



ATLAS LAr calorimeter cryostats and cryogenics

Contents

- Responsibilities AT-ECR in "LAr calorimeter cryostats and cryogenics project"
- Institutes collaborating in the project
- Functional demands
- Work done in building 180
- Work done at Point 1
- Work to be done at Point 1



ATLAS LAr calorimeter cryostats and cryogenics

Responsibilities AT-ECR in "LAr calorimeter and cryogenics project";

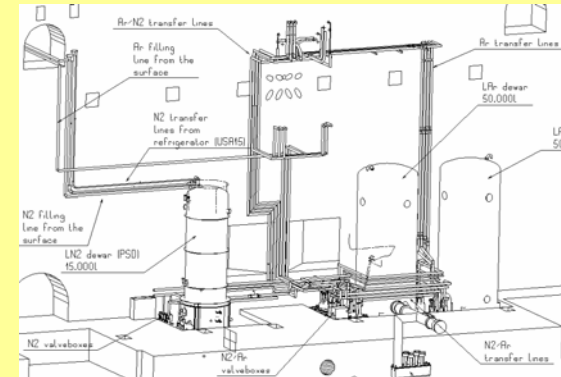
- Development, design, tendering, fabrication follow up, installation, commissioning and operation of external cryogenic installation (B. 180 and Point 1);
- Coordination of collaboration working on complete cryogenics / cryostats project;
 - Cryostat preparation, detector integration and cold tests B. 180;
 - Transport to and lowering at Point1;
 - Integration of cryogenic system at Point 1;
 - Cool down and filling of three cryostats;
 - Operation over ATLAS lifetime.



ATLAS LAr calorimeter cryostats and cryogenics

Institutes collaborating in the project I

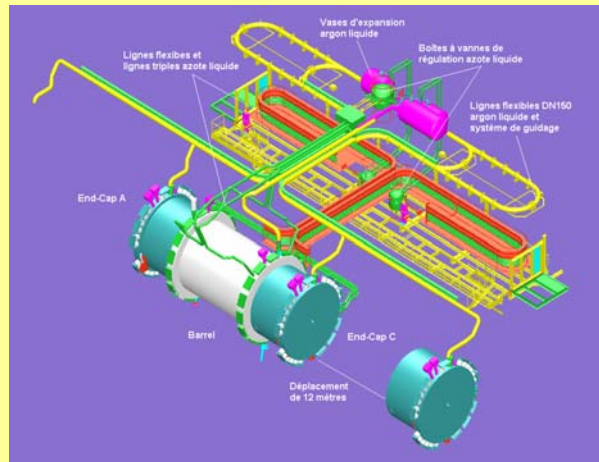
CERN AT/ECR, external cryogenics:



LPSC Grenoble, proximity cryogenics:



03/07/06



LEAF



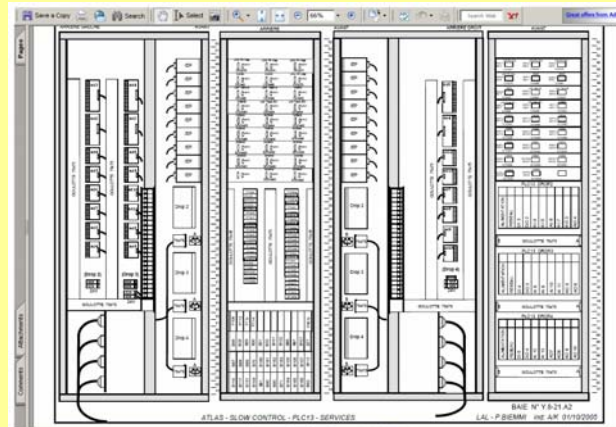
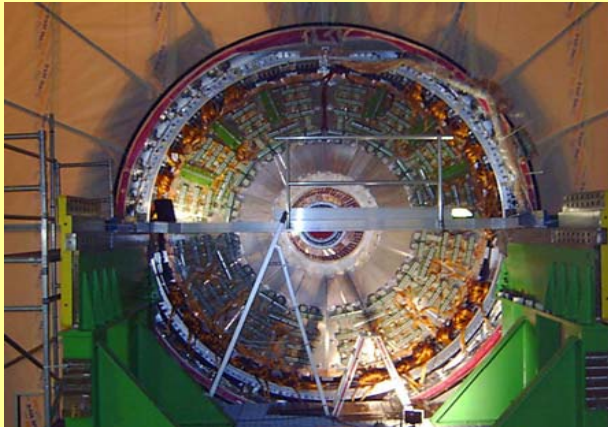
Johan Bremer AT/ECR



ATLAS LAr calorimeter cryostats and cryogenics

Institutes collaborating in the project II

LAL Orsay: interconnections and control



BNL: Nitrogen Refrigerator



03/07/06



LEAF



Johan Bremer AT/ECR



ATLAS LAr calorimeter cryostats and cryogenics

Institutes collaborating in the project III

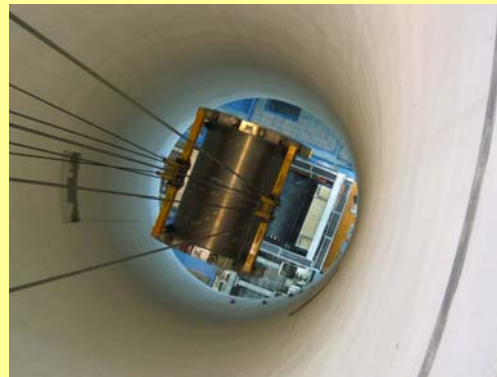
SINTEF, Trondheim: storage tanks



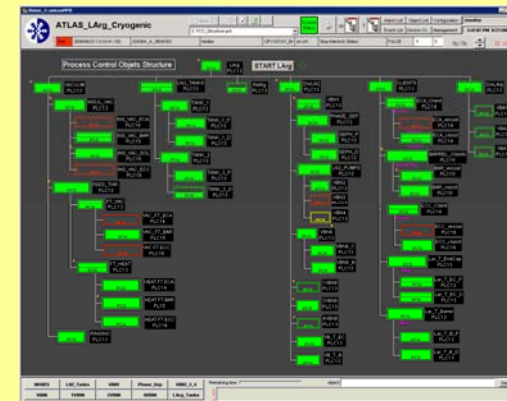
CEA Saclay: cryostats transport, functional analysis



03/07/06



LEAF



Johan Bremer AT/ECR



ATLAS LAr calorimeter cryostats and cryogenics

Functional demands

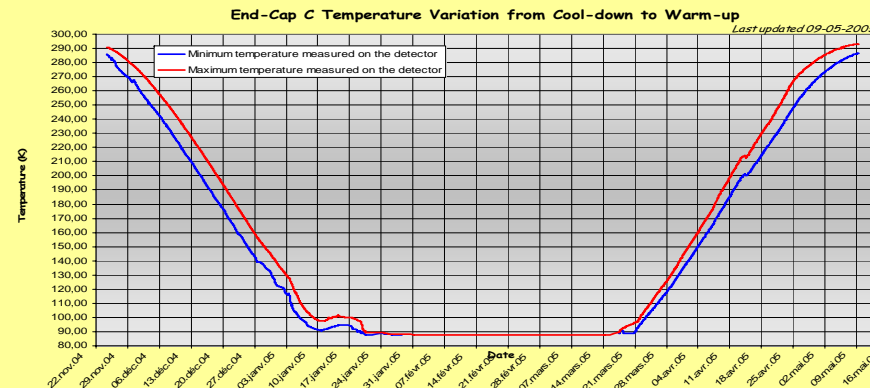
- Seen the large quantities of argon in underground area: high safety level;
- High stability of detector temperature;
- Continuous operation over ATLAS lifetime;
- Displacement of full EC cryostats over 12 meter;
- Program in UNICOS standard;
- Integration of material in ATLAS cavern and detector;



ATLAS LAr calorimeter cryostats and cryogenics

Work done in building 180

- Installation of test area (hardware, electrical power, etc....);
- Reception tests of empty cryostats (vacuum / pressure / cold);
- Integration of detectors;
- Closure of cryostats (welded), vacuum tests / pressure tests;
- Cool down of cryostats;
- Operation of cryogenic system during at least 3 months of cold tests;
- Warming up of cryostats;
- Preparation for transport;
- Transport.

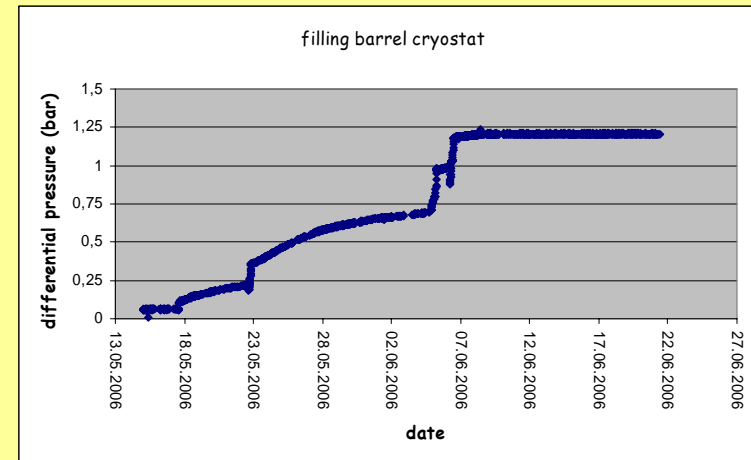
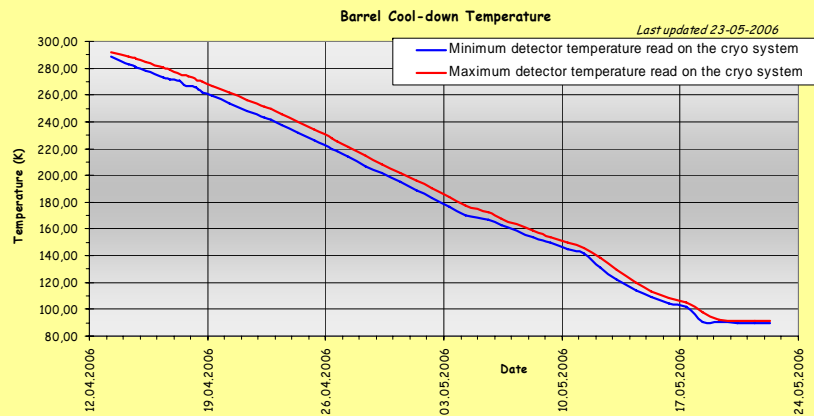




ATLAS LAr calorimeter cryostats and cryogenics

Work done at Point 1

- Installation, tests, commissioning
 - N2 refrigerator;
 - Transfer lines (1,5 km) and valve boxes (13);
 - Cabling and electrical interconnections;
 - Electrical power / cooling water / compressed air.
- Installation, test, commissioning cryogenic installation;
- Cool-down and filling of Barrel cryostat;



03/07/06

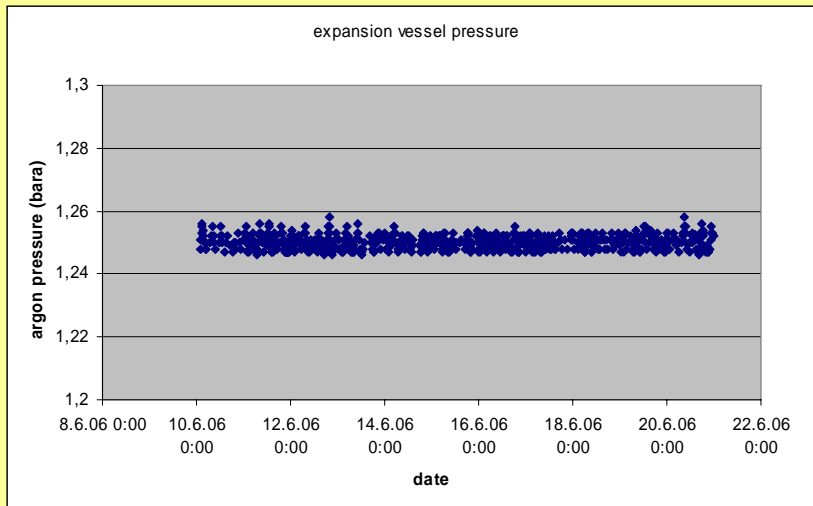
LEAF

Johan Bremer AT/ECR



ATLAS LAr calorimeter cryostats and cryogenics

Stable situation in expansion vessel



Impurity level

Can only be measured in gaseous phase (by us): < 2 ppm (= lower limit measurement)

Stable situation detector temperatures

$T_{\min} = 88,2 \text{ K};$

$T_{\max} = 88,6 \text{ K};$

} Stable in time

Detector sub-cooled between 5,8 K and 8,6 K.



ATLAS LAr calorimeter cryostats and cryogenics

Work to be done at Point 1

- Installation and connection of transfer lines between platforms to EC cryostats;
- Connection of signal cabling between rack-room and EC cryostats;
- Displacement of ECs to test guiding systems for cryogenic lines and cabling;
- Cool down and filling of EC cryostats;
- Upgrade of refrigerator program to UNITY;
- Preparation of handover of cryogenic installation to operations (documentation, courses etc.).

