
WS acquisition system CDR

**Critical Design Review (CDR)
5 - 6 March 2018, Trieste, Italy**

Charge for the CDR

Purpose and scope of the CDR

This is the CDR of the wire scanner acquisition system.

The purpose of the design review is to verify that the design fulfils the requirements, and is well matched to these boundary conditions. Also, the CDR covers documentation, verification, planning, risks and safety issues.

Passing the CDR is a prerequisite to start series production.

The scope of the CDR is the wire scanners acquisition system. Initial results from the acquisition system prototype tests are also covered in the review.

CDR Committee

The CDR committee consists of:

- **Andreas Jansson, ESS AD, Review chair**
- **Thomas Shea, ESS BI (reviewer)**
- **Bruno Lagoguez, ESS RF (reviewer)**
- **Hinko Kocavar, ESS BI (reviewer)**
- **Clement Derrez, ESS BI (reviewer)**

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- **Henrik Carling , ESS ICS (reviewer)**
- **Peter Jacobsson, ESS Safety (reviewer)**
- **Kent Wigren, ESS AD/QA (reviewer)**
- **Evangelia Vaena, ESS ICS/Cabling (reviewer)**
- **Mario Ferianis (presenter)**
- **Raffaele De Monte (presenter)**
- **Sandy Grulja (presenter)**
- **Stefano Cleva (presenter)**
- **Ibon Bustinduy, ESS Bilbao (observer)**

Supporting Documents

The supporting documentation will be provided to the committee in advance, on the review Indico page <https://indico.esss.lu.se/event/998> which also contains the agenda. Presentations will also be available on the Indico page.

Committee Charge

The committee is asked to consider the following questions. Where appropriate, please organize the responses by acquisition system component.

1. Do the presented designs enable the WS system to fulfil all requirements and respect all interfaces, specifically:
 - a. Do the results from the prototype acquisition system tests demonstrate that this design will provide adequate performances to fulfil ESS specifications (providing an RMS beam size measuring accuracy better than ± 0.100 mm)?
 - b. Is the design and performance of the analog front end for SEM current readout appropriate for the WS acquisition system to reach ESS specifications?
 - c. Is the design and performance of the optical front end for scintillator readout appropriate for the WS acquisition system to reach ESS specifications?
 - d. Is the design and performance of the back end modules for analog front ends appropriate for the WS acquisition system to reach ESS specifications?
2. Is the planning appropriate and consistent with the overall ESS plans and milestones?
3. Is there an acquisition plan for major procurements, and is the lead time for procurements and contracts properly accounted for in the planning?
4. Are there any unmitigated safety hazards related to the scope under review?
5. Have reliability aspects been considered in the design choices?
6. Have the project risks and opportunities been properly identified and their impact considered in the design? If required, is there a mitigation plan?
7. Given that this CDR is a milestone in the in-kind agreement with Elettra – Sincrotrone Trieste SC.P.A., have the contractual obligations been met such that

this milestone can be declared complete? Specifically, has the Elettra – Sincrotrone Trieste SC.P.A. team contributed their part to the tasks:

- a. Completion of the WS acquisition system's design as a whole. This includes:
 - i. Analog Front End (AFE) modules for SEM current and Optical Front End (OFE) for modules for scintillator readout;
 - ii. OFE for the scintillator fast WS readout
 - iii. Back End modules for the AFE
 - iv. Modified Back End modules for the OFE
 - v. Selection of cables types, fibers and connectors needed for connection from the crate in the klystron gallery to the beam line device;
 - vi. Any other components needed for the WS acquisition system's to function properly.
- b. Completion of the SEM AFE prototype tests at external partner lab. The initial results of these tests, which shall drive the modification of the WS acquisition system design, shall be reported in the CDR data package. The same data package shall also include possible further plans for the prototype tests.

Also:

- c. Has ESS ERIC provided Elettra – Sincrotrone Trieste SC.P.A. all information and equipment required to complete the prototype test and acquisition system design?
8. Were any other issues identified during the review?

The results of the review should be summarized in a short report, outlining the answers to the above review questions and whether the review is considered passed, passed with action items, or failed. The report may also provide findings, comments, and recommended actions. Actions should be clearly categorized as one of the following:

- Must be addressed before CDR is considered closed and production starts
- Must be addressed prior to the TRR
- Must be addressed at some time during the project