

Memorandum of Understanding

between

Brookhaven National Laboratory

and

The U.S. ATLAS Project Office

for Fiscal Year FY 2002

October 16, 2001

3 Introduction

This Memorandum of Understanding describes the collaboration by members of Brookhaven National Laboratory (BNL) in the ATLAS Project in the United States. The purpose of this collaboration is the design, fabrication, operation and scientific exploitation of the ATLAS Detector. The detector is described in the ATLAS Technical Proposal, December 15, 1994, the Technical Design Reports, and subsequent technical documents elaborating that design. The contribution of the U.S. ATLAS Collaboration to the ATLAS Detector Project was described in the U.S. ATLAS Project Management Plan, Revised (PMP) (U.S. ATLAS 99-20), and the U.S. ATLAS Physics and Computing Project Management Plan (U.S. ATLAS 02-XX).

It is understood that successful collaboration in design, implementation and operation of the ATLAS Physics and Computing Project requires execution of a clear management plan for ATLAS. In the U.S., the U.S. ATLAS Project Management Plans are the basis for meeting this requirement and are accepted as part of this memorandum. The U.S. ATLAS project management infrastructure (U.S. ATLAS Project Office) resides at Brookhaven National Laboratory, and the responsibility for U.S. ATLAS project management resides in the U.S. ATLAS Project Manager (PM), reporting to the BNL Associate Director for High Energy and Nuclear Physics and to the Joint Oversight Group of the DOE and NSF. This work is in accord with the Memorandum of Understanding for the construction of the ATLAS Experiment between CERN and the Institutions/Funding Agencies of the ATLAS collaboration which is under the International Cooperation Agreement between CERN and the U.S. Department of Energy and the U.S. National Science Foundation concerning Scientific and Technical Cooperation on Large Hadron Collider Activities (1997) and the Experiments Protocol.

This Memorandum of Understanding describes the anticipated funding from the DOE and/or NSF, together with the long-term contributions of Brookhaven National Laboratory to the design, construction and operation of the ATLAS Physics and Computing Project. It is understood that the anticipated contributions of Brookhaven National Laboratory may later be modified or that additional responsibilities may be added to those described here.

An annual Amendment to this MOU will detail the contributions of Brookhaven National Laboratory as the Physics and Computing Project proceeds and will contain the specific activities, deliverables and funding required. The normal period of performance will be the U.S. fiscal year (October 1-September 30). It is understood that shortfalls in funding will result in reduced deliverables.

This Memorandum of Understanding is made between Brookhaven National Laboratory and U.S. ATLAS Project Manager (PM). It does not constitute a legal contractual obligation on the part of either of the parties. It reflects an arrangement that is currently satisfactory to the parties involved. The parties agree to negotiate amendments to this memorandum as required to meet the evolving requirements of the ATLAS research and development and Physics and Computing program.

This particular MOU is made to provide details of the work agreed to between the parties covering the specific period of performance from October 1, 2001 through September 30, 2002. It is subject to all the points of agreement and conditions in the current version of the parent Memorandum and the current version of the U.S. ATLAS Project Management Plan.

2. Personnel

2.1. List of Scientific Personnel

Participating scientists with anticipated fraction of their research time committed to ATLAS during this period of performance are:

Name	ATLAS Fraction	Other Research Commitments/Comments
Torre Wenaus	100%	None
Hong Ma	100%	None
Srini Rajagopalan	100%	None

2.2. Collaboration Board Representative

David Lissauer is the present representative of Brookhaven National Laboratory on the U.S. ATLAS Collaboration Board.

2.3. List of Technical Personnel

Participating technical personnel with the anticipated fraction of their time committed to ATLAS during this period of performance and their source(s) of support are:

Computing Professionals

Name	ATLAS Fraction	Source of Support
David Adams	100%	LDRD, PPDG
Wensheng Deng	100%	LDRD, PPDG
Valeri Fine	50%	Project
Yuri Fisyak	40%	Project
Pavel Nevski	80%	Project, PPDG
Victor Perevoztchikov	30%	Project, PPDG
Alex Undrus	100%	Project
Pending Hire	100%	Project, PPDG

2.4. Other Key Personnel

The officer for Brookhaven National Laboratory responsible for compliance with applicable ES&H policies associated with ATLAS participation by this institution is currently Environmental Safety Officer, R. Gill of Brookhaven National Laboratory. The Quality Assurance officer for the Physics Department of Brookhaven National Laboratory currently responsible for QA compliance of tasks performed by this institution is M. Garber of Brookhaven National Laboratory. The Cyber Security officer is C. Sadler and the head of networking is S. Bradley.

3. Design, Development, Deployment and Support Responsibilities

3.1. Design, Development, Deployment and Support for this Period of Performance

3.1.1 *Effort*

3.1.1.1 *Effort paid From U.S. ATLAS Project Funds:*

WBS (L5)	Description	FTE
2.2.1.3	Database	.8
2.2.1.4	Event	.5
2.2.2.1	Offline infrastructure	.6
2.2.4.1	Software librarian	.8
2.2.4.2	Software help desk	.1
2.2.4.6	Software QA/QC tools and infrastructure	.2

3.1.1.2 *Effort: From Outside Funding:*

WBS (L5)	Description	Source	FTE
2.2.1.10	Distributed data management and processing software	PPDG	1.0
2.2.1.10	Distributed data management and processing software	LDRD	1.5

3.1.1.1 *Effort paid From BNL base program:*

WBS (L5)	Description	FTE
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2.2.1.3	Database	.1
2.2.1.4	Event	.5
2.2.1.10	Distributed data management and processing software	.3
2.2.2.4	Liquid Argon Calorimeter software	1.5
2.2.2.6	Muon Spectrometer software	.3
2.4.1	Coordination and planning	.3

3.1.1 Hardware

No hardware deployment is funded during the period of this agreement.

3.1.2 Maintenance and Licenses

No maintenance and licenses are funded during the period of this agreement.

3.2. Coordination and Reporting

The U.S. ATLAS L2 Software Manager is Torre Wenaus. The L2SM will coordinate efforts among project subtasks, prepare quarterly reports on progress and performance, and do the financial (FTE) and progress (percent complete) reporting using input from subtask managers.

3.3. Collaboration with Other Groups and Institutions

Design, development and deployment of ATLAS software projects undertaken in whole or in part by BNL will be carried out in close communication and collaboration with other groups inside and outside ATLAS working in the same and related areas.

WBS / Task	Collaboration Group	Responsibility with Brookhaven National Laboratory
2.2.1.3 / Database	ANL, Int'l ATLAS	Shared development effort in event database
2.2.1.4 / Event	LBNL	Shared development effort in event model
2.2.1.10/Distributed data management	ANL, Int'l ATLAS, PPDG	Shared development effort in distributed data management (grid software)
2.2.2.1 / Offline infrastructure	Int'l ATLAS	Shared development effort in simulation infrastructure. Simulation coordination.

4. **Contribution of Effort, Services and Equipment**

4.1. Effort

Subject to adequate funding by DOE, Brookhaven National Laboratory will provide support for the scientific and technical personnel as indicated in section 2 during this period of performance.

4.2. Services

The services of the Brookhaven National Laboratory Purchasing, Expediting, and Receiving Departments and the Administrative Staff will be available to the ATLAS project to the degree required to carry out the responsibilities of Brookhaven National Laboratory.

4.3. Facilities and Equipment

The following Brookhaven National Laboratory facilities and equipment will be made available to the ATLAS project to the degree necessary to carry out the responsibilities of the group:

Offices for Computing Professionals

4.4. Operating Costs

Brookhaven National Laboratory, subject to adequate base program funding from DOE, will support the normal research operating expenses (such as physicists' salaries, travel expenses, miscellaneous supplies, administrative support, etc.) of the Brookhaven National Laboratory group working on the ATLAS project. These normal operating expenses are not considered as part of the ATLAS Physics and Computing Project cost estimate. However, all expenses for project-supported Computing Professionals are expected to be provided by the ATLAS Project.

5. **Costs and Funding**

An amount of \$xxxK will be needed for the period 1 October 2001 - 30 September 2002 to cover work described above. **I need the current correct software FTE cost breakdown from Bob, correcting the estimate I sent around recently.**

6. **Administration**

6.1. Method of Funding Transfers and Purchasing

The expenditures by Brookhaven National Laboratory are to be covered by funds provided by DOE, upon the allocation decision of the U.S. ATLAS PM. Funds to cover work described in this document will be provided directly to Brookhaven National Laboratory by the DOE.

6.2. Procurement Authorization

Major procurements (currently \$100k) must have the written authorization of the U.S. ATLAS PM. No such procurements are planned.

6.3. Reporting to U.S. ATLAS Project Management

All reporting to ATLAS project management will be in accordance with the procedures defined in U.S. ATLAS Physics and Computing Project Management Plan (U.S. ATLAS 02-XX)

Brookhaven National Laboratory will report quarterly to the U.S. ATLAS Project Office the expenditure of U.S. ATLAS Project funds related to the Software Project, including labor charges and travel. The reports will cover all items.

Technical progress will be reported by WBS element Level 4 to the Subsystem on a quarterly basis and will cover all activities covered in this Memorandum of Understanding regardless of the specific nature of the funding support. All status reports will be assembled by the U.S. ATLAS PM and made public to the U.S. ATLAS collaboration.

6.4. Component Ownership

All equipment items bought or fabricated using DOE funds will be properly marked as the property of DOE. Any other equipment furnished by Brookhaven National Laboratory will remain Brookhaven National Laboratory property. In either case, the equipment will remain part of the Software Project until it is dismantled or the computing element in question is replaced.

7. **General Considerations**

7.1. Safety and Engineering Practices

The experimenters from Brookhaven National Laboratory will be supplied a description of DOE and NSF safety policies by the U.S. ATLAS Project Office. They agree to familiarize themselves with DOE and NSF safety policies and to adhere to them. All computing components must be designed, fabricated, installed and operated in conformity with DOE, NSF and CERN safety policies and practices as well as DOE, NSF and CERN engineering standards. The U.S. ATLAS Project Office will provide copies of the necessary standards. All engineering, design, quality assurance, safety, and other activities shall be in compliance with ISO standards. All major components will undergo appropriate design, safety, and engineering reviews with oversight by the U.S. ATLAS Project Office.

7.2. Operations

Brookhaven National Laboratory agrees to maintain, to the best of their ability, equipment provided for the ATLAS Physics and Computing Project as long as Brookhaven National Laboratory is a member of the ATLAS collaboration.

8. **Schedules and Milestones**

Brookhaven National Laboratory will make every effort to carry out their institutional responsibilities consistent with the overall ATLAS schedule. In this document are listed the program milestones for this period of performance.

8.1. Design, Development and Deployment Milestones

The program milestones for this period of performance relevant to Brookhaven National Laboratory are listed here:

Program Milestones	Baseline Date	Current Date
First full release of LAr OO/C++ software		December 12, 2001
C++/OO muon reconstruction released		December 21, 2001
Deploy distributed data management service		December 31, 2001
Complete ATLAS Mock Data Challenge 0		January 2002
Deliver ROOT implementation of event store		March 2002
Complete ATLAS Mock Data Challenge 1		August 2002
Decide on ATLAS Event store DB technology		September 2002
Deliver production distributed data management system		June 2002

