***U.S. Department of Energy***
***and the***
***National Science Foundation***

U.S. LHC Joint Oversight Group

To: J. K. Blackburn (Caltech), A. Boehnlein (FNAL), R. Dubois (SLAC), T. Haas (DESY), A. Kotwal (Duke Univ.), J. Lauret (BNL), M. Morandin (INFN, Padova), D. Olson (LBNL), T. Schalk (UC, Santa Cruz)

Subject: Charge for the January 2007 review of the software and computing (S&C) efforts of the U.S. LHC Research Program

The Joint Oversight Group (JOG) of the Department of Energy and the National Science Foundation (DOE/NSF) greatly appreciates your willingness to participate in the review of the software and computing (S&C) programs of U.S. ATLAS and U.S. CMS. This review will take place at the University of Texas at Arlington on January 17-19, 2007.

The goal is to evaluate recent progress and the effectiveness of current and planned U.S. S&C activities in enabling the research of U.S. physicists at the LHC. You are asked to examine the scope, cost and schedule of the S&C plans for the period of FY2007 through FY2011, with special emphasis on readiness for initial LHC running. You are asked to judge whether the U.S. S&C portfolio is balanced so as to give U.S. researchers a sound basis for effective participation in the analysis of LHC data, and to examine the realism of the plans in the context of the funding guidelines provided by the agencies.

In addition, we ask you to evaluate the progress made by each collaboration in implementing the recommendations of previous reviews (February 2006 and August 2006). As a guide, we point to the following issues:

1) Management

- Are the current management structures and techniques well-matched to the needs of the U.S. collaboration?
- Are their internal contingency and risk-management mechanisms appropriate?
- Are there adequate plans for transitioning from a development phase to a deployment and operations phase? Are the assumptions for resource requirements well justified?
- Are the priorities of the S&C program conducive to effective participation in data analysis by U.S. physicists?
- Does management have adequate S&C plans to accommodate new collaborators? Have they developed a reasonable model for the corresponding incremental costs?
- What would be the impact of a 10% S&C funding shortfall on current U.S. deliverables and on productivity in physics analysis?
- Do the U.S. projects interact sufficiently with the international S&C efforts?

- Does the U.S. play a role in the international S&C leadership that is commensurate with its overall participation in the experiment?

2) Facilities, Grids, Networking, and Infrastructure

- Are the current computing models of the experiments appropriate for U.S. needs?
- Have infrastructure and operating costs of the Tier-1 and Tier-2 facilities been fully considered in their deployment? Are there any high-risk assumptions? Are the estimated personnel requirements, equipment and infrastructure costs valid and well-justified?
- Has there been adequate progress made in deploying the U.S. Tier-1 and Tier-2 centers and in their integration with the CERN Tier-0 center?
- From a user's perspective, is the usability and readiness of grid-based production software in good shape? (The collaborations should provide sufficient information to help the committee evaluate typical user experience with grid-based tools.)
- Are cybersecurity issues given adequate priority by management? On matters of security, are the lines of authority clearly spelled out? Has the collaboration assessed the impact of a cybersecurity incident on user access to data and to computing cycles? Is there a mitigation plan in place?
- Have network bandwidth and connectivity requirements been appropriately identified by the U.S. collaborations? Are these requirements consistent with their latest computing models? Is there a roadmap to achieve the required T0-T1-T2 connectivity?
- Do the U.S. S&C programs have adequate links to the Worldwide LHC Computing Grid (WLCG) and the Open Science Grid (OSG)?

3) Core Software and Analysis Support

- Are the current models for the support of data analysis well thought out, and is the support structure responsive to the needs of the U.S. community, both in the U.S. and at CERN? Are there adequate metrics to monitor progress in this area? Have all the required resources been identified by the collaborations? Will there be adequate support during all phases of the experiment?
- From a user's perspective, comment on the usability and readiness of the analysis software. (The collaborations should provide sufficient information to help the committee evaluate typical user experience with analysis tools.)
- Are the personnel requirements for the maintenance and operation phase of production software well understood, well justified and available? On what basis are commitments made to the international collaboration? Are these commitments realistic and consistent with U.S. interests?
- Is the role of Tier-3 centers well-defined and integrated into the S&C facilities plan? Are the plans for Tier-3 facilities sufficiently developed to guarantee capability for data analysis at interested U.S. institutions by November 2007?
- Has progress in core software relative to the milestones presented at the February 2006 comprehensive DOE/NSF review of the U.S. program been adequate? Are the forthcoming U.S. milestones on track and realistic? Is there any critical dependence on international milestones that could put U.S. deliverables at risk?

- Is the U.S. core software portfolio sufficiently balanced to offer U.S. researchers a good chance to participate effectively in the initial science of the LHC?

The review will be chaired by the U.S. LHC Associate Program Manager for Computing, Saul Gonzalez, with other program staff members from the DOE and the NSF in attendance. The proponents will post their presentations on the web a week prior to the meeting, and you will have access to additional supporting documentation at least two weeks prior to the start of the review. We would appreciate close-out statements following the reviews of both U.S. ATLAS and U.S. CMS, and more formal written reports within two weeks of the completion of your evaluation. This will provide valuable and timely input to the agencies and to the experiments. Your reports will also be made available to other DOE and NSF committees that review U.S. ATLAS and U.S. CMS projects.

Again, we wish to express our deepest appreciation for your willingness to participate in this important activity.

Sincerely,

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| Co-Chair | Co-Chair |
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