

Charge to the Standing Committee on Upgrade Installation-to-Physics Commissioning

SC-IPC 1
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1. Introduction

On April 20, 2004 the Spokespersons posted in D0NEWS the announcement of the formation of a Standing Committee on Upgrade Installation-to-Physics Commissioning (hereafter, the SC-IPC). The posting named the members of the Committee and framed its charge. As given in the posting, the charge to the SC-IPC asks that we generate a detailed plan describing the evolution of the various activities necessary to ensure that the total downtime of the experiment from acquisition of physics-quality data is minimized to the greatest extent possible. This plan will ultimately include a breakdown and timelines for each of the major efforts, the resources required (including manpower type – physicist, engineer, technician, etc.), and the sequence in which the various pieces need to be developed. The planning of the SC-IPC will be used to inform the collaboration as to the optimal approach to, and timing for, the installation of the upgrade elements. The first report of its activities will be presented to the collaboration at the 2004 Workshop in Fresno.

2. Working Groups of the SC-IPC

To expedite the charge to the Committee (hereafter denoted as the SC-IPC) we have elected to form a number of working groups from the membership of the committee. Each of the working groups will address the charge to the SC-IPC as it relates to a sub-element of the RunIIb upgraded detector. Apologizing in advance for “WBS speak” (this jargon refers to the work breakdown structure used by the laboratory to manage major activities), the RunIIb Upgrade provides major additions/changes to three detector sub-elements: WBS 1.2 Trigger (including AFE II), WBS 1.3 Online, and WBS 1.6, L0 Silicon.

As part of its function, each working group will analyze all aspects of the upgrade element to which it is assigned and detail in writing how the installation of that element into the detector and commissioning it for physics will impact the operation of the detector in several critical areas:

- Installation and technical commissioning of the hardware;
- Calibration databases, both online and offline;
- Updates to data unpacking & formatting;
- Development of Level 3 filtering algorithms;
- Updates to clustering and track finding, both online and offline;
- Development of Monte Carlo and TRIGSIM.

Ultimately each working group will detail the costs in effort and time that will be required to ameliorate the impacts of the upgrade element on the operation of the detector. Members of each group should not hesitate to ask any others in the collaboration to lend expertise and input as their work progresses, or to conduct studies that may be needed.

3. Structure and Membership of the Working Groups of the SC-IPC

At the outset, five working groups are seen as appropriate. Four of the working groups will focus on elements of the trigger upgrade and simulation, and one will focus on the Layer 0 silicon. At a later date, a sixth working group may be formed to deal with the upgrade to the online system.

- A. For **WBS 1.2 Trigger**, four working groups are appropriate:
 - W-G No. 1. L1 Cal Trig (1.2.1)
 - W-G No. 2. L1 Cal Track Match (1.2.2, 1.2.3) and CTT
 - W-G No. 3. L2 Beta Upgrade (1.2.4) and STT Expansion (1.2.5)
 - W-G No. 4. Trigger Simulation (1.2.6)
- B. For **WBS 1.6 Silicon**, a single working group is appropriate:
 - W-G No. 5. Layer Zero Detector(1.6)
- C. For **WBS 1.3 Online**, a sixth working group may be formed at a later time.
- D. For **AFE II**, an additional working group may be formed when the status of this system is more well-defined later this summer/fall.

Members of the SC-IPC are encouraged to contribute to more than one of the working groups, and each working group will have a leader named from the membership of the group. In the following, the proposed membership and leader (underlined) for each working group are indicated.

- A. **Working Group 1 (L1 Cal Trig)** : Ken Johns, Ela Barberis, Volker Buescher, Bob Hirosky
- B. **Working Group 2 (L1 Cal Track Match, CTT)**: Stefan Gruenendahl, Ken Johns, Gordon Watts, Breese Quinn
- C. **Working Group 3 (L2 Beta Upgrade, STT Expansion)**: Bob Hirosky, Rick Jesik, Gordon Watts, Taka Yasuda
- D. **Working Group 4 (Simulation)**: Jonathan Hays, Elizaveta Shabalina, Volker Buescher, Rick Jesik, Erik Kajfasz, Eckhard von Toerne
- E. **Working Group 5 (Layer 0)**: Breese Quinn, Ela Barberis, Bill Cooper, Eric Kajfasz, Elizaveta Shabalina, Taka Yasuda, Eckhard von Toerne

Working group assignments have been proposed based on the interests and contributions of each member to D0 to date. Individuals have been assigned to multiple groups where appropriate in an effort to “cross-fertilize” the activities of related groups so that duplication of effort is avoided. Do not hesitate to comment if you feel you can better serve in a different group.

4. Schedule of the SC-IPC

In a real sense the installation of the RunIIb upgrades is just around the corner – late 2005 is not many tens of inverse picobarns away. The working groups will meet as their leaders determine, with a view to the following SC-IPC schedule:

May Meeting

Each working group should convene as soon as possible to begin its deliberations and hold meetings as necessary so its leader is prepared to meet at Fermilab the third week of May (e.g. May 19 is proposed) with the other working group leaders and the co-chairs of the SC-IPC (a video-ready room will be used). At this meeting each leader will present a summary of the progress of the work of his or her working group at that time. All members of the SC-IPC are encouraged to attend the May meeting, as well as any or all of the meetings of the several working groups

Fresno Workshop

After the May meeting, the progress of the working groups will be collected and summarized for presentation to the collaboration at the Fresno Workshop by the co-chairs of the SC-IPC.

In addition, a working session of SC-IPC members and working group leaders will be convened at Fresno to advance the efforts and planning of each of the working groups. Members of the SC-IPC should plan to attend the Fresno Workshop for this session.

Summer/Fall 2004

Working groups will continue to plan their activities in the months after the Fresno workshop, and the co-chairs of the SC-IPC will present progress updates at select ADM’s and collaboration meetings.

Because working groups may well identify infrastructure work that can profitably be accomplished during the summer 2004 shutdown (presently rumored to be late summer/early fall, lasting 14—16 weeks), it is important that they function productively during the summer of 2004.

2004/2005

As the upgrade hardware matures each working group will work toward a full exposition of the manpower and time required to commission and bring to physics readiness the element in its purview. It will prepare a document that bridges the hardware/software boundaries to provide guidance and direction to the collaboration for the optimal time for the installation of the element into the detector.

5. Detailed Instructions for the Working Groups

Each working group (except W-G 4 Simulation) may assume a schedule exists for the preparation and installation of the related hardware into the detector. This schedule provides a date at which the hardware is predicted to be ready for electronic integration into the detector, based on the assumed completion of the Layer 0 silicon, and the various components of the upgraded trigger hardware. The most recent version of the RunIIb Installation Schedule can be seen at:

\\D0Server6\projects\run2b\Management\Schedule\Schedule_Inbox\Run2b_L0_Installation_Schedule_1114.mpp (MSProject) or .xls (MSExcel).

Caution: the completion dates in this schedule for the several upgrade elements have evolved since the time this schedule was drafted, and many of the installation details for the silicon are immature. The actual date for the start(s) of RunIIb installation will in the end depend on the machine schedule and the readiness of D0 as defined by the SC-IPC for the collaboration. The Installation schedule in fact will evolve in the coming weeks to reflect the latest planning of the trigger and silicon projects. Perhaps the major value of the present version of this schedule is that it can provide insight into the planning (or lack thereof!) that has been made for the installation of the hardware of the upgrade, and perhaps guide the thinking of how each component must be commissioned and made ready for physics.

Each working group must determine all aspects of the commissioning of the element so that it is seamlessly integrated into the operation of the full detector, i.e. so that full physics data taking can resume at whatever luminosity the machine is delivering at that time.

In the case of the silicon working group for example, the members must consider the changes that must be made to:

- A. Online Software – downloading operating parameters (zero suppression thresholds, ADC settings, etc.) for all operating modes (calibration, physics data taking, zero bias, etc.)
- B. Oracle Database – Hardware (Epics process variables), Electronics, Hardware mapping, Calibration
- C. Shifter GUI's – (HV, Epics, etc.), and Examines (both for zero bias, physics data taking)
- D. 1553 Communication – non-VME modules;
- E. SDAQ and PDAQ operations;
- F. Commissioning Software – debugging of channels, sorting out mappings, etc.
- G. L1, L2, and L3 software and algorithms;
- H. Offline (Reco) algorithms, Missing Et, EM ID, Photons, Jets, etc.
- I. Installation and Technical Commissioning Activities

J. Other?

The considerations of each of the trigger working groups are likely to be similar.

The simulation group will concern itself with providing revised trigger turn-on modeling, revised trigger rates, jet triggering, ICD inclusion in missing Et, electron/photon trigger revisions, new topological triggers, etc.

6. Report(s) of the Working Groups

As indicated, each working group will present its preliminary findings at the May meeting of the SC-IPC. A written draft report will be prepared for this meeting which identifies the preliminary concerns of the working group (suggested by or extending from) the list of issues in the previous section, which indicates how pertinent issues will/may change from RunIIa, which defines revised or new strategies that might be employed to resolve them for RunIIb, and which describes how other areas of expertise (e.g. Trigsim, MonteCarlo, etc.) must be employed to resolve uncertainties.

This report will be extended and detail added at the Fresno workshop, and it will continue to evolve throughout 2004 and 2005, until installation commences.