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Revision History

Revision	Date Released	Description of Change
R0	10/1/2017	Original Release.

1 Purpose

Interface Control Documents (ICDs) are interface or boundary documents that define the boundaries between two systems. ICDs are used to describe the boundaries or endpoints of one specific system with respect to another system, the physical interface between the two, and/or the limits of responsibilities for the two systems or contributors.

This document defines the interfaces between and responsibilities of SLAC National Laboratory and Jefferson National Laboratory [JLAB] for LCLS-II Project with respect to the cryomodule testing in the Low Energy Recirculating Facility (LERF) at JLAB.

2 Scope

The scope of this document is to define roles and responsibilities for the LERF CM Test Facility project team comprising of individuals from SLAC and JLAB.

3 Definitions

I&C	Instrumentation and Controls
RF	Radio Frequency
CW	Continuous Wave
LLRF	Low level RF
SCRF	Superconducting RF
HPRF	High Power RF
CM	Cryomodule

LERF	Low Energy Recirculating Facility
PSS	Personal Safety System

4 Responsibilities

Table below defines the Partner lab leading the development for each of the LLRF system elements. Every system or element is collaboration between partner labs and SLAC, and the specific roles and responsibilities are defined in the following table.

System or Element	Partner Lab Lead
LLRF	SLAC
Cryomodule Controls	SLAC
Cryo System Controls (LERF)	JLAB
Local waveguide and Cabling installation	JLAB
Utilities	JLAB
Safety and access control	JLAB
HPRF Hardware	SLAC
Controls Computing Infrastructure (CCI) and Networking	SLAC

Vacuum		SLAC
System or Element	SLAC Area of Responsibility	JLAB Area of Responsibility
Project Support	<ul style="list-style-type: none"> · Provide project management guidance · Provide and update project schedule · Provide coordination between collaborating labs. · Facilitate weekly communications and Design reviews · Interface between LCLS-II project management and the LERF team · Provide requirements and documentation · Provide Project support for reviews and manage SLAC teams. 	<ul style="list-style-type: none"> · Assemble and edit requirements and specifications. · Provide requirements and documentation · Participate in weekly updates · Provide Project support for reviews, and manage JLAB teams. <ul style="list-style-type: none"> • Install and test hardware
System or Element	SLAC Area of Responsibility	JLAB Area of Responsibility
RF Power Hardware (SLAC Dian) JLAB: r	<ul style="list-style-type: none"> · Loan 18 SSAs (2 Spares) · Loan 16 circulators and dummy loads · Loan 16 Directional Couplers 	<ul style="list-style-type: none"> · Design, procure and install all waveguide and waveguide components · Provide and connect to AC power, water cooling <ul style="list-style-type: none"> • Provide RF Cabling • Ensure PSS is functional and working
RF Power SW	<ul style="list-style-type: none"> · Software configuration and controls 	

System or Element	SLAC Area of Responsibility	JLAB Area of Responsibility
LLRF Hardware (Andy)	<ul style="list-style-type: none"> · Loan 4 full racks to control 16 cavities <ul style="list-style-type: none"> • Provide Local Oscillator (LO) • Provide Master Reference and distribution 	<ul style="list-style-type: none"> · Local installation support <ul style="list-style-type: none"> • Provide LO distribution • Provide RF cables to LLRF chassis
LLRF Firmware (Andy)	<ul style="list-style-type: none"> · All integrated firmware for testing 	<ul style="list-style-type: none"> · Local support
LLRF Software (Garth/Sonya)	<ul style="list-style-type: none"> · Provide the necessary set of LCLS-II production EPICS software 	<ul style="list-style-type: none"> · Contribute to definitions and requirements · Local support
System or Element	SLAC Area of Responsibility	JLAB Area of Responsibility
Vacuum System Hardware (Shweta)	<ul style="list-style-type: none"> · Provide controllers not already installed on CM. · Provide gages not already installed on CM. 	<ul style="list-style-type: none"> · Interfaces with LERF vacuum · Beamline pump (ion pump) · 2 insulating pumps (turbo) · 2 coupler pumps installed on CM
PLC and EPICS	<ul style="list-style-type: none"> · Software configuration and controls 	<ul style="list-style-type: none"> · Local support · Install cables and connectors · Provide requirements and guidance
System or Element	SLAC Area of Responsibility	JLAB Area of Responsibility

Controls Software (Debbie/Sonya)	<ul style="list-style-type: none"> · Full EPICS installation in production LCLS-II configuration · Including necessary EPICS client applications · Version control 	<ul style="list-style-type: none"> · Local support · Access to version controlled SW · Provide access to existing datasets
RF Test Apps	<ul style="list-style-type: none"> · EPICS application infrastructure · Implement RF test applications not already in EPICS 	<ul style="list-style-type: none"> · Provide RF HLA requirements and examples from existing CMTF · Define RF test applications EPICS interface
System or Element	SLAC Area of Responsibility	JLAB Area of Responsibility
Cryogenics (Matt C)	<ul style="list-style-type: none"> · Interface with JLAB· PLC programming to interface with JLAB's infrastructure and LCLS-II LERF Controls 	<ul style="list-style-type: none"> · Provide Liquid He supply with valves Guard He supply with valving Local support · Provide requirements and guidance
System or Element	SLAC Area of Responsibility	JLAB Area of Responsibility
Cryomodule Controls Hardware (Kevin)	<ul style="list-style-type: none"> · Loan a complete set of controls hardware for two cryomodules Number of racks?? 	<ul style="list-style-type: none"> · Local installation support · Provide requirements and guidance · CDA?? for four total, two JT and two cooldown valves. · Install pneumatic lines (instrument air) · Provide feed cap and end cap designs for additional interfacing with control system. ·
Cryomodule Controls Software	<ul style="list-style-type: none"> · Provide LCLS-II Production CM controls logic in PLC and EPICS 	<ul style="list-style-type: none"> · Local support · Provide requirements and guidance

System or Element	SLAC Area of Responsibility	JLAB Area of Responsibility
Network and Computing HW (Patrick)	<ul style="list-style-type: none"> · Loan a set of computing hardware · Provide consultation for computing · Provide consultation for networking 	<ul style="list-style-type: none"> · Local installation and management · Integration with local or site computing services (NFS, DHCP, NTP, DNS..) · Account management · Network management · Remote access control

System or Element	SLAC Area of Responsibility	JLAB Area of Responsibility
Racks and Cables	<ul style="list-style-type: none"> · Provide all cabling information with details · Provide L1 CAPTAR with necessary changes 	<ul style="list-style-type: none"> · procure and install cabling and racks (where applicable) · procure all connectors to interface to cryomodule · terminate all connectors that interface to cryomodule

5 References

LCLSII-2.5-IC-0056	Accelerator Systems to Cryogenic Systems ICD
LCLSII-2.1-IC-0156	Accelerator to Infrastructure Systems ICD
TBD	Controls ICD
XXX	JLAB LERF SOP

ADD All relevant documents from the existing sub-systems