

ISTITUTO NAZIONALE DI FISICA NUCLEARE  
CONSIGLIO DIRETTIVO

DELIBERAZIONE N. 12142

Il Consiglio Direttivo dell'Istituto Nazionale di Fisica Nucleare, riunito a Roma in data 21 e 22 dicembre 2011, alla presenza di n. 34 suoi componenti su n. 34:

considerato che presso il CERN di Ginevra è in fase di installazione e inizio presa dati l'esperimento denominato AEGIS, promosso dal CERN e da un gruppo di Istituzioni appartenenti sia a Paesi Membri che non del CERN, con lo scopo di misurare l'interazione gravitazionale dell'anti-idrogeno;

tenuto conto dell'interesse dell'INFN a far parte di questa Collaborazione finalizzato alla realizzazione dei sistemi di rivelazione e delle apparecchiature ausiliarie;

visto lo schema di "Memorandum of Understanding for the construction of the AEGIS/AD-6 Experiment" tra INFN e CERN, allegato alla presente deliberazione e di essa parte integrante;

tenuto conto del parere espresso dalla CSN3 in data 29 novembre u.s.;

vista la lettera del Direttore della Sezione di Genova, Prof. Sandro Squarcia, del 3 novembre u.s., prot. n. 1526;

su proposta della Giunta Esecutiva;

il giorno 21 dicembre 2011 con n. 34 voti favorevoli;

DELIBERA

E' approvato lo schema di "Memorandum of Understanding for the construction of the AEGIS/AD-6 Experiment" tra INFN e CERN, allegato alla presente deliberazione e di essa parte integrante. Il Presidente è autorizzato a perfezionarlo e a sottoscriverlo.

Gli oneri derivanti dall'attuazione del presente Accordo, pari a Euro 157.000,00 per il 2012, trovano copertura con i finanziamenti allo scopo assegnati dalla CSN3 alla Collaborazione sui capitoli 130120 (consumo), 520910 (costruzione apparati), 141940 (trasporti) e 520110 (inventario).

Per gli anni successivi, con i finanziamenti assegnati alla medesima CSN3 negli esercizi finanziari di competenza.

(7-12/25)

July 2011

# **Memorandum of Understanding**

## **for the Construction of the AEGIS/AD-6 Experiment**

**between**

The EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH, "CERN",  
an Intergovernmental Organization having its seat at Geneva, Switzerland,  
as Host Laboratory and Collaborating Institution

on the one hand,

**and**

the Collaborating Institutions/Funding Agencies of the AEGIS Collaboration

on the other hand.

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Construction MoU

**WHEREAS**

- (a) A group of institutes from CERN Member and non-Member States, and CERN, ("the Collaborating Institutions"), listed in **Annex 1**, have proposed to CERN to carry out an experiment ("the Experiment") to measure the gravitational interaction of antihydrogen. For this purpose, it has been agreed to form the AEGIS Collaboration ("the Collaboration"). The experimental apparatus ("the Detector") comprises a number of particle detection systems and their auxiliary equipment (severally "the Sub-Detectors", jointly "the Equipment");
- (b) On the basis of an Experimental Proposal ("the Experimental Proposal") submitted in June 2007 (CERN-SPSC-2007-017), and a detailed review of the scientific merits of the Experiment, the technological feasibility and estimates of the resources needed, the SPSC Committee has recommended approval of the Experimental Proposal to the CERN Research Board (minutes of the 86<sup>th</sup> meeting of the SPSC);
- (c) Based on the recommendation by the SPSC and in the context of an evaluation of the medium term future of CERN's antiproton facility (AD), the Research Board recommended to the Director General of CERN to approve the project under the reference number *AD-6*;
- (d) The Director General accepted the Research Board recommendation and approved the project (minutes of the 186<sup>th</sup> meeting of the RB). At the same time, the decision was taken to operate the AD until 2017.
- (e) The execution of the Experiment is subject to the General Conditions applicable to Experiments at CERN ("the General Conditions"). The General Conditions define the representation of the parties involved in the Experiment and the basic documents that govern its execution, and set out in general terms the organisation of the Collaboration, CERN's obligations as Host Laboratory and the obligations of the Collaborating Institutions. They also set out the rules governing liability and arbitration, as well as matters related to Intellectual Property. The General Conditions are regarded as an integral part of the Construction MoU and the current version is attached as **Annex 7**;
- (f) As provided for in the General Conditions, agreement on the construction and installation of the Equipment shall be effected through this Memorandum of Understanding ("the Construction MoU") between CERN as Host Laboratory and Collaborating Institution, and the other Collaborating Institutions, represented for the purpose of signature, as the case may be, by their Funding Agencies;

**IT IS HEREWITH UNDERSTOOD AS FOLLOWS****Article 1. Parties to the Construction MoU**

- 1.1 The Parties to the Construction MoU are CERN as Host Laboratory and Collaborating Institution, and the Collaborating Institutions listed in **Annex 1**. **Annex 2** lists the Funding Agencies of the Collaboration. A Funding Agency may be a Collaborating Institution or a body acting on behalf of one or more Collaborating Institutions in the conclusion of the Construction MoU.

**Article 2. Purpose of the Construction MoU**

- 2.1 The Construction MoU defines the structure of the Equipment and the organizational structure of the Collaboration. It also sets out organizational, managerial and financial guidelines to be followed by the Collaboration.
- 2.2 It sets out the technical participation of the Collaborating Institutions in the construction and installation of the Equipment, as well as the associated timetable. It provides a breakdown of the financial contributions to the Equipment by Funding Agency.

**Article 3. CERN's Obligations as Host Laboratory**

- 3.1 CERN's general Host Laboratory obligations are set out in the General Conditions. Beyond these the following specific Host Laboratory obligations apply:
  - 3.1.1 CERN shall keep in operation the Antiproton Decelerator at least until the experimental programme approved by its Research Board has been completed.

**Article 4. The Equipment and Collaboration**

- 4.1 The Equipment is described in detail in the Experimental Proposal. It consists of a number of Sub-Detectors and Equipment as listed in **Annex 3**.
- 4.2 The names of the scientists currently participating in the Collaboration ("the Members") are listed in **Annex 4** by Country and by Collaborating Institution.
- 4.3 The management structure of the Collaboration is defined in **Annex 5.1**. Persons currently holding management positions are listed in **Annex 5.2**.
- 4.4 The technical participation of each Collaborating Institution in the construction of the Equipment is set out in **Annex 3**.
- 4.5 Any institute that wishes to join the Collaboration prior to the completion of the Construction and Installation shall make an appropriate contribution thereto (including to the Common Fund – see Article 6 below). In the event that the Construction and Installation are already fully funded, the institute shall make a special contribution. Such contributions shall be negotiated by the Collaboration and endorsed by the Collaboration Board.
- 4.6 Except as indicated otherwise, all cost figures in the Construction MoU are expressed in year 2011 Swiss francs and based on estimates valid on 1 January 2011. The calculated CERN index for materials cost variations shall be used for construction cost monitoring purposes throughout the lifetime of the Experiment.

**Article 5. Programme of Work for the Construction and Installation, and Sharing of Responsibilities for its Execution**

- 5.1 **Annex 6** gives a breakdown of the Detector by Sub-Detector and the Deliverables committed to by each Funding Agency.

- 5.2 The Collaborating Institutions, supported by their Funding Agencies, shall make their best efforts to design, produce final prototypes, construct, calibrate, transport, assemble, install and commission the Deliverables listed in **Annex 6** within the limits of their funding.
- 5.3 Any cost overruns that cannot be accommodated internally shall be reported by the Collaborating Institution(s) concerned to the Collaboration. The Collaboration shall propose ways of addressing such overruns (e.g. by cost-savings, asking for additional funds or, if other ways cannot be found, by de-scoping or staging).

#### **Article 6. Common Fund**

- 6.1 To support the costs of the experimental effort at CERN a Common Fund Account has been set up for AD-6. Each Collaborating Institution shall contribute to the Common Fund CHF 3,000 annually per member at the degree level of postdoc or higher. The amount of this contribution may be changed by absolute majority vote of the Collaboration Board to adapt to future needs of the experimental program. Exceptions to this rule may be granted in specific cases by the Collaboration Board.
- 6.2 These funds will be available to cover all incidental expenses at CERN, including, but not limited to, electronic pool charges, material cost, telephone charges, services performed by CERN or by outside contractors on the CERN site, fabrication charges from internal and external machine shops, and other expenses incurred by members of the Collaboration in operating the experiment at CERN, as well as for some common equipment.
- 6.3 Signature authority for the Common Fund shall rest with the Spokesperson and Deputy Spokesperson of the Experiment, as well as the Technical Coordinator. Expenses of € 5,000 or more shall be announced to and approved by the Collaboration Board in advance.

#### **Article 7. Specific Rights and Obligations of the Collaborating Institutions**

- 7.1 The Collaborating Institutions are entitled to join the exploitation phases of the Experiment and to participate in the scientific exploitation of the data acquired.
- 7.2 The publication policy of the collaboration foresees that all collaborating institutes are entitled to sign publications that rely on data that has been acquired by the AEGIS apparatus or subcomponents of it. Publications stemming from a subcomponent of the apparatus prior to integration on site are under the sole responsibility of the corresponding Collaborating Institute. Each institute's representative defines the list of signing authors from her/his institute. Any institute can decline to sign a common publication, which will nevertheless be in the name of the collaboration. Any publication using data obtained by means of the AEGIS apparatus can only be submitted if a majority of the Collaboration Board give their agreement. In case of tie, the Director of Research of CERN will be asked to mediate and, if no agreement can be reached, will have the final vote.



**Article 8. Theses**

- 8.1 One copy of any Ph.D. thesis or similar academic document relating to the Experiment must be sent by the Collaborating Institution(s) concerned to the CERN Library for inclusion in its collection.

**Article 9. Observance of the Construction MoU and the General Conditions**

- 9.1 The Construction MoU is not legally binding, but the Parties recognise that the success of the Collaboration depends upon their adherence to its provisions. Any default under its provisions shall be dealt with by the Collaboration in consultation with the CERN Management.
- 9.2 Notwithstanding the foregoing, the provisions of the General Conditions are binding.

**Article 10. Duration of the Construction MoU and its Extension**

- 10.1 This MoU is valid for the construction period of the AEGIS Experiment from the date of signing to a date not earlier than 31 December 2013. The actual termination date will be set by the Collaboration Board no later than 31 December 2013.
- 10.2 The Construction MoU may be extended at any time by mutual agreement of the Parties.

**Article 11. Withdrawal of Funding Agencies or Collaborating Institutions**

- 11.1 Any Funding Agency may withdraw its support from the Collaboration by giving not less than twelve months notice in writing to the Collaboration and the Director-General of CERN. In such an event, reasonable compensation to the Collaboration shall be negotiated through CERN and confirmed by the Collaboration Board.
- 11.2 Any Collaborating Institution may withdraw from the Collaboration in accordance with the General Conditions, the procedures agreed by the Collaboration and by giving notice in writing to its Funding Agency.

**Article 12. Participation of additional institutes**

- 12.1 Subject to the agreement of the Parties, additional institutes may join the Collaboration at any time during the lifetime of the Construction MoU. Each such event shall give rise to an **Addendum** to the Construction MoU setting out the specific terms of collaboration for the institute(s) concerned and with explicit mention that the terms of the Construction MoU (including all existing Addenda and Amendments) apply. The terms of collaboration shall be negotiated by the Collaboration (which reserves the right to request additional contributions from such institutes). The Addendum shall be signed by CERN as Host Laboratory, by the Spokesperson as representative of the Collaboration, and by the institute(s), for the purposes of signature represented, as the case may be, by their Funding Agency/Agencies.

**Article 13. Amendments**

- 13.1 The Construction MoU may be amended at any time in accordance with the General Conditions.

**Article 14. Annexes**

- 14.1 All the Annexes are an integral part of this Construction MoU. They are understood to be the planning basis for the construction of the Equipment. The Collaboration Management shall keep up-to-date the information contained therein.

This MoU is produced in 20 original documents, each pair signed by a Collaborating Institution and by CERN as Host Laboratory and as a Collaborating Institution.

Done in Geneva

Done in \_\_\_\_\_

on \_\_\_\_\_

on \_\_\_\_\_

For CERN

For

\_\_\_\_\_  
Sergio Bertolucci

Director of Research and Scientific Computing

\_\_\_\_\_

ANNEXES

- 1. Collaborating Institutions in the Collaboration and the names of their Contact Persons**
- 2. Funding Agencies of the Collaboration and their Representatives**
- 3. Sub-Detector Structure and Technical Participation of the Collaborating Institutes of the Experiment**
- 4. Current Members of the Collaboration by Country and Collaborating Institution (postdoc or above)**
- 5. The Organizational Structure of the Collaboration**
- 6. Overview of the Financial Participation of the Funding Agencies in Equipment Construction**
- 7. General Conditions applicable to Experiments at CERN**



**Annex 1 Collaborating Institutions in the Collaboration and the names of their Contact Persons**

Country	Institute	Contact Person
	CERN	M. Doser
Czech Republik	Czech Tech. Univ. Prague	V. Petracek
France	Laboratoire Aimé-Cotton, Orsay	D. Comparat
France	UCBL Lyon	P. Nedelec
Germany	Kirchhoff Institute of Physics, Heidelberg	M. Oberthaler
Germany	MPI-K Heidelberg	A. Kellerbauer
Italy	Istituto Nazionale di Fisica Nucleare (INFN) Genova (G. Testera) ; Pavia-Brescia (A. Fontana) ; Milano (M. Giammarchi); Padova-Trento (R. Brusa); Bologna (M. Prevedelli)	G. Testera
Norway	Univ. Bergen, Univ. Oslo	H. Sandaker
Russia	INR Moscow	S. Gninenko
Switzerland	ETH, Zürich	F. Merkt
Switzerland	University Zürich	C. Amsler

**Annex 2 Funding Agencies of the Collaboration and their Representatives**

Country	Agency	Place	Represented by
	CERN	Geneva	S. Bertolucci
Czech Republic	Czech Technical University	Prague	
France	Laboratoire Aimé Cotton	Paris	P. Pillet
France	UCBL	Lyon	
Germany	Max Planck Gesellschaft	München	P. Gruss
Germany	Universität Heidelberg	Heidelberg	
Italy	INFN	Rome	R. Petronzio
Norway	Bergen and Oslo Universities	Bergen	H. Sandaker
Russia	Institute for Nuclear Research	Moscow	V. Matveev
Switzerland	ETHZ	Zürich	F. Merkt
Switzerland	University of Zürich	Zürich	C. Amsler

**Annex 2      Funding Agencies of the Collaboration and their Representatives**

Country	Agency	Place	Represented by
	CERN	Geneva	S. Bertolucci
Czech Republic	Czech Technical University	Prague	
France	Laboratoire Aimé Cotton	Paris	P. Pillet
France	UCBL	Lyon	
Germany	Max Planck Gesellschaft	München	P. Gruss
Germany	Universität Heidelberg	Heidelberg	
Italy	INFN	Rome	R. Petronzio
Norway	Bergen and Oslo Universities	Bergen	H. Sandaker
Russia	Institute for Nuclear Research	Moscow	V. Matveev
Switzerland	ETHZ	Zürich	F. Merkt
Switzerland	University of Zürich	Zürich	C. Amsler

### Annex 3 Sub-Detector Structure and Technical Participation of the Collaborating Institutes of the Experiment

Responsibilities	Institute
Main magnets (1T and 5T) and cryostats	CERN
Dilution refrigerator	CERN, MPIK
Positron accumulator (moderator, short lifetime trap)	INFN Milano, INFN Padova-Trento, CERN, common
Positron accumulator (long lifetime accumulator)	INR, CERN
Positron transfer line	Prague
Central detector	University Zürich
Peripheral detectors	CERN
Downstream detector	Bergen, Oslo
Traps and related electronics	INFN Genova, MPI-K
Hydrogen-related equipment	UCBL Lyon, University Zürich
Moire deflectometer	Kirchoff Institute
Positronium excitation laser system	INFN Milano, INFN Padova-Trento, MPI-K
Laser infrastructure, Lyman- $\alpha$ laser system	Laboratoire Aimé Cotton, MPIK
Further laser systems (antihydrogen and positronium spectroscopy)	ETHZ
Trap Control system	INFN Genova
DAQ and Offline Computing	INFN Pavia-Brescia, INFN Milano
Vacuum system and AD interface	INFN Genova
Common Infrastructure (pumps, power supplies, ...)	Common fund (all institutes)

**Annex 4      Current Members of the Collaboration by Country and Collaborating Institution (postdoc or above)**

**CERN**

European Organization for Nuclear Research: M. Doser, D. Perini, J. Bremer, F. Haug, A. Dudarev, S. Haider, G. Burkhardt

**Czech Republic**

Czech Tech. Univ. Prague: V. Petracek

**France**

Laboratoire Aimé-Cotton, Orsay: D. Comparat, L. Cabaret  
UCBL Lyon: P. Nedelec

**Germany**

Kirchhoff Institute of physics, Heidelberg: M. Oberthaler  
MPI-K Heidelberg: A. Kellerbauer

**Italy**

INFN Genova: G. Testera, V. Lagomarsino, Z. Zavatarelli, R. Vaccarone  
INFN Milano: M. Giammarchi, S. Cialdi, R. Ferragut, G. Consolati, F. Moia, F. Castelli, F. Prelz  
INFN Trento: R. Brusa, S. Mariazzi, G. Nebbia, G. Ferrari  
INFN Pavia: G. Bonomi, A. Fontana, L. Dassa, A. Rotondi, C. Riccardi  
INFN Bologna: M. Prevedelli

**Norway**

University of Bergen: H. Sandaker, J. P. Hansen, B. Stugu  
University of Oslo: O. Rohne

**Russia**

INR Moscow: S. Gninenko, A. Belov, V. Matveev

**Switzerland**

ETH, Zürich, Switzerland: F. Merkt, S. Hogan  
University of Zürich: Y. Ailkofer, C. Amsler, C. Canali, C. Regenfus, J. Storey

**Annex 5 The Organizational Structure of the Collaboration****5.1 The Management Structure of the Collaboration**

Subject to the terms of this MoU, all persons who are members of the Collaboration shall have equal status in conducting the Experiment, including full voting rights and the right to be considered for appointment to official functions related to the Experiment.

The Experiment shall be managed by the Collaboration Board, which shall comprise the Spokesperson as chairperson and one representative per collaborating institute. The Collaboration Board shall be actively involved in the preparation and running of the Experiment.

The Spokesperson and his/her Deputy represent the Collaboration to the outside and lead the Collaboration in all day-to-day matters. They are elected by absolute majority of the Collaboration Board and shall act within the framework of this MoU and such instructions as the Collaboration Board may give. Where the Spokesperson is not stationed full-time at CERN, the Collaboration shall also appoint a Contact Person at CERN.

The Spokesperson is elected for a term of 2 years and he/she can be re-elected several times.

The Leader of the CERN Department responsible for the physics programme of which the Experiment is part shall appoint a Group Leader in Matters of Safety (GLIMOS), on the proposal of the Spokesperson. The rights and responsibilities of the GLIMOS are defined in the document "Safety Policy at CERN - SAPOCO/42".

**5.2 Persons currently holding Management and other senior positions within the Collaboration**

Spokesperson	Michael Doser
Deputy	Gemma Testera
Technical Coordinator	Stefan Haider
GLIMOS	



## Annex 6 Overview of the Financial Participation of the Funding Agencies in Equipment Construction

### 1 - Magnets (1T & 5T) and Cryostats

Item	Cost (kCHF)	Sharing
Mechanics	260	CERN
Assembly and welding	40	CERN
Electronics & Cabling	60	CERN
<b>Total</b>	<b>360</b>	CERN

### 2 - Positron Accumulator

Item	Cost (kCHF)	Sharing
Source	50	CERN
Moderator	250	INFN Milano (50); INFN Padova-Trento(100), CERN(50), common(50)
Accumulator stage 1	250	INFN Milano (20); INFN Padova-Trento (30), CERN (100), common (100)
Accumulator stage 2	260	Russia (60), CERN(200)
Transfer section	100	Prague
<b>Total</b>	<b>910</b>	

### 3 - Dilution Refrigerator

Item	Cost (kCHF)	Sharing
Vessel, Insulation and Probes	250	[required in 2013]
Pumps and equipment	60	MPI-K
<sup>3</sup> He (100l @ 2500\$/l)	200	CERN
<b>Total</b>	<b>510</b>	

### 4 - Positronium target assembly

Item	Cost (kCHF)	Sharing
Target, pumps and equipment	100	INFN Padova-Trento, INFN Milano
<b>Total</b>	<b>100</b>	

### 5 - Positronium Excitation Laser, Antihydrogen and Positronium Spectroscopy Lasers

Item	Cost (kCHF)	Sharing
OPG + OPA, lasers	150	INFN Milano
Equipment (laser table, optics, laser, microwave)	100	Lab. Aimé-Cotton
Lasers	200	ETHZ
Infrastructure (table, mirrors, aux. eqpt.)	100	ETHZ
<b>Total</b>	<b>550</b>	

## 6 - Central and Peripheral Detectors

Item	Cost (kCHF)	Sharing
Scintillating fiber detector	150	University Zürich
Electronics	150	University Zürich
Mechanics	50	University Zürich
Peripheral detectors	50	CERN
Data acquisition / electronics	50	INFN Pavia
<b>Total</b>	<b>450</b>	

## 7 - Antihydrogen Detector

Item	Cost (kCHF)	Sharing
Silicon strip detector + FE electronics	250	Norway
Electronics and construction	150	Norway
<b>Total</b>	<b>400</b>	

## 8 - Hydrogen-related

Item	Cost (kCHF)	Sharing
Proton source and auxiliary equipment	100	UCBL Lyon
Vacuum equipment, Hydrogen detector, cryogenic electronics and construction	100	University Zürich
<b>Total</b>	<b>200</b>	

## 9 - Moiré Deflectometer

Item	Cost (kCHF)	Sharing
Control system	50	Kirchhoff Inst.
Gratings	150	Kirchhoff Inst.
<b>Total</b>	<b>200</b>	

## 10 - Traps, Electronics, Vacuum, equipment in vacuum

Item	Cost (kCHF)	Sharing
Traps (Mechanics, Plating)	50	INFN Genova
Electronics	175	INFN Genova (140), MPI-K (35)
Diagnostic(MCP,CCD)	30	INFN Genova
Vacuum	80	INFN Genova
Cryogenic mirrors and aux. equipment	70	MPI-K
<b>Total</b>	<b>405</b>	

## 11 - Infrastructure and consumables

Item	Cost (kCHF)	Sharing
Electricity, Gas, Cabling & Services	50	CERN
Installation/zone infrastructure	100	CERN
Consumables (annually, recurring)	20	common
<b>Total</b>	<b>170</b>	

<b>Grand Total (kCHF)</b>	<b>4,255</b>	
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**Annex 7**

**General Conditions applicable to Experiments at CERN**

Laboratoire Européen pour la Physique des Particules European Laboratory for Particle Physics

**GENERAL CONDITIONS**

**APPLICABLE TO  
EXPERIMENTS AT CERN**

20 February 2008

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## **GENERAL CONDITIONS**

*applicable to*

**Experiments at CERN**

*(Terms with a particular meaning in the context of this document are defined at the end – their first occurrence in the document is indicated with a reference number thus: term<sup>1</sup>).*

The mission of the European Organization for Nuclear Research (“CERN”) is to sponsor international scientific research in high-energy physics.

This document (the “General Conditions”) sets out the rules and procedures in organisational, managerial and financial matters, which apply to the participation by Universities and Research Institutions (the “Collaborating Institution(s)”) in experiments at CERN. The Collaborating Institutions jointly constitute the “Collaboration”. They provide, and are responsible for, the Visiting Research Teams (the “Team(s)”) carrying out the experiment.

The General Conditions also define CERN's role as Host Laboratory of the experiment, which must be distinguished from its role as a Collaborating Institution, as the case may be.

Any reference made in the General Conditions to a specific document shall be to its most recent version.

### **1. SCOPE OF APPLICATION**

The General Conditions apply to Approved Experiments<sup>2</sup> (the “Experiment(s)”) carried out on the CERN site. They do not apply to Recognised Experiments.

### **2. PARTIES AND THEIR REPRESENTATION**

2.1. The parties involved in the Experiment (the “Party” or the “Parties”) are:

- CERN as Host Laboratory;
- The Collaborating Institutions (including, as the case may be, CERN).

2.2. Each Party shall have a representative:

- CERN as Host Laboratory shall be represented by its Director of Research, acting on behalf of the Director-General;
- The Collaboration shall appoint a Spokesperson, who shall represent the Collaboration to the outside, including to CERN as Host Laboratory, and co-ordinate its work. Where the Spokesperson is not stationed full-time at CERN, the Collaboration shall also appoint a Contactperson at CERN;
- Each Collaborating Institution shall appoint a Team Leader who shall represent it in its relations with CERN as Host Laboratory. The Team Leader's responsibilities are detailed in the “Appointment of Team Leader” form (available on the Users' Office Web site – see Article 5.7).

2.3. Each Collaborating Institution shall ensure that the members of its Team (the "*Team Member(s)*") comply with the General Conditions.

### 3. BASIC DOCUMENTS GOVERNING THE EXECUTION OF THE EXPERIMENT

3.1. The following documents shall constitute the formal basis for the Experiment:

3.1.1. the **EXPERIMENTAL PROPOSAL**, after its approval by the CERN Research Board on the recommendation of the Experiment Committee dealing with the appropriate part of the physics programme (the "*Experiment Committee*");

3.1.2. the **TECHNICAL DESIGN REPORTS**, where appropriate;

3.1.3. the **MEMORANDUM OF UNDERSTANDING** (the "*MoU*"), which sets out the detailed arrangements specific to the Experiment and which shall be agreed and signed by CERN as Host Laboratory and the Collaborating Institutions, for the purpose of signature represented, as the case may be, by their Funding Agencies. Through the signature of the MoU, the Collaborating Institutions accept its terms;

3.1.4. the **GENERAL CONDITIONS**.

#### Contents of the MoU

3.2. The MoU may be a single document setting out the arrangements for construction, installation, maintenance and operation, or it may comprise two documents, one for construction and installation and the other for maintenance and operation. As a guide, the essential parts of the MoU are the following:

- a) a list of the Collaborating Institutions responsible for the Teams carrying out the Experiment;
- b) a list of the Funding Agencies of the Collaboration;
- c) details of the persons with specific responsibilities in the Experiment;
- d) the obligations of the Parties for:
  - i) construction and installation
    - the obligations for construction and installation of the detector components and the auxiliary equipment (jointly the "*Equipment*");
    - a breakdown of the funding requirements for the Equipment, together with the contributions of the Parties;
    - a timetable for the construction and installation of the Equipment;
  - ii) maintenance and operation
    - the obligations for maintenance and operation of the Equipment;
- e) an explicit statement that the General Conditions apply;
- f) references to any specific agreements and Protocols relevant to the Experiment, copies of which shall be included as Appendices to the MoU.



#### 4. ORGANISATION OF THE COLLABORATION

##### **Internal autonomy and co-ordination with CERN as Host Laboratory**

4.1. In its internal relations, the Collaboration shall be free to take such organisational decisions as deemed necessary, always subject to the terms of the MoU and the General Conditions. Any financial arrangements between CERN as Host Laboratory and the Collaboration shall be subject to the Financial and Administrative Provisions for Visiting Research Teams.

##### **Co-ordination in matters of safety**

4.2. The Leader of the CERN Department responsible for the physics programme of which the Experiment is part shall appoint a Group Leader in Matters of Safety (GLIMOS), on the proposal of the Spokesperson. The rights and responsibilities of the GLIMOS are defined in the document "Safety Policy at CERN -SAPOCO/42".

##### **Finance Review Committee/Resources Review Board**

###### **Initial Decision**

4.3. For Experiments involving large capital investments, a Finance Review Committee (FRC) or a Resources Review Board (RRB) may be set up by agreement of CERN as Host Laboratory and the Collaboration.

###### **Membership**

4.4. The FRC/RRB shall consist of one representative of each Funding Agency, along with the Managements of CERN and the Collaboration. It shall be chaired by the CERN Director of Research.

###### **Terms of reference**

4.5. The role of the FRC/RRB includes:

-reaching agreement on the MoU; -approving any modification of, or addition to, the Experiment that would require amending the MoU; -monitoring the supply of Equipment according to the agreed schedule; -monitoring the Common Projects and the use of the Common Funds; -monitoring the general financial and manpower support; -approving a maintenance and operation procedure and monitoring its

functioning; -approving the annual construction and installation budgets as well as those for maintenance and operation.

4.6. The Collaboration Management reports to the FRC/RRB on technical, managerial, financial and administrative matters, and on the composition of the Collaboration.

## 5. CERN'S OBLIGATIONS AS HOST LABORATORY

### PRINCIPLES

#### Installation

5.1. The Collaboration shall ensure that the Equipment and counting rooms meet the CERN Safety Rules. Provided that this is the case, CERN shall agree in writing to their installation in the appropriate experimental area.

#### Duration

5.2. CERN shall agree to keep the Equipment on-site during the data-taking for the experimental programme approved by the CERN Research Board.

#### Network connections

5.3. CERN shall agree that computers and peripherals belonging to the Collaboration, which are needed for the operation of the Equipment, may be connected to the CERN computer network, provided they meet its compatibility and security standards, including as set out in the document "Operational Circular No 5 – Use of CERN Computing Facilities" and subsidiary rules.

#### Insurance

##### *-Property*

5.4. CERN shall at its expense insure against the risks of fire, explosion, natural disaster and water damage all items belonging to the Collaboration or a Collaborating Institution, once they have been delivered to the CERN site, added to the Ownership Inventory (Article 6.10) and accepted in writing by CERN. CERN shall not insure such items against the risks of transport, crane or rigging accidents. It may however offer the possibility that such insurance is taken out at the expense of the Collaborating Institution(s) concerned.

##### *-Third party liability*

5.5. CERN shall at its expense insure the members of the Collaborating Institutions against third party liability incurred by them at CERN in the execution of the Experiment.

##### *-Limitation of coverage*

5.6. The insurance covers defined in Articles 5.4 and 5.5 are subject to the provisions, including the specified deductibles, exclusions and limits, of CERN's insurance policies. Any risk or amount not covered by such policies shall be for the exclusive account of the Collaboration. CERN does not warrant or accept liability as to the sufficiency of its insurance policies in relation to the risks incurred by the Collaboration.

### SERVICES

#### User support, Users' Office and ACCU

5.7. CERN operates a Users' Office as a point of contact with the user community. Documentation for users is maintained on the Users' Office Web site, which can

be accessed through the CERN home page (<http://www.cern.ch>). CERN shall provide access to its services, as described in the "CERN Guide for Newcomers" (available from the Users' Office Web site). The Users' Office provides assistance on questions concerning access to the services provided by CERN.

The Advisory Committee of CERN Users (ACCU) promotes links between CERN Management and the User Community and advises CERN Users on the working conditions and the arrangements for technical support.

### **Standard services and facilities**

5.8. CERN normally provides, free of charge and within the limits and constraints imposed by the available resources and schedules of accelerators, the following standard services and facilities for the duration of the Experiment:

#### ***Particle beams and equipment***

- a) particle beams and related shielding, monitoring equipment and standard communication with the accelerator control rooms;
- b) beam time allocation and scheduling, in accordance with the recommendations of the Experiment Committee;
- c) test-beam time for testing prototypes and calibrating final detector components, subject to the applicable scheduling and allocation procedures;

#### ***Space***

- d) floor space in the experimental area(s) for the Equipment;
- e) laboratory and hall space for construction, testing and assembly of the Equipment;
- f) temporary short-term storage space for spare parts, handling and assembly tools and Equipment that is awaiting installation or removal. CERN reserves the right to charge the cost of longer-term storage of the above items to the Collaborating Institution(s) concerned;
- g) office space, equipped with standard furniture and infrastructure facilities including network connections, telephones and electricity;

#### ***Supplies and installations at the Experiment***

- h) assistance with the installation and removal of the Equipment, such as the provision of crane and rigging services, geometrical survey and alignment, as well as transport of the Equipment on and between the parts of the CERN site and inside the experimental areas;
- i) mechanical infrastructure, local infrastructure for the supply of mains electricity, raw cooling water, compressed air and standard connections to the CERN communication network;

#### ***Computing***

- j) central computing resources for the Collaboration, in amounts to be decided in accordance with the applicable CERN allocation procedures;

***Transport of persons***

- k) basic transportation for personnel between the main parts of the CERN site, including the experimental areas;

***Safety services***

- l) access to its safety services for advice, inspection and verification, and first aid or other emergency help;

***Administrative services***

- m) access to its administrative services to assist the Collaboration in financial matters, in accordance with the Financial Rules and the Financial and Administrative Provisions for Visiting Research Teams;

***Purchasing services***

- n) access to its purchasing services to assist the Collaboration in placing purchase orders and contracts for its account, in accordance with the CERN Financial Rules and the CERN Purchasing Procedures. In such cases there is immediate automatic transfer of ownership to the Collaborating Institution(s) for which the purchase is made. This(These) Institution(s) shall hold CERN free and harmless from liability arising from such assistance;

***Maintenance and operation***

- o) the resources needed to operate and maintain the standard infrastructure and other equipment supplied by CERN as Host Laboratory.

***Special services***

5.9. A variety of services other than those specified above may be provided to the Collaboration on request, subject to the availability of resources. Such services shall be charged according to the applicable conditions.

***Special equipment***

5.10. Any additional infrastructure equipment to be provided by CERN, as well as the obligations of CERN and the Collaborating Institutions with regard to the construction, installation, maintenance and operation of such equipment, shall be explicitly mentioned in the MoU.

**6. OBLIGATIONS OF THE COLLABORATING INSTITUTIONS**

***Basic obligations***

6.1. In their capacity as members of the personnel of CERN<sup>1</sup>, the Team Members shall be subject to the authority of the Director-General of CERN and shall comply with the rules and regulations in force at CERN. Items brought onto the site by the Collaboration are subject to the rules and regulations in force at CERN.

#### **Status of personnel**

6.2. Each Collaborating Institution shall ensure that its Team Members shall for the duration of their Contract of Association with CERN (the "*Contract of Association*") remain employed by, and receive a salary from, their Collaborating Institution. It is understood that where they are students, the Team Members shall remain enrolled at their Collaborating Institution, and where they have a sponsor, they shall remain under contract with, and continue to be financed by, their sponsor.

6.3. Each Collaborating Institution shall ensure the provision of adequate social and third party liability insurance cover to its Team Members and the members of their family accompanying them. The social insurance must include cover against the financial consequences of illness and accidents that is adequate in the Host States of CERN for the duration of the Contract of Association.

6.4. Each Collaborating Institution shall be liable to CERN for any cost or expense resulting from the situation where its Team Members have insufficient insurance cover.

#### **Medical surveillance and certificates**

6.5. Each Collaborating Institution shall remain responsible for the medical surveillance of its Team Members and, in the case of Team Members who are to work in conditions which are deemed to pose special risks (e.g. radiation controlled areas), shall supply to the CERN Medical Service a certificate of medical fitness, for the first time on registration of the Team Member at CERN and then every two years thereafter (a form for such certificates is available on the Users' Office Web site – Article 5.7).

#### **Safety briefings and inspections**

6.6. The Collaborating Institutions, in conjunction with the CERN Department responsible for the physics programme of which the Experiment is part, shall ensure the safety of the Team Members and the Equipment. The Collaborating Institutions shall participate in safety meetings and studies of the Experiment. They shall ensure compliance by the Team Members with the CERN Safety Rules.

Each Team Member has specific safety responsibilities and obligations, as defined in the document "Safety Policy at CERN - SAPOCO/42". The Team Members shall attend the CERN safety course(s) for newcomers, any compulsory CERN safety course, and all specific safety courses deemed necessary by the Collaboration.

The CERN safety personnel shall be entitled to carry out safety visits, checks and inspections as well as other safety measures set out in the document "Safety Policy at CERN - SAPOCO/42".

#### **Supply of Equipment**

6.7. The Collaborating Institutions shall make available on the CERN site, according to an agreed timetable and in working order, the Equipment that they have undertaken to supply and commission. The Spokesperson shall promptly inform the CERN Director of Research of any material failure to meet the agreed schedule. For experiments with an FRC/RRB, this body shall monitor such matters.



**Transport, installation and dismantling of Equipment**

6.8. Each Collaborating Institution supplying Equipment shall be responsible for its delivery to and removal from the CERN site, always in compliance with applicable export laws and restrictions. All such Equipment shall be properly documented to indicate its ownership status (Article 6.10) handling requirements and any potential hazards that it may pose. The Collaborating Institutions shall be collectively responsible for the installation and dismantling of the Equipment.

**Ownership of Equipment**

6.9. Except as may be agreed in writing by the owner and CERN as Host Laboratory, the delivery of Equipment to the CERN site or its handling on the CERN site shall not affect its ownership. The owner and CERN as Host Laboratory may agree in writing to transfer to CERN the ownership of Equipment which is no longer required by the Collaboration.

**Ownership inventory**

6.10. As a condition of coverage by CERN's insurance policy, the Collaboration shall provide CERN with a list of the Equipment which it brings on the CERN site, specifying for each item the owning Collaborating Institution(s) or joint ownership by the Collaboration. It shall keep the list up-to-date and inform CERN promptly of any modifications.

**Maintenance and operation of Equipment**

6.11. The Collaborating Institutions shall be collectively responsible for the maintenance and operation of the Equipment, and for providing the resources necessary to carry out the experimental programme.

**Assignment of Equipment**

6.12. Any Collaborating Institution providing Equipment shall continue to make it available to the Collaboration until the Experiment has been declared completed (Article 8.2).

**Early removal of Equipment**

6.13. The Collaboration may request the removal from the CERN site under the responsibility of the owning Collaborating Institution(s) of any Equipment which in the opinion of the Collaboration is no longer required for the Experiment.

**Release of space**

6.14. Space allocated for construction and assembly shall be released when these activities have terminated. As Host Laboratory, CERN reserves the right to change the space allocation during the lifetime of the Experiment. As soon as the Experiment has been declared completed (Article 8.2), all space used by the Collaboration, including office and laboratory space, and the space used for testing and running the Experiment, shall be made available to CERN for reallocation.

**Removal of Equipment**

6.15. Equipment shall be removed from the CERN site under the responsibility of the owning Collaborating Institution(s) within six months following a request from



the Leader of the CERN Department responsible for the physics programme of which the Experiment is part.

6.16. The dismantling and removal of the Equipment must respect the CERN Safety Rules and the laws of the countries through which the dismantled Equipment will transit during the removal, including the country of its final destination (e.g. transport, disposal, elimination of special or radioactive waste). Except as may be agreed in writing by the Collaboration and CERN, the associated costs shall be borne by the Collaboration.

## **7. INTELLECTUAL PROPERTY**

### **Publication and use of data and knowledge**

7.1. CERN is bound by its Convention to publish or otherwise make generally available the results of its experimental and theoretical work.

7.2. The Collaborating Institutions shall strive to publish any data and knowledge resulting from the experiment through Open Access<sup>1</sup> journals. Where the copyright in an article shall be transferred to the publisher, each Collaborating Institution shall ensure that it has the necessary internal authorisations to approve such a transfer.

7.3. Subject to Articles 7.4 and 7.5, each Collaborating Institution and CERN as Host Laboratory shall be entitled to use any data and knowledge resulting from the Experiment for its own scientific non-military purposes.

### **Contribution of proprietary information**

7.4. A Collaborating Institution contributing proprietary information to the Collaboration shall ensure that it has or has procured the rights to use, and to contribute to the Collaboration for use by the other Collaborating Institutions, such proprietary information for the execution of the Experiment. The term "use" shall include any integration, modification, enhancement and redistribution. Where the use of proprietary information is subject to restrictions, the contributing Collaborating Institution shall disclose them in writing when making its contribution available to the Collaboration. The obligations defined in this article shall apply whether or not the proprietary information is pre-existing or developed in the execution of the Experiment, and whether or not it was developed individually or jointly with one or more other institution(s).

### **Use of proprietary information**

7.5. The contribution by a Collaborating Institution of any proprietary information, including information protected by trademark, patent or copyright, shall not create any right in respect of such information for the other Collaborating Institutions, other than a free, irrevocable and non-exclusive licence to use such information in the execution of the Experiment.

### **Publication and disclosure of proprietary information**

7.6. Subject to the intellectual property rights of the Collaborating Institutions having contributed the proprietary information and taking into account any potential for commercial exploitation, the Collaborating Institutions shall strive to publish and make publicly available all proprietary information contributed to the

Collaboration. In particular, they shall consider making any software available under Open Source licence conditions.

### **Limitation of liability**

7.7. The Collaborating Institutions provide no warranties or representations of any kind to each other.

Each Collaborating Institution shall use the data and knowledge resulting from the Experiment and the proprietary information contributed to the Collaboration at its own risk.

The Collaborating Institutions shall have no liability to each other with respect to the subject matter of this Article 7.

## **8. FINAL PROVISIONS**

### **Modification of the Experiment and amendment to the MoU**

8.1. The Collaboration shall agree on any modification of or addition to the Experiment that would require amending the MoU and shall inform CERN as Host Laboratory of such changes. For experiments with an FRC/RRB, such changes shall also be approved by this body. Where the changes constitute a substantial change to the Experiment, they shall be submitted to the Experiment Committee for approval by the CERN Research Board and the Director-General. Any amendment to the MoU shall be signed by the representatives of the parties to the MoU.

### **Duration of applicability of the MoU**

8.2. Unless another duration is specified in the MoU, the MoU shall remain in force until the CERN Director of Research, in agreement with the Spokesperson, has declared the Experiment completed, the Equipment has been dismantled and the arrangements for its disposal agreed in writing.

8.3. Notwithstanding the foregoing, the General Conditions shall remain in force.

### **Observance of the MoU and the General Conditions**

8.4. The MoU is not legally binding but the parties to the MoU recognise that the success of the Collaboration depends upon their adherence to its provisions. Any default under its provisions shall be dealt with, in the first instance, by the Collaboration in consultation with the CERN Management and if necessary then by the FRC/RRB (where such a body exists).

8.5. Notwithstanding the foregoing, the provisions of the General Conditions are binding.

### **Liability**

8.6. Except as specifically stipulated in the General Conditions, the Parties shall not be liable to each other for any loss or damage arising in connection with the Experiment.

**Arbitration**

8.7. If a dispute within the Collaboration or between the Collaboration and CERN as Host Laboratory cannot be resolved amicably, it shall be referred by any party to the dispute for arbitration to the President of the CERN Council, whose decision shall be binding and final, without right of revision or appeal.

**Relevant documents**

8.8. The following documents apply to the execution of the MoU:

-the CERN Guide for Newcomers; -Financial and Administrative Provisions for Visiting Research Teams; -Use of CERN Computing Facilities - Operational Circular No 5 (<http://cern.ch/ComputingRules/>); -the Safety Guide for experiments at CERN (<http://cern.ch/SafetyGuide/>); -the Safety Policy at CERN - SAPOCO/42; - Purchasing Rules and Procedures for Experiments at CERN

## Definitions

<sup>1</sup> **Visiting Research Team:** A Collaborating Institution's personnel involved in the Experiment.

<sup>2</sup> **Approved Experiment:** An Experiment approved by the CERN Research Board and the Director-General after consideration of a written proposal submitted to the appropriate Experiment Committee, taking into account scientific interest, technical feasibility and the constraints imposed by available resources.

<sup>3</sup> **CERN site:** All parts of CERN's fenced-in domain and all of its underground works.

<sup>4</sup> **Recognised Experiment:** An experiment in fields allied to particle physics, such as astroparticle physics, the full definition of which was decided by the CERN Research Board (CERN/DG/RB 99-285). The conditions applicable to such experiments are decided by the CERN Research Board on a case-by-case basis.

<sup>5</sup> **Funding Agency:** A body providing resources to one or more of the Collaborating Institutions for the purpose of participation in the Experiment. A Collaborating Institution may itself be a Funding Agency.

<sup>6</sup> **Common Project:** A project that the Collaboration has decided to manage jointly under the authority of the Collaboration Management.

<sup>7</sup> **Common Funds:** Funds contributed by the Funding Agencies to joint accounts administered by the Collaboration Management.

<sup>8</sup> **Member of the personnel of CERN:** All Team Members who are not employed by CERN are required to sign a Registration Form, in which they apply to become an associated member of the personnel of CERN.

<sup>9</sup> **Contract of Association:** The contract defined in Article RI 2.04 of the Staff Rules and Regulations of CERN.

<sup>10</sup> **Open Access:** The free, irrevocable, worldwide right of access to, and use of, a work in any digital medium for lawful purposes, subject to proper attribution of authorship.