

Trigger

1.
 - a. The project has achieved the necessary level of technical preparation and readiness to begin construction.
 - i. 6.8.1 L0Calo Fiber Optic Plant
 1. Findings:
 - a. The L0 Calorimeter Fiber Plant is well scoped, understood, and the production plan appears to be straight forward.
 2. Comment: The WBS item is ready to proceed to FDR.
 3. Recommendation: None
 - ii. 6.8.2 Hardware Track Trigger (HTT)
 1. Findings:
 - a. The HTT is well scoped and is in final design stages, which appear solid. Nevertheless, the demonstrator card has not yet been produced or tested. Hence, there appears to be a potential for possible design changes in the HTT, following the upcoming demonstrator testing program.
 2. Comment:
 - a. It would be appropriate to explicitly present the HTT testing program (scope, timeline, tests scheduled to be performed) of the demonstrator cards in more detail (possibly in backup slides), including what conclusions the proponents hope to draw from the testing program to inform the next prototype boards and firmware, leading to final production.
 - b. Not all documents were public and viewable by the reviewers.
 - c. Minor comment (scientific labor units of 900 in TFHW10240 TFM Demonstrator QA Testing (20 12-Feb-20 11-Mar-20) seems way too large).
 - d. Overall, the WBS item is ready to proceed to FDR
 3. Recommendation:
 - a. Ensure that all references to external, supporting documentation are explicitly made available to the committee before the review takes place. Ensure that any references to private, internal ATLAS documentation (and hence not available to the review committee) are scrubbed from all talks and from any other material provided to the review committee.
 - iii. 6.8.3 Global Processing
 1. Findings:

- a. The Global Event Processor Firmware is ambitious, but the project has a solid plan and has made significant progress in prototyping and testing algorithms.
 2. Comment: The WBS item is ready to proceed to FDR.
 3. Recommendation: None
- b. The project's scientific and technical contributors are credibly expected to accomplish the proposed work scope within the requested budget and schedule duration.
 - i. 6.8.1 L0Calo Fiber Optic Plant
 1. Findings: yes, the personnel bring their experience and expertise from a similar phase-1 project.
 2. Comment: None
 3. Recommendation: None
 - ii. 6.8.2 Hardware Track Trigger (HTT)
 1. Findings: yes, the group is strong and has extensive experience from carrying out similar projects in the past.
 2. Comment: None
 3. Recommendation: None
 - iii. 6.8.3 Global Processing
 1. Findings: yes, the team is very knowledgeable about the algorithms to be implemented and has the necessary expertise to deliver the project.
 2. Comment: None
 3. Recommendation: None
- c.
- d. The project has finalized all necessary commitments and partnerships, including definition of project deliverables, performing organizations, and schedules.
 - i. 6.8.1 L0Calo Fiber Optic Plant, 6.8.2 Hardware Track Trigger (HTT), 6.8.3 Global Processing
 1. Findings: Each of the subsystems presented a list of collaborators. The project schedule and deliverables are also well defined.
 2. Comment: None
 3. Recommendation: None
- e. The project has a defined acquisition strategy for purchased items. Designs, specifications and work scope comprising bid packages to industry are in advanced states of maturity and available for NSF review. Bid packages to be released in FY2020 are sufficiently clear and well defined as to be ready for bid.
 - i. 6.8.1 L0Calo Fiber Optic Plant, 6.8.2 Hardware Track Trigger (HTT), 6.8.3 Global Processing
 1. Findings:

a. Detailed quotes for each M&S item has been obtained. Bid packages have not yet been developed.

2. Comment:

a. The full specification of the HTT demonstrator board was sparsely outlined in the presentation. Since this is a "Final Design Review" the proponents should consider presenting (in the talk, possibly as backup material) a complete and explicit description of the technology choices that now fully specify the current demonstrator boards (e.g. the PCBs are currently in layout and expected to be delivered by the end of 2019). This information was referenced in the talk (pointing to internal ATLAS documentation) and could be inferred by examining the BOE (and corresponding quotes), but the technical specifications of the board designs were not easily available nor readily visible to the reviewers.

3. Recommendation: none

f.

g. Tools and technologies needed to construct the project are available.

Industrialization of key technologies needed for construction is complete.

i. 6.8.1 L0Calo Fiber Optic Plant, 6.8.2 Hardware Track Trigger (HTT), 6.8.3 Global Processing

1. Findings: All deliverables use industrial technologies

2. Comment: The tools are well advanced and there are no new technologies required for construction.

3. Recommendation: None

2. Project Scope

a. Project documentation describes how the construction-ready design is derived from the flow-down of science goals to science requirements then on to technical performance specifications and requirements. The documentation is in a format that enables traceability, is clearly explained, and is aggregated into a dedicated section of the PEP.

i. 6.8.1 L0Calo Fiber Optic Plant, 6.8.2 Hardware Track Trigger (HTT), 6.8.3 Global Processing

1. Findings: similar comment as for MUONS

2. Comment:

3. Recommendation: same as for MUONS

b. All detector functions and requirements are reflected in the Performance Measurement Baseline.

i. 6.8.1 L0Calo Fiber Optic Plant

- 1. Findings: Yes, the work described in the RLS targets deliverables that meet or exceed specifications.
 - 2. Comment: None
 - 3. Recommendation: None
 - ii. 6.8.2 Hardware Track Trigger (HTT)
 - 1. Findings: Yes, the work described in the RLS targets deliverables that meet or exceed specifications.
 - 2. Comment: None
 - 3. Recommendation: None
 - iii. 6.8.3 Global Processing
 - 1. Findings: Yes, the work described in the RLS targets deliverables that meet or exceed specifications.
 - 2. Comment: None
 - 3. Recommendation: None
- c.
- d.
- e.
- f. Specialized technologies enabling the scope fabrication are sufficiently mature to begin construction.
 - i. 6.8.1 L0Calo Fiber Optic Plant
 - 1. Findings: The proposed technologies are off-the-shelf; there are no specialized technologies to consider.
 - 2. Comment: None
 - 3. Recommendation: None
 - ii. 6.8.2 Hardware Track Trigger (HTT)
 - 1. Findings: The proposed technologies are off-the-shelf; there are no specialized technologies to consider.
 - 2. Comment: None
 - 3. Recommendation: None
 - iii. 6.8.3 Global Processing
 - 1. Findings: The proposed technologies are off-the-shelf; there are no specialized technologies to consider.
 - 2. Comment: None
 - 3. Recommendation: None
- g. Technical scope elements of the performance baseline remain consistent with what was approved for advancement to Final Design stage following PDR.
 - i. 6.8.1 L0Calo Fiber Optic Plant, 6.8.2 Hardware Track Trigger (HTT), 6.8.3 Global Processing
 - 1. Findings: Yes. No technical scope has changed since PDR
 - 2. Comment: None
 - 3. Recommendation: None

- 4.
5. Project management and the Project Execution Plan, including governance of the project, working with interagency and international partners, and subaward management.
 - a.
 - b.
 - c.
 - d.
 - e.
 - f.
 - g.
 - h.
 - i.
 - j. Performance verification and acceptance test policies for all deliverables are defined and complete. Documentation describes how acceptance tests will verify that deliverables meet design performance specifications and safety requirements.
 - i. QA plans and activities are integrated into the RLS.
 - ii. QA and radiation exposure policies are applied consistently across the project.
 - 6.8.1 L0Calo Fiber Optic Plant, 6.8.2 Hardware Track Trigger (HTT), 6.8.3 Global Processing
 1. Findings: [yes. QA/QC procedures are documented and integrated in RLS.](#)
 2. Comment: [None](#)
 3. Recommendation: none
 - k. There is a vetted safety plan and appropriate safety experts are available to the project to implement and oversee the safety plan.
 - i. 6.8.1 L0Calo Fiber Optic Plant, 6.8.2 Hardware Track Trigger (HTT), 6.8.3 Global Processing
 1. Findings: [All subsystems have an ES&H plan. Contacts responsible for ES&H at each institute have been identified.](#)
 2. Comment: [None](#)
 3. Recommendation: none
 - l. Plans and justifications for fabrication of spares within the construction program are defined and well justified.
 - i. 6.8.1 L0Calo Fiber Optic Plant
 1. Findings: [N/A](#)
 2. Comment: [None](#)
 3. Recommendation: [None](#)
 - ii. 6.8.2 Hardware Track Trigger (HTT)

1. Findings: **yes**
 2. Comment: **the assumed yield is 95%, which is higher than typical. It would be useful to justify this assumption**
 3. Recommendation: **None**
- iii. 6.8.3 Global Processing
1. Findings: **N/A, as this WBS is firmware development.**
 2. Comment: **None**
 3. Recommendation: **None**
- m. Plans and schedules for shipment of deliverables to CERN are credible and appropriately integrated into the RLS.
- i. 6.8.1 L0Calo Fiber Optic Plant
 1. Findings: **The deliverable will be constructed at CERN.**
 2. Comment: **None**
 3. Recommendation: **None**
 - ii. 6.8.2 Hardware Track Trigger (HTT)
 1. Findings: **Yes, the shipment plan to CERN exists.**
 2. Comment: **None**
 3. Recommendation: **None**
 - iii. 6.8.3 Global Processing
 1. Findings: **N/A**
 2. Comment: **None**
 3. Recommendation: **None**