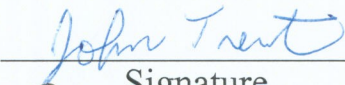
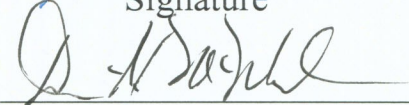
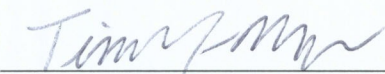
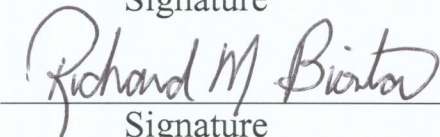

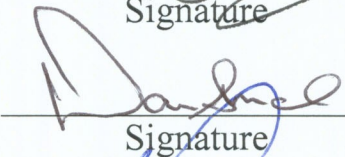
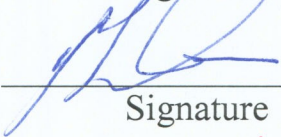



LCLS Interface Control Document		1.1 - 504	Linac XTOD	Revision 1
<b>Linac - XTOD Interface Control Document</b>				
John Trent XTOD Mechanical Engineer	Author		4/10/06	Signature Date
Donn McMahon XTOD Deputy System Manager			4/12/06	Signature Date
Tim Montagne Injector-Linac Mechanical Eng.			4/17/06	Signature Date
Richard Bionta XTOD Systems Manager			4/13/2006	Signature Date
Eric Bong Injector-Linac Systems Manager			4/17/06	Signature Date
Darren Marsh Quality Assurance Manager			4/14/06	Signature Date
Mark Reichanadter Chief Engineer			4/17/06	Signature Date
John Galayda Project Director			4/17/06	Signature Date

Summary: This document describes the interface between the LCLS Linac System (WBS# 1.3) and the LCLS XTOD System (WBS# 1.5). Subsystems that connect at or cross the boundary are identified.

Key WBS#s: 1.3, 1.5

## Change History Log

Rev Number	Revision Date	Sections Affected	Description of Change
000		All	Initial Version
1	3-10-06	Many	All XTOD hardware removed from Beam Dump Region. Interface plane moved to upstream end of FEE. Stay clear aperture for x-rays has changed. Linac group responsible for all beamline into FEE.

### Disclaimer

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### Auspices Statement

This work was performed under the auspices of the U.S. Department of Energy by University of California, Lawrence Livermore National Laboratory under Contract W-7405-Eng-48.

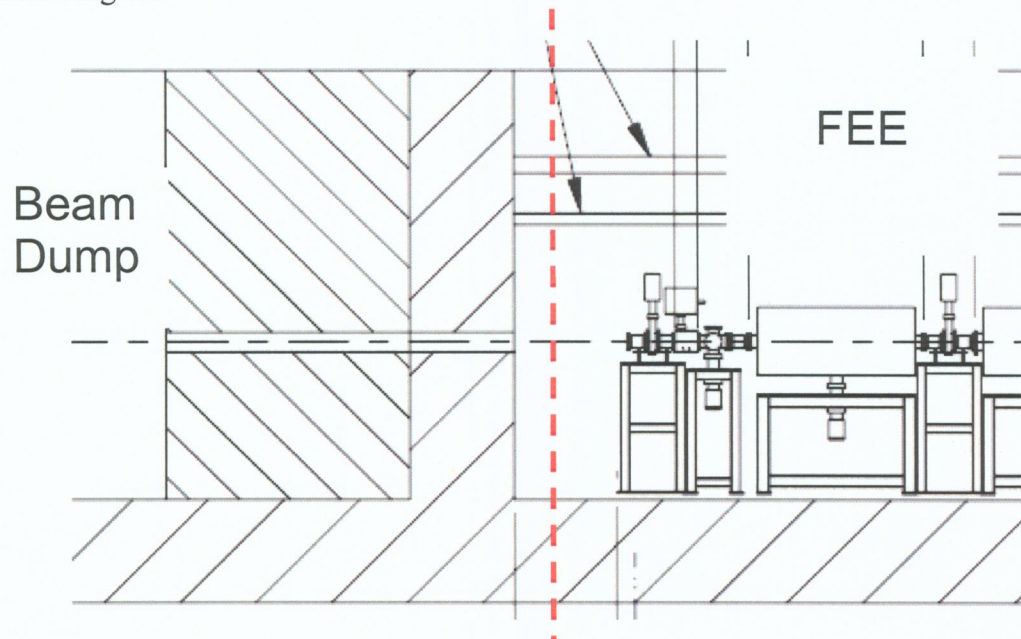
## EXECUTIVE SUMMARY

1.1 Scope Interface between LCLS Linac System and LCLS XTOD System. Linac delivers x-rays to XTOD. Feedback and other control signals cross boundary originating from and delivered to either system.

### 1.2 Responsibilities

WBS	Represented by	Responsible for:
1.5	<i>R. Bionta</i>	Preparing, maintaining, and approving this ICD
1.3	<i>E. Bong</i>	Supporting, maintaining, and approving this ICD

### 1.3 Interface Diagram



### 1.4 Interface Description

Heading	Check	Type	Location and Description
3.1	X	Mechanical	Linac signal cables to pass into FEE to electronics rack
3.2		Fluid	
3.3	X	Vacuum	Interconnected HV System at Isolation Valve
3.4		Thermal	
3.5		RF	
3.6	X	Electrical	Control and Network Cabling.
3.7		Power	(AC, DC, Pulse, etc.)
3.8	X	Signal	PPS, Vacuum level, timing
3.9	X	Radiation	X-rays, Neutrons, Muons, Electrons
3.10		Environmental	
3.11	X	Other	Clear Aperture for Spontaneous Radiation, Electronic Rack from Linac group to be in FEE

## 2.0 Applicable Documents

PRD# 1.3-001 LCLS Linac System Requirements  
PRD# 1.1-303 LCLS Controls System Requirements  
PRD# 1.5-001 XTOD Physics Requirements

## 3.0 Interface Definition

The interfaces between the Linac Systems and XTOD occur in the FEE. The physical component defining the interfaces is vacuum flange. When the vacuum valve near the interface plane is open, a contiguous vacuum envelope crosses the system interface. X-rays, delivered from the undulators cross the interface inside the beamline vacuum envelope. Controls and network cabling also cross the interface providing feedback, PPS, and vacuum control signals. General requirements for each system are detailed in PRD# 1.3-001 “LCLS Linac System Requirements” and PRD# 1.5-001 XTOD Physics Requirements. Requirements for the controls system which crosses the interface are found in PRD# 1.1-303 “LCLS Controls System Requirements”.

Using the standard LCLS Coordinate System, the interface is located at  $Z = 722.411$  m. The interface plane is in the upstream end of the FEE approximately 1 foot from the wall between the electron beam dump and the FEE.

**3.1 Mechanical Requirements** – The mechanical interfaces are 6” Conflat style vacuum flange pairs. The Linac System will provide a vacuum flange at the interface that will be placed within 1 mm of its nominal position. The XTOD System will provide a vacuum bellows at the interface plane with a VAT vacuum isolation valve nearby.

**3.2 Fluid Requirements** – None.

**3.3 Vacuum Requirements** – High Vacuum is maintained inside the vacuum envelope on both sides of the interface. Controlled valves on both sides of the interface are interlocked to vacuum status on both sides of the interface. Maximum pressure is  $2 \times 10^{-6}$  Torr, which is consistent with standard LCLS vacuum requirements.

**3.4 Thermal Requirements** – None

**3.5 RF Requirements** – None.

**3.6 Electrical Requirements** – As required, cabling carrying PPS, vacuum control and timing signals cross the interface.

**3.7 Power Requirements** – None

**3.8 Signal Requirements** – PPS, vacuum and timing signals cross the interface.

**3.9 Radiation Requirements** – Linac system delivers x-rays to XTOD as described in 1.1-001 Global Requirements Document and PRD# 1.5-001 XTOD Physics Requirements

**3.10 Environmental Requirements** – None

**3.11 Conventional Facilities Requirements** – The radiation shield wall between the XTOD Front End Enclosure and the Linac beam dump region will have penetrations to pass through cables between the 2 regions. The beam dump system will utilize controls rack space in the FEE for Linac diagnostics. Nineteen units (about 33.25 inches) of standard single rack space will be available for the beam dump system in or near the FEE.

**3.12 Other Requirements** – Clear aperture for the Wide Field of View Camera must be maintained by both side of the interface. The size of clear aperture varies, growing in Z. The size is called out in PRD 1.3-016.

**4.0 Verification** – Verification of all requirements to be performed during system commissioning. Performance goals for each system to be tested are described in the Physics Requirements Documents.

**5.0 Notes** – Design of global controls, feedback and controls infrastructure to be managed and funded from WBS 1.1 LCLS Management and Integration. Acquisition of Linac and XTOD controls hardware and cable plant are managed and funded through respective accounts in WBS 1.2 LCLS Linac and WBS 1.5 LCLS XTOD with global oversight from WBS 1.1 LCLS Management and Integration.