# Addendum No. 1

### to the

# Memorandum of Understanding

## for Maintenance and Operation of the ATLAS Detector

# Core Computing

# Preamble

(a) Whereas, in its Article 3.1, the Memorandum of Understanding for the Maintenance and Operation of the ATLAS Detector[1] (hereinafter referred to as the M&O MoU) specifies that software and computing will be treated in a separate Memorandum of Understanding, it has now been decided to proceed as follows.

(b) The software development and maintenance of many products of use to more than one experiment and the provision of offline computing infrastructure are addressed by the Memorandum of Understanding for Collaboration in the Deployment and Exploitation of the LHC Computing Grid[2].

(c) The development of detector-specific software (such as that for simulation, reconstruction and analysis) and software for physics analysis is considered to be an integral part of the research activities of the scientists in the ATLAS Collaboration and is therefore not subject to any Memorandum of Understanding.

(d) All other aspects of the experiment-specific Core Computing, in particular the contributions from the ATLAS Collaboration to the ATLAS Core Computing development, maintenance and support are addressed in the present Addendum to the M&O MoU, in recognition of the operational character of the ongoing development effort required during the life of the Collaboration.

# Article 1: Annexes

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

# Article 2 : Parties to this Addendum

2.1   The Parties shall be as for the M&O MoU, namely all the Institutes of the ATLAS Collaboration (as listed in the currently valid Annex 1 of that document) and their Funding Agencies, and CERN as the Host Laboratory.

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

# Article 3 : The ATLAS Core Computing

3.1   The scope of the Core Computing for the Collaboration is defined in Annex A1 and is hereinafter referred to as "the Activities".

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[1] CERN-RRB-2002-035
[2] CERN-C-RRB-2005-01

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## Article 4 : Responsibilities of the Institutes for the Activities

4.1     The Activities are described in a Work Breakdown Structure (WBS), outlined in Annex A2.

4.2     From the Institutes listed in the currently valid Annex 1 of the M&O MoU, those participating in the Activities are listed in Annex A3.  The Collaboration shall update Annex A3 annually to reflect the situation on 1 January of the current year.

4.3     Resources necessary for Software Infrastructure services items are funded by the entire Collaboration as  M&O Category A and/or on a voluntary basis through M&O Category B items.

4.4     Annex A4 shows the detailed WBS of the Category A tasks.

4.5     The Institutes listed in Annex A3 have, on a voluntary basis, committed resources towards the Activities.  These WBS items, shown in Annex A5, therefore constitute M&O Category B items.

## Article 5: Procedure

5.1     The sharing of responsibilities for the Activities shall be subject to the same scrutiny and approval procedure as other M&O items, as described in Article 10 of the M&O MoU.  To this end, Annex A5 shall be updated by the Collaboration annually in time for the spring meeting of the RRB.

## Article 6 : Intellectual Property Rights

6.1     Rights to contribute pre-existing software:   Members of the Collaboration contributing pre-existing software to the Collaboration shall ensure that they have, or that they have procured, the rights to contribute such software and that its use (which term in this article shall include any modification, enhancement, integration in other software or redistribution, but exclude use for commercial purposes) by the Members of the Collaboration in accordance with the terms of this Addendum, including the terms of this article, is in conformity with the legal provisions which apply to the use of such software .

6.2     Rights to contribute created software:  Members of the Collaboration having created software in the execution of this Addendum shall ensure that they have, or that they have procured, the rights to contribute such software for use by the Members of the Collaboration for the purpose of the execution of this Addendum.

6.3     Granting of license:  Each Member of the Collaboration contributing pre-existing software to the Collaboration or creating software in the execution of this Addendum ("the software") herewith grants the other Members of the Collaboration the right to use the software for their own scientific purposes,

including their participation in the ATLAS Experiment, as well as the right jointly, that is, through the Collaboration, to make the software publicly available, under an open source license in accordance with the terms defined in paragraph 6.4 hereunder.

6.4     Such license:

6.4.1   shall stipulate that copyright in the software is vested in the contributing Member of the Collaboration and that it may include voluntary contributions;

6.4.2   shall permit the installation, use, reproduction, display, modification and redistribution of the software, with or without modification, it being understood that any such redistribution, shall reproduce the above copyright notice and these license conditions, and acknowledge the Collaboration in the user documentation and/or the software;

6.4.3   shall stipulate that any licensee publishing or distributing any modifications, enhancements or derivative works of the software without contemporaneously requiring users to enter into a separate written license agreement shall be deemed to have published or distributed such modifications, enhancements or derivative works under the conditions defined in this paragraph;

6.4.4   shall stipulate that the Members of the Collaboration provide no warranties or representations and accept no liability of any kind with respect to the software.

6.5     Except as provided elsewhere in this article, including in paragraphs 6.1 and 6.2 above, the Members of the Collaboration provide no warranties or representations of any kind with respect to the software to each other. They shall have no liability to each other with respect to the software, it being understood that each Member of the Collaboration shall bear the consequences of its own use of the software.


# Article 7: Final Provisions

7.1     This Addendum is not binding on the Parties, it being understood however that the success of the ATLAS Collaboration depends on all Collaboration members adhering to its provisions.

**Annex A1 : ATLAS Core Computing (the Activities)**

1.1     The ATLAS Computing Coordination has responsibility for the processing of event and non-event data, from the online environment to providing the environment and the tools for Physics analysis. It also covers the various Grid applications developments required by ATLAS and important contributions to the LCG project common software activities.

        Several areas of software development are shared with other ATLAS systems. For example: the tuning of the Athena framework for online use (Level-2 and Event Filter) is shared with the Trigger and Data Acquisition (TDAQ) project; the alignment, calibration, detailed simulation and detector-level reconstruction procedures with the detector systems; and the combined reconstruction and analysis tool developments with the Physics working groups. In contrast, the Core Computing Project deals with the development and deployment of the software and computing environment, which together enable the detector and analysis code to be run, as described in clause (c) of the preamble to this addendum.

1.2     The scope of the ATLAS Core Computing Project covered by this addendum is defined as the development and maintenance of the experiment software framework and databases, the documentation and web, the software infrastructure, visualisation, and the production tools. It also includes ATLAS software distribution and support and its interfacing to the Grid and LCG software. Some areas of the project are shared with the ATLAS DAQ and HLT project.

1.3     The Core Computing has the following responsibilities:

- Design, prototyping, deployment, maintenance, and documentation, of the software framework and infrastructure.

- Support for the possible central database services not provided by CERN.

- First line support and distribution of all software produced. Detailed questions may need to be reported to the original authors or current maintainer of the software.

- Development of a computing model and its validation in series of Data Challenges. These are executed in collaboration with DAQ and HLT. These challenges imply organisation and operation of large-scale testing of prototypes of increasing complexity, for the distributed production of simulated data and the subsequent reconstruction and analysis of these data.

- Provision of continuously operational software enabling the physicists to assess the functionality of the framework toward the final goal of extracting physics from the data.

- Integration of Grid systems into the ATLAS software framework and the provision of interfaces.

- Operation of central and distributed data processing activities for real and simulated data.

- Liaison with the LCG project and with the regional centres providing the computing resources for ATLAS.

- Preparation of the ATLAS Software and Computing TDR describing the ATLAS Computing model.

- Review of the ATLAS computing resource planned needs.

- Provision to the Collaboration of the necessary justification of the present and planned computing needs to support the negotiation with the funding agencies to obtain the computing resources.

- Preparation and update of the multi-year resource planning.

- Review of the resources actually used by the collaboration.

- Relations with the LCG project management.

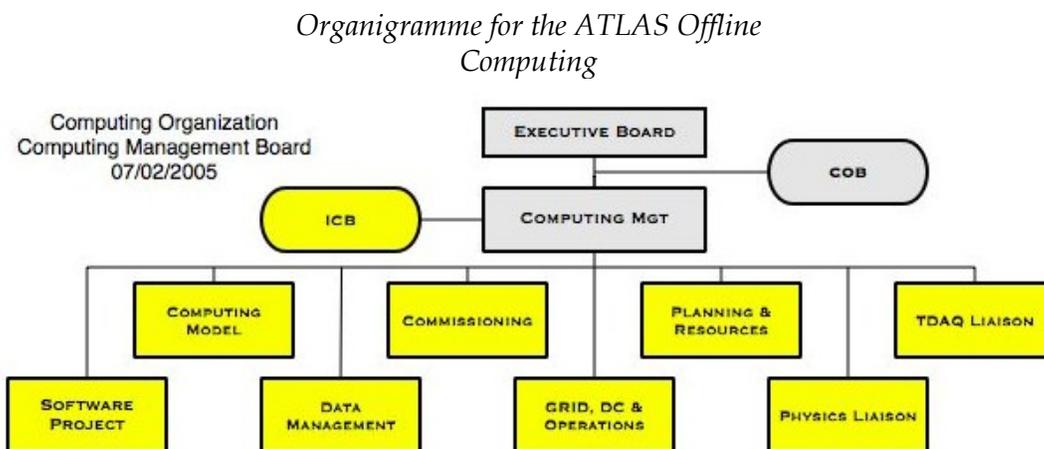*Organigramme for the ATLAS Offline Computing*



**Figure 1: The top-level organisation of the ATLAS Core Computing project. The M&O costs arise essentially in the Software Project, Data Management and Operations.**

The Core Computing project is organized in a similar way to the detector construction systems of ATLAS, in that a group of institutions in ATLAS, backed by their funding agencies, have agreed on how to partition the responsibilities. The present top-level structure is reflected in Figure 1. The ATLAS Computing Coordination (CCn) is lead by a Computing Coordinator, who takes the strategic overview and is the principle representative of the ATLAS CCn to external bodies. The candidate Computing Coordinator is selected by the Spokesperson with the aid of a search committee. He then proposes the selected candidate to the overall ATLAS Collaboration Board for endorsement. The Computing Coordinator has primary responsibility for all ATLAS offline computing. The same mechanism is also used to appoint a Software Project Leader, who oversees the technical delivery of the project and the overall architecture. Both are members of the ATLAS

Executive Board, and form the Computing Oversight Board, along with the Spokesperson, the Deputy Spokespersons, the Physics Co-ordinator and the TDAQ Project Leaders.

The issues of computing resources and the interaction between CERN and the worldwide computing infrastructure are considered by the ATLAS International Computing Board (ICB), on which sit representatives of all Funding Agencies within the ATLAS project. It elects its own Chair from its membership.

The computing management will annually provide a list of tasks in Category A and Category B with a description and job profile. For the autumn Collaboration meeting the International Computing Board (ICB) will review these tasks required for the Core Computing, and the estimated costs associated with each task; the recommendations of the ICB will be presented to the Collaboration Board for comment and modification or approval. The Collaboration Board can refer the estimates back to the ICB for further consideration. In parallel, the ICB will review the computing resource estimates for the coming year and the forecast of needs for the subsequent two years; the recommendations will be passed onto the Collaboration Board. The projected Category A and B estimates will also be passed to the ATLAS Resources Review Board in the spring in order to set the approved level for the following year.

1.4　　There will be small contributions in Category A to allow a few central servers and build & test machines to be provided to the Core Computing project and to cover telecommunications costs. These will be costed using the agreed cost of hardware at CERN at the time. For the Category B tasks outlined in Annex 2, the necessary effort will be found by a voluntary commitment of collaborating institutes. In case of a shortfall of computing resources an additional call for voluntary contributions will be made.

## Annex A2 : ATLAS outline decomposition of  Activities

M&O Category A Items

| | |
|---|---|
| **1.2** | **Software Project** |
| 1.2.9.1 | Central Computing Environment |
| 1.2.9.2 | User Support |
| 1.2.9.3 | Software Process Service |
| **1.4** | **Computer Operations** |
| 1.4.2 | Production Operations |

M&O Category B Items

| | |
|---|---|
| **1.1** | **Computing Coordination/Management** |
| **1.2** | **Software Project** |
| 1.2.1 | Software Project Coordination/Management |
| 1.2.7 | Simulation Software |
| 1.2.8 | Core Services |
| 1.2.9 | Infrastructure |
| 1.2.10 | Event Selection, Reconstruction and Analysis Tools |
| **1.3** | **Data Management** |
| **1.4** | **Computer Operations** |
| 1.4.1 | Grid; Data Challenges & Operation |
| 1.4.3 | Tools and Services |
| 1.4.4 | Management |
| **1.5** | **Collaborative Tools** |

## Annex A3 : Institutes participating in the Activities

*The following uses the short forms for institutes set out in Annex 1 of the* ATLAS *M&O MoU and the full addresses are to be found in Annex 13 of the same document.*

| Institute |
| :---: |
| |
| Melbourne |
| Rio |
| Alberta, Montreal, Simon Fraser, TRIUMF, Victoria |
| CERN |
| Prague AS, Prague CU |
| Copenhagen |
| Annecy, Grenoble, Marseille, Orsay |
| Saclay |
| Mainz, Munich LMU |
| Weizmann |
| Genova, Milano, Pavia, Roma I, Roma III |
| Nijmegen |
| Oslo |
| Portugal |
| Protvino |
| Barcelona, Valencia |
| Lund, Uppsala |
| Geneva |
| Taipei |
| Birmingham, Cambridge, Glasgow, Lancaster, London QMW, Sheffield, London RHBNC, London UC |
| Arlington, Argonne, Berkeley, Boston, Brookhaven, Indiana, Michigan, Pittsburgh, Wisconsin |

## Annex A4 : Details of Category A tasks

| 1.2.9 Infrastructure & Services | 1.2.9.1 Central Computing Environment | 1.2.9.1.1 Standard Operating System/Grid Environment |
| | | 1.2.9.1.2 Dedicated developer platforms and general desktop support and operations |
| | | 1.2.9.1.3 Database administration |
| | | 1.2.9.1.3 Platform and compiler validation and support |
| | | 1.2.9.1.4 WWW server, collaboration DB, document storage |
| | | 1.2.9.1.5 Support of videoconferencing, email lists, news, calendar, agendas |
| | 1.2.9.2 User support | 1.2.9.2.1 Help-desk system and staff |
| | | 1.2.9.2.2 User and resource administration at CERN and Grid virtual organisation |
| | | 1.2.9.2.3 Computing and software documentation and training |
| | 1.2.9.3 Software Process Service | 1.2.9.3.1 Software repository management, access rights and mirroring |
| | | 1.2.9.3.2 Configuration management, tag collection, software releases, nightly builds |
| | | 1.2.9.3.3 Software packaging and offsite installation and testing |
| | | 1.2.9.3.4 Software quality: code/dependency checking, regression/integration testing, bug-tracking, performance |
| 1.4.2 Production | 1.4.2.2 Production Operations | 1.4.2.2.2 Central Support for Production Tools |
| | | 1.4.2.2.3 Central production operations, request and resource management |
| | | 1.4.2.2.4 Integrating productions including error correction, catalogue publishing |

## Annex A5 : Details of Category B tasks

| WBS | |
|---|---|
| 1.1<br>Core<br>Computing<br>Management | |
| 1.2<br><br>Software<br>Project | 1.2.1<br>Software Project Management |
| | 1.2.7<br>Simulation |
| | 1.2.8<br>Core Software |
| | 1.2.10<br>Event Selection, Reconstruction & Analysis<br>Tools |
| 1.3<br>Data<br>Management | |
| 1.4<br>Computer<br>Operations | 1.4.1+1.4.4<br>Grid and DC Operations, Management |
| | 1.4.3<br>Tools & Services |
| 1.5<br>Collaborative<br>Tools | |

## The European Organization for Nuclear Research (CERN)

and

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declare that they agree on the present Addendum to the Memorandum of Understanding for Maintenance and Operations of the ATLAS Detector.

Done in Geneva                              Done in _____

on_____                       on_____

For CERN                                     For

_____                    _____
 Jos Engelen
 Chief Scientific Officer

**ATLAS**