

LCLS ECS Packaging and Deployment

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Control System Engineer

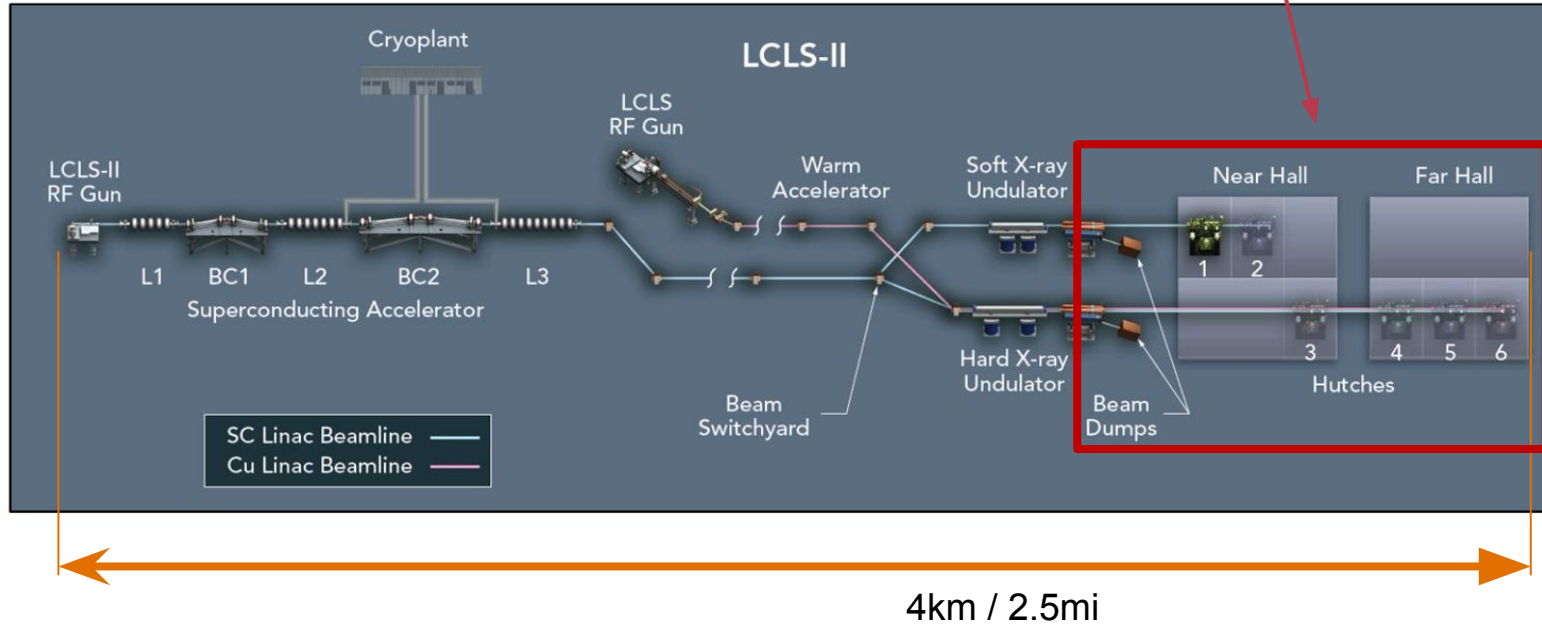
LCLS Experiment Control Systems

4/24/2026



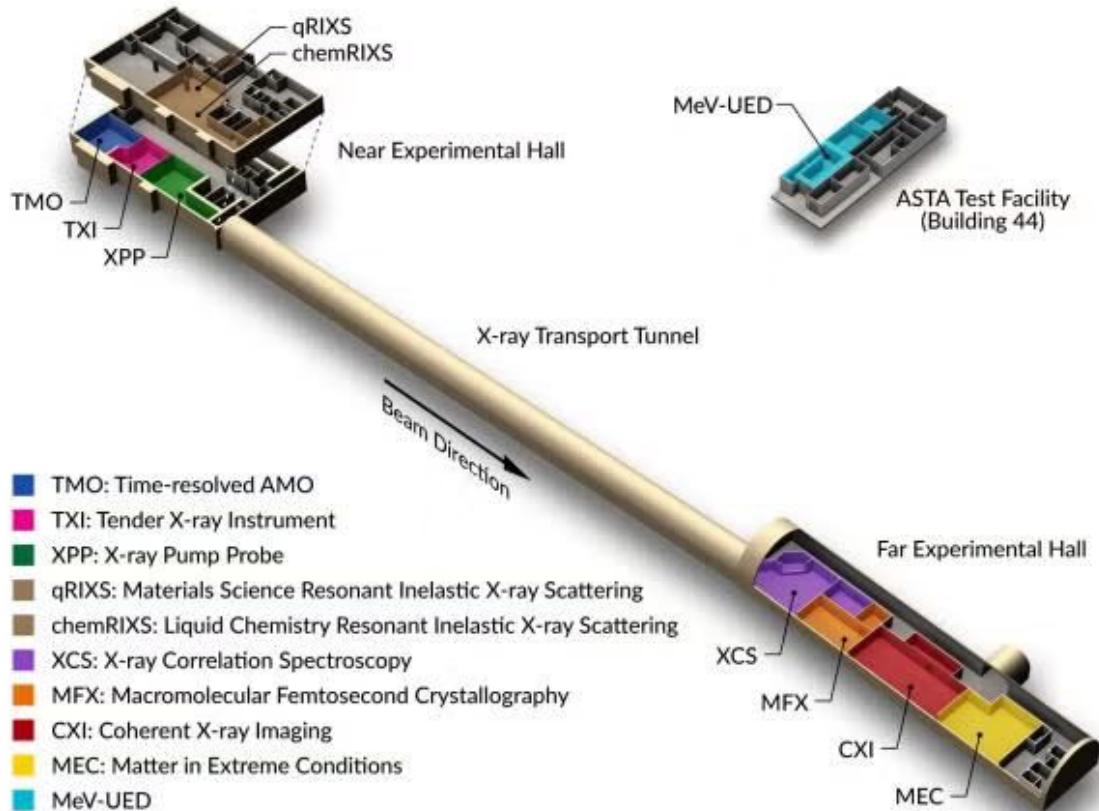
LCLS Diagram: ECS Scope*

ECS: Experiment Control Systems



* This presentation is focused on ECS; the accelerator controls are managed by a different group

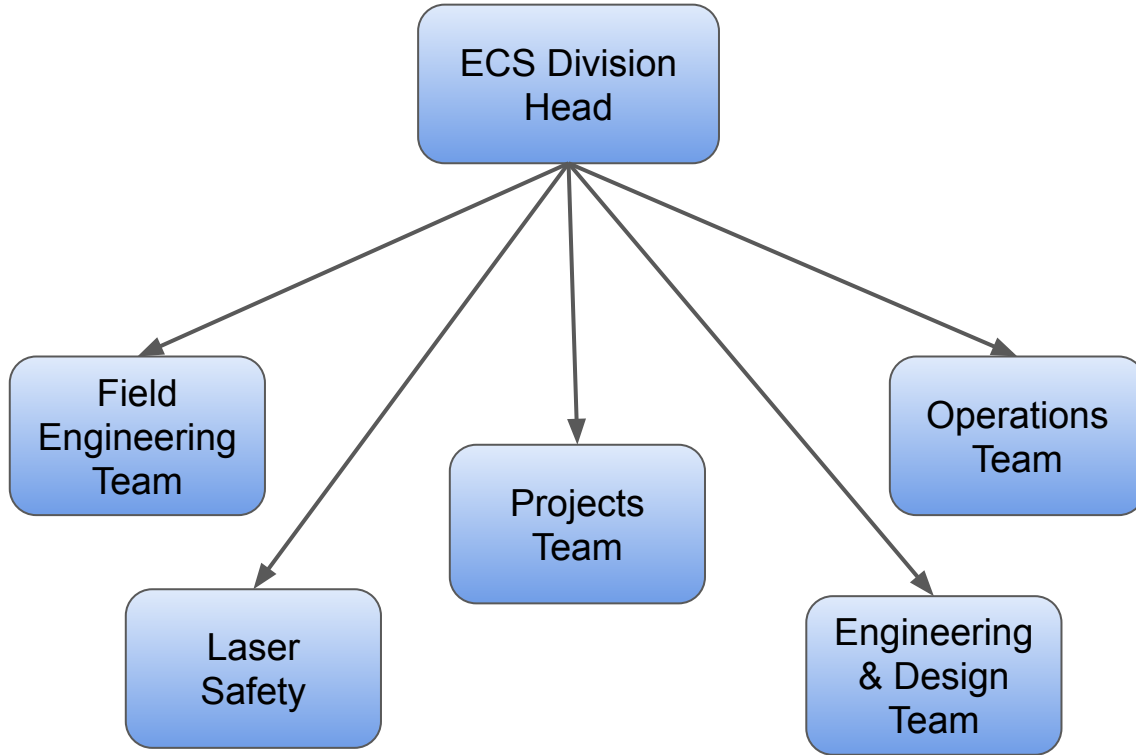
ECS Control System



As of February 2026:

- 9 hutches
- 12 interaction points
- ~1700 IOCs
- ~240 Linux servers
- > 1 million PVs

ECS Team Structure



External Teams

IT

Technical
Support

T.I.D.

IOC Lifecycle

1. Developer forks repo from main GH organization
2. Developer clones their fork to NFS & develops IOC on dev machine
3. Build/deploy/test IOC on test machine with test hardware (hopefully)
4. Push changes to GH, create PR against organization repo
5. Code review \longleftrightarrow incorporate changes \rightarrow approve & merge (master branch protected!)
6. Developer tags new version on main repo
7. Deploy a release (shallow clone of new tag) to NFS & build (scripted)
 - a. Old versions are left in directory structure

`/<ioc_deployment_area>/<ioc_name>/<GH_tag>/...`

8. Developer, field engineer, or hutch/sub-system owner updates production IOC version using IOC Manager application during maintenance period

IOC Manager Application

RIX iocmanager R3.0.3 (on rix-control)

Configuration IOC Control Utilities

IOC Name	IOC ID	State	Status	Host	OS	PORT	Version	Parent	Information
QRIX TPR 1	ioc-qrix-tp1	Dev	RUNNING	ctl-rix-qrix-cam-01	rhel9	30001	/reg/g/pcds/epics-dev/opperman/rix/ioc/ioc-rix-tp1Standalone	ioc/common/tp1Standalone/R2.0.0	
Rack 2 PDU (Beamline)	ioc-rix-pwr-r02	Dev	RUNNING	ctl-rix-qrix-cam-01	rhel9	39105	/reg/g/pcds/epics-dev/opperman/rix/ioc/ioc-rix-pdu_snmp	ioc/common/pdu_snmp/R3.3.1	
Rack 3 PDU (QRIXS)	ioc-rix-pwr-r03	Dev	RUNNING	ctl-rix-qrix-cam-01	rhel9	39109	/reg/g/pcds/epics-dev/opperman/rix/ioc/ioc-rix-pdu_snmp	ioc/common/pdu_snmp/R3.3.1	
Rack 4 PDU (ChemRIXS)	ioc-rix-pwr-r04	Dev	RUNNING	ctl-rix-qrix-cam-01	rhel9	39100	/reg/g/pcds/epics-dev/opperman/rix/ioc/ioc-rix-pdu_snmp	ioc/common/pdu_snmp/R3.3.1	
Rack 5 PDU (Laser)	ioc-rix-pwr-r05	Dev	RUNNING	ctl-rix-qrix-cam-01	rhel9	39104	/reg/g/pcds/epics-dev/opperman/rix/ioc/ioc-rix-pdu_snmp	ioc/common/pdu_snmp/R3.3.1	
Rack 6 PDU (PAXS)	ioc-rix-pwr-r06	Dev	RUNNING	ctl-rix-qrix-cam-01	rhel9	39102	/reg/g/pcds/epics-dev/opperman/rix/ioc/ioc-rix-pdu_snmp	ioc/common/pdu_snmp/R3.3.1	
Rack 7 PDU (Laser)	ioc-rix-pwr-r07	Dev	RUNNING	ctl-rix-qrix-cam-01	rhel9	39103	/reg/g/pcds/epics-dev/opperman/rix/ioc/ioc-rix-pdu_snmp	ioc/common/pdu_snmp/R3.3.1	
SVLS PDU	ioc-rix-pwr-svls	Dev	RUNNING	ctl-rix-qrix-cam-01	rhel9	39106	/reg/g/pcds/epics-dev/opperman/rix/ioc/ioc-rix-pdu_snmp	ioc/common/pdu_snmp/R3.3.1	
QRIX GIGE 05	ioc-qrix-gige-05	Dev	RUNNING	ctl-rix-qrix-cam-02	rhel9	30002	/reg/g/pcds/epics-dev/kaushikm/ioc/rix/gigECam/	ioc/common/gigECam/R6.2.1	
QRIX GIGE 06	ioc-qrix-gige-06	Dev	RUNNING	ctl-rix-qrix-cam-02	rhel9	30005	/reg/g/pcds/epics-dev/kaushikm/ioc/rix/gigECam/	ioc/common/gigECam/R6.2.1	
QRIX GIGE 07	ioc-qrix-gige-07	Dev	RUNNING	ctl-rix-qrix-cam-02	rhel9	39100	/reg/g/pcds/epics-dev/kaushikm/ioc/rix/gigECam/	ioc/common/gigECam/R6.2.1	
QRIX GIGE 08	ioc-qrix-gige-08	Dev	RUNNING	ctl-rix-qrix-cam-02	rhel9	39101	/reg/g/pcds/epics-dev/kaushikm/ioc/rix/gigECam/	ioc/common/gigECam/R6.2.1	
QRIX TPR 2	ioc-qrix-tp2	Dev	RUNNING	ctl-rix-qrix-cam-02	rhel9	30001	/reg/g/pcds/epics-dev/opperman/rix/ioc/ioc-rix-tp1Standalone	ioc/common/tp1Standalone/R2.0.0	
QRIXS ICT 01	ioc-qrix-plv-pdu-01	Dev	NOCONNECT	ctl-rix-qrix-cam-02	rhel9	30101	/reg/g/pcds/epics-dev/opperman/rix/ioc/ioc-rix-ict	ioc/common/ict/R2.1.0	
AT1K2 Calculator IOC	ioc-rix-at1k2-calc	Dev	RUNNING	ctl-rix-qrix-mot-01	rhel7	34001	/reg/g/pcds/epics-dev/wwright8/ioc/rix/ioc-rix-at1k2-calc	caproto conda local	
QRIX Lakeshore 336	ioc-qrix-ls336-01	Dev	RUNNING	ctl-rix-qrix-mot-01	rhel7	39102	/reg/g/pcds/epics-dev/opperman/rix/ioc/ioc-rix-lakeshore336	ioc/common/lakeshore336/R2.2.3	
QRIXS ICT 02	ioc-qrix-plv-pdu-02	Prod	RUNNING	ctl-rix-qrix-mot-01	rhel7	30102	ioc/rix/ict/R1.1.0	ioc/common/ict/R2.1.0	
QRIXS Motion PLC IOC	ioc-plc-qrix-mot	Prod	RUNNING	ctl-rix-qrix-mot-01	rhel7	31013	ioc/rix/cls-plc-qrix-motion/v0.4.0/iocBoot/ioc-qrix-motion	ioc/common/ads-ioc/R0.8.0	
QRIXS Smaract Controller 1	ioc-mcp-qrix-01	Dev	RUNNING	ctl-rix-qrix-mot-01	rhel7	32000	/reg/g/pcds/epics-dev/nlentsz/smaract/build/iocBoot/ioc-rix-qrix-...	ioc/common/smaract/R2.0.0	
QRIXS Smaract Controller 2	ioc-mcp-qrix-02	Dev	RUNNING	ctl-rix-qrix-mot-01	rhel7	32001	/reg/g/pcds/epics-dev/nlentsz/smaract/build/iocBoot/ioc-rix-qrix-...	ioc/common/smaract/R2.0.0	
QRIXS Smarpod	ioc-qrix-smarpod-01	Dev	RUNNING	ctl-rix-qrix-mot-01	rhel7	30001	/reg/g/pcds/epics-dev/opperman/rix/ioc/ioc-common-SmarPod	/reg/g/pcds/epics-dev/opperman/rix/io...	

Current IOC: Heartbeat:

Time of Day: Boot Time:

Location: Description:

Find PV:

User: rioxpr (full auth) (ssh/git ready)

Infrastructure Monitoring

Grafana + archiver data source + Slack integration

The sidebar menu shows the following structure:

- Home
- Bookmarks
- Starred
- Dashboards
 - Accelerator Cryo Systems
 - ACR
 - CXI
 - CXI Basic
 - CXI FMS
 - KB2 Thermocouple Temperatures
 - Laser drift
 - LV65
 - Detector Group
 - Facility Monitoring System
 - FEE
 - General Alerting
 - Grafana Development
 - Grafana Training
 - KFE
 - LAS
 - LFE
 - MEC
 - MFx
 - peregrine sandbox
 - Precision Environment Monitoring
 - RIX
 - Sandbox
 - SSED
 - System Dashboards

