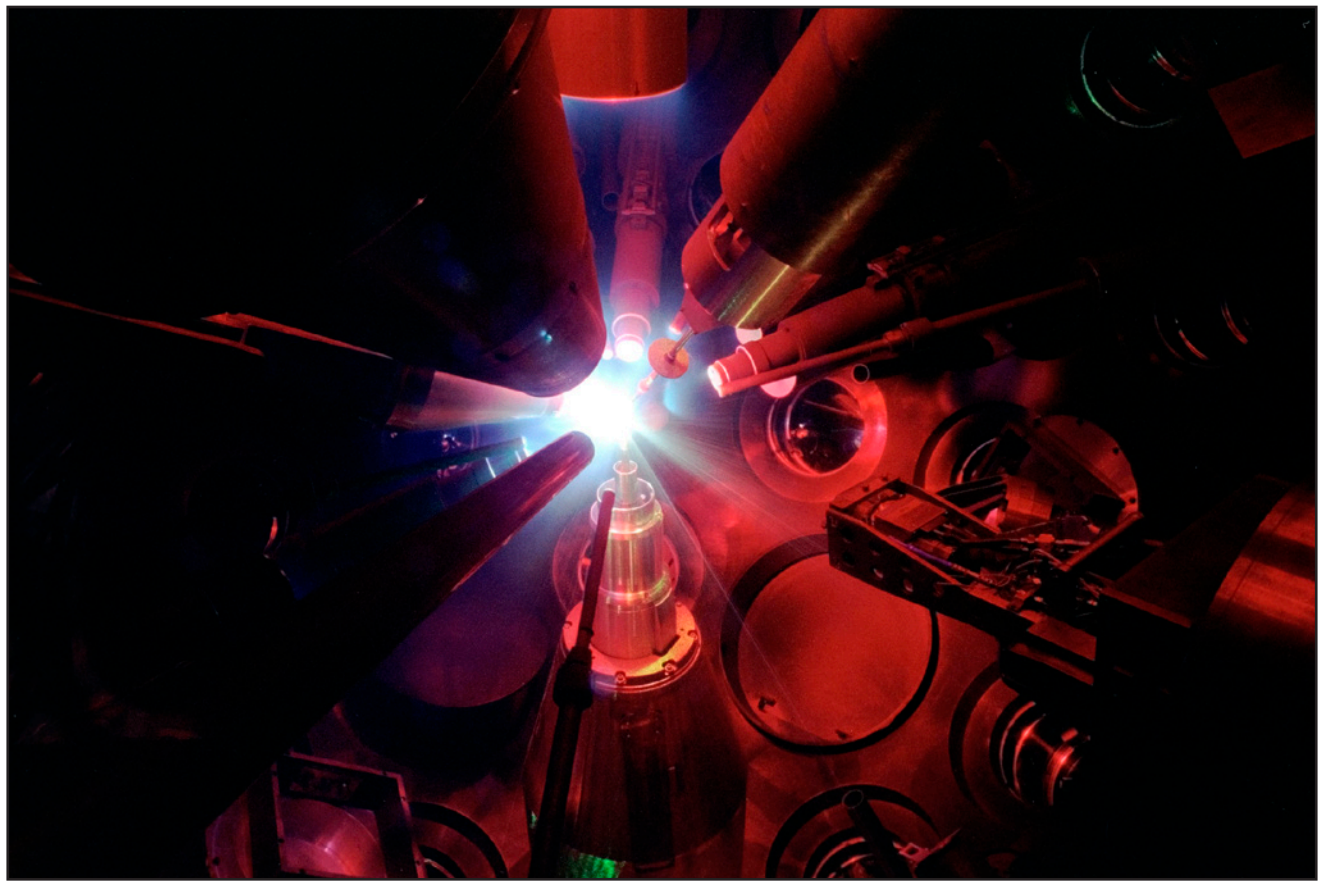
Engineering Support and Qualification Process for Interfacing New Experiments



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Omega Laser Facility
Users' Group Workshop
Rochester, NY
29 April – 1 May 2009

Summary

Qualification is mandatory for all subsystems installed on Omega facilities

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- Agenda
  - motivation for formal qualification
  - important information on the LLEINST7700F process
  - strategies for optimizing the qualification process

Why are formal qualifications required for all new or modified equipment?

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- Ensure safety
- Assure integration
- Optimize equipment design
- Support long-term serviceability

Every new or modified subsystem is reviewed, approved, and integrated into the Omega facility a minimum of two weeks prior to first operational use.

The qualification process supplements, but does not necessarily replace the developer's internal design review process.

LLE Instruction 7700F defines the design and integration of equipment

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- What
  - specifies design review, operational readiness review, and documentation requirements to ensure that safety, reliability, and all other relevant factors are addressed during the equipment design and qualification process
- Where
  - www.lle.rochester.edu/pub/documents/ext/7700.pdf

LLE7700F "applies to projects that produce new equipment or significant modifications to existing equipment ..."

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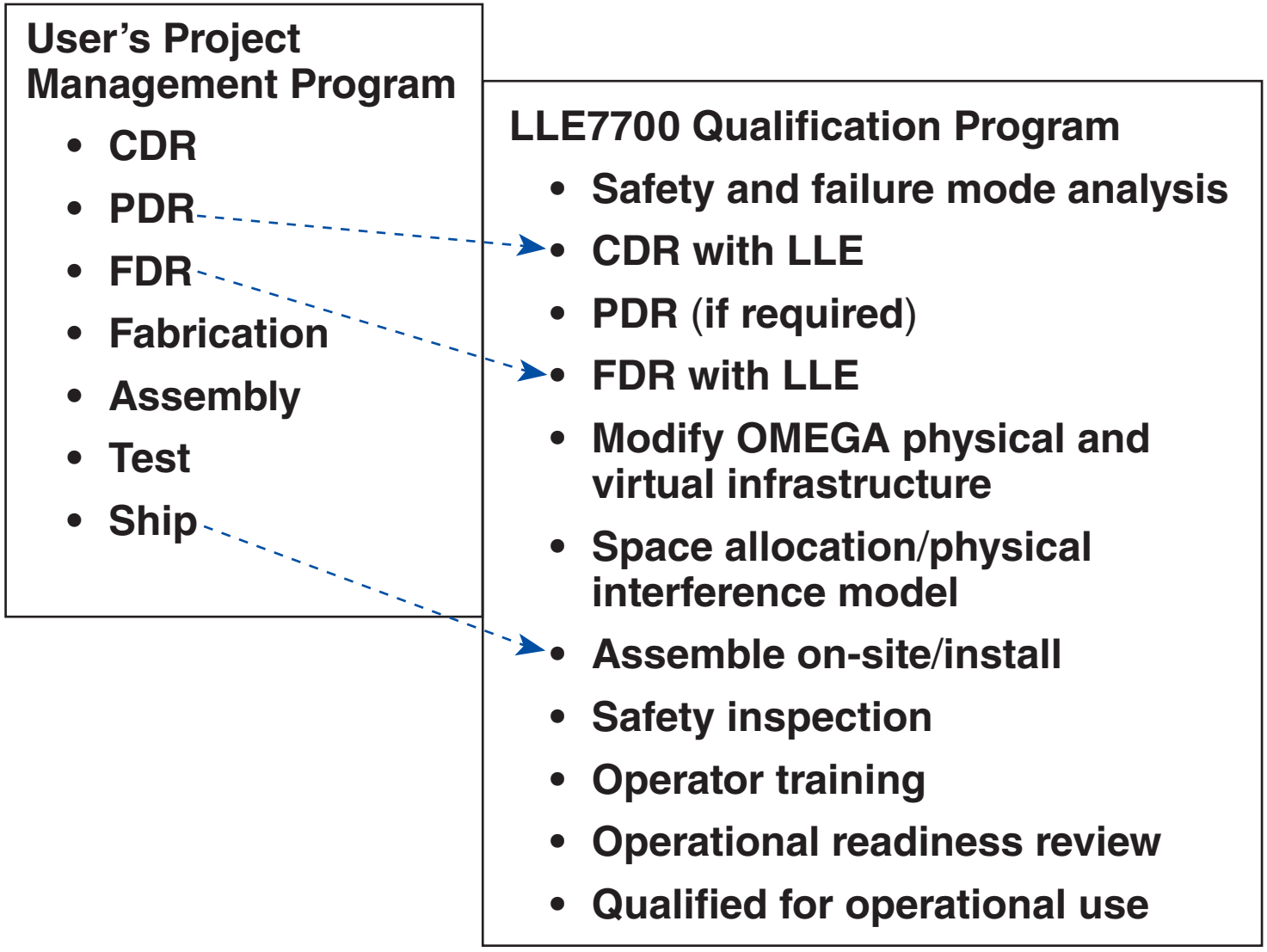
- Significant modifications can affect
  - operational characteristics,
  - structural integrity,
  - safety of a previously qualified piece of equipment, and
  - can involve more than one engineering discipline
- Full requalification is not required for minor changes
  - Engineering Division Director approval is required
  - changes may be approved as part of the normal PDM design approval process
  - modifications may be implemented via a Work Authorization Procedure (WAP) permit

The OMEGA diagnostic qualification program overlays the User's Project Management Program



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Specific deliverables are required at each design review

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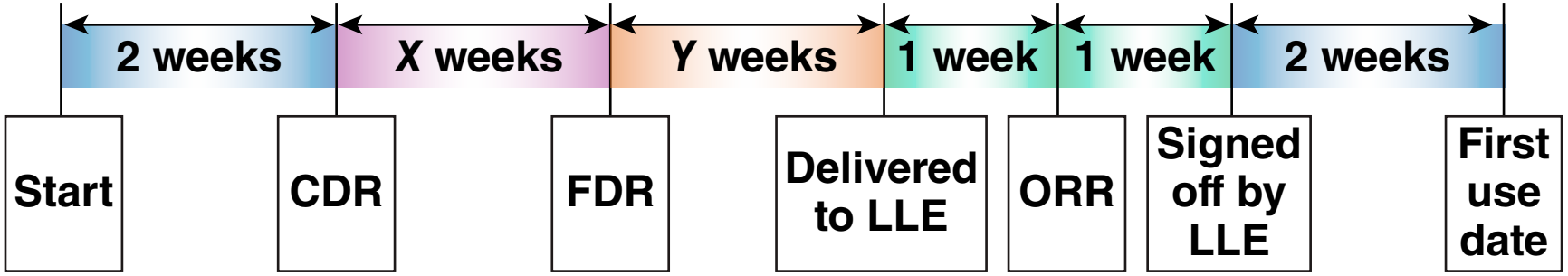
CDR	FDR	ORR
• Project Plan • ID Project Team • Requirements Document • Safety Risk Analysis (SRA) • Failure Mode Effect Analysis (FMEA) • Schedule [Equipment Qualification Checklist (EQC)]	• Completed final design • Updated requirements • Assembly drawings, BOM, schematics • Assembly, alignment, test procedures • Preliminary software packages • Preventative maintenance plan • CDR action items complete • Revised SRA, FMEA, EQC	• Completed EQC • Final install, operating, and maintenance procedures • Final assembly drawings, BOM, schematics • Database and software updates • Fit/function test results • Safety inspection complete • Final SRA and FMEA • All CDR and FDR action items complete

Negotiating and maintaining a realistic schedule is critical to meeting objectives

- No unapproved systems are allowed to operate on OMEGA or OMEGA EP
- Typical delivery of hardware for install is four weeks prior to first operational use (complexity dependent)
- Elapsed times of 8 to 12 weeks from FDR to parts ready for assembly are common
- Allow additional time to make it possible to correct action items found at FDR, assembly/install, safety inspection, and ORR



Qualification must be completed no later than two weeks prior to first operational use.

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Important elements in qualification

- Required first date of use is declared on campaign proposal no later than 8 weeks to first deployment
- Project team includes an LLE-resident project manager
  - maintains project momentum
  - monitors progress and verifies all details
  - ensures communication with LLE stakeholders
  - may be an LLE collaborator
- LLE will consider all proposals, but feasibility and complexity will determine our level of support
- The developer is responsible for negotiating for LLE resources
- A schedule driven by the initial use date is vital
- Expect operation to be conducted by trained LLE full-time staff
- Initiate a project by contacting:

Greg Pien
Manager, OMEGA Experimental Operations
pien@lle.rochester.edu
(585) 275-5848

Reference information for diagnostic design

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- LLE Specification Control Drawings (SCD's)
  - D-EA-B-035 Boat Weldment
  - D-EA-C-094 TIM Diagnostic envelope drawing
- LLE Specifications and Standards
  - LLE TIM-Based Diagnostic Design Requirements document
  - M-AA-G-017 "Design Specification for Static-Face Seal O-Ring Glands"
  - M-AA-G-044 "OMEGA EP Structures Fabrication Specification"
  - M-AA-G-048 "OMEGA EP Precision Cleanable Components, Manufacturing Specification"
  - M-CC-G-007 "Guidelines for Selecting Materials for use in OMEGA EP Vacuum Vessels"
  - LLE Instruction 6610 "LLE Radiological Controls Manual"
  - LLE Instruction 6706 "Beryllium Safety Procedures"
  - LLE Instruction 7700 "Design and Integration of Equipment"
  - LLE Instruction 9800 "Introduction of Computers into the Omega Facility
- LLE Operational Data
  - OMEGA and OMEGA EP Target Chamber Port Assignment List

A downloadable design guide package will be available soon.

Summary/Conclusions

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