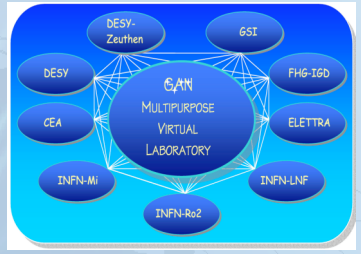
GANMVL

Multipurpose Virtual Laboratory



A project to improve communication to support collaboration in the field of accelerator research

WP8 in the EUROTEV Project

- Motivation
- Project goals
- Project Elements
- Audio Video Task
- Virtual Instrument Integration
- Accelerator Controls integration
- Electro-Mechanical Set UP
- WP8 GANMVL Collaboration

Motivation

If the linear collider is to be build in a collaboration between the large HEP laboratories and contributions from smaller institutions, a dense network of inter-laboratory taskforces needs to be managed and supported

EXAMPLES :

- Prototypes will be developed in one institution and tested with beam in another laboratory
- Equipment will be built and delivered by one partner and needs to be integrated into the accelerator complex by another partner
- Whole parts of the facility will be provided by a remote partner and need to be commissioned and possibly operated with the experts at their remote home institutions
- In situ trouble shooting and repairs needs to be performed with the support of off-site experts
- and many more …

The needs of the worldwide accelerator community to operate in this mode on a routine base in an efficient manner are by no means obvious. It will be a new way executing a large accelerator project. The laboratories will have to learn how to deal with it.

The Accelerator community has started to prepare itself for the new mode of collaboration

The GANMVL project understands itself as part of the worldwide effort.

Project Goal

Integrate

- state of the art audio- and video communications technology
- virtual instruments
- and accelerator controls

into an all round communications tool

implemented as a compact and transportable hardware set-up containing

- 3D-video screens,
- audio devices, video capturing devices,
- computer terminal,
- sockets for connecting network, instruments

Audio-Video Task

Making the latest MPEG-4 based technology which is not available on the market available for GANMVL

- Fast video advanced protocols suited for low data rates
- 3-D (quasi 3-D) video capture and reproduction to support remote assembly and trouble shooting
- Eye-Contact Video Conferencing
- Directed Audio capture

Virtual 3-D Conference Table reconstructed from 3-D Video Capture

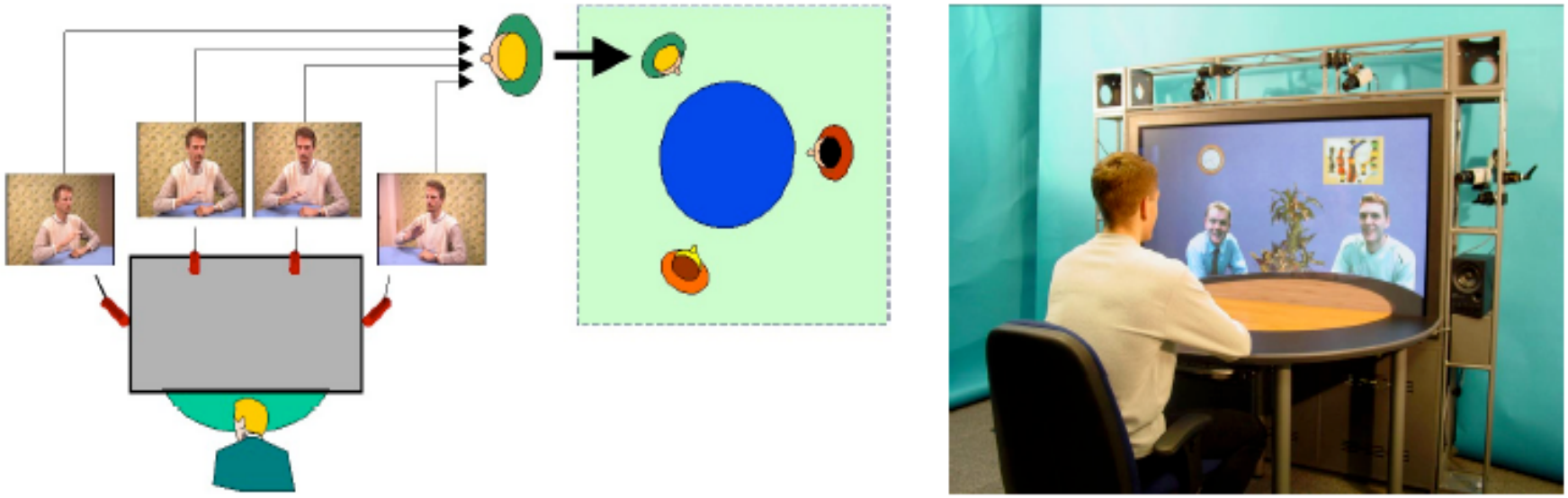
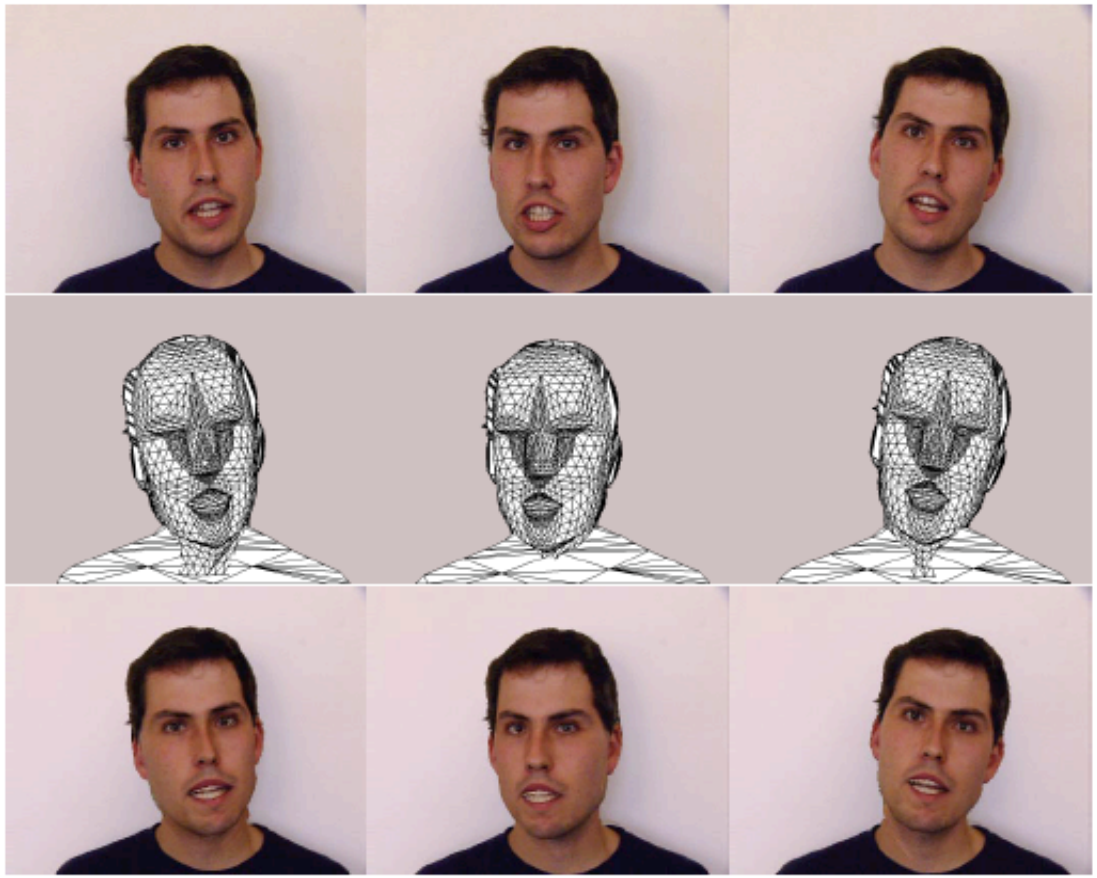


Figure 5. Left: Setup for a 3-party conference. Right: VIRTUE setup

From P.Eisert, FHG for Telecommunications, Berlin, in proceedings of VCIP conference, Lugano, 2003

3-D video modeling for minimizing data rates and (possibly) eye-contact video conferencing



3-D modeling

Low speed

Transmission

1kbit/s

3-D
reconstraction

From P.Eisert, FHG for Telecommunications, Berlin, in proceedings of VCIP conference, Lugano, 2003

Integration of Controls

There is no uniform approach as control systems are all very different

Case to case solution depends on the technology and safety rules of the control system to be connected to

Solutions are wasy for :

TTF,thin client (x-terminal)

HERA, thick client, tine:

applications run on windows platform,

connection to control system via VPN connection

Common task for all control system:

Need as system to make MVL aware to control room

Token system to grant access to data, components

Desirable to do this in a gereric way, this needs careful thinking

Integration of virtual instruments

Virtual Versions of oscilloscopes, network analysers, spectrum analysers available from many supplies

Differential Impedance Measurements with the Tektronix 8000B Series Instruments

▶ Application Note

LABView VI Solution for a major supplier

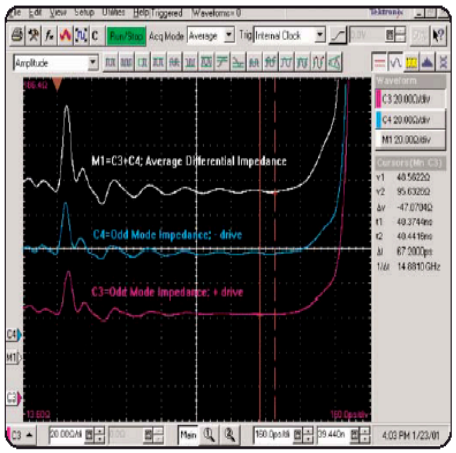


Figure 9. Odd-mode and Average Differential Impedances

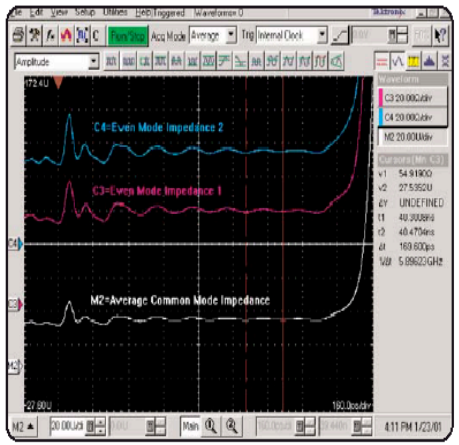
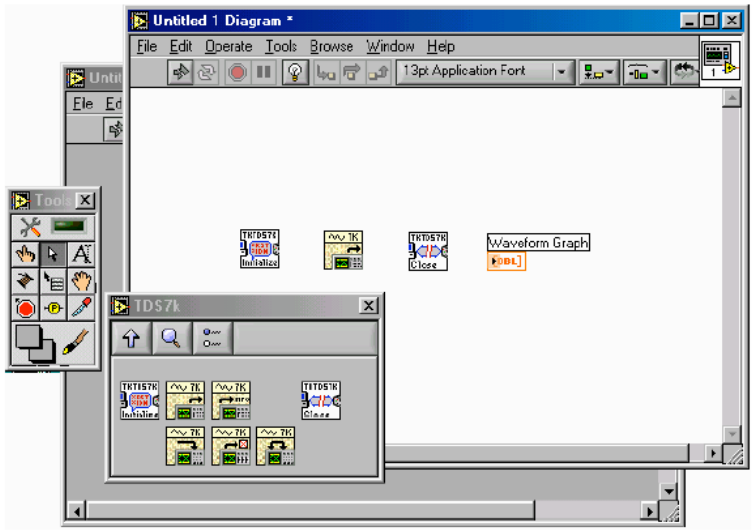


Figure 10. Even-mode and Average Common Impedances



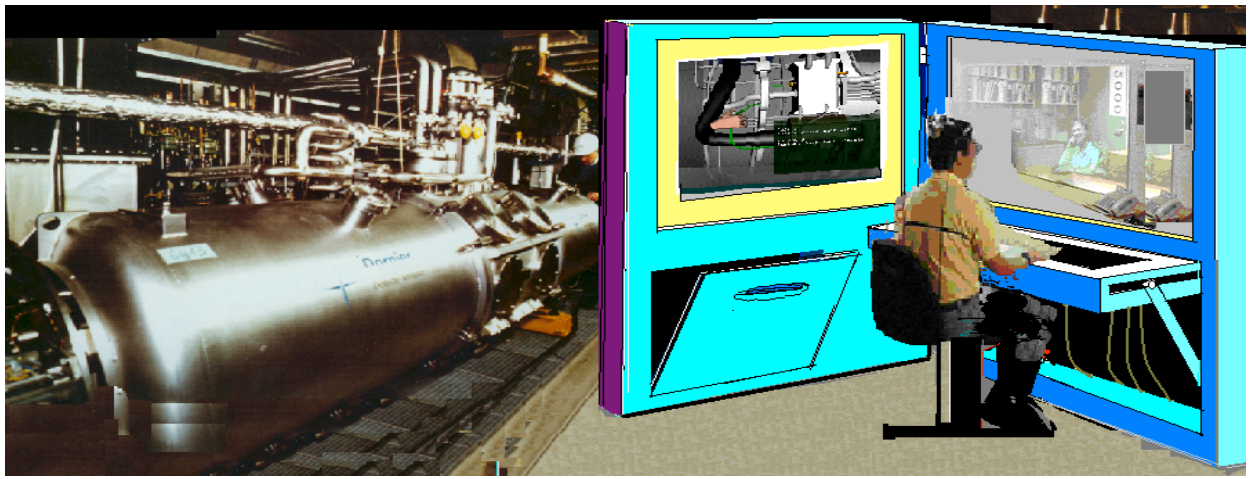
Assessments of available instruments

Integrate available software into MVL (if possible)

Plug and Play software which recognizes connected devices

And makes software remotely available

Electro-Mechanical Implementation



Preliminary Specs

- (to be confirmed in project phase 1)
- Transportable set-up weight <10kG
- Foldable, foldable size, 1.8m x 1m x 15cm
- Setup time ~15 min

Participating Institutes

Participant	Task1 MA	Task2 ODI	Task3 SC	Task4 ME	Task5 DGF
DESY	X	X	X		X
DESY-Z	X	X	X	X	X
GSI	X	X	X		X
FHI-IGD	X	X	X		x
ELETTRA	X	X	X		X
UDINE	X	X	X		X
INFN-Milano	X	X	X		X
INFN-ROMA2	X	X	X	X	X
INFN-Frascati	X	X	X		X
Uni Mannheim	X	X			X

Table 1 Distribution of Tasks

Task		DESY	DESY-Z	Elettra	FHG	GSI	INFN-Mi	INFN-Ro2	N F	U-Ma	U-Udin
WP Coordination	MA	80%				20%					
Analysis of User Needs	ODI-1	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Overall Design Requirements	ODI-2	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Develop, maintain update system design	ODI-3	50%					50%				
Organise integration events	ODI-4	50%					50%				
Intermediate design evaluations	ODI-5	20%				20%	20%			20%	20%
Human Computer Interface Issues	ODI-6									50%	50%
Collaboratory Issues	ODI-7									50%	50%
Immersive audio/video	SC-1		5%	10%	65%				10%		10%
Desktop Video Conferencing	SC-2				60%				40%		
Virtual Instrumentation Integration	SC-3			60%		40%					
Integration of controls	SC-4	35%		40%			15%	10%			
Integration of Data Access	SC-5			50%	50%						
Networking and Security	SC-6	30%		50%	20%						
MVL operational software applications	SC-7			70%	30%						
Analysis based on task System Comp. results	ME-1		90%					10%			
Electrical Specifications	ME-2		100%								
Electrical Design	ME-3		100%								
Mechanical Design	ME-4		100%								
Procurement of Components	ME-5		100%								
Construction and Assembly	ME-6		100%								
TTF far remote operation	DFG-1	30%	10%				10%	5%	5%	20%	20%
ELETTRA remote access	DFG-2			60%						20%	20%
Usability Analysis of Components	DFG-3	0		0	5%	10%				40%	45%
Performance plan and Evaluations	DFG-4	20%		20%		10%				15%	15%

GANMVL Tasks

Task 1 Workpackage Coordination (MA)

Task 2 Determination of User Needs and Overall Design and Layout (ODI)

Task 3 Building the System Components (SC)

Task 4 Electrical and Mechanical Set-up (ME)

Task 5 Demonstration of GAN and Remote Operating

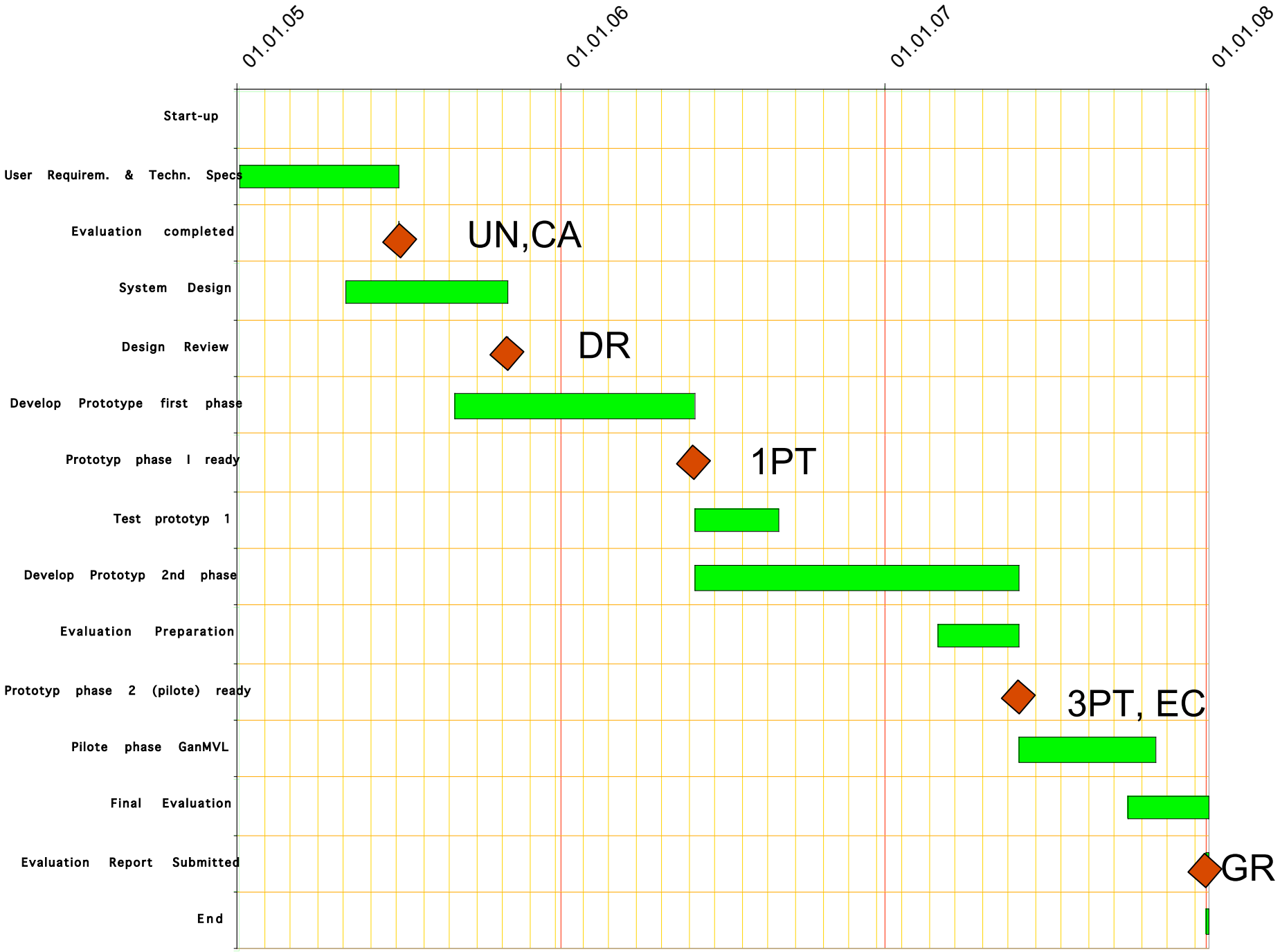
			1.
Analysis of User Needs	ODI-1		0
Overall Design Requirements	ODI-2		0
design	ODI-3		2
Organise integration events	ODI-4		1
Intermediate design evaluations	ODI-5		0
Human Computer Interface Issues	ODI-6		0
Collaboratory Issues	ODI-7		0
Immersive audio/video	SC-1		8
Desktop Video Conferencing	SC-2		4
Virtual Instrumentation Integration	SC-3		0
Integration of controls	SC-4		1
Integration of Data Access	SC-5		0
Networking and Security	SC-6		2
applications	SC-7		2
Comp. results	ME-1		2
Electrical Specifications	ME-2		1
Electrical Design	ME-3		3
Mechanical Design	ME-4		3
Procurement of Components	ME-5		2
Construction and Assembly	ME-6		2
TTF far remote operation	1		8
ELETTRA remote access	2		5
Usability Analysis of Components	3		5
Performance plan and Evaluations	4		5

Delivrables

Evaluation report of user needs (UN)	Task ODI
Eval. of human and collaboratory aspects (CA)	Task ODI
GANMVL Design Report (DR)	Task ODI
First MVL Prototype (1PT)	Task SC
Improved MVL Prototypes: 3 units (3PT)	Task ME
Evaluation Criteria Report (EC)	Task DGF
Demonstration of GAN Evaluation Report (GR)	Task DGF

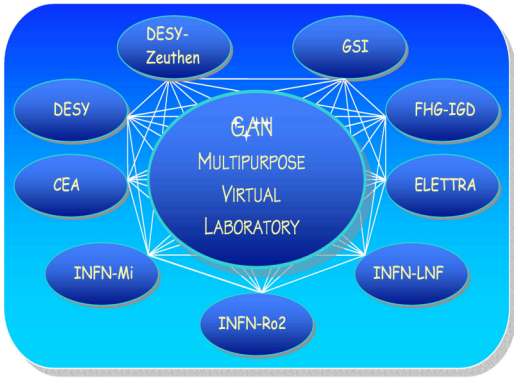
Deliverables & Milestones

GANMV Schedule			
	Start	Dt / 8h	End
Start-up	1.1.05	0	01.01.2005 07:00
User Requirem. & Techn. Specs	1.1.05	181	01.07.2005 07:00
Evaluation completed	29.6.05	2	01.07.2005 07:00
System Design	1.5.05	184	01.11.2005 07:00
Design Review	30.10.05	2	01.11.2005 07:00
Develop Prototype first phase	1.9.05	273	01.06.2006 07:00
Prototyp phase I ready	30.5.06	2	01.06.2006 07:00
Test prototype 1	1.6.06	92	01.09.2006 07:00
Develop Prototype 2nd phase	1.6.06	365	01.06.2007 07:00
Evaluation Preparation	1.3.07	92	01.06.2007 07:00
Prototype phase 2 (pilote) ready	30.5.07	2	01.06.2007 07:00
Pilote phase GANMVL	1.6.07	153	01.11.2007 07:00
Final Evaluation	1.10.07	91	31.12.2007 07:00
Evaluation Report Submitted	29.12.07	2	31.12.2007 07:00
End	29.12.07	2	31.12.2007 07:00


01.01.05
01.01.06
01.01.07
01.01.08
Start-up
User Requirem. & Techn. Specs
Evaluation completed
UN,CA
System Design
Design Review
DR
Develop Prototype first phase
Prototyp phase I ready
1PT
Test prototyp 1
Develop Prototyp 2nd phase
Evaluation Preparation
Prototyp phase 2 (pilote) ready
3PT, EC
Pilote phase GanMVL
Final Evaluation
Evaluation Report Submitted
GR
End

WP8

Task and Management team



GANMVL coordinator	F. Willeke
Deputy	P. Schuett

Task	Full name	Short name	Leaders
WP 8 task 1 ODI	Overall Design and Integration	ODI	M. Kasemann, DESY
WP 8 task 2 SC	System Components	SC	R. Pugliese, Elletra
WP 8 task 3 ME	Mechanical and Electrical Design	ME	A. Oppelt, DESY-Z
WP 8 task 4 DGF	Demonstration of GAN and far remote Operating	DGF	F. Willeke, DESY