Memorandum of Understanding

for Maintenance and Operation of the ATLAS Detector

between

The EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH,

hereinafter referred to as CERN, Geneva, as the Host Laboratory

on the one hand

and

a Funding Agency / Institution 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. 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 has been effected through the signature of Memoranda of Understanding (RRB ATLAS-D 98-44 rev.) between each Funding Agency or Institute, as appropriate, in the Collaboration and CERN as the Host Laboratory. These Memoranda of Understanding for construction (Construction MoUs) collectively define the Collaboration and its objectives, and the rights and obligations of the collaborating Institutes in construction matters during the construction period.

(c) In their Article 6.6, the Construction MoUs specify that the responsibilities for the maintenance and operation (M&O) of the ATLAS detector are to be laid down in a separate Memorandum of Understanding on maintenance and operation procedures (M&O MoU), to be signed by all the Parties. Agreement is effected as for construction, i.e. through Memoranda of Understanding between each Funding Agency or Institute, as appropriate, in the Collaboration and CERN as the Host

Laboratory. While the Construction MoUs remain valid, their provisions take precedence over those of the M&O MoUs.

(d) The Resources Review Board (RRB) referred to in Preamble (g) of the Construction MoU is defined therein to have the following roles with respect to M&O :

- reaching agreement on a maintenance and operation procedure and monitoring its functioning
- endorsing the annual maintenance and operation budgets of the detector

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

(e) The present M&O MoUs are not legally binding, but the Funding Agencies and Institutes recognise that the success of the experiment depends on all members of the Collaboration adhering to their provisions. Any default will be dealt with in the first instance by the Collaboration and if necessary then by the RRB.

Article 1 : Annexes

1.1 All the Annexes are an integral part of this MoU.

1.2 Annexes 1, 2, 4, 5 and 6 shall be identical to Annexes 1, 2, 3, 5 and 6 (including any amendments thereto) of the Construction MoU. When the latter ceases to be valid, amendments to these Annexes shall be made in accordance with the provisions of this M&O MoU.

Article 2 : Parties to this MoU

2.1 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 authorised representatives. The Funding Agency may be an Institute or an established institution acting on behalf of one or more Institutes.

2.2 The collaborating Institute(s) and the ATLAS Collaboration will hereinafter be referred to as “Institute(s)” and “Collaboration”, respectively.

Article 3 : Purpose of this MoU

3.1 This MoU addresses the pre-exploitation and exploitation phases of the ATLAS detector. Its purpose is to define the procedure for determining the maintenance and operation (M&O) costs in these phases along with the mechanisms by which they are reviewed and by which the charges and responsibilities for the execution of this work are distributed amongst the Parties. It sets out organisational, managerial and financial guidelines to be followed by the Collaboration. It does not address the offline computing needs of the Collaboration. These will the subject of a separate Memorandum of Understanding for LHC Computing as described in the document "Proposal for Building the LHC Computing Environment" (CERN / 3279 Rev.).

3.2 Exploitation refers to the time after data-taking for physics has commenced at the LHC. Pre-exploitation refers to the time before this and in particular, for individual sub-detector / system components of the ATLAS detector, to the time after they have been commissioned.

3.3 M&O comprises all of the actions needed to fulfil the ATLAS Collaboration co-ordination function and to operate and keep in good working order the individual components of the ATLAS detector, along with their respective infrastructure and facilities.

3.4 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.

3.5 In case of conflict between relevant Co-operation Agreements or Protocols entered into by CERN and the present MoU, the former prevail.

Article 4 : Duration of this MoU and its Extension

4.1 The initial period of validity of this MoU covers the pre-exploitation phase of the ATLAS detector and the expected first five years of physics running, i.e. from 1 May 2002 to 31 December 2011.

4.2 The validity of this MoU will be extended automatically at its expiry for successive periods of five years beyond the initial period unless the RRB determines otherwise. This provision notwithstanding, the MoU will automatically cease to be valid when the LHC programme is declared closed by the CERN Council.

4.3 The provisions of this MoU will apply to elements of the ATLAS detector as they begin to incur M&O costs, as distinct from the costs that belong to the construction phase and are defined in Article 2.2 of the Construction MoU.

4.4 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.

4.5 Any Institute may withdraw from the Collaboration according to the procedures agreed by the Collaboration, subject to the General Conditions for Experiments Performed at CERN (**Annex 3**), and by giving notice in writing to its Funding Agency.

4.6 Any Institute that joins the Collaboration in accordance with the Collaboration rules during the period of validity of this MoU shall accept the agreements in force and will be expected to make an appropriate contribution to the M&O. This will be negotiated by the Collaboration (which reserves the right to request additional contributions from such Institutes) and endorsed by the RRB.

Article 5 : The ATLAS Detector and Collaboration

5.1 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-detector / system Technical Design Reports. It consists of a number of sub-detector / system units as listed in **Annex 4**.

5.2 The current management structure of the Collaboration is described in **Annex 5**.

5.3 The technical participation of the Institutes in detector construction, grouped by Funding Agency, is set out in **Annex 6**.

5.4 The Collaboration shall update Annexes 5 and 6 annually to reflect the situation on 1 January of the current year.

Article 6 : Responsibilities of the Institutes for the Maintenance and Operation of the ATLAS Detector, and of CERN as Host Laboratory

6.1 Responsibility for the M&O of the ATLAS detector rests jointly with the Collaboration as a whole and with CERN as Host Laboratory, within the General Conditions for Experiments Performed at CERN. It is a fundamental principle

that each Institute within the Collaboration shall participate in both maintenance and operation and contribute a fair and equitable share of common costs.

6.2 It is also a fundamental principle that an Institute, which has contributed a component of equipment, will also contribute to the necessary scientific and technical manpower support to operate that component and maintain it in good working order.

6.3 Within the fundamental principles set out in Articles 6.1 and 6.2 above, the Collaboration shall, for each M&O cost item, decide whether the cost is to be borne at the common expense of the Collaboration or not. The M&O cost items are thereby divided into two categories :

6.3.1 Common Items, comprising those costs that the Collaboration has agreed to bear at its common expense, and

6.3.2 Sub-detectors / systems that are the responsibility of individual Institutes or groups of Institutes.

6.4 **Annex 7** lists the M&O cost items agreed by the Collaboration to be Common Items.

6.5 **Annex 8** lists for the second category, by sub-detector / system, the deliverables provided by the Institutes, the CORE value of these deliverables and the sharing among Institutes. Also summarised are the CORE values of the deliverables for particular sub-detectors / systems by Funding Agency.

6.6 The general obligations of CERN in its role as Host Laboratory and of the Institutes (including CERN in this role) are contained in the General Conditions for Experiments Performed at CERN (Annex 3), which in case of contradiction or ambiguity shall prevail over the main body of this MoU.

Article 7 : Maintenance and Operation Categories

7.1 The M&O expenses can be divided into the following three categories :

7.1.1 **Category A**. M&O expenses that are shared by the entire Collaboration (cf. Article 6.3.1 above). **Annex 9** lists the headings under which Category A costs are categorised.

7.1.2 **Category B**. M&O expenses that are borne by part of the Collaboration, i.e. by single Institutes or groups of Institutes, and their Funding Agencies (cf. Article 6.3.2 above). The headings in this category are defined with reference to the distribution of responsibilities amongst the various Institutes for the construction of the ATLAS Detector as given in Annex 8.

Annex 10 lists the headings under which Category B costs are categorised and the Institutes concerned.

It is agreed that an Institute having responsibility under a Category B heading will contribute to providing the necessary financial, scientific and technical support, as well as replacement or spare parts, for normal operation of that equipment and for the routine maintenance needed to keep it in good working order. If problems arise that require major modifications, responsibility will lie with the Collaboration as a whole. The Collaboration will propose on a case-by-case basis the events to which this provision will apply. The proposal will be submitted for approval to the next RRB meeting, which will also be asked to approve the provision of the necessary resources.

7.1.3 **Category C**. General maintenance and operation expenses that are provided to the Collaboration by CERN, acting in its role as Host Laboratory. Subject to the General Conditions for Experiments Performed at CERN (Annex 3), these are more precisely described in the list given in **Annex 11**.

Article 8 : Approval and Oversight

8.1 Oversight of the M&O costs for the ATLAS detector shall lie with the RRB, which will meet normally twice per year, in spring and autumn. The RRB shall have the responsibility for approving the levels and sharing of the Category A costs. It shall also approve the overall level of Category B costs and the sharing of these costs as proposed by the Collaboration.

8.2 The RRB shall be assisted in this aspect of its work by a Scrutiny Group that it shall appoint. The role of the Scrutiny Group is to analyse critically the Collaboration's M&O reports and estimates, refine the Category A estimates in consultation with the Collaboration and advise the RRB on the course of action to take.

8.3 The Scrutiny group shall operate according to the procedures set out in **Annex 12**.

Article 9 : Cost Sharing

9.1 Subject to exceptions that may be agreed on a case-to-case basis by the RRB, the following guidelines are agreed for the sharing of M&O costs :

9.2 For Category A, the costs are to be shared amongst the Funding Agencies or Institutes in proportion to the number of their scientific staff holding PhD or

equivalent qualifications who are entitled to be named as authors of scientific publications of the Collaboration. To this end, the Collaboration shall maintain a list, by Funding Agency and Institute, of these persons (**Annex 13**). The Collaboration shall update this list annually to reflect the situation on 30 September. The updated list is to be ready in time for the autumn meeting of the RRB (see Article 10.1 below).

9.3 Funding Agencies or their Institutes must normally pay their share of Category A costs in cash. In exceptional circumstances some of the Category A costs could eventually be paid in kind with the agreement of the RRB, subject always to a minimum fixed cash amount per Institute. In such cases the cash value attributed to the in-kind contribution shall also be agreed by the RRB. The Collaboration shall propose annually to the RRB the minimum fixed cash amount to be applied in the following year.

9.4 CERN will pay from its operating budget the energy costs falling on Member States. In recognition of the contributions made to the construction of the LHC machine by some non-Member States, CERN will treat these countries in a manner analogous to Member States and will partially pay the energy costs that fall on their Funding Agencies and Institutes.

The non-Member States for which CERN will partially pay the energy costs are listed in **Annex 14**.

CERN Management shall propose annually in its Medium Term Plan (The Scientific Activities of CERN and Budget Estimates for the Years n - n+3) the overall size of these energy payments for the following year, so that they may be incorporated in the M&O budget presented to the RRB for approval in October. The payments are shared amongst the countries concerned according to a formula, the current version of which is explained in **Annex 15**. Any modifications to the arrangements for these payments will also be proposed in the context of the Medium Term Plan.

9.5 For Category B, the costs are to be shared by the Funding Agencies and Institutes concerned in a manner that the Collaboration shall propose to the RRB.

9.6 For Category C, the costs are paid by CERN from its operating budget.

9.7 The boundary between Category A and Category B costs is determined by the Collaboration as explained in Article 6.3 above. Category C costs are determined by the CERN Director General, having regard to the General Conditions for Experiments Performed at CERN and, in particular, the need to provide a safe and secure environment for the operation of the ATLAS detector.

Article 10 : Procedure

10.1 Proposals for providing and sharing Category A M&O costs according to the criteria set out in Article 9 above, including the proposal for the minimum fixed cash amount per Institute, will be drawn up annually by the Collaboration and submitted to the RRB at its spring meeting. At the same meeting, the Collaboration will report on Category B costs and on the proposed responsibilities and commitments for these, while CERN will report on Category C costs. The information for all Categories will comprise the M&O expenses for the previous year and the proposals for the following year, along with estimates for the three subsequent years. The Scrutiny Group will then operate during the summer, with the aim of agreeing the estimates for Category A for the following year, so that they can be endorsed at the autumn meeting of the RRB. It will also make critical comment on the arrangements for Category B costs.

10.2 The RRB will approve the M&O budget for the following year at its autumn meeting.

10.3 Unless explicitly mentioned, all proposals and estimates are to be expressed in Swiss Francs, using the calculated CERN index for materials cost variations.

10.4 For Category A expenses, a common Maintenance and Operation account (M&O Account) will be opened in the name of the Collaboration. All payments made by CERN on behalf of the Collaboration and the related receipts will be shown in that account.

10.5 CERN will issue invoices in Swiss Francs to the Funding Agencies of the Collaboration for their M&O contributions. The detailed procedure for the payment of Category A contributions is set out in **Annex 16**.

10.6 For Category A, the Resources Co-ordinator (see Annex 5) and other named individuals as necessary will be authorised by the Collaboration to sign commitments and payments relating to the above-mentioned account within the limits of the agreed annual budget for Category A. The authorised signature levels for these persons will be subject to the standard CERN rules for Team Accounts.

10.7 The Resources Co-ordinator shall report annually to the autumn meeting of the RRB on the functioning of the M&O arrangements for Categories A and B, and shall point out any cases of default (see Article 12.3 below). At the same meeting CERN Finance Division shall report on the status of the Collaboration accounts for Category A and those parts of Category B for which accounts exist at CERN.

10.8 If, for any reason, the RRB should fail to reach agreement on the M&O costs or on their sharing, the arrangements that it last agreed will continue to apply until agreement is reached.

Article 11 : Rights and Benefits of Institutes

11.1 The Institutes participating in the Collaboration are entitled to join the pre-exploitation and exploitation phases of the project and to participate in the scientific exploitation of the data acquired. Further details are set out in the document "General Conditions for Experiments Performed at CERN" (Annex 3).

Article 12 : Administrative and Financial Provisions

12.1 General financial matters and purchasing rules and procedures for the LHC experiments, including the rules that apply for Common Fund operations, are dealt with in accordance with the "Financial Guidelines for the LHC Collaborations" (CERN / FC / 3796).

12.2 Under the provisions of the CERN basic Convention dated 1st of July 1953 and 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.

12.3 Default on provision of the agreed contributions for M&O shall engage the procedure for resolution of disputes described in Article 14.1 below and may result in specific action against the defaulter. Should the outcome of the dispute resolution procedure imply a loss of M&O contributions to the Collaboration, the question of recovery from the loss is for the RRB to address.

Article 13 : Amendments

13.1 The Collaboration will make every effort to ensure that the information contained in the Annexes to this MoU is kept up-to-date. To this end it shall review the information at least annually in time for the autumn meeting of the RRB.

13.2 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 14 : Disputes

14.1 As indicated in the Preamble (e), the primary mechanism for resolution of any disputes shall be negotiation within the Collaboration in the first instance and then if necessary in the RRB. Should these fail to conclude, the following three mechanisms shall apply, as appropriate. Any dispute between Funding Agencies shall be resolved by negotiation or, failing that, by arbitration through the President of the CERN Council, who will use defined arbitration procedures where they exist and will otherwise adopt one at his or her discretion. 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.

14.2 It is understood that any issues that have arisen during the lifetime of the Construction MoU shall be without prejudice to the rights and obligations laid down in this M&O MoU. No party shall be entitled under this M&O MoU to reduce, retain or set-off any obligation due under the Construction MoU.

Annex 1 : ATLAS Funding Agencies, Institutions and Names of Contact Physicists (NCP).

Funding Agency	NCP	Institutes supported	Contact person	Referred to
Armenia	H. Hakopian	Yerevan Physics Institute, Yerevan	H. Hakopian	Yerevan
Australia	G. Taylor	Research Centre for High Energy Physics, Melbourne University, Melbourne	G. Taylor	Melbourne
		University of Sydney, Sydney	L. Peak	Sydney
Austria	D. Kuhn	Institut für Experimentalphysik der Leopold-Franzens-Universität Innsbruck, Innsbruck	D. Kuhn	Innsbruck
Azerbaijan Republic	O.B. Abdinov	Institute of Physics, Azerbaijan Academy of Science, Baku	O.B. Abdinov	Baku
Republic of Belarus	Y. Kulchitsky, N. Shumeiko	Institute of Physics, National Academy of Science, Minsk	Y. Kulchitsky	Minsk AC
		National Centre for Particle and High Energy Physics, Minsk	V. Rumiantsau	Minsk NC
Brazil	F. Marroquim	Universidade Federal do Rio de Janeiro, COPPE/EE/IF, Rio de Janeiro	F. Marroquim	Rio
Canada	R.S. Orr	University of Alberta, Edmonton	J. L. Pinfold	Alberta
		University of Carleton / C.R.P.P., Carleton	J. Armitage, F. G. Oakham	Carleton
		Group of Particle Physics, University of Montreal, Montreal	C. Leroy	Montreal
		Department of Physics, University of Toronto, Toronto	R.S. Orr	Toronto
		TRIUMF, Vancouver	C. Oram	TRIUMF
		Department of Physics, University of British Columbia, Vancouver	D. Axen	Vancouver
		University of Victoria, Victoria	M. Lefebvre	Victoria
CERN	P. Schmid	European Laboratory for Particle Physics (CERN), Geneva	P. Schmid	CERN
China (NSFC + MST)	J.-M. Ma, T.-Y. Chen, G. Tong	Joint Cluster formed by IHEP Beijing, Nanjing, Shandong and USTC Hefei	J.-M. Ma, T.-Y. Chen, G. Tong	Chinese Cluster
Czech Republic	R. Leitner	Academy of Sciences of the Czech Republic, Institute of Physics and Institute for Computer Science, Prague	V. Vrba	Prague AS
		Charles University in Prague, Faculty of Mathematics and Physics, Prague	R. Leitner	Prague CU
		Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering, Faculty of Mechanical Engineering, Prague	S. Pospísil	Prague TU
Denmark	J. D. Hansen	Niels Bohr Institute, University of Copenhagen, Copenhagen	J. D. Hansen	Copenhagen

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		Institut des Sciences Nucléaires de Grenoble, IN2P3-CNRS-Université Joseph Fourier, Grenoble	J. Collot	Grenoble
		Centre de Physique des Particules de Marseille, IN2P3-CNRS, Marseille	P. Delpierre, S. Tisserant	Marseille
		Laboratoire de l'Accélérateur Linéaire, IN2P3-CNRS, Orsay	P. Petroff	Orsay
		LPNHE, Universités de Paris VI et VII, IN2P3-CNRS, Paris	P. Schwemling	Paris
France CEA	J. Ernwein	Commisariat à l'Energie Atomique (CEA), DSM/DAPNIA, Centre d'Etudes de Saclay, Gif-sur-Yvette	J. Ernwein	Saclay
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		Fakultät für Physik, Albert-Ludwigs-Universität, Freiburg	G. Herten	Freiburg
		Institut für Hochenergiephysik der Universität Heidelberg	K. Meier	Heidelberg
		Institut für Physik, Universität Mainz, Mainz	K. Kleinknecht	Mainz
		Lehrstuhl für Informatik V, Universität Mannheim, Mannheim	R. Männer	Mannheim
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		Fachbereich Physik, Universität Siegen, Siegen	M. Holder	Siegen
		Fachbereich Physik, Bergische Universität, Wuppertal	P. Mättig	Wuppertal
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		Department of Physics, Royal Holloway and Bedford New College, Egham	J. A. Strong	London RHBNC
		Department of Physics and Astronomy, University College London, London	P. Clarke	London UC
		Department of Physics and Astronomy, University of Manchester, Manchester	R. Marshall	Manchester
		Department of Physics, Oxford University, Oxford	A. R. Weidberg	Oxford
		Rutherford Appleton Laboratory, Chilton, Didcot	P. R. Norton, M. Tyndel	RAL
		Department of Physics, University of Sheffield, Sheffield	C.N. Booth	Sheffield
United States of America	W. Willis, H. Gordon	State University of New York at Albany, New York	M.A. Alam	Albany
		Argonne National Laboratory, Argonne, Illinois	L. E. Price	Argonne
		University of Arizona, Tucson, Arizona	M. Shupe	Arizona
		Department of Physics, The University of Texas at Arlington, Arlington, Texas	K. De	Arlington
		Lawrence Berkeley Laboratory and University of California, Berkeley, California	M. Gilchriese	Berkeley
		Physics Department of the University of Boston, Boston, Massachusetts	J. S. Whitaker	Boston
		Brandeis University, Department of Physics, Waltham, Massachusetts	J. R. Bensinger	Brandeis

		Brookhaven National Laboratory (BNL), Upton, New York	D. Lissauer, V. Radeka, H. Gordon	Brookhaven
		University of Chicago, Enrico Fermi Institute, Chicago, Illinois	J. Pilcher	Chicago
		Nevis Laboratory, Columbia University, Irvington, New York	W. Willis	Columbia
		Department of Physics, Duke University, Durham, North Carolina	S.H. Oh	Duke
		Department of Physics, Hampton University, Virginia	K. Baker	Hampton
		Department of Physics, Harvard University, Cambridge, Massachusetts	G. J. Feldman	Harvard
		Indiana University, Bloomington, Indiana	H. Ogren	Indiana
		Iowa State University, Ames, Iowa	E.I. Rosenberg	Iowa
		University of California, Irvine, California	A. J. Lankford	UC Irvine
		Massachusetts Institute of Technology, Department of Physics, Cambridge, Massachusetts	F. E. Taylor	MIT
		Michigan State University, Department of Physics and Astronomy, East Lansing, Michigan	B. G. Pope	Michigan SU
		University of Michigan, Department of Physics, Ann Arbor, Michigan	H.A. Neal	Ann Arbor
		Department of Physics, New Mexico University, Albuquerque	S. Seidel	New Mexico
		Northern Illinois University, DeKalb, Illinois	S. E. Willis	Northern Illinois
		Ohio State University, Columbus, Ohio	H. Kagan	Ohio
		Department of Physics and Astronomy, University of Oklahoma	P. Skubic	Oklahoma
		Department of Physics, University of Pennsylvania, Philadelphia, Pennsylvania	H.H. Williams	Philadelphia
		University of Pittsburgh, Pittsburgh, Pennsylvania	W. E. Cleland	Pittsburgh
		Department of Physics and Astronomy, University of Rochester, Rochester, New York	P. Slattery	Rochester
		Institute for Particle Physics, University of California, Santa Cruz, California	A. Seiden	UC Santa Cruz
		Department of Physics, Southern Methodist University, Dallas, Texas	R. Stroynowski	Dallas
		State University of New York at Stony Brook, New York	M. Rijssenbeek	Stony Brook
		Tufts University, Medford, Massachusetts	K. Sliwa	Tufts
		High Energy Physics, University of Illinois, Urbana, Illinois	S. Errede	Urbana
		Department of Physics, Department of Mechanical Engineering, University of Washington, Seattle, Washington	H. J. Lubatti, P. M. Mockett	Seattle
		Department of Physics, University of Wisconsin, Madison, Wisconsin	S. L. Wu	Wisconsin

Annex 2 : ATLAS Funding Agencies and their Representatives.

Funding Agency		Representative
Armenia	Yerevan Physics Institute, Yerevan	S. Sirunyan, Director
Australia	Australian Institute for High Energy Physics	S.N. Tovey, Chair
Austria	Bundesministerium für Bildung, Wissenschaft und Kultur	H. Schacher and H. Borns
Azerbaijan Republic	Academy of Science of Azerbaijan	N.A.K. Guliyev, Vice-President
Republic of Belarus	Ministry of Education and Science of the Republic of Belarus	V.I. Prokoshin, **Head of the Dept. on Science Technical Policy, Cttee on Science and Technologies ?**
Brazil	Conselho Nacional de Pesquisas (CNPq)	E. Mirra de Paula e Silva, President, CNPq (**OR** C. Pinto de Melo, Director, CNPq ?)
Canada	Natural Sciences and Engineering Research Council of Canada (NSERC)	N. Lloyd, Director General of Research Grants and Scholarships
CERN	European Laboratory for Particle Physics (CERN), Geneva	D. Schlatter, Leader of the Experimental Physics Division
China	National Natural Science Foundation of China (NSFC)	N.Y. Wang, Vice-President
Czech Republic	Ministry of Industry and Trade of the Czech Republic	F. Suransky, Head of Department of Nuclear Energy
	Committee for Collaboration of the Czech Republic with CERN	J. Niederle, President
Denmark	Danish Natural Science Research Council	M. Loycke
France IN2P3	Institut National de Physique Nucléaire et de Physique des Particules (IN2P3-CNRS), Paris	G. Wormser, Director
France CEA	Commisariat à l'Energie Atomique (CEA), DSM/DAPNIA, Centre d'Etudes de Saclay, Gif-sur-Yvette	M. Spiro, Director
Georgia	Insitute of Physics, Georgian Academy of Sciences	A.N. Tavkhelidze, President
Germany BMBF	Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie	H. Schunck, Ministerialdirigent
Germany MPI	Max-Planck-Institut für Physik, Munich	S. Bethke, Director
Greece	National Centre for Scientific Research	E. Floratos, **President ?**
Israel	Israel Commission for High Energy Physics (ICHEP)	D. Horn, Dean, Raymond Beverly Sackler Faculty of Exact Sciences, Tel Aviv University Ramat Aviv
Italy	Istituto Nazionale di Fisica Nucleare (INFN), Rome	E. Iarocci, President
Japan	KEK, High Energy Accelerator Research Organisation, Tsukuba	H. Sugawara, Director-General
Morocco	Ministère de l'Enseignement Supérieur et de la Recherche Scientifique	S. Belcadi, Directeur de la Recherche Scientifique et de la Coopération Universitaire

Netherlands	NIKHEF, National Institute for Nuclear Physics and High Energy Physics	J. Engelen, Director
Norway	Norwegian Research Council	S. Irgens-Jensens
Poland	State Committee for Scientific Research	J.K. Fraçkowiak, Under-Secretary of State (**OR** A. Wiszniewski, Chairman ?)
Portugal	Instituto de Cooperação Cientifica, Tecnológica e Internacional(ICCTI)	F. Ramôa Ribeiro (**OR** A. Trigo de Abreu, President ?)
Romania	Institute of Atomic Physics	T.I. Bujor, Director General
Russia	Ministry of Science and Technologies of the Russian Federation	M.P. Kirpichnikov, First Deputy Minister of Industry, Science and Technologies
JINR	Joint Institute for Nuclear Research Dubna (JINR)	A.N. Sissakian, Vice-Director
Slovak Republic	Department of International Science and Technology Cooperation, Ministry of Education of the Slovak Republic	D. Valachovic, Director
Slovenia	Ministry of Education, Science and Sport	Z. Stancic, State Secretary for Science
Spain	Ministerio de Ciencia y Tecnologia	E. Ferrándiz, Subdirector-General, Organismos y Programas Internacionales y de Grandes Instalaciones
Sweden	The Swedish Research Council	L. Gidefeldt
Switzerland	Fonds National Suisse de la Recherche, Division of Science and Engineering	Ch. Schäublin, Rector, University of Bern, and M. Bourquin, Rector, University of Geneva
Taipei	National Science Council	M.-K. Wu, Vice-Chairman
Turkey	Turkish Scientific and Technical Research Council (TUBITAK)	N.K. Pak, President
United Kingdom	Particle Physics and Astronomy Research Council (PPARC)	R. Wade
United States of America	Department of Energy (DOE)	J. O'Fallon, Director, Division of High Energy Physics
	National Science Foundation (NSF)	J.W. Lightbody

Annex 3 : General Conditions for Experiments Performed at CERN.

ORGANISATION EUROPEENNE POUR LA RECHERCHE NUCLEAIRE

CERN EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

GENERAL CONDITIONS

APPLICABLE TO

EXPERIMENTS PERFORMED AT CERN

14 April 2000

GENERAL CONDITIONS

applicable to

Experiments Performed at CERN

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

This document sets out the rules and procedures concerning organisational, managerial and financial matters, which apply to all Universities and Research Institutions in connection with their participation in an experiment at CERN.

This document also addresses CERN's role as that of a Host Laboratory, to be distinguished from CERN's scientific responsibility as a member of an experiment Collaboration.

1. SCOPE OF APPLICATION

1.1. The General Conditions apply to experiments carried out at CERN by the combined efforts of several Universities and Research Institutions.

1.2. These experiments require approval by the CERN Research Board and the Director-General after consideration of written proposals submitted to the appropriate experiments committees, taking into account scientific interest, technical feasibility and the constraints imposed by available resources.

1.3. The General Conditions do not apply to "Recognised Experiments", the 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 Research Board on a case-by-case basis and any individual members of these experiments who become registered as CERN users are subject to the rules in operation on the CERN site governing this category of personnel.

2. PARTIES AND THEIR REPRESENTATION

2.1. The Parties concerned include:

- CERN as Host Laboratory, hereinafter referred to as "***CERN as Host***" (or simply "CERN") - in this connection, the "***CERN site***" refers to all parts of CERN's fenced-in territory and all of its underground works,
- the Institutions responsible for the research teams taking part in the experiments and forming ***the Collaborating Institutions,*** hereinafter collectively referred to as the ***Collaboration***. CERN may be a Collaborating Institution as well as Host Laboratory.

2.2. Each Party shall have a Representative:

- CERN as Host shall be represented by a ***Director of Research,*** acting on behalf of the Director-General.

- The Collaboration shall be represented by a duly appointed ***Spokesperson***, who represents the Collaboration to the outside and who co-ordinates its work. Where the Spokesperson is not stationed permanently at CERN, the Collaboration shall appoint in addition a ***Contactperson*** at CERN.

- In its relations with CERN, each Collaborating Institution taking part in the experiment shall be represented by a **team member** appointed by the relevant Institution and/or a **member** of the relevant **Funding Agency**.

2.3. All Parties shall assume responsibility for ensuring that all members of their teams comply with these General Conditions.

3. BASIC DOCUMENTS GOVERNING THE COLLABORATION

3.1. The following documents shall constitute the formal basis for experiments performed at CERN:

3.1.1. the ***EXPERIMENTAL PROPOSAL***, after its approval by the CERN Research Board;

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

3.1.3. a ***MEMORANDUM OF UNDERSTANDING,*** which sets out the detailed arrangements and provisions specific to the experiment and which must be agreed and signed by CERN as Host and by the Collaborating Institutions and/or Funding Agencies; special agreements or protocols of relevance may be appended to the Memorandum of Understanding;

3.1.4. the present ***GENERAL CONDITIONS,*** which the Parties accept by signing the Memorandum of Understanding, except as otherwise specified therein.

Contents of the Memorandum of Understanding

3.2. As a guide, the essential parts of the Memorandum of Understanding are the following:

a) a list of the Collaborating Institutions and/or the Funding Agencies, responsible for the teams in the Collaboration;

b) details of the persons with specific responsibilities in the experiment;

c) - the definition of the obligations of the Parties with respect to the construction of the detector and the auxiliary equipment;
- a breakdown of the funding requirements for the main items of the detector and of the auxiliary equipment, together with the contributions of the Parties;
- a timetable for the construction and installation of the equipment to be provided for the experiment;

d) the obligations of the Parties concerning the installation, operation and maintenance of the detector and auxiliary equipment, unless they are specified in a separate Maintenance and Operation agreement;

e) a mechanism for the resolution of disputes amongst the Parties;

f) an explicit reference to the General Conditions (in particular 6.7, 6.8 and 6.13), which the Parties accept unless otherwise specified in the Memorandum of Understanding; moreover, references should be made to the specific agreements and protocols relevant to the experiment.

4. ORGANISATION OF THE COLLABORATION

Internal autonomy and co-ordination with CERN

4.1. In its internal relations, the Collaboration is free to take such organisational decisions as deemed necessary. However, in preparing and performing the experiment, the Collaboration shall take into account the rules in force on the CERN site. In particular, financial arrangements between CERN and the Collaboration shall be subject to the Financial and Administrative Provisions for Visiting Teams currently in force.

Co-ordination in matters of safety

4.2. The Leader of the CERN Division with responsibility for the physics programme to which the experiment belongs shall appoint a Group Leader in Matters of Safety (GLIMOS) on the proposal of the Spokesperson of the Collaboration. The rights and obligations 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 in agreement with all the Parties concerned.

Membership

4.4. The FRC/RRB will consist of one representative of each Funding Agency or Collaborating Institution, and the Managements of CERN and the Collaboration. It will be chaired by the appropriate Director of Research.

Terms of reference

4.5. The role of the FRC/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;
- approving a maintenance and operation procedure and monitoring its functioning;
- approving the annual construction and maintenance & operation budgets.

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

5.1. CERN is the Host Laboratory for the Collaboration. The provisions of this Section concern its obligations as Host.

PRINCIPLES

Installation

5.2. CERN will agree to the installation of the detector, its auxiliary equipment and counting rooms in the appropriate experimental area, provided that they satisfy CERN safety standards.

Duration

5.3. CERN will agree to keep the detector on-site during the data taking for the experimental programme approved by its Research Board.

Network Connections

5.4. CERN agrees that computers and peripherals belonging to the Collaboration, which are needed for the operation of the detector and its auxiliary equipment, may be connected to the CERN Computer network, provided they conform to its compatibility standards.

Insurance[1]

- ***Property***

5.5. The items belonging to the Collaboration and the Collaborating Institutions, once they have been officially accepted on the CERN site, shall be insured at CERN's expense and under the conditions and within the limits set out in the relevant insurance policy against the risks of fire, explosion, natural disaster and water damage.

- ***Third Party Liability***

5.6. Any third party liability of the Collaboration, the Collaborating Institutions and their personnel arising from the experiment shall be insured at CERN's expense under the conditions and within the limits set out in the relevant insurance policy.

- ***Limitation of coverage***

5.7. However, CERN's insurance coverage is effective only above specified amounts of excess. Any amount not covered by CERN's insurance policies shall be for the account of the Collaboration. CERN shall not be liable for any loss or damage arising from or in connection with the experiment.

Social insurance

5.8. Independently of the foregoing provisions, social insurance cover for the experimental teams shall remain the responsibility of the employer institutions concerned.

[1] CERN's insurance policies are currently under review and it is intended that new insurance policies will come into effect on 1 January 2003. CERN does not warrant that the new insurance policies will continue to cover the risks set out in clauses 5.5 and 5.6 and accepts no liability in this connection.

SERVICES

User Support and Users Office

5.9. CERN will provide access to its services, as described in the document "CERN User's Guide". The Users Office will provide assistance, if required, on questions concerning access to the services provided by CERN.

Standard Services

5.10. CERN will generally provide, for the duration of the experiment, free of charge and within the limits and general constraints imposed by the available resources and schedules of accelerators, the standard services and facilities listed below:

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, following the recommendations of the relevant Experiment Committee;

c) test beam time for testing prototypes and calibrating final detector elements, subject to the normal scheduling and allocation procedures;

Space

d) floor space in the experimental area(s) for the experimental detector and its auxiliary equipment;

e) laboratory and hall space for construction, testing and assembly of equipment;

f) temporary, short-term storage place for spare parts, handling and assembly tools, detector and auxiliary equipment that is awaiting installation or removal. CERN reserves the right tocharge longer term storage of the above items to the Collaborating Institutions;

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 detector and its auxiliary equipment, such as the provision of crane and rigging services, geometrical survey and alignment, transport of equipment on and between the parts of the CERN site, as well as 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 for the duration of the experiment in amounts to be decided by the normal CERN allocation procedures;

Transport of persons

k) basic transportation for personnel between the main parts of the CERN site;

Safety services

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

Administrative services

m) access to its administrative services to help the Collaboration in financial matters, in accordance with the CERN Financial Rules and in particular with those applying to Visiting Teams.

Special Services

5.11. A variety of services other than those specified above may be provided to the Collaborating Institutions on request, subject to the availability of resources. Such services will be charged to the Collaborating Institutions according to the rules currently in force at CERN.

Special Equipment

5.12. Any additional infrastructure equipment to be provided by CERN shall be explicitly mentioned in the Memorandum of Understanding. The respective obligations of CERN and of the Collaborating Institutions with regard to the construction, operation and maintenance of this equipment shall also be specified therein or in the Maintenance and Operation agreement, where this is a separate document.

6. OBLIGATIONS OF THE COLLABORATING INSTITUTIONS

Basic Obligations

6.1. The team members and property of Collaborating Institutions shall, while located on the CERN site, be subject to the authority of the Director-General of CERN and shall comply with the regulations in force on the Organization's site. Each Collaborating Institution shall nominate a Team Leader who is responsible, among other things, for ensuring that all members of the team (paid academic, research, technical and administrative staff and registered students) are aware of the regulations and obligations, and of the need to comply with them at all times while on the CERN site.

Medical surveillance and certificates

6.2. Each Collaborating Institution sending team members to CERN shall remain responsible as employer for the medical surveillance of its team members and, in the case of team members who are to work in conditions deemed to constitute special risks (e.g. radiation controlled areas), shall supplya certificate of medical fitness on first arrival at CERN.

Safety briefings and inspections

6.3. Collaborating Institutions shall participate in safety meetings and studies of their experiment, and shall accept the right of the CERN safety personnel to carry out safety inspections as well as other safety measures set out in the document "Safety Policy at CERN - SAPOCO/42".

Supply of equipment

6.4. 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 to commission. The Spokesperson shall inform the appropriate Director of Research of any significant failure to meet the agreed schedule. For experiments with FRCs or RRBs, these bodies will monitor such matters.

Ownership status

6.5. The delivery of items to the CERN site, or the handling of such items there, will not affect the property rights relevant to those items, unless otherwise formally agreed with the owner. On the other hand, the ownership of equipment no longer required by the Collaboration can, subject to formal mutual agreement, be transferred to CERN, where this is in the mutual interest of CERN and the Collaboration concerned.

Ownership inventory

6.6. As a condition of coverage by CERN's Insurance, each Collaborating Institution must provide CERN with a list of the property it installs on the CERN site. All equipment delivered to the CERN sites must be properly documented to indicate its ownership status, handling requirements and any potential hazards that it may pose. It shall keep the list up to date and, where necessary, inform CERN of any modifications to it.

Transport of equipment

6.7. Each Collaborating Institution supplying equipment shall be responsible for its delivery to and removal from the CERN site.

Installation and dismantling of equipment

6.8. The Collaboration is collectively responsible for the installation and dismantling of the equipment supplied by the Collaborating Institutions, in common or individually.

Operation and maintenance costs of equipment

6.9. The Collaborating Institutions shall be collectively responsible for the operation and maintenance of the equipment supplied by them, and for providing the resources necessary to carry out the experimental programme. The resources needed to operate and maintain the infrastructure and other equipment supplied by CERN as Host shall be provided by CERN.

Assignment of equipment

6.10. Any Party providing equipment undertakes to continue to make it available to the Collaboration at CERN until the experiment is officially declared to have been completed (see 8.2 below).

Early removal of equipment

6.11. If equipment provided by a Collaborating Institution is, in the opinion of the Collaboration, no longer required, the Parties may agree to and request its removal from the CERN site under the responsibility of the Institution concerned.

Release of space

6.12. Space allocated for construction and assembly should be released when these activities have been terminated. CERN reserves the right to change the space allocation during the lifetime of the experiment. As soon as the experiment is declared to have been completed (see 8.2 below), all space used by the Collaboration, including office and laboratory space, and the space used for testing and running the experiment, will be made available to CERN for reallocation.

Removal of equipment

6.13. Equipment associated with an experiment shall be removed from the CERN site within six months following a request from the CERN Division Leader concerned.

7. INTELLECTUAL PROPERTY

Free use of knowledge and data

7.1. CERN is bound by its Convention to publish or otherwise make generally available the results of its experimental and theoretical work. In addition, subject to clause 7.2 hereunder, each Collaborating Institution and CERN as the Host Laboratory is entitled to use for its own purposes any data and knowledge arising from the preparation or execution of the experiment.

Matters for prior agreement

7.2. Title to any patentable invention or any know-how arising from the preparation or execution of the experiment is vested in the Collaborating Institution(s) which is/are its author(s), who shall decide on the taking of measures, at its/their own expense, to protect such invention or know-how and who shall grant each Collaborating Institution and CERN a free, perpetual and irrevocable license to use such invention or know-how for its own purposes. Such license does not include the right to sub-license.

8. FINAL PROVISIONS

Modifications and formal amendments

8.1. The Collaboration shall reach agreement on any modification or addition to the experiment that affects the terms of the Memorandum of Understanding and shall inform CERN of such changes. Where the changes constitute a substantial change to the experiment, they will be submitted to the appropriate committee for approval and acceptance by CERN. In cases where the Collaboration has an FRC/RRB, the latter bodies must also approve any such changes. Major modifications shall be approved as formal amendments to the Memorandum of Understanding and signed by the representatives of all the Parties.

Duration of applicability of the Memorandum of Understanding

8.2. Unless the duration of applicability is specified in the Memorandum of Understanding, the terms and conditions of the Memorandum of Understanding will apply until the appropriate CERN Research Director, in agreement with the Spokesperson, declares the experiment to have been completed, dismantled and the arrangements for its disposal agreed.

Observance of the Memorandum of Understanding

8.3. The Memorandum of Understanding formalises the agreement reached between all the Parties on the experiment, who will do their best to adhere to its provisions. Any default under its provisions will be dealt with by the Collaboration, in consultation with the CERN Management.

Relevant documents

8.4. The following documents are fully applicable in the execution of the Memorandum of Understanding:

- the CERN Users' Guide,
- the Safety Guide for CERN experiments,
- the Safety Policy at CERN - SAPOCO/42,
- Financial Guidelines for the LHC Collaborations (CERN/FC/3796) - for the LHC experiments only,
- Financial and Administrative Provisions for Visiting Teams.

ACCU

8.5. 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.

Annex 4 : Sub-detector Structure of the ATLAS detector.

The ATLAS detector is structured into the following sub-detector units, which will be used throughout this document:

- **Inner Detector**
  - Pixel Detector (PD)
  - Semiconductor Tracker (SCT)
  - Transition Radiation Tracker (TRT)
- **Solenoid Magnet**
- **Liquid Argon Calorimeter**
  - Electromagnetic Barrel Calorimeter (EMB) including a pre-sampler (PS)
  - End Cap Calorimeters (EC)
  - Electromagnetic End Cap Calorimeter (EMEC)
  - Hadron Calorimeter (HCAL)
  - Forward Calorimeter (FCAL)
- **Tile Calorimeter**
  - Barrel Tile
  - Extended Barrel
- **Toroid Magnets**
  - Barrel Toroid
  - End-Cap Toroids
- **Muon Detection System**
  - Monitored Drift Tube Ch. (MDT)
  - Cathode Strip Chambers (CSC)
  - Resistive Plate Chambers (RPC)
  - Thin Gap Chambers (TGC)
- **Trigger, Data Acquisition and Detector Control System**
  - Level 1 Trigger
  - Level 2 Trigger
  - DAQ and Event Filter
  - Detector Control System (DCS)
- **Detector Infrastructure**
- **Off-line Data Handling**

Annex 5 : Management Structure of the ATLAS Collaboration.

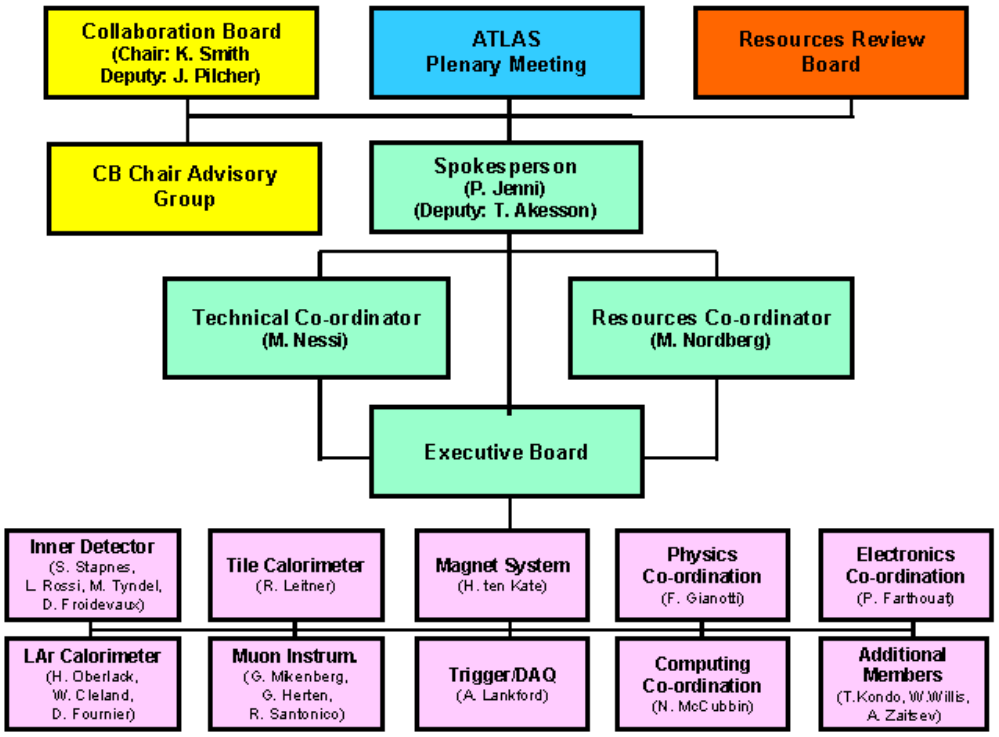
The organisation of ATLAS with present holders of central management positions, is shown in annex 5.1. It is described in annex 5.2 and is based on the three documents, annexes 5.3, 5.4 and 5.5, approved by the Collaboration Board.

On 7 March 1997 the Collaboration Board approved three additions to this organisation: conditions for institutions joining after 1996 (annex 5.5), conditions for suspended membership (annex 5.6) and on the exclusion of institutions from ATLAS (annex 5.7).

Annex 5.8 describes the procedures for admission of new institutions.

The overall construction, installation and commissioning task of ATLAS is formalised in a system using a Product Breakdown Structures (P.B.S.) and a task list which together produce a Work Breakdown Structure (W.B.S.). The W.B.S. consists of work packages which together fully describe the complete project.

Annex 5.1



(situation as of January 1, 2002)

Annex 5.2

ATLAS

Internal Note

Gen-No-016
16 December 1996

Article 15 : Description of the ATLAS Organisation

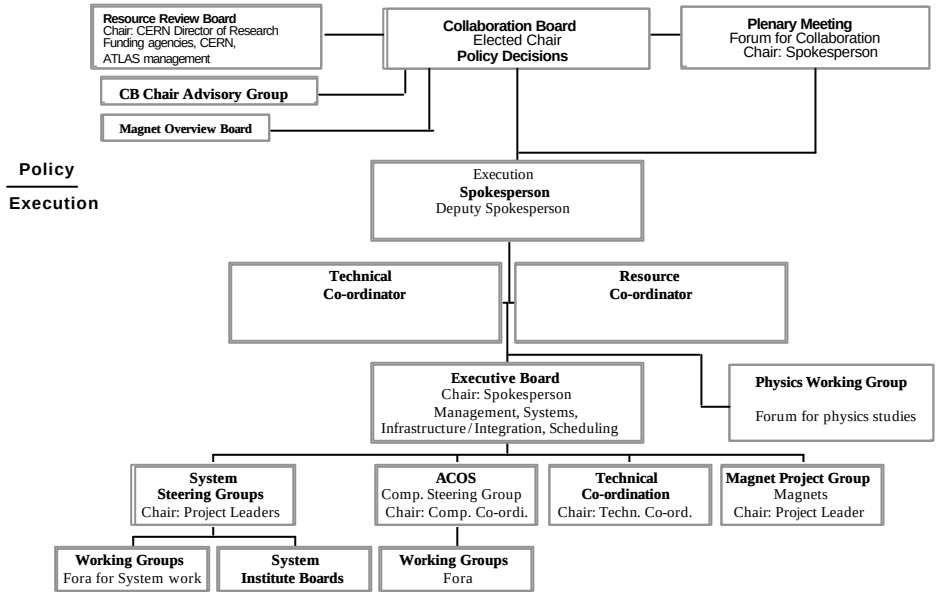
Torsten Åkesson

Introduction

This report gives an overview of the ATLAS organisation as decided by the Collaboration Board and defined in the ATLAS Internal Notes [1,2].

ATLAS organisation

The management operates under the constitution of the ATLAS collaboration [1] which specifies that the collaboration shall have a separation between policy-making and executive powers. This is implemented as shown in the block diagram below:



Policy

The full collaboration has week-long meetings (ATLAS Weeks) four times a year. The general forum, *the Plenary Meeting (PM),* and the policy deciding body, *Collaboration Board (CB)* assemble at these occasions. Systems give overview presentations at the PM and issues to be decided in the CB are presented and openly debated first in the PM before being brought up at the CB for decision. The decisions in the CB are taken by consensus or vote. All votes are open except those concerning persons, e.g. the Spokesperson or CB chair elections. Each institution of ATLAS is represented in the CB and has one vote. Larger institutions can at their discretion have two persons in the CB, but still with only one vote. The exact rules for CB decisions and elections can be found in [1]. The Executive Board (see below) members are ex-officio at the CB.

The CB chairperson can have an Advisory Group to help prepare the agenda. The Advisory Group is nominated by the CB-chair and elected by the CB for the duration the chairpersons office. The Advisory Group also prepares the Spokesperson elections and is the body where especially sensitive issues can be brought up, e.g. issues concerning persons in the executive organisation. The ATLAS Spokesperson, Deputy, Resource and Technical Co-ordinators are in attendance in the Advisory Group, but the CB-chair can decide to hold some meetings without these people present.

The CB can form *Overview Boards* to monitor the development of crucial items. Currently, the only example is the *Magnet Overview Board* monitoring the largest common project item in the experiment, the magnets.

The *Resource Review Board, RRB,* is the body where the ATLAS resources are approved upon proposals from the collaboration, and monitored. It is composed of representatives of the national funding agencies, the CERN management and the ATLAS management. It is chaired by the CERN Director of Research. The RRB discusses the different national contributions and the Memoranda of Understanding. In-kind contributions to the Common Projects have to be approved in the RRB.

The formal commitments to the ATLAS construction are made through the Memorandum of Understanding signed by the funding agencies and CERN.

Overall Execution

Having clearly defined System interfaces and guide-lines for organisation [2], performance and technical co-ordination allows Subsidiarity to be a governing principle for the execution of ATLAS; the decision making is done when possible at the System level. However, global directives, approvals and monitoring have to be done centrally to ensure overall physics performance, a synchronous time schedule, integratability, and uniform hardware and software quality in the project.

The Spokesperson is the highest level executive of ATLAS, and as such has the overall responsibility of the ATLAS execution. He or she organises the day-to-day execution of the project. He or she represents the ATLAS executive branch at the CB and is the ATLAS contact to the outside world and the CERN management. The Spokesperson may have one or two deputies. Technical co-ordination is delegated to a Technical Co-ordinator and resource co-ordination to a Resource Co-ordinator. Both are CERN staff. The Technical Co-ordinator monitors the technical aspects of the construction of the System, is responsible for the detector integration, for the overall construction of the detector and of the experimental area, and for common project issues. The Resource Co-ordinator monitors and manages the financial and human resources of the collaboration.

Appointments are done in consultation with the CERN management for the Spokesperson, and in agreement with the CERN management for the Technical and Resource Co-ordinators.

About once a month the *Executive Board (EB)* meets. The EB is the main body for directing the execution of the ATLAS project and for direct communication between the ATLAS management and the Systems. It monitors the execution of the individual Systems and discusses matters involving several Systems. The EB meetings are prepared by the Spokesperson who chairs them. The EB is composed of:

The ATLAS management (Spokesperson, Deputy Spokesperson, Technical Co-ordinator and Resource Co-ordinator)

The System Project Leaders and for some Systems additional representation depending on their size and complexity.

The Magnet Project Leader

Technical co-ordination staff (in attendence)

Up to two additional individuals chosen to ensure an overall balance in the complete EB.

The CB Chairperson and Deputy as ex-officio

The contact between the ATLAS management and the national funding agencies is maintained via an ancillary structure of *National Contact Physicists* relating to the Spokesperson and the Resource Co-ordinator.

In difficult cases, e.g. when major technology choices have to be made, a review panel can be appointed. Such a panel is chaired by an ATLAS physicist not directly involved in the issue.

System Interaction with the ATLAS Management

An ATLAS System roughly correspond to a performance task. It is a major activity involving a set of institutions which will produce hardware and software. A System is constrained by a performance specification and the integration requirements of the whole experiment, and has to work inside a geometrical envelope and a cost ceiling. This is specified in its Technical Design Report (TDR). The original version of the TDR is submitted to the LHCC for construction approval. It defines the design, production procedure including quality assurance, maintenance, commissioning and sharing of responsibilities. This includes the formal breakdown structures that are linked to the highest levels of the ATLAS breakdown structures, and the scheduling that is included in the overall ATLAS project planning.

The internal ATLAS TDR approval procedure is the guarantee that the System is coherent with the overall ATLAS organisation and quality. The TDRs are regularly revised to be consistent with the System being constructed. Depending on the level of changes the revision approvals are done at the System levels, by the technical co-ordination, the Spokesperson or the EB. Changes that could have a major impact on the experiment have to be approved by the CB.

The Project Leader regularly communicates the System status to the ATLAS management and technical co-ordination.

The ATLAS management regularly discuss with the Project Leader questions relevant to the System execution and resources.

System Execution

General Organisation

The large number of institutions and people involved necessitates a management structure. This management has to have the solid support in the System collaboration and an excellent working relationship with the central ATLAS management team. The day-to-day System execution is lead by the Project Leader who is usually a member of the ATLAS Executive Board. The System has a Steering Group and an Institute Board. If it is convenient for the System, these bodies can be combined in order to be able to

carry out the steering and decision making in one group. The Project Leader is the System representative within the ATLAS organisation.

Steering Groups

Each System has a Steering Group reflecting the range of activities within itself and bringing together the people leading these efforts. The Steering Group takes decisions on technical execution matters and make recommendations to the Institute Board on major technical choices and on matters of sharing resources and responsibilities. The Steering Group is chaired by the Project Leader who prepares its agenda. Its members are nominated by the Project Leader based on broad consultation in the System community and approved by the Institute Board. The frequency of Steering Group meetings shall be sufficiently high to ensure the effective leadership of the System execution. The Project Leader shall routinely consult the Steering Group whenever significant issues arise. The ATLAS management members are ex-officio in all Steering Groups.

Institute Boards

Each System has an Institute Board. The Institute Board takes decisions on major technical choices and on sharing of resources and responsibilities. Major technology choices affecting the overall performance of ATLAS have to be brought forward to the collaboration as a whole for decision in the Collaboration Board [1]. The institutions are the source of money and manpower, and therefore all major questions involving sharing of responsibilities and contribution of resources have to be agreed upon by the Institute Board. The Institute Board also proposes the Project Leader candidate for approval by ATLAS, and approves the Steering Group composition. In major matters concerning resources the Institute Board shall invite the ATLAS Resource Co-ordinator.

Sub-System

Each System may be broken up into smaller organisations, Sub-Systems, which in some cases may more directly correspond to the direct detector construction tasks. These Sub-Systems may well have their internal organisations with Project Leaders, Steering Groups and Institute Boards as described in the System organisation. However, the formal lines of responsibilities go through the System Project Leader.

ATLAS Project Leaders

Appointment

The Project Leader candidate is nominated by the System participants, short-listed by the Steering Group, elected by the System Institute Board, proposed by the spokesperson to the Collaboration Board and approved by it. The appointment is for two years with the possible extension according to the ATLAS organisation rules[1].

Mandate

The Project Leader is the person directly and ultimately responsible to the ATLAS collaboration, for ensuring that the design and construction of the corresponding System are carried out on schedule, within the cost ceiling, and in a way that guarantees the required performance and reliability, within the framework of the ATLAS resource planning. He or she collaborate closely with the ATLAS technical and resource co-ordination. The Project Leader shall bring up to discussion, with the ATLAS management, incompatibilities between the requirered project development and the available resources.

While the responsibility to the ATLAS collaboration remains at all times with the Project Leader, he or she may choose to delegate some tasks, or to appoint people such as project engineer, electronics project

engineer, s/w responsible, etc. to assist in managing the project. Such appointments must specify a clear set of responsibilities; they shall be approved by the Steering Group and confirmed by the Institute Board.

References

[1] *ATLAS Organisation*, ATLAS Internal Note GEN-NO-009, 16 September 1994

[2] *ATLAS System Organisation*, ATLAS Internal Note Gen-No-015, 29 November 1996

Annex 5.3

ATLAS Internal Note
Gen-No-009
16 September 1994

ATLAS Organization

(16 September 1994)

1 Preamble

The ATLAS Organization shall be guided by the following principles:

- democracy;
- separation of policy-making and executive powers;
- minimal formal organization;
- limited terms of office.

2 Plenary Meeting

The Plenary Meeting is the forum of the all-hands discussion. All major ATLAS decisions concerning

- physics objectives and results;
- hardware and software design;
- organizational matters

must be discussed in the Plenary Meeting and, if appropriate, in its subordinate Working Group Meetings.

3 Collaboration Board

The Collaboration Board is the policy- and decision-making body of the ATLAS Collaboration.

Typical tasks of the Collaboration Board will be:

- decisions on the global detector design;
- policy matters (guidelines for the interaction with the LHC Committee and the CERN Management, publications, presentations etc.);
- financial and human resources;

- elections;
- ATLAS organization;
- ATLAS membership.

Members of the Collaboration Board are:

- in general one representative per institution; however, institutions may have, at their discretion, up to two representatives;
- members of the Executive Board (*ex officio*).

Each participating institution has one and only one vote.

Decisions require a 2/3 majority of the institutions represented during the vote. A quorum of 50% (including procurations) is required. Voting representatives can carry not more than 2 procurations in addition to their own vote.

In case a 2/3 majority cannot be obtained another vote has to be arranged for a later date with the aim of obtaining a 2/3 majority at that time. If this majority still cannot be obtained a further vote with a relative majority (abstentions not counted) will decide.

Elections will follow the subsequent procedure:

1. A candidate is elected in the first round if he or she obtains the absolute majority of the represented institutions. If no candidate obtains this absolute majority, those with the two highest numbers of votes will be retained for a second round.
2. In case of a second round, the candidate with the relative majority (abstentions not counted) is elected.

Re-elections, however, need a 2/3 majority.

The vote for elections and re-elections is secret and made by ballot.

The Collaboration Board can decide to terminate a person's assignment at any time and to request new elections.

The chairperson of the Collaboration Board is elected *ad personam* by the Collaboration Board. The chairperson shall not represent any country, institution, or activity within ATLAS. The term of office is two years, and is not renewable. After the first year of office, a deputy is elected who will become the chairperson's successor. After the end of the chairperson's term of office, the chairperson will serve for yet another year as deputy.

The chairperson may nominate an advisory group, the members of which will be elected by the Collaboration Board upon proposal of the chairperson for the duration of the chairperson's term.

4 Spokesperson(s)

ATLAS will normally have one spokesperson. However, the Collaboration Board can also decide, with a 2/3 majority, to elect two spokespersons.

The spokesperson(s) are responsible to the Collaboration Board for the execution of the ATLAS project.

The spokesperson(s) are elected *ad personam* by the Collaboration Board, after nomination of candidates by, and due consultation with, the Collaboration. The spokesperson(s) represent the Collaboration to the LHC Committee, to the CERN Management, and to the outside.

The term of office is three years, renewable with a 2/3 majority.

The spokesperson(s) may nominate one or two deputies, who will be elected by the Collaboration Board for the duration of the term of office of the spokesperson(s). The responsibilities of the deputy spokesperson(s) have to be clearly defined.

The spokesperson(s) and their deputies shall not represent any country, institution, or activity within ATLAS.

5 Executive Board

The Executive Board directs the execution of the ATLAS project, in line with policies set by the Collaboration Board. The Executive Board brings together the coordinators responsible for the design, construction, and operation of ATLAS within the available resources, with a view to the overall performance of the experiment.

Typical tasks will be:

- review of schedules;
- setting and review of milestones;
- review of financial and human resources;
- coordination between the subdetector work programmes;
- coordination of test beam activities;
- coordination of hardware and software.

The detailed composition of the Executive Board will be adapted to the current needs of the experiment. Its composition, as well as the description of the specific tasks for the Executive Board members, are given in a separate document which is subject to approval by the Collaboration Board.

The Executive Board is chaired by the spokesperson(s). The technical coordinator serves as deputy chairperson.

The members of the Executive Board are elected for a period of office of two years, renewable with a 2/3 majority.

The technical coordinator will typically deal with

- integration issues of the subdetectors;
- safety;
- ATLAS infrastructure at CERN;
- surface and experimental areas, services;
- installation;
- machine interface;
- test beams.

The technical coordinator chairs regular technical coordination meetings.

The resource coordinator is a member of the Executive Board. He or she oversees the resource planning of the ATLAS project, and will typically deal with

- budget planning;
- manpower planning;
- Memoranda of Understanding;
- Common Fund.

Annex 5.4

ATLAS Internal Note
Gen-No-015
29 November 1996

Article 16 : ATLAS System Organisation

Preamble

The optimisation and construction of ATLAS as one coherent scientific facility is a large task. The required resources are substantial and the ATLAS collaboration has a responsibility to ensure that these will efficiently produce a facility with the expected performance. This requires an organisation with clear lines of responsibilities. ATLAS is divided into different performance tasks (Systems) and we need one person with an overall responsibility for each of these, the Project Leader. This responsibility requires the full support from the System community which is ensured by the appointment procedure. This appointment procedure is executed with the Project Leader responsibilities open on the table, so that the participating institutes know exactly what they agree to when they select their candidate. The Project Leader is working with a Steering Group which shall be an active body in guiding the System execution.

The System organisation described in this document was approved by the Collaboration Board the 29'th of November 1996.

System Interaction with the ATLAS Management

An ATLAS System roughly corresponds to a performance task. It is a major activity involving a set of institutions which will produce hardware and software. A System is constrained by a performance specification, and has to work inside a geometrical envelope, schedule and a cost ceiling. This is specified in its Technical Design Report (TDR). The original version of the TDR is submitted to the LHCC for construction approval. It defines the design, production procedure including quality assurance, maintenance, commissioning and sharing of responsibilities. This includes the formal breakdown structures that are linked to the highest levels of the ATLAS breakdown structures, and the scheduling that is included in the overall ATLAS project planning. The internal ATLAS TDR approval procedure is the guarantee that the System is coherent with the overall ATLAS organisation and quality. The TDRs are regularly revised to be consistent with the System being constructed. Depending on the level of changes the revision approvals are done at the System levels, by the technical co-ordination, the Spokesperson or the EB. Changes that could have a major impact on the experiment have to be approved by the CB.

The Project Leader regularly communicates the System status to the ATLAS management and technical co-ordination. The ATLAS management regularly discuss with the Project Leader questions relevant to the System execution and resources.

General Organisation

The large number of institutions and people involved necessitates a management structure. This management has to have the solid support in the System collaboration and an excellent working

relationship with the central ATLAS management team. The day-to-day System execution is lead by the Project Leader who is usually a member of the ATLAS Executive Board. The System has a Steering Group and an Institute Board. If it is convenient for the System, these bodies can be combined in order to be able to carry out the steering and decision making in one group. The Project Leader is the System representative within the ATLAS organisation.

Steering Groups

Each System shall have a Steering Group reflecting the range of activities within itself and bringing together the people leading these efforts. The Steering Group takes decisions on technical execution matters and make recommendations to the Institute Board on major technical choices and on matters of sharing resources and responsibilities. The Steering Group is chaired by the Project Leader who prepares its agenda. Its members are nominated by the Project Leader based on broad consultation in the System community and approved by the Institute Board. The frequency of Steering Group meetings shall be sufficiently high to ensure the effective leadership of the System execution. The Project Leader shall routinely consult the Steering Group whenever significant issues arise. The ATLAS management members are ex-officio in all Steering Groups.

Institute Boards

Each System shall have an Institute Board. The Institute Board takes decisions on major technical choices and on sharing of resources and responsibilities. Major technology choices affecting the overall performance of ATLAS have to be brought forward to the collaboration as a whole for decision in the Collaboration Board [1]. The institutions are the source of money and manpower, and therefore all major questions involving sharing of responsibilities and contribution of resources have to be agreed upon by the Institute Board.

The Institute Board also proposes the Project Leader candidate for approval by ATLAS, and approves the Steering Group composition. In major matters concerning resources the Institute Board shall invite the ATLAS Resource Co-ordinator.

Sub-System

Each System may be broken up into smaller organisations, Sub-Systems, which in some cases may more directly correspond to the direct detector construction tasks. These Sub-Systems may well have their internal organisations with Project Leaders, Steering Groups and Institute Boards as described in the System organisation. However, the formal lines of responsibilities to the central ATLAS organisation go through the System Project Leader.

Work Definition of ATLAS Project Leaders

Appointment

At latest when entering the TDR phase the Systems shall start the process of appointing the Project Leader.

The Project Leader candidate is nominated by the System participants, short-listed by the Steering Group, elected by the System Institute Board, proposed by the spokesperson to the Collaboration Board and approved by it. The appointment is for two years with the possible extension according to the ATLAS organisation rules[1].

Mandate

The Project Leader is the person directly and ultimately responsible to the ATLAS collaboration, for ensuring that the design and construction of the corresponding System are carried out on schedule, within the cost ceiling, and in a way that guarantees the required performance and reliability, within the framework of the ATLAS resource planning. He or she collaborate closely with the ATLAS technical and resource co-ordination. The Project Leader shall bring up to discussion, with the ATLAS management, incompatibilities between the requirered project development and the available resources.

While the responsibility to the ATLAS collaboration remains at all times with the Project Leader, he or she may choose to delegate some tasks, or to appoint people such as project engineer, electronics project engineer, s/w responsible, etc. to assist in managing the project. Such appointments must specify a clear set of responsibilities; they shall be approved by the Steering Group and confirmed by the Institute Board.

The Project Leader chairs the System Steering Group. He or she shall maintain continuous communication with the Steering Group, keeping it up-dated on the development of the project and consulting it on questions of major importance.

In leading the System the Project Leader shall always consider the effect of any decisions taken within the System on the performance and functioning of the ATLAS experiment as a whole.

Typical tasks of the Project Leader include (but are not limited to):

- Preparing all decisions in the sub-detector community, by activating all the necessary studies and forums, thus making sure that everyone has the opportunity to express opinions well before the formal decision is taken by the Steering Group and the Institute Board.
- Maintaining up-to-date knowledge on all activities inside the System either directly or through people to whom co-ordination has been delegated.
- Keeping the System community informed on developments from the central ATLAS co-ordination relevant to the execution of the System.
- The production of the System TDR and its presentation to the LHCC.
- Ensuring a correct distribution and balance of responsibilities among the participating institutions.
- Keeping an updated project plan for the System, including the use of resources (resource loaded project plan), and communicating it to the general ATLAS project planning.
- Representing the System in the Executive Board (Project Leaders and the EB members are subject to endorsement by the CB).
- Organising System collaboration meetings and Steering Group meetings.
- Ensuring that clear work definitions are written for people to whom tasks are permanently delegated, such as the project engineer.
- Ensuring the efficiency of the System execution.
- Ensuring that the System status is regularly communicated to the ATLAS management.
- Bringing to the ATLAS management's attention changes that could affect the rest of the experiment.

References

[1] *ATLAS Organisation*, ATLAS Internal Note GEN-NO-009, 16 September 1994

Annex 5.5

ATLAS Internal Note
10 January 2000

Collaboration Board decisions on ATLAS organization in 1998/1999

Matteo Cavalli-Sforza

Decisions taken by the Collaboration Board in 1998 and 1999 on matters of organization of the collaboration are collated in this document for ease of reference. These decisions complete the rules and procedures laid down in the ATLAS Organization document [1] and in the ATLAS System Organization document [2] and together with these two documents define the basic rules under which ATLAS operates.

1. Procedure approved in the Collaboration Board meeting of September 18, 1998:

Concerning elections in which two candidates receive equal numbers of votes:

The procedure to be followed to break a deadlock in the Collaboration Board is described. This procedure is also meant as a guide if such a situation arises in (sub)detector communities.

In the case that two candidates receive equal numbers of votes

1. First, the election shall be repeated in the same session.

2. If the deadlock is not broken, the body that organized the previous vote shall have the authority to propose solutions that may produce a majority, and shall organize an other vote. This vote must be announced at least two weeks in advance and must follow the previous vote with a delay of no less than three weeks.

3. If the deadlock persists, the Collaboration Board Chair shall be entrusted with finding a solution.

2. Rules approved in the Collaboration Board meetings of June 11, 1999 and September 16, 1999:

A. Concerning (sub)system project leaders:

A.1: A search committee of the Institute Board presents a short list of project leader candidates after consulting with the (sub)system community and management. The spokesperson may add one candidate to the short list. Before the Institute Board vote, the Spokesperson may express to the Institute Board management's preferences between the candidates. (11/06/99)

A.2: In exceptional circumstances, the spokesperson may call for the resignation of a (sub)system project leader. In this case, a new election must take place within 30 days. The outgoing project leader remains in charge until the new one is elected. (16/09/99)

B. Concerning decisions by Institute Boards:

In constructing detector components, majority decisions of the Institute Boards must be followed by all Institutes. However under serious circumstances majority decision can be appealed. Such appeals will be arbitrated by the spokesperson, and may only be reversed by a vote of the Collaboration Board. (11/06/99)

C. Concerning reelections of outgoing spokesperson and project leaders:

C.1: If the outgoing spokesperson/(sub)system project leader has served for two terms or longer and seeks reelection, the relevant search committee should actively seek new candidates. (16/09/99)

C.2: Elections of (sub)system project leaders should normally take place at least four months before the end of the mandate of the current project leaders. (16/09/99)

References

[1] ATLAS Organization, ATLAS Internal Note Gen-No-009, 16 Sept. 1994, reproduced as Annex 5.3 of ATLAS Memorandum of Understanding, RRB-D 98-44 rev.
[2] ATLAS System Organization, ATLAS Internal Note Gen-No-015, 29 November 1996, reproduced as Annex 5.4 of ATLAS Memorandum of Understanding, RRB-D 98-44 rev.

Annex 5.6

Conditions for Institutions joining after 1996

New Institutions are expected to make significant contributions to the ATLAS project (detector construction, software) which will have to be negotiated case by case. These contributions will be laid down in an amendment to the MoU.

New collaborators will have the same obligations towards the Common Projects as all other collaboration members. In particular the full minimum Common Fund cash contribution of 100 kCHF is requested. A definite payment plan has to be included in the request to join the ATLAS Collaboration.

Annex 5.7

Suspended Membership

ATLAS can create the status of 'Suspended Membership' in order to allow Institutions to temporarily interrupt their contributions to the experiment and to re-integrate without having to re-apply for membership.

Suspended Membership will be granted only in exceptional cases and for well justified circumstances which will have to be considered case by case by the Collaboration Board.

The following rules apply to the status of Suspended Membership:

Suspension of membership shall in no case be possible beyond a duration of 3 years.

The integrated minimal cash contribution to the Common Fund remains 100 kCHF; the standard annual dues of 12.5 kCHF not paid during the suspension period will have to be paid according to a plan to be agreed upon at the time of re-integration.

Commitments taken by the Institutions and laid down in the IMoU and MoU will be redefined in an amendment.

Suspended Membership of a period of less than 3 years can only be extended once to a total maximum period of 3 years.

If the Institution does not re-integrate at the end of the suspension period it may declare withdrawal from the Collaboration, otherwise ATLAS will start an exclusion procedure.

Annex 5.8

Exclusions of Institutions from ATLAS

It is the duty of the ATLAS management to inform the Collaboration Board about Institutions which are not fulfilling their commitments and obligations as specified in the IMoU and MoU. The commitments are not only of material nature, but concern also the active participation in the experiment.

The ATLAS management shall also inform in writing the representative of the Institution and its Funding Agency that the expected commitments are not being honored.

After a delay of six months following the written notification, the Collaboration Board may ultimately decide to exclude an Institution from the Collaboration, after due verification of the facts and after considering all circumstances.

Contributions already made to ATLAS shall remain part of ATLAS until completion of the experiment as specified in the General Conditions for Experiments at CERN.

Annex 5.9

Procedures for Admission of New Institutions

The Collaboration Board (CB) decides on admission of new Institutions to ATLAS. A positive decision is then forwarded to the Resource Review Board for endorsement. The conditions for Institutions joining after 1996 are described in the Collaboration Board Minutes (7-Mar-97) and in Annex 5.5

An Institution that wishes to join the ATLAS Collaboration sends an Expression of Interest (EoI) to the spokesperson. This EoI should include:

Current Institution members who wish to join;

Name of the team leader;

Field of interest in ATLAS;

The expected contribution to the project;

Expected development of team size during the ATLAS project;

The associated funding agencies.

The spokesperson informs the CB about the EoI, and a decision can be taken earliest at the subsequent meeting.

The spokesperson discusses the EoI with the relevant national contact physicist, relevant system project leaders and Institutions in the area in which the candidate Institution has expressed interest.

The spokesperson brings the EoI to the CB for decision when the future ATLAS activities of the Institution are clarified. The CB is notified in advance in such a case.

If the Collaboration Board admits the new Institution, the Resource Review Board is informed and its endorsement is requested.

Annex 6 : Participation of Institutes in ATLAS Sub-systems.

Funding Agency	Institute	Inner Det.	LAr Cal.	Tile Cal.	Muon cham.	Trigger /DAQ
Armenia	Yerevan			•		
Australia	Melbourne	•				
	Sydney U	•				
Austria	Innsbruck					•
Azerbaijan	Baku					
Belarus	Minsk AC			•		
	Minsk NC			•	•	
Brazil	Rio			•		
Canada	Alberta		•			•
	Carleton		•			
	Montreal		•			
	Toronto	•	•			
	TRIUMF		•			•
	Vancouver		•			
	Victoria		•			
China NSFC+MSTC	Chinese Cluster		•		•	
Czech Republic	Prague AS	•		•		•
	Prague CU	•		•		•
	Prague TU	•				
Denmark	Copenhagen	•				•
France IN2P3	Annecy		•			
	Clermont			•		
	Grenoble		•			
	Marseille	•	•			•
	Orsay		•			
	Paris		•			
France CEA	Saclay		•		•	
Georgia	Tbilisi AS + SU					
Germany BMBF	Bonn	•				
	Dortmund	•				
	Freiburg	•			•	
	Heidelberg					•
	Mainz		•			•
	Mannheim					•
	Munich LMU				•	
	Siegen	•				
	Wuppertal	•	•			
Germany MPI	Munich MPI	•	•		•	

Funding Agency	Institute	Inner Det.	LAr Cal.	Tile Cal.	Muon cham.	Trigger /DAQ
Greece	Athens TU				•	
	Athens U			•	•	
	Thessaloniki				•	
Israel	Haifa				•	•
	Tel-Aviv				•	•
	Weizmann				•	•
Italy	Cosenza				•	
	Frascati				•	
	Genova	•				•
	Lecce				•	•
	Milano	•	•			
	Naples				•	•
	Pavia				•	•
	Pisa			•		
	Rome I				•	•
	Rome II				•	•
	Rome III				•	•
	Udine	•				•
Japan	Fukui					
	Hiroshima IT					
	Hiroshima U	•				
	KEK	•			•	•
	Kobe				•	•
	Kyoto U					•
	Kyoto UE	•				
	Nagasaki					•
	Naruto					
	Okayama					•
	Shinshu				•	•
	Tokyo ICEPP				•	•
	Tokyo MU	•			•	•
	Tokyo UAT				•	
	Tsukuba	•				
Morocco	Morocco		•			
Netherlands	NIKHEF	•			•	•
	Nijmegen				•	
Norway	Bergen	•				
	Oslo	•				
Poland	Cracow INP	•				•
	Cracow FPNT	•				•
Portugal	Portugal			•		•
Romania	Bucharest			•		•

Funding Agency	Institute	Inner Det.	LAr Cal.	Tile Cal.	Muon cham.	Trigger /DAQ
Russia	Moscow ITEP		•			
	Moscow FIAN	•	•			
	Moscow MEPhI	•				
	Moscow SU	•				•
	Novosibirsk		•			•
	Protvino	•	•	•	•	•
	St Petersburg NPI	•			•	•
JINR	JINR	•	•	•	•	•
Slovak Republic	Slovakia		•	•		
Slovenia	Ljubljana	•				
Spain	Barcelona			•		•
	Madrid		•			
	Valencia	•		•		
Sweden	Lund	•				
	Stockholm KTH		•			
	Stockholm U			•		•
	Uppsala	•				
Switzerland	Bern					•
	Geneva	•	•			•
Taipei	Academica Sinica	•	•			
Turkey	Ankara					•
	Istanbul	•				•
United Kingdom	Birmingham	•				•
	Cambridge	•				
	Glasgow	•				
	Lancaster	•				
	Liverpool	•				•
	London QMW	•				•
	London RHBNC					•
	London UC	•				•
	Manchester	•				•
	Oxford	•				
	RAL	•				•
	Sheffield	•				•

Funding Agency	Institute	Inner Det.	LAr Cal.	Tile Cal.	Muon cham.	Trigger /DAQ
US DoE+NSF	Albany	•				
	Ann Arbor				•	
	Argonne			•		•
	Arizona		•			
	Arlington			•		
	Berkeley	•				
	Boston				•	
	Brandeis				•	
	Brookhaven		•		•	
	Chicago			•		
	Columbia		•			
	Duke	•				
	Hampton	•				
	Harvard				•	
	Indiana	•				
	Iowa SU	•				
	UC Irvine	•				•
	MIT				•	
	Michigan SU			•		•
	New Mexico	•				
	Northern Illinois				•	
	Ohio SU	•				
	Oklahoma	•				
	Philadelphia	•				
	Pittsburgh		•			
	Rochester		•			
	UC Santa Cruz	•				
	Dallas		•			
	Stony Brook		•		•	
	Tufts				•	
	Urbana			•		
	Seattle				•	
	Wisconsin	•				•
CERN		•	•	•	•	•

Annex 7 : ATLAS M&O Common Items (Category A)

The ATLAS Collaboration agrees to share cost of the following Common Items across the Collaboration in proportion to the number of authors (Category A):

A. Magnet System
Magnet controls
Magnet power supply
Cooling systems & fluids
Cryogenics (proximity, external)
Cryogenic fluids

B. TDAQ/DCS
Systems management
Computers / processors / LAN equipment
Detector controls
Electronics, pool rentals
Common desktop infrastructure
Power supplies
Cables, connectors, store items
Laboratory instruments
Software licenses

C. Technical Coordination activities
Gas systems, consumption
Cooling systems & fluids
Moving / hydraulic systems
Detector safety systems
Shutdown activities & general technical support
UPS maintenance
Control rooms equipment
Secretariat
Communications
Laboratory operations
General services (power, C&V, transport, survey etc.)
Outreach

Annex 8 : Deliverables (by Sub-detector/System) that are to be maintained and operated by individual Institutes or groups of Institutes.

8.1 Update of the ATLAS Detector Funding by Funding Agency (CORE MoU, in 1995 ATLAS MCHF)

revision October 24, 2001

Funding Agency	Inner Det.	LAr Cal.	Tile Cal.	Muon cham.	Trigger/ DAQ/con	Common Projects	Total
Armenia			0.1			0.1	**0.2**
Australia	1.4					1.1	**2.5**
Austria					0.3	0.3	**0.6**
Azerbaijan						0.1	**0.1**
Belarus						0.2	**0.2**
Brazil			0.1			0.1	**0.2**
Canada	0.1	8.4				6.6	**15.1**
China NSFC+MSTC		0.3		0.3		0.4	**1.0**
Czech Republic	0.5		0.5			0.6	**1.6**
Denmark	0.9				1.0	1.4	**3.3**
Finland						0.1	**0.1**
France IN2P3	2.1	17.8	2.1			17.0	**39.0**
France CEA		5.7		2.2		5.8	**13.7**
Georgia						0.1	**0.1**
Germany BMBF	7.9	3.2		2.5	4.7	14.2	**32.5**
Germany MPI	1.7	1.6		0.9		3.3	**7.5**
Greece				1.0		0.7	**1.7**
Israel				2.5	0.4	2.1	**5.0**
Italy	5.0	3.7	1.3	9.3	5.9	19.8	**45.0**
Japan	6.8			6.8	4.5	14.0	**32.1**
Morocco		0.2				0.1	**0.3**
Netherlands	1.8			3.0	0.9	6.7	**12.4**
Norway	2.4					1.8	**4.2**
Poland	0.4				0.2	0.4	**1.0**
Portugal			1.0		0.3	0.9	**2.2**
Romania			0.3			0.3	**0.6**
Russia	3.4	4.7	1.1	3.5		8.0	**20.7**
JINR	0.5	0.7	0.8	1.0	0.1	2.3	**5.4**
Slovak Republic		0.3				0.2	**0.5**
Slovenia	0.8					0.7	**1.5**
Spain	1.2	2.3	2.0			4.3	**9.8**
Sweden	3.1	1.5	0.9		0.6	4.7	**10.8**
Switzerland	4.9	1.1			4.0	8.5	**18.5**
Taipei NSC	1.0	0.7				1.3	**3.0**
Turkey					0.2	0.2	**0.4**
United Kingdom	13.1				5.9	15.0	**34.0**
US DoE + NSF	12.0	16.9	3.6	8.8	4.0	35.5	**80.8**
CERN	9.0	8.6	3.0	1.5	11.5	27.4	**61.0**
Total	80.0	77.7	16.8	43.3	44.5	206.3	**468.6**
Rev. CORE detector cost	78.5	80.0	15.2	42.5	45.9	208.7	**470.8**
Total - cost	1.5	-2.3	1.6	0.8	-1.4	-2.4	-2.2

Comment: A number of Funding Agencies have indicated possible additional contributions to the Common Projects

8.2 ATLAS Inner Detector funding and deliverables by funding agency (CORE MoU, in 1995 ATLAS MCHF)

revision October 24, 2001

Funding Agency	CORE value (MCHF)	Type of Deliverable						
		Mechanics,sensors,gas,cooling	Optics	Read-out electronics,boxes	Photodetectors	Front-End Electronics	Calibration	Voltage Suppliers
Armenia								
Australia	1.4	•						•
Austria								
Azerbaijan								
Belarus								
Brazil								
Canada	0.1						•	
China NSFC+MSTC								
Czech Republic	0.5	•						•
Denmark	0.9			•				
France IN2P3	2.1	•						
France CEA								
Georgia								
Germany BMBF	7.9	•						•
Germany MPI	1.7	•						•
Greece								
Israel								
Italy	5.0	•				•		•
Japan	6.8	•		•				
Morocco								
Netherlands	1.8	•		•		•	•	
Norway	2.4	•		•		•		
Poland	0.4	•		•				•
Portugal								
Romania								
Russia	3.4	•						
JINR	0.5	•						
Slovak Republic								
Slovenia	0.8	•		•				
Spain	1.2	•		•		•		
Sweden	3.1	•		•		•		
Switzerland	4.9	•				•		•
Taipei NSC	1.0		•	•				
Turkey								
United Kingdom	13.1	•		•		•	•	•
US DoE + NSF	12.0	•		•		•		
CERN	9.0	•		•		•	•	•
total	**80.0**							

8.3 ATLAS LAr Detector funding and deliverables by Funding Agency (CORE MoU, in 1995 ATLAS MCHF)

revision October 24, 2001

Funding Agency	CORE value (MCHF)	Type of Deliverable							
		Mechanics,sensors,gas,cooling	Optics	Read-out electronics,boxes	Photodetectors	Front-End Electronics	Calibration	Voltage Suppliers	Cryogenics & related
Armenia									
Australia									
Austria									
Azerbaijan									
Belarus									
Brazil									
Canada	8.4	•		•		•			
China NSFC+MSTC	0.3	•							
Czech Republic									
Denmark									
France IN2P3	17.8	•		•		•	•	•	•
France CEA	5.7	•		•		•	•		•
Georgia									
Germany BMBF	3.2	•		•			•		
Germany MPI	1.6	•		•		•		•	•
Greece									
Israel									
Italy	3.7	•				•			
Japan									
Morocco	0.2	•						•	
Netherlands									
Norway									
Poland									
Portugal									
Romania									
Russia	4.7	•		•			•		•
JINR	0.7	•					•		
Slovak Republic	0.3						•	•	
Slovenia									
Spain	2.3	•				•			
Sweden	1.5	•		•				•	•
Switzerland	1.1								
Taipei NSC	0.7					•		•	
Turkey									
United Kingdom									
US DoE + NSF	16.9	•		•		•		•	•
CERN	8.6	•		•		•	•	•	
total	**77.7**								

8.4 ATLAS Tile Calorimeter funding and deliverables by Funding Agency (CORE MoU, in 1995 ATLAS MCHF)

revision October 24, 2001

Funding Agency	CORE value (MCHF)	Type of Deliverable						
		Mechanics,sensors,gas,cooling	Optics	Read-out electronics,boxes	Photodetectors	Front-End Electronics	Calibration	Voltage Suppliers
Armenia	0.1	•	•					
Australia								
Austria								
Azerbaijan								
Belarus								
Brazil	0.1			•		•		
Canada								
China NSFC+MSTC								
Czech Republic	0.5	•	•		•			•
Denmark								
France IN2P3	2.1	•	•		•		•	•
France CEA								
Georgia								
Germany BMBF								
Germany MPI								
Greece								
Israel								
Italy	1.3	•	•		•			
Japan								
Morocco								
Netherlands								
Norway								
Poland								
Portugal	1.0	•	•	•	•			
Romania	0.3	•						
Russia	1.1	•	•		•		•	
JINR	0.8	•	•		•		•	
Slovak Republic								
Slovenia								
Spain	2.0	•	•	•	•		•	
Sweden	0.9		•	•	•			
Switzerland								
Taipei NSC								
Turkey								
United Kingdom								
US DoE + NSF	3.6	•	•	•	•	•		
CERN	3.0	•	•	•	•		•	•
total	**16.8**							

8.5 ATLAS Muon Spectrometer funding and deliverables by Funding Agency

(CORE MoU, in 1995 ATLAS MCHF)

revision October 24, 2001

Funding Agency	CORE value (MCHF)	Type of Deliverable						
		Mechanics,sensors,gas,cooling	Optics	Read-out electronics,boxes	Photodetectors	Front-End Electronics	Calibration	Voltage Suppliers
Armenia								
Australia								
Austria								
Azerbaijan								
Belarus								
Brazil								
Canada								
China NSFC+MSTC	0.3	•						
Czech Republic								
Denmark								
France IN2P3								
France CEA	2.2	•		•			•	
Georgia								
Germany BMBF	2.5	•		•				•
Germany MPI	0.9	•		•				•
Greece	1.0	•						
Israel	2.5	•						•
Italy	9.3	•		•		•		•
Japan	6.8	•				•		•
Morocco								
Netherlands	3.0	•		•			•	
Norway								
Poland								
Portugal								
Romania								
Russia	3.5	•		•				
JINR	1.0	•		•				
Slovak Republic								
Slovenia								
Spain								
Sweden								
Switzerland								
Taipei NSC								
Turkey								
United Kingdom								
US DoE + NSF	8.8	•		•		•	•	•
CERN	1.5	•						
total	**43.3**							

8.6 ATLAS TDAQ funding and deliverables by Funding Agency (CORE MoU, in 1995 ATLAS MCHF)

revision October 24, 2001

Funding Agency	CORE value (MCHF)	Type of Deliverable			
		Level-1 Trigger	Level-2 Trigger	DAQ & Event Filter	Detector Controls
Armenia					
Australia					
Austria	0.3			•	
Azerbaijan					
Belarus					
Brazil					
Canada					
China NSFC+MSTC					
Czech Republic					
Denmark	1.0		•	•	
France IN2P3					
France CEA					
Georgia					
Germany BMBF	4.7	•	•	•	
Germany MPI					
Greece					
Israel	0.4	•	•		
Italy	5.9	•	•	•	
Japan	4.5	•		•	
Morocco					
Netherlands	0.9		•	•	•
Norway					
Poland	0.2		•		
Portugal	0.3			•	
Romania					
Russia					
JINR	0.1			•	
Slovak Republic					
Slovenia					
Spain					
Sweden	0.6	•			
Switzerland	4.0			•	
Taipei NSC					
Turkey	0.2			•	
United Kingdom	5.9	•	•	•	
US DoE + NSF	4.0		•	•	
CERN	11.5	•	•	•	•
total	**44.5**				

Annex 9 : Category A Headings for ATLAS M&O Costs Categorisation

Detector related costs

- Magnet
- Magnet controls
- Magnet power supply
- Gas systems
- Gas consumption
- Cooling systems
- Cooling fluids (above -50°C)
- External cryogenics
- Cryogenic fluids (below -50°C)
- Moving / hydraulic systems
- Detector safety systems
- Shutdown activities
- General Technical support
- UPS maintenance
- Electronics pool rentals
- Beam pipe & vacuum
- Counting & control rooms

Secretariat

- Secretarial assistance
- Economat
- Fax, photocopiers, printers
- Printing and publication

Communications

- GSM phones / on-call service
- Automatic call-back

On-line computing (no recording media)

System management
Data storage, (temporary on disk)
Detector controls
Computers / processors / LANs
Software licenses
Common desktop infrastructure

Test beams, calibration facilities

General operation
Common electronics
Electronics pool rentals
Gas systems
Gas consumption
External cryogenics

Laboratory operations

Assembly areas, clean rooms
Workshops
Laboratory instruments

General services

Cooling & ventilation
Power
Power distribution system
Heavy transport
Cranes
Cars
Cleaning
Survey
Storage space
Common desktop infrastructure
Academic subsistence
Outreach

Annex 10

10.1 Category B Headings for ATLAS M&O Costs Categorisation

Mechanics

Gas-system

Cryo-system

Cooling system

Front-end electronics spares

Standard electronics
- Power supplies (low voltage, high voltage)
- Crates
- Read-out Modules

Controls
- Detector Control System
- Detector Safety System

Sub-Detector Spares

Areas
- Clean Rooms
- Storage Areas
- Workshops

Communications

Store Items

Manpower @ CERN
- Hired as Industrial Support (CHF)
- Technicians from Collaborating Institutes (FTE)

10.2 Participating Institutes per System (listed in the same order as in Annex 6)

Inner Detector

Melbourne, Sydney, Toronto, Prague AS, Prague CU, Prague TU, Copenhagen, Marseille, Bonn, Dortmund, Freiburg, Siegen, Wuppertal, Munich MPI, Genova, Milano, Udine,, Hiroshima U, KEK, Kyoto UE, Tokyo MU, NIKHEF, Bergen, Oslo, Cracow INP, Cracow FPNT, Moscow FIAN, Moscow MEPhI, Moscow SU, Protvino, Petersburg NPI, JINR, Ljubljana, Valencia, Lund, Uppsala, Geneva, Taipei, Birmingham, Cambridge, Glasgow, Lancaster, Liverpool, London QMW, London UC, Manchester, Oxford, RAL, Sheffield, Albany, Berkeley, Duke, Hampton, Indiana, Iowa SU, UC Irvine, Ann Arbor, New Mexico, Ohio, Oklahoma, Philadelphia, UC Santa Cruz, Wisconsin, CERN

Liquid Argon

Alberta, Carleton, Montreal, Toronto, TRIUMF, Vancouver, Victoria, Chinese Cluster, Annecy, Grenoble, Marseille, Orsay, Paris, Saclay, Mainz, Wuppertal, Munich MPI, Milano, Morocco, Moscow ITEP, Moscow FIAN, Novosibirsk, Protvino, JINR, Slovakia, Madrid, Stockholm KTH, Geneva, Taipei, Arizona, Brookhaven, Columbia, Pittsburgh, Rochester, Dallas, Stony Brook, CERN

Tile Calorimeter

Yerevan, Minsk AC, Minsk NC, Rio, Prague AS, Prague CU, Clermont, Pisa, Portugal, Bucharest, Protvino, JINR, Slovakia, Barcelona, Valencia, Stockholm U, Argonne, Arlington, Chicago, Michigan SU, Urbana, CERN

Muon System

Minsk NC, Chinese Cluster, Saclay, Freiburg, Munich LMU, Munich MPI, Athens TU, Athens U, Thessaloniki, Haifa, Tel-Aviv, Weizmann, Cosenza, Frascati, Lecce, Naples, Pavia, Rome I, Rome II, Rome III, KEK, Kobe, Shinshu, Tokyo ICEPP, Tokyo MU, Tokyo, UAT, NIKHEF, Nijmegen, Protvino, Petersburg NPI, JINR, Boston, Brandeis, Brookhaven, Harvard, MIT, Ann Arbor, Northern Illinois, Stony Brook, Tufts, Seattle, CERN

Annex 11 : Category C Headings for ATLAS M&O Costs Categorisation

General services

- Safety & radioprotection
- INB compliance
- Radioactive waste disposal
- Access system
- Elevators
- Gerant de site
- Flood control
- Insurance (CERN standard)
- Cleaning
- Office space

Annex 12 : Rules of Procedure for the M&O Scrutiny Group

12.1 The RRBs of the LHC experiments, acting together, shall appoint a Scrutiny Group to assist them in exercising their duties with respect to the oversight of M&O costs and the approval of M&O spending for the coming year. The Scrutiny Group has a technical role and shall be composed of six persons chosen appropriately by the RRBs acting jointly and four persons chosen by CERN. The Scrutiny Group shall perform its duties for all of the LHC Collaborations. The members chosen by the RRBs shall normally include at least one person from each of a large Member State, a small Member State, a large non-Member State and a small non-Member State.

12.2 In order to promote continuity in its deliberations, appointments to the Scrutiny Group shall normally be for two years, with the possibility of re-appointment. Half of the members chosen by the RRBs and half of those chosen by CERN will be replaced each year. In order to establish this rolling replacement, half of the initial members of the Scrutiny Group will serve for three years.

12.3 The names of new Scrutiny Group members for the current and following year will normally be settled at the spring meeting of the RRBs. For the members to be chosen by the RRBs, the RRB Chairperson will receive nominations. CERN will inform the RRBs of its choice of members. The RRBs will then appoint the Scrutiny Group members by consensus in plenary session.

12.4 The Scrutiny Group shall select its Chairperson from amongst the members chosen by the RRBs.

12.5 At his or her discretion, the Chairperson of the Scrutiny Group will accept that, in exceptional circumstances, a member is replaced at an individual meeting by a named proxy.

12.6 The Scrutiny Group will receive for scrutiny, normally at the spring meetings of the RRBs, the Collaborations' proposals concerning the level, provision and sharing of Category A M&O costs for the following year, along with their reported Category B costs and the proposed responsibilities and commitments for these. It will then carry out its scrutiny activities and will submit its reports for each experiment to the autumn meetings of the RRBs.

Annex 13 : Participants in the ATLAS Collaboration.

Participants in the ATLAS Collaboration holding PhD or equivalent qualifications, grouped by Funding Agency

Armenia

Yerevan Physics Institute, Yerevan
Grabsky V., Hakopian H.

Australia

Research Centre for High Energy Physics, Melbourne University, Melbourne
Moorhead G.F., Sevior M.E., Taylor G.N., Tovey S.N.

University of Sydney, Sydney
Gorfine G., Peak L.S., Varvell K.E.

Austria

Institut für Experimentalphysik der Leopold-Franzens-Universität Innsbruck, Innsbruck
Epp B., Ghete V.M., Girtler P., Kneringer E., Kuhn D., Nairz A., Rudolph G.

Azerbaijan

Institute of Physics, Azerbaijan Academy of Science, Baku
Abdinov O.B., Akhmedov A., Akhoundov A., Javadov N., Khalilzade F.T., Oussoubov Z., Rzayev H.J.

Republic of Belarus

National Centre of Particle and High Energy Physics, Minsk
Kuzhir P., Rumiantsau V., Shevtsov V., Starovoytov P.

Institute of Physics, National Academy of Sciences, Minsk
Bogush A.A., Kulchitsky Y., Kuzmin M.V., Satsunkevich I.S.

Brazil

Universidade Federal do Rio de Janeiro, COPPE/EE/IF, Rio de Janeiro
Caloba L.P., Dos Anjos A., Gomes R., Maidantchik C.L., Marroquim F., Seixas J.M., Thome Z.D.

Canada

University of Alberta, Edmonton
Armstrong W.W., Burris W., Davis R., Gingrich D. M., Hewlett J.C., Holm L., Macpherson A.L., Mullin S., Pinfold J.L., Schaapman J., Soukup J., Wampler L.

Department of Physics, University of British Columbia, Vancouver
Axen D.

University of Carleton/C.R.P.P., Carleton
Armitage J., Dixit M., Oakham G.

Group of Particle Physics, University of Montreal, Montreal
Azuelos G., Leroy C., Martin J.-P., Mazini R., Mehdiyev R.

Department of Physics, University of Toronto, Toronto
Bailey D.C., Joo K.K., Krieger P., Martin J.F., Orr R.S., Sinervo P.K., Trischuk W.

TRIUMF, Vancouver
Langstaff R., Losty M., Oram C., Stenzel H., Vetterli M., Wielers M.

University of Victoria, Victoria
Astbury A., Dobbs M., Fincke-Keeler M., Kanaya N., Keeler R., Lefebvre M., McPherson R., Poffenberger P., Sobie R.

CERN

European Laboratory for Particle Physics (CERN), Geneva
Amelung C., Anghinolfi F., Bachy G., Barberio E., Beltramello O., Belymam A., Benincasa G., Bergsma F., Bertinelli F., Blocki J., Bogaerts J., Bonneau P., Boonekamp M., Boxman E., Bremer J., Burckhart D., Burckhart H.J., Butin F., Capeans Garrido M., Cataneo F., Catinaccio A., Cernoch C., Cerutti F., Chevalley J.L., Cook J., Cwetanski P., Danielsson H., Davidek T., Dell'Acqua A., Di Girolamo B., Dittus F., Dobinson R., Dobson M., Dolgetta N., Drevermann H., Dudarev A., Dydak F., Eklund L., Ellis N., Elsing M., Farthouat P., Fassnacht P., Foussat A., Francis D., Froidevaux D., Gadomski S., Gianotti F., Godlewski J., Golonka P., Gonidec A., Goossens L., Gorini B., Grenier P., Grosse-Knette J., Gruwe M., Hahn F., Haider S., Hallgren B., Hansen J., Hatch M., Haug F., Hauser R., Hawkings R., Henriques A., Hervas L., Hooton I., Hott T., Hruska I., Inigo-Golfin J., Jarron P., Jenni P., Jones R., Kaplon J., Kersevan B., Klioutchnikova T., Knezo E., Konstantinidis N., Kotamäki M., Kubischta W., Lacour D., Lacourt A., Lasseur C., Lehmann G., Letheren M., Lichard P.,.Liko D., Mapelli L., Martin B., Maugain J.-M., McLaren R.A, Menot C., Miele P., Mitsou V., Mladenov D., Mornacchi G., Nagano K., Nassakiou M., Nessi M., Nicquevert B., Niinikoski T., Nordberg M., Nyman T., Pailler P., Palestini S., Papadopoulos I., Parkman C., Passardi G., Passmore M., Pernegger H., Petersen J., Placci A., Pommès K., Poppleton A., Poulard G., Price M., Rembser C., Roe S., Rohne O., Romaniouk A., Ruggiero G., Sbrissa E., Schinzel D., Schmid P., Schmuecker H., Schoerner T., Schricker A., Schuh S., Schuler G., Spiwoks R., Stavrianakou M., Szczygiel R., Szeless B., Ten Kate H., Tremblet L., Trigger I., Valls Ferrer J., Van der Bij H., Varela F., Voss R., Wallny R., Weilhammer P., Wells P., Wengler T., Werner P., Wicke D., Witzeling W., Wotschack J.

China

Institute of High Energy Physics, Academia Sinica, Beijing, University of Science and Technology of China, Hefei, University of Nanjing and University of Shandong
Chen T-Y., Feng C.F., He M., Jin J., Jin S., Ma J.M., Ouyang Q., Ping J.L., Qi M., Tong G.L., Xie Y.G., Xu G.F., Yu X.Q., Zhang X.Y.

Czech Republic

Academy of Sciences of the Czech Republic, Institute of Physics and Institute of Computer Science, Prague
Bohm J., Hruska I., Lokajicek M., Nemecek S., Sicho P., Stastny J., Tomasek L., Vrba V., Weichert J., Zitek K.

Charles University in Prague, Faculty of Mathematics and Physics, Prague
Dolejsi J., Dolezal Z., Kodys P., Leitner R., Suk M., Tas P., Valkar S., Wilhelm I.

Czech Technical University in Prague, Prague
Jakubek J., Pospisil S., Sinor M., Sodomka J., Solar M., Sopko B., Stekl I.

Denmark

Niels Bohr Institute, University of Copenhagen, Copenhagen
Dam M., Hansen J.D., Hansen J.R., Hansen P., Muresan R., Nilsson B.S., Wäänänen A.

France

Laboratoire d'Annecy-le-Vieux de Physique des Particules (LAAP), IN 2P3-CNRS, Annecy-le-Vieux
Abdesselam A., Aubert B., Colas J., Di Ciaccio L., Ghez Ph., Gouanère M., Ionescu G., Jérémie A., Lafaye R., Massol N., Perrodo P., Poggioli L., Przysiezniak H., Sauvage G., Wingerter-Seez I., Zolnierowski Y.

Universite Blaise Pascal, IN2P3-CNRS, Clermont-Ferrand
Calvet D., Grenier P., Gris Ph., Guicheney Ch., Martin F., Montarou G., Pallin D., Podlyski F., Santoni C., Says L.P., Vazeille F.

Institut des Sciences Nucléaires de Grenoble, IN2P3-CNRS-Université Joseph Fourier, Grenoble
Collot J., Dzahini D., Gallin-Martel L., Hostachy J.Y., Ledroit F., Martin Ph., Ohlsson-Malek F.,

Centre de Physique des Particules de Marseille, IN2P3-CNRS, Marseille
Bee C., Benchouk C., Delpierre P., De Vivie De Regie J.-B., Djama F., Etienne F., Henry-Couannier F., Koudobin V., Monnier E., Pralavorio P., Qian Z., Rozanov A., Sauvage D., Tisserant S., Touchard F.

Laboratoire de l'Accélérateur Linéaire, IN2P3-CNRS, Orsay
Arnault C., Auge E., Bourdarios C., De la Taille C., Fayard L., Fournier D., Hrivnack J., Parrour G., Perus A., Puzo P., Rousseau D., Schaffer A-C., Serin L., Veillet J.-J., Wicek F., Zerwas D.

LPNHE, Universités de Paris VI et VII, IN2P3-CNRS, Paris
Ferrag S., Hubaut F., Laforge B., Nikolic-Audit I., Schwemling F.

CEA, DSM/DAPNIA, Centre d'Etudes de Saclay, Gif-sur-Yvette
Bauer F., Besson N., Bonnekamp M., Chalifour M., Chevalier L., Durand D., Ernwein J., Ferrer-Ribas E., Formica A., Guyot C., Hansl-Kozanecka T., Laporte J.F., Mansoulié B., Meyer J.P., Nikolaidou R., Ponsot P., Schuller J.P., Schune Ph., Schwindling J., Virchaux M., Zaccone H.

Republic of Georgia

Institute of Physics of the Georgian Academy of Sciences and Tbilisi State University, Tbilisi
Chikovani L., Djobava T., Grigalashvili N., Grigalashvili T., Khubua J., Tavkhelidze A., Tskhadadze E.

Germany

Physikalisches Institut, Universität Bonn, Bonn
Dietsche W., Eyring A., Fischer P., Geich-Gimbel C., Gross S., Huegging F., Klasen V., Kobel M., Kokott T., Martinez G., Ockenfels W., Peric I., Quadt A., Runolfsson O., Schumacher M., Wermes N.

Institut für Physik, Universität Dortmund, Dortmund
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Annex 14 : Non-Member States for which CERN will partially pay the energy costs

14.1 CERN will partially pay the energy costs for the following CERN Non-Member States by virtue of their contributions to the construction of the LHC machine.

1. Canada
2. India
3. Japan
4. Russian Federation
5. United States of America

14.2 Under a co-operation agreement Israel contributes to CERN 20% of the amount that would normally be expected of it as a Member State. The further provisions of this co-operation agreement on the use of these funds lead to the conclusion that CERN should pay 16% of the energy costs for this country.

Annex 15 : Formula used for determining the sharing of the CERN payment of energy costs amongst the eligible non-Member States.

M_i = contribution to the LHC machine of country *i*

M_{MS} = contribution to the LHC machine of CERN Member States taken together

M_{NMS} = contribution to the LHC machine of the non-Member States listed in Annex 1.1 taken together

G_i = GDP of country *i* (see explanatory note below)

A_i = category A costs for country *i*

E_{MS} = energy costs of the Member States together

E_{NMS} = energy costs of the non-Member States listed in Annex 14.1 taken together

E_i = Energy costs attributable to country *i*

The CERN share $E_{NMS(CERN)}$ of E_{NMS} is determined by the LHC machine contribution of these countries relative to the contribution of the CERN Member States, i.e.

$E_{NMS(CERN)} = E_{NMS} . M_{NMS} / M_{MS}$

Beyond this, the algorithm used for sharing amongst the eligible non-Member States is:

$\mathbf{E_i = k . (M_i / G_i). A_i}$ where $k = E_{NMS(CERN)} / \sum_{NMS}((M_i / G_i).A_i)$

Explanatory note on the calculation of GDPs

The Gross Domestic Products to be taken into account in preparation for the decision in the autumn of year *n* on the payment of energy costs by CERN in year *n+1* to contributing non-Member States are those for the years of LHC construction (1996-2006). Thus initially the averaged Gross Domestic Product in Swiss francs for each contributing non-Member State is calculated as described in the following two paragraphs.

1. The Gross Domestic Product (GDP) in US Dollars of each contributing non-Member State for the years 1996 to *m*, the last year available ($m \leq n-1$), is obtained from the

document "International Financial Statistics" published by the International Monetary Fund (IMF), Washington DC.

2. An average of the resulting data for each contributing non-Member State is calculated by the application of the following formula :

$$(GDP_{1996} + GDP_{1997} + ... + GDP_{m}) / (m\text{-}1996+1)$$

When *m* reaches 2006, the averaged GDP for the country in question will cover the whole period of LHC construction and will then be used unchanged in subsequent years.

Annex 16 : Procedure for the payment of Category A contributions

For Category A expenses, CERN will issue, each calendar year, on the basis of the agreed costs and sharing, invoices in Swiss francs to the Funding Agencies of the various Institutes for payment during that year; any necessary adjustments will be made and taken into account in the following year. Payment of 50% of the amount invoiced will be due not later than 10 February and the remaining 50% not later then 10 June. Advance payments are encouraged. The RRB will be informed at its autumn meeting each year of the interest gained or lost by the Collaboration.

The European Organization for Nuclear Research (CERN)

and

_____

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

Done in Geneva

on_____

For CERN

_____

Roger Cashmore
Director of Research

Done in _____

on_____

For

_____

ATLAS