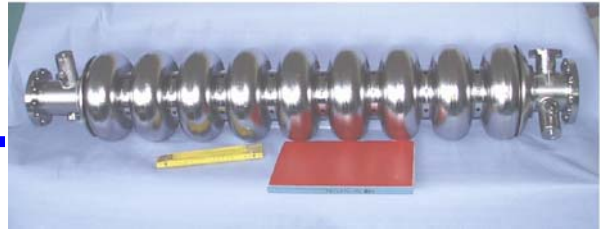




SRF



## SECOND QUARTERLY REPORT OF THE SRF COLLABORATION

D. Proch, DESY, T. Garvey, CNRS-Orsay

**CARE/JRA1 Quarter report 2/2004**  
version c

**Research and Development on Superconducting Radio-Frequency  
Technology for Accelerator Application**

**Acronym: SRF**

**Co-Coordinator: D. Proch, DESY, T.Garvey, CNRS-Orsay**

**Participating Laboratories and Institutes:**

<b>Institute (Participating number)</b>	<b>Acronym</b>	<b>Country</b>	<b>Coordinator</b>	<b>SRF Scientific Contact</b>	<b>Associated to</b>
DESY (6)	DESY	D	D. Proch	D. Proch	
CEA/DSM/DAPNIA (1)	CEA	F	R. Aleksan	O. Napoly	
CNRS-IN2P3-Orsay (3)	CNRS-Orsay	F	T.Garvey	T.Garvey	CNRS
INFN Legnaro (10)	INFN-LNL	I	S. Guiducci	E. Palmieri	INFN
INFN Milano (10)	INFN-Mi	I	S. Guiducci	C. Pagani	INFN
INFN Roma2 (10)	INFN-Ro2	I	S. Guiducci	S. Tazzari	INFN
INFN Frascati (10)	INFN-LNF	I	S. Guiducci	M. Castellano	INFN
Paul Scherrer Institute (19)	PSI	CH	V. Schlott	V. Schlott	
Technical University of Lodz (12)	TUL	PL	A.Napieralski	M. Grecki	
Warsaw University of Technology (14)	WUT-ISE	PL	R.Romaniuk	R. Romaniuk	
IPJ Swierk (13)	IPJ	PL	M. Sadowski	M. Sadowski	

**Industrial Involvement:**

<b>Company Name</b>	<b>Country</b>	<b>Contact Person</b>
ACCEL Instruments GmbH	D	M. Peiniger
WSK Mess- und Datentechnik GmbH	D	F. Schölz
E. ZANON SPA	I	G. Corniani
Henkel Lohnpolierttechnik GmbH	D	B. Henkel

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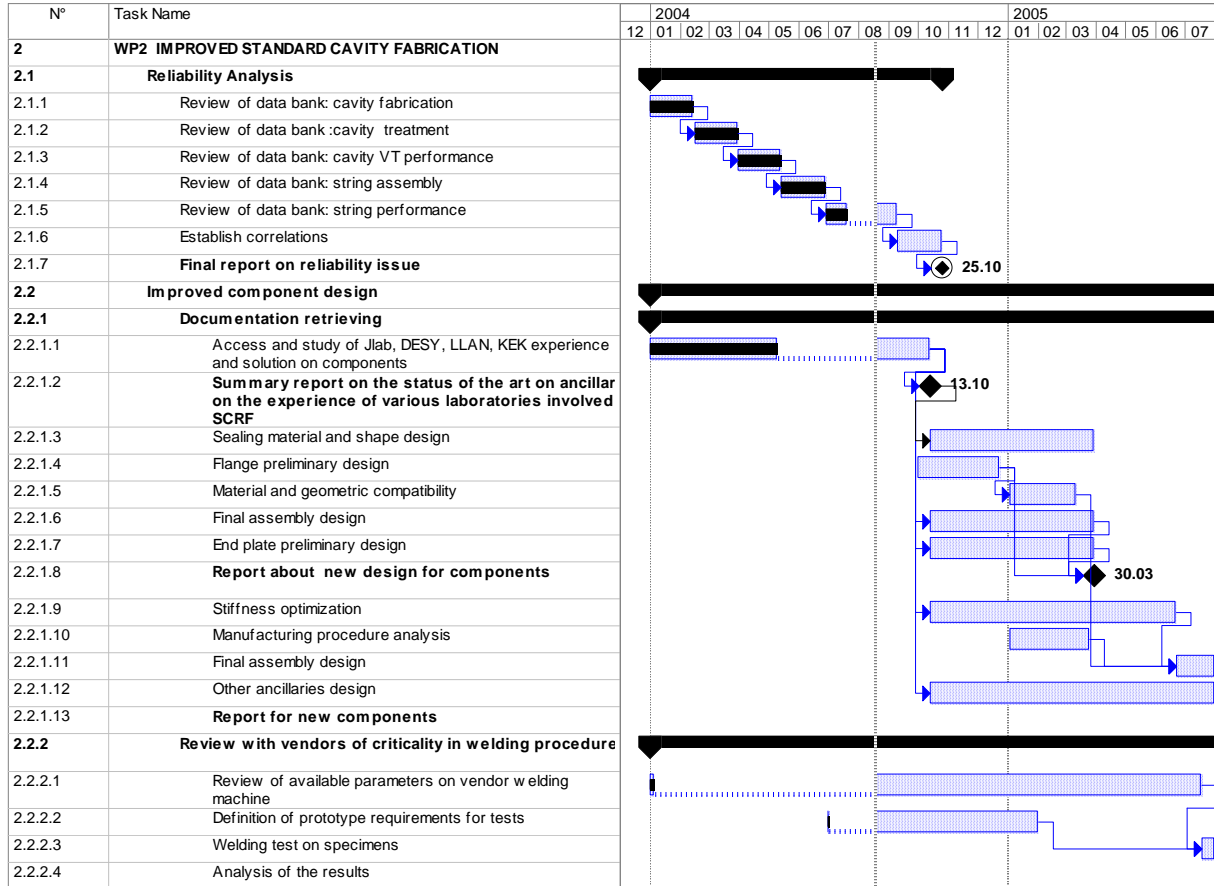
CARE JRA1 SRF Technology

Table1.1.1.a: Overview of meetings, workshop and event (co) organized by the Activity or with Activity contributions

JRA Activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Activity yearly and/ or steering meeting											CARE 04; 2.-6.Nov.	
Meeting WP1-WP11	21.-23 Zeuthen		24.; Telefone conference	7.; DESY		21., 22.; Telefon conference	26.,27.; Telefone conference		9.; Orsay			
Meeting WP's		WP3,5,7,8,10; 3.Feb. Orsay	4.; WP1-11, DESY briefing			24.- 26.;WP8, DESY						
Meeting WP's		WP 5,6; 12.Feb. Legnaro				22., WP1, DESY administratio n		30.; WP1, DESY administrati on				
Meeting WP's		WP8; 12.Feb.										
Joined meeting / workshop with other CARE activities					ELAN, 4.- 6., Frascati							
Joined meeting with other collaborations												
TESLA	21.-23. Zeuten			6.-8.; DESY					6.-8.; Orsay			
Conferences & workshops with activity contributions						24.-26.; IEEE Szczecin	5.-9, EPAC, Lucern	16.-20.; Linac, Lübeck				

WP2 IMPROVED STANDARD CAVITY FABRICATION

Task 2.1: Reliability analysis,  
Task 2.2: Improved component design



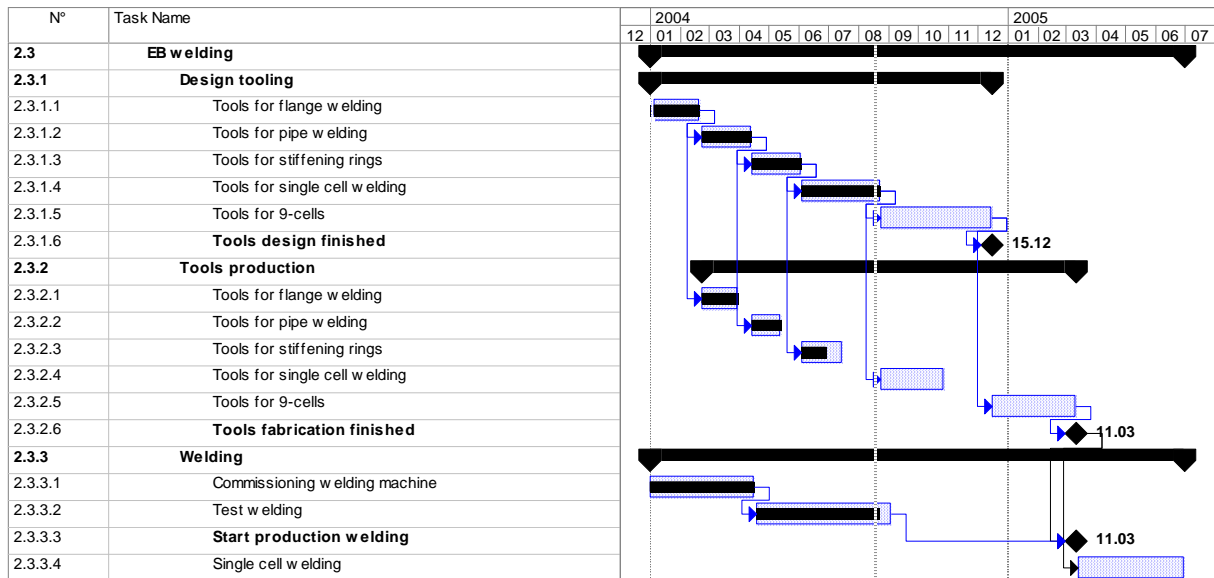
**Status of activity:**

Task 2.1 is slightly delayed, but it is assumed that milestone 2.1.7 will be met in time.

Subtask 2.2.1 has accumulated a certain delay due to the difficulty in hiring people as discussed in the past phone conference. We estimated a delay of about three months.

Subtask 2.2.2 foresees contacts and activities with industrial subcontractors, these will start in September.

**Task 2.3: EB welding**

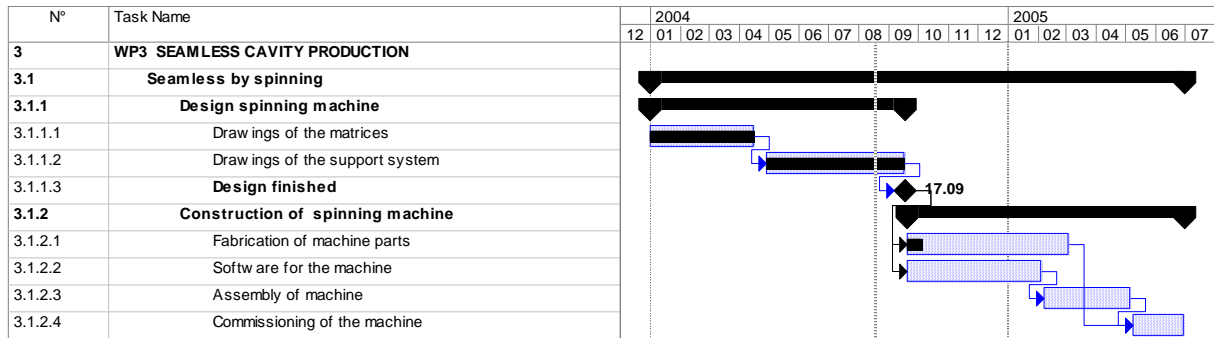


**Status of activity:**

Task 2.3 is in line. At present the rotating welding table in the vacuum welding chamber is thoroughly cleaned from standard grease in order to meet the stringent vacuum requirement for welding high purity Niobium.

WP3 SEAMLESS CAVITY PRODUCTION

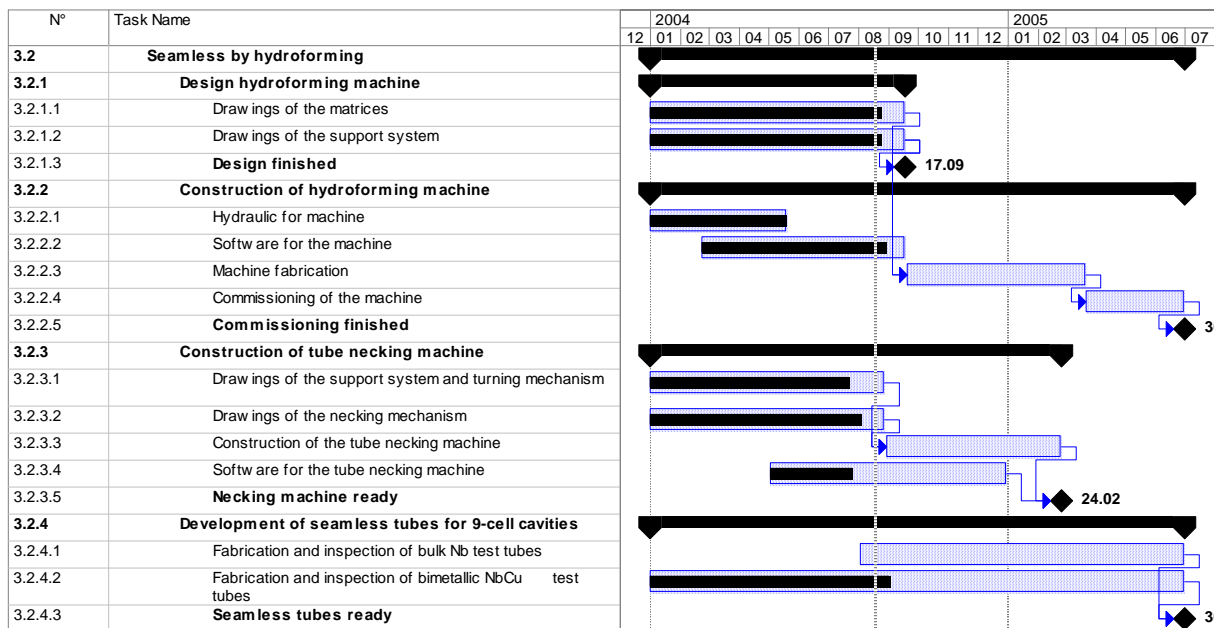
**Task 3.1: Seamless by spinning**



**Status of activity:**

Task 3.1 proceeds in time. It has been evaluated and chosen the solution of upgrading an existing spinning machine with a second turret, in order to industrialize the actual spinning procedure. The specifications for the new turret have been finally decided. We received a quotation from the firm. The order waits to be processed by our administration.

**Task 3.2: Seamless by hydroforming**



**Status of activity:**

- At the moment we do not have any delay.
- Work on design of the hydroforming machine was continued. Drawings of the matrices and of the support system are in the final stage.
- Construction of the hydroforming machine is in work. Hydraulic for the machine is ready. Work on the software is in the final stage. Software will be based on the LabVIEW principles (company National Instruments).

## CARE JRA1 SRF Technology

- Construction of the tube necking machine is in work. Drawings of necking mechanism, support system and turning mechanism are in the final stage. Concept for the software is developed and is in the implementation.
- A seam less bimetallic NbCu tube is ordered.

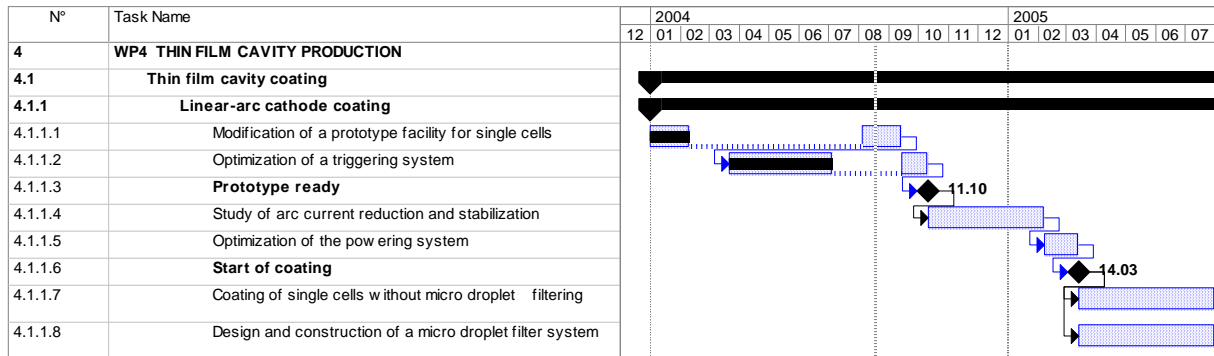
### Task 3.2: Status of money spending

<b>K €</b>	<b>Spent money</b>	<b>Value of new orders/ contracts</b>	<b>Expected spending of new orders/contracts until end 2004</b>	<b>Sum of column 2 &amp; 4</b>
<b>Travel</b>				
<b>Consumables</b>	<i>14225</i>		<i>53000</i>	<i>67157</i>
<b>Manpower</b>	<i>9020</i>		<i>14.760</i>	<i>23780</i>
<b>Durable</b>				
			<b>Total sum</b>	<i>90937</i>



WP4 THIN FILM CAVITY PRODUCTION

**Task 4.1.1: Linear arc cathode coating**



**Status of activity:**

Optimization of a triggering system has been finished. Two independent triggering systems are ready: HV trigger and modified mechanical trigger. Laser triggering has been tested with ruby laser. Nd YAG laser is ordered (delivery in September confirmed).

Modification of a prototype facility for single cells is delayed. This delay of about 2 month is caused by the 2-month delay in money transfer from the coordinator office. It was impossible to order a durable equipment (vacuum pumps, gauges and spectrometer) in proper time. New power supply has been bought only. On today, needed equipment is ordered and the delivery in August/September is confirmed.

Good candidate, young engineer has been found. Since September he should be employed in the frame of contract.

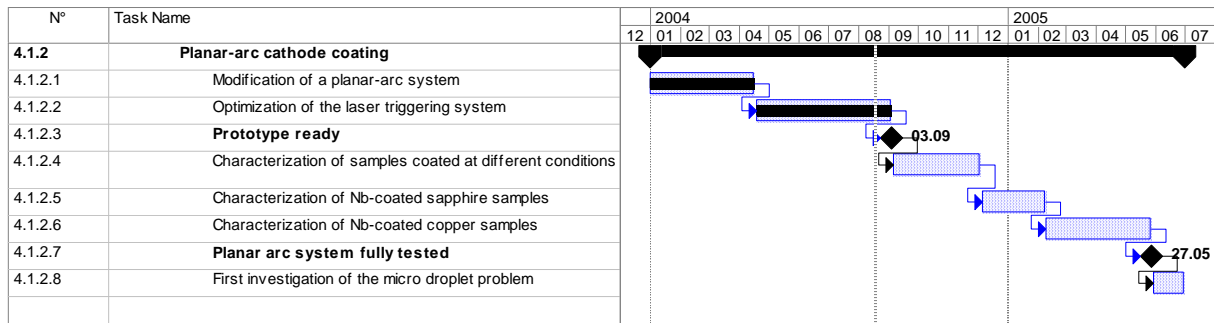
**Task 4.1.1: Status of money spending**

K €	Spent money	Value of new orders/ contracts	Expected spending of new orders/contracts until end 2004	Sum of column 2 & 4
<b>Travel</b>	2.5		2.0	4.5
<b>Consumables</b>	5.5		15.0	20.5
<b>Manpower</b>		3.2	3.2	3.2
<b>Durable</b>	2.2	50.0	52.5	52.5
			<b>Total sum</b>	80.7

**Publications and meetings**

1. “Super-conducting niobium films produced by means of ultra-high vacuum arc”, J.Langner, M.J.Sadowski, K.Czaus, R.Mirowski, J.Witkowski, L.Catani, A.Cianchi, R.Russo, S.Tazzari, F.Tazzioli, D.Proch, N.N.Koval, Y.H.Akhmadeev, 21<sup>st</sup> SPPT in Prague, Czech Republic, published in Czech. J. Phys. Vol. 54 C (2004)

**Task 4.1.2: Planar arc cathode coating**



**Status of activity:**

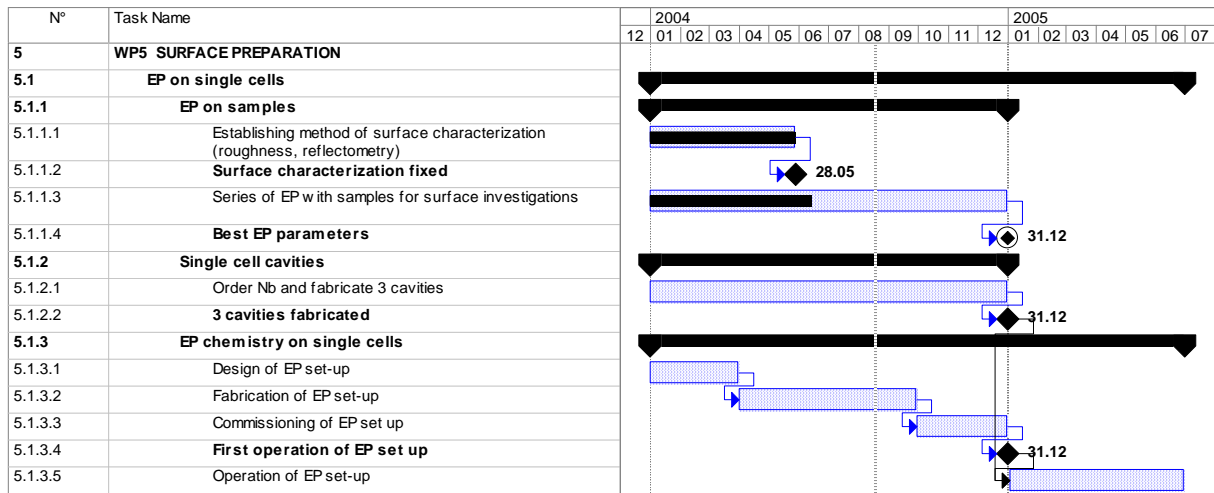
The status is summarised in the schedule above. Project start is when money was actually received. We are ahead of schedule on item 4.1.2.1 and partially ahead on item 4.1.2.2. Laser triggering works very well, the first shot reliably starting the arc every time. Work on “New magnetic filtering system “ is running late because we are in the process of upgrading the design, on the basis of recent experience, so as to make it capable of also depositing single cell like objects. Large copper samples to be employed for task 4.1.2.6 are being prepared and should be delivered by end of August. We have also ordered a new cathode assembly.

**Financial report**

		(K€)
A. Committed so far:	<b>Consumables</b>	5,5
B. Expected till end 2004:	<b>Instrumentation</b>	25,0
	<b>Personnel,Temp.Contract (4 m)</b>	14,0
<b>Consumables</b>		<u>10,0</u>
<b>TOTAL A+B</b>		<b>55,5</b>

**WP5 SURFACE PREPARATION**

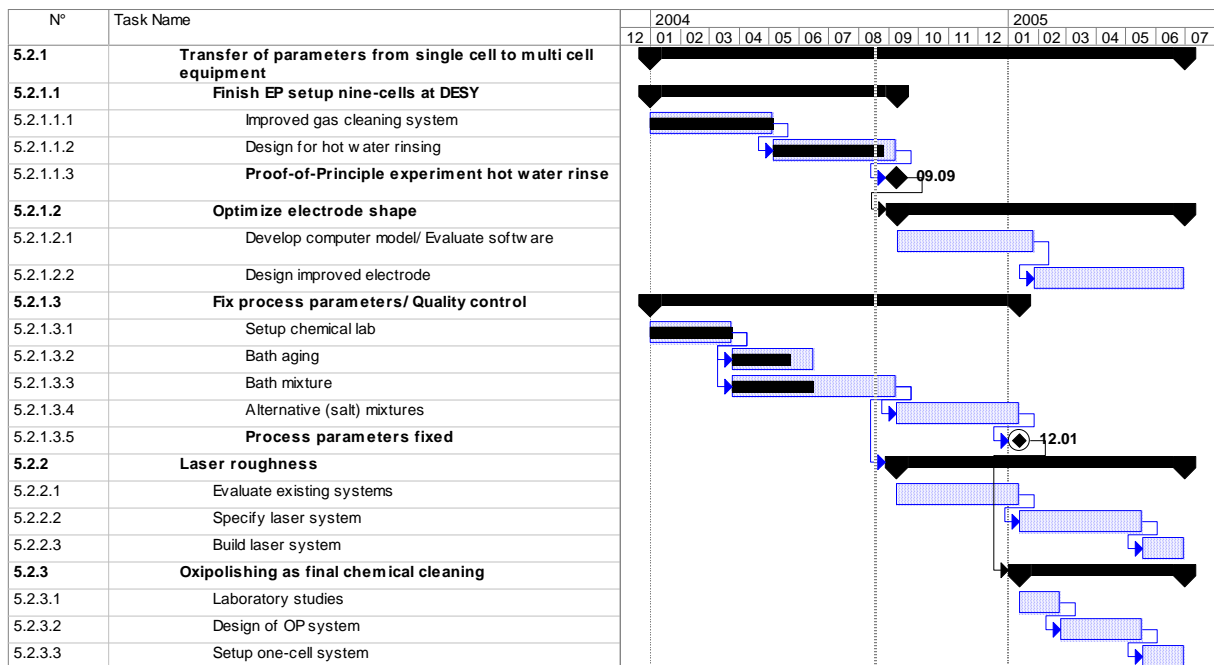
**Task 5.1: EP on single cells**



**Status of activity:**

Milestone 5.1.1.2 has been met. A report on a method of surface characterization has been submitted. Due to a relocation of the service the activity is stopped until mid-September. This will have no serious effect to the schedule

**Task 5.2: Multicell EP**

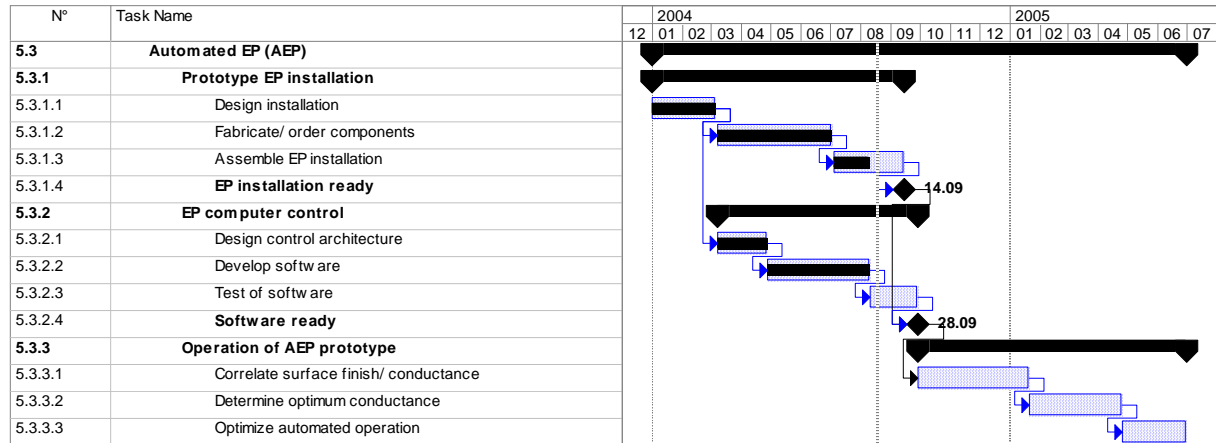


**Status of activity:**

The improved gas cleaning system is installed. Due to some problems with EP setup currently a delay of about a month has been accumulated. It still seems feasible to electropolish 10 cavities this year.

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.

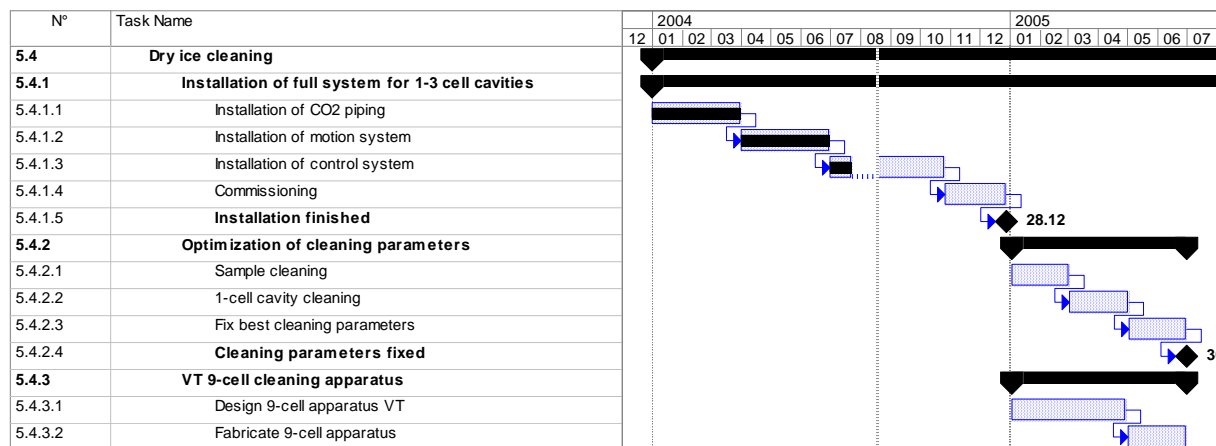
**Task 5.3: Automated EP**



**Status of activity:**

Also this activity proceeds in time. We decided to do the automation by means of a PLC programmed in labview. The software has been developed but not yet tested. The supply ordered on ESGARD budget has been not yet delivered, so we used an existing supply for the moment. The supply was however a current generator, so it was not suitable for the Automated EP process that must drive a voltage generator. The supply has been modified in order to be driven both in current and in voltage. The modify has been executed a few days ago. This supply can be used for testing, meanwhile we wait for the delivery of the new supply.

**Task 5.4: Dry ice cleaning**



**Status of activity:**

Main activity was the construction and test assembly of the motion system. The construction is ready, but due to some missing components (delay in fabrication) the further assembly is delayed by 6 weeks.

## CARE JRA1 SRF Technology

Furthermore additional tests with a prototype system were performed to determine a better parameter set for the upcoming commissioning and the order of the CO2 purifier/cooler unit.

The quotation for the CO2 purifier/cooler unit is available and the order will be placed in the next weeks.

Beginning from August, 1<sup>st</sup> a technician contract starts to support and accelerate the installation of the system. Therefore the delay will be eliminated within the next months.

### Status of milestones / deliverables for WP 5 in the second quarter:

The WP 3.1 and the WP 5.3 are on time. The WP 6.2 has some delay. No publications are yet available.

### Financial report INFN in JRA1:

We have hired a mechanical technician for support, a material scientist working on Electropolishing and a Physicist that will take care of cavity characterization, then we have ordered a power supply for EP and we have submitted to the LNL administration the order for the turret to add on the spinning machine. The money for materials have been accounted, but not yet paid. For January 05 we would like to hire a second technician.

K €	Spent money	Value of new orders/ contracts	Expected spending of new orders/contracts until end 2004	Sum of column 2 & 4
<b>Travel</b>				
<b>Consumables</b>		€ 3,468 (WP5.3 for the EP supply)	€41.300 (WP3.1 for spinning turret, not yet paid)	
<b>Manpower</b>	€ 22,550 (WP5.3 and WP6.2 for Dr. Rampazzo) € 16,900 (WP 3.1, WP5.3 and WP6.2 for Mr. Varotto )	€ 33,406.00 (WP5.3 for Dr.Stark)		
<b>Durable</b>				
			<b>Total sum</b>	<i>Total € 117,624</i>

**Financial report of subtasks in WP 5**

	Single-cells	Multi-cells	Automated	Dry-ice
Spend money	5.1.	5.2.	5.3.	5.4.
Travel				5000
Consumables		6300		41900
Manpower			39450	10000
Durable				

New contracts	5.1.	5.2.	5.3.	5.4.
Travel				
Consumables				
Manpower		15000	33406	
Durable				

Expected spending	5.1.	5.2.	5.3.	5.4.
Travel				
Consumables			3468	
Manpower				
Durable				

Sum

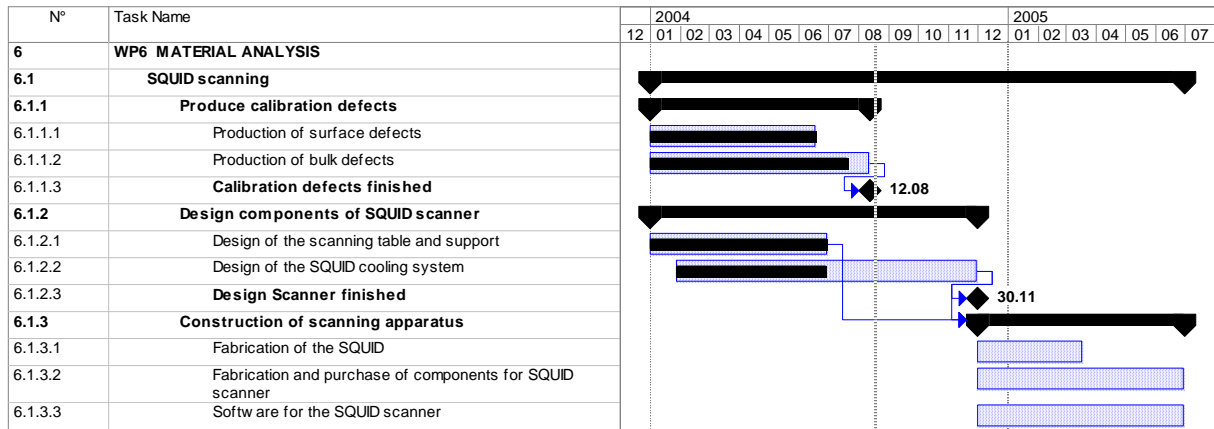
Travel	0	0	0	5000
Consumables	0	6300	3468	41900
Manpower	0	15000	72856	10000
Durable	0	0	0	0

**IV Publications and meetings**

A short overview of the activities can be found in the proceedings of the 1<sup>st</sup> ELAN Workshop in Frascati (<http://elan.desy.de>) .

WP6 MATERIAL ANALYSIS

Task 6.1 SQUID SCANNING



Status of activity:

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 niobium sheet.

Design of components of the SQUID scanner is in work. One of the possible solutions for the scanning table design is finished.

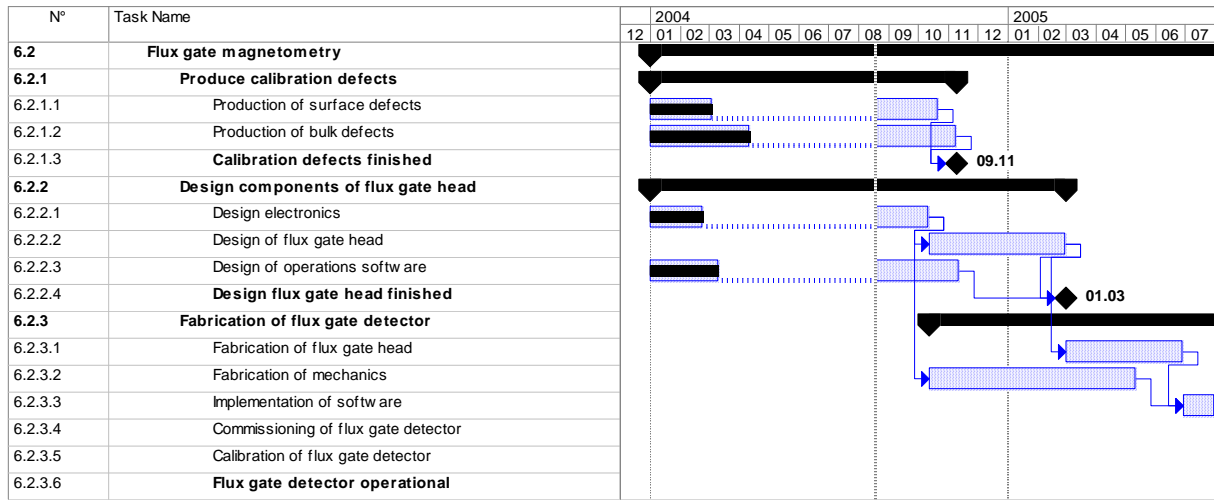
II Status of milestones / deliverables in this quarter

No milestones / deliverables in this quarter

III Financial report

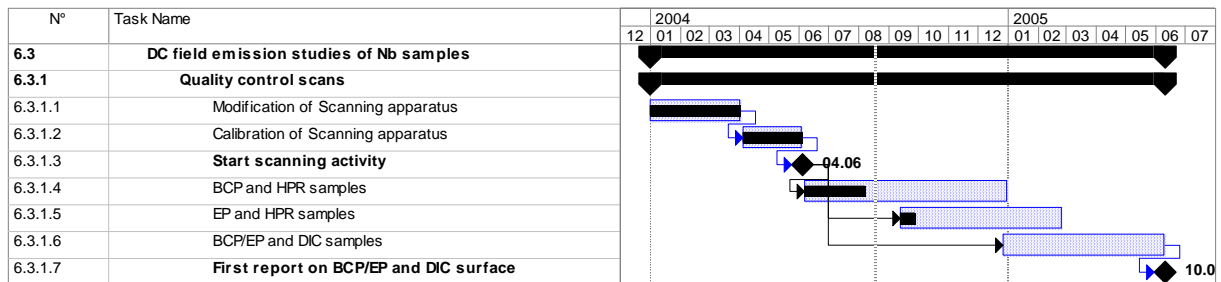
K €	Spent money	Value of new orders/ contracts	Expected spending of new orders/contracts until end 2004	Sum of column 2 & 4
<b>Travel</b>				
<b>Consumables</b>			55300	55300
<b>Manpower</b>	6150		1230	7380
<b>Durable</b>				
			<b>Total sum</b>	62680

**Task 6.2 Flux gate magnetometry**



**Status of activity**

We are in delay. The reason is that because of late arrival of money added to the long time needed by INFN for people recruitment, the mechanical technician that was supposed to fabricate the electrolytic cells for magnetometry was hired with delay, so as soon as he arrived he was busy for the activity of spinning seamless cavity. This has delayed the construction of magnetometry tools. The delay however will be fully recovered in the second part of the year.



**Status of activities:**

Beginning from July, 1<sup>st</sup> 2004 the work is supported by a new scientific co-worker financed by CARE money.

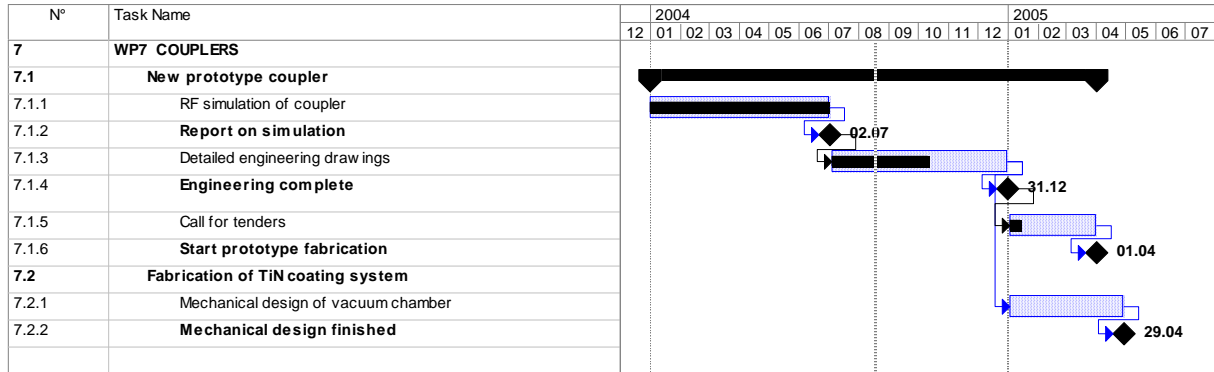
A dedicated specimen holder for high pressure rinsing experiments is under construction. The status of the existing samples is ascertained.



WP7 COUPLERS

**Task 7.1: New prototype coupler**

**Task 7.2: Fabrication of TiN coating system**



**Status of activity:**

Design of new prototype couplers: There are two designs for the new prototype couplers (see last quarter report): TTF5 with cylindrical windows and TW60 with planar windows. RF simulations are already done (task 7.1.1, see last quarter report). Mechanical design (task 7.1.2) is done for TTF5 coupler, and should be finished for TW60 coupler in September.

A call for tenders (task 7.1.3) for TTF5 couplers is on the way of publishing. Another call for tenders will be launched after this first one for some TW60 couplers. So for task 7.1 we are on schedule.

The design of the TiN coating device (task 7.2) will begin probably in October 2004 with a little ahead on schedule (CARE schedule: 1<sup>st</sup> January 2005)

Exploring new processing methods: we start this activity and we have good results (processing in less than 44,6 hrs, internal report)

**Status of milestones / deliverables in this quarter**

All milestones for this quarter report are on schedule.

**Financial report**

For travel the spent money is for the moment supported by LAL

<b>K €</b>	<b>Spent money</b>	<b>Value of new orders/ contracts</b>	<b>Expected spending of new orders/contracts until end 2004</b>	<b>Sum of column 2 &amp; 4</b>
<b>Travel</b>	*			
<b>Consumables</b>	6166.20 €		**250 k€	256166.20€
<b>Manpower</b>				
<b>Durable</b>	6964.27€			6964.27€
			<b>Total sum</b>	

\* For travel the spent money is for the moment supported by LAL

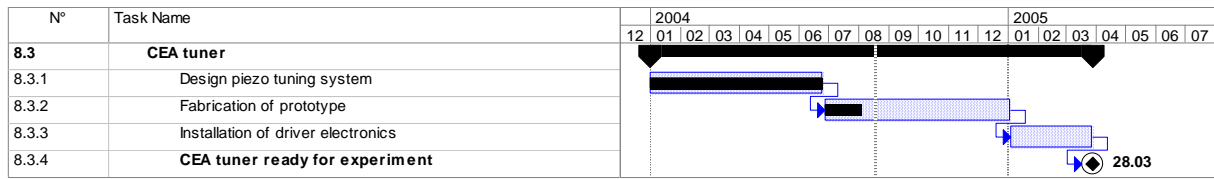
\*\* Ordering of 4 couplers TTF 5 expected end of 2004

**Publications and meetings**

Publications are internal reports and notes only.



**Task 8.3 CEA tuner**

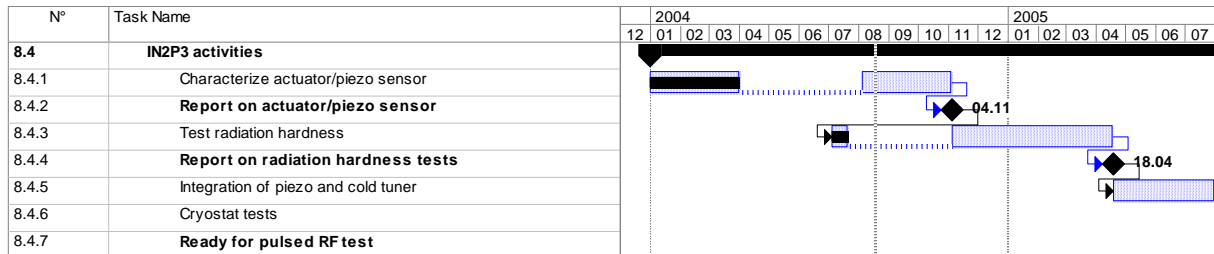


**Status of activity:**

The pre studies of the piezo tuner were finished and final drawings for realization are going to be sub contracted. They shall be delivered mid of October. The components will be realized following this delivery. We hope to have the possibility to mount them before the end of the year, in less than 2 months.

The piezo support is designed to mount two lengths of piezo: 30 and 36 mm. The 12 NOLIAC piezo actuators 30mm long were bought and they should be delivered before the end of September. The PI piezoelements will be taken from IPN Orsay for tests. Several NOLIAC piezoelements will be sent to IPN for low temperature characterization and radiation tests.

**Task 8.4 In2P3 activities**



**Status of activities:**

The task of CNRS-IN2P3-Orsay institute is characterization of piezoelectric actuators at low temperature, 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 horizontal cryostat in collaboration with CEA/DSM/DAPNIA institute.

Equipment, which is necessary for piezoelement characterization like a dedicated test-chamber, temperature sensors, liquid helium level gauge, etc, was recently delivered to IPN Orsay and assembling of elements is started. The thermometers were already calibrated in the temperature range 1.6 K-300K at the IPN Orsay facility. The low temperature full characterization of piezoelement from PIEZOSYSTEM JENA was continued and preliminary room temperature tests of a new experiment (piezoelement as force sensor) were performed. The new prototypes of piezostacks from PI Company have been also delivered. The NOLIAC piezostacks will be taken from CEA Saclay. The first technical report on low temperature characterization of piezostacks is expected before end of October.

The preparation for an irradiation hardness experiment is well in progress: the detailed drawings of the irradiation test-chamber are finished, the calculation concerning material activation are started, order for the electronics dedicated to these tests were placed and the item delivery is expected by end of July. According to the agreement with CERI laboratory (the host lab for irradiation test) the first experiments with neutron beam might be performed after January 2005. The exact date will be defined before December 2004. As a consequence, the corresponding technical report will not be available before end of April 2005. From the beginning of September a research assistant will be hired.

**Status of milestones / deliverables of WP8 in the second quarter**

- 8.1 A delay of 6 months in milestones 8.1.5.1 Tuner Design Report is expected (it was initially foreseen for 15 Apr 2005),
- 8.2 At this moment no delay is foreseen for the technical report,
- 8.3 The pre study was longer than expected, and the time scheduled for the tests will be shortened. However we are still on time for the delivery in March 2005 of the piezo tuners.
- 8.4 A delay of 4 months in milestones 8.4.2 Report on actuator/sensor piezo and 8.4.3 Report on radiation hardness test is expected. It is mainly due to the delay of European financial support and delay in delivery of the piezo components from Physic Instrument.

**Financial report WP8**

Tables for each task are presented below. The last one shows the total cost of whole work package.

8.1.UMI tuner

<b>K €</b>	<b>Spent money</b>	<b>Value of new orders/ contracts</b>	<b>Expected spending of new orders/contracts until end 2004</b>	<b>Sum of column 2 &amp; 4</b>
<b>Travel</b>	<i>0</i>	<i>0</i>	<i>5</i>	<i>5</i>
<b>Consumables</b>	<i>0</i>	<i>0</i>	<i>15</i>	<i>15</i>
<b>Manpower</b>	<i>0.8</i>	<i>0</i>	<i>18</i>	<i>18.8</i>
<b>Durable</b>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
			<b>Total sum</b>	<i>38.8</i>

8.2. Magnetostrictive tuner

K €	Spent money	Value of new orders/ contracts	Expected spending of new orders/contracts until end 2004	Sum of column 2 & 4
<b>Travel</b>	0.7		4	4.7
<b>Consumables</b>	2.8		20	22.8
<b>Manpower</b>	1.7		2	3.7
<b>Durable</b>				
			<b>Total sum</b>	31.2

The values presented above might be slightly different due to the exchange rate.

8.3. CEA tuner

K €	Spent money	Value of new orders/ contracts	Expected spending of new orders/contracts until end 2004	Sum of column 2 & 4
<b>Travel</b>	~ 0.27		~0.54	~0.81
<b>Consumables</b>		6.264 (actuators)		
<b>Manpower</b>				
<b>Durable</b>			~20 (tuners)	~20
			<b>Total sum</b>	~27

8.4 IN2P3 activities

K €	Spent money	Value of new orders/ contracts	Expected spending of new orders/contracts until end 2004	Sum of column 2 & 4
<b>Travel</b>	1.350		4.0	5.35
<b>Consumables</b>	11.384	27.3	27.3	38.684
<b>Manpower</b>	0	0	12	12
<b>Durable</b>	0	0	0	
			<b>Total sum</b>	56.034

Total sum of 8<sup>th</sup> WP

K €	Spent money	Value of new orders/ contracts	Expected spending of new orders/contracts until end 2004	Sum of column 2 & 4
<b>Travel</b>	2.320	0.000	13.540	15.860
<b>Consumables</b>	14.184	33.564	62.300	76.484
<b>Manpower</b>	2.500	0.000	32.000	34.500
<b>Durable</b>	0.000	0.000	20.000	20.000
			<b>Total sum</b>	146.844

## **Publications and meetings**

### Meetings:

Kick-off Meeting, Work Package #8, Hamburg, Germany, February 12th, 2004  
1<sup>st</sup> Workshop of ELAN Meeting, Frascati, Italy, 4-6 May 2004

### Papers:

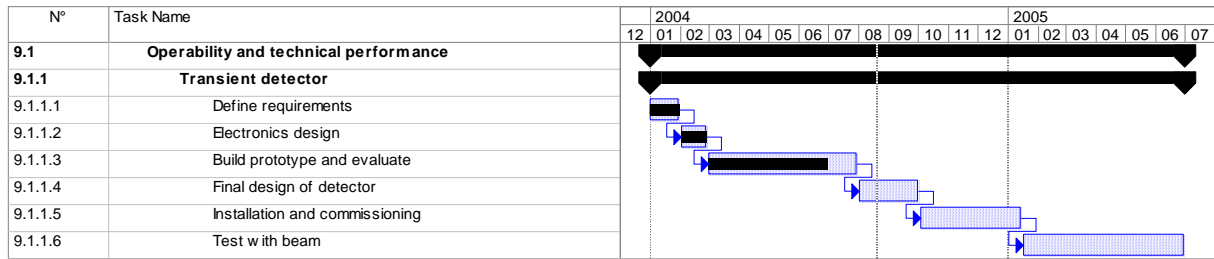
- [1] “Lorentz Force Detuning Compensation System for Accelerating Field Gradients up to 35 MV/m for Superconducting XFEL and Tesla Nine-Cell Cavities”, P. Sekalski, S. Simrock, L. Lilje, C. Albrecht, MIXDES 2004, Poland,

### Web sites:

<http://tesla.desy.de/~sekalski>

WP9 LOW LEVEL RF (LLRF)

**Subtask 9.1.1: Transient detector**

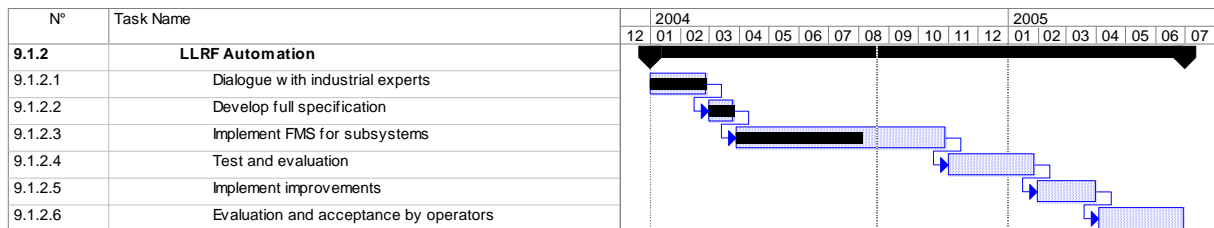


**Status of activities**

Progress is in line with schedule.

Studied prototype of single bunch electronics with beam at TTFII. Difficulties encountered include electromagnetic noise from the environment, phase changes of individual cavities during the flat-top portion of the vector-sum, and direct pick-up of the signal by the bunch itself. Systematic studies with varying beam phase showed that direct crosstalk from the beam dominated the measurement. Studies will resume in September following the shutdown of the accelerator.

**Subtask 9.1.2: LLRF Automation**



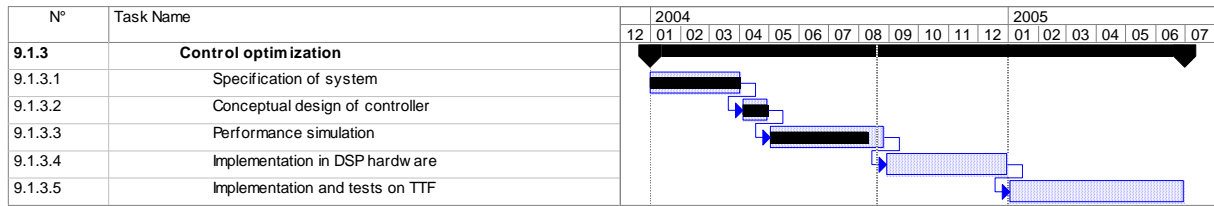
**Status of activities**

Progress is in line with schedule.

The recognition of power supply subsystem and initial design of the application (Finite State Machine). Main interest was a single RF power station which consists of klystron, “modulator”, waveguides and all auxiliary facilities which make this all those things working. The requirement analysis has been worked out and discussed. The new XML based method for preparation configuration files has been worked out. The WEB application for generation and edition of those files is under development. The software design has been started using Harel's finite state machine diagrams. Some discussions have been performed with the programmers working on device drivers of the hardware equipment. The prototype model of the FSM is being developed in the Matlab (Stateflow toolbox).



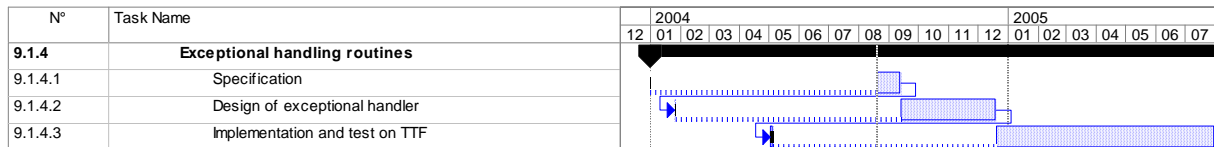
**Subtask 9.1.3: Control optimisation**



**Status of activities**

Progress is in line with schedule

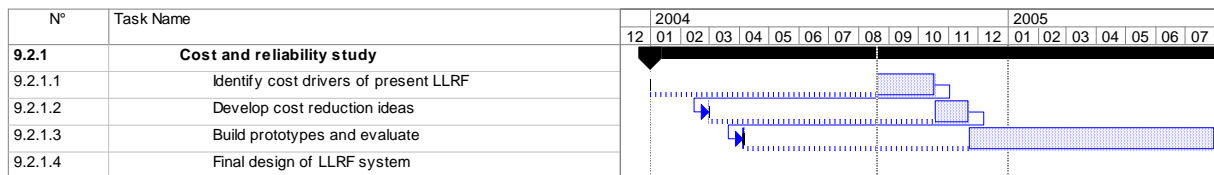
**Subtask 9.1.4: Exception handling routines**



**Status of activities**

Delay of 6 month because of difficulties in hiring a competent person. The expert is just hired now, it is assumed that the delay can partially be made up.

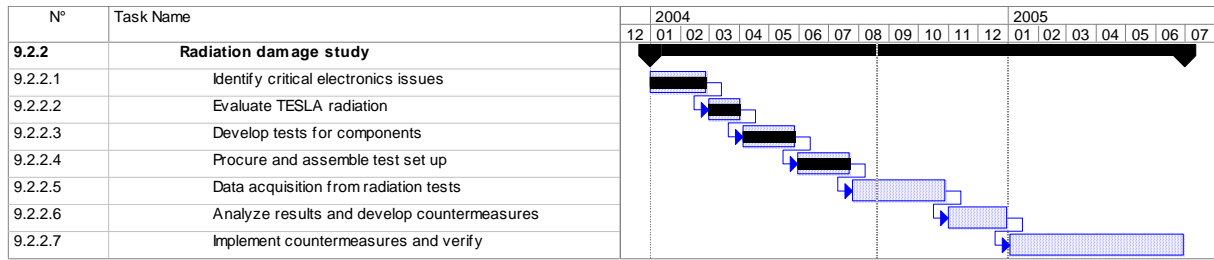
**Subtask 9.2.1: Cost and reliability study**



**Status of activities**

Delay of 6 month because of difficulties in hiring a competent person. The expert is just hired now, it is assumed that the delay can partially be made up.

**Subtask 9.2.2: Radiation damage study**

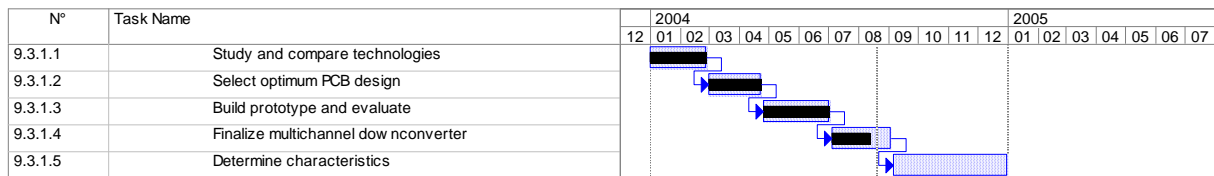


**Status of activities**

Progress is in line with schedule.

The investigations focus on application of SRAM memories to detection and measurements of radiation level. The experiments done in previous months have proven that SRAM memory can be used for that purpose, however accelerator environment is so radiated and noisy that it is necessary to use special hardware and communication channels. The specialized computer based on two synchronously operating processors has been build and installed in Linac II tunnel. It is able to detect SEUs in SRAM memory and to measure supply current in the memory. Both parameters are collected in database accessible through www interface. The data are collected during normal Linac II operation and will be used for further analysis. Other boards will be installed in TTF2 tunnel when accelerator will be under operation.

**Subtask 9.3.1: Multichannel down converter**



**Status of activities**

The activity is in line with the schedule

The 81 MHz downconverter board has been designed and will be produced within the next month. A reference frequency system allowing tests at Chechi is under construction.

**Subtask 9.3.2: Third generation RF control**

N°	Task Name	2004												2005								
		12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	
<b>9.3.2</b>	<b>Third generation RF control</b>	[Gantt bar from Dec 2004 to Dec 2005]																				
9.3.2.1	Integrate system generator w ith VHDL	[Task bar from Dec 2004 to Jan 2005]																				
9.3.2.2	Complete specification	[Task bar from Jan 2005 to Feb 2005]																				
9.3.2.3	Demonstrate simulator	[Task bar from Feb 2005 to Apr 2005]																				
9.3.2.4	Final design of RF electronic board	[Task bar from Apr 2005 to Sep 2005]																				
9.3.2.5	Evaluate performance	[Task bar from Sep 2005 to Dec 2005]																				

**Status of activities**

The activity is in line with the schedule.

The FPGA based feedback has been tested at Chechia. Performance has been limited by offset in the vector-modulator and the Small signal levels from the downconverter. Identification of QL and detuning has been demonstrated. Following improvements of the vector modulator and downconverter the testing at Chechia will resume.

**Subtask 9.3.3: Stable frequency distribution**

N°	Task Name	2004												2005								
		12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	
<b>9.3.3</b>	<b>Stable frequency distribution</b>	[Gantt bar from Dec 2004 to Dec 2005]																				
9.3.3.1	Complete specification	[Task bar from Dec 2004 to Jan 2005]																				
9.3.3.2	Conceptional design of frequency	[Task bar from Jan 2005 to Feb 2005]																				
9.3.3.3	Build prototype and evaluate	[Task bar from Feb 2005 to Jul 2005]																				
9.3.3.4	Final design	[Task bar from Jul 2005 to Sep 2005]																				
9.3.3.5	Procurement and assembly of subsystems	[Task bar from Sep 2005 to Nov 2005]																				
9.3.3.6	Installation and commissioning	[Task bar from Nov 2005 to Dec 2005]																				
9.3.3.7	Performance test w ith beam	[Task bar from Dec 2005 to Feb 2006]																				

**Status of activities.**

The activity is in line with the schedule.

Stability of the stabilized fiber optic distribution system has been evaluated to be better than 1 ps (over 60 sec) and better than 5 ps for several hours. Main problem of the regulation is the long time constant of the fiber optic phase shifter. A fast phase shifter (motorized length control) is procured and will provide better regulation.

**Subtask 9.4.1: Data management development**

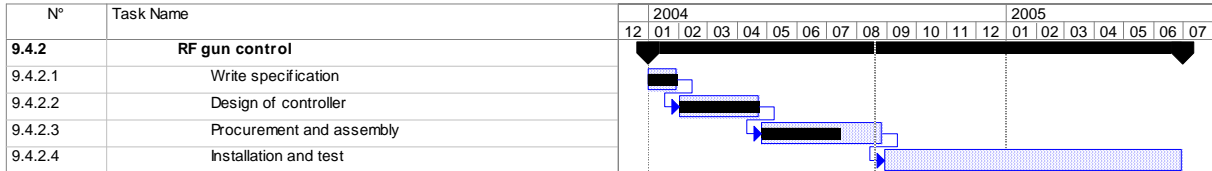
N°	Task Name	2004												2005								
		12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	
<b>9.4.1</b>	<b>Data management development</b>	[Gantt bar from Dec 2004 to Dec 2005]																				
9.4.1.1	Specification	[Task bar from Dec 2004 to Feb 2005]																				
9.4.1.2	Conceptional design w ith DOOCS	[Task bar from Feb 2005 to Apr 2005]																				
9.4.1.3	Prototype	[Task bar from Apr 2005 to Jun 2005]																				
9.4.1.4	User evaluation	[Task bar from Jun 2005 to Aug 2005]																				
9.4.1.5	Finalize design	[Task bar from Aug 2005 to Oct 2005]																				
9.4.1.6	Implementation in TTF	[Task bar from Oct 2005 to Dec 2005]																				

**Status of activities:**

Until now the investigation of existing environment (DOOCS system) was made and the possibilities of implementation of database functionality to the DOOCS system was

considered. The necessary changes in both server and client libraries of DOOCS system were analyzed and discussed with peoples developing DOOCS system

**Subtask 9.4.2: RF gun control**



**Status of activity:**

The task is in line with the schedule

**Financial report**

*TUL*

K €	Spent money	Value of new orders/ contracts	Expected spending of new orders/contracts until end 2004	Sum of column 2 & 4
Travel	0.7	0	2	2.7
Consumables	10	0	20	30
Manpower	3	0	18	21
Durable	0	0	0	0
			Total sum	53.7

*WUT-ISE*

K €	Spent money	Value of new orders/ contracts	Expected spending of new orders/contracts until end 2004	Sum of column 2 & 4
Travel	0,3	0	1	1,3
Consumables	10	0	50	60
Manpower	2	0	10	12
Durable	0	0	0	0
			Total sum	73,3

*DESY*

K €	Spent money	Value of new orders/ contracts	Expected spending of new orders/contracts until end 2004	Sum of column 2 & 4
Travel	0.8	0	2	2.8
Consumables	0	0	30	30
Manpower		0	15	15
Durable	0	0	0	0
			Total sum	47.5

**IV Publications and meetings**

[1] Makowski D, Grecki M, Jabłoński G.: “Application of A Genetic Algorithm to design of Radiation Tolerant Programmable devices”, 11<sup>th</sup> MIXDES Conference, Szczecin 2004, pp. 463-467

WP10 CRYOSTAT INTEGRATION TESTS

N°	Task Name	2004												2005								
		12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	
<b>10</b>	<b>WP10 CRYOSTAT INTEGRATION TESTS</b>																					
<b>10.1</b>	<b>Displace CRYHOLAB</b>																					
10.1.1	Move CRYHOLAB, commissioning																					
10.1.2	Report on intended integration tests in CRYHOLAB																					
<b>10.2</b>	<b>Integration tests in cryostat</b>																					
10.2.1	First experiment in CRYHOLAB																					
10.2.2	Test 1																					

**Status of activities**

The activity is in line with the schedule.

Modifications are necessary to ensure the right positioning of the 9-cell cavity inside CryHoLab for the RF test.

By comparison with to the previous drawings, shown during the ELAN meeting, the cavity will be necessarily shifted out off the main cryostat axis: the reason being the easier connection between the coupler and the RF waveguide.

The final drawings were completed in June. After call for tenders, two manufacturers have been selected from among four of them. The dead line for mechanical realization is planned for mid-September according to the previous schedu

**Financial report**

€	Spent money	Value of new orders/ contracts	Expected spending of new orders/contracts until end 2004	Sum of column 2 & 4
<b>Travel</b>	1668.54		2000.00	3668.54
<b>Consumables</b>				
<b>Manpower</b>				
<b>Durable</b>	5657.00		5000.00	10657.00
	1662.00			1662.00
	1594.00			1594.00
			<b>Total sum</b>	17581.54

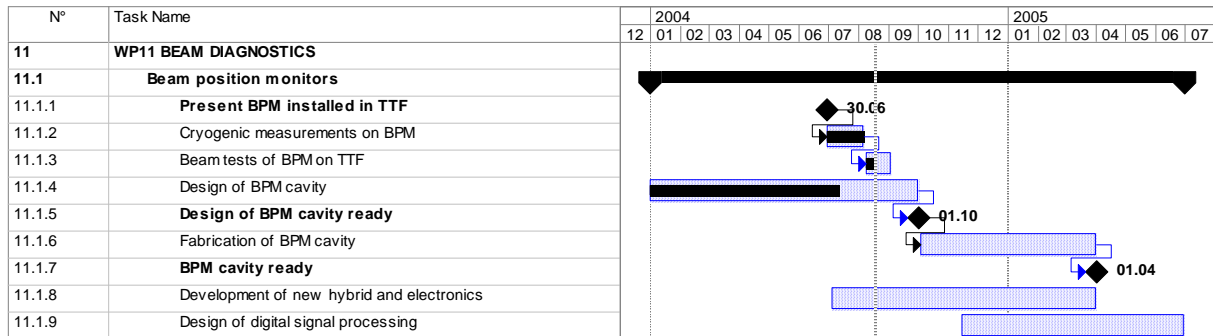
**Publications and meetings**

*ELAN Meeting (Frascati)*

[http://elan.desy.de/e150/upload/upload\\_file/Meetings/Frascati\\_2004/WP10.pdf](http://elan.desy.de/e150/upload/upload_file/Meetings/Frascati_2004/WP10.pdf)

## WP11 BEAM DIAGNOSTICS

### Task 11.1: Beam position monitor



#### Status of activity

The activity is in line with the schedule. Milestone 11.1.1 has been met.

The reentrant BPM (Beam Position Monitor) built in 2003 is now installed inside the first cryomodule of the linac. This monitor is similar to the units that were used on the TTF1 linac in warm sections. The new feature is the functioning under more restrictive conditions inside a cryostat and close to a superconducting cavity. This represents the achievement of milestone 11.1.1. No leak or anomalous heat dissipation have been reported during cooling down. In the first measurements with beam the BPM signals look clean. These preliminary measurements were made by connecting an oscilloscope directly to the cables .

#### Financial report

No EU Money has yet been spent.

As soon as possible there will be orders for the main components of the BPM prototype #1, which is a deliverable. They consist in:

- feedthroughs 15 kEuros
- cavity mechanics 10 kEuros

**Sum: 25 kEuros**

The travel costs are not mentioned and should be added.

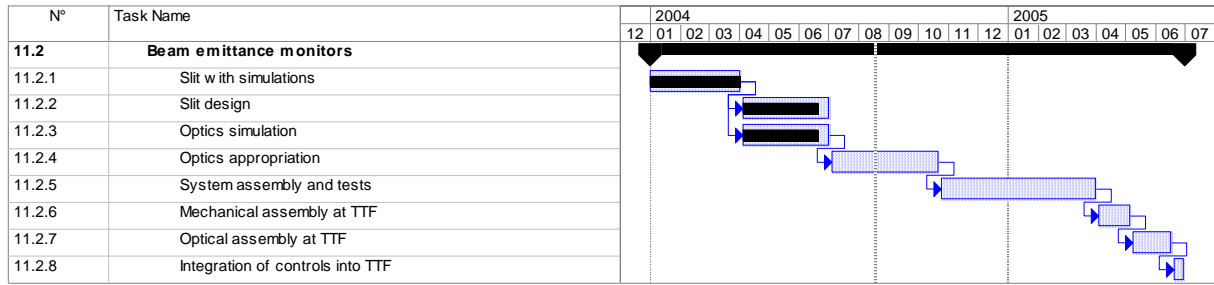
#### Publications and meetings

Meeting at DESY, 04/08/04 :

Diskussion on the mechanical design of the cold reentrant cavity BPM

(R. Bandelmann , H. Brück, MKS, M. Jablonka, CEA, D. Nölle, MPY, M. Wendt , MDI, K. Wittenburg, MDI, K. Zapfe, MVP), minutes taken by D. Nölle.

**Task 11.2: Beam emittance monitors**



**Status of activities**

Simulations of the Diffraction Radiation for different conditions of beam parameters are going on.

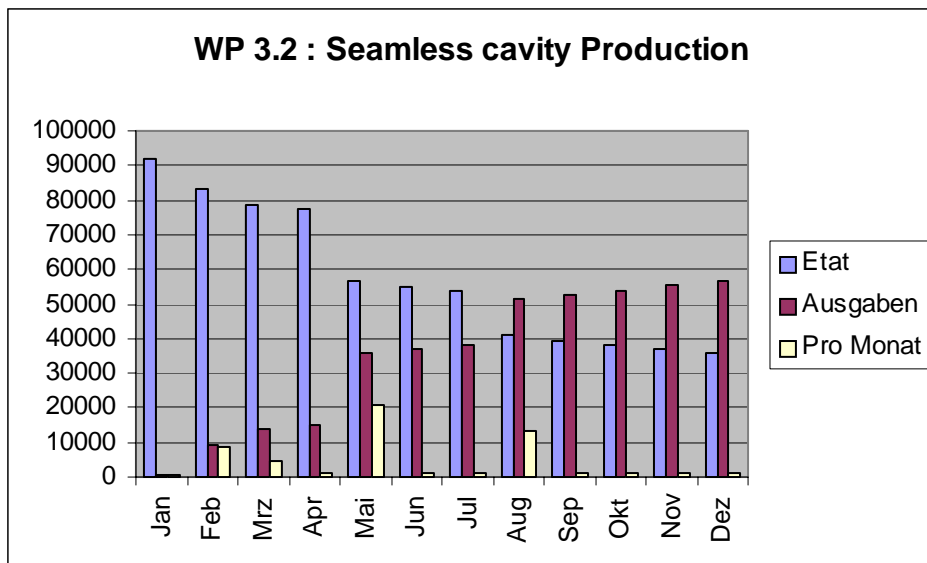
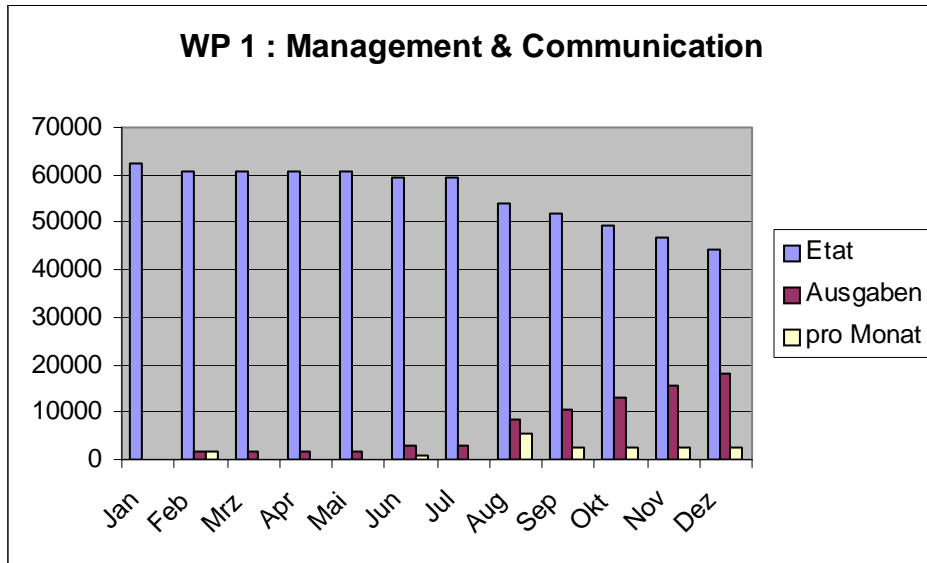
We have a delay in the recruitment of additional manpower, with small effect in the simulation conclusions. No real effect is aspected for the whole project

**Financial report**

K €	Spent money	Value of new orders/ contracts	Expected spending of new orders/contracts until end 2004	Sum of column 2 & 4
<b>Travel</b>	0		4	4
<b>Consumables</b>	0		5	5
<b>Manpower</b>	0		5	5
<b>Durable</b>	0		0	0
			<b>Total sum</b>	14



**12 Months Spending Profile DESY in JRA1**  
 Status 1. September 2004



CARE JRA1 SRF Technology

