

**INTERFACE CONTROL
DOCUMENT (ICD)****Doc. No.
SP 391-001-72- R0****LUSI SUB-SYSTEM
CXI & XCS****LUSI CXI Instrument to XCS Instrument Interface
Control Document**

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Table of Contents

Table of Contents	2
1. Scope	2
2. CXI Reserved Space in XRT	2
3. Shared Components in XRT.....	2
4. Transport Line through Hutch 4.....	2
5. Configuration Turnaround.....	3
6. Shared Controls	3
7. Vacuum Connection through Hutch 5 Wall.....	3

1. Scope

This document defines the interface between LUSI CXI (WBS 1.3) and XCS (WBS 1.4). This document also defines the responsibilities for interface between CXI or XCS and LUSI controls (WBS 1.6).

2. CXI Reserved Space in XRT

The CXI and XCS instruments share the main LCLS hard X-ray beamline through most of the X-Ray Tunnel (XRT). The last 10 meters at the end of the XRT, before the vestibule in Hutch 4 shall be reserved for CXI devices on the main line. No XCS specific devices or support stands shall be installed on the main line in those last 10 meters.

3. Shared Components in XRT

The XCS instrument shall operate using both the main LCLS hard X-ray and an offset line using a large offset monochromator. The CXI instrument shall use only the main hard X-ray line. Therefore, all devices placed on the main hard X-ray line in the XRT by either instrument must have shared controls and have the ability to be completely removed from the beam.

The XCS instrument shall be responsible to provide at least one Intensity-Position Monitor and at least one Pop-in Profile Monitor downstream of the large offset monochromator and upstream of the 10 meters of CXI reserved space. The CXI instrument plans rely on the presence of these 2 devices.

Each instrument shall be responsible to interface with the controls group for devices within its scope. Therefore, ensuring that proper controls requirements are communicated to the controls group for the aforementioned monitors in the XRT shall be the responsibility of XCS.

4. Transport Line through Hutch 4

The X-ray transport line to Hutch 5 through Hutch 4 is the responsibility of the LCLS construction project and shall be subject to the approval of the XCS lead engineer. Sections of this transport line shall be removable to allow for the XCS instrument to utilize the main hard X-ray line. Due to the

nature of the removable transport line sections appropriate interlocks shall be implemented to ensure that no transport line may be removed during Hutch 5 operations.

5. Configuration Turnaround

It shall be the design goal to reconfigure the transport line from beam delivery to Hutch 4 to beam delivery to Hutch 5 in 8 hours or less.

6. Shared Controls

All devices placed on the main hard X-ray line in the XRT shall be controllable by either the XCS or CXI instrument. Password control shall be implemented to allow only expert users to control the XCS devices from the CXI endstation and vice versa.

The status of all devices on the main hard X-ray line in the XRT shall be logged and read by either the CXI or XCS instrument without password protection.

7. Vacuum Connection through Hutch 5 Wall

A fixed vacuum spool shall pass through the upstream wall of Hutch 5. This vacuum spool shall have a 6" non-rotatable CFF flange on the Hutch 4 side and a 6" rotatable CFF flange on the Hutch 5 side. The sealing surface of each of these flanges shall be located 3.77 inches from the wall in their respective hutch. The CXI instrument shall provide a valve immediately downstream of the Hutch 5 treaty flange. The CXI treaty flange shall be located at Z=1028.4988m in the LCLS coordinate system.