

# Memorandum of Understanding

## for Collaboration in the Construction of the ATLAS Detector

between

The EUROPEAN ORGANISATION FOR NUCLEAR RESEARCH,  
hereinafter referred to as CERN, Geneva, as the Host Laboratory

on the one hand

and

an Institution/Funding Agency of the ATLAS Collaboration

on the other hand.

### Preamble

- (a) A group of Institutes from CERN Member and non-Member States, and CERN, has agreed to collaborate to form the ATLAS Collaboration (Annex 1). This Collaboration has proposed to CERN an experiment to study particle interactions at the highest possible energies and luminosities to be reached with the Large Hadron Collider (LHC). These Institutes have secured the support of their Funding Agencies to enable them to participate in the ATLAS Collaboration.
- (b) Agreement to this Collaboration is effected through identical Memoranda of Understanding (MoU) between each Funding Agency or Institute, as appropriate, in the Collaboration and CERN, as the Host Laboratory. These MoUs collectively define the Collaboration and its objectives, and the rights and obligations of the collaborating Institutes.
- (c) On the basis of a Technical Proposal submitted in December 1994 (CERN/LHCC/94-43) and a detailed review of the scientific merits, the technological feasibility and estimates of the needed resources, the LHC Committee (LHCC) recommended approval of the experiment to the CERN Research Board, subject to a set of milestones to be met by the experiment in its initial phase (CERN/LHCC 95-76).
- (d) Based on the recommendation by the LHCC and in agreement with the list of milestones, the Research Board recommended to the Director General of CERN to approve the project, together with plans, including milestones, leading to the sub-system/detector Technical Design Reports.

- (e) The Director General accepted the Research Board recommendation and approved the project to build the detector for the ATLAS experiment within a cost ceiling not exceeding 475 MCHF (in 1995 prices).
- (f) Before proceeding to the final construction phase each sub-detector/system will be subjected to a technical, financial, and manpower review (CERN/DG/RB 95-234) by the LHCC based on the Technical Design Reports. This process will be completed during 1997 and 1998 for most of the sub-systems/detectors.
- (g) A Resources Review Board (RRB) has been constituted which comprises the representatives of all ATLAS Funding Agencies and the managements of CERN and the ATLAS Collaboration. It is chaired by the CERN Director of Research.

The role of the RRB includes :

- reaching agreement on the Memorandum of Understanding
- monitoring the Common Projects and the use of the Common Funds
- monitoring the general financial and manpower support
- reaching agreement on a maintenance and operation procedure and monitoring its functioning
- endorsing the annual construction and maintenance and operation budgets of the detector

The collaboration management reports regularly to the RRB on technical, managerial, financial and administrative matters, and on the composition of the Collaboration.

- (h) These Memoranda of Understanding replace the existing Interim Memoranda of Understanding (IMoU) which were valid for the period 1 January 1995 to 31 December 1997.
- (i) This MoU is not legally binding, but the Institutes and Funding Agencies recognize that the success of the Collaboration depends on all its members adhering to its provisions. Any default will be dealt with, in the first instance, by the Collaboration and if necessary then by the RRB.

### **Article 1 : Parties to this MoU**

- 1.1 The Parties shall be all the Institutes of the Collaboration as listed in **Annex 1** and their Funding Agencies, and CERN as the host laboratory. **Annex 2** lists the Funding Agencies and their duly authorized representatives. The Funding Agency may be an Institute or an established institution acting on behalf of one or more funding agencies.
- 1.2 The collaborating Institute(s) and the ATLAS Collaboration will hereinafter be referred to as "Institute(s)" and "Collaboration", respectively.

**Article 2 : Purpose of this MoU**

- 2.1 This MoU defines the construction phase of the ATLAS detector. Its purpose is to define the programme of work to be carried out for this phase and the distribution of charges and responsibilities among the Parties for the execution of this work. It sets out organisational, managerial and financial guidelines to be followed by the Collaboration.
- 2.2 The construction phase comprises the engineering design, final prototyping, preproduction, construction, calibration, transportation, assembly, installation and commissioning of the elements which will be part of the ATLAS detector in the underground experimental area.
- 2.3 The ATLAS project is executed in the normal framework of the CERN scientific programme, approved by the CERN Council, and subject to the bilateral Agreements and Protocols between CERN and non-Member States.
- 2.4 In case of conflict between Agreements or Protocols and the present MoU, the former prevail.

**Article 3 : Duration of this MoU and its Extension**

- 3.1 This MoU is valid for the construction period of the ATLAS detector, from 1 January 1998 to a date not earlier than 31 December 2005. The actual termination date will be set by the RRB no later than 31 December 2003.
- 3.2 This MoU may be extended at any time by mutual agreement of the Parties.
- 3.3 Any Funding Agency may withdraw its support from the Collaboration by giving not less than eighteen months notice in writing to the Collaboration and the Director General of CERN. In such an event, reasonable compensation to the Collaboration will be negotiated through CERN and confirmed by the RRB.
- 3.4 Any Institute may withdraw from the Collaboration according to the procedures agreed by the Collaboration, the conditions as set out in the current document "General Conditions for Experiments Performed at CERN" and by giving notice in writing to its Funding Agency.

**Article 4 : The ATLAS Detector and Collaboration**

- 4.1 The detector for the ATLAS experiment has been described in detail in the Technical Proposal submitted to the LHCC in December 1994 and in the subsequent sub-system/detector Technical Design Reports. It consists of a number of sub-system/detector units as listed in Annex 3.
- 4.2 The names of the scientists presently participating in the Collaboration are listed in Annex 4 by country and by Institute.

- 4.3 The current management structure of the Collaboration is described in the attached ATLAS documents (Annex 5).
- 4.4 The technical participation of the Institutes in detector construction is set out in Annex 6.
- 4.5 Annex 7 gives an overview of the foreseen construction schedule.
- 4.6 Following the recommendations of the LHC Cost Review Committee (CORE) the manpower and financial resources needed for the ATLAS experiment are grouped into three headings:
  - 4.6.1 R&D work on the various detector elements ;
  - 4.6.2 costs for infrastructure in the Institutes, and costs for personnel, travel, etc. of the Institutes as arising from their participation in the Collaboration ;
  - 4.6.3 engineering design, final prototyping, preproduction, construction, calibration, transportation, assembly, and installation costs for the complete detector.

The resources needed for work under the headings 4.6.1 and 4.6.2 are the responsibility of the Institutes supported by their respective Funding Agencies. These resources are neither accounted for in detector construction costs, nor monitored centrally by the Collaboration.

The resources needed for work under the heading 4.6.3 cover the costs of the detector construction. These costs have been evaluated by the Collaboration and verified by CORE. Only these costs are monitored centrally by the Collaboration.

- 4.7 Any Institute that wishes to join the Collaboration during the period of validity of this MoU will be expected to make an appropriate contribution to the funding of the detector construction including the Common Projects. This will be negotiated by the Collaboration and endorsed by the RRB. In the event that the detector construction is already fully funded, the new Institute will have to make a special contribution which will be negotiated by the Collaboration and endorsed by the RRB.
- 4.8 The individual sub-system/detector CORE costs, expressed in Swiss Francs, are contained in the ATLAS Cost Review Estimate, Version 7, dated 31 Jan. 1998.
- 4.9 Unless explicitly mentioned, all cost figures in this MoU are expressed in 1995 Swiss Francs based on estimates valid on 31 January 1998. The calculated CERN index for materials cost variations (investments) will be used for cost monitoring purposes throughout the lifetime of the project.

### **Article 5 : Programme of Work for the Construction Phase of the ATLAS Detector and Sharing of Responsibilities for its Execution**

- 5.1 The total construction work for the detector, which includes the work executed under the terms of the IMoU, is divided into:

- 5.1.1 Sub-system/detector construction, which will be the responsibility of individual Institutes, or groups of Institutes, and
- 5.1.2 Common Projects comprising those elements of the detector construction which the Collaboration has agreed are to be provided at the common expense of the Collaboration; see Article 6.
- 5.2 Annex 8 shows the value of the deliverables, by Funding Agency and system/sub-detector, to which the Funding Agencies are committed and for which they have foreseen the appropriate funding.
- 5.3 Annexes 9.1 to 9.6 list, by system/sub-detector, the deliverables to be provided by the Institutes, the value of these deliverables, their delivery dates and the sharing among Institutes (Annexes 9.n.A). Annexes 9.n.B summarise the value of the deliverables for particular systems/sub-detectors by Funding Agency. Annexes 9.n.C show the planned spending profiles.
- 5.4 The Institutes, supported by their Funding Agencies, will make their best efforts to design, produce final prototypes, preproduce, construct, calibrate, transport, assemble, install and commission all the deliverables listed in Annexes 9.1.A to 9.6.A, within the limits of their funding.

In the event of cost overruns, these will first be brought, by the Institute(s) concerned, to the attention of the Collaboration and then to the RRB if solutions have not been found. The Collaboration will propose ways of accommodating such overruns within the overall cost ceiling of the ATLAS detector, including descoping or staging if other ways cannot be found, and seek the endorsement of the RRB.

### Article 6 : Common Projects

- 6.1 Annex 10 lists the Common Projects, together with their estimated costs (Annex 10.A) and the contributions from each Funding Agency (Annex 10.B) to cover them. The planned spending profile is shown in Annex 10.C.
- 6.2 Contributions to the Common Projects will be made in two ways :
  - 6.2.1 by taking responsibility to supply a Common Project item or parts of it, in agreement with the ATLAS Executive and Collaboration Boards and endorsed by the RRB. This option is referred to as "in-kind contribution".
  - 6.2.2 by cash payments to a dedicated Common Fund which will be established for the Common Projects through a dedicated account at CERN. The Common Fund will be managed and operated by the ATLAS Resources Coordinator, taking advice from the ATLAS Management, together with the CERN Finance Division. All Common Fund operations will be monitored by the RRB.

- 6.3 Contributions to the Common Projects are due in proportion to contributions to the funding of the ATLAS detector construction, as set out in Annex 9.n.B, based on the ATLAS Cost Review Estimate, Version 7, of Article 4.8.

A minimum cash contribution of 100 kCHF is required from each and every Institute which has voting rights in the Collaboration Board. As the design and construction stage is expected to last eight years the minimum cash contribution to the Common Fund will be invoiced by the Collaboration Management at a rate of 12.5 kCHF per Institute and per year, starting in 1996 and terminating in 2003.

The ATLAS Management may also recommend to the RRB to update the level of contribution to the Common Projects, for example due to a major change in the level of participation of an Institute or due to an Institute joining or leaving the Collaboration.

- 6.4 Subscriptions by Institutes for "in-kind contributions" to Common Projects have been solicited by the ATLAS management. On the basis of the subscriptions offered, and aiming at a fair sharing among all Institutes/Funding Agencies, the ATLAS Management will propose such "in-kind contributions" to the ATLAS Collaboration Board and will submit their recommendations to the RRB for approval.
- 6.5 Contracts for Common Projects will be placed either by CERN in accordance with the document "Financial Guidelines for LHC Collaborations" (CERN/FC/3796), or by other Institutes, in accordance with their own purchasing rules and regulations.
- 6.6 The responsibilities for the maintenance and operation of the ATLAS detector will be laid down in a separate MoU on maintenance and operation procedures. This will be prepared by the Collaboration together with CERN, in consultation with the RRB and will be signed by all the Parties.

### **Article 7 : Obligations of CERN as the Host Laboratory, and of the Institutions**

- 7.1 The general obligations of CERN as host laboratory and of the Institutions are contained in the current document "General Conditions for Experiments Performed at CERN". This document is regarded as an integral part of this MoU and is attached as Annex 11.
- 7.2 All equipment brought to the CERN site must comply with CERN's safety regulations. If relevant, the design, test criteria and testing of equipment should be discussed well in advance with CERN's safety officials. All equipment brought to CERN must be accessible for inspection by the Group Leader in Matters of Safety.

**Article 8 : Rights and Benefits of Institutes**

- 8.1 The Institutes participating in the Collaboration are entitled to join the operational phase of the project and to participate in the scientific exploitation of the data acquired. Further details are set out in the current document "General Conditions for Experiments Performed at CERN".

**Article 9 : Administrative and Financial Provisions**

- 9.1 General financial matters and purchasing rules and procedures for the LHC experiments, including the rules which apply for Common Fund operations, are dealt with in accordance with the "Financial Guidelines for the LHC Collaborations" (CERN/FC/3796).
- 9.2 Under the provisions of the CERN basic Convention dated 1st of July 1953, revised on 17 January 1971, any Institute's staff and property located at CERN shall be subject to the authority of the CERN Director General and shall comply with the CERN regulations.

**Article 10 : Amendments**

- 10.1 This MoU may be amended at any time with the agreement of its signatories or of their appointed successors. Any such amendments will be subject to the prior agreement of the RRB.

**Article 11 : Disputes**

- 11.1 Any dispute between Funding Agencies shall be resolved by negotiation or, failing that, by arbitration through the President of the CERN Council, who may, at his or her discretion, adopt any form of arbitration process. Any dispute between a Funding Agency and CERN will be resolved using standard CERN procedures for the resolution of such disputes. Any dispute between Institutes will be resolved according to Collaboration procedures.

**Article 12 : Annexes**

- 12.1 All the Annexes are an integral part of this MoU. They are understood to be the planning basis for the construction of the ATLAS detector.

ANNEXES

**Annex 1 :**

Institutes in the ATLAS Collaboration and Names of their Contact Persons

**Annex 2 :**

List of Funding Agencies and their Representatives

**Annex 3 :**

Sub-system/detector Structure of the ATLAS Detector

**Annex 4 :**

Present Participants in the ATLAS Collaboration by Country and Institute

**Annex 5 :**

Management Structure of the ATLAS Collaboration

**Annex 6 :**

Overview of the Technical Participation of Institutes in Detector Construction

**Annex 7 :**

Construction Schedule for 1997 to 2005

**Annex 8 :**

Summary Table of the value of the deliverables to which the Funding Agencies are committed and for which they have foreseen the appropriate funding

**Annex 9.1 to 9.6 :**

Deliverables to be provided by the Institutes for the individual Sub-systems/detectors (including their estimated values)

**Annex 10 :**

Common Projects, their estimated Costs and Funding

**Annex 11 :**

General Conditions for Experiments Performed at CERN.



**The European Organization for Nuclear Research (CERN)**

and

**High Energy Accelerator Research Organisation (KEK), Tsukuba**


declare that they agree on the present Memorandum of Understanding for the ATLAS Experiment.

Done in Geneva


Done in Tsukuba, Japan

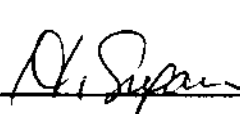
on 30th April, 1998

on 23th June, 1998

For CERN 

For KEK

  
\_\_\_\_\_  
Lorenzo Foà  
Director of Research

  
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Hirotaka Sugawara  
Director General

