GANMVL

Global Accelerator Network
Multipurpose Virtual Laboratory
Present Status and Future Developments

Roberto Pugliese
roberto.pugliese@elettra.trieste.it
on behalf of WP8

EUROTeV Scientific Workshop
26-28 August 2008 - Uppsala University

Outline

- **The EUROTeV/GANMVL project**

- **The status of the GANMVL**

- **Features of the GANMVL**

- **The GANMVL @ ELETTRA**

- **Future developments**

Roberto Pugliese
roberto.pugliese@elettra.trieste.it

GANMVL motivation

- The most likely scenario of a linear collider is that it will be built by a collaboration of existing laboratories, which will remain involved during the operation of the accelerator.
  - 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
- Advanced means of communication will be necessary to support efficient collaboration.
- The GANMVL project will design and build a novel collaboration tool and test it in existing accelerator collaborations.

GANMVL tool

- The tool will be a <u>mobile communication centre</u> which provides immersive video and audio capture and reproduction of an accelerator control room, a laboratory workplace environment or an accelerator hardware installation

- The tool should be <u>able to connect to</u> standard measurement equipment (scopes, network analyzers etc.) and to elements of accelerator controls and make these connections available to a remote client

- The tool should be an <u>integration platform</u>, providing a secure unified access to all the related tools and services available at the laboratory

- The <u>remote user</u> should be enabled to participate in accelerator studies, assembly of accelerator components, trouble shooting of hardware or analysis of on-line data as <u>if he or she would be present on site</u>

EUROTeV/GANMVL

- **The EUROTeV Work package 8 (GANMVL) been organized in four sub work packages. Each contains a number of subtasks**
  - ODI: Overall Design and Integration
  - SC: System Components
  - ME: Mechanical and Electrical Design
  - DGF: Demonstration of GAN and far remote operating
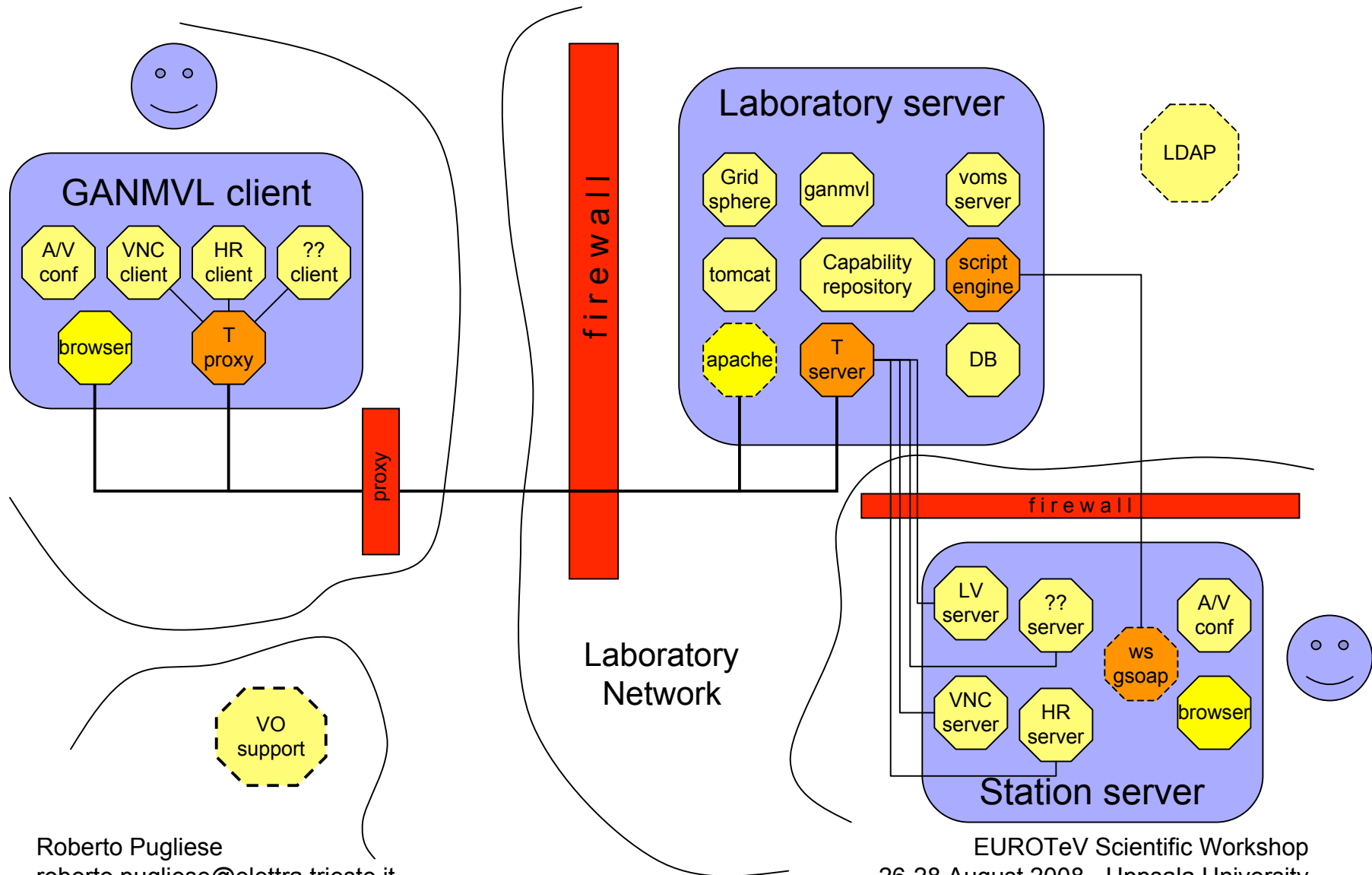- **Shift from hardware to software solution deployable on different platforms**

Development approach

- Focus on both technical and non-technical aspects
- Deep involvement of human computer interaction and psychology experts
- User surveys, interviews, feedbacks, euristic evaluation
- Extensive use of prototypes
- Extreme programming

Global GANMVL Architecture

Roberto Pugliese
roberto.pugliese@elettra.trieste.it
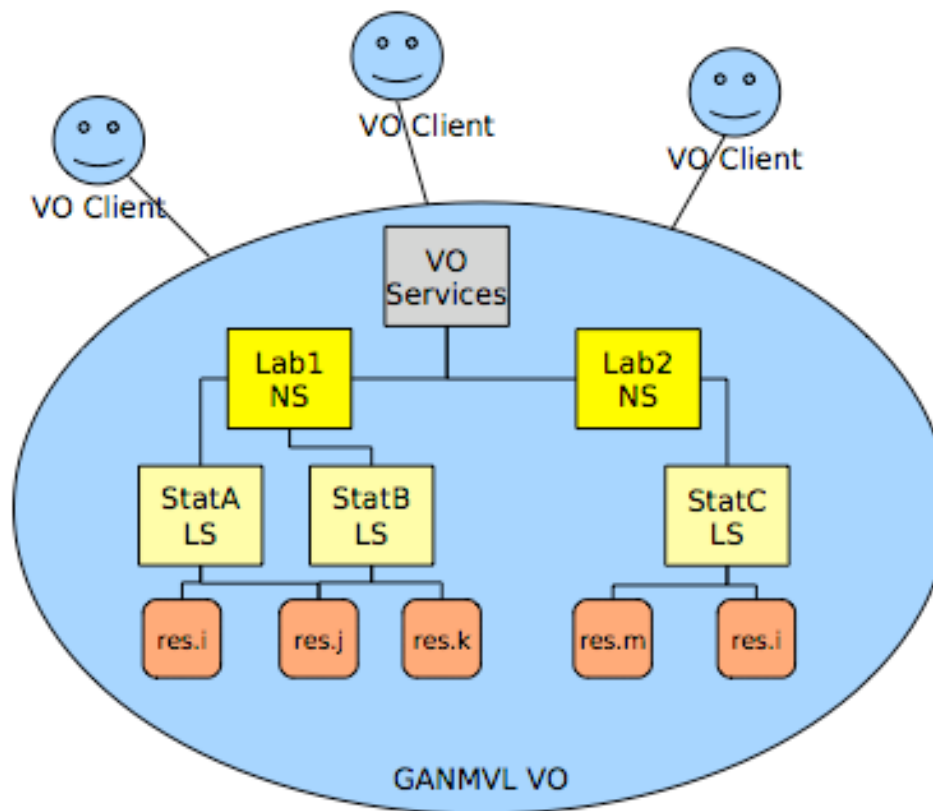
GANMVL internal architecture

GANMVL client

A/V conf, VNC client, HR client, ?? client, browser, T proxy

proxy

firewall

Laboratory server

Grid sphere, ganmvl, voms server, tomcat, Capability repository, script engine, apache, T server, DB

LDAP

Laboratory Network

firewall

Station server

LV server, ?? server, A/V conf, ws gsoap, VNC server, HR server, browser

VO support

Roberto Pugliese
roberto.pugliese@elettra.trieste.it

EUROTeV Scientific Workshop
26-28 August 2008 - Uppsala University

Current GANMVL status

- <u>Web portal interface for all the type of users</u> (remote, laboratory admin, station admin) and all usage scenarios

- Fine grain control on authorization (VOMS): resource or capabilities can be associated to different levels

- <u>Security and Awareness</u>: tunnel, tunnel monitoring and control, resource enable and disable

- Knowledge management tab with e-log, help, download area

- GANMVL tab with an integrated resource and people browser

- By selecting a node in the browser associated and authorized capabilities are presented on a toolbox

- <u>Different kind of capabilities</u>: High resolution cameras, file manager, chat, audio and video conference (skype, VRVS), Web tools (IVI instrument integration), Remote desktop tools (VNC, NX), Wizards

- Open source, modular distribution, plug-in architecture (API)

Features: web based interface

Features: wizards

- **Instruments, control panels and other supported capabilities can be added by the web interface via a wizard**. The wizard together with the help system will guide the administrator in the procedure.

- There are different integration issues and hence different wizards: http, VNC, VLC, HRC, Generic (NX)
  - ☐ The http is suitable when the instrument or control already has a web interface available or is a web resource
  - ☐ The VNC is suitable when the instrument or control is equipped with legacy software which was not designed for the web
  - ☐ The VLC and HRC wizards are used to integrate high resolution streams
  - ☐ Generic wizard can be used in all the other cases

- New capabilities can be developed via API

- Specific integration issues can be solved using the Scripting capabilities

Features: Web/Wizard based Administration

Features: Troubleshooting via remote desktop
and High Resolution Camera
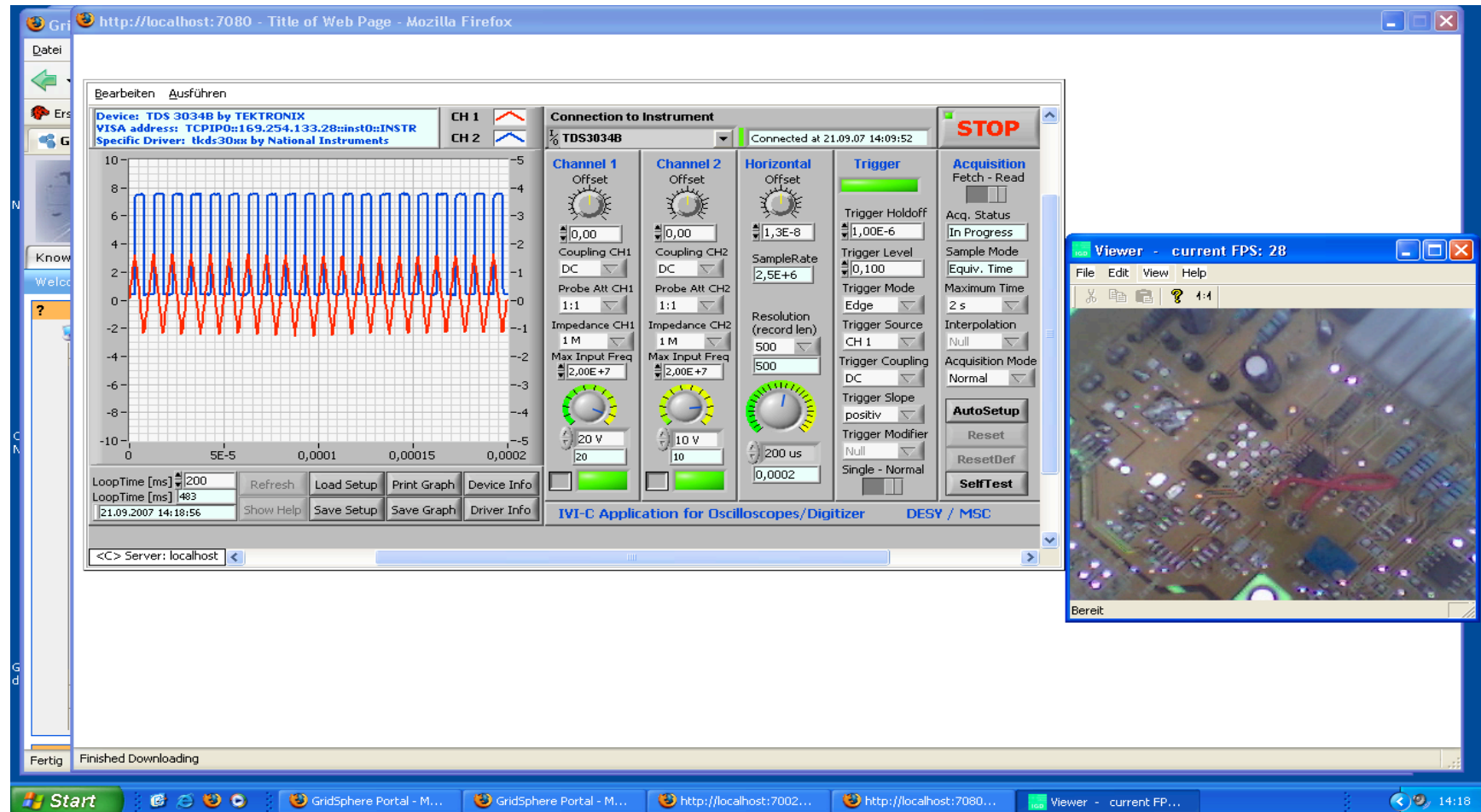
Roberto Pugliese
roberto.pugliese@elettra.trieste.it

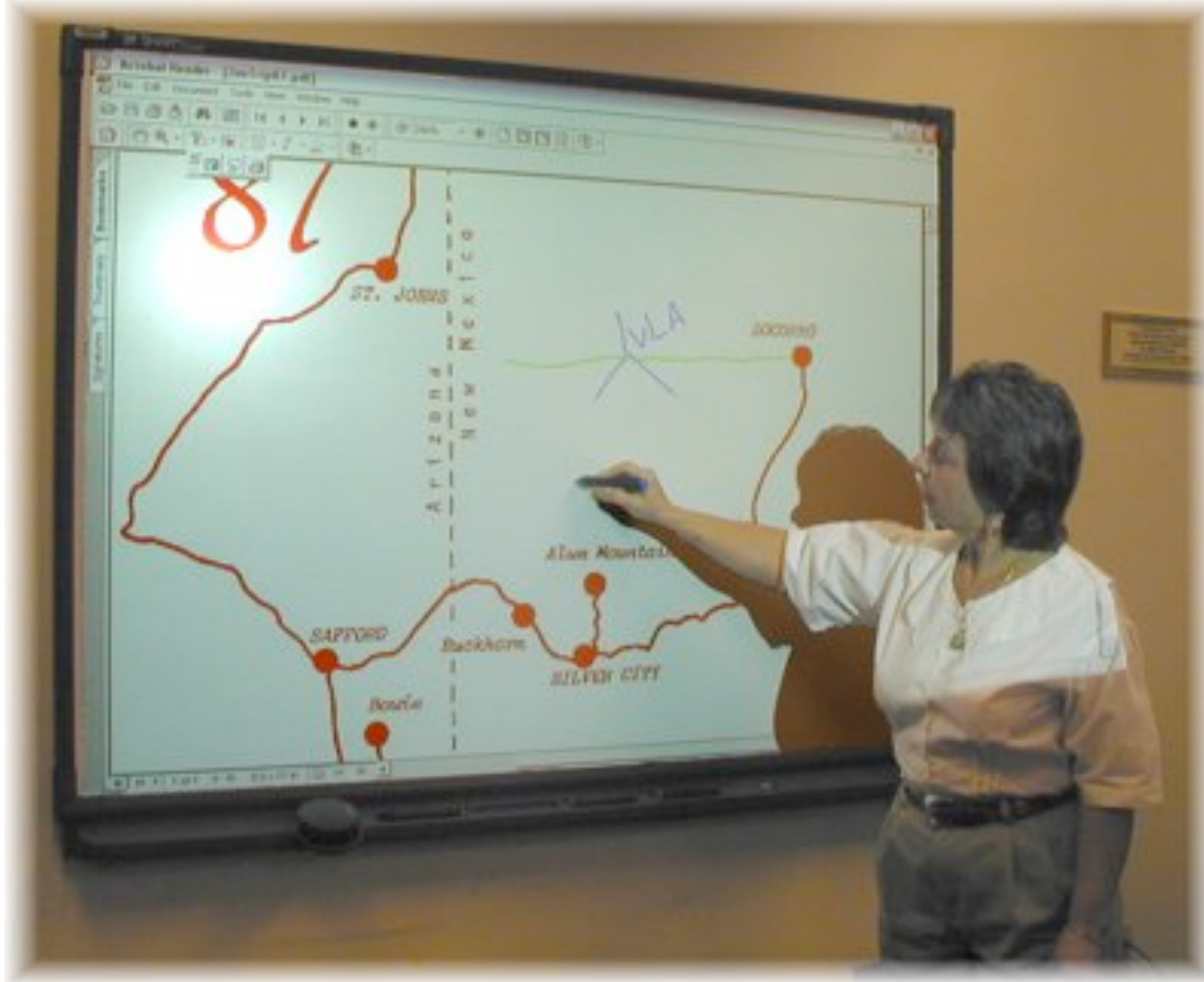# Features: IVI standard support

- Implemented with LabView
- Based on IVI scope class libraries
- Tested with:
  - NI USB-5102
  - TEK TDS5104
  - TEK TDS3054
  - LC WR 6200
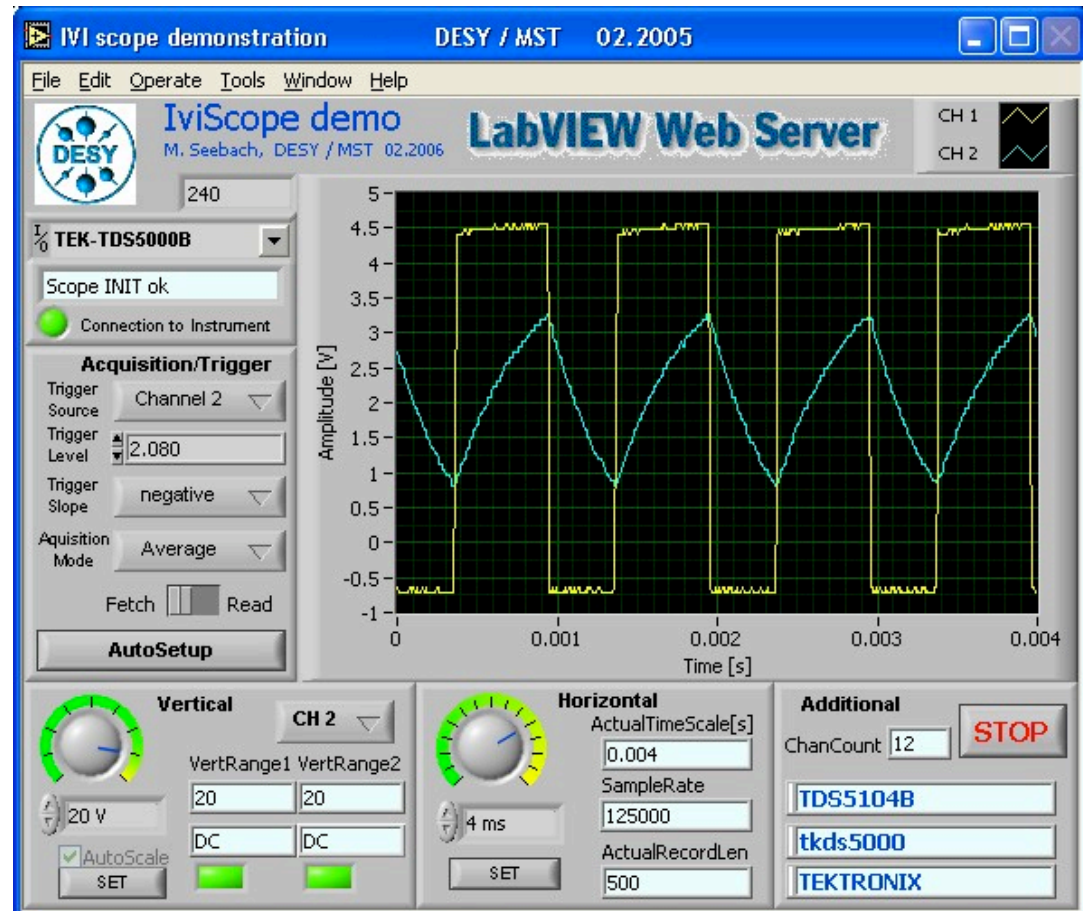
Features: flexibility (smartboard support)

Roberto Pugliese
roberto.pugliese@elettra.trieste.it

Features: Integrated Awareness via Tunnel Monitoring

Features: Integrated Help System

Features: Integrated Monitoring System

- Based on MonALISA (MonALISA, Monitorig Agent using a Large Integrated Services Architecture)

    - A MonALISA server on each GANMVL Laboratory Server

    - A LISA client on each Local station server sending data ti the server

    - A LISA client on the client itself to monitor the quality of the connection

    - A repository to collect all the data and make them geographycally available to the users

Features: Integrated Monitoring System

Roberto Pugliese
roberto.pugliese@elettra.trieste.it

Features: Possible station setups

		High Resolution Video & Cameras	3-D high resolution Video & Cameras	Multiple Screens	Large Display	Lighting	Audio Support	Virtual Instruments	Control System Interface	Wireless Access Point
Stationary Setup	remotely assisted Accelerator Experiment	x	x	x	x	x		x		x	
	Remotely assisted Accelerator Commissioning	x	x	x	x	x		x		x	
Semi-mobile Setup	Remotely assisted Test preparation	x	x	x		x	x	x	x	x	x
	Remotely assisted Assembly	x	x	x		x	x	x	x	x	x
Mobile Setup	Remotely Assisted Maintenance	x	x			x	x		x	x	
	Remotely Assisted Repair	x	x			x	x		x	x	
	Remotely assisted Trouble Shooting	x	x			x	x		x	x	

Roberto Pugliese
roberto.pugliese@elettra.trieste.it

GANMVL @ ELETTRA

- Production use for remote operations of ELETTRA and commissioning of the booster

- Production use for remote operations of the beamlines and experimental stations

- Will be used for commissioning and remote operations of FERMI@ELETTRA

Roberto Pugliese
roberto.pugliese@elettra.trieste.it

GANMVL: Stationary Station Set-up

Roberto Pugliese
roberto.pugliese@elettra.trieste.it

Mobile Station

Tablet PC

Micro PC

Roberto Pugliese
roberto.pugliese@elettra.trieste.it

Semi-Mobile Station
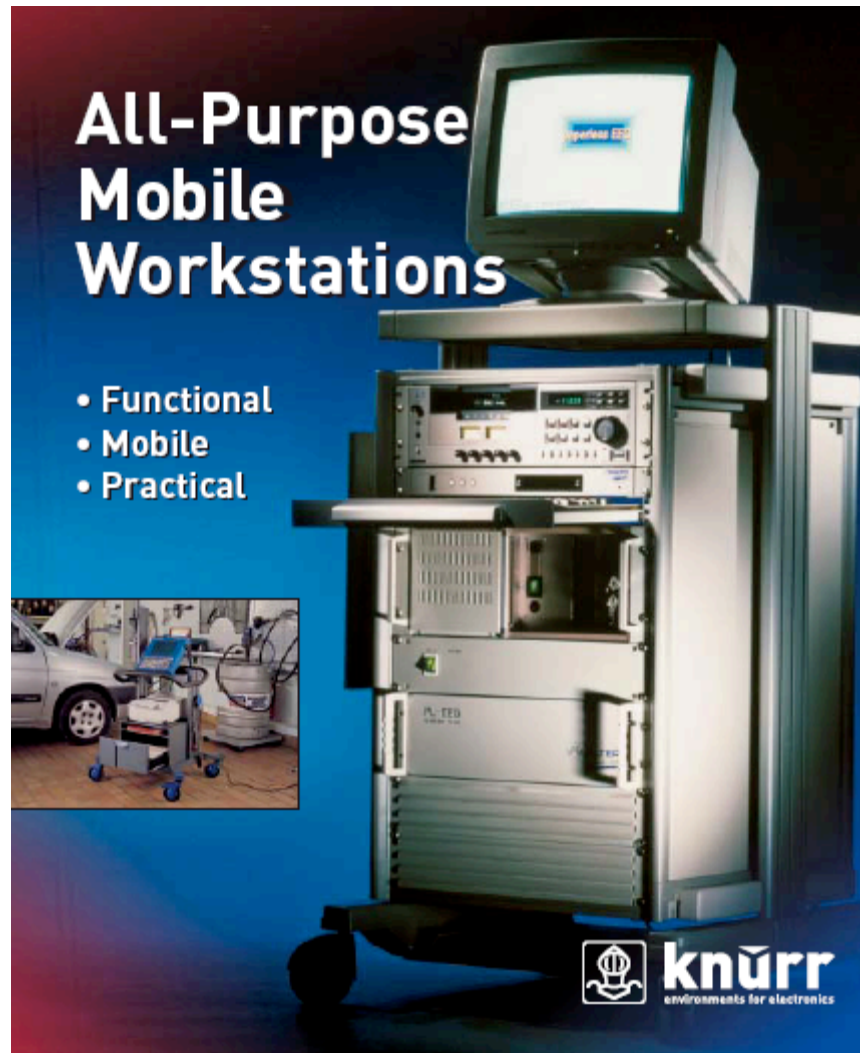
GANMVL @ ELETTRA Video Storyboard

- **GANMVL in the ELETTRA Control Room (Large Displays)**
- **Using the client**
  - Control Panel via HTTP tunnel
  - External Logbook via HTTP tunnel
  - Mobile camera via HTTP tunnel
  - Local Tunnel monitor
  - MOXA camera server via HTTP tunnel
  - Skype integration
  - EVO integration
  - Labview integration via HTTP tunnel
  - High Resolution Camera integration via HRC tunnel

Roberto Pugliese
roberto.pugliese@elettra.trieste.it

GANMVL @ ELETTRA Video Storyboard (2)

- **Administrator access**
  - ☐ Using the HTTP wizard
  - ☐ Tunnel monitor and Operator Remote Connection Awareness
  - ☐ Controlling the large displays via remote script execution
  - ☐ Generic Tunnel Wizard
  - ☐ Telnet and ssh integration
  - ☐ Plugin architecture
  - ☐ Scripting
  - ☐ Internal Logbook
  - ☐ Help system
  - ☐ Tablet PC

- **Collaboration via Smart board, VNC and skype**

Roberto Pugliese
roberto.pugliese@elettra.trieste.it

GANMVL Future

- **Production use at ELETTRA, DESY, GSI, INFN**

- **Integration of MCE/VCR technology and the "Grid" world with the GANMVL approach "Not-Grid" world**
  - Virtual Control Room (http://www.youtube.com/watch?v=vcSAIp9qps0)
  - Instrument Element
  - More info on EGEE RESPECT program (http://technical.eu-egee.org/index.php?id=290)

- **Funding**
  - DORII project started Feb 2008
  - EUROTeV, then ILC ?

- **Interest by ITER, FERMILAB, XFEL, OGF,…**

Roberto Pugliese
roberto.pugliese@elettra.trieste.it

Many Thanks to ...

- All the members of the collaboration
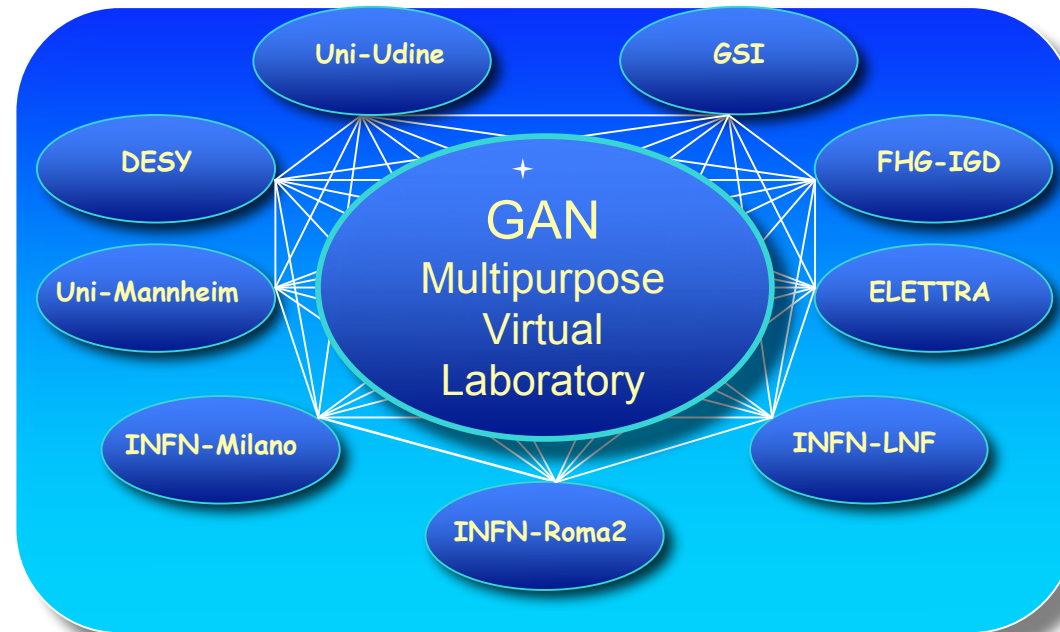
- The developers of the tools we integrated in the GANMVL (VRVS, EVO, ...)

Roberto Pugliese
roberto.pugliese@elettra.trieste.it