
30. MANAGEMENT OF THE PROJECT

30.1 INTRODUCTION

The construction of the Magnet is a Common Project of the CMS collaboration. It is financed by all participating institutes with contributions that are proportional to their financial contribution to the experiment as a whole (see Chapt. 31). The guidelines for the contributions to the Magnet Project will be set in the Memorandum of Understanding and are laid down in the document entitled “Guidelines on CMS Common Project Contributions” [31-1].

The CMS Magnet Project is organised under the technical responsibility of the Magnet Project Manager who is nominated by the CMS Spokesperson and endorsed by the CMS Management Board and the CMS Collaboration Board. The Magnet Project Manager is assisted by the Coil Co-ordinator, the Yoke Co-ordinator and a CERN based Project Office.

The financial aspects are monitored by the CMS Budget Co-ordinator and the CMS Resource Manager and ultimately by the CMS Finance Board.

The technical aspects are monitored by the CMS Technical Co-ordinator and ultimately by the CMS Technical Board.

Major issues and changes will be referred to the CMS Management Board for approval.

30.2 ORGANISATION

30.2.1 The Magnet Technical Board

The Magnet Project Manager takes advice from the Magnet Technical Board (MTB), which regularly regroups experts from participating institutes together with experts from institutions that are not members of CMS. The MTB meets every four to six weeks.

Figure 30.1 shows the present organisation of the MTB including the names of the current members.

30.2.2 Technical Working Group

The Technical Working Group (TWG) meets regularly to discuss technical matters concerning mainly the coil. Current members of the working group are:

E. Baynham / Rutherford Appleton Laboratory	D. Campi / CERN-PPE
P. Fabbriatore / INFN-Genova	J.P. Grillet / CERN-PPE
A. Hervé / CERN-PPE	S. Horvath / ETH Zürich
J.C. Lottin / CEA-Saclay	C. Lyraud / CEA-Saclay
W. Maurer / Forschungszentrum Karlsruhe	R. Musenich / INFN-Genova
L. Veillet / CERN-PPE	

30.2.3 Co-operation Protocol with CEA-Saclay

CEA-Saclay has been at the origin of the project for the superconducting coil and has worked on its design since 1991. They have helped the collaboration ascertain that a 4 T coil, with the given parameters, was possible and affordable. CEA-Saclay developed the conceptual design for the Letter of Intent and for the Technical Proposal (end of 1994) which finally led to the approval of CMS by the LHCC and the CERN Research Board. A Protocol of Co-operation was negotiated in 1995 between CERN, acting on behalf of the CMS

Collaboration, and CEA-Saclay.

This Protocol of Co-operation covers the design, manufacture follow-up and commissioning of the superconducting coil. The Magnet Project Manager(*) is responsible for the design and the technical specifications which shall be provided by CEA-Saclay and the participating institutes (see also Chapt. 31).

* Assisted by the Magnet Technical Board.

30.3 PARTICIPATING LABORATORIES

Several institutes have participated in the studies, design, and pre-industrialisation effort for the magnet project. These institutes, which are listed below, are and will continue to be technically involved in the development and procurement of large items. Below we outline the current plans under which the Magnet Project will be carried out. To guarantee the necessary coherence of the project, and satisfy the Quality Assurance Plan, it has been agreed that the work done by an institute participating in the CMS magnet project, must satisfy the following conditions:

- (a) The work will be carried out under the authority of the Magnet Project Manager, with the advice of the Magnet Technical Board, in full accordance with the approved Work-Plans and Schedules of the CMS Magnet Project;
- (b) The participating institute will nominate a Project Engineer who shall be a member of the CMS Collaboration and of the MTB;
- (c) The firm (and subcontractors) selected by a participating institute shall be agreed by the CMS Magnet Project Manager (*) on the basis of technical considerations;
- (d) For the coil project, work shall be carried out according to technical specifications provided by CEA-Saclay and the participating institutes under the control of the CMS Magnet Project Manager (*). The regular follow-up of the contracts will be organised by the Project Engineer. Regular status meetings will be called by the Project Engineer with the participation of representatives of CEA-Saclay and/or of the Project Office, with full access to companies involved. These status meetings may also be called, upon request, by the CMS Magnet Project Manager;
- (e) For the yoke project, work will be carried out under the control the CMS Magnet Project Manager (*). The regular follow-up of the contracts will be organised by the Project Engineer. Regular status meetings will be called by the Project Engineer with the participation of representatives of the Project Office, with full access to companies involved. These status meetings may also be called, upon request, by the CMS Magnet Project Manager;
- (f) Proposals for technical changes, including Work-Plans and Schedules, shall be referred by the Project Engineer to the Magnet Project Manager (*);
- (g) Proposals for changes having potentially significant cost implications shall be jointly presented by the Magnet Project Manager and the Project Engineer to the proper financial authority;
- (h) Provisional and final technical acceptance will be given by the Project Engineer of the participating Institute in accordance with the technical specification, after approval by the CMS Magnet Project Manager (*).

* Assisted by the Magnet Technical Board.

30.3.1 Collaboration with the University of Wisconsin

The University of Wisconsin, with the help of Physical Sciences Laboratory, is designing the endcap section of the magnet. They will prepare the tender documents and organise the main procurements, (see also Chapt. 31).

30.3.2 Collaboration with ITEP Moscow

ITEP Moscow currently provides the necessary connections with the Russian industry which could manufacture the barrel yoke. If the manufacture is in Russia ITEP could take part in the manufacturing follow-up, including quality checks like permeability measurements and ascertain that the manufacture is progressing in accordance with the Quality Assurance Plan.

30.3.3 Collaboration with Fermi National Accelerator Laboratory (FNAL)

FNAL has a major responsibility for the construction of the Hadron Calorimeter and has shown an interest in the vacuum tank, as this is the supporting structure of the barrel part of this detector system. They have participated in the mechanical analysis of the vacuum tank and provided an independent analysis of the barrel yoke. FNAL will participate in the financing of these items, (see also Chapt. 31). FNAL will organise the field mapping strategy taking into account requirements arising from physics.

30.3.4 Collaboration with ETH Zürich and EMPA

From the beginning and with the help of EMPA (Eidgenössisches Material Prüfungs Anstalt) ETH Zürich has been involved in the design of the CMS conductor and has supported the project.

In particular, ETH Zürich, with the help of EMPA, will be in charge of carrying out the work concerning the conductor for the superconducting coil. It also intends to organise the commercial aspects of this procurement (see also Chapt. 31).

30.3.5 Collaboration with INFN Genoa

From the beginning, the INFN Genoa group has been involved in the design of the CMS coil, with full support from INFN. They have participated in the FEA and stability analysis of the coil. In particular they will be in charge of the conductor characterisation.

In addition INFN proposes to provide the complete CMS coil winding. In this context INFN intends to participate technically and to assume the contractual and financial responsibility for the full winding operation (see also Chapt. 31).

30.3.6 Collaboration with NHMFL

NHMFL (National High Magnetic Field Laboratory in Tallahassee) has large testing facilities particularly relevant for magnets the size of CMS, and they will be of great help for the conductor characterisation.

Discussions are going on to define exactly the framework of this collaboration.

Magnet Project

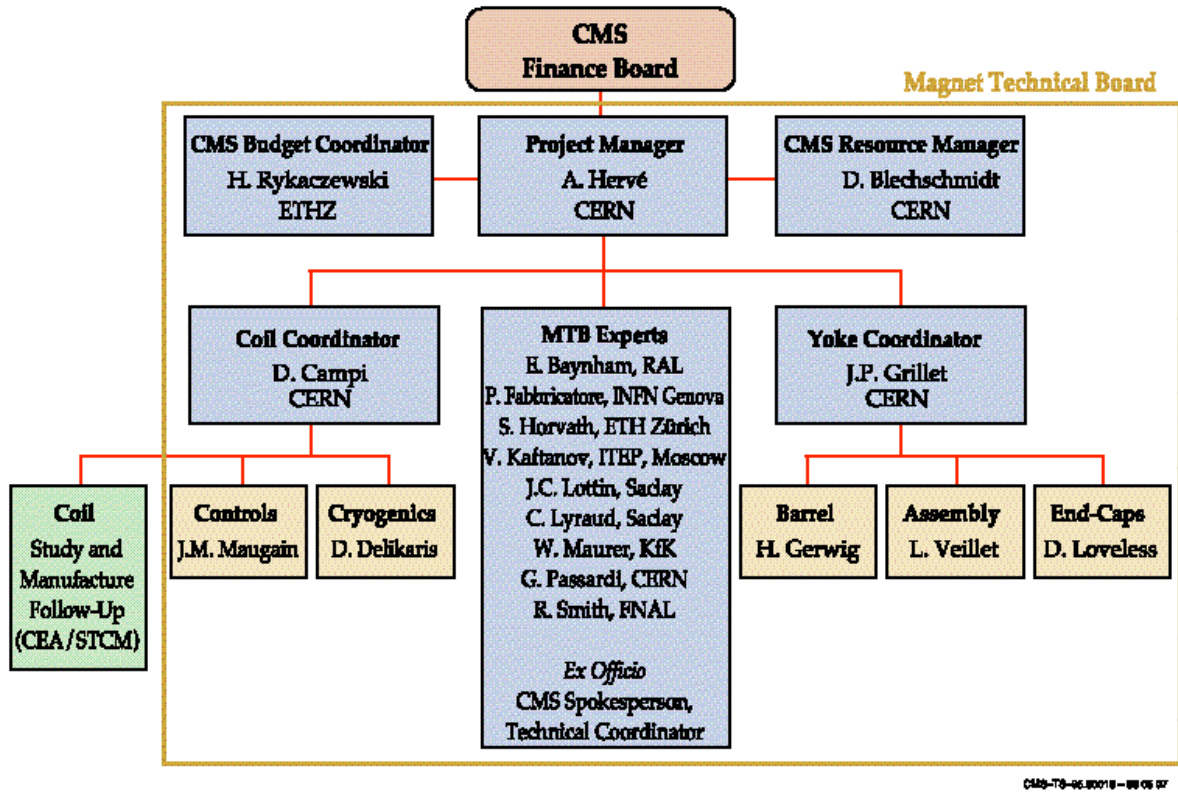


Fig. 30.1: Present organisation of the Magnet Technical Board.