

Control of the ATLAS experiment



EST fellow:

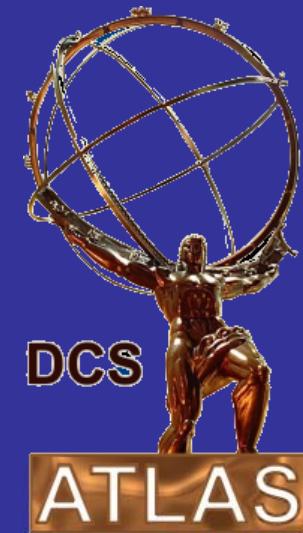
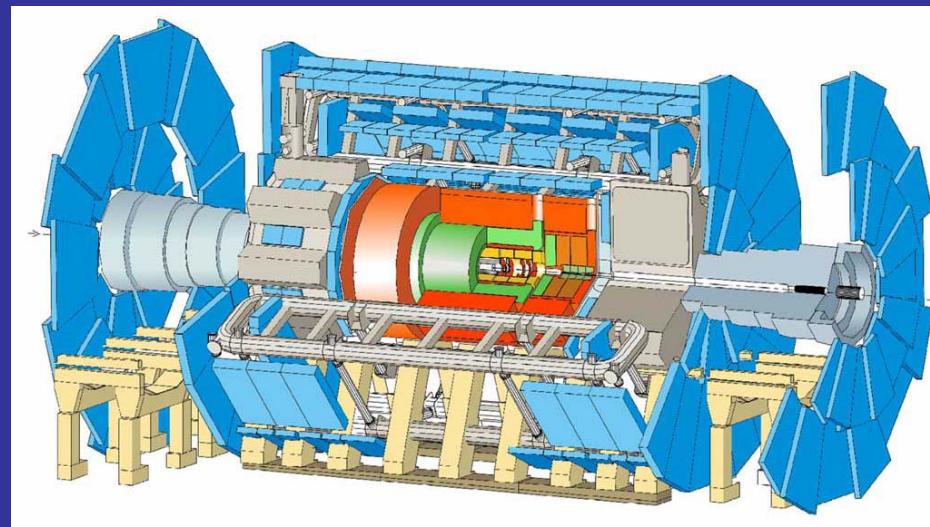
Olivier Gutzwiller

Supervisor at CERN: Helfried Burckhart



ELACCO project - Controls of LHC experiments

Fellowship started in January 2007

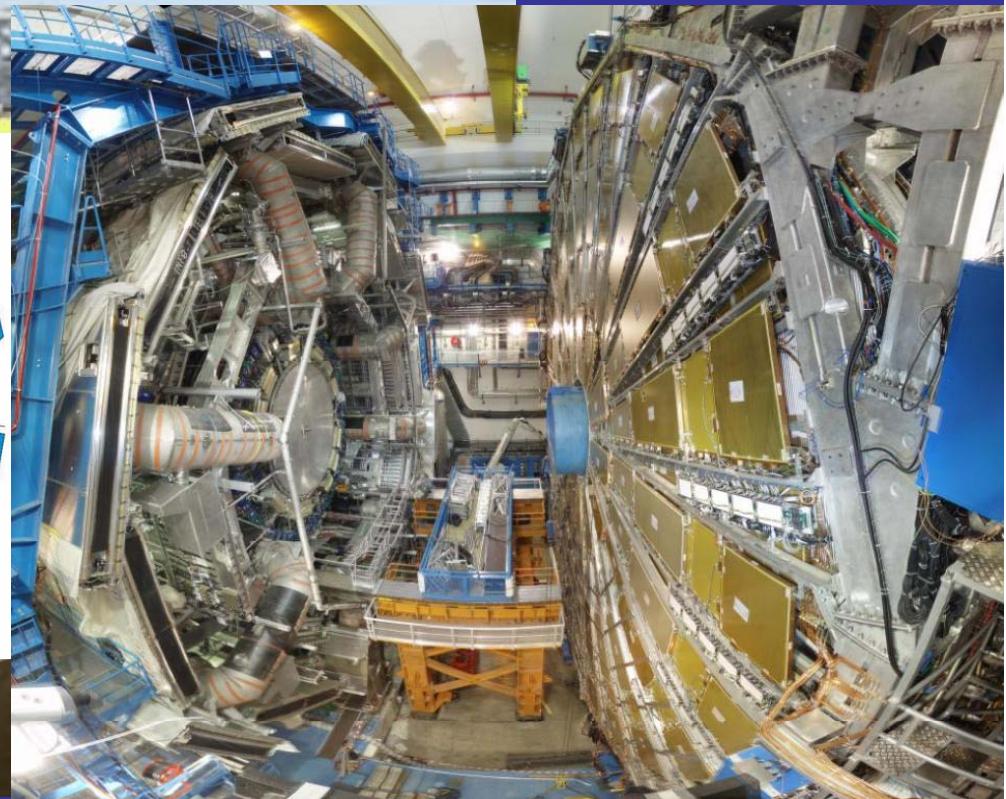
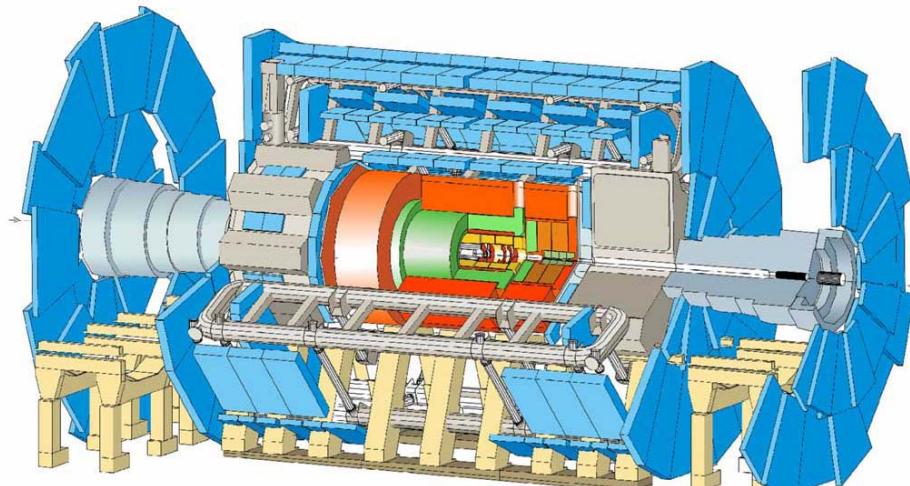


ATLAS experiment



Composed of 3 detectors of the LHC

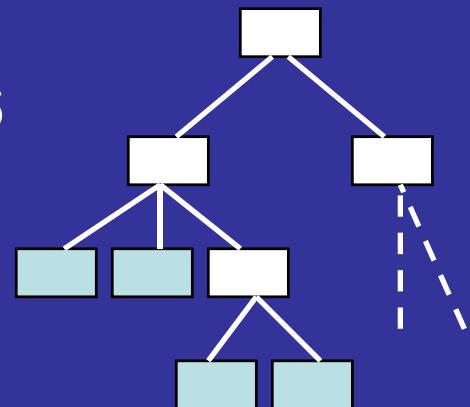
- Standard Model
- Trackers
- Calorimeters
- Muon system



ATLAS DCS



- Equipment supervision
- Safe operation of the detector
- Distributed system – 100 PCs
- Based on the industrial software PVSSII 3.6
- Tree hierarchically organized
- DCS in the Control Room:
 - FSM mechanism
 - Alarm handling
- Main Information displayed on the web:
<http://pcatdwww.cern.ch/atlas-point1/dcs/>



The figure displays two main sections of the ATLAS control system interface:

- Top Section:** A status table for various ATLAS subsystems. The columns are labeled "State" and "Status". The rows are color-coded by subsystem type: ID (blue), Calo (orange), Muon (green), and Services (yellow). A red box highlights the first eight rows (ID, Calo, Muon subsystems), while a yellow box highlights the last four rows (Services).

	State	Status	
ATLAS	READY	ERROR	
SCT	READY	OK	
TRT	NOT_READY	OK	
IDF	READY	WARNING	
LAR	READY	WARNING	
TIL	NOT_READY	WARNING	
MDT	UNKNOWN	FATAL	
RPC	UNKNOWN	WARNING	
TGC	NOT_READY	ERROR	
CSC	NOT_READY	OK	
CIC	READY	ERROR	
EXT	NOT_READY	WARNING	
TDQ	DEAD	DEAD	
LHC	UNKNOWN	ERROR	
FWD	READY	OK	
SAFETY	READY	OK	

- Bottom Section:** A 3D visualization of the ATLAS detector structure, showing its complex multi-layered design. To the right of the 3D model, the word "ATLAS" is written vertically in large, stylized letters.

The figure displays the ATLAS Detector Control interface, featuring a 3D cutaway diagram of the ATLAS detector and several status tables.

ATLAS DETECTOR CONTROL

Detector Status:

LHC	UNKNOWN	E
No Beam Energy	2.0 GeV	
Detector Standby	N	
Handshake		

System Status Legend:

- PIX: ???
- LAR: W
- MDT: F
- CIC: E
- SCT: G
- TIL: W
- RPC: W
- EXT: W
- TRT: OK
- TGC: E
- TDQ: D
- CSC: OK
- FWD: OK
- SAF: OK
- IDE: W

Object Status Legend:

- S: Object
- W: W
- E: E
- F: F
- D: D

Log Table:

Object	Date
CIC: SAFETYSYSTEM	2008.11.08 08:46:17
GCS: MAGNETS	2008.11.10 14:28:17
TDQ: CP3 OVERVIEW	2008.11.04 16:32:17

Inner Detector Status:

System	PIX	SCT	TRT	LAR	TIL
BARREL B LAYER DISKS	??? ???	??? ???	??? ???	??? ???	??? ???
BARREL ENDCAP A	R OK				
BARREL C	R OK				
BARREL A	N OK				
BARREL C	N OK				
ENDCAP A	N OK				
ENDCAP C	N OK				

Calorimeter Status:

System	FMR8	EMBC	EMECA	EMECC	HEC FCAL A	HEC FCAL C
LBA	R OK	R W	R OK	R OK	R OK	R OK
LBC	R W	R W	R OK	R OK	R OK	R OK
EBA	N OK	R W	R OK	R OK	R OK	R OK
EBC	R W	R W	R OK	R OK	R OK	R OK

Muon Spectrometer Status:

System	BARREL A	BARREL C	ENDCAP A	ENDCAP C
RPC SIDE A	U W	U W	U E	U F
RPC SIDE C	U W	U W	U E	U F
TGC SIDE A	N E	N E	N E	N E
TGC SIDE C	N E	N E	N E	N E
CSC SIDE C	N OK	N OK	N OK	N OK

Services Status:

Service	SAF	DSS SHIFTERS	MAGNETS	Toroids	Solenoid	TDQ	TRIGGER L1
COOLING ENVIRONMENT	R OK	R OK	R W	0 A	0 A		
RACKS USAL1	R OK	R OK	R E				
RACKS USAL2	R OK	R OK	R E				
RACKS USL2	R E	R E	R E				
RACKS SDX1	R OK	R OK	R E				
RACKS UX	R OK	R OK	R E				

Back Home ogutzwil 14:41:42
ATLAS CIC ENVIRONMENT
 USA15 L2 READY OK ✓
 GOTO_ON ACKNOWLEDGE

LHC UNKNOWN E
 No Beam Energy - 2.0 GeV
 Detector Standby N
 Handshake

ID	CALO	MUON	SERVICE
PIX ???	LAR E	MDT F	CIC OK
SCT W	TIL W	RPC W	EXT W
TRT W		TGC E	TDQ D
IDE W		CSC OK	FWD OK
			SAF OK

S Object Time
 W GCS: MAGNETS 2008.11.11 13:25:25
 W TDQ: CP3 OVERVIEW 2008.11.04 16:32:08
 E MDT: MDT BA 2008.11.11 14:40:53
 W IDE: Q4::LOOP_168 2008.11.11 14:41:19
 W SCT: TEMP MCool 2008.11.11 14:41:22

ENVIRONMENT USA15L2

Temperature

Temperature 22.2 °C

Time Range Y Axes Save Settings Other 1:1 log auto |<- 90 d 0 h 0 m ->|
 7/1/2008 11:41:18 AM.808 Temp 22.2

Humidity

Humidity 48.7 %

Time Range Y Axes Save Settings Other 1:1 log auto |<- 90 d 0 h 0 m ->|
 7/1/2008 11:41:18 AM.808 Hum 48.68333333333333

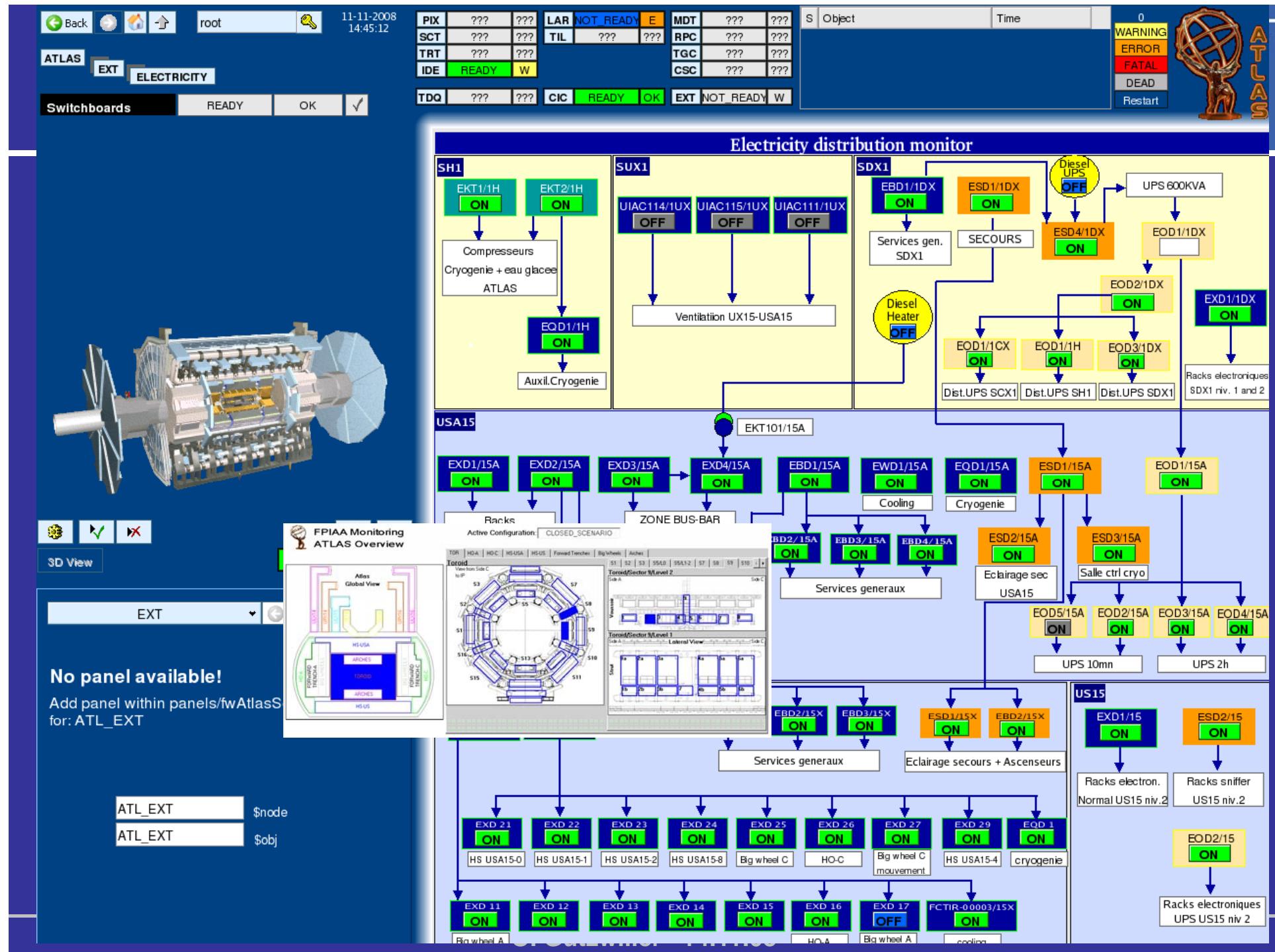
Dew Point

DewPoint 10.9 °C

Time Range Y Axes Save Settings Other 1:1 log auto |<- 90 d 0 h 0 m ->|
 7/1/2008 11:41:18 AM.808 Dew Point 10.87160713037

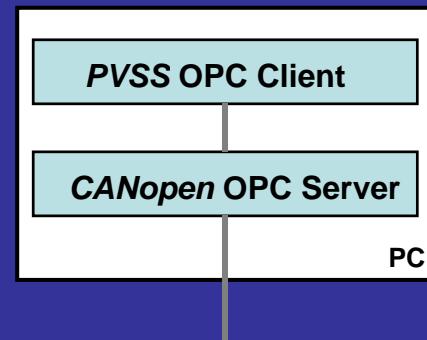
ATLAS Back Home

ATLAS DCS
???
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My Contributions

- **Supervision of the services**
- **ELMB support**
 - Embedded Local Monitor Board
 - General-purpose board developed by NIKHEF for the experiments
 - 5000 ELMBs at ATLAS





My Contributions

- **Supervision of the services**
- **ELMB support**
- **Software development and support**
 - PVSS 3.6 II
 - Generic frameworks (CAN PSUs, GAS components)
 - Customized applications
 - Coordination of the DCS
 - Writing guidelines
 - Help to the users/developers
 - Shifts in the control room

My Personal Development



- Professional and Social skills developed at CERN
- Papers
 - The Detector Control System of the ATLAS experiment
 - The Common Infrastructure Control of the ATLAS experiment
- Books (Physics and Computing) & Training in C++ at CERN
- Workshops/Conferences
 - ESOF2008, Barcelona, Spain
 - CSC08, Gjovik, Norway
 - TWEPP08, Naxos, Greece
 - GO-Automation07 / Inelec Expo07, Basel, Switzerland
- Thank you !

