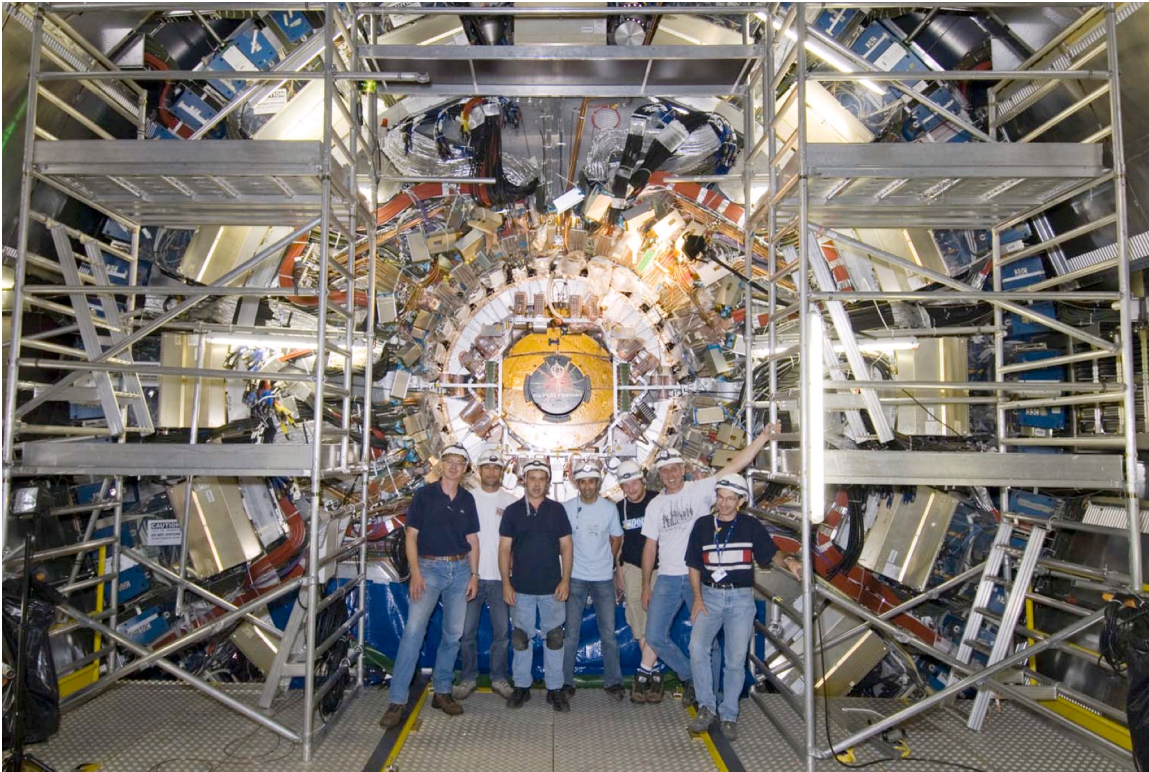


Section DT1/DI (Detector Design and Integration)

Highlights: During 2007 the mechanical installation of the whole Inner Detector has been completed. The two Inner Detector End Caps have been inserted and aligned into the ATLAS central bore, connections completed and tested. The Pixel detector was installed and the beam pipe connected on both sides.

The DT1-DI section, has, over the past 10 years, fully developed and engineered the ATLAS Transition Radiation Tracker (TRT); a detector based on proportional straw tubes. The TRT is the external part of the ATLAS Inner Detectors, it surrounds and supports the two inner detection systems: the Silicon (SCT) and Pixel detectors.

With Project Engineering responsibilities for the overall ATLAS Inner Detector (ID), the section has completed in 2007 the integration and mechanical installation of the entire ID, with the accurate positioning of the Inner Detector End Cap's (EC) and the Pixel in the heart of the ATLAS experiment.



The installation of the ID inside the LAr cryostat has required a long preparation of the detectors and their services in the cryostat bore and on the flange. Detailed surveys were performed before and after the detector insertion. In addition, an extensive campaign of measurements of envelopes and precise position of the detectors were carried out with “the robotic arm”. After insertion of the EC's, all connections and testing were completed for the TRT. The Pixel Support Tube was then installed, surveyed and aligned. Once the

Pixel insertion completed, the beam pipe central section was aligned and connected on both sides.

On the ID evaporative cooling system (Pixel and SCT), the layout of the input and output lines had to be reworked completely to make the evaporative heaters accessible. In the new layout, repair and maintenance was made possible, without adding delays to the main Atlas installation schedule.

In parallel to ATLAS the section has also participated in the development of straw detector that shall be operated in the vacuum chamber of the Na62 experiment. A first prototype of this detector was built and successfully tested in the 2007 run of the Na48 experiment.

Section DT1-GS (Gas Systems)

Highlights: 17 gas systems have been put into operation with 13 connected to detectors and 4 finished but in stand-by

The year 2007 marked a flagrant change for the gas section as it transitioned from construction to largely installation, running-in and operation phase. Almost all gas racks have been successfully installed and most have been tested by now. The gas separating and gas purification modules were amongst the latest ones to be installed. The construction of the analysis modules, the only remaining mass production, is to about 80% finished and in some cases already in use by the experiments.

A further major milestone achievement was the declaration of experimental areas for using flammable gas in ATLAS, ALICE and CMS.

Several gas systems have been handed over to detector experts, which use them for commissioning their chambers, leak measurements and first HV tests with chamber performance on cosmic rays. Sometimes these activities go even on in parallel in different detector location, like e.g. ATLAS MDT.

In CMS the first gas system with the final configuration and purification was successfully tested on the CSC detector. Since November the CSC gas system delivers design parameters, enabling the physicists to test their chambers with cosmic rays. About 50% of the chambers were installed and connected by the end of 2007. The DT gas system was supplying final the gas mixture to the installed detectors, although the gas was not yet re-circulated.

ALICE successfully operated the TPC and HMPID gas system in final configurations. The latter one runs pure Methane and needed therefore the entire flammable gas infrastructure operational. Six other gas systems are finished and four of them supply final mixtures to partially commissioned chambers.

In LHCb the operation was successfully started for the OT detector.

Section DT1-IC (Instrumentation and Control)

Highlights: the tests of the magnet control systems have continued. The piquet service for the MCS, MSS and DSS have operated successfully.

ATLAS

The vacuum for the ECT was tested and put into service. Both ECT's have been cooled down and tested with currents up to 10 and 15 kA.

The section developed a PVSS supervisor for the TRT CO2 cooling system.

CMS

After the surface test of the magnet in 2006, all the equipment has been moved down and installed in the underground areas. The equipment is been commissioned and full magnet test is foreseen in March or April 2008.

The monitoring and control system for the ECAL barrel cooling system has been installed, and completely commissioned in autumn 2007. Since then the ECAL barrel cooling system is operating.

LHCB

The dipole magnet and its control system has been successfully tested. The nominal current has been maintained during 48 hours.

ALICE

The control system of the ALICE dipole magnet was tested.

TOTEM

Realization and installation of electrical connection patch panels for the four Roman Pots in Point 5. A control chassis for the detector motorization has been developed, tested and installed in the USC55.

MAGNETIC FIELD MEASUREMENTS :

In the framework of the EUDET project the section has made an acquisition system for the field mapper of the EUDET magnet. In collaboration with the PH-ESE the section has participated in the development of new B-field sensor.

Section DT1/MM (Magnets and Mechanics)

Highlights: In 2007 the ATLAS ECT's were installed, and the main activities for magnet commissioning were started.

The EUDET solenoid was successfully mapped at DESY.

The TOTEM roman pot assembly and installation.

During the summer 2007 the EUDET superconducting solenoid has been successfully mapped in DESY with a dedicated new machine. For this B-field map, new types of 3D probes were designed and set up with the help of the PH/ESE group. The first production series of this new probe was achieving an accuracy of 10^{-3} which was accurate enough

for the needs of the EUDET collaboration. Later in the year a collaboration with NIKHEF was set-up to produce an even better and more reliable design.

Technical support has been provided for the integration of ATLAS ECT's, transport in the cavern and their installation in ATLAS. After integration of the coils in the cryostats and the vacuum tests, both end caps were cooled down at LN2 temperature before transporting them into the ATLAS site. Measurements of the magnetic field in the bore tube were performed and analyzed to assess the precise positioning of the cold mass inside the cryostat.

A campaign for cold check of ATLAS ECT's was started, in preparation of a full magnet test (ECT's, BT, Solenoid) in 2008.

The TOTEM Roman Pot units were assembled and installed in the LHC tunnel. The connection of the Roman Pot services (cabling, cooling) is on-going. The detector installation and commissioning is foreseen for 2008.

In 2007 the section also has continued to provide support to ATLAS integration and installation activities for the Muon Chambers, Small Wheels and Big Wheels. For the CMS Pre-shower detector technical help was given for the gluing of the absorber plate assemblies.

As usual, the section has provided technical support for the maintenance, repairing and storage of departmental experimental magnets, with specific servicing done for the DIRAC dipole, and for COMPASS. On this dipole all the rubber cooling water pipes have been replaced.

Support has also been provided to T2K collaboration for the recovering of the UA1 magnet, specifically, the pancakes have been checked for water leaks, putting in pressure (once to 25 bar, then to 45 bar) the single circuits of the coils.

Section DT1-TI (Tracking and Identification)

Highlights: During 2007 the Alice TPC was installed inside the Alice magnet. The system for the circulation of liquid C_6F_{14} in the HMPID radiator has been completed and it will be installed at P2 in 2008. The section continues to assume the technical coordination of the CAST experiment. Data taking for different 4He gas density has been carried over the year. The section has started to contribute to the TOTEM installation and to the NA62 RICH detector.

The outstanding event in 2007 was the successful insertion of the TPC into the ALICE experiment in spring, which was done with strong involvement of the section. In order to allow for the installation and commissioning of the ITS the position of the TPC was adjusted several time inside the space frame before reaching its final position in September. After the installation work the section participated in the connection of the

services for the TPC. At the end of the year the installation was completed and the TPC took part in the global ALICE commissioning run with cosmic rays.

The section also continued to support the HMPID detector. The pumping and filling stations for the liquid radiator circuit have been assembled and prepared for installation. The HMPID gas and cooling systems were commissioned and successfully tested at the end of the year.

In 2007 the section started to contribute to the NA62 experiment, namely in the assembly of the RICH prototype for which 100 quartz windows have been glued on a stainless steel frame as well as special conical shaped reflective covers. Assistance was given to the CMS ECAL project helping them to glue thin aluminum foils on large surfaces.

The TI section has taken on responsibility for the integration of the T1 and T2 detectors in TOTEM comprising the supervision of the installation. A set of mock-up chambers have been produced to simulate and test the installation procedure.

The group contributes to the CAST experiment staffing the technical coordinator of the experiment. A complex ^3He cryogenic gas system has been installed, involving modifications both inside and outside the magnet cryostat. The gas system was commissioned shortly before the winter shutdown and is now ready for the long ^3He data-taking runs in 2008-2010. For the magnet movement system, protection mechanisms were installed under the main pivot and at the vertical suspension points and key components received a major overhaul. The cryostat was equipped with safety rails and cables for personnel working at height on the magnet. A new Micromegas detector line (Saclay) was integrated on the X-ray telescope platform and the integration of two new Micromegas detectors (Saclay/ Zaragoza) are in an advanced stage at the opposite end of the magnet. It is planned to start data-taking with all three new detectors plus the existing pn-CCD detector and X-ray telescope in mid-March 2008.