct eligible costs	213515		
Total indirect costs	42703		
Total costs [(3)]	256218	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	790000

Justify any deviations with respect to the planned budget

The difference between planned badget and total costs in 2004 are mainly due to the delay in personnel recruitment, which could not be started before May 2004.

The travel money for the November meetings has not been included because it has not been paid within 2004. In particular for HHH people has worked for the HHH-APD-Workshop held at Cern 8-11 November 2004; this work will be reported in the 2005 report with the corresponding expenses.

Participant N°	11	Participant short name	TEU

		N1-ELAN - Electron Linear Accelerator Network	
		Total effort in person-months [1]	1.2 (0.0)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel (see note 1)			

		N3-HHH - High Energy High Intensity Hadron Beams	
		Total effort in person-months [1]	
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel (see note 1)	0	March 22-24 HEHIHB-AMT workshop WAMS-Archamps (2 persons)	

		R2-PHIN - Photo Injector	
		Total effort in person-months [1]	2,3
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]	16 181,00	WP1: networking and adaption to ELAN-ANAD objectives WP2: literature research on photocathode work, design of cathode preparation diagnostics, preparation for making alternative photo cathodes (mainly suitable for photo-injector for Laser Wake Field Accelerator. (1 scientific staff member)	
Durable equipment			
Consumable and prototyping			
Travel	1 797,00	3 persons visit to Hamburg meeting (2 ELAN-ANAD, 1 ELAN-LTECNC) 1 person Frascati meeting (ELAN-LTECNC)	

		R4- NED - Next European Dipole	
		Total effort in person-months [1]	2,3
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]	14 093	TEU-CARE Institutional representative, administartive work and travel WP-1: NED deputy coordinator, administartive work and travel WP-3: coordination and participation NED-Workgroup on Conductor Characterisation, critical current measurements lab intercomparison program (1 scientific staff member)	
Durable equipment			
Consumable and prototyping	1 553	WP-3: components for critical current measurements	
Travel	2 093	WP-1/3: March 24/25 NED-ESAC and SC meeting at CERN (1 person) WP-1: June 24/25 CARE-SC/DB meeting at Warsaw (1 person) WP-1/3: October 28/29 NED-WGCC and SC meeting at Cea-Saclay (1 person)	
Total direct eligible costs	35 717,00		
Total indirect costs	26 970,00		
Total costs [3]	62 687,00	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	

Justify any deviations with respect to the planned budget

The difference between planned budget and total costs in 2004 is mainly due to an unsuccessful personnel recruitment in JRA-2 (PHIN) . Travel costs for NA-3 and partly JRA-4 appeared wrongly charged in the internal 2004 accounting system and will be charged to the 2005 budget.

Participant N°	12 (AC)	Participant short name	TUL
		N1-ELAN - Electron Linear Accelerator Network	
		Total effort in person-months [1]	0.3(0)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	1 855	LTECSC: Participation in 1st ELAN Meeting (4-6.V.2004), Frascati, Italy (2 persons)	
		R1-SRF - Superconduting Radio Frequency	
		Total effort in person-months [1]	42(35)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]	14 911	WP8: Task 8.2 (Magneto-strictive Tuner) one researcher (12 months) - specification and conceptual design of magnetostrictive tuner (MT), driver prototype for MT; WP9: in total four researchers: Task 9.1.2 (LLRF Automation) Klystron requirements for FSM development (2 persons - 9 months each), Task 9.2.2 (Radiation damage study) RadMon - system for radiation detection (1 person - 2 months), Task 9.4.1 (Data management development) database for settings (1 person - 3 months)	
Durable equipment			
Consumable and prototyping	10 528	WP8: Task 8.2 (Magneto-strictive Tuner) electronic parts for current amplifier for magnetostrictive actuator and piezoelectric driver system for ACC1; WP9: Task 9.2.2 (Radiation damage study) electronic parts for RadMon system (radiation monitoring system), RADECS Association Fee, software licences	
Travel	4 300	WP8: Participation in 1) JRA SRF Kick-off Meeting, Zeuthen, Germany 21-23.I.2004 (1 person); 2) CARE Meeting, Orsay, France, 6-8.IX.2004 (1 person); 3) Experiments in IPN, Orsay, France 21-26.XI.2004 (1 person); WP8&WP9: Participation in 1) VIT@MIB training, Orsay, France 19-21.X.2004 (1 person); 2) CARE Annual Meeting, Hamburg, Germany 2-6.XI.2004 (2 persons);	

Total direct eligible costs	31 594		
Total indirect costs	6 319		
Total costs [3]	37 913	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	106 260

Justify any deviations with respect to the planned budget

Concerning the delay of money flow from European Community, we cannot realize all our financial plans. The public tenders have been placed, but invoices will be register in begining of 2005.

[1] AC contractors must include both the total estimated human effort (including permanent staff) and, in brackets, additional staff only.
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[3] Totals should correspond to the respective figures on FORM C - Financial Statement

Participant N°	13	Participant short name	IPJ
		N1-ELAN - Electron Linear Accelerator Network	
		Total effort in person-months (1)	0,4
Cost category	**Actual direct**	**Justification of costs** description of expenditure and link to the specific work carried out (e.g. tasks, work packages, ...)	
Personnel cost (2)			
Durable equipment			
Consumable and prototyping			
Travel	2205	Participation in the ELAN Meeting (WP2), Frascati, 2 persons and CARE Ann. Meeting, Hamburg, 2 persons	
		R1-SRF - Superconduting Radio Frequency	
		Total effort in person-months (1)	83 (4)
Cost category	**Actual direct eligible**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, ...)*	
Personnel cost (2)	3910	additional staff- 1 scientist working in WP4 for 4 monthso on computer modeling, design of equipment, measurement	
Durable equipment	2081	WP4: high vacuum equipment, pulse ruby laser and an computer (depreciation costs only)	
Consumable and prototyping	67211	WP4: mainly special components for an ultra-high vacuum stand, i.e. the turbo-molecular pumps, Nd:YAG laser, ARM supply unit	
Travel	4957	CARE WP4 Meeting - Rome(4 per.), JRA1 Kick-off Meeting-WP4- Berlin (1 per.), Prague - Symp (1 per.), Tomsk - Conf. (1 per.)	

Total direct eligible costs	80364		
Total indirect costs	16072		
Total costs (3)	96436	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	159839€ (63403€ - cost of work by perm.staff)

Justify any deviations with respect to the planned budget

Costs of additional staff are considerably lower then expected because most of work was be done by permanent staff.

All bought equipment for the project realization is a "special durable equipment" - cathegory: consumables and prototyping.

The difference between expected costs and total eligible costs in 2004 is about 3%.

Participant N°	14	Participant short name	WUT-ISE
		Management activity	
		Total effort in person-months [1]	
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** description of expenditure and link to the specific work carried out (e.g. tasks, work packages, ...)	
Audit certificate	1 150,50	Cost of the audit certificate	
		R1-SRF - Superconduting Radio Frequency	
		Total effort in person-months [1]	29,36 (14,46)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, ...)*	
Personnel cost [2]	34 304,04	Additional staff: 1 technician, 2 postgraduate students, 5 Ph.D. students, 3 engineers, 5 researchers. Design and tests of hardware LLRF blocks - WP9-T03 (22.496,30€). Realisation of software blocks WP9-T04 (11.807,74€)	
Durable equipment	0,00		
Consumable and prototyping	80 301,86	Purchase of electronic (complete sub-assembles, PCB, IC's, resistors, capacitors, connectors, wires and cables) and mechanical (frames, panels, mounting brackets, racks) components for LLRF blocks - WP9-T03	
Travel	2 361,84	Participation in professional conference "Optoelektronika" in Poznan, Poland (1 person) and CARE VIT@MIB Meeting in Paris (3 persons) - WP9	
Total direct eligible costs	118 118,24		
Total indirect costs	23 393,55		
Total costs [3]	141 511,79	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	210 300,00

Justify any deviations with respect to the planned budget

The reason of the deviation is the fact that cost of the audit were not included in the planned budget.

[1] AC contractors must include both the total estimated human effort (including permanent staff) and, in brackets, additional staff only.
[2] For TA activities excluding the effort charged under the user fees if the UF cost model is used.
[3] Totals should correspond to the respective figures on FORM C - Financial Statement

Participant N°	15	Participant short name	WUT
		N3-HHH - High Energy High Intensity Hadron Beams	
		Total effort in person-months [1]	0.2 (0.0)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	**517,13**	Participation in the CARE Annual meeting, Hamburg (1 person)	
		R4- NED - Next European Dipole	
		Total effort in person-months [1]	7.8 (4)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]	**1 845,57**	two additional staff (temporary contracts) working for 2 months in WP2, cryostat design and heat transfer calculation	
Durable equipment	**0,00**		
Consumable and prototyping	**26 821,14**	WP2, the purchase of basic cryostat (26 242.21) and the purchase of pipes and pressure transdusers for the cryogenic test of the cryostat (578.93)	
Travel	**1 192,49**	Participation in the NED meeting (WP2), Saclay (2 person)	

Total direct eligible costs	**30 376,33**		
Total indirect costs	**826,82**		
Total costs [3]	**31 203,15**	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	**61000**

Justify any deviations with respect to the planned budget

The difference between planned buget and total costs in 2004 is of about 40% because a part of expenses related to the NED helium cryostat commissioning and accerosires was shifted to 2005.

[1] AC contractors must include both the total estimated human effort (including permanent staff) and, in brackets, additional staff only.
[2] For TA activities excluding the effort charged under the user fees if the UF cost model is used.
[3] Totals should correspond to the respective figures on FORM C - Financial Statement

Participant N°	16	Participant short name	CSIC

		N1-ELAN - Electron Linear Accelerator Network	
		Total effort in person-months [1]	4.8
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	1 584,87	Participation in the ELAN meeting, Frascati (1 persons) and the CARE Annual meeting, Hamburg (1 person). WP: BDYN	

		N2-BENE - Beam for European Neutrino Experiments	
		Total effort in person-months [1]	10.8
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	7 042,86	Participation in the BENE meetings, CERN (5 persons), NuFact (1 person) and the CARE Annual meeting, Hamburg (3 persons) WP: Physics	

		Total effort in person-months [1]	6.0
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	1 950,15	Participation in HHH meetings, WAMS-CERN (1 person) WP: AMT, and HHH general CERN (2 persons) WP: AMT, APD	

Total direct eligible costs	10 577,88		
Total indirect costs			
Total costs [3]	10 577,88	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	

Justify any deviations with respect to the planned budget

Participant N°	17	Participant short name	CERN

		N1-ELAN - Electron Linear Accelerator Network	
		Total effort in person-months [1]	9 (0)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	14161,61	Travel costs of the participants from CERN and Associate Institutes into: -- First ELAN workshop in Frascati (It.) to gather all participants, launch the network activities, have a common reflection, coordinate the efforts, exchange informations and discuss the improvement of the existing infrastructures (5 physicists in WP1, and 3 in WP3). -- Experimental mini-workshop at CERN on the operation of the existing CLIC (Compact Linear Collider) test facility CTF3 (1 invited physicist). -- CARE annual meeting in Hamburg to review and report on ELAN activities, publications, data-bases, web-sites as well as on the status of CTF3; to present the financial status and future plans of ELAN; also to define and discuss the interactions between ELAN, EUROTeV and the GDE (Global Design Efforts), all related to linear colliders; and to agree upon the message to be given in the first ILC (International Linear Collider) workshop (3 physicists in WP1 ,4 in WP3, 1 in WP4). -- First ILC workshop at KEK (Japan), to initiate the work for the ILC after the technology choice of superconducting RF technology, review the Technical Issues and the element design, and communicate the contributions of ELAN and EUROTeV (2 physicists).	

		N2-BENE - Beam for European Neutrino Experiments	
		Total effort in person-months [1]	15(0)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	6081,43	1) Terrestrial and Cosmic Neutrinos, leptogenesis and Cosmology wokshop held in Benasque 2004, July 4 - July 23, 2004, (1 person, WP1) 2) ECT* meeting: Exploring the Impact of New Neutrino Beams, Trento, 18 - 22 October, 2004 (3 persons, WP1, WP5) 3) CARE annual meeting to review and report on BENE activities, publications, data-bases, web-sites etc., at DESY, November 2-5, 2004 (4 persons, work packages WP1, WP2, WP3, WP4 and WP5) 4) FFAG Collaboration meeting in Grenoble (WP5, 1 person), Dec. 4, 2004 5) Meeting on beta-beam (http://beta-beam.web.cern.ch/beta-beam/Previous%20meetings/Paris-7-Dec-2004.htm), Paris, Dec. 7, 2004 (WP5, 2 persons)	

		N3-HHH - High Energy High Intensity Hadron Beams
		Total effort in person-months [1] 36 (0)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*
Personnel cost [2]	0	The planned expenses for a temporary staff (called fellow at CERN) were delayed since no appropriate candidate was yet found
Durable equipment		
Consumable and prototyping		
Travel	18765,56	Travel costs of the participants from CERN and Associate Institutes into: (1) WP1: HHH-AMT kick-off meeting, (2) All WPs: 1st HHH-network steering meeting, (3) All WPs: 1st CARE steering meeting, (4) WP2 and WP3: 26&27 Feb 04 US-LARP meeting, (5) WP1: 1st HHH-AMT workshop, (6) WP1: General Meeting HHH-AMT, (7) WP3: 31st ICFA workshhop ECLOUD04, (8) WP2: 11th Beam Instrumentation Workshop BIW04, (9) WP1 and WP2: HIF2004 workshop, (10) all WPs: 2nd CARE steering meeting; (11) all WPs: EPAC'04 conference, (12) WP1: HHH-AMT meeting on 22 Oct 04; (13) WP2 and WP3: 19-23 Oct US-LARP meeting; (14) all WPs: 2nd HHH-network steering meeting; (15) all WPs: 1st annual meeting CARE'04, (16) WP3: 1st HHH-APD workshop; (17) WP1: HHH-AMT meeting on 12 Nov 04. (18) WP2: 2nd HHH-ABI (WP2) workshop. (19) all WPs: sparse ad hoc meetings for collaborations and contributions to HHH collateral activities.

		R2-PHIN - Photo Injector
		Total effort in person-months [1] 21.2(2)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*
Personnel cost [2]	0	1.6 m/y for permanent staff + 2 m/month Fellow (all payed by CERN). WP1: participation to Steering commitees, preparation of both technical and financial reports; organization of PHIN meeting. WP2: Refurbishment of the preparation chamber and of the DC gun test line for the qualification and commissioning of photocathodes. WP3: Collaboration with RAL for the Design of the Oscilator and of the Amplifier. Studies of test layout for 2nd harmonic generation. WP4: Collaboration with LAL (several meetings and videoconferences) for the definition of the parameters of the RF gun for CTF3.
Durable equipment		
Consumable and prototyping	7963,54	Optical material for test of different schemes and for acceptance test of oscillator (WP2 and 3)
Travel	1366,78	CARE Steering committee: Warsaw (1 person), WP3: 2 persons, visit to companies Time Bandwith (Zurich (CH) and HighQ Lasers (Hohenems, Austria) for qualification for the 1.5 GHz oscillator.

		R3- HIPPI - High Intensity Pulsed Proton Injector
		Total effort in person-months [1] 90.6 (21)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*
Personnel cost [2]	108345,85	WP2: Salaries E. Benedico-Mora since January (beam dynamics and design of SCL and DTL structures)+ M. Pasini since October (CCDTL design) WP4 & WP5: E. Sargsyan since July (beam dynamics computations)
Durable equipment		
Consumable and prototyping	255721,09	WP2: payment of drawings and construction, components of CCDTL prototype WP4: payment of drawings and construction, components of bunchers & chopper for 3 MeV test place+ development of chopper driver WP5: payment of drawings and construction, components of Bunch Shape and Halo Monitor ("BSHM")
Travel	10872,08	HIPPI annual workshop in Frankfurt (4 persons + 2 members of External Scientific Advisory Committee) CARE annual meeting in Hamburg (3 persons)

		R4- NED - Next European Dipole	
		Total effort in person-months [1]	4.8(0)
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, ...)*	
Personnel cost [2]	0	WP3:Writing of the Technical specifications,discussions with companies following a call for tender made by CERN staff	
Durable equipment	0		
Consumable and prototyping	89287	Subcontracting (no indirect costs): Down-payment for the purchase of Nb3Sn superconducting cables in 2 European companies following an official CERN call for tender (WP3).	
Travel	0		

Total direct eligible costs	512564,83		
Total indirect costs	84655,59		
Total costs [3]	597220,42	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	2'163'050

Justify any deviations with respect to the planned budget

BENE+ELAN: the deviation in underspending the planned travelling money is due to the delay in the budget assignment which caused a late start of the workshops and other relevant meetings.
HHH: deviation due to lack of appropriate candidate for a planned temporary position.
PHIN: the deviation is justified by delay in receiveing the budget assignement. 60 % of the budget is already committed, but no material has been received yet, so no invoice has been payed.Most of the remaining money will be committed in 2 months.
NED:WP3,the deviation is due to a payment schedule different of the one initially foreseen.Only 15% of the orders have been paid as down-payment in the 2 contracts placed for Nb3Sn superconducting cables.

[1] AC contractors must include both the total estimated human effort (including permanent staff) and, in brackets, additional staff only.
[2] For TA activities excluding the effort charged under the user fees if the UF cost model is used.
[3] Totals should correspond to the respective figures on FORM C - Financial Statement

Participant N°	22	Participant short name	UniGE
		N2-BENE - Beam for European Neutrino Experiments	
		Total effort in person-months [1]	7

Cost category	Actual direct eligible costs (€)	Justification of costs *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*
Personnel cost [2]		
Durable equipment		
Consumable and prototyping	2 710 €	BENE Workshop on Physics with a high power proton source at CERN -- posters 500CHF and proceedings printing 4200 CHF of which 4200CHF were accounted on the EU grant
Travel	443 €	BENE workshop CERN May 2004 (3 pers) ; muon cooling meetings in London June 2004 (1 pers) in Rutherford Lab Oct. 2004 (3 pers), workshop of swiss physicists on neutrino physics (June 2004)(3 pers+ one invitee) , general CARE meeting in DESY Nov 2004(2 pers). REPORTS of BENE activities at APS study meetings in Argonne April 2004(1 pers) , BNL April 2004 (1 pers), report at Neutrino2004 conference in Paris May 2004(1 pers); HIF04 workshop (1 pers) (june 2004); ECFA meeting in DESY (1 pers) July 2004, WP: BENE management, physics, target, novel neutrino beams -- total 22895 CHF=14698€ of which 443€ were accounted on the EU grant in 2004.
		NB taux de conversion € -- CHF 1,55
Total direct eligible costs	3 153 €	
Total indirect costs	579 €	
Total costs [3]	3 732 €	**Global estimate of the total costs for AC contractors (not only the eligible costs)**

Justify any deviations with respect to the planned budget

[1] AC contractors must include both the total estimated human effort (including permanent staff) and, in brackets, additional staff only.
[2] For TA activities excluding the effort charged under the user fees if the UF cost model is used.
[3] Totals should correspond to the respective figures on FORM C - Financial Statement

Participant N°	19	Participant short name	PSI
		N1-ELAN - Electron Linear Accelerator Network	
		Total effort in person-months [1]	1
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	1 561,00	Participation in the ELAN meeting WP2, Frascati (1 person) and the CARE Annual meeting, Hamburg (2 persons)	
		R1-SRF - Superconduting Radio Frequency	
		Total effort in person-months [1]	14
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]	39 823,00	WP9 LLRF: work at DESY with the LLRF-group for RF-gun control and evaluation of common HW-platform for RF control	
Durable equipment			
Consumable and prototyping			
Travel			

Total direct eligible costs	41 384,00		
Total indirect costs	9 956,00		
Total costs [3]	51 340,00	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	
Justify any deviations with respect to the planned budget			

Participant N°	20	Participant short name	CCLRC

		Management activity	
		Total effort in person-months [1]	
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)	
Audit certificate	1 000	Cost of the audit certificate	

		N1-ELAN - Electron Linear Accelerator Network	
		Total effort in person-months [1]	2 staff months approximately
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	2 775,57	ELAN meetings at Frascati (May 04, 5 people) and DESY(Nov 04, I person)	

		N2-BENE - Beam for European Neutrino Experiments	
		Total effort in person-months [1]	3 staff months approximately
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	3397,81	BENE meetings in CERN (May 04, 3 people), DESY (Nov 04, 4 people) and representing	

		N3-HHH - High Energy High Intensity Hadron Beams	
		Total effort in person-months [1]	0.5 staff months approximately
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	830,33	Participation in HEHIHB meeting in Archamps (Jan 04, 1 person)	

		R2-PHIN - Photo Injector	
		Total effort in person-months [1]	8,6
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]	32 170,74	1.3 staff months on WP1 (management), 7.3 staff months on WP3 (Laser)	
Durable equipment			
Consumable and prototyping			
Travel	2 372,16	SC meeting in Paris (March 04), PHIN meeting in Frascati (May 04, 2 people), and further meetings in CERN (Oct04, 2 people) , CERN (Jun 04, 1 person) and DESY. WP1 771, WP3 1601 Eur	

		R3- HIPPI - High Intensity Pulsed Proton Injector	
		Total effort in person-months [1]	21,65
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]	99445,03	9.1 staff months on WP2, 11.0 staff months on WP4, 1.55 staff months on WP5	
Durable equipment			
Consumable and prototyping	20272	Mechanical and electrical equipment (switches, fuses,etc) for Chopper	
Travel	7119	Meetings in CERN, Darmstadt, Frankfurt, Switzerland and DESY: WP2 4117, WP4 509, WP5 2493 Eur	

		R4- NED - Next European Dipole	
		Total effort in person-months [1]	8,95
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]	**29 646,36**	WP1 (management) 0.55 staff months, WP3 (conductor) 1.5 staff months, WP4 (insulation) 6.9 staff months	
Durable equipment	**0,00**		
Consumable and prototyping	**8 130,00**	WP4, purchase of insulation and test equipment including resin mixer for insulation tests	
Travel	**11 026,00**	Meetings every two months (RAL,Paris,CERN) WP1 1654, WP3 3528, W4 5844 Euro	

Total direct eligible costs	**217 184,50**		
Total indirect costs	**225 766,98**		
Total costs [3]	**443 951,48**		

Justify any deviations with respect to the planned budget

There is a lower spend than anticipated on almost all projects. For ELAN, the leader of the project is on long-term sick leave and took little part. For BENE there are some expenses still to appear in the accounts; these will appear next year. For HIPPI and PHIN, the delay in approval of the contract, late arrival of the money, and the time taken to hire new staff have contributed to a slower ramp-up than anticipated. This will be rectified in 2005 provided enough resources are available.

For NED, great care has to be taken because of the small EU funds made available.

[1] AC contractors must include both the total estimated human effort (including permanent staff) and, in brackets, additional staff only.
[2] For TA activities excluding the effort charged under the user fees if the UF cost model is used.
[3] Totals should correspond to the respective figures on FORM C - Financial Statement

Participant N°	21	Participant short name	ICL
		Management activity	
		Total effort in person-months [1]	
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)	
Audit certificate	456,31	Cost of the audit certificate	
		N1-ELAN - Electron Linear Accelerator Network	
		Total effort in person-months [1]	0.5[0]
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	672,00	Participation in the CARE Annual meeting, Hamburg (2 persons)	
		N2-BENE - Beam for European Neutrino Experiments	
		Total effort in person-months [1]	1[0]
Cost category	**Actual direct eligible costs (€)**	**Justification of costs** *description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)*	
Personnel cost [2]			
Durable equipment			
Consumable and prototyping			
Travel	2015,06	Participation in the CARE Annual meeting, Hamburg (2 persons). Participation in beta-beam design-study meeting (4 persons).	

Total direct eligible costs	3 143,37		
Total indirect costs	537,41		
Total costs [3]	3 680,78	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	**9 025,78**

Justify any deviations with respect to the planned budget

The difference between the planned budget and the actual costs in 2004 is due to the fact that for many participants this is a new activity making the build up of their involvement slower than expected. In addition, part of the planned travel would have supported preparations for a Neutrino Factory Design Study bid. The Design Study call was cancelled, which has slowed down this aspect of the work since those involved have required time to identify new routes to funding the conceptual-design work.

Participant N°	22	Participant short name	UMA
		N1-ELAN - Electron Linear Accelerator Network	
		Total effort in person-months [1]	2(0)

Cost category	Actual direct eligible costs (€)	Justification of costs description of expenditure and link to the specific work carried out (e.g. tasks, work packages, …)
Personnel cost [2]		
Durable equipment		
Consumable and prototyping		
Travel	4 681,98	Attendance at network meetings for WP3 and WP4: 6 persons at ELAN-workshop at Frascati (May 2004), 3 persons at CARE04 at Hamburg (Nov 2004)

Total direct eligible costs	4 681,98		
Total indirect costs	936,40		
Total costs [3]	5 618,38	**Global estimate of the total costs for AC contractors (not only the eligible costs)**	

Justify any deviations with respect to the planned budget

Meeting attendance is low at the start of the project as activity has yet to build up

[1] AC contractors must include both the total estimated human effort (including permanent staff) and, in brackets, additional staff only.
[2] For TA activities excluding the effort charged under the user fees if the UF cost model is used.
[3] Totals should correspond to the respective figures on FORM C - Financial Statement

2. Forms C - Financial Statements

Form C – Financial Statements (Appendix 2)

1 CEA

Type of instrument	Integrated Infrastructure Initiatives	Type of Action (if necessary)	I3
Project Title (or Acronym)	CARE	Contract n°	RII3-CT-2003-506395
Contractors's legal name	COMMISSARIAT A L'ENERGIE ATOMIQUE		
Legal Type	Governemental		
Contact Person	Roy Aleksan	Telephone	33 1 69083347
Telecopy	33 1 69086428	E-mail	aleksan@dapnia,cea,fr
Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	FC	Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)	real
Period from	1st january 2004	TO	31 december 2004

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)	NO
If Yes, please provide the following information	

Third Party 1 (Y1)	Legal name		Cost model used	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs	691 527,62				215 730,38		14 349,22						921 607,22	
Of which subcontracting														
Indirect costs	387 121,15				152 469,28		0,00						539 590,43	
Adjustments to previous period(s)														
Total costs	1 078 648,77				368 199,66		14 349,22						1 461 197,65	

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts														

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution resuested is equal to (amount in €)	749 000

6- Audit certificates			
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)			NO
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)			
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to		
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?			

Audit certificate of the contractor (X)			
Legal name of the audit firm		**Cost of the**	
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary add another Form C.		**Total (Z) = (X) +**	

Reminders:

The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit certificate (s) is (are) attached to this Financial Statement

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another Form C.

8- Contractor's Certificate

We certify that:

- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	Aleksan Roy	**Boyer Muriel**
	Date	**Date**
	11/02/2005	**11/02/2005**
	Signature	**Signature**

2 UCLN

Type of instrument	Integrated Infrastructure Initiatives	Type of Action (if necessary)	
Project Title (or Acronym)	CARE	Contract n°	RII-CT-2003-506395
Contractors's legal name	Universite Catholique de Louvain la Neuve		
Legal Type			
Contact Person	Thierry Delbar	Telephone	
Telecopy		E-mail	
Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	AC	Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)	20%
Period from	01/01/2004	TO	31/12/2004

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)	No

If Yes, please provide the following information

Third Party 1 (Y1)	Legal name		Cost model used	
Third Party 2 (Y2)	Legal name		Cost model used	
Third Party 3 (Y3)	Legal name		Cost model used	
Third Party 4 (Y4)	Legal name		Cost model used	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Technological (A)		Demonstration (B)		the Consortium (C)		Activities: (D)		Activities: (E)		Specific (E)		(A)+(B)+(C)+(D)+(E)+(F)	
	Contractor	Third Party (ies)	Contractor	Third Party (ies)	Contractor	Third Party (ies)	Contractor	Third Party (ies)	Contractor	Third Party (ies)	Contractor	Third Party (ies)	Contractor	Third Party (ies)
Direct costs							584						584	
Of which subcontracting														
Indirect costs							117						117	
Adjustments to previous period(s)														
Total costs							701						701	

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Technological (A)		Demonstration (B)		the Consortium (C)		Activities: (D)		Activities: (E)		Activities (E)		(A)+(B)+(C)+(D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts													0	

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution resuested is equal to (amount in €)	701,00

6- Audit certificates		
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third		No
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)		
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to	
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?		

Audit certificate of the contractor (X)			
Legal name of the audit firm		**Cost of the certificate**	
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**	
Reminders:			
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit			

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.
Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	No
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	No

8- Contractor's Certificate

We certify that:
- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in
- the above information declared is complete and true ;

- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	Thierry Delbar	
	Date	**Date**
	21/01/2005	21/01/2005
	Signature	**Signature**

3 CNRS

Type of instrument	**Integrated Initiatives for Infrastructures**	**Type of Action**	**Communication Network Development**
Project Title (or Acronym)	**CARE**	**Contract n°**	**RII3-CT-2003-506395**
Contractor's Legal Name	**Centre National de la Recherche Scientifique**		
Legal Type	**GOV**		
Contact Person	**T.Garvey**	**Telephone**	**33 1 64 46 89 61**
Telecopy		**E-mail**	garvey@lal.in2p3.fr
Cost model used (AC/FC or FCF)	**FCF**	**Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)**	**20%**
Period from	**January 1st, 2004**	**To**	**December 31st, 2004.**

1- Resources (Third party(ies), JRU)

Are there any resources made available on the basis of a prior agreement with third parties or JRU identified in Annex I of the contract? (Yes / No)	**NO**

If Yes, please provide the following information

Third Party/JRU 1 (Y1)	**Legal Name**	**N/A**	**Cost Model used**	**N/A**
Third Party/JRU 2 (Y2)	**Legal Name**	**N/A**	**Cost Model used**	**N/A**
Third Party/JRU 3 (Y3)	**Legal Name**	**N/A**	**Cost Model used**	**N/A**
Third Party/JRU 4 (Y4)	**Legal Name**	**N/A**	**Cost Model used**	**N/A**
Third Party/JRU 5 (Y5)	**Legal Name**	**N/A**	**Cost Model used**	**N/A**
Third Party/JRU 6 (Y6)	**Legal Name**	**N/A**	**Cost Model used**	**N/A**
Third Party/JRU 7 (Y7)	**Legal Name**	**N/A**	**Cost Model used**	**N/A**
Third Party/JRU 8 (Y8)	**Legal Name**	**N/A**	**Cost Model used**	**N/A**

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation		Demonstration (B)		Management of the Consortium (.C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Connectivity (E)		Other Specific Activities (F)		**Total =(A)+(.C)+(D)+(F)**	
	JRA1,JRA2,JRA3,JRA4		N/A		NA1 + Audit Certificate		NA2, NA3, NA4, NA5		N/A		SA1 SA2			
	Contractor	Third party/JRU	Contractor	Third party/JRU	Contractor	Third party/JRU	Contractor	Third party/JRU	Contractor	Third party/JRU	Contractor	Third party/JRU	Contractor	Third party/JRU
Direct costs	898067		0	0		0	4327		0	0		0	**902394**	0
Of which subcontracting			0	0		0			0	0		0	**0**	0
Indirect Costs	179613		0	0		0	865		0	0		0	**180478**	0
Adjustments to previous period(s)			0	0		0			0	0		0	**0**	0
Total costs	**1077680**		**0**	**0**	**0**	**0**	**5192**		**0**	**0**	**0**	**0**	**1082872**	**0**

3- Declaration of receipts (in €)

Please report in this section the total receipts reported by each member of the Third Party Agreement / JRU. Individual FormC must be attached

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (.C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Connectivity (E)		Other Specific Activities (F)		**Total =(A)+(.C)+(D)+(F)**	
	JRA1,JRA2,JRA3,JRA4		N/A		NA1 + Audit Certificate		NA2, NA3, NA4, NA5		N/A		SA1 SA2			
	Contractor	Third party/JRU	Contractor	Third party/JRU	Contractor	Third party/JRU	Contractor	Third party/JRU	Contractor	Third party/JRU	Contractor	Third party/JRU	Contractor	Third party/JRU
Total Receipts														

4- Declaration of interest generated by the pre-financing (in €)		
To be completed only by the coordinator.		
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	N/A	
If yes, please indicate the amount (in €)	N/A	

5- Request of FP6 Financial contribution (in €)					
				Contractor	Third party/JRU
FP6 Community financial contribution requested by	The Contractor	CNRS	amount in €	544032	
FP6 Community financial contribution requested by	Member of Third Party/JRU1	N/A	amount in €		0
FP6 Community financial contribution requested by	Member of Third Party/JRU2	N/A	amount in €		0
FP6 Community financial contribution requested by	Member of Third Party/JRU3	N/A	amount in €		0
FP6 Community financial contribution requested by	Member of Third Party/JRU4	N/A	amount in €		0
FP6 Community financial contribution requested by	Member of Third Party/JRU5	N/A	amount in €		0
FP6 Community financial contribution requested by	Member of Third Party/JRU6	N/A	amount in €		0
FP6 Community financial contribution requested by	Member of Third Party/JRU7	N/A	amount in €		0
FP6 Community financial contribution requested by	Member of Third Party/JRU8	N/A	amount in €		0
For this period, the FP6 Community financial contribution requested is equal to (amount in €)					**544032**

6- Audit certificates					
According to the contract, does this Financial Statement need an audit certificate delivered by independent auditor(s)? (Yes / No)					NO
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)					
If No, what are the periods covered by this (those) audit certificate(s) ?	From		To		
What is the total cost of this (those) audit certificate(s) (in €) per independent auditor(s) ?					0
				Contractor	Third party/JRU
Audit certificate of the contractor (X)					
Legal name of the audit firm		Cost of the certificate			
Audit certificate of the Third Party/JRU member1					
Legal name of the audit firm	N/A	Cost of the certificate			0
Audit certificate of the Third Party/JRU member2					
Legal name of the audit firm	N/A	Cost of the certificate			0
Audit certificate of the Third Party/JRU member3					
Legal name of the audit firm	N/A	Cost of the certificate			0
Audit certificate of the Third Party/JRU member4					
Legal name of the audit firm	N/A	Cost of the certificate			0
Audit certificate of the Third Party/JRU member5					
Legal name of the audit firm	N/A	Cost of the certificate			0
Audit certificate of the Third Party/JRU member6					
Legal name of the audit firm	N/A	Cost of the certificate			0
Audit certificate of the Third Party/JRU member7					
Legal name of the audit firm	N/A	Cost of the certificate			0
Audit certificate of the Third Party/JRU member8					
Legal name of the audit firm	N/A	Cost of the certificate			0
Reminders:					
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium".					
The required audit certificate(s) is(are) attached to this Financial Statement.					

7- Conversion rates	
Costs incurred in currencies other than EURO shall be reported in EURO.	
Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.	
Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

8- Contractor's Certificate

We certify that:
- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of

Contractor's Stamp	Name of the Person responsible for the work	Name of the duly authorised Financial Officer
	T.GARVEY	**MT DORIN-GERALD**
	Date	**Date**
	10/02/2005	**10/02/2005**
	Signature	**Signature**

4 GSI

Type of instrument	**Integrated Infrastructure Initiatives**	**Type of Action (if necessary)**	
Project Title (or Acronym)	**CARE/JRA HIPPI**	**Contract n°**	RII-CT-2003-506395
Contractors's legal name	**Gesellschaft für Schwerionenforschung mbH (GSI)**		
Legal Type	**GmbH limited liability company**		
Contact Person	**Dr. Lars Groening**	**Telephone**	0049 6159 71 2344
Telecopy		**E-mail**	la.groening@gsi.de
Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	**FC**	**Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)**	
Period from	**01/01/2004**	**TO**	31/12/2004

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)				No
If Yes, please provide the following information				
Third Party 1 (Y1)	**Legal name**		**Cost model used**	
Third Party 2 (Y2)	**Legal name**		**Cost model used**	
Third Party 3 (Y3)	**Legal name**		**Cost model used**	
Third Party 4 (Y4)	**Legal name**		**Cost model used**	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+(D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs	140 740						4 176						144 916	
Of which subcontracting														
Indirect costs	52 449												52 449	
Adjustments to previous period(s)														
Total costs	193 189						4 176						197 365	

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+(D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts													0	

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution resuested is equal to (amount in €),received	**100 770,50**

6- Audit certificates		
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)		No
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)		
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to	01.-12.2004
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?		

Audit certificate of the contractor (X)			
Legal name of the audit firm		**Cost of the certificate**	
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**	

Reminders:
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit certificate (s) is (are) attached to this Financial Statement

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	No
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	No
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another Form C.

8- Contractor's Certificate

We certify that:

- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	Dr. Lars Groening	**Dr. H. Zeittraeger**
	Date	**Date**
	02/02/2005	**02/02/2005**
	Signature	**Signature**

5 IAP-FU

Type of instrument	Integrated Infrastructure Initiatives	Type of Action (if necessary)	
Project Title (or Acronym)	CARE	Contract n°	RII3-CT-2003-506395
Contractors's legal name	Johann Wolfgang Goethe Universität Frankfurt am Main		
Legal Type	Public research body organized under the laws of Germany		
Contact Person	Dr. Dorothee Lux	Telephone	+ 49 69 798 22130
Telecopy	+ 49 69 798 25007	E-mail	d.lux@vdv.uni-frankfurt.de
Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	AC	Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)	20%
Period from	01.2004	TO	12,2004

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)	

If Yes, please provide the following information

Third Party 1 (Y1)	Legal name		Cost model used	
Third Party 2 (Y2)	Legal name		Cost model used	
Third Party 3 (Y3)	Legal name		Cost model used	
Third Party 4 (Y4)	Legal name		Cost model used	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+(D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs	64865													
Of which subcontracting														
Indirect costs	12973													
Adjustments to previous period(s)														
Total costs	77838													

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+(D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts														

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution resuested is equal to (amount in €)	77838

6- Audit certificates			
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)			
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)			
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to		
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?			

Audit certificate of the contractor (X)			
Legal name of the audit firm		**Cost of the certificate**	
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**	
Reminders: *The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit certificate (s) is (are) attached to this Financial Statement*			

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another Form C.

8- Contractor's Certificate

We certify that:

- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	Prof. U. Ratzinger	**Dr D. Lux**
	Date	**Date**
	27/01/2005	**01/02/2005**
	Signature	**Signature**

6 DESY

Type of instrument	Integrated Infrastructure Initiatives	Type of Action (if necessary)	
Project Title (or Acronym)	CARE	Contract n°	RII3-CT-2003-506395
Contractors's legal name	Stiftung Deutsches Elektronen-Synchrotron		
Legal Type			
Contact Person	Prof. Dr. Dieter Proch	Telephone	(+49)-40-8998-3273
Telecopy	(+49)-40-8998-4302	E-mail	dieter.proch@desy.de
Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	AC	Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)	Flat rate 20%
Period from	01/01/2004	TO	31/12/2004

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)	No

If Yes, please provide the following information

Third Party 1 (Y1)	Legal name		Cost model used	
Third Party 2 (Y2)	Legal name		Cost model used	
Third Party 3 (Y3)	Legal name		Cost model used	
Third Party 4 (Y4)	Legal name		Cost model used	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+(D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs	211550,00						22541,56						234091,56	
Of which subcontracting	27650,00												27650,00	
Indirect costs	36780,00						4508,31						41288,31	
Adjustments to previous period(s)														
Total costs	248330,00						27049,87						275379,87	

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+(D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts														

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution resuested is equal to (amount in €)	275 379,87

6- Audit certificates			
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)			No
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)			No
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to		
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?			

Audit certificate of the contractor (X)			
Legal name of the audit firm		**Cost of the certificate**	
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**	

Reminders:
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit certificate (s) is (are) attached to this Financial Statement

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	No
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another Form C.

8- Contractor's Certificate

We certify that:

- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;

- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	Dieter Proch	**Uwe Wolframm**
	Date	**Date**
	24/01/2005	**24/01/2005**
	Signature	**Signature**

7 FZJ

Type of instrument	Integrated Infrastructure Initiatives	Type of Action (if necessary)	
Project Title (or Acronym)	CARE	Contract n°	RII3-CT-2003-506395
Contractors's legal name	Forschungszentrum Jülich GmbH		
Legal Type	GmbH		
Contact Person	Dr. Raimund Tölle	Telephone	+49-2461-61-5615
Telecopy	+49-2461-61-2670	E-mail	r.toelle@fz-juelich.de
Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	FC	Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)	
Period from	01/01/2004	TO	31/12/2004

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)				
If Yes, please provide the following information				
Third Party 1 (Y1)	Legal name		Cost model used	
Third Party 2 (Y2)	Legal name		Cost model used	
Third Party 3 (Y3)	Legal name		Cost model used	
Third Party 4 (Y4)	Legal name		Cost model used	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs	238 318,96						5 220,18						243 539,14	
Of which subcontracting														
Indirect costs	171 145,59												171 145,59	
Adjustments to previous period(s)														
Total costs	409 464,55						5 220,18						414 684,73	

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts														

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution resuested is equal to (amount in €)	**209 950**

6- Audit certificates		
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)		No
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)		
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to	**01.01.2004 - 31.12.2005**
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?		

Audit certificate of the contractor (X)			
Legal name of the audit firm		**Cost of the certificate**	
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**	
Reminders: *The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit certificate (s) is (are) attached to this Financial Statement*			

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	No
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	No

If necessary add another Form C.

8- Contractor's Certificate

We certify that:

- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	Dr. Raimund Tölle	**H. Schilling** **H. Sommer**
	Date	**Date**
	13/01/2005	**13/01/2005**
	Signature	**Signature**

8 TUM

Type of instrument	Integrated Infrastructure Initiatives	Type of Action (if necessary)	
Project Title (or Acronym)	CARE	Contract n°	RII-CT-2003-506395
Contractors's legal name	Technical University of München		
Legal Type			
Contact Person	Manfred Lindner	Telephone	(49) 89 289 12196
Telecopy	(49) 89 289 14583	E-mail	manfred.lindner@ph.tum.de
Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	AC	Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)	20%
Period from	01/01/2004	TO	31/12/2004

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)	No

If Yes, please provide the following information

Third Party 1 (Y1)	Legal name		Cost model used	
Third Party 2 (Y2)	Legal name		Cost model used	
Third Party 3 (Y3)	Legal name		Cost model used	
Third Party 4 (Y4)	Legal name		Cost model used	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+(D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs							743						743	
Of which subcontracting														
Indirect costs							149						149	
Adjustments to previous period(s)														
Total costs							892						892	

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+(D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts													0	

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution resuested is equal to (amount in €)	**892,00**

6- Audit certificates			
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)			No
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)			
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to		
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?			

Audit certificate of the contractor (X)			
Legal name of the audit firm		**Cost of the certificate**	
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**	

Reminders:
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit certificate (s) is (are) attached to this Financial Statement

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	No
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	No
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another Form C.

8- Contractor's Certificate

We certify that:

- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;

- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	M. Lindner	**A. Baer**
	Date	**Date**
	21/01/2005	**21/01/2005**
	Signature	**Signature**

9 FZR

Type of instrument	**Integrated Infrastructure Initiatives**	**Type of Action (if necessary)**	
Project Title (or Acronym)	**CARE**	**Contract n°**	RII3-CT-2003-506395
Contractors's legal name	**Forschungszentrum Rossendorf e.V.**		
Legal Type	**Private public non-commercial**		
Contact Person	**Dr. Jochen Teichert**	**Telephone**	0049 351 260 3445
Telecopy	**0049 351 260 3690**	**E-mail**	j.teichert@fz-rossendorf.de
Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	**AC**	**Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)**	20%
Period from	**01/01/2004**	**TO**	31/12/2004

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)	No

If Yes, please provide the following information

Third Party 1 (Y1)	**Legal name**		**Cost model used**	
Third Party 2 (Y2)	**Legal name**		**Cost model used**	
Third Party 3 (Y3)	**Legal name**		**Cost model used**	
Third Party 4 (Y4)	**Legal name**		**Cost model used**	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+(D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs	83 268,95						1 975,64						85 244,59	
Of which subcontracting														
Indirect costs	16 653,79						395,13						17 048,92	
Adjustments to previous period(s)														
Total costs	99 922,74						2 370,77						102 293,51	

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+(D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts													0	

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution requested is equal to (amount in €)	**102 293.51**

6- Audit certificates		
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)		No
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)		
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to	1.1.2004 - 31.12.2005
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?		

Audit certificate of the contractor (X)			
Legal name of the audit firm		**Cost of the certificate**	
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**	

Reminders:
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit certificate (s) is (are) attached to this Financial Statement

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another Form C.

8- Contractor's Certificate

We certify that:

- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;

- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	Dr. Jochen Teichert	Dr. Rainer Maletti
	Date	**Date**
	13/01/2005	13/01/2005
	Signature	**Signature**

10 INFN

Type of instrument	Integrated Infrastructure Initiatives	Type of Action (if necessary)	
Project Title (or Acronym)	CARE	Contract n°	RII3-CT-2003-506395
Contractors's legal name	Istituto Nazionale di Fisica Nucleare		
Legal Type	GOV		
Contact Person	Dolores Federici	Telephone	+39 6 94032224
Telecopy	+39 6 9424498	E-mail	dolores.federici@lnf.infn.it
Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	AC	Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)	20%
Period from	01/01/2004	TO	31/12/2004

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)	NO

If Yes, please provide the following information

Third Party 1 (Y1)	Legal name		Cost model used	
Third Party 2 (Y2)	Legal name		Cost model used	
Third Party 3 (Y3)	Legal name		Cost model used	
Third Party 4 (Y4)	Legal name		Cost model used	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs	209 651,00						3 864,00						213 515,00	
Of which subcontracting														
Indirect costs	41 930,00						773,00						42 703,00	
Adjustments to previous period(s)														
Total costs	251 581,00						4 637,00						256 218,00	

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts														

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution requested is equal to (amount in €)	**256 218,00**

6- Audit certificates			
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)			
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)			
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to		
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?			

Audit certificate of the contractor (X)			
Legal name of the audit firm		**Cost of the certificate**	
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**	

Reminders:
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit certificate (s) is (are) attached to this Financial Statement

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another Form C.

8- Contractor's Certificate

We certify that:

- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	Dr. Susanna Guiducci	**Dr. Dolores Federici**
	Date	**Date**
	25.01.2005	**25.01.2005**
	Signature	**Signature**

11 TEU

Type of instrument	Integrated Infrastructure Initiatives	Type of Action (if necessary)	
Project Title (or Acronym)	CARE	Contract n°	RII3-CT-2003-506395

Contractors's legal name	UNIVERSITY OF TECHNOLOGY TWENTE		
Legal Type	GOVERNMENTAL		
Contact Person	A. Tigelaar	Telephone	+31 53 4893665
Telecopy	+31 53 4894841	E-mail	A.Tigelaar@utwente.nl

Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	FC	Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)	

Period from	01-janv-04	TO	31-dec-2004

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)	No

If Yes, please provide the following information

Third Party 1 (Y1)	Legal name		Cost model used	
Third Party 2 (Y2)	Legal name		Cost model used	
Third Party 3 (Y3)	Legal name		Cost model used	
Third Party 4 (Y4)	Legal name		Cost model used	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs	35717												35717	
Of which subcontracting														
Indirect costs	26970												26970	
Adjustments to previous period(s)														
Total costs	62687												62687	

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts													0	

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution resuested is equal to (amount in €)	**31343,50**

6- Audit certificates		
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)		**No**
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)		
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to	01-01-2004 to 31-12-2004
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?		

Audit certificate of the contractor (X)			
Legal name of the audit firm		**Cost of the certificate**	
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**	

Reminders:

The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit certificate (s) is (are) attached to this Financial Statement

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	**No**
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another Form C.

8- Contractor's Certificate

We certify that:

- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	ir. A. den Ouden	**A. Groenink**
	Date	**Date**
	February 14th. 2005	**February 14th. 2005**
	Signature	**Signature**

12 TUL

Type of instrument	**Integrated Infrastructure Initiatives**	**Type of Action (if necessary)**	
Project Title (or Acronym)	**CARE**	**Contract n°**	RII3-CT-2003-506395

Contractors's legal name	**TECHNICAL UNIVERSITY of LODZ, POLAND**		
Legal Type	**TECHNICAL UNIVERSITY**		
Contact Person	**Mariusz Grecki**	**Telephone**	0-48-42-631-26-28
Telecopy	**0-48-42-636-03-27**	**E-mail**	grecki@dmcs.p.lodz.pl

Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	**AC**	**Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)**	**20%**

Period from	**1.01.2004**	**TO**	**31.12.2004**

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)	No

If Yes, please provide the following information

Third Party 1 (Y1)	**Legal name**		**Cost model used**	
Third Party 2 (Y2)	**Legal name**		**Cost model used**	
Third Party 3 (Y3)	**Legal name**		**Cost model used**	
Third Party 4 (Y4)	**Legal name**		**Cost model used**	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs	29 739						1 855						31 594	
Of which subcontracting													0	
Indirect costs	5 948						371						6 319	
Adjustments to previous period(s)													0	
Total costs	35 687						2 226						37 913	

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts	0	0	0	0	0	0	0	0	0	0	0	0	0	0

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution resuested is equal to (amount in €)	37 913

6- Audit certificates			
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)			No
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)			
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to		
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?			

Audit certificate of the contractor (X)			
Legal name of the audit firm		**Cost of the certificate**	
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**	

Reminders:
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit certificate (s) is (are) attached to this Financial Statement

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (NO)	No
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES)	Yes
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another Form C.

8- Contractor's Certificate

We certify that:

- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	prof. Andrzej Napieralski	**Jadwiga Machnicka**
	Date	**Date**
	20.01.2005	**20.01.2005**
	Signature	**Signature**

13 IPJ

Type of instrument	Integrated Infrastructure Initiatives	Type of Action (if necessary)	
Project Title (or Acronym)	CARE	Contract n°	RII3-CT-2003-506395
Contractors's legal name	The Andrzej Soltan Institute for Nuclear Studies		
Legal Type	gov		
Contact Person	Bogumila Rykaczewska	Telephone	48 22 7180583
Telecopy	48 22 7793481	E-mail	b.rykaczewska@ipj.gov.pl
Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	AC	Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)	Yes
Period from	January 1st 2004	TO	December 31 2004

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)	No

If Yes, please provide the following information

Third Party 1 (Y1)	Legal name		Cost model used	
Third Party 2 (Y2)	Legal name		Cost model used	
Third Party 3 (Y3)	Legal name		Cost model used	
Third Party 4 (Y4)	Legal name		Cost model used	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs	78159						2205						80364	
Of which subcontracting														
Indirect costs	15631						441						16072	
Adjustments to previous period(s)														
Total costs	93790						2646						96436	

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts													0	

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution resuested is equal to (amount in €)	96436

6- Audit certificates			
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)			No
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)			
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to		
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?			

Audit certificate of the contractor (X)			
Legal name of the audit firm		**Cost of the certificate**	
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**	

Reminders:
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit certificate (s) is (are) attached to this Financial Statement

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	**NO**
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	**YES**
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another Form C.

8- Contractor's Certificate

We certify that:

- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;

- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	Prof. M. Sadowski	**Anna Slapa**
	Date	**Date**
	January 19 2005	**January 19 2005**
	Signature	**Signature**

14 WUT-ISE

Type of instrument	Integrated Infrastructure Initiatives	Type of Action (if necessary)	
Project Title (or Acronym)	CARE	Contract n°	RII3-CT-2003-506395
Contractors's legal name	Politechnika Warszawska		
Legal Type	Governmental		
Contact Person	Ryszard Romaniuk	Telephone	+48 22 6607738
Telecopy	+48 22 8252300	E-mail	rrom@ise.pw.edu.pl
Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	AC	Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)	Flat rate 20%
Period from	01/01/2004	TO	31/12/2004

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)	No

If Yes, please provide the following information

Third Party 1 (Y1)	Legal name		Cost model used	
Third Party 2 (Y2)	Legal name		Cost model used	
Third Party 3 (Y3)	Legal name		Cost model used	
Third Party 4 (Y4)	Legal name		Cost model used	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs	116 967,74				1 150,50								118 118,24	
Of which subcontracting	0,00				1 150,50								1 150,50	
Indirect costs	23 393,55				0,00								23 393,55	
Adjustments to previous period(s)														
Total costs	140 361,29				1 150,50								141 511,79	

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts														

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution resuested is equal to (amount in €)	141 511,79

6- Audit certificates			
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)			Yes
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)			Yes
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to		
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?			

Audit certificate of the contractor (X)			
Legal name of the audit firm	Biuro Audytorskie SADREN Sp. z o.o.	**Cost of the certificate**	1 150,50
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**	

Reminders:
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit certificate (s) is (are) attached to this Financial Statement

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	NO
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	YES
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another Form C.

8- Contractor's Certificate

We certify that:

- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	Ryszard Romaniuk	Jadwiga Bajkowska
	Date	**Date**
	Signature	**Signature**

15 WUT

Type of instrument	Integrated Infrastructure Initiatives	Type of Action (if necessary)	
Project Title (or Acronym)	CARE	Contract n°	RII3-CT-203-506395

Contractors's legal name	WROCLAW UNIVERSITY OF TECHNOLOGY		
Legal Type			
Contact Person	Maciej CHOROWSKI	Telephone	+ 48 71 320 23 20
Telecopy	+48 71 328 38 18	E-mail	maciej.chorowski@pwr.wroc.pl

Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	AC	Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)	Flat Rate of 20% of Direct costs, except subcontracting

Period from	January 1st 2004	TO	December 31 2004

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)	No
If Yes, please provide the following information	

Third Party 1 (Y1)	Legal name		Cost model used	
Third Party 2 (Y2)	Legal name		Cost model used	
Third Party 3 (Y3)	Legal name		Cost model used	
Third Party 4 (Y4)	Legal name		Cost model used	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs	29859,19						517,13						30376,32	
Of which subcontracting	26242,21						0,00						26242,21	
Indirect costs	723,40						103,42						826,82	
Adjustments to previous period(s)	0,00						0,00						0,00	
Total costs	30582,59						620,55						31203,14	

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts													0	

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution resuested is equal to (amount in €)	**31 203.14**

6- Audit certificates			
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)			**No**
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)			
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to		
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?			

Audit certificate of the contractor (X)			
Legal name of the audit firm		**Cost of the certificate**	
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**	

Reminders:

The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit certificate (s) is (are) attached to this Financial Statement

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	No
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	Yes
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another Form C.

8- Contractor's Certificate

We certify that:

- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	Maciej Chorowski	**Alicja Maniak**
	Date	**Date**
	28.01.2005	**28.01.2005**
	Signature	**Signature**

16 CSIC

Type of instrument	Integrated Infrastructure Initiatives	Type of Action (if necessary)	
Project Title (or Acronym)	CARE	Contract n°	RII3-CT-2003-506395
Contractors's legal name	Consejo Superior de Investigaciones Científicas		
Legal Type			
Contact Person	Angeles Faus-Golfe	Telephone	34 963543545
Telecopy	34 963543488	E-mail	Angeles.Faus-Golfe@uv.es
Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	FC	Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)	Real
Period from	1 January 2004	TO	31 December 2004

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)	No

If Yes, please provide the following information

Third Party 1 (Y1)	Legal name		Cost model used	
Third Party 2 (Y2)	Legal name		Cost model used	
Third Party 3 (Y3)	Legal name		Cost model used	
Third Party 4 (Y4)	Legal name		Cost model used	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs							10577.88						10577.88	
Of which subcontracting														
Indirect costs														
Adjustments to previous period(s)														
Total costs							10577.88						10577.88	

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts														

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution resuested is equal to (amount in €)	**10577.88**

6- Audit certificates			
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)			No
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)			
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to	1/01/2004 - 31/12/2005	
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?			

Audit certificate of the contractor (X)			
Legal name of the audit firm		**Cost of the certificate**	
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**	

Reminders:
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit certificate (s) is (are) attached to this Financial Statement

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	No
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another Form C.

8- Contractor's Certificate

We certify that:

- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;

- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	Angeles Faus-Golfe	Maria del Mar Garcia Ferrer
	Date	**Date**
	14 February 2005	14 February 2005
	Signature	**Signature**

17 CERN

Type of instrument	Integrated Infrastructure Initiatives	Type of Action (if necessary)	
Project Title (or Acronym)	CARE	Contract n°	RII3-CT-2003-506395

Contractors's legal name	European Organisation for Nuclear Research		
Legal Type			
Contact Person	Gilbert Guignard	Telephone	+41-22-7675975
Telecopy	+41-22-7679590	E-mail	gilbert.guignard@cern.ch

Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	AC	Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)	Flat Rate of 20%
Period from	01-janv-04	TO	31-déc-04

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)				NO
If Yes, please provide the following information				
Third Party 1 (Y1)	Legal name	N/A	Cost model used	
Third Party 2 (Y2)	Legal name	N/A	Cost model used	
Third Party 3 (Y3)	Legal name	N/A	Cost model used	
Third Party 4 (Y4)	Legal name	N/A	Cost model used	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs	473556	N/A	N/A	N/A	N/A	N/A	39008,61	N/A	N/A	N/A	N/A	N/A	512564,8	N/A
Of which subcontracting	89286,88	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	89286,88	N/A
Indirect costs	76853,87	N/A	N/A	N/A	N/A	N/A	7801,72	N/A	N/A	N/A	N/A	N/A	84655,59	N/A
Adjustments to previous period(s)	0	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	0	N/A
Total costs	550410,1	N/A	N/A	N/A	N/A	N/A	46810,33	N/A	N/A	N/A	N/A	N/A	597220,4	N/A

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts													N/A	N/A

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	**N/A**
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution resuested is equal to (amount in €)	**597220,42**

6- Audit certificates			
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)			**NO**
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)			
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to		
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?			**NIL**

Audit certificate of the contractor (X)			
Legal name of the audit firm	**N/A 2004**	**Cost of the certificate**	**NIL**
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm	**N/A**	**Cost of the certificate**	**N/A**
Y2 : Legal name of the audit firm	**N/A**	**Cost of the certificate**	**N/A**
Y3 : Legal name of the audit firm	**N/A**	**Cost of the certificate**	**N/A**
Y4 : Legal name of the audit firm	**N/A**	**Cost of the certificate**	**N/A**
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**	

Reminders:
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit certificate (s) is (are) attached to this Financial Statement

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts. **Euro 1 = CHF 1.544**

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	**NO**
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	**YES**
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	**N/A**
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another Form C.

8- Contractor's Certificate

We certify that:

- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	Gilbert Guignard	**Thierry Lagrange**
	Date	**Date**
	February 4, 2005	**February 4, 2005**
	Signature	**Signature**

18 UNI-GE

Type of instrument	Integrated Infrastructure Initiatives	Type of Action (if necessary)	
Project Title (or Acronym)	CARE	Contract n°	RII3-CT-2003-506395
Contractors's legal name	University of Geneva		
Legal Type			
Contact Person	Alain Blondel	Telephone	00 41 22 379 6227
Telecopy	41223796992	E-mail	alain.blondel@cern.ch
Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	AC	Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)	
Period from	01-janv-04	TO	31-déc-04

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)	no

If Yes, please provide the following information

Third Party 1 (Y1)	Legal name		Cost model used	
Third Party 2 (Y2)	Legal name		Cost model used	
Third Party 3 (Y3)	Legal name		Cost model used	
Third Party 4 (Y4)	Legal name		Cost model used	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs							3 153						3 153	
Of which subcontracting														
Indirect costs							579						579	
Adjustments to previous period(s)														
Total costs							3 732						3 732	

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts														

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution resuested is equal to (amount in €)	0 €

6- Audit certificates			
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)			no
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)			
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to		
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?			

Audit certificate of the contractor (X)			
Legal name of the audit firm		**Cost of the certificate**	
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**	
Reminders: *The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit certificate (s) is (are) attached to this Financial Statement*			

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts. 1€ = 1.55 CHF

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	yes
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another Form C.

8- Contractor's Certificate

We certify that:

- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	Alain Blondel	Beda Manzano di Blasi
	Date	**Date**
	07-févr-05	21/03/2005
	Signature	**Signature**
		

19 PSI

Type of instrument	Integrated Infrastructure Initiatives	Type of Action (if necessary)	
Project Title (or Acronym)	CARE	Contract n°	RII3-CT-2003-506395

Contractors's legal name	Paul Scherrer Institute (PSI)		
Legal Type			
Contact Person	Volker Schlott	Telephone	00 41 56 310 4237
Telecopy	0041 56 310 4528	E-mail	volker.schlott@psi.ch

Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	FC	Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)	
Period from	01-janv-04	TO	31-dec-2004

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)	No

If Yes, please provide the following information

Third Party 1 (Y1)	Legal name		Cost model used	
Third Party 2 (Y2)	Legal name		Cost model used	
Third Party 3 (Y3)	Legal name		Cost model used	
Third Party 4 (Y4)	Legal name		Cost model used	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+(D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs	39823						1 561						41384	
Of which subcontracting														
Indirect costs	9956												9956	
Adjustments to previous period(s)														
Total costs	49779						1 561						51340	

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+(D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts													0	

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution resuested is equal to (amount in €)	

6- Audit certificates		
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)		**No**
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)		
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to	01-01-2004 to 31-12-2004
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?		

Audit certificate of the contractor (X)			
Legal name of the audit firm		**Cost of the certificate**	
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**	

Reminders:

The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit certificate (s) is (are) attached to this Financial Statement

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	**No**
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	**Yes**
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another Form C.

8- Contractor's Certificate

We certify that:

- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	Volker Schlott	**Angela Vatter**
	Date	**Date**
	15-févr-05	**15-févr-05**
	Signature	**Signature**

20 CCLRC

Type of instrument	Integrated Initiative for Infrastructures	**Type of Action** (if necessary)	N.A.
Project title (or Acronym)	CARE	**Contract n°**	
Contractor's Legal Name	CCLRC, Rutherford Appleton Laboratory		
Legal Type			
Contact Person	Peter Norton	**Telephone**	(+44) 1235 445486
Telecopy	(+44) 1235 446733	**E-mail**	P.R.Norton@rl.ac.uk
Cost Model used (AC/FC or FCF) / (UF: User Fee) (*)	FC	**Indirect costs** (Real or Flat rate of 20% of Direct costs, except subcontracting)	Real
Period from	01-janv-04	**To**	31-déc-04

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (e.g.: FC / UF or FCF / UF or AC/UF)

1 - Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract (Yes/No)	

If yes, please provide the following information

Third Party 1 (Y1)	**Legal Name**		**Cost model used**	
Third Party 2 (Y2)	**Legal Name**		**Cost model used**	
Third Party 3 (Y3)	**Legal Name**		**Cost model used**	
Third Party 4 (Y4)	**Legal Name**		**Cost model used**	

If necessary add another Form C

2 - Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (F)		Total (G) = (A)+(B)+(C)+(D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct Costs	211 011,12				1 000,00		6 173,38						218 184,50	
Of which subcontracting														
Indirect costs	225 766,98												225 766,98	
Adjustments to previous period(s)														
Total costs	**436 778,10**				**1 000,00**		**6 173,38**						**443 951,48**	

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A')		Demonstration (B')		Management of the Consortium (C')		Other Specific Activities: Coordination / Networking (D')		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (F)		Total (G) = (A)+(B)+(C)+(D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total Receipts														

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial contribution (in €)	
For this period, the FP6 Community financial contribution requested is equal to (amount in €)	**€ 225 562,43**

6- Audit certificates				
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)				**Yes**
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)				**Yes**
If No, what are the periods covered by this(those) audit certificate(s) ?		**From - To**		
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?			**€ 1 000,00**	
Audit certificate of the contractor (X)				
Legal name of the audit firm		Cost of the certificate		
Audit certificate(s) of the third party(ies) (Ys) (if necessary)				
Y1 : Legal name of the audit firm	Research Councils Internal Audit	**Cost of the certificate**		**€ 1 000,00**
Y2 : Legal name of the audit firm		**Cost of the certificate**		
Y3 : Legal name of the audit firm		**Cost of the certificate**		
Y4 : Legal name of the audit firm		**Cost of the certificate**		
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**		
Reminders:				
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium".				
The required audit certificate(s) is(are) attached to this Financial Statement.				

7- Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.
Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	**No**
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	**Yes**
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	
Third Party 2 (Y2)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	
Third Party 3 (Y3)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	
Third Party 4 (Y4)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another Form C.

8- Contractor's Certificate

We certify that:
- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;

- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	Peter Norton	**Steph Rankin**
	Date	**Date**
	20.01.2005	**20.01.2005**
	Signature	**Signature**

21 ICL

Type of instrument	Integrated Initiatives for Infrastructures	**Type of Action** *(if necessary)*	N.A.
Project Title (or Acronym)	**CARE**	**Contract n°**	**RII3-CT-2003-506395**

Contractor's Legal Name	**Imperial College of Science, Technology and Medicine**		
Legal Type	PNP		
Contact Person	Brooke Alasya	**Telephone**	+44 (0)207 5941181
Telecopy	+44 (0)207 5941515	**E-mail**	b.alasya@imperial.ac.uk

Cost model used (AC/FC or FCF) / (UF: User Fee) (*)	AC	**Indirect costs** (Real or Flat Rate of 20% of Direct costs, except subcontracting)	Flat Rate of 20% of Direct Costs, except subcontracting

Period from	01 January 2004	**To**	31 December 2004

(*) If UF is used under "other specific activities: transnational access", please mention the two costs models used (eg: FC/UF or FCF/UF or AC/UF)

1 - Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)	No
If Yes, please provide the following information	

Third party 1 (Y1)	**Legal Name**		**Cost model used**	
Third party 2 (Y2)	**Legal Name**		**Cost model used**	
Third party 3 (Y3)	**Legal Name**		**Cost model used**	
Third party 4 (Y4)	**Legal Name**		**Cost model used**	

If necessary add another Form C.

2 - Declaration of eligible costs (in €)

	Type of Activity												Total (G) = (A)+(B)+(C)+(D)+(E)+(F)	
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access /Connectivity (E)		Other Specific Activities (F)			
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs					456,31		2 687,06						3 143,37	0,00
Of which subcontracting													0,00	0,00
Indirect costs							537,41						537,41	0,00
Adjustments to previous period(s)													0,00	0,00
Total costs	0,00	0,00	0,00	0,00	456,31	0,00	3 224,47	0,00	0,00	0,00	0,00	0,00	3 680,78	0,00

3 - Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity												Total (G) = (A)+(B)+(C)+(D)+(E)+(F)	
	Research and Technological Development / Innovation (A')		Demonstration (B')		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access /Connectivity (E)		Other Specific Activities (F)			
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts													0,00	0,00

4 - Declaration of interest generated by the pre-financing (in €)

To be completed only by the coordinator.

Did the pre-financing (advance) you received by the Commission for this period earn interest (Yes / No)	
If yes, please indicate the amount (in €)	

5 - Request of FP6 Financial contribution (in €)

For this period, the FP6 Community financial contribution requested is equal to (amount in €).	3 680,78

6 - Audit certificates

According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)			Yes
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)			Yes
If No, what are the periods covered by this(those) audit certificate(s)?	**From - To**		
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s)?			
Audit certificate of the contractor (X)			
Legal name of the audit firm	Imperial College London	**Cost of the certificate**	456,31
Audit certificate(s) of the third party(ies) (Ys) *(if necessary)*			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary, add another Form C.		**Total (Z) = (X) + (Ys)**	456,31

Reminders:
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium".
The required audit certificate(s) is(are) attached to this Financial Statement.

7 - Conversion rates

Costs incurred in currencies other than EURO shall be reported in EURO.
Please mention the conversion rate used (only one choice is possible) - Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	Yes 0.7088
Third party(ies) *(if necessary)*	
Third party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another form C.

8 - Contractor's Certificate

We certify that:
- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	Name of the Person responsible for the work	Name of the duly authorised Financial Officer
	Professor Ken Long	Brooke Alasya
	Date	**Date**
	05/01/2005	05/01/2005
	Signature	**Signature**

22 UMA

Type of instrument	Integrated Infrastructure Initiatives	Type of Action (if necessary)	
Project Title (or Acronym)	CARE	Contract n°	R113-CT-2003-506395/DGRes/F
Contractors's legal name	University of Manchester		
Legal Type			
Contact Person	Roger Barlow	Telephone	(+44) 161 275 4178
Telecopy		E-mail	Roger.Barlow@manchester.ac.uk
Cost model used (AC/FC or FCF)/ (UF: User Fee)(*)	AC	Indirect costs (Real or Flat Rate of 20% of Direct costs, except subcontracting)	20%
Period from	1st January 2004	TO	31st December 2004

(*) If UF is used under "other specific activities: transnational access/connectivity", please mention the two cost models used (eg. FC/UF or FCF/UF or AC/UF)

1- Resources (Third party(ies))

Are there any resources made available on the basis of a prior agreement with third parties identified in Annex I of the contract? (Yes / No)	No

If Yes, please provide the following information

Third Party 1 (Y1)	Legal name		Cost model used	
Third Party 2 (Y2)	Legal name		Cost model used	
Third Party 3 (Y3)	Legal name		Cost model used	
Third Party 4 (Y4)	Legal name		Cost model used	

If necessary add another Form C

2- Declaration of eligible costs (in €)

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Direct costs							4681,98						4681,98	
Of which subcontracting														
Indirect costs							936,40						936,40	
Adjustments to previous period(s)														
Total costs							5618,38						5618,38	

3- Declaration of receipts (in €)

If you are a contractor using the additional cost model (AC), indicate only receipts covered by Article II.23.c of the contract.
If you are a contractor using a full cost model (FC/FCF), indicate receipts covered by Article II.23 of the contract.

	Type of Activity													
	Research and Technological Development / Innovation (A)		Demonstration (B)		Management of the Consortium (C)		Other Specific Activities: Coordination / Networking (D)		Other Specific Activities: Transnational Access / Connectivity (E)		Other Specific Activities (E)		Total (G) = (A)+(B)+(C)+ (D)+(E)+(F)	
	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)	Contractor	Third Party(ies)
Total receipts														

4- Declaration of interest generated by the pre-financing (in €)	
To be completed only by the coordinator.	
Did the pre-financing (advance) you received by the Commission for this period earn interest? (Yes / No)	
If yes, please indicate the amount (in €)	

5- Request of FP6 Financial Contribution (in €)	
For this period, the FP6 Community financial contribution resuested is equal to (amount in €)	5618,38

6- Audit certificates			
According to the contract, does this Financial Statement need an audit certificate (or several in case of Third party(ies)) delivered by independent auditor(s)? (Yes / No)			No
If Yes, does this(those) audit certificate(s) cover only this Financial Statement per Activity? (Yes / No)			
If No, what are the periods covered by this(those) audit certificate(s) ?	From - to		
What is the total cost of this(those) audit certificate(s) (in €) per independent auditor(s) ?			

Audit certificate of the contractor (X)			
Legal name of the audit firm		**Cost of the certificate**	
Audit certificate(s) of the third party(ies) (Ys) ***(if necessary)***			
Y1 : Legal name of the audit firm		**Cost of the certificate**	
Y2 : Legal name of the audit firm		**Cost of the certificate**	
Y3 : Legal name of the audit firm		**Cost of the certificate**	
Y4 : Legal name of the audit firm		**Cost of the certificate**	
If necessary add another Form C.		**Total (Z) = (X) + (Ys)**	

Reminders:
The cost of an audit certificate is included in the costs declared under the activity "Management of the Consortium". The required audit certificate (s) is (are) attached to this Financial Statement

7- Conversion rates ***Exchange Rate used: 0.708800 Sterling to EURO***

Costs incurred in currencies other than EURO shall be reported in EURO.

Please mention the conversion rate used (only one choice is possible) – Please note that the same principle applies for receipts.

Contractor	
- Conversion rate of the date of incurred actual costs? (YES / NO)	**No**
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	**YES**
Third Party(ies) ***(if necessary)***	
Third Party 1 (Y1)	
- Conversion rate of the date of incurred actual costs? (YES / NO)	
- Conversion rate of the first day of the first month following the period covered by this Financial Statement? (YES/NO)	

If necessary add another Form C.

8- Contractor's Certificate

We certify that:

- the costs declared above are directly related to the resources used to reach the objectives of the project ;
- the receipts declared above are directly related to the resources used to reach the objectives of the project ;
- the costs declared above fall within the definition of eligible costs specified in Articles II.19, II.20, II.21, II.22 and II.25 of the contract, and, if relevant, in Annex III and Article 9 (special clauses) of the contract ;
- the receipts declared above fall within the definition of receipts specified in Article II.23 of the contract ;
- the interest generated by the pre-financing declared above falls within the definition of Article II.27 of the contract ;
- the necessary adjustments, especially to costs reported in previous Financial Statement(s) per Activity, have been incorporated in the above Statement ;
- the above information declared is complete and true ;
- there is full supporting documentation to justify the information hereby declared. It will be made available at the request of the Commission and in the event of an audit by the Commission and/or by the Court of Auditors and/or their authorised representatives.

Contractor's Stamp	**Name of the Person responsible for the work**	**Name of the duly authorised Financial Officer**
	Prof Roger Barlow	Mrs Jane A Foulkes
	Date	**Date**
	2nd February 2005	26th January 2005
	Signature	**Signature**

3. Summary financial report

Summary financial report (Appendix 3)

Type of Instrument	I3	Project Title (or Acronym)	CARE	Contract N°	RII3-CT-2003-506395
Reporting period number	1	From (dd/mm/yyyy)	01/01/2004	To (dd/mm/yyyy)	31/12/2004	Page	1/1

Contractor n°	Organisation Short Name	Cost model(s) used		Eligible costs (in €)	Type of activities																		Total eligible costs (G)=(A)+(B)+(C)+(D)+(E)+(F)			Receipts		
		For Transnational Access	For any other activities		Research and Technological Development / Innovation (A)			Demonstration (B)			Management of the consortium (C)			Other Specific Activities: Coordination (D)			Other Specific Activities: Transnational Access (E)			Other Specific Activities (F)								
					Contractor	AC Third party(ies)	FC/FCF Third party(ies)	Contractor	AC Third party(ies)	FC/FCF Third party(ies)	Contractor	AC Third party(ies)	FC/FCF Third party(ies)	Contractor	AC Third party(ies)	FC/FCF Third party(ies)	Contractor	AC Third party(ies)	UF Third party(ies)	Contractor	AC Third party(ies)	FC/FCF Third party(ies)	Contractor	AC Third party(ies)	FC/FCF Third party(ies)	Contractor	AC Third party(ies)	FC/FCF Third party(ies)
1	CEA		FC	Direct eligible costs	691 527,62						215 730,38			14 349,22									921 607,22	0,00	0,00			
				of which direct eligible costs of subcontracting																			*0,00*	*0,00*	*0,00*			
				Indirect eligible costs	387 121,15						152 469,28			0,00									539 590,43	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*1 078 648,77*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*368 199,66*	*0,00*	*0,00*	*14 349,22*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	1 461 197,65	0,00	0,00			
2	UCLN		AC	Direct eligible costs										584,00									584,00	0,00	0,00			
				of which direct eligible costs of subcontracting																			*0,00*	*0,00*	*0,00*			
				Indirect eligible costs										117,00									117,00	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*701,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	701,00	0,00	0,00			
3	CNRS		FCF	Direct eligible costs	898067									4 327,00									902 394,00	0,00	0,00			
				of which direct eligible costs of subcontracting																			*0,00*	*0,00*	*0,00*			
				Indirect eligible costs	179613									865,00									180 478,00	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*1 077 680,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*5 192,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	1 082 872,00	0,00	0,00			
4	GSI		FC	Direct eligible costs	140 740,00									4 176,00									144 916,00	0,00	0,00			
				of which direct eligible costs of subcontracting																			*0,00*	*0,00*	*0,00*			
				Indirect eligible costs	52 449,00																		52 449,00	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*193 189,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*4 176,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	197 365,00	0,00	0,00			
5	IAP-FU		AC	Direct eligible costs	64 865,00																		64 865,00	0,00	0,00			
				of which direct eligible costs of subcontracting																			*0,00*	*0,00*	*0,00*			
				Indirect eligible costs	12 973,00																		12 973,00	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*77 838,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	77 838,00	0,00	0,00			
6	DESY		AC	Direct eligible costs	211 550,00									22 541,56									234 091,56	0,00	0,00			
				of which direct eligible costs of subcontracting	*27 650,00*																		*27 650,00*	*0,00*	*0,00*			
				Indirect eligible costs	36 780,00									4 508,31									41 288,31	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*248 330,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*27 049,87*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	275 379,87	0,00	0,00			
7	FZJ		FC	Direct eligible costs	238 318,96									5 220,18									243 539,14	0,00	0,00			
				of which direct eligible costs of subcontracting																			*0,00*	*0,00*	*0,00*			
				Indirect eligible costs	171 145,59																		171 145,59	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*409 464,55*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*5 220,18*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	414 684,73	0,00	0,00			
8	TUM		AC	Direct eligible costs										743									743,00	0,00	0,00			
				of which direct eligible costs of subcontracting																			*0,00*	*0,00*	*0,00*			
				Indirect eligible costs										149									149,00	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*892,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	892,00	0,00	0,00			

9	FZR		AC	Direct eligible costs	83 268,95									1 975,64									85 244,59	0,00	0,00			
				of which direct eligible costs of subcontracting																			*0,00*	*0,00*	*0,00*			
				Indirect eligible costs	16 653,79									395,13									17 048,92	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*99 922,74*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*2 370,77*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	102 293,51	0,00	0,00			
10	INFN		AC	Direct eligible costs	209 651,00									3 864,00									213 515,00	0,00	0,00			
				of which direct eligible costs of subcontracting																			*0,00*	*0,00*	*0,00*			
				Indirect eligible costs	41 930,00									773,00									42 703,00	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*251 581,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*4 637,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	256 218,00	0,00	0,00			
11	TEU		FC	Direct eligible costs	35717																		35 717,00	0,00	0,00			
				of which direct eligible costs of subcontracting																			*0,00*	*0,00*	*0,00*			
				Indirect eligible costs	26970																		26 970,00	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*62 687,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	62 687,00	0,00	0,00			
12	TUL		AC	Direct eligible costs	29 739									1 855									31 594,00	0,00	0,00			
				of which direct eligible costs of subcontracting																			*0,00*	*0,00*	*0,00*			
				Indirect eligible costs	5 948									371									6 319,00	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*35 687,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*2 226,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	37 913,00	0,00	0,00			
13	IPJ		AC	Direct eligible costs	73202									7162									80 364,00	0,00	0,00			
				of which direct eligible costs of subcontracting																			*0,00*	*0,00*	*0,00*			
				Indirect eligible costs	14640									1432									16 072,00	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*87 842,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*8 594,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	96 436,00	0,00	0,00			
14	WUT_ISE		AC	Direct eligible costs	116 967,74						1 150,50												118 118,24	0,00	0,00			
				of which direct eligible costs of subcontracting	0,00						*1 150,50*												*1 150,50*	*0,00*	*0,00*			
				Indirect eligible costs	23 393,55						0,00												23 393,55	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*140 361,29*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1 150,50*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	141 511,79	0,00	0,00			
15	WUT		AC	Direct eligible costs	30 376,32																		30 376,32	0,00	0,00			
				of which direct eligible costs of subcontracting	26242,21																		*26 242,21*	*0,00*	*0,00*			
				Indirect eligible costs	826,82																		826,82	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*31 203,14*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	31 203,14	0,00	0,00			
16	CSIC		FC	Direct eligible costs										10577,88									10 577,88	0,00	0,00			
				of which direct eligible costs of subcontracting																			*0,00*	*0,00*	*0,00*			
				Indirect eligible costs																			0,00	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*10 577,88*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	10 577,88	0,00	0,00			
17	CERN		AC	Direct eligible costs	473556									39008,61									512 564,83	0,00	0,00			
				of which direct eligible costs of subcontracting	89286,88									0									*89 286,88*	*0,00*	*0,00*			
				Indirect eligible costs	76853,87									7801,72									84 655,59	0,00	0,00			
				Adjustment on previous period(s)	0									0									0,00	0,00	0,00			
				Total eligible costs	*550 410,09*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*46 810,33*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	597 220,42	0,00	0,00			

18	UNIGE		AC	Direct eligible costs										3153,00									3 153,00	0,00	0,00			
				of which direct eligible costs of subcontracting																			*0,00*	*0,00*	*0,00*			
				Indirect eligible costs										579,00									579,00	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*3 732,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	3 732,00	0,00	0,00			
19	PSI		FC	Direct eligible costs	39823									1 561									41 384,00	0,00	0,00			
				of which direct eligible costs of subcontracting																			*0,00*	*0,00*	*0,00*			
				Indirect eligible costs	9956																		9 956,00	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*49 779,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1 561,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	51 340,00	0,00	0,00			
20	CCLRC		FC	Direct eligible costs	211 011,12						1 000,00			6 173,38									218 184,50	0,00	0,00			
				of which direct eligible costs of subcontracting																			*0,00*	*0,00*	*0,00*			
				Indirect eligible costs	225 766,98																		225 766,98	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*436 778,10*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1 000,00*	*0,00*	*0,00*	*6 173,38*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	443 951,48	0,00	0,00			
21	ICL		AC	Direct eligible costs							456,31			2 687,06									3 143,37	0,00	0,00			
				of which direct eligible costs of subcontracting																			*0,00*	*0,00*	*0,00*			
				Indirect eligible costs										537,41									537,41	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*456,31*	*0,00*	*0,00*	*3 224,47*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	3 680,78	0,00	0,00			
22	UMA		AC	Direct eligible costs										4681,98									4 681,98	0,00	0,00			
				of which direct eligible costs of subcontracting																			*0,00*	*0,00*	*0,00*			
				Indirect eligible costs										936,40									936,40	0,00	0,00			
				Adjustment on previous period(s)																			0,00	0,00	0,00			
				Total eligible costs	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*5 618,38*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	5 618,38	0,00	0,00			
Total eligible costs					4 831 401,68	0,00	0,00	0,00	0,00	0,00	370 806,47	0,00	0,00	153 105,48	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	5 355 313,63	0,00	0,00	0,00	0,00	0,00
							4 831 401,68			0,00			370 806,47			153 105,48			0,00			0,00			5 355 313,63			0,00
Requested EC contribution for the reporting period (in €) without taking into account receipts							0,00			0,00			0,00			0,00			0,00			0,00			3 498 142,20			
Requested EC contribution for the reporting period (in €) taking into account receipts [=Periodic Invoice]																										3 498 142,20			
Amount of the financial interests generated by the prefinancing																													

C. REPORT ON THE DISTRIBUTION OF THE COMMUNITY FINANCIAL CONTRIBUTION

Report on the distribution between contractors made during the reporting period of the Community financial contribution

Report on the Distribution of the Community's contribution

Type of Instrument	I3	Project Title (or Acronym)	CARE	Contract N°	RII3-CT-2003-506395

Part I — Community's prefinancing (or payment) sent to the coordinator *(1)*

	Reporting Period 1 *(2)*		Reporting Period 2 *(2)*		Reporting Period 3 *(2)*		Reporting Period 4 *(2)*		Reporting Period 5 *(2)*		Reporting Period 6 *(2)*		Reporting Period 7 *(2)*		Final payment		Total Amount (I) *(3)*
	From	To	From	To	From	To	From	To	From	To	From	To	From	To			
	EC	CEA															
	Date	Amount (A)	Date	Amount (B)	Date	Amount (C)	Date	Amount (D)	Date	Amount (E)	Date	Amount (F)	Date	Amount (G)	Date	Amount (H)	
Total (X)	15/03/2004	5 235 000,00															5 235 000,00

Part II			Distribution of the Community's prefinancing (or payment) between contractors according to the consortium decision(s) (4)																
			Reporting Period 1		Reporting Period 2		Reporting Period 3		Reporting Period 4		Reporting Period 5		Reporting Period 6		Reporting Period 7		Final payment		Total Amount (I') (6)
Contractor n°	Organisation Short Name	Country Code	Date(s) (5)	Amount(s) (A') (5)	Date(s) (5)	Amount(s) (B') (5)	Date(s) (5)	Amount(s) (C') (5)	Date(s) (5)	Amount(s) (D') (5)	Date(s) (5)	Amount(s) (E') (5)	Date(s) (5)	Amount(s) (F') (5)	Date(s) (5)	Amount(s) (G') (5)	Date(s) (5)	Amount(s) (H') (5)	
1	CEA	F	9/04/2004	653 490,00 €															653 490,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	653 490,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	653 490,00 €
2	UCLN	B	19/04/02004	1 425,00 €															1 425,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	1 425,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	1 425,00 €
3	CNRS	F	30/04/2004	831 242,00 €															831 242,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	831 242,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	831 242,00 €
4	GSI	D	19/04/2004	133 554,00 €															133 554,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	133 554,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	133 554,00 €
5	IAP-FU	D	3/05/2004	108 732,00 €															108 732,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	108 732,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	108 732,00 €
6	DESY	D	19/04/2004	638 912,00 €															638 912,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	638 912,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	638 912,00 €
7	FZJ	D	22/04/2004	124 405,00 €															124 405,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	124 405,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	124 405,00 €
8	TUM	D	30/04/2004	2 325,00 €															2 325,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	2 325,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	2 325,00 €
9	FZR-ELBE	D	19/04/2004	147 726,00 €															147 726,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	147 726,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	147 726,00 €
10	INFN	I	19/04/2004	780 160,00 €															780 160,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	780 160,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	780 160,00 €

Part II — **Distribution of the Community's prefinancing (or payment) between contractors according to the consortium decision(s)** *(4)*

Contractor n°	Organisation Short Name	Country Code	Reporting Period 1		Reporting Period 2		Reporting Period 3		Reporting Period 4		Reporting Period 5		Reporting Period 6		Reporting Period 7		Final payment		Total Amount (I') *(6)*
			Date(s) *(5)*	Amount(s) (A') *(5)*	Date(s) *(5)*	Amount(s) (B') *(5)*	Date(s) *(5)*	Amount(s) (C') *(5)*	Date(s) *(5)*	Amount(s) (D') *(5)*	Date(s) *(5)*	Amount(s) (E') *(5)*	Date(s) *(5)*	Amount(s) (F') *(5)*	Date(s) *(5)*	Amount(s) (G') *(5)*	Date(s) *(5)*	Amount(s) (H') *(5)*	
11	TEU	PL	19/04/2004	111 545,00 €															111 545,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	111 545,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	111 545,00 €
12	TUL Lodz	PL	20/04/2004	100 904,00 €															100 904,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	100 904,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	100 904,00 €
13	IPJ	PL	20/04/2004	93 885,00 €															93 885,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	93 885,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	93 885,00 €
14	PW (WUT-ISE)	PL	20/04/2004	146 526,00 €															146 526,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	146 526,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	146 526,00 €
15	WUT	PL	20/04/2004	40 119,00 €															40 119,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	40 119,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	40 119,00 €
16	CSIC	SP	30/04/2004	11 473,00 €															11 473,00 €
																			0,00 €
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			Total	11 473,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	11 473,00 €
17	CERN	CH	19/04/2004	1 069 328,00 €															1 069 328,00 €
																			0,00 €
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																			0,00 €
			Total	1 069 328,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	1 069 328,00 €
18	UNI-GE	CH		0,00															0,00 €
																			0,00 €
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			Total	0,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	0,00 €
19	PSI	CH		0,00															0,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	0,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	0,00 €
20	CCLRC	GB	20/04/2004	209 029,00 €															209 029,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	209 029,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	209 029,00 €
21	ICL	GB	30/04/2004	20 472,00 €															20 472,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	20 472,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	20 472,00 €
22	UMA	GB	20/04/2004	9 748,00 €															9 748,00 €
																			0,00 €
																			0,00 €
																			0,00 €
			Total	9 748,00 €	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	Total	0,00	9 748,00 €

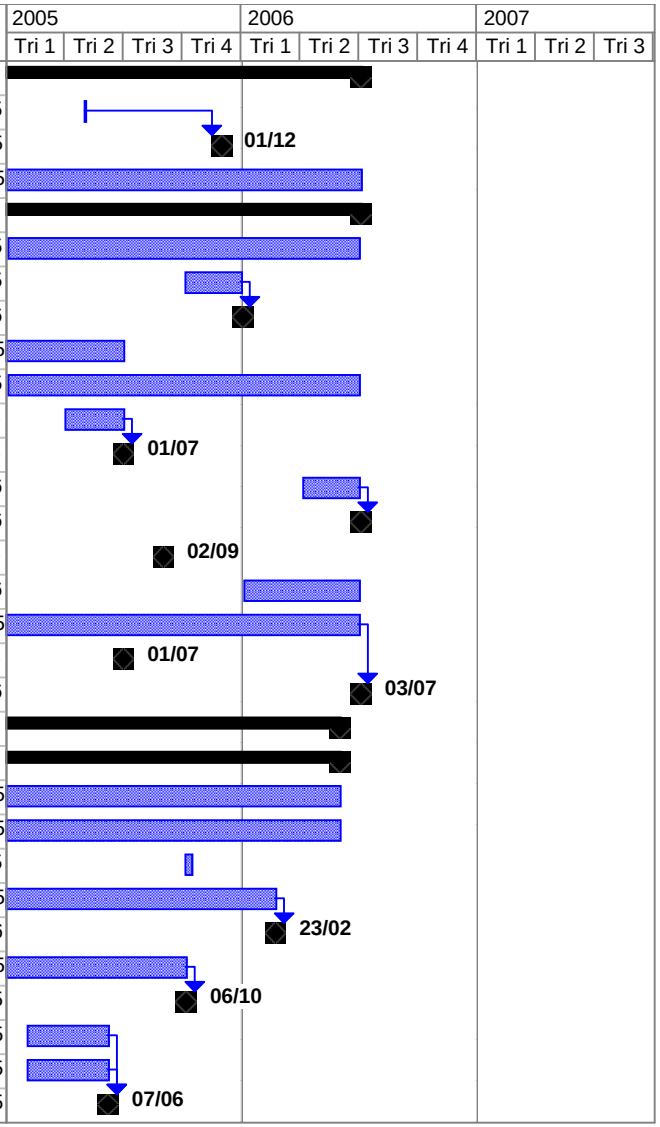
D. DETAILED IMPLEMENTATION PLAN FOR THE NEXT 18 MONTHS

The following Gantt charts present the updated detailed implementation plan for the next 18 months for the three CARE networking activities and the four CARE joint research activities. They are supplemented by tables providing the corresponding financial information.

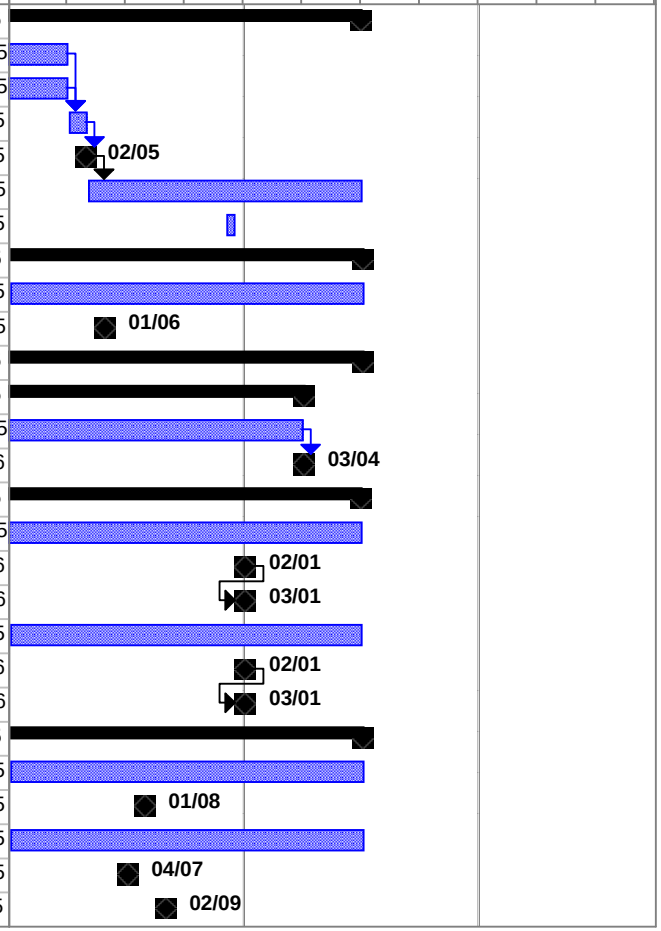
NETWORKING ACTIVITIES (other than Management)

N1 Electron Linear Accelerator Network (ELAN)

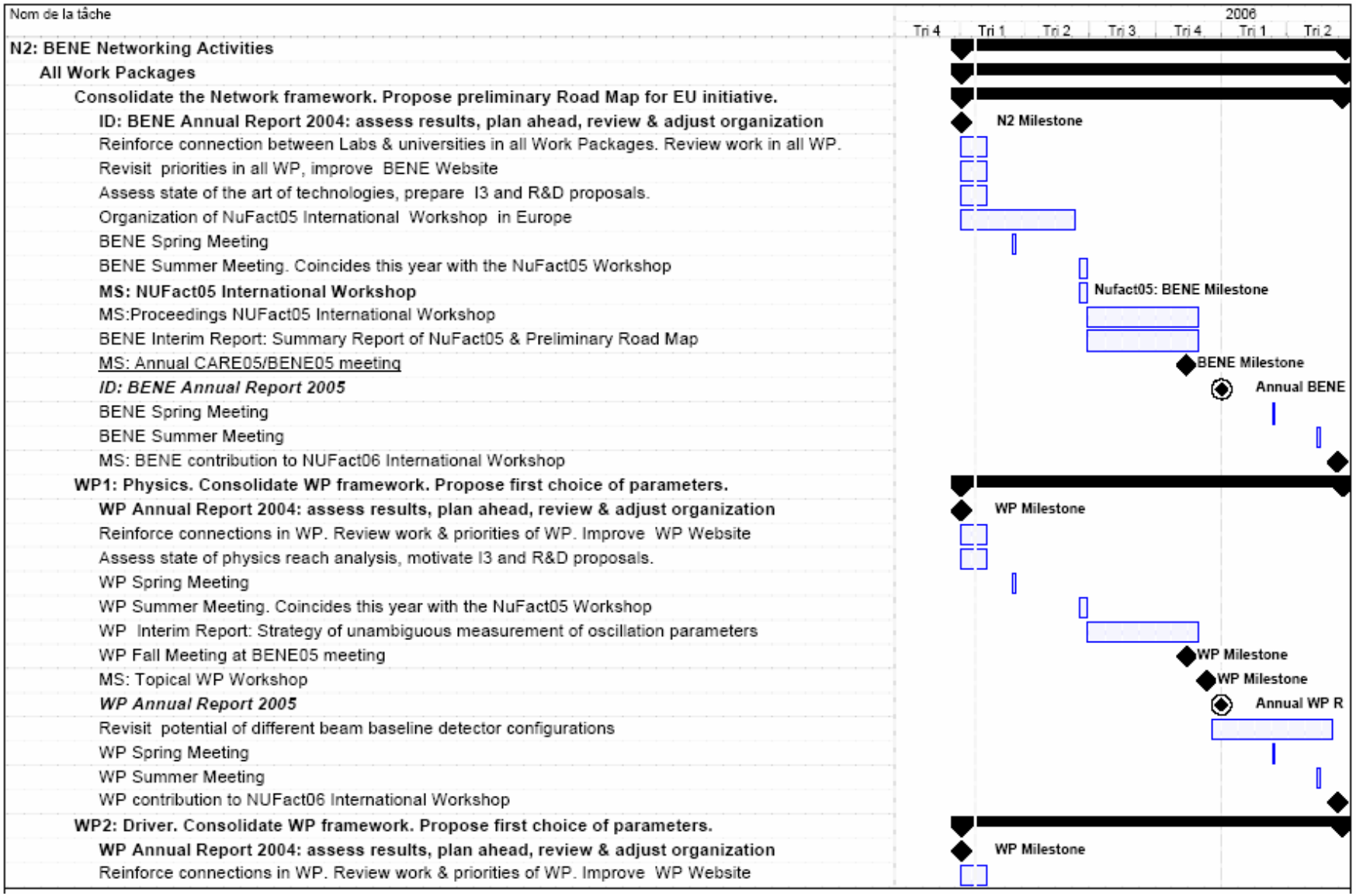
Nº	Task Name	Début
1	**Review of network activity**	**Sam 01/01/05**
2	Annual Meeting	Lun 02/05/05
3	Annual Report	Jeu 01/12/05
4	Coordination with EUROTeV	Sam 01/01/05
5	**WP 1**	**Sam 01/01/05**
6	Progress on CTF3	Lun 03/01/05
7	CTF3 Review	Lun 03/10/05
8	CTF Proceedings	Lun 02/01/06
9	Review of benchmarks and workplan	Sam 01/01/05
10	Progress on LTECNC topics, incl. topics common with other WP	Lun 03/01/05
11	Workshop on topical activity status	Ven 01/04/05
12	Workshop report	Ven 01/07/05
13	Workshop on topical activity status	Lun 03/04/06
14	Workshop report	Lun 03/07/06
15	Complementing data base and documentation	Ven 02/09/05
16	Review of structure prototype results	Lun 02/01/06
17	Review on sources including outcome of PHIN	Sam 01/01/05
18	Report on status of sources	Ven 01/07/05
19	Report on status of sources	Lun 03/07/06
20	**WP 2**	**Sam 01/01/05**
21	**ILC Technology Development**	**Sam 01/01/05**
22	Monitor ILC preparation	Sam 01/01/05
23	Coordinate Work together with EUROTeV	Sam 01/01/05
24	Courses on SC technology at CERN Accelerator School	Lun 03/10/05
25	Build Database for SRF	Sam 01/01/05
26	MS: Database	Jeu 23/02/06
27	Develop cavity reliability roadmap	Sam 01/01/05
28	MS: Workshop (TESLA Meeting II)	Jeu 06/10/05
29	Evaluation of quality control	Mar 01/02/05
30	Evaluation of cleaning methods	Mar 01/02/05
31	MS: Workshop (TESLA Meeting I)	Mar 07/06/05

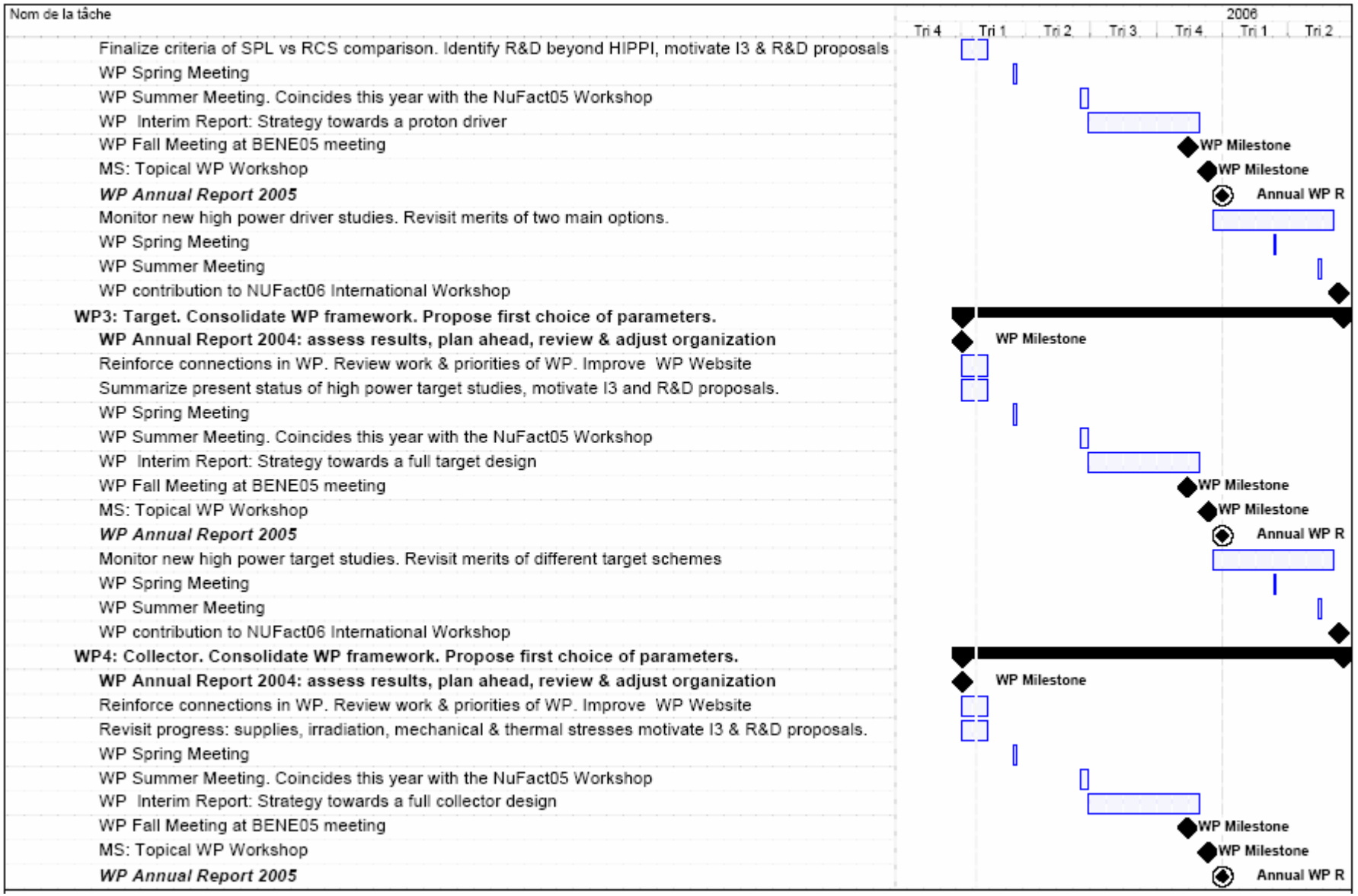


Nº	Task Name	Début
32	**WP 3**	**Sam 01/01/05**
33	Identification of code extensions	Sam 01/01/05
34	Definition of interfaces	Sam 01/01/05
35	Workshop on Emittance preservation	Lun 04/04/05
36	ID: Report	Lun 02/05/05
37	Interations on code extensions/interfaces	Mar 03/05/05
38	EUROTeV / ELAN Workshop	Lun 05/12/05
39	**WP 4**	**Lun 03/01/05**
40	Coordinate R&D	Lun 03/01/05
41	Create WWW site	Mer 01/06/05
42	**WP 5**	**Sam 01/01/05**
43	**Monitor and coordinate strudies on short pulse injectors**	**Sam 01/01/05**
44	Compare status of all-optical and RF injectors in view of recent progress	Sam 01/01/05
45	ID: Report	Lun 03/04/06
46	**Extended plasma wave excitation**	**Sam 01/01/05**
47	Evaluate existing laser guiding techniques	Sam 01/01/05
48	MS: Database	Lun 02/01/06
49	ID: Document	Mar 03/01/06
50	Identify optical diagnostics	Lun 03/01/05
51	MS: Database	Lun 02/01/06
52	ID: Document	Mar 03/01/06
53	**Electron beam focusing and transport**	**Lun 03/01/05**
54	Identify main issues	Lun 03/01/05
55	MS: Workshop	Lun 01/08/05
56	Coordinate European Proposals	Lun 03/01/05
57	Meeting	Lun 04/07/05
58	RTN proposal	Ven 02/09/05

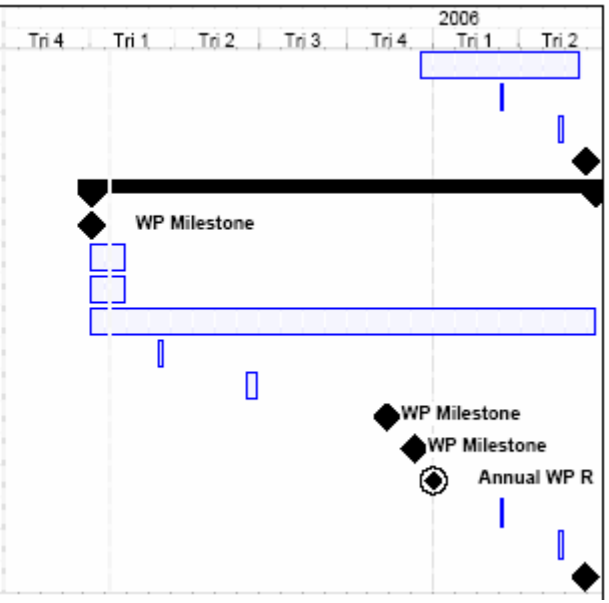


N2 Beam for European Neutrino Physics (BENE)



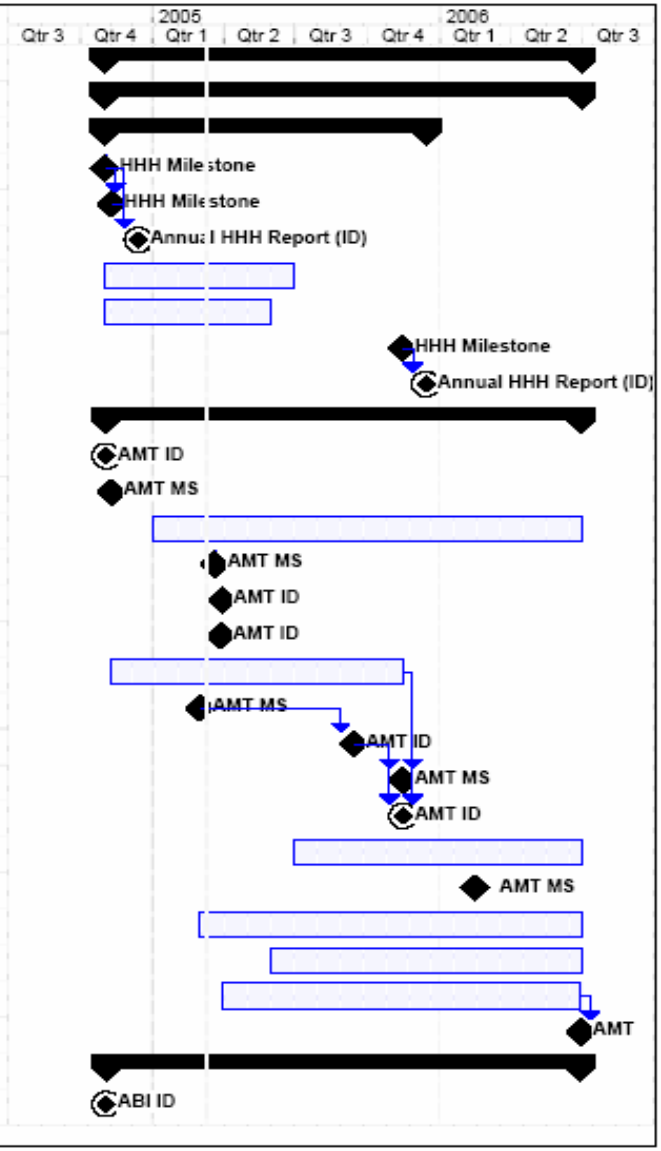

Nom de la tâche
2006
Tri 4
Tri 1
Tri 2
Tri 3
Tri 4
Tri 1
Tri 2
Finalize criteria of SPL vs RCS comparison. Identify R&D beyond HIPPI, motivate I3 & R&D proposals
WP Spring Meeting
WP Summer Meeting. Coincides this year with the NuFact05 Workshop
WP Interim Report: Strategy towards a proton driver
WP Fall Meeting at BENE05 meeting
MS: Topical WP Workshop
WP Annual Report 2005
Monitor new high power driver studies. Revisit merits of two main options.
WP Spring Meeting
WP Summer Meeting
WP contribution to NUFact06 International Workshop
WP3: Target. Consolidate WP framework. Propose first choice of parameters.
WP Annual Report 2004: assess results, plan ahead, review & adjust organization
Reinforce connections in WP. Review work & priorities of WP. Improve WP Website
Summarize present status of high power target studies, motivate I3 and R&D proposals.
WP Spring Meeting
WP Summer Meeting. Coincides this year with the NuFact05 Workshop
WP Interim Report: Strategy towards a full target design
WP Fall Meeting at BENE05 meeting
MS: Topical WP Workshop
WP Annual Report 2005
Monitor new high power target studies. Revisit merits of different target schemes
WP Spring Meeting
WP Summer Meeting
WP contribution to NUFact06 International Workshop
WP4: Collector. Consolidate WP framework. Propose first choice of parameters.
WP Annual Report 2004: assess results, plan ahead, review & adjust organization
Reinforce connections in WP. Review work & priorities of WP. Improve WP Website
Revisit progress: supplies, irradiation, mechanical & thermal stresses motivate I3 & R&D proposals.
WP Spring Meeting
WP Summer Meeting. Coincides this year with the NuFact05 Workshop
WP Interim Report: Strategy towards a full collector design
WP Fall Meeting at BENE05 meeting
MS: Topical WP Workshop
WP Annual Report 2005
WP Milestone
WP Milestone
Annual WP R
WP Milestone
WP Milestone
Annual WP R
WP Milestone
WP Milestone
Annual WP R

Nom de la tâche
Monitor new high power collector studies. Revisit merits of different collector schemes
WP Spring Meeting
WP Summer Meeting
WP contribution to NUFact06 International Workshop
WP5: Novel Neutrino Beams. Consolidate WP framework. Propose first choice of parameters.
WP Annual Report 2004: assess results, plan ahead, review & adjust organization
Reinforce connections in WP. Review work & priorities of WP. Improve the 3 WP sub Websites
Review of existing designs for NuFact and Betabeams, motivate I3 and R&D proposals.
Verify & Reinforce dissemination mechanisms
WP Spring Meeting
WP Summer Meeting. Coincides this year with the NuFact05 Workshop
WP Fall Meeting at BENE05 meeting
MS: Topical WP Workshop
WP Annual Report 2005
WP Spring Meeting
WP Summer Meeting
WP contribution to NUFact06 International Workshop

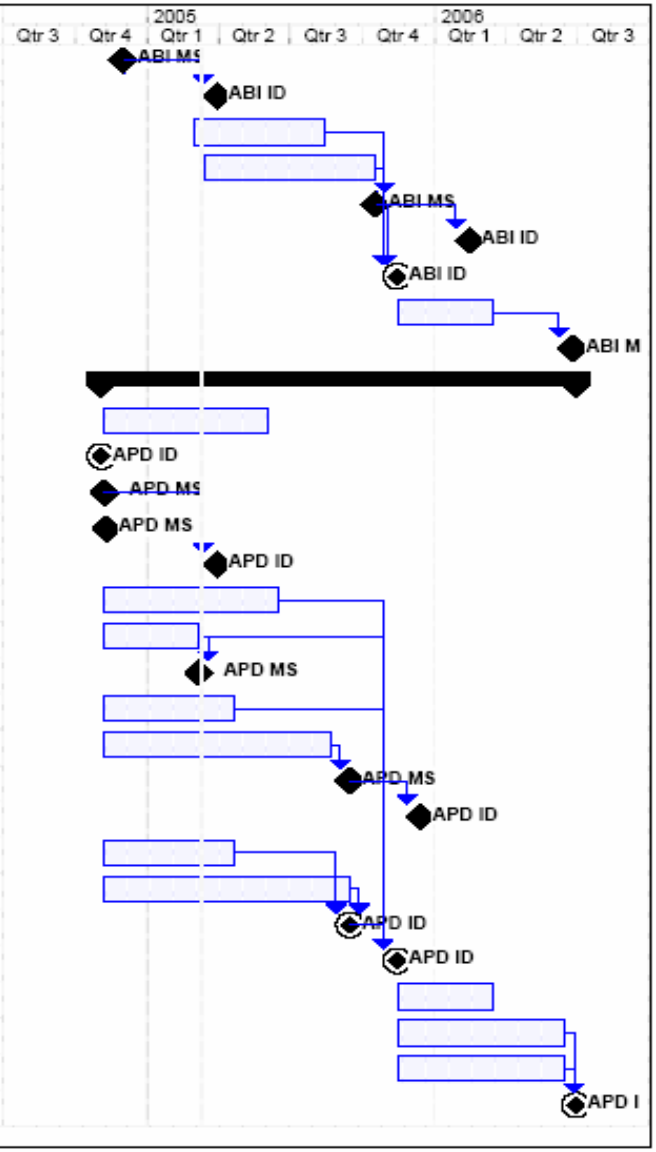


N3 High Energy High Intensity Hadron Beams (HHH)

ID	Task Name
1	**N3: HHH Networking Activities**
2	**All Work Packages**
3	**Establish the Network framework**
4	MS: Joint HHH/NED meeting at CARE04
5	General HHH meeting at CERN including non-EU partners
6	ID: HHH Annual Report
7	Reinforce connections between Labs and Universities in all WP
8	Revisit priorities for all WP, improve HHH web site
9	MS: Annual HHH meeting
10	ID: HHH Annual Report
11	**WP1 Accelerator Magnet Technology (AMT)**
12	ID: Interim report on AMT activities and reporting at the general CARE meeting
13	MS: General AMT meeting
14	Coordinate conductor development and tests
15	MS: AMT topical meeting on Insulation and Impregnation Techniques
16	ID: Proceedings of the 1st AMT topical workshop on Accelerator Magnet Superconductors
17	ID: Report on AMT organization and conductor development roadmap
18	Codes and models for design, stability and protection studies for AMT1 and AMT4
19	MS: AMT mini-workshop on Beam Generated Heat and Magnet Quench Level
20	ID: Proceedings of AMT mini-workshop on Beam Generated Heat and Magnet Quench Level
21	MS: establish a catolog of existing codes for design, stability and protection studies
22	ID: Interim report on AMT activities and reporting at the general CARE meeting
23	Catalog and comparison of different IR options (AMT4)
24	MS: AMT workshop on Contact Tooling
25	Studies of fast pulsed SC magnets for Super-SPS
26	Comparative studies of alternatives using low field magnets for AMT2 and AMT3
27	Determination of scaling law for magnet and cryogenic cost for AMT5
28	MS: Preliminary report on scaling law for magnet and cryogenic cost (roadmap)
29	**WP2 Accelerator Beam Instrumentation (ABI)**
30	ID: Interim report on ABI activities and reporting at the general CARE meeting

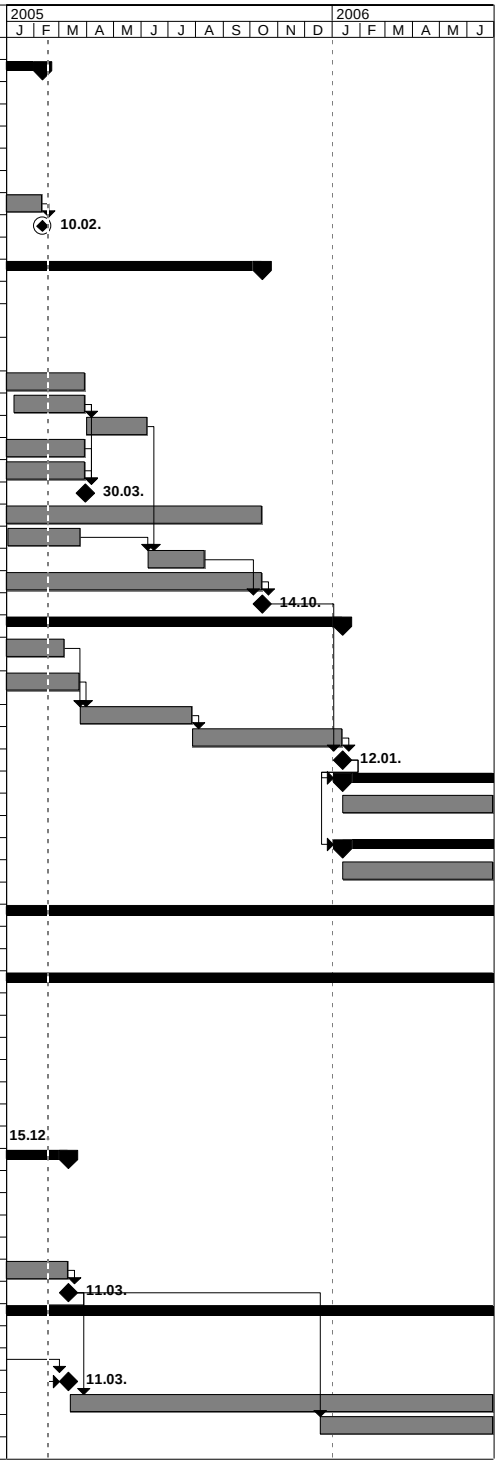


ID	Task Name
31	MS: 2nd ABI topical workshop on Beam Intensity and Lifetime measurements
32	ID: Proceedings of the 2004 ABI topical workshops
33	Contribution to US-LARP activities/events and possible synergy with HHH WP1-WP3
34	Study of tune control after identification of its limiting issues
35	MS: 3rd ABI topical workshop on Tune Control
36	ID: Proceedings of the 3rd ABI topical workshop
37	ID: Interim report on ABI activities and reporting at the general CARE meeting
38	Definition of possible new milestones
39	MS: 4th ABI topical workshop
40	**WP3 Accelerator Physics and Synchrotron Design (APD)**
41	Further development of the APD Web Site with structured information flow
42	ID: Interim report on APD activities and reporting at the general CARE meeting
43	MS: 1st APD topical workshop on Fast Synchrotrons and IR design HHH-2004
44	MS: General APD meeting
45	ID: Proceedings of the 1st APD topical workshop
46	Systematic comparison of alternative synchrotron and IR designs
47	Determination of beam dynamics studies and experiments to validate different options (APD1
48	APD mini-workshop on Crystal Collimation
49	Studies relevant for APD3, APD4 and APD5, contribution to US-LARP events
50	Identification of beam intensity limitations and determination of roadmap for Synchrotron and
51	MS: 2nd APD topical workshop on Fast Synchrotrons and IR design
52	ID: Proceedings of the 2nd APD topical workshop
53	Establish a structured catolog of existing simulation codes for APD1-APD7
54	Collect and document benchmarked codes
55	Creation of a first web based code repository
56	ID: Interim report on APD activities and reporting at the general CARE meeting
57	Definition of possible new milestones
58	Definition of optics design options for IR layout and booster synchrotrons
59	Assessment of impedance budget for booster synchrotrons
60	First structured list of intensity limits for booster synchrotrons and LHC

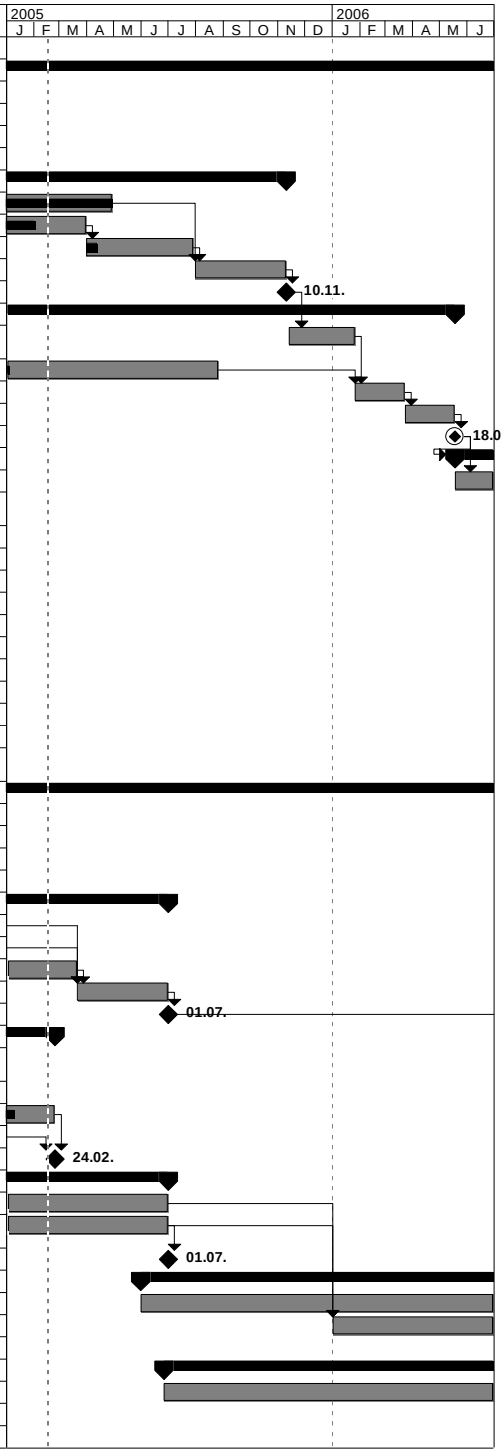


JOINT RESEARCH ACTIVITIES
JRA1: Superconducting Radio Frequency (SRF)

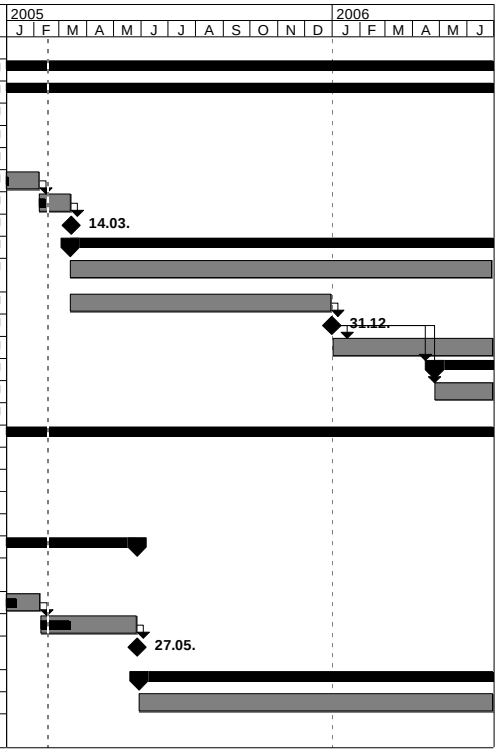
N°	Task Name	Milestones	Main Deliverables	Contractor
2	**WP 2 IMPROVED STANDARD CAVITY FABRICATION**			
2.1	**Reliability Analysis**			**DESY**
2.1.1	Review of data bank: cavity fabrication			**DESY**
2.1.2	Review of data bank :cavity treatment			**DESY**
2.1.3	Review of data bank: cavity VT performance			**DESY**
2.1.4	Review of data bank: string assembly			**DESY**
2.1.5	Review of data bank: string performance			**DESY**
2.1.6	Establish correlations			**DESY**
2.1.7	**Final report on reliability issue**		**Final Report**	**DESY**
2.2	**Improved component design**			**INFN-Mi**
2.2.1	**Documentation retrieving**			**INFN-Mi**
2.2.1.1	Start up meetings			**INFN-Mi**
2.2.1.2	Access and study of Jlab, DESY, LLAN, KEK experience			**INFN-Mi**
2.2.1.3	**Summary report on the status of the ar on ancillaries**	**Summary Report**		**INFN-Mi**
2.2.1.4	Sealing material and shape design			**INFN-Mi**
2.2.1.5	Flange preliminary design			**INFN-Mi**
2.2.1.6	Material and geometric compatibility			**INFN-Mi**
2.2.1.7	Final assembly design			**INFN-Mi**
2.2.1.8	End plate preliminary design			**INFN-Mi**
2.2.1.9	**Report about new design for compone**	**Design Report**		**INFN-Mi**
2.2.1.10	Stiffness optimization			**INFN-Mi**
2.2.1.11	Manufacturing procedure analysis			**INFN-Mi**
2.2.1.12	Final assembly design			**INFN-Mi**
2.2.1.13	Other ancillaries design			**INFN-Mi**
2.2.1.14	**Final Report for new components**	**Report**		**INFN-Mi**
2.2.2	**Review of criticality in welding procedures**			**INFN-Mi**
2.2.2.1	Review of available parameters on vendor welding machine			**INFN-Mi**
2.2.2.2	Definition of prototype requirements for tests			**INFN-Mi**
2.2.2.3	Welding test on specimens			**INFN-Mi**
2.2.2.4	Analysis of the results			**INFN-Mi**
2.2.2.5	**Report about welding parameters**	**Report**		**INFN-Mi**
2.2.3	**Finalize new component design**			**INFN-Mi**
2.2.3.1	Do drawings			**INFN-Mi**
2.2.3.2	**New components design finished**	**Design report**		**INFN-Mi**
2.2.4	**Finalize new cavity design**			**INFN-Mi**
2.2.4.1	Make drawings			**INFN-Mi**
2.2.4.2	**New cavity design finished**	**Design report**		**INFN-Mi**
2.2.5	**Fabrication of new cavity**			**INFN-Mi**
2.2.5.1	Fabrication			**INFN-Mi**
2.2.5.2	New cavity finished		**Cavity Prototyp**	**INFN-Mi**
2.3	**EB welding**			**DESY**
2.3.1	**Design tooling**			**DESY**
2.3.1.1	Tools for flange welding			**DESY**
2.3.1.2	Tools for pipe welding			**DESY**
2.3.1.3	Tools for stiffening rings			**DESY**
2.3.1.4	Tools for single cell welding			**DESY**
2.3.1.5	Tools for 9-cells			**DESY**
2.3.1.6	**Tools design finished**	**Design report**		**DESY**
2.3.2	**Tools production**			**DESY**
2.3.2.1	Tools for flange welding			**DESY**
2.3.2.2	Tools for pipe welding			**DESY**
2.3.2.3	Tools for stiffening rings			**DESY**
2.3.2.4	Tools for single cell welding			**DESY**
2.3.2.5	Tools for 9-cells			**DESY**
2.3.2.6	**Tools fabrication finished**	**Tools Ready**		**DESY**
2.3.3	**Welding**			**DESY**
2.3.3.1	Commissioning welding machine			**DESY**
2.3.3.2	Test welding			**DESY**
2.3.3.3	**Start production welding of component**	**Commissioning**		**DESY**
2.3.3.4	Single cell welding			**DESY**
2.3.3.5	Multicell welding			**DESY**
2.3.3.6	**Welding of prototypes of components f**		**Prototypes**	**DESY**



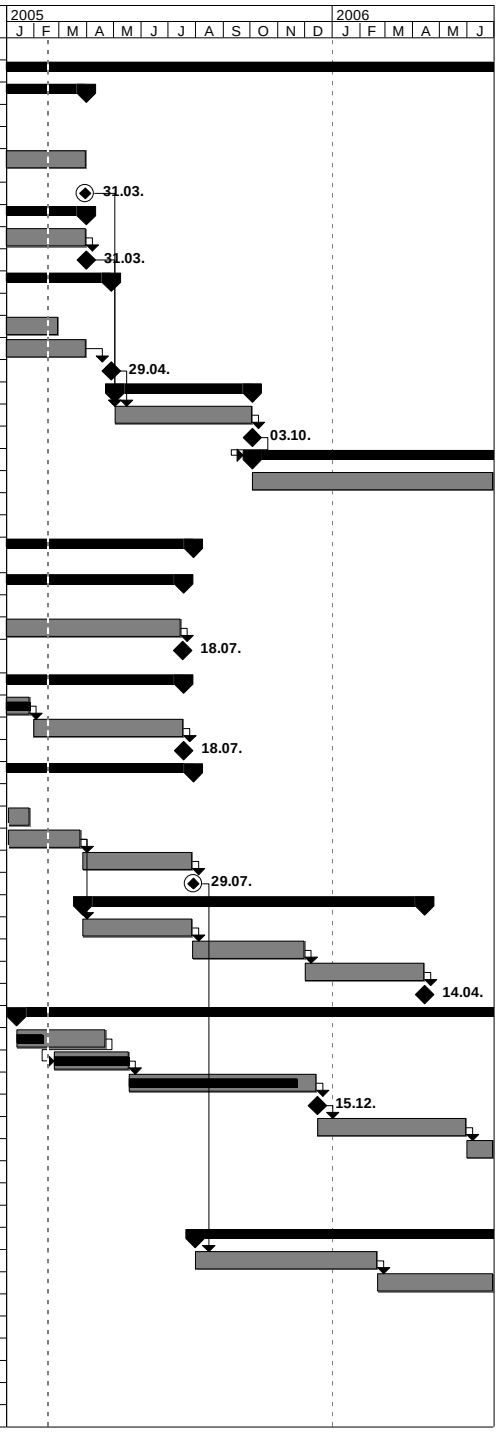
N°	Task Name	Milestones	Main Deliverables	Contractor
3	**WP3 SEAMLESS CAVITY PRODUCTION**			
3.1	**Seamless by spinning**			**INFN-LNL**
3.1.1	**Design spinning machine**			**INFN-LNL**
3.1.1.1	Drawings of the matrices			**INFN-LNL**
3.1.1.2	Drawings of the support system			**INFN-LNL**
3.1.1.3	**Drawings of spinning machine finished**	**Design report**		**INFN-LNL**
3.1.2	**Fabrication of spinning machine**			**INFN-LNL**
3.1.2.1	Fabrication of machine parts			**INFN-LNL**
3.1.2.2	Software for the machine			**INFN-LNL**
3.1.2.3	Assembly of machine			**INFN-LNL**
3.1.2.4	Commissioning of the machine			**INFN-LNL**
3.1.2.5	**Spinning machine ready**	**Commissioning**	**Machine ready**	**INFN-LNL**
3.1.3	**Evaluation of spinning parameters**			**INFN-LNL**
3.1.3.1	Drawings of the support system and turning mechanism			**INFN-LNL**
3.1.3.2	Drawings of the necking mechanism			**INFN-LNL**
3.1.3.3	Fabrication of the tube necking machine			**INFN-LNL**
3.1.3.4	Commissioning of the machine			**INFN-LNL**
3.1.3.5	**Spinning parameters defined**		**Design Report**	**INFN-LNL**
3.1.4	**Spinning of 1-celll cavities**			**INFN-LNL**
3.1.4.1	Material and fabrication of bulk Nb test tubes			**INFN-LNL**
3.1.4.2	Material and fabrication of bimetallic NbCu test tubes			**INFN-LNL**
3.1.4.3	**1-cell spinning parameters defined**		**Design Report**	**INFN-LNL**
3.1.5	**Extension of spinning apparatus to multicel**			**INFN-LNL**
3.1.5.1	Computer simulation of the necking			**INFN-LNL**
3.1.5.2	**Start of Multi-cell spinning**	**Start spinning**		**INFN-LNL**
3.1.6	**Spinning of multi-cell cavities cavities**			**INFN-LNL**
3.1.6.1	Computer simulation of the hydro forming			**INFN-LNL**
3.1.6.2	Hydro forming of bulk Nb 9-cell cavities			**INFN-LNL**
3.1.6.3	**Parameters of multi-cell spinning defin**	**Design report**		**INFN-LNL**
3.1.7	**Series production of multi-cell cavities**			**INFN-LNL**
3.1.7.1	Spinning			**INFN-LNL**
3.1.7.2	**Multi-cell cavities finished**		**Final report, Cavity**	**INFN-LNL**
3.2	**Seamless by hydroforming**			**DESY**
3.2.1	**Design hydro forming machine**			**DESY**
3.2.1.1	Drawings of the matrices			**DESY**
3.2.1.2	Drawings of the support system			**DESY**
3.2.1.3	**Drawings matrix & support finished**	**Design report**		**DESY**
3.2.2	**Construction of hydro forming machine**			**DESY**
3.2.2.1	Hydraulic for machine			**DESY**
3.2.2.2	Software for the machine			**DESY**
3.2.2.3	Machine fabrication			**DESY**
3.2.2.4	Commissioning of the machine			**DESY**
3.2.2.5	**Hydro forming machine ready**	**Commissioning**		**DESY**
3.2.3	**Construction of tube necking machine**			**DESY**
3.2.3.1	Drawings of the support system and turning mechanism			**DESY**
3.2.3.2	Drawings of the necking mechanism			**DESY**
3.2.3.3	Fabrication of the tube necking machine			**DESY**
3.2.3.4	Software for the tube necking machine			**DESY**
3.2.3.5	**Construction tube necking machine fini**	**Design report**		**DESY**
3.2.4	**Development of seamless tubes for 9-cell c**			**DESY**
3.2.4.1	Material and fabrication of bulk Nb test tubes			**DESY**
3.2.4.2	Material and fabrication of bimetallic NbCu test tubes			**DESY**
3.2.4.3	**Seamless tubes ready**	**Design report**		
3.2.5	**Development of tube necking**			**DESY**
3.2.5.1	Computer simulation of the necking			**DESY**
3.2.5.2	Experiments on tube necking at iris			**DESY**
3.2.5.3	**Tube necking machine operational**	**Commissioning**		**DESY**
3.2.6	**Hydro forming of seamless cavities**			**DESY**
3.2.6.1	Computer simulation of the hydro forming			**DESY**
3.2.6.2	Hydro forming of bulk Nb 9-cell cavities			**DESY**
3.2.6.3	**Hydro formed 9-cell cavities ready**		**Cavity Prototyp**	**DESY**



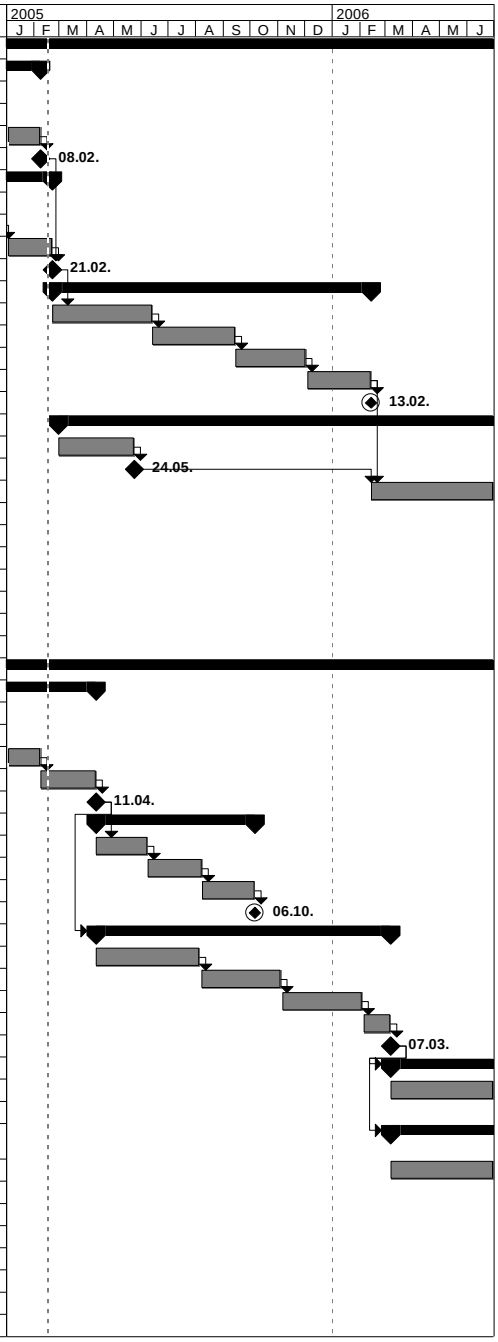
N°	Task Name	Milestones	Main Deliverables	Contractor
4	**WP4 THIN FILM CAVITY PRODUCTION**			
4.1	**Linear-arc cathode coating**			**IPJ**
4.1.1	**Installation & commissioning of coating app**			**IPJ**
4.1.1.1	Modification of a prototype facility for single c			**IPJ**
4.1.1.2	Optimization of a triggering system			**IPJ**
4.1.1.3	**Prototype facility ready**	**Commissioning**		**IPJ**
4.1.1.4	Study of arc current reduction and stabilizatio			**IPJ**
4.1.1.5	Optimization of pow ering system			**IPJ**
4.1.1.6	**Coating apparatus operational**	**Apparatus ready**		**IPJ**
4.1.1.7	**Coating single cells**			**IPJ**
4.1.1.7.1	Coating of single cells w ithout micro droplet filtering			**IPJ**
4.1.1.7.2	Design and construction of a micro drop			**IPJ**
4.1.1.7.3	**Droplet filter ready**	**Hardware ready**		**IPJ**
4.1.1.7.4	Coating of single cell w ith micro droplet f			**IPJ**
4.1.2	**Coating multi-cell**			**IPJ**
4.1.2.1	Design and commissioning			**IPJ**
4.1.2.2	First multicell coating			**IPJ**
4.2	**Planar-arc cathode coating**			**INFN-Ro2**
4.2.1	**Modification of a planar-arc & trigger system**			**INFN-Ro2**
4.2.1.1	Modification			**INFN-Ro2**
4.2.1.2	Optimization of the laser triggering system			**INFN-Ro2**
4.2.1.3	**Planar arc system fully tested**	**Status Report**		**INFN-Ro2**
4.2.2	**Routine Operation of planar arc system**			**INFN-Ro2**
4.2.2.1	Characterization of samples coated at different conditions			**INFN-Ro2**
4.2.2.2	Characterization of Nb-coated sapphire			**INFN-Ro2**
4.2.2.3	Characterization of Nb-coated copper sa			**INFN-Ro2**
4.2.2.4	**Summary report on quality of planar arc coating**	**Status Report**		**INFN-Ro2**
4.2.3	**Studies of other HTC superconducting coati**			**INFN-Ro2**
4.2.3.1	Study of superconducting properties			**INFN-Ro2**
4.2.3.2	**Report on quality of superconducting properties**		**Final Report**	**INFN-Ro2**



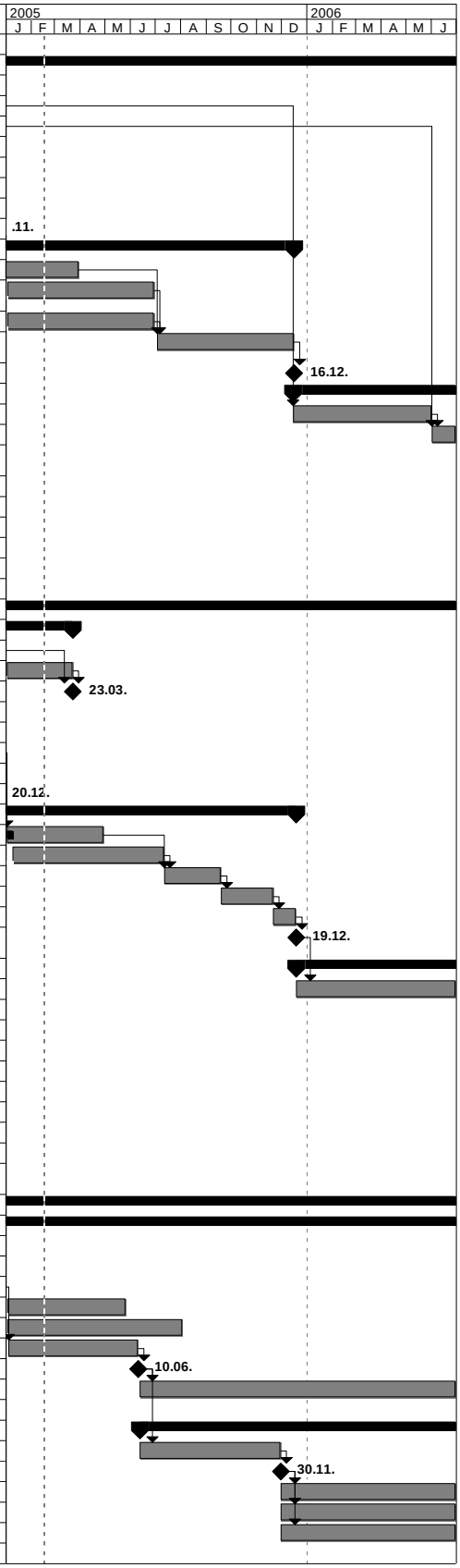
N°	Task Name	Milestones	Main Deliverables	Contractor
5	**WP5 SURFACE PREPARATION**			
5.1	**EP on single cells**			**CEA**
5.1.1	**EP on samples**			**CEA**
5.1.1.1	Establishing method of surface characterizat			**CEA**
5.1.1.2	**Surface characterization fixed**	**Design Report**		**CEA**
5.1.1.3	Series of EP with samples for surface investigations			**CEA**
5.1.1.4	**Best EP parameters**		**Final Report**	**CEA**
5.1.2	**Single cell cavities**			**CEA**
5.1.2.1	Order Nb and fabricate 3 cavities			**CEA**
5.1.2.2	**3 cavities fabricated**	**Cavities ready**		**CEA**
5.1.3	**Build EP chemistry for single cells**			**CEA**
5.1.3.1	Design of EP set-up			**CEA**
5.1.3.2	Fabrication of EP set-up			**CEA**
5.1.3.3	Commissioning of EP set-up			**CEA**
5.1.3.4	**First operation of EP set-up**	**Commissioning**		**CEA**
5.1.4	**Operation of single cell EP**			**CEA**
5.1.4.1	Continous single cell operation			**CEA**
5.1.4.2	**Define working parameters for single c**	**Design Report**		**CEA**
5.1.5	**Continuous operation, search for best para**			**CEA**
5.1.5.1	Parametrising EP procedure			**CEA**
5.1.5.2	**EP parameters fixed**		**Final report**	**CEA**
5.2	**EP on multi-cells**			**DESY**
5.2.1	**Transfer of parameters from 1 cell to multi cell equipment**			**DESY**
5.2.1.1	**Finish EP setup nine-cells at DESY**			**DESY**
5.2.1.1.1	Improved gas cleaning system			**DESY**
5.2.1.1.2	Design for hot water rinsing			**DESY**
5.2.1.1.3	**Proof-of-Principle experiment hot water rinsing**	**Status Report**		**DESY**
5.2.1.2	**Optimize electrode shape**			**DESY**
5.2.1.2.1	Develop computer model / Evaluate softw			**DESY**
5.2.1.2.2	Design improved electrode			**DESY**
5.2.1.2.3	**Electrode design fixed**	**Design report**		**DESY**
5.2.1.3	**Fix process parameters/ Quality control**			**DESY**
5.2.1.3.1	Setup chemical lab			**DESY**
5.2.1.3.2	Bath aging			**DESY**
5.2.1.3.3	Bath mixture			**DESY**
5.2.1.3.4	Alternative (salt) mixtures			**DESY**
5.2.1.3.5	**Process parameters fixed**		**Final report**	**DESY**
5.2.2	**Laser roughness**			**DESY**
5.2.2.1	Evaluate existing systems			**DESY**
5.2.2.2	Specify laser system			**DESY**
5.2.2.3	Built laser system			**DESY**
5.2.2.4	**Roughness measurement finished**	**Equipment ready**		**DESY**
5.2.3	**Oxipolishing as final chemical cleaning**			**DESY**
5.2.3.1	Laboratory studies			**DESY**
5.2.3.2	Design of OP system			**DESY**
5.2.3.3	Setup one-cell system			**DESY**
5.2.3.4	**Proof-of-Principle experiment Oxipolish**	**Status Report**		**DESY**
5.2.3.5	Design OP for nine-cells			**DESY**
5.2.3.6	Build OP for 9-cells			**DESY**
5.2.3.7	**OP for 9-cells ready**	**Commissioning**		**DESY**
5.2.3.8	Study op with 9-cell cavities			**DESY**
5.2.3.9	Evaluate experiments		**Status Report**	**DESY**
5.2.4	**Transfer Electropolishing technology to ind**			**DESY**
5.2.4.1	Qualify industry with one-cells			**DESY**
5.2.4.2	Industrial design study on setup for multi-cel			**DESY**
5.2.4.3	**Report on industrial design**	**Report**		**DESY**
5.2.4.4	Fabricate EP multi-cell industrial prototype			**DESY**
5.2.4.5	Commission EP multi-cell industrial prototype			**DESY**
5.2.4.6	**EP multi-cell industrial prototype ready**	**Commissioning**		**DESY**
5.2.4.7	Operate EP multi-cell industrial prototype			**DESY**
5.2.4.8	**Final report on industrial EP**		**Final report**	**DESY**



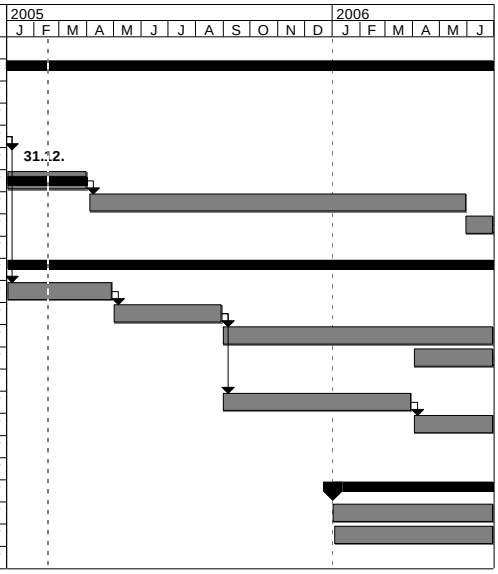
N°	Task Name	Milestones	Main Deliverables	Contractor
5.3	**Automated EP (AEP)**			**INFN-LNL**
5.3.1	**Prototype EP installation**			**INFN-LNL**
5.3.1.1	Design installation			**INFN-LNL**
5.3.1.2	Fabricate/ order components			**INFN-LNL**
5.3.1.3	Assemble EP installation			**INFN-LNL**
5.3.1.4	**First operation of automated EP**	**Commissioning**		**INFN-LNL**
5.3.2	**EP computer control**			**INFN-LNL**
5.3.2.1	Design control architecture			**INFN-LNL**
5.3.2.2	Developed software			**INFN-LNL**
5.3.2.3	Test of software			**INFN-LNL**
5.3.2.4	**Software ready**	**Status Report**		**INFN-LNL**
5.3.3	**Operation of AEP prototype**			**INFN-LNL**
5.3.3.1	Correlate surface finish/ conductance			**INFN-LNL**
5.3.3.2	Determine optimum conductance			**INFN-LNL**
5.3.3.3	Optimize automated operation			**INFN-LNL**
5.3.3.4	Design report on AEP			**INFN-LNL**
5.3.3.5	**Automated EP is defined**		**Final Report**	**INFN-LNL**
5.3.4	**Alternative electrolytes**			**INFN-LNL**
5.3.4.1	Review of EP chemistry			**INFN-LNL**
5.3.4.2	**Proposal for alternative electrolytes**	**Report**		**INFN-LNL**
5.3.4.3	Experiments with alternative electrolytes			**INFN-LNL**
5.3.4.4	**Conclude experimental results**	**Status Report**		**INFN-LNL**
5.3.5	**Define best AEP**			**INFN-LNL**
5.3.5.1	Compare standard/new electrolyte method			**INFN-LNL**
5.3.5.2	Modify AEP installation for best electrolyte			**INFN-LNL**
5.3.5.3	Operate modified AEP			**INFN-LNL**
5.3.5.4	Design report on best AEP			**INFN-LNL**
5.3.5.5	**Conclude on best electrolyte**		**Final Report**	**INFN-LNL**
5.4	**Dry ice cleaning**			**DESY**
5.4.1	**Installation of full system for 1-3 cell cavities**			**DESY**
5.4.1.1	Installation of CO_2 piping			**DESY**
5.4.1.2	Installation of motion system			**DESY**
5.4.1.3	Installation of control system			**DESY**
5.4.1.4	Commissioning			**DESY**
5.4.1.5	**Installation finished**	**Commissioning**		**DESY**
5.4.2	**Optimization of cleaning parameters**			**DESY**
5.4.2.1	Sample cleaning			**DESY**
5.4.2.2	1-cell cavity cleaning			**DESY**
5.4.2.3	Fix best cleaning parameters			**DESY**
5.4.2.4	**Cleaning parameters fixed**		**Final Report**	**DESY**
5.4.3	**VT 9-cell cleaning apparatus**			**DESY**
5.4.3.1	Design 9-cell apparatus VT			**DESY**
5.4.3.2	Fabricated 9-cell apparatus			**DESY**
5.4.3.3	Installation of 9-cell apparatus			**DESY**
5.4.3.4	Commissioning of 9-cell apparatus			**DESY**
5.4.3.5	**VT Cleaning Installation finished**	**Commissioning**		**DESY**
5.4.4	**VT Cleaning of 9-cell cavities**			**DESY**
5.4.4.1	Continuous cleaning			**DESY**
5.4.4.2	**Evaluation of experimental results**		**Final Report**	**DESY**
5.4.5	**Design & construction of H9-cell cleaning apparatus**			**DESY**
5.4.5.1	Design 9-cell apparatus VT			**DESY**
5.4.5.2	Fabricated 9-cell apparatus			**DESY**
5.4.5.3	Installation of 9-cell apparatus			**DESY**
5.4.5.4	Commissioning of 9-cell apparatus			**DESY**
5.4.5.5	**Start H9-cell cleaning**	**Commissionning**		**DESY**
5.4.6	**Cleaning of horizontal nine-cell cavity**			**DESY**
5.4.6.1	Continuous cleaning			**DESY**
5.4.6.2	**Evaluation of experimental results**		**Final Report**	**DESY**



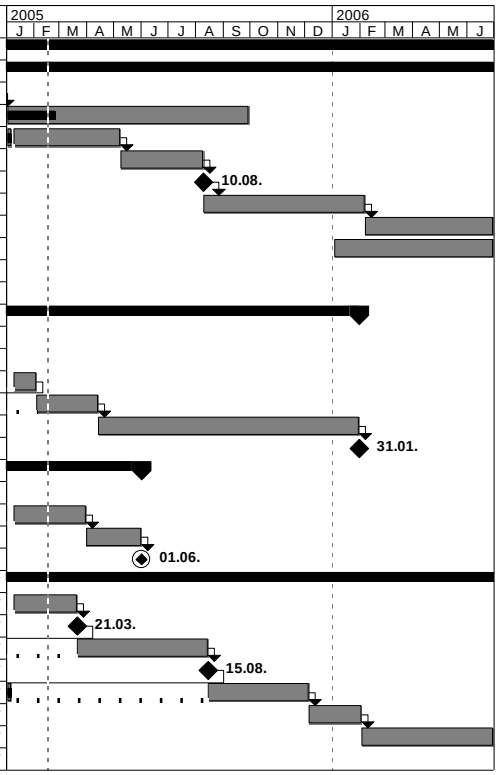
N°	Task Name	Milestones	Main Deliverables	Contractor
6	**WP6 MATERIAL ANALYSIS**			**DESY**
6.1	**SQUID scanning**			**DESY**
6.1.1	**Produce calibration defects**			**DESY**
6.1.1.1	Production of surface defects			**DESY**
6.1.1.2	Production of bulk defects			**DESY**
6.1.1.3	**Calibration defects finished**	**Status Report**		**DESY**
6.1.2	**Design components of Squid scanner**			**DESY**
6.1.2.1	Design of the scanning table and support			**DESY**
6.1.2.2	Design of the SQUID cooling system			**DESY**
6.1.2.3	**Design Scanner finished**	**Design report**		**DESY**
6.1.3	**Construction of scanning apparatus**			**DESY**
6.1.3.1	Fabrication of the SQUID			**DESY**
6.1.3.2	Fabrication and purchase of components for SQUID apparatus			**DESY**
6.1.3.3	Software for the SQUID scanner			**DESY**
6.1.3.4	Commissioning and calibration of scanning apparatus			**DESY**
6.1.3.5	**Scanning apparatus operational**	**Commissioning**		**DESY**
6.1.4	**Scanning of sheets with artificial defects**			**DESY**
6.1.4.1	Scanning of sheets with artificial surface def			**DESY**
6.1.4.2	Scanning of sheets with artificial bulk defects			**DESY**
6.1.4.3	Development of algorithm for material defects classification			**DESY**
6.1.4.4	**Classification of defects finished**	**Status Report**		**DESY**
6.1.5	**Scanning of production sheets**			**DESY**
6.1.5.1	Scanning of sheets of different producers			**DESY**
6.1.5.2	Identification of defects by (EDX, SURFA etc			**DESY**
6.1.5.3	Conclusive comparison with eddy current da			**DESY**
6.1.5.4	**Final report on SQUID scanning**		**Final Report**	**DESY**
6.2	**Flux gate magnetometry**			**INFN-LNL**
6.2.1	**Produce calibration defects**			**INFN-LNL**
6.2.1.1	Production of surface defects			**INFN-LNL**
6.2.1.2	Production of bulk defects			**INFN-LNL**
6.2.1.3	**Calibration defects finished**	**Status Report**		**INFN-LNL**
6.2.2	**Design components of flux gate head**			**INFN-LNL**
6.2.2.1	Design electronics			**INFN-LNL**
6.2.2.2	Design of flux gate head			**INFN-LNL**
6.2.2.3	Design of operations software			**INFN-LNL**
6.2.2.4	**Design flux gate head finished**	**Design report**		**INFN-LNL**
6.2.3	**Fabrication of flux gate detector**			**INFN-LNL**
6.2.3.1	Fabrication of flux gate head			**INFN-LNL**
6.2.3.2	Fabrication of mechanics			**INFN-LNL**
6.2.3.3	Implementation of software			**INFN-LNL**
6.2.3.4	Commissioning of flux gate detector			**INFN-LNL**
6.2.3.5	Calibration of flux gate detector			**INFN-LNL**
6.2.3.6	**Flux gate detector operational**	**Design report, start operation**		**INFN-LNL**
6.2.4	**Commissioning of flux gate detector**			**INFN-LNL**
6.2.4.1	Operational tets tests			**INFN-LNL**
6.2.4.2	Evaluation of test results			**INFN-LNL**
6.2.4.3	**Flux gate scanner commissioned**	**Status Report**		**INFN-LNL**
6.2.5	**Operation of flux gate detector**			**INFN-LNL**
6.2.5.1	Regular operation			**INFN-LNL**
6.2.5.2	Report of operation			**INFN-LNL**
6.2.5.3	**Conclusion of flux gate scanning operat**	**Status Report**		**INFN-LNL**
6.2.6	**Comparison with SQUID scanner**			**INFN-LNL**
6.2.6.1	Compare measurements			**INFN-LNL**
6.2.6.2	**Conclude SQUID scanner vs. flux gate detector**		**Final Report**	**INFN-LNL**
6.3	**DC field emission studies of Nb samples**			**DESY**
6.3.1	**Quality control scans**			**DESY**
6.3.1.1	Modification of Scanning apparatus			**DESY**
6.3.1.2	Calibration of Scanning apparatus			**DESY**
6.3.1.3	**Start scanning activity**	**Start Operation**		**DESY**
6.3.1.4	BCP and HPR samples			**DESY**
6.3.1.5	EP and HPR samples			**DESY**
6.3.1.6	BCP/EP and DIC samples			**DESY**
6.3.1.7	**First report on BCP/EP and DIC surface**	**Interim Report**		**DESY**
6.3.1.8	Continue QA scanning			**DESY**
6.3.1.9	**Evaluation of scanning results**		**Final Report**	**DESY**
6.3.2	**Detailed measurements on strong emitters**			**DESY**
6.3.2.1	Calibrate apparatus for high current			**DESY**
6.3.2.2	**Start strong emitter evaluation**	**Start Measuremen**		**DESY**
6.3.2.3	I/V curves and current limits			**DESY**
6.3.2.4	SEM and AES			**DESY**
6.3.2.5	Influence of heat treatment and ion impact			**DESY**
6.3.2.6	**Evaluate strong emitter investigations**		**Final Report**	**DESY**



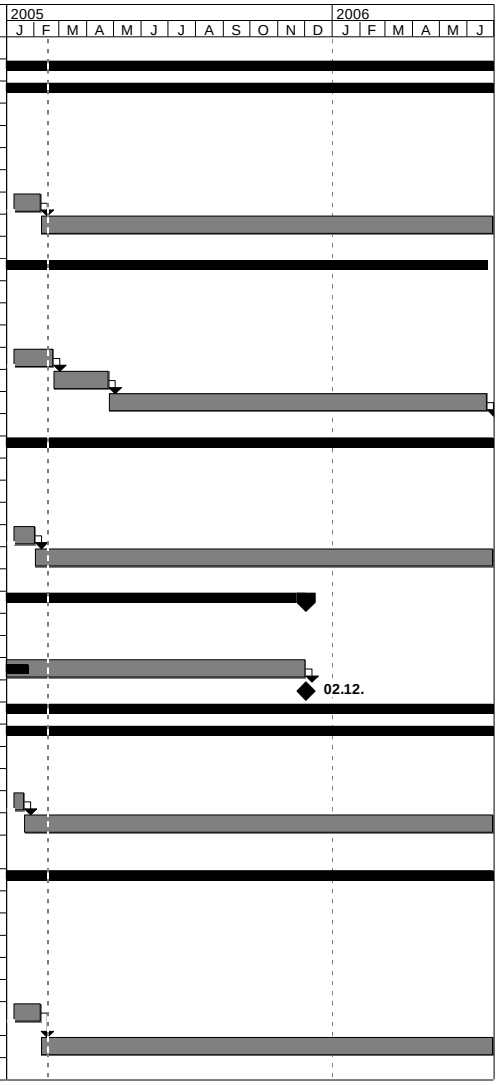
N°	Task Name	Milestones	Main Deliverables	Contractor
7	**WP7 COUPLERS**			
7.1	**New Prototype Coupler**			**CNRS-Orsay**
7.1.1	RF Simulations of Coupler			**CNRS-Orsay**
7.1.2	Report on Simulation			**CNRS-Orsay**
7.1.3	Detailed Engineering Drawings			**CNRS-Orsay**
7.1.4	Engineering complete			**CNRS-Orsay**
7.1.5	Call for tenders			**CNRS-Orsay**
7.1.6	Prototype Fabrication in Industry			**CNRS-Orsay**
7.1.7	Low Power tests			**CNRS-Orsay**
7.1.8	**Ready for High Power Tests**	**Coupler Prototype**		**CNRS-Orsay**
7.2	**Fabrication of TiN Coating System**			**CNRS-Orsay**
7.2.1	Mechanical design of vacuum chamber			**CNRS-Orsay**
7.2.2	Fabrication drawings			**CNRS-Orsay**
7.2.3	Construction of vacuum chamber			**CNRS-Orsay**
7.2.4	Define vacuum needs			**CNRS-Orsay**
7.2.5	Appropriation of vacuum equipment			**CNRS-Orsay**
7.2.6	Design of electronic circuitry			**CNRS-Orsay**
7.2.7	Fabrication of electronics in industry			**CNRS-Orsay**
7.2.8	Installation and Test at Orsay			**CNRS-Orsay**
7.2.9	**First Window Coating**	**Commissioning**		**CNRS-Orsay**
7.3	**Conditioning Studies of Proto-type Couplers**			**CNRS-Orsay**
7.3.1	Conditioning of couplers			**CNRS-Orsay**
7.3.2	Evaluate conditioning results			**CNRS-Orsay**
7.3.3	**Final report on conditioning**		**Final report**	**CNRS-Orsay**



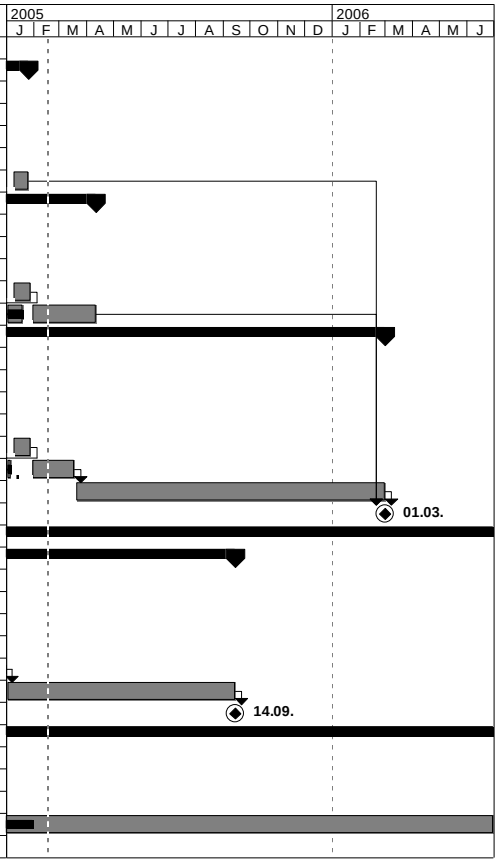
N°	Task Name	Milestones	Main Deliverables	Contractor
8	**WP8 TUNERS**			
8.1	**UMI TUNER**			**INFN-Mi**
8.1.1	Control electronics			**INFN-Mi**
8.1.2	Mechanical tuner design, leverage system/motor			**INFN-Mi**
8.1.3	Integration piezo design			**INFN-Mi**
8.1.4	Choice of transducer/actuator			**INFN-Mi**
8.1.5	**Report UMI tuner**	**Design report**		**INFN-Mi**
8.1.6	Tuner fabrication			**INFN-Mi**
8.1.7	Piezo fabrication and bench tests			**INFN-Mi**
8.1.8	Cavity-tuner-coupler integration			**INFN-Mi**
8.1.9	Pulsed RF tests			**INFN-Mi**
8.1.10	**Evaluation of tuner operation**		**Final report**	**INFN-Mi**
8.2	**Magneto-strictive Tuner**			**TUL**
8.2.1	Complete specification			**TUL**
8.2.2	Conceptual design			**TUL**
8.2.3	Prototype and performance evaluation			**TUL**
8.2.4	Finalize tuner and drive electronics design			**TUL**
8.2.5	Test of tuner			**TUL**
8.2.6	**Report on magneto-strictive Tuner**	**Status report**		**TUL**
8.3	**CEA Tuner**			**CEA**
8.3.1	Design Piezo + Tuning System			**CEA**
8.3.2	Fabrication			**CEA**
8.3.3	Installation RF			**CEA**
8.3.4	**Start of Integrated Experitments**		**Tuner Prototyp**	**CEA**
8.4	**IN2P3 Activity**			**CNRS-Orsay**
8.4.1	Characterize actuators/piezo-sensors at low temp			**CNRS-Orsay**
8.4.2	Report on actuator/piezo sensor			**CNRS-Orsay**
8.4.3	Test radiation hardness of piezo tuners			**CNRS-Orsay**
8.4.4	Report on radiation hardness tests			**CNRS-Orsay**
8.4.5	Integration of pieco and cold tuner			**CNRS-Orsay**
8.4.6	Cryostat tests			**CNRS-Orsay**
8.4.7	Tests with pulsed RF			**CNRS-Orsay**
8.4.8	**Report on IN2P3 tuner activities**		**Final Report**	**CNRS-Orsay**



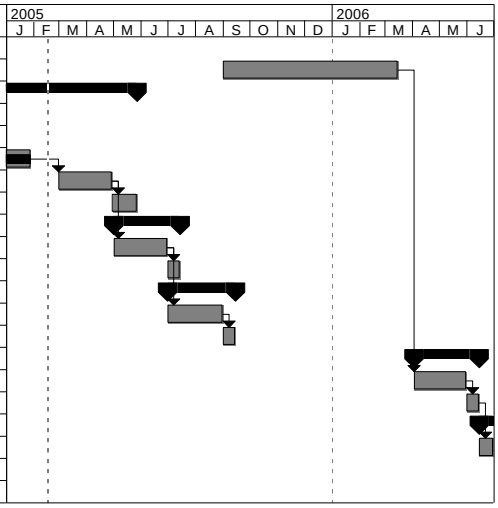
N°	Task Name	Milestones	Main Deliverables	Contractor
9	**WP9 LOW LEVEL RF (LLRF)**			
9.1	**Operability and technical performance**			**DESY**
9.1.1	**Transient detector**			**DESY**
9.1.1.1	Define requirements			**DESY**
9.1.1.2	Electronics design			**DESY**
9.1.1.3	Build prototype and evaluate			**DESY**
9.1.1.4	Final design of detector			**DESY**
9.1.1.5	Installation and commissioning			**DESY**
9.1.1.6	Test with beam			**DESY**
9.1.1.7	**Report on transient detector test**	**Status Report**		**DESY**
9.1.2	**LLRF Automation**			**TUL/DESY**
9.1.2.1	Dialogue with industrial experts			**TUL/DESY**
9.1.2.2	Develop full specification			**TUL/DESY**
9.1.2.3	Implement FMS for subsystems			**TUL/DESY**
9.1.2.4	Test and evaluation			**TUL/DESY**
9.1.2.5	Implement improvements			**TUL/DESY**
9.1.2.6	Evaluation and acceptance by operators			**TUL/DESY**
9.1.2.7	**Report on LLRF atomization design**	**Status Report**		**TUL/DESY**
9.1.3	**Control optimization**			**WUT-ISE/DESY**
9.1.3.1	Specification of system			**WUT-ISE/DESY**
9.1.3.2	Conceptual design of controller			**WUT-ISE/DESY**
9.1.3.3	Performance simulation			**WUT-ISE/DESY**
9.1.3.4	Implementation in DSP hardware			**WUT-ISE/DESY**
9.1.3.5	Implementation and tests on TTF			**WUT-ISE/DESY**
9.1.3.6	**Evaluation of test results**	**Status report**		**WUT-ISE/DESY**
9.1.4	**Exceptional handling routines**			**DESY**
9.1.4.1	Specification			**DESY**
9.1.4.2	Design of exceptional handler			**DESY**
9.1.4.3	Implementation and test on TTF			**DESY**
9.1.4.4	**Report on exceptional handler operatio**	**Status Report**		**DESY**
9.2	**LLRF cost and reliability study**			**TUL**
9.2.1	**Cost and reliability study**			**TUL**
9.2.1.1	Identify cost drivers of present LLRF			**TUL**
9.2.1.2	Develop cost reduction ideas			**TUL**
9.2.1.3	Build prototypes and evaluate			**TUL**
9.2.1.4	Final design of LLRF system			**TUL**
9.2.1.5	**Complete design of LLRF system for reduced cost**	**Status Report**		**TUL**
9.2.2	**Radiation damage study**			**TUL**
9.2.2.1	Identify critical electronics issues			**TUL**
9.2.2.2	Evaluate TESLA radiation			**TUL**
9.2.2.3	Develop tests for components			**TUL**
9.2.2.4	Procure and assembles test set up			**TUL**
9.2.2.5	Data acquisition from radiation tests			**TUL**
9.2.2.6	Analyze results and develop countermeasures			**TUL**
9.2.2.7	Implement countermeasures and verify			**TUL**
9.2.2.8	**Report on radiation damage studies**	**Status Report**		**TUL**



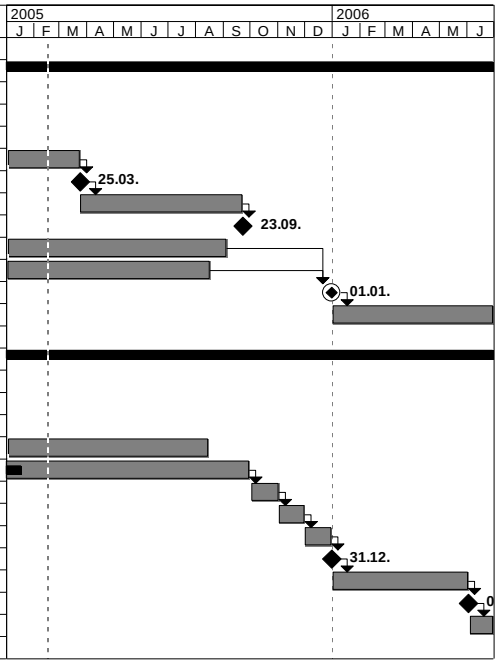
N°	Task Name	Milestones	Main Deliverables	Contractor
9.3	**Hardware**			**WUT-ISE**
9.3.1	**Multichannel downconvertor**			**WUT-ISE**
9.3.1.1	Study and compare technologies			**WUT-ISE**
9.3.1.2	Select optimum PCB design			**WUT-ISE**
9.3.1.3	Build prototype and evaluate			**WUT-ISE**
9.3.1.4	Finalize multichannel downconverter			**WUT-ISE**
9.3.1.5	Determine characteristics			**WUT-ISE**
9.3.2	**Third generation RF control**			**WUT-ISE**
9.3.2.1	Integrate system generator with VHDL			**WUT-ISE**
9.3.2.2	Complete specification			**WUT-ISE**
9.3.2.3	Demonstrate simulator			**WUT-ISE**
9.3.2.4	Final design of RF electronic board			**WUT-ISE**
9.3.2.5	Evaluate performance			**WUT-ISE**
9.3.3	**Stable frequency distribution**			**WUT-ISE**
9.3.3.1	Complete specification			**WUT-ISE**
9.3.3.2	Conceptional design of frequency			**WUT-ISE**
9.3.3.3	Build prototype and evaluate			**WUT-ISE**
9.3.3.4	Final design			**WUT-ISE**
9.3.3.5	Procurement and assembly of subsystems			**WUT-ISE**
9.3.3.6	Installation and commissioning			**WUT-ISE**
9.3.3.7	Performance test with beam			**WUT-ISE**
9.3.3.8	**Report on new LLRF hardware compon**		**Final Report**	**WUT-ISE**
9.4	**Software**			**TUL/WUT-ISE**
9.4.1	**Data management development**			**TUL/WUT-ISE**
9.4.1.1	Specification			**TUL/WUT-ISE**
9.4.1.2	Conceptional design with DOOCS			**TUL/WUT-ISE**
9.4.1.3	Prototype			**TUL/WUT-ISE**
9.4.1.4	User evaluation			**TUL/WUT-ISE**
9.4.1.5	Finalize design			**TUL/WUT-ISE**
9.4.1.6	Implementation in TTF			**TUL/WUT-ISE**
9.4.1.7	**Report on data management developme**		**Final report**	**TUL/WUT-ISE**
9.4.2	**RF gun control**			**PSI/WUT-ISE**
9.4.2.1	Write specification			**PSI/WUT-ISE**
9.4.2.2	Design of controller			**PSI/WUT-ISE**
9.4.2.3	Procurement and assembly			**PSI/WUT-ISE**
9.4.2.4	Installation and test			**PSI/WUT-ISE**
9.4.2.5	**Report on RF gun control tests**		**Final Report**	**PSI/WUT-ISE**



N°	Task Name	Milestones	Main Deliverables	Contractor
10	**WP10 CRYOSTAT INTEGRATION TESTS**			
10.1	Displace CRYHOLAB			**CEA**
10.2	**CRYHOLAB adaption to 9 cell**			**CEA**
10.2.1	Mechanical adaption			**CEA**
10.2.2	Low performance cavity and coupler			**CEA**
10.2.3	Assembly in CRYHOLAB and cryogenic test			**CEA**
10.2.4	High performance coupler - High pow er pulsed te			**CEA**
10.2.5	High performance cavity transfered from DESY			**CEA**
10.3	**Integration tests in cryostat (1st test)**	**Status report**		**CEA**
10.3.1	CEA could tuning system			**CEA**
10.3.2	Evaluate experimental results			**CEA**
10.4	**Integration tests in cryostat (2nd test)**	**Status report**		**CEA**
10.4.1	Magnetostrictive tuner			**CEA**
10.4.2	Evaluate experimental results			**CEA**
10.5	**Integration tests in cryostat (3rd test)**			**CEA**
10.5.1	Piezoelectric tuner			**CEA**
10.5.2	Evaluate experimental results			**CEA**
10.6	**Integration tests in cryostat (4th test)**			**CEA**
10.6.1	New coupler from LAL			**CEA**
10.6.2	Evaluation of results			**CEA**
10.6.3	**Final evaluation**		**Final Report**	**CEA**

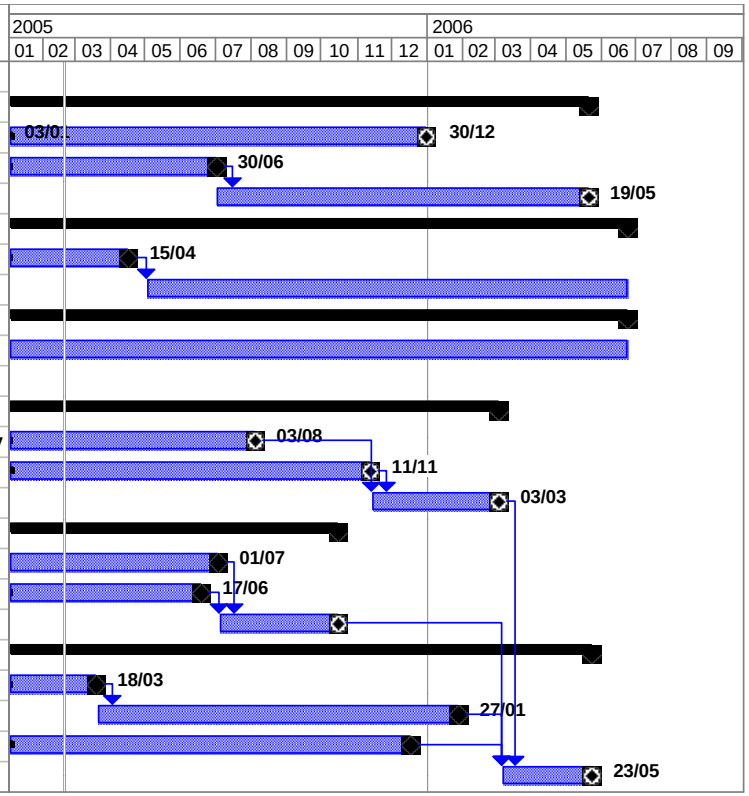


N°	Task Name	Milestones	Main Deliverables	Contractor
11	**WP 11 BEAM DIAGNOSTICS**			**CEA**
11.1	**Beam position monitor**			**CEA**
11.1.1	**Present BPM installed in TTF module**	**Start Measuremen**		**CEA**
11.1.2	Cryogenic measurements on BPM			**CEA**
11.1.3	Beam tests of BPM on TTF			**CEA**
11.1.4	Design of BPM Cavity			**CEA**
11.1.5	Design of BPM cavity ready			**CEA**
11.1.6	Fabrication of BPM Cavity			**CEA**
11.1.7	BMP cavity ready			**CEA**
11.1.8	Development of new hybrid coupler and electronic			**CEA**
11.1.9	Design of Digital Signal Processing			**CEA**
11.1.10	**New BPM ready for Installation**		**BPM Prototype**	**CEA**
11.1.11	Beam Tests w ith new BPM			**CEA**
11.1.12	**Evaluation of BPM operation**		**Final report**	**CEA**
11.2	**Beam Emittance Monitor**			**INFN-LNF**
11.2.1	Slit w idth simulations			**INFN-LNF**
11.2.2	Slit design			**INFN-LNF**
11.2.3	Optics simulations			**INFN-LNF**
11.2.4	Optics appropriations			**INFN-LNF**
11.2.5	System assembly and tests			**INFN-LNF**
11.2.6	Mechanical assembly at TTF			**INFN-LNF**
11.2.7	Optical assembly at TTF			**INFN-LNF**
11.2.8	Integration of controls into TTF			**INFN-LNF**
11.2.9	**Ready for beam test in TTF**	**Start Measuremen**		**INFN-LNF**
11.2.10	Beam tests at TTF			**INFN-LNF**
11.2.11	Evaluate first beam test result	**Status Report**		**INFN-LNF**
11.2.12	Successive measurements			**INFN-LNF**
11.2.13	**Final evaluation**		**Final Report**	**INFN-LNF**

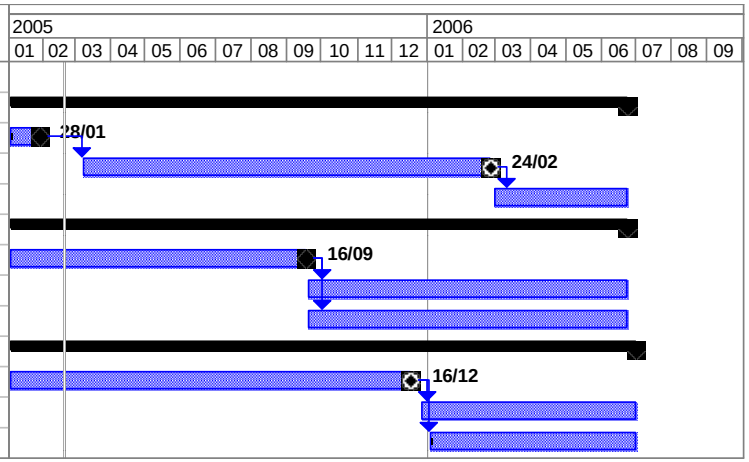


JRA2: Charge Production in Photo-Injector (PHIN)

#	Task Name	Milestones	Main Deliverables
2	**WP2 Charge Production**		
2.1	**High efficiency photocathode for 3 GHz RF gun**		
2.1.1	High efficiency photocathode comparison	Intermediate report	**Final report**
2.1.2	Photocathode preparation equipment construction	Equipment ready	
2.1.3	photocathode 3 GHz high field R&D	Intermediate report	**Photocathode ready**
2.2	**Photocathode for SC cavity**		
2.2.1	Photocathode preparation equipment upgrade	Equipment ready	
2.2.2	Photocathodes test		
2.3	**Laser driven plasma source**		
2.3.1	250 MeV laser driven plasma source R&D		
3	**WP3 Laser**		
3.1	**Laser System**		
3.1.1	High power oscillator construction		**Laser oscillator ready**
3.1.2	Amplifier construction		**Laser amplifier ready**
3.1.3	Oscillator + amplifier test		**Final report**
3.2	**Pulse shaping system**		
3.2.1	Phase mask acquisition and test		**Final report**
3.2.2	Dazzler acquisition and test		**Final report**
3.2.3	Pulse shaping comparison		**Pulse shaper ready**
3.3	**UV generation and Feedbacks**		
3.3.1	UV Harmonic generator R&D	Intermediate report	
3.3.2	UV Harmonic generator test		**UV crystals ready**
3.3.3	Laser-RF Feedback development		**Feedback test**
3.3.4	Overall system assembly and tests		**Laser System ready**

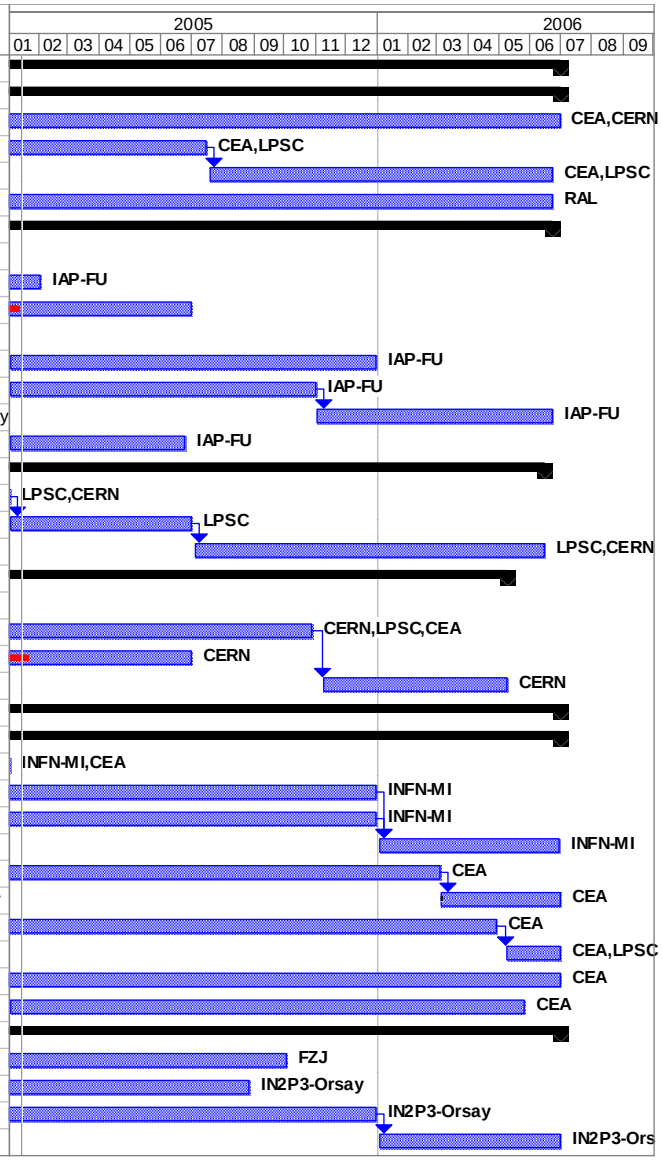


#	Task Name	Milestones	Main Deliverables
4	**WP4 GUN**		
4.1	**SC RF gun**		
4.1.1	SC RF gun design	Design report	
4.1.2	SC RF gun realisation		**SC RF gun ready**
4.1.3	SC RF gun test		
4.2	**3 GHz RF gun**		
4.2.1	Two 3 GHz RF guns construction		
4.2.2	CTF3 3GHz RF gun test at CERN		
4.2.3	NEPAL 3 GHz RF gun test at Orsay		
4.3	**Spectrometer for e- beam**		
4.3.1	1-250 MeV Spectrometer construction		**Spectrometer ready**
4.3.2	1-250 MeV Spectrometer test		
4.3.3	0.1-1Gev Spectrometer development		

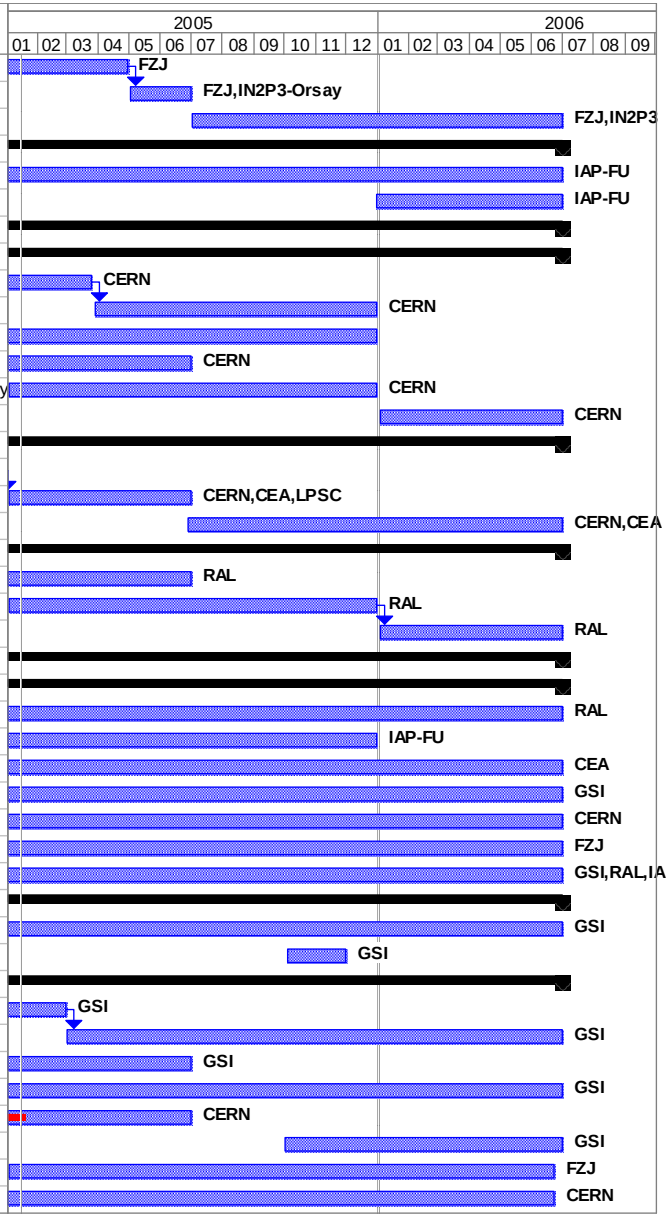


JRA3: High Intensity Proton injector (HIPPI)

ID	Task Name	Milestones	Deliverables
1	**WP2: NORMAL CONDUCTING STRUCTURES**		
2	**2.1 Drift Tube Linac**		
3	2.1.1 DTL design		
5	2.1.3 DTL coupler prototype design		
6	2.1.5 DTL coupler prototype construction and testing		
7	2.1.4 DTL beam dynamics design		
8	**2.2 H-mode Drift Tube Linac**		
9	2.2.1 RF model CH tank1 RF design		
10	2.2.2 RF cold model design & construction		
11	2.2.3 RF model construction		
12	2.2.4 Beam dynamics design CH tank1		
13	2.2.5 CH model cavity tests	Dec-05 Intermediate repor	
14	2.2.6 CH-prototype design		
15	2.2.7 CH-prototype construction		Dec-06: Prototype ready
16	2.2.8 CH-DTL beam dynamics study	Jun-05 Design report	
17	**2.3 Side Coupled Linac**		
18	2.3.1 RF model RF design		
19	2.3.2 RF model mechanical design		
20	2.3.3 RF model construction and testing		
21	**2.4 Cell Coupled Drift Tube Linac**		
22	2.4.1 Pre-prototype construction	Jun-05 Intermediate repor	
23	2.4.2 Pre-prototype high-power RF tests		
24	2.4.3 Contribution to ISTC prototype construction	Jun-06 Prototype ready	
25	2.4.4 Revision of design after prototype testing		Dec-06: Design report
26	**WP3: SUPERCONDUCTING STRUCTURES**		
27	**3.1 ELLIPTICAL CAVITIES**		
28	3.1.1 Cavity A vertical tests		
29	3.1.2 Tuner design		
30	3.1.3 Integration of piezo design		
31	3.1.4 Tuner construction and testing	Dec-05 Intermediate repor	
32	3.1.5 Design cavity B		
33	3.1.6 Construction cavity B		Jun-06: cavity B ready
34	3.1.7 Power coupler design & engineering		
35	3.1.9 RF coupler construction		
36	3.1.8 RF source order & preparation		
37	3.1.10 Modulator preparation for 700 MHz test stand		
38	**3.2 SPOKE CAVITIES**		
40	3.2.2 Evaluation of 760 MHz resonator in vertical cry	Mar-05 Intermediate repor	
41	3.2.3 Evaluation of 352 MHz 2-gap res. in vertical cry	Oct-05 Intermediate report	
42	3.2.4 Design of coupler prototype		
43	3.2.5 Test of coupler prototype		

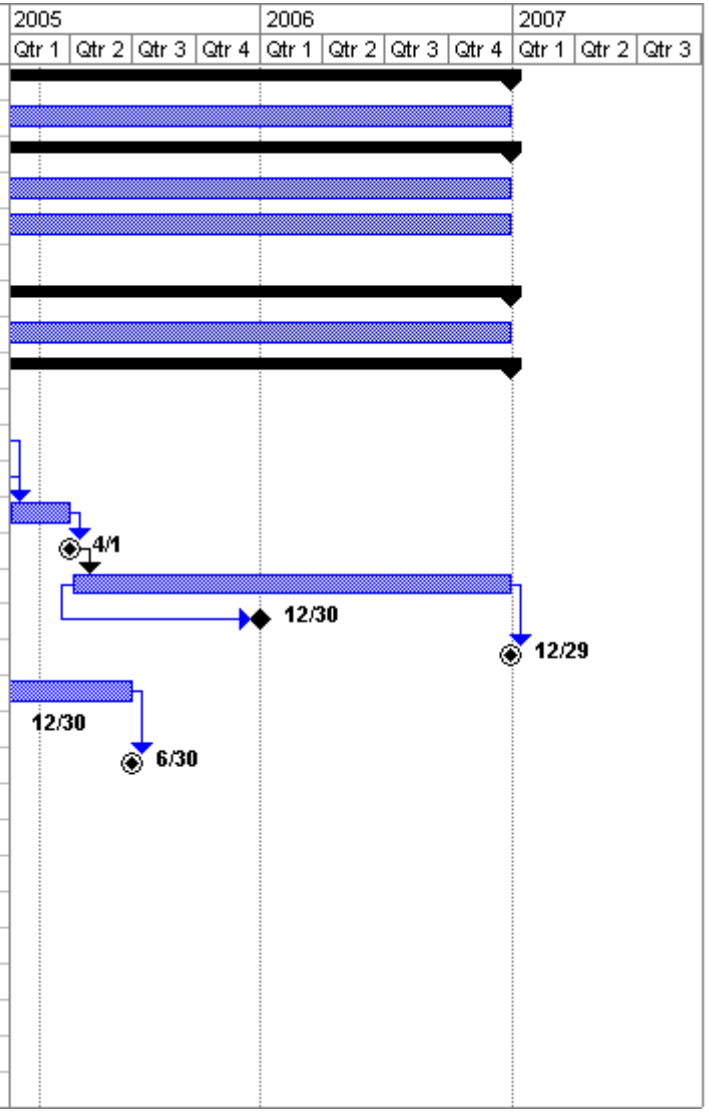


ID	Task Name	Milestones	Deliverables
44	3.2.6 RF design of 352 MHz multi-gap resonator	May-05 Design report	
45	3.2.7 Engineering of resonator, coupler and tuner		
46	3.2.8 Final design of 352 MHz multi-gap prototype		
47	**3.3 CH RESONATOR**		
48	3.3.1 Design of tuning system	Jun-05 Intermediate repor	
49	3.3.2 Construction of CH tuning system		
50	**WP4: CHOPPING**		
51	**4.1 CHOPPER STRUCTURE A**		
52	4.1.1 Pre-prototype construction	Jun-05 Design report	
53	4.1.2 Pre-Prototype testing	Mar-05 Intermediate repor	
54	4.1.3 Driver construction, testing		
55	4.1.4 Full scale prototype design		
56	4.1.5 Full scale prototype construction		Aug-06: Prototype ready
57	4.1.6 Pre-prototype testing w/o beam		
58	**4.2 CHOPPER LINE**		
59	4.2.1 Dump design		
60	4.2.2 Dump construction	Jun-05 Intermediate repor	
61	4.2.3 Beam line assembling		
62	**4.3 CHOPPER STRUCTURE B**		
63	4.3.1 Pre-prototype design and test	Jun-05 Intermediate repor	
64	4.3.2 Prototype design	Jun-06 Design report	
65	4.3.3 Prototype construction		
66	**WP5: BEAM DYNAMICS**		
67	**5.1 Code development**		
68	5.1.1 3D space charge routines dev., testing		
69	5.1.2 LORASR development	Dec-05 Intermediate report	
70	5.1.3 Neutralization and ECR source modelization st		
71	5.1.4 Improvement, modelling high current		
72	5.1.5 Code preparation for 3 MeV test stand	Jun-06 Intermediate repor	
73	5.1.6 Codes preparation for SC linacs		
74	5.1.7 Code comparison and benchmarking		
75	**5.2 Experiment at UNILAC**		
76	5.2.1 Preparation, simulations		
77	5.2.2 First experiment campaign		
78	**5.3 Diagnostics and collimation**		
79	5.3.1 Profile measurement prototype design, construc	Mar-05 Prototype ready	
80	5.3.2 Profile measurement testing		
81	5.3.3 Non-interceptive bunch measurement design		
82	5.3.4 Non-interceptive bunch measurement const. an	Jun-05 Components ready	
83	5.3.5 Halo meas. device design, construction	Jun-05 Prototype ready	Jun-05 Final report
84	5.3.6 On-line transmission control		
85	5.3.7 Beam profile monitor design		
86	5.3.8 Collimators study		

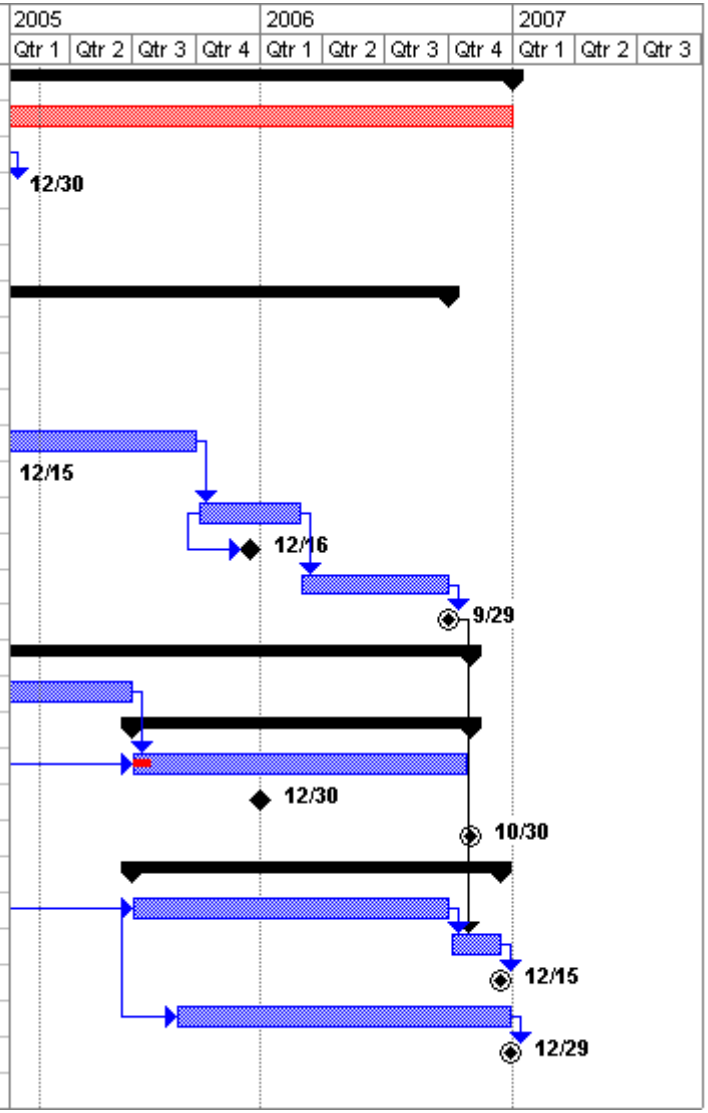


JRA4: New European Dipole (NED)

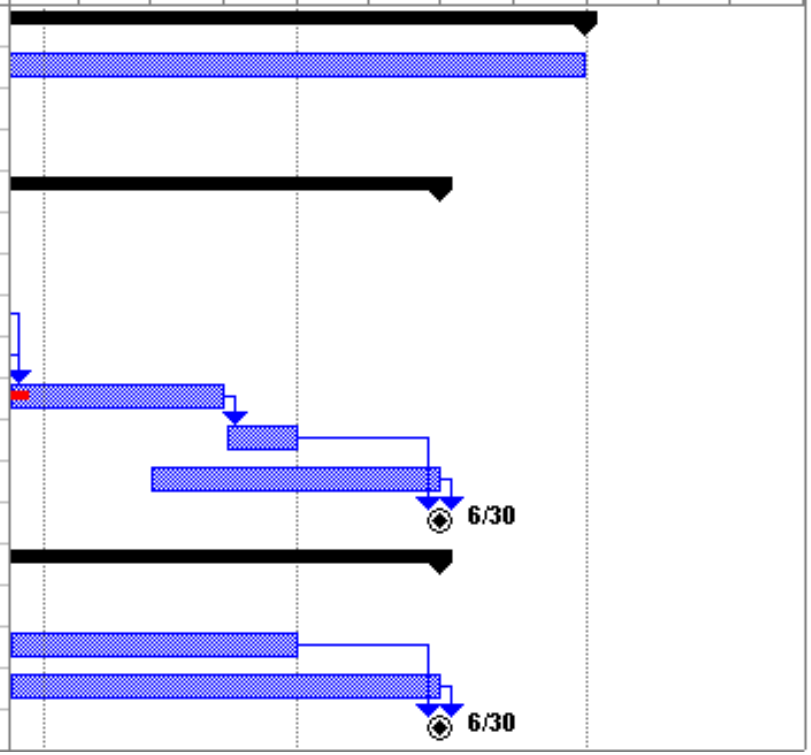
Next European Dipole Joint Research Activity
1 Management and Communication (M&C)
1.1 Activity Coordination
1.2 Meetings
1.2.1 Steering Committee Meetings
1.2.2 External Scientific Advisory Committee Meetings
2 Thermal Studies and Quench Protection (TSQP)
2.1 Work Package Coordination
2.2 Heat Transfer Measurements
2.2.1 Drafting of Test Facility Specifications
2.2.2 Cryostat Design and Fabrication
2.2.3 Cryogenic Module Design and Fabrication
2.2.4 Facility Integration and Qualification
Commisioning of Heat Transfer Facility (deliverable)
2.2.5 Measurements and Analyses
Interim Report on Heat Transfer Measurements (milestone)
Final Report on Heat Transfer Measurements (deliverable)
2.3 Quench Protection Computation
Interim Report on Quench Performance (milestone)
Final Report on Quench Protection (deliverable)



Next European Dipole Joint Research Activity
3 Conductor Development (CD)
3.1 Work Package Coordination
3.2 Cable Definition from Field Computations of a 15 T Dipole Magnet
Design of a 15T Dipole Magnet (deliverable)
3.3 Specifications' Drafting
Specifications on Wire and Cable (deliverable)
3.4 Wire Development
3.4.1 Call for tender
3.4.2 Contracts preparation
Contract Signature
3.4.3 Step 1
Progress Report (milestone)
3.4.4 Step 2
Progress Report (milestone)
3.4.5 Final production
Final Wire Production (deliverable)
3.5 Wire Characterization
3.5.1 Definition of Measuring Procedures
3.5.2 Wire Ic Measurements
3.5.3 Wire Magnetization Measurements
Interim Report on Wire Characterization (milestone)
Final Report on Wire Characterization (deliverable)
3.6 Cable Development
3.6.1 Cabling Trial
3.6.2 Final Production
Final Cable Production (deliverable)
3.7 Cable Characterization
Report on Cable Performance (deliverable)



Next European Dipole Joint Research Activity
4 Insulation Development and Implementation (IDI)
4.1 Work Package Coordination
4.2 Specifications' Drafting
Report Specifications for Conductor Insulation (milestone)
4.3 Implementation Study of Conventional Solution
4.3.1 Litterature Survey
Definition of the Test Programme (milestone)
4.3.2 Tooling Preparation
4.3.3 Compoment Supply
4.3.4 Iterative Tests
4.3.5 Data Analysis
4.3.6 Irradiation Tests
Report on Conventional Insulation (deliverable)
4.4 Implementation Study of Innovative Solution
Definition of the Test Programme
4.4.1 Tape Weaving Trial
4.4.2 Characterization Tests
Report on Innovative Insulation (deliverable)



Financial information for the duration of the detailed implementation plan (per activity)

N0 Management

Management	Participant (cost model)	Permanent Staff (Euros)	Additional Staff (Euros)	Durable Equipment (Euros)	Consumables and Prototyping (Euros)	Travel (Euros)	Expected costs (Euros)	Direct cost	Subcontract	Indirect cost	Requested funding (Euros)
1	CEA (FC)	427 500	0	1 500	7 500	11 100	447 600	253 350	0	194 250	187 260
	Grand total	**427 500**	**0**	**1 500**	**7 500**	**11 100**	**447 600**	**253 350**	**0**	**194 250**	**187 260**

N1 Electron Linear Accelerator Network (ELAN)

N1	Participant (cost model)	Permanent Staff (Euros)	Additional Staff (Euros)	Durable Equipment (Euros)	Consumables and Prototyping (Euros)	Travel (Euros)	Expected costs (Euros)	Direct cost	Subcontract	Indirect cost	Requested funding (Euros)
1	CEA (FC)	0	0	0	0	9 000	9 000	9 000	0	0	9 000
3	CNRS(FCF)	0	0	0	0	47 000	47 000	39 167	0	7 833	47 000
6	DESY(AC)	0	0	0	0	71 000	71 000	59 167	0	11 833	71 000
7	FZJ(FC)	0	0	0	0	3 000	3 000	3 000	0	0	3 000
9	FZR(AC)	0	0	0	0	8 629	8 629	7 191	0	1 438	8 629
10	INFN (AC)	0	0	0	0	27 000	27 000	22 500	0	4 500	27 000
11	TEU(FC)	0	0	0	0	6 000	6 000	6 000	0	0	6 000
12	TUL(AC)	0	0	0	0	3 300	3 300	2 750	0	550	3 300
13	IPJ(AC)	0	0	0	0	3 300	3 300	2 750	0	550	3 300
14	WUT-ISE(AC)	0	0	0	0	3 300	3 300	2 750	0	550	3 300
16	CSIC(FC)	0	0	0	0	3 400	3 400	2 833	0	567	3 400
17	CERN(AC)	0	0	0	0	40 000	40 000	33 333	0	6 667	40 000
19	PSI(FC)	0	0	0	0	11 200	11 200	11 200	0	0	0
20	CCLRC(FC)	0	0	0	0	13 500	13 500	13 500	0	0	13 500
21	ICL(AC)	0	0	0	0	6 098	6 098	5 082	0	1 016	6 098
22	UMA(AC)	0	0	0	0	14 600	14 600	12 167	0	2 433	14 600
	Grand total	**0**	**0**	**0**	**0**	**270 327**	**270 327**	**232 390**	**0**	**37 937**	**259 127**

N2 Beam in Europe for Neutrino Experiments (BENE)

N2	Participant (cost model)	Permanent Staff (Euros)	Additional Staff (Euros)	Durable Equipment (Euros)	Consumables and Prototyping (Euros)	Travel (Euros)	Expected costs (Euros)	Direct cost	Subcontract	Indirect cost	Requested funding (Euros)
1	CEA(FC)	0	0	0	0	14 250	14 250	14 250	0	0	14 250
2	UCLN(AC)	0	0	0	0	2 400	2 400	2 000	0	400	2 400
3	CNRS(FCF)	0	0	0	0	13 788	13 788	11 490	0	2 298	13 788
4	GSI(FC)	0	0	0	0	4 100	4 100	4 100	0	0	4 100
7	FZJ(FC)	0	0	0	0	14 000	14 000	14 000	0	0	14 000
8	TUM(FC)	0	0	0	0	3 100	3 100	2 583	0	517	3 100
10	INFN(AC)	0	0	0	0	27 900	27 900	23 250	0	4 650	27 900
16	CSIC(FC)	0	0	0	0	11 100	11 100	9 250	0	1 850	11 100
17	CERN (AC)	0	0	0	0	24 000	24 000	20 000	0	4 000	24 000
18	UNI-GE(AC)	0	0	0	0	20 000	20 000	16 667	0	3 333	0
19	PSI(FC)	0	0	0	0	0	0	0	0	0	0
20	CCLRC-RAL (FC)	0	0	0	0	13 000	13 000	13 000	0	0	13 000
21	ICL(AC)	0	0	0	0	29 667	29 667	24 723	0	4 945	29 667
	Grand total	**0**	**0**	**0**	**0**	**177 305**	**177 305**	**155 313**	**0**	**21 993**	**157 305**

N3 High-Energy High-Intensity Hadron Beams (HHH)

N3	Participant (cost model)	Permanent Staff (Euros)	Additional Staff (Euros)	Durable Equipment (Euros)	Consumables and Prototyping (Euros)	Travel (Euros)	Expected costs (Euros)	Direct cost	Subcontract	Indirect cost	Requested funding (Euros)
1	CEA(FC)	0	0	0	0	5 250	5 250	5 250	0	0	5 250
4	GSI(FC)	0	0	0	0	6 700	6 700	6 700	0	0	6 700
6	DESY(AC)	0	0	0	0	6 900	6 900	5 750	0	1 150	6 900
10	INFN(AC)	0	0	0	0	27 900	27 900	23 250	0	4 650	27 900
11	TEU(FC)	0	0	0	0	6 000	6 000	6 000	0	0	6 000
15	WUT(AC)	0	0	0	0	1 500	1 500	1 250	0	250	1 500
16	CSIC(FC)	0	0	0	0	1 200	1 200	1 000	0	200	1 200
17	CERN(AC)	0	46 667	0	0	58 116	104 783	87 319	0	17 464	104 783
19	PSI(FC)	0	0	0	0	0	0	0	0	0	0
20	CCLRC(FC)	0	0	0	0	1 739	1 739	1 739	0	0	1 739
	Grand total	**0**	**46 667**	**0**	**0**	**115 305**	**161 972**	**138 258**	**0**	**23 714**	**161 972**

JRA1 Superconducting Radio-Frequency (SRF)

JRA1	Participant (cost model)	Permanent Staff (Euros)	Additional Staff (Euros)	Durable Equipment (Euros)	Consumables and Prototyping (Euros)	Travel (Euros)	Expected costs (Euros)	Direct cost	Subcontract	Indirect cost	Requested funding (Euros)
1	CEA(FC)	574 885	217 500	0	159 800	15 000	967 185	704 339	0	262 846	245 800
3	CNRS(FCF)	637 000	120 000	6 000	189 339	20 000	972 339	810 283	0	162 057	335 399
6	DESY(AC)	0	250 000	0	385 000	35 000	670 000	577 908	117 450	92 092	670 000
10	*INFN-LNL*	*0*	*52 775*	*6 435*	*60 000*	*9 508*	*128 718*	*107 265*	*0*	*21 453*	*128 718*
	INFN-LNF	*0*	*40 000*	*10 000*	*10 000*	*15 000*	*75 000*	*62 500*	*0*	*12 500*	*75 000*
	INFN-Mi	*0*	*102 480*	*0*	*58 000*	*11 500*	*171 980*	*143 317*	*0*	*28 663*	*171 980*
	INFN-Ro2	*0*	*126 848*	*9 945*	*45 127*	*18 720*	*200 640*	*167 200*	*0*	*33 440*	*200 640*
	INFN(AC)	0	322 103	26 380	173 127	54 728	576 338	480 282	0	96 056	576 338
12	TUL(AC)	0	52 000	0	80 000	20 000	152 000	126 667	0	25 333	0
13	IPJ(AC)	0	41 000	20 000	87 000	25 000	173 000	144 167	0	28 833	*105 000*
14	WUT-ISE(AC)	0	42 600	0	118 400	10 500	171 500	142 917	0	28 583	171 500
19	PSI(FC)	57 444	58 320	32 467	43 247	10 389	201 867	160 700	0	41 167	0
	Grand total	**1 269 329**	**1 103 523**	**84 847**	**1 235 913**	**190 617**	**3 884 229**	**3 147 263**	**117 450**	**736 967**	**2 104 037**

JRA2 Charge Production with Photo-Injectors (PHIN)

JRA2	Participant (cost model)	Permanent Staff (Euros)	Additional Staff (Euros)	Durable Equipment (Euros)	Consumables and Prototyping (Euros)	Travel (Euros)	Expected costs (Euros)	Direct cost	Subcontract	Indirect cost	Requested funding (Euros)
3	*CNRS-Orsay*	*550 000*	*50 000*	*260 000*	*330 000*	*20 000*	*1 210 000*	*1 008 333*	*0*	*201 667*	*520 000*
	CNRS-LOA	*250 000*	*0*	*0*	*325 000*	*0*	*575 000*	*479 167*	*0*	*95 833*	*325 000*
	CNRS(FCF)	800 000	50 000	260 000	655 000	20 000	1 785 000	1 487 500	0	297 500	845 000
9	FZR-ELBE(AC)	0	100 000	0	75 558	9 775	185 333	154 444	0	30 889	185 333
10	*INFN-LNF*	*0*	*75 000*	*0*	*100 000*	*15 000*	*190 000*	*158 333*	*0*	*31 667*	*190 000*
	INFN-Mi	*0*	*75 000*	*0*	*80 000*	*5 000*	*160 000*	*133 333*	*0*	*26 667*	*160 000*
	INFN(AC)	0	150 000	0	180 000	20 000	350 000	291 667	0	58 333	350 000
11	TEU(FC)	88 500	119 424	0	35 000	3 000	245 924	138 285	0	107 639	122 962
17	CERN (AC)	0	90 000	0	1 110 000	18 000	1 218 000	1 015 000	0	203 000	1 218 000
20	CCLRC-RAL (FC)	52 200	210 000	0	0	5 600	267 800	114 900	0	152 900	55 000
	Grand total	**940 700**	**719 424**	**260 000**	**2 055 558**	**76 375**	**4 052 057**	**3 201 796**	**0**	**850 261**	**2 776 295**

JRA3 High Intensity Pulsed Proton Injectors (HIPPI)

JRA3	Participant (cost model)	Permanent Staff (Euros)	Additional Staff (Euros)	Durable Equipment (Euros)	Consumables and Prototyping (Euros)	Travel (Euros)	Expected costs (Euros)	Direct cost	Subcontract	Indirect cost	Requested funding (Euros)
1	CEA (FC)	675 000	100 000	350 000	400 000	2 000	1 527 000	1 027 000	0	500 000	450 000
3	*CNRS-IN2P3*	*70 000*	*0*	*0*	*20 000*	*0*	*90 000*	*75 000*	*0*	*15 000*	*20 000*
	CNRS-LPSC	*261 000*	*0*	*0*	*35 000*	*3 000*	*299 000*	*249 167*	*0*	*49 833*	*31 000*
	CNRS(FCF)	331 000	0	0	55 000	3 000	389 000	324 167	0	64 833	51 000
4	GSI(FC)	365 000	190 000	95 300	7 000	13 300	670 600	530 000	0	140 600	240 000
5	IAP-FU(AC)	0	275 000	0	230 000	5 000	510 000	425 000	0	85 000	210 000
7	FZJ(FC)	479 000	132 000	0	110 000	9 000	730 000	358 661	0	371 339	251 000
10	INFN-Mi(AC)	0	22 990	0	30 000	8 000	60 990	50 825	0	10 165	30 000
17	CERN (AC)	0	345 000	0	150 000	15 000	510 000	425 000	0	85 000	250 000
20	CCLRC (FC)	520 460	351 476	0	257 000	5 000	1 133 936	625 307	0	508 629	128 000
	Grand total	**2 370 460**	**1 416 466**	**445 300**	**1 239 000**	**60 300**	**5 531 526**	**3 765 960**	**0**	**1 765 566**	**1 610 000**

JRA4 Next European Dipole (NED)

JRA4	Participant (cost model)	Permanent Staff (Euros)	Additional Staff (Euros)	Durable Equipment (Euros)	Consumables and Prototyping (Euros)	Travel (Euros)	Expected costs (Euros)	Direct cost	Subcontract	Indirect cost	Requested funding (Euros)
1	CEA (FC)	358 116	41 667	0	92 500	24 000	516 283	0	0	516 283	45 000
10	INFN (AC)	0	15 000	0	25 750	7 000	47 750	39 792	0	7 958	47 750
11	TEU (FC)	139 334	0	0	30 000	4 500	173 834	108 637	0	65 197	69 534
15	WUT (AC)	0	6 500	0	4 500	2 000	13 000	10 833	0	2 167	13 000
17	CERN (AC)	0	21 451	0	360 800	7 200	389 451	382 876	350 000	6 575	350 000
20	CCLRC (FC)	274 000	0	0	33 300	16 500	323 800	163 967	0	159 833	26 250
	Grand total	**771 450**	**84 618**	**0**	**546 850**	**61 200**	**1 464 118**	**706 105**	**350 000**	**758 013**	**551 534**

Financial information for the duration of the detailed implementation plan (per contractor)

Proposal Number	506395	Proposal Acronym	CARE

Financial information – "Reporting period 2 + first six months of Reporting period 3"

Partici-pant n°	Organi-sation short name	Cost model used		Estimated eligible costs and requested EC contribution		Costs and EC contribution per type of activities							Total (8)= (1)+(2)+(3)+(4)+(5)+(6)+(7)	Total receipts
		For transnational Access	For any other activities			RTD activities (1)	Demonstration activities (2)	Consortium Management activities (3)	Other specific activities					
									Coordination/Networking (4)	Transnational access (5)	Connectivity (6)	Other including Specific Service Activities for CND (7)		
1	CEA		FC	Eligible costs	*Direct costs (a)*	1 731 339		253 350	28 500				2 013 189	
					of which subcontracting	0		0	0				0	
					Indirect costs (b)	1 279 129		194 250	0				1 473 379	
					Total eligible costs (a)+(b)	3 010 468		447 600	28 500				3 486 568	
				Requested EC contribution		740 800		187 260	28 500				**956 560**	
2	UCLN		AC	Eligible costs	*Direct costs (a)*	0			2 000				2 000	
					of which subcontracting	0			0				0	
					Indirect costs (b)	0			400				400	
					Total eligible costs (a)+(b)	0			2 400				2 400	
				Requested EC contribution		0			2 400				**2 400**	
3	CNRS		FC	Eligible costs	*Direct costs (a)*	2 621 950			50 657				2 672 607	
					of which subcontracting	0			0				0	
					Indirect costs (b)	524 390			10 131				534 521	
					Total eligible costs (a)+(b)	3 146 339			60 788				3 207 127	
				Requested EC contribution		1 231 399			60 788				**1 292 187**	
4	GSI		FC	Eligible costs	*Direct costs (a)*	530 000			10 800				540 800	
					of which subcontracting	0			0				0	
					Indirect costs (b)	140 600			0				140 600	
					Total eligible costs (a)+(b)	670 600			10 800				681 400	
				Requested EC contribution		240 000			10 800				**250 800**	
TOTAL				Eligible costs										
				Requested EC contribution										

Please use as many copies of form A3.3 as necessary for the number of participants | ***Form A3.3 page*** *1* | ***of*** *6*

Financial information – "Reporting period 2 + first six months of Reporting period 3"														
Participant n°	Organisation short name	Cost model used		Estimated eligible costs and requested EC contribution		Costs and EC contribution per type of activities							Total (8)= (1)+(2)+(3)+(4)+(5)+(6)+(7)	Total receipts
		For transnational Access	For any other activities			RTD activities (1)	Demonstration activities (2)	Consortium Management activities (3)	Other specific activities					
									Coordination/Networking (4)	Transnational access (5)	Connectivity (6)	Other including Specific Service Activities for CND (7)		
5	IAP-FU		FC	Eligible costs	*Direct costs (a)*	425 000			0				425 000	
					of which subcontracting	0			0				0	
					Indirect costs (b)	85 000			0				85 000	
					Total eligible costs (a)+(b)	510 000			0				510 000	
				Requested EC contribution		210 000			0				**210 000**	
6	DESY		AC	Eligible costs	*Direct costs (a)*	577 908			64 917				642 825	
					of which subcontracting	117 450			0				117 450	
					Indirect costs (b)	92 092			12 983				105 075	
					Total eligible costs (a)+(b)	670 000			77 900				747 900	
				Requested EC contribution		670 000			77 900				**747 900**	
7	FZJ		FC	Eligible costs	*Direct costs (a)*	358 661			17 000				375 661	
					of which subcontracting	0			0				0	
					Indirect costs (b)	371 339			0				371 339	
					Total eligible costs (a)+(b)	730 000			17 000				747 000	
				Requested EC contribution		251 000			17 000				**268 000**	
8	TUM		AC	Eligible costs	*Direct costs (a)*	0			2 583				2 583	
					of which subcontracting	0			0				0	
					Indirect costs (b)	0			517				517	
					Total eligible costs (a)+(b)	0			3 100				3 100	
				Requested EC contribution		0			3 100				**3 100**	
TOTAL				Eligible costs										
				Requested EC contribution										

Please use as many copies of form A3.3 as necessary for the number of participants	***Form A3.3 page***	*2*	***of***	*6*

Financial information – "Reporting period 2 + first six months of Reporting period 3"														
artici-ant n°	Organi-sation short name	Cost model used		Estimated eligible costs and requested EC contribution		Costs and EC contribution per type of activities							Total (8)= (1)+(2)+(3)+(4)+(5)+(6)+(7)	Total receipts
		For transnational Access	For any other activities			RTD activities (1)	Demonstration activities (2)	Consortium Management activities (3)	Other specific activities					
									Coordination/Networking (4)	Transnational access (5)	Connectivity (6)	Other including Specific Service Activities for CND (7)		
9	FZR		AC	Eligible costs	*Direct costs (a)*	154 444			7 191				161 635	
					of which subcontracting	0			0				0	
					Indirect costs (b)	30 889			1 438				32 327	
					Total eligible costs (a)+(b)	185 333			8 629				193 962	
				Requested EC contribution		185 333			8 629				**193 962**	
10	INFN		AC	Eligible costs	*Direct costs (a)*	862 566			69 000				931 566	
					of which subcontracting	0			0				0	
					Indirect costs (b)	172 512			13 800				186 312	
					Total eligible costs (a)+(b)	1 035 078			82 800				1 117 878	
				Requested EC contribution		1 004 088			82 800				**1 086 888**	
11	TEU		FC	Eligible costs	*Direct costs (a)*	246 922			12 000				258 922	
					of which subcontracting	0			0				0	
					Indirect costs (b)	172 836			0				172 836	
					Total eligible costs (a)+(b)	419 758			12 000				431 758	
				Requested EC contribution		192 496			12 000				**204 496**	
12	TUL		AC	Eligible costs	*Direct costs (a)*	126 667			2 750				129 417	
					of which subcontracting	0			0				0	
					Indirect costs (b)	25 333			550				25 883	
					Total eligible costs (a)+(b)	152 000			3 300				155 300	
				Requested EC contribution		152 000			3 300				**155 300**	
TOTAL				Eligible costs										
				Requested EC contribution										

Please use as many copies of form A3.3 as necessary for the number of participants	***Form A3.3 page***	*3*	***of***	*6*

Financial information – "Reporting period 2 + first six months of Reporting period 3"														
Partici-ant n°	Organi-sation short name	Cost model used		Estimated eligible costs and requested EC contribution		Costs and EC contribution per type of activities							Total (8)= (1)+(2)+(3)+(4)+(5)+(6)+(7)	Total receipts
		For transnational Access	For any other activities			RTD activities (1)	Demonstration activities (2)	Consortium Management activities (3)	Other specific activities					
									Coordination/Networking (4)	Transnational access (5)	Connectivity (6)	Other including Specific Service Activities for CND (7)		
13	IPJ		AC	Eligible costs	*Direct costs (a)*	144 167			2 750				146 917	
					of which subcontracting	0			0				0	
					Indirect costs (b)	28 833			550				29 383	
					Total eligible costs (a)+(b)	173 000			3 300				176 300	
				Requested EC contribution		105 000			3 300				**108 300**	
14	WUT-ISE		AC	Eligible costs	*Direct costs (a)*	142 917			2 750				145 667	
					of which subcontracting	0			0				0	
					Indirect costs (b)	28 583			550				29 133	
					Total eligible costs (a)+(b)	171 500			3 300				174 800	
				Requested EC contribution		171 500			3 300				**174 800**	
15	WUT		AC	Eligible costs	*Direct costs (a)*	10 833			1 250				12 083	
					of which subcontracting	0			0				0	
					Indirect costs (b)	2 167			250				2 417	
					Total eligible costs (a)+(b)	13 000			1 500				14 500	
				Requested EC contribution		13 000			1 500				**14 500**	
16	CSIC		AC	Eligible costs	*Direct costs (a)*	0			13 083				13 083	
					of which subcontracting	0			0				0	
					Indirect costs (b)	0			2 617				2 617	
					Total eligible costs (a)+(b)	0			15 700				15 700	
				Requested EC contribution		0			15 700				**15 700**	
TOTAL				Eligible costs										
				Requested EC contribution										

Please use as many copies of form A3.3 as necessary for the number of participants	***Form A3.3 page***	*4*	***of***	*6*

Financial information – "Reporting period 2 + first six months of Reporting period 3"														
artici-ant n°	Organi-sation short name	Cost model used		Estimated eligible costs and requested EC contribution		Costs and EC contribution per type of activities							Total (8)= (1)+(2)+(3)+(4)+(5)+(6)+(7)	Total receipts
		For transnational Access	For any other activities			RTD activities (1)	Demonstration activities (2)	Consortium Management activities (3)	Other specific activities					
									Coordination/Networking (4)	Transnational access (5)	Connectivity (6)	Other including Specific Service Activities for CND (7)		
17	CERN		AC	Eligible costs	*Direct costs (a)*	1 822 876			140 652				1 963 528	
					of which subcontracting	350 000			0				350 000	
					Indirect costs (b)	294 575			28 131				322 706	
					Total eligible costs (a)+(b)	2 117 451			168 783				2 286 234	
				Requested EC contribution		1 818 000			168 783				**1 986 783**	
18	UNI-GE		AC	Eligible costs	*Direct costs (a)*	0			16 667				16 667	
					of which subcontracting	0			0				0	
					Indirect costs (b)	0			3 333				3 333	
					Total eligible costs (a)+(b)	0			20 000				(20 000)*	
				Requested EC contribution		0			(20 000)*				**(20 000)***	
19	PSI		AC	Eligible costs	*Direct costs (a)*	160 700			11 200				171 900	
					of which subcontracting	0			0				0	
					Indirect costs (b)	41 167			0				41 167	
					Total eligible costs (a)+(b)	201 867			11 200				213 067	
				Requested EC contribution		(201 867)*			(11 200)*				**(11 200)***	
20	CCLRC		FC	Eligible costs	*Direct costs (a)*	904 174			28 239				932 413	
					of which subcontracting	0			0				0	
					Indirect costs (b)	821 362			0				821 362	
					Total eligible costs (a)+(b)	1 725 536			28 239				1 753 775	
				Requested EC contribution		209 250			28 239				**237 489**	
TOTAL				Eligible costs										
				Requested EC contribution										

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Financial information – "Reporting period 2 + first six months of Reporting period 3"														
artici-ant n°	Organi-sation short name	Cost model used		Estimated eligible costs and requested EC contribution		Costs and EC contribution per type of activities							Total (8)= (1)+(2)+(3)+(4)+(5)+(6)+(7)	Total receipts
		For transnational Access	For any other activities			RTD activities (1)	Demonstration activities (2)	Consortium Management activities (3)	Other specific activities					
									Coordination/Networking (4)	Transnational access (5)	Connectivity (6)	Other including Specific Service Activities for CND (7)		
21	ICL		AC	Eligible costs	*Direct costs (a)*	0			29 805				29 805	
					of which subcontracting	0			0				0	
					Indirect costs (b)	0			5 961				5 961	
					Total eligible costs (a)+(b)	0			35 765				35 765	
				Requested EC contribution		0			35 765				**35 765**	
22	UMA		AC	Eligible costs	*Direct costs (a)*	0			12 167				12 167	
					of which subcontracting	0			0				0	
					Indirect costs (b)	0			2 433				2 433	
					Total eligible costs (a)+(b)	0			14 600				14 600	
				Requested EC contribution		0			14 600				**14 600**	
TOTAL				Eligible costs		**14 931 930**		**447 600**	**609 604**				**15 989 134**	
				Requested EC contribution		**7 193 866 (201 867)***		**187 260**	**578 404 (+31 200)***				**7 959 530 (+233067)***	

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**Since the contract with EU is expected to be signed in 2003 and the agreement on Swiss participation in the 6th FP will not yet be in force , Swiss Partners should be funded by the Swiss Government*)