

**U. S. DEPARTMENT OF ENERGY  
FIELD WORK PROPOSAL**

1. WORK PROPOSAL NO.: 2247.2	2. REVISION NO.:	3. DATE PREPARED: 03-15-07	3a. CONTRACTOR NO.: 52107*
4. WORK PROPOSAL TITLE: ATLAS/LHC Project			
5. BUDGET & REPORTING CODE: KA-11-02	6. WORK PROPOSAL TERM: Begin: End:	7. IS THIS WORK PACKAGE INCLUDED IN THE INST. PLAN? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	7a. PRINCIPAL INVESTIGATORS: See Below**
8. HEADQUARTERS/OPERATIONS OFC PROGRAM MANAGER: Staffin, R. No. 301-903-3624	11. HEADQUARTERS ORGANIZATION: High Energy Physics		14. DOE ORG. CODE: SC
9. DOE FIELD ORGANIZATION WORK PROPOSAL REVIEWER:	12. DOE FIELD ORGANIZATION: Chicago		15. DOE ORG. CODE: CH
10. CONTRACTOR WORK PROPOSAL MANAGER: Weerts, H.J. No. 630-252-8831	13. CONTRACTOR NAME: UChicago Argonne, LLC		16. CODE: 12
17. IS THIS PROPOSAL TO DO WORK THAT INCLUDES A SECURITY INTEREST? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			
18. WORK PROPOSAL DESCRIPTION (Approach, anticipated benefit in 200 words or less):  <p align="center">Argonne is collaborating on the ATLAS detector, a general-purpose detector for the Large Hadron Collider (LHC) at the CERN Laboratory. The LHC and the ATLAS detector will provide data at the frontier of high energy hadron colliders, starting in 2007. The data are expected to provide answers or detailed clues to the origin of electroweak symmetry violations in the standard model and to search for a large range of extensions to the standard model. Argonne has accepted responsibilities for constructing and operating important parts of both the scintillating tile hadronic calorimeter and the trigger system, for engineering work associated with the overall technical coordination of ATLAS, and for core software development. This account covers the parts of the design and fabrication funded from special ATLAS project funds.</p> <p>* 52107, 52108, 52109, 52111, 53204</p> <p>** R. Blair, T. LeCompte, J. Proudfoot</p>			
19. CONTRACTOR WORK PROPOSAL MANAGER:  <p align="center"><i>H. Weerts</i></p>		20. OPERATIONS OFFICE REVIEW OFFICIAL:  <p align="center">03-15-07</p>	
SIGNATURE		SIGNATURE	
DATE		DATE	
21. DETAIL ATTACHMENTS: (See specific attachments.)			
<input type="checkbox"/> a. Facility requirements	<input checked="" type="checkbox"/> e. Approach	<input type="checkbox"/> i. NEPA requirements	<input type="checkbox"/> m. ES&H considerations
<input type="checkbox"/> b. Publications	<input checked="" type="checkbox"/> f. Technical progress	<input checked="" type="checkbox"/> j. Milestones	<input type="checkbox"/> n. Human/Animal Subjects
<input checked="" type="checkbox"/> c. Purpose (mandatory)	<input checked="" type="checkbox"/> g. Future accomplishments	<input type="checkbox"/> k. Deliverables	<input type="checkbox"/> o. Security requirements
<input type="checkbox"/> d. Background	<input checked="" type="checkbox"/> h. Relationships to other projects	<input type="checkbox"/> l. Performance Measures/Expectations	<input checked="" type="checkbox"/> p. Other (specify)

**WORK PROPOSAL REQUIREMENTS FOR OPERATING/EQUIPMENT  
OBLIGATIONS AND COST**

CONTRACTOR NAME UChicago Argonne, LLC		WORK PROPOSAL NO. 2247.2		REVISION NO.		CONTRACTOR NO. 52107		DATE PREPARED 01/25/2007	
21. STAFFING (in staff years)		PRIOR YEARS	FY2007	FY2008	FY2009		FY2010	FY2011	TOTAL TO COMPLETE
				ESTIMATE	REQUEST	AUTHORIZED			
a. Scientific .....			9.6	10.0	9.1		0.0	0.0	
b. Other Direct .....			0.9	0.9	0.9		0.0	0.0	
c. Technical Services* .....			0.3	0.3	0.3		0.0	0.0	
d. Total Direct .....			10.8	11.2	10.3		0.0	0.0	
23. OBLIGATIONS AND COSTS (in thousands)									
a. Total Obligations .....			2304	2629	2486		0	0	
b. Total Costs .....			2435	2619	2493		0	0	
24. EQUIPMENT (in thousands)									
a. Equipment Obligations .....			(155)	0	0		0	0	
b. Equipment Costs .....			0	0	0		0	0	
25. MILESTONE SCHEDULE (Tasks)		FY2009 DOLLARS				PROPOSED SCHEDULE	AUTHORIZED SCHEDULE		
		PROPOSED		AUTHORIZED					
26. REPORTING REQUIREMENTS									

\* Technical services staffing includes ANL support divisions' scientific effort.

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## 21. DETAIL ATTACHMENTS: (See specific attachments.)

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| <input type="checkbox"/> b. Publications                   | <input type="checkbox"/> f. Technical progress              | <input type="checkbox"/> j. Milestones                        | <input type="checkbox"/> n. Human/Animal Subjects |
| <input checked="" type="checkbox"/> c. Purpose (mandatory) | <input type="checkbox"/> g. Future accomplishments          | <input type="checkbox"/> k. Deliverables                      | <input type="checkbox"/> o. Security requirements |
| <input type="checkbox"/> d. Background                     | <input type="checkbox"/> h. Relationships to other projects | <input type="checkbox"/> l. Performance Measures/Expectations | <input type="checkbox"/> p. Other (specify)       |

**ATLAS/LHC Project**

a) FY 2006 and 2007 Accomplishments: The assembly of the final calorimeter section, EBA, was completed on 23 May 2006 and essentially fully meets its mechanical envelope. Installation of calorimeter services and testing and repair of the tile calorimeter readout electronics (the drawers) and low voltage power supplies continued throughout this period. A software professional was hired to work on Tile Calorimeter database development and with Argonne physicists on the development of remote monitoring tools. The TDAQ effort has also increased with the hire of a system professional, who is resident at CERN and responsible for installation and commissioning of the Region of Interest Builder (RoIB) into the ATLAS trigger and DAQ system. A full RoIB system was installed at Point 1 and has been tested with several Level 1 trigger inputs. Development and testing of the ATLAS movement system continued: automatic leveling was incorporated into the control system, the interfaces to the service cable system and to the liquid argon transfer line were implemented, and mechanical hardware for the docking system was fabricated. The computing group has delivered several key software components: the strategy and infrastructure to support evolution of the ATLAS data model; improvement in the I/O performance of the ATLAS control framework (ATHENA); prototyping of a variety of distributed database deployment strategies; and a scalable event-level selection infrastructure (TAGs). The group also provided database support and coordination of ATLAS-wide data streaming tests. Argonne physicists continued their studies of jet triggers and jet energy calibration, Monte Carlo generators, and QCD production of two photons. A member of our group (Tom LeCompte) has been appointed co-convener of the ATLAS Standard Model physics group.

b) FY 2007 Plans: Installation of services and tile calorimeter commissioning will continue through the end of FY07. Integration and testing of the RoIB will continue, in particular with the inclusion of all Level 1 trigger inputs. Two additional RoIB systems will be built. All remaining work needed to close the detector for beam operations will be completed in FY07. In particular, this will include interfacing to the beam-pipe sensors and the necessary alarm/safety actions and the commissioning of the interface to the control system for the "Big Wheel". The computing effort will continue with the tasks described above, and the group will contribute to the "full dress rehearsal" to exercise the offline computing model. Physics studies will focus on the ATLAS CSC notes and on physics which will be accessible with early data and which will provide feedback on detector performance. We will investigate the use of web-based technology for routine detector monitoring.

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b) FY 2008 Plans: This will be the first operational period for ATLAS and in all technical areas (Tile Calorimeter, Trigger/RoIB, movement system, and core software), and we will focus on supporting these systems and monitoring and improving their performance. We anticipate that following our work in 2007, some significant level of monitoring will be conducted using web-based technology by physicists located at Argonne. A high priority will be to achieve stable trigger operations and monitoring during the 900 GeV run. Physics analysis will focus on tests of standard model processes and their use in evaluating detector performance, in addition to physics *per se*. The Argonne group expects to retain principal responsibility for the ATLAS event store, I/O framework infrastructure, and event-level metadata systems as ATLAS begins data-taking in 2008 and beyond, and to continue in a leadership role in distributed database services. Finally, as time permits we will explore opportunities for participation in ATLAS upgrades for higher luminosity.

c) FY 2009 Plans: By this time all maintenance and operations tasks, established in the period 2007-08, will have fallen into a regular routine. Data taking will have the highest priority in 2009 and stable trigger operation and monitoring will be essential. Run conditions are likely to evolve rapidly and will likely require development in software and in RoIB firmware. In all technical areas (Tile Calorimeter, Trigger, movement system, and core software) activities during shutdowns will focus on evaluating hardware/software performance and stability. In the computing group, the balance between software design and development and support for physics and physicists will shift over time, and the Argonne software group will contribute more heavily to the long-term physics support effort. The Analysis Center will provide a regional focus for physicists working on detector performance and physics analysis, and we anticipate significant and exciting physics results to begin to appear. Although the physics program will take priority, we expect that initial contributions to ATLAS upgrades will begin in this period.