

Amendment

to

Memorandum of Understanding

between

University of Michigan

and

The U.S. ATLAS Project Office

for Fiscal Year FY 1999

February 1, 1999

1. Introduction

This Amendment is made to provide details of the work agreed to between the parties making the Memorandum of Understanding covering the specific period of performance January 1, 1999 through December 31, 1999. 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 (U.S. ATLAS 97-7).

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
Homer Neal	80%	D0
Jay Chapman	50%	CDF Muon Trigger/DoE Project Director
Jianming Qian	10%	D0 Preshower Detector Development
Greg Tarle	15%	HEAT/TOSCA/MACRO
Bing Zhou	80%	D0
Rudi Thun	50%	TOSCA

Myron Campbell	10%	CDF Trigger and TDC
Robert Ball	25%	BOONE/Electronics/Computing
Dan Levin	50%	MACRO/TOSCA
Shawn McKee	50%	HEAT/TOSCA

2.2. Institutional Board Representative

Homer Neal is the present representative of University of Michigan on the U.S. ATLAS Institutional 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:

Engineers

Name	ATLAS Fraction	Source of Support
John Mann	60%	DoE Base Grant

Designers

Name	ATLAS Fraction	Source of Support
Edward Diehl	100%	DoE

Technicians

Name	ATLAS Fraction	Source of Support
Helmut Schick	100%	ATLAS
David Kouba	100%	ATLAS
Curtis Weaverdyck	80%	DoE

Software Professionals

Others

Name	ATLAS Fraction	Source of Support
graduate students (2)	50%each	DoE
undergraduates (4)	30% each	ATLAS

2.4. Other Key Personnel

The Environment, Safety and Health officer for the University of Michigan Physics currently responsible for compliance with applicable ES&H policies associated with ATLAS participation by this institution is John Vidolich of the University of Michigan. The Quality Assurance officer for the University of Michigan currently responsible for QA compliance of tasks performed by this institution is Greg Tarle by the University of Michigan.

3. **Design, Prototype, Production and Installation Responsibilities**

3.1. Design, Prototype and Production Responsibilities for this Period of Performance

3.1.1 *Deliverables: From U.S. ATLAS Project Funds:*

WBS (L5)	Deliverable	(k\$)
1.5.1.2.1.	Tube Assembly Station	\$33.0
1.5.1.2.2	Tube Test Station	\$49.0
1.5.1.2.3.	Chamber Assembly Station	\$300.0
1.5.1.2.4	Chamber Test Station	\$80.0
1.5.1.2.5	Handling/Transport Fixtures	\$17.0
1.5.1.2.6	General Equipment	\$23.0
1.5.1.3	MDT Prototypes	\$60.0
1.5.3.1.2	Design of Mini-DAQ readout of ASD/TDC Mezzanine Cards	\$68.9
1.5.3.1.4	Test Station/PC/Test Fixtures/Instrumentation/Crate/PS	\$64.8
1.5.3.2	Prototype Electronics	\$20.0
	TOTAL	\$715.7

The Chamber Assembly Station budget of \$300K includes the Granite plate transportation and installation at \$8.5K, a reinforcement structure for the assembly area floor at \$55.0K, an environmental HVAC control system at \$70K, tool machining at \$93.6K, a gas-manifold, sensors, and control system at \$12.5K, and \$60.4K of assembly labor.

3.2. Coordination and Reporting

The U.S. ATLAS L2 Manager for the Muon Subsystem is Venetis Polychronakos of Brookhaven National Laboratory. The overall U.S. MDT chamber manager is Frank Taylor of Massachusetts Institute of Technology. The institution contact person for Muon Subsystem activities at the University of Michigan is Bing Zhou. The task managers for Muon Subsystem activities carried out at the University of Michigan are as follows:

Rudi Thun, University of Michigan – 1.5.1.2.2 – Tube assembly.

Bing Zhou, University of Michigan - 1.5.1.2.3/4 - Chamber assembly.

Jay Chapman, University of Michigan - 1.5.3.1 - MDT electronics.

3.3. Collaboration with Other Groups and Institutions

Design, construction and installation related to the Muon subsystem will be carried out in close communication and collaboration other groups working on this and related subsystems. Collaborating groups outside the University of Michigan are listed below.

WBS / Task	Collaboration Group	Responsibility with University of Michigan
1.5	BNL	Forward Muon System
1.5.1	Univ. of Washington	MDT Chambers
1.5.1	BMC	MDT Chambers
1.5.6	MPI, Munich	Forward Alignment System
1.5.6	NIKHEF, Amsterdam	Forward Alignment System
1.5.6	SACLAY, Paris	Forward Alignment System
1.5.x.1	BMC	MDT Electronics
1.5.3.x.1.2	KEK	Mezzanine Cards
1.5.3.x.1.2	BMC	Mezzanine Cards
1.5.3.x.2.1	NIKHEF, Amsterdam	NIMROD
1.5.3.x.2	CERN	Coordination of Electronics Protocols

4. Contribution of Effort, Services and Equipment

4.1. Effort

Subject to adequate funding by DOE or NSF, the University of Michigan will provide support for the scientific and technical personnel as indicated in section 2 during this period of performance.

5. Costs and Funding

An amount of \$715.7K will be provided for calendar 1999. Of this amount \$562K will be utilized for tube and chamber fixtures and construction. The remaining funds, \$153.7K will be directed toward the certification and production of prototype electronics of the ATLAS design.

6. Administration (no amendments are included in this section)

7. General Considerations (no amendments are included in this section)

8. Schedules and Milestones

The University of Michigan will make every effort to carry out their institutional responsibilities consistent with the overall ATLAS schedule. In this amendment are listed the program milestones for this period of performance.

8.1. Design, Fabrication and Installation Milestones

The program milestones for this period of performance relevant to the University of Michigan are listed here:

WBS	Key Milestones for MDT Chambers – 1.5.1	Baseline Date	Current Date
1.5.1.2.1.3	Tube Assembly Station Complete	12/31/98	5/15/99
1.5.1.2.3.3	Chamber Assembly Station Complete	9/1/99	11/15/99
1.5.1.2.2	Tube Test	8/2/99	6/1/99
1.5.1.2.4	Chamber Test	9/30/99	12/20/99
1.5.1.3.3	Fabrication of Module 0	9/1/99	12/6/99
1.5.1.3.3	Approval of Chamber 0 Complete	10/1/99	1/30/00
1.5.1.4.1.3	Start of Michigan Assembly Line	11/1/99	2/1/00
1.5.1.4.2	Fabrication of Chambers Complete	9/15/03	12/15/04
1.5.1.5	Installation of Chambers Complete	12/15/04	12/15/05

WBS	Key Milestones for MDT Electronics – 1.5.3	Baseline Date	Current Date
1.5.3.1.2.1	Pre-production TDC AMT-0 Testing Complete	8/21/98	11/27/98
1.5.3.1.2.2	Chamber Data Flow Simulation Software	9/25/98	2/26/99
1.5.3.1.2.1	Prototype Chamber Service Module Design Complete	10/9/98	1/29/99
1.5.3.1.4	Prototype Test Station Complete	2/16/99	4/16/99
1.5.3.1.4	Mezzanine Card Test Fixture Complete	5/23/01	5/23/01
1.5.3.1.2.1	Integration of Prototypes Concentrator Cards Begins	4/29/99	4/29/99
1.5.3.1.2.1	NIMROD+Conc Card+AMT Integration Test Complete	12/23/99	12/23/99
1.5.3.1.2.1	Final Front-end Design Integration Begins	11/17/00	11/17/00

