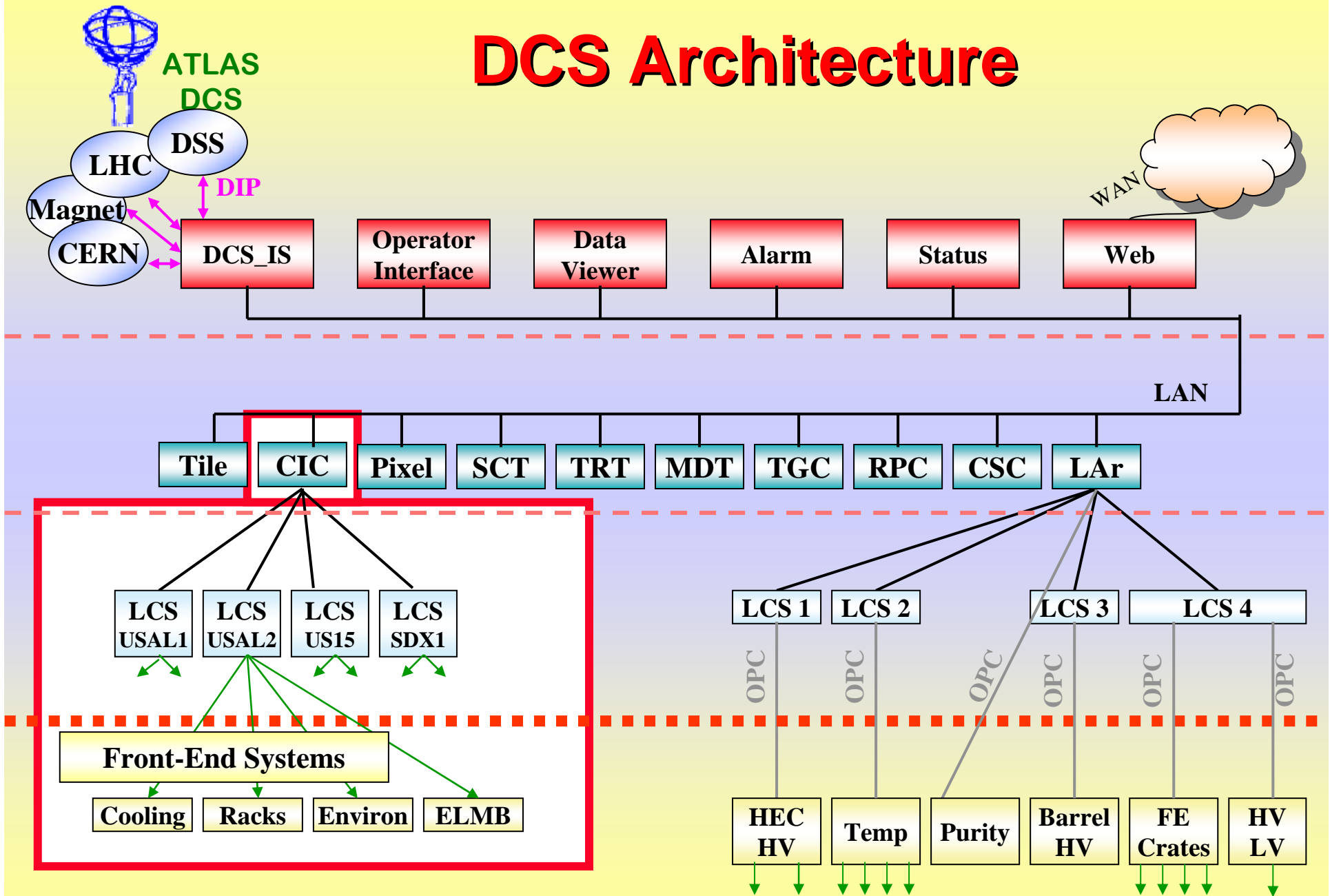




ATLAS DCS

- ◆ **Organizational Points**
 - DCS collaboration
 - Central team
 - Subdetectors
 - Work organization
- ◆ **Technical Points**
 - Overview of ATLAS DCS
 - JCOP packages and tools
 - ATLAS as provider
 - ATLAS as user
 - ATLAS specific
 - “Challenges”
- ◆ **Control Room Interface (J.Cook)**

DCS Architecture





DCS Collaboration

Sub-collaboration in ATLAS

- Reports to Technical Coordination
- Budget autonomy

- ◆ **NIKHEF, Amsterdam**
 - CANbus
 - ELMB firmware

- ◆ **PNPI, St.Petersburg**
 - CANopen OPC server
 - DCS-DAQ-Connection (DDC)
 - DB aspects

- ◆ **CERN (PH/ATI/DC)**
 - ...the rest ...



DCS Central Team

Human resources:

	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>
Staff 1 (coordinator)	1	1	1	1	1
Staff 2 (SW engineer)	1	0.1			
PJAS 1 (SW engineer)	0.8				
PJAS 2 (SW engineer)	0.8				
Curie Fellow (Instrumentation eng.)	1	0.2			
Doctoral Student (Controls)	0.7				
<u>Total</u>	<u>5.3</u>	<u>1.3</u>	<u>1</u>	<u>1</u>	<u>1</u>



ATLAS
DCS

DCS Central Team

Tasks:

- ◆ **Support of packages and tools**
 - JCOP
 - ATLAS specific
- ◆ **Global Control Station (GCS) layer**
- ◆ **Common Infrastructure Controls (CIC)**
- ◆ **Integration**
 - Policy, rules and guidelines (see doc. In EDMS)
 - Consultancy and practical help



Subdetector DCS

- ◆ **Organization:**
 - Subdetector DCS coordinator
 - (Sub-)system experts
- ◆ **... some subdetector are more active than others...**
- ◆ **... DCS is not a research topic but a tool...**
(they think of it in the last minute and then it has to work !)
- ◆ **Responsibility: from Subdetector Control Station (SCS) towards detector**



DCS Work Organization

- ◆ **Each member of Central Team supports**
 - a set of packages and tools
 - a set of subdetectors
- ◆ **1-2 day DCS workshops**
- ◆ **½ day DCS meetings in ATLAS weeks**
- ◆ **Individual subdetector DCS reviews**
 - Begin 2004: Baseline
 - End 2005 to now: Progress Review
- ◆ **Individual consulting**
- ◆ **Integration**
 - SCS is meeting point of responsibility



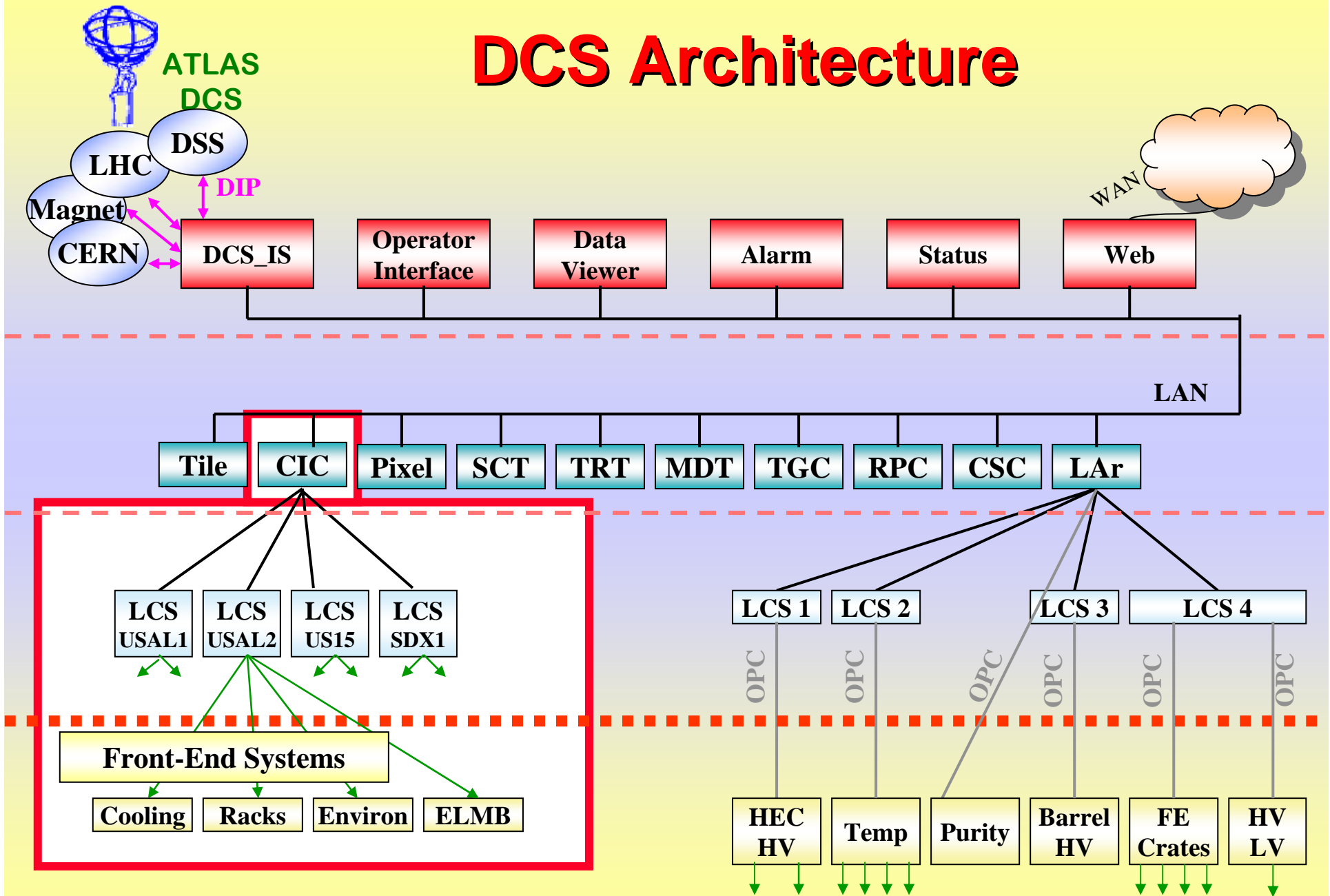
ATLAS
DCS

Joint Controls Project

Who is JCOP ?

- ◆ **WE !**
- ◆ **History**
 - Review of Controls in Research 1996
 - EPICS evaluation started May 1996
 - Experiment Controls Steering group (12/12/1997)
 - ...
- ◆ **Decision:**
 - Leave main resources for experiment controls in one place
 - Use as basis industrial solution(s)
 - Use as much HW and SW in common
- ◆ **Main Player: IT/CO**

DCS Architecture





DCS System Components

- ◆ **PVSS (almost) throughout**
 - **Exceptions:**
 - 2 LabView systems, connected via OPC)
 - A few dedicated (compute-intensive) systems, connected via DIM
 - **Presently only on Windows** (Linux is expected to also be used)
- ◆ **Order of 80% based on JCOP Framework**
- ◆ **Connection of Front-End mainly by OPC**
- ◆ **Front-End largely based on Embeded Local Monitor Board (ELMB)**
- ◆ **GCS layer based on FSM**



Common HW Components

- ◆ **ELMBs**
 - Adapters
 - Motherboards
 - Sensors
- ◆ **CAN PSU**
- ◆ **CAN cables**
- ◆ **PCI/CAN interfaces**
- ◆ **PCs**



ATLAS SW Components

- ◆ **DCS-DAQ-Communication (DDC)**
 - Available
 - Uses DIM
 - Transfer of commands, data, and messages
- ◆ **Transfer ORACLE archive → COOL**
 - Prototype available
- ◆ **Main operator interface**
 - Based on FSM
 - See next talk



ATLAS
DCS

JCOP Packages and Tools

ATLAS as provider

◆ **ELMB**

- 12000 units produced, very good quality
 - ~1% rejected during QA
 - Only 2 boards returned by user with faults
 - Now faults observed in firmware
- FW component stable, SPI support being added

◆ **CANopen OPC server** (usable for any CANopen device)

- Release stable
- Reported problems: un-registering
- Improvements foreseen: alarm and event server and interfaces OPC 3.0

◆ **PCI/CAN interface** (supplied by industry) can be ordered from CERN Stores (including 3m halogen-free cables)

- Evolution to 3.3V PCI standard
 - First production batch in use, ok

◆ **CAN Power Supply Unit (PSU)**

- ATLAS: design and prototype
- PH/ESS: review and production



JCOP Packages and Tools

Package or Tool

Subdetector usage

Reported problems

Upgrades in pipeline

Additional requests

Status

General comments



ATLAS
DCS

JCOP Packages and Tools

Framework Core

90% of projects

None

?

? Installation ?

Stable, in maintenance

Backward compatibility important



JCOP Packages and Tools

CAEN component

starting

?

ADC 1801

DAC 3802

Released



JCOP Packages and Tools

Configuration DB

Usage starting (4 subdetectors)

(re-)connection to ORACLE

Handling of static properties

?

Incomplete production version



JCOP Packages and Tools

Detector Cooling (and ventilation)

Usage starting (2 subdetectors)

No access across network domains

?

?

In advanced prototype form

Becoming crucial for subdetector commissioning



ATLAS
DCS

JCOP Packages and Tools

Rack Control

Used by all subdetectors

Loosing synchronization with electricity PLC
(many problems in electricity SW)

?

Access to all PLC status flags

Production version, improvements needed

Expert tool, cannot be used by subdetector user, needs something above



JCOP Packages and Tools

Detector Safety System (DSS)

Used by common infrastructure (subdetectors coming now)

Coherence of information PLC-BE

Move to CFM, remote access, combine BE and Gateway PCs in one PC

Improve HI for operator (more intuitive), details to be defined

Production version, PLC ok, BE see above

In rather good state, essential for commissioning



JCOP Packages and Tools

DIM

Used by 2 subdetectors and DDC

none

none

none

Production version

none



ATLAS
DCS

JCOP Packages and Tools

FW installation tool

Widely used

none

none

none

none

none



JCOP Packages and Tools

Conditions DB (i.e. PVSS archiving in ORACLE)

Used by 2.5 subdetectors

Performance limitations? High overhead, DLL required on server, (network) access to ORACLE

Investigations ongoing (hopefully)

Buffering when no network available

R&D

Answers needed urgently (“Will it fulfill our requirements at all?”), this has essential impact on data storage



JCOP Packages and Tools

PVSS

Used by all subdetectors

Send to ITcontrols.support@cern.ch

V 3.5: what and when?

What part of alert handling (summary hopefully?),
All QT?

...

Maintained (but releases always late)

Good product, some more features essential, experiments rely on IT/CO as
interface to ETM



JCOP Packages and Tools

Wiener VME crate

all

Reset problem,

?

Improve access to monitor parameters

Released, improvements needed

Very urgent, hinders seriously commissioning work



JCOP Packages and Tools

Wiener power supplies

all

Instabilities with PL500

Maraton

Compute-intensive?

In development

Clarification how many OPC servers, handle which devices ?



JCOP Packages and Tools

FSM

all

none

none

none

Released (every week)

Essential for ATLAS operations, good response to requests



JCOP Packages and Tools

CFM

Used by 3 subdetectors

Not available: FW, OPC servers

?

See above

Released ?

Urgent, essential for commissioning



JCOP Packages and Tools

WTS

Used by 3 subdetectors

?

New user shell

?

Released ?

Urgent, essential for commissioning



ATLAS
DCS

JCOP Packages and Tools

Not yet used

PVSS access control

FW alert handling (starting this week)

FW trending tool

DIP: must extend across network domains

ISEG component

IPMI (will become important for operation)

Components for

- Magnet Control

- LHC interaction

- Access control for persons

- Cryogenics control (?)



JCOP Packages and Tools

Major issues:

- ◆ Data visualization
 - We have done some work with ROOT “standalone”
 - What will QT bring
 - What will integration of ROOT in PVSS bring?
- ◆ Linux
 - Request to use only Linux in ATLAS Control Room
- ◆ Training
 - Need self-learning material for beginners
 - Controls coordinators fill places (quotas) for experiments
- ◆ Backup and repository for PVSS projects
 - Guidance (and tools) requested from JCOP
- ◆ Network restrictions (“Security”)



“Challenges”

- ◆ **Cool-down of LAr central barrel (4/06)**
- ◆ **Commissioning of Barrel Toroid (5/06)**
- ◆ **Cosmic data taking calorimeters (6/06)**
- ◆ **Control Room (9/06)**
- ◆ **Operation with TDAQ**
- ◆ **Full cosmics data taking (?/06)**
- ◆ **...**
- ◆ **Physics data taking (?)**



ATLAS
DCS

Conclusions

- ◆ **ATLAS DCS organization in a reasonable shape**
 - **BUT** in 2007 are only 1.3 person(s) left
- ◆ **JCOP is a fruitful collaboration based on PVSS as a reasonable product**
 - **BUT** substantial functionality not yet tested or available
- ◆ **IT/CO gives reasonable support**
 - **BUT** direct help with deployment must increase
- ◆ **Front-End systems in reasonable shape**
 - **BUT** not much final solutions yet for Control Room

➔ A lot of work to do !