# LCLS Collaboration Drawing Control

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<thead>
<tr>
<th>Name</th>
<th>Role/Institution</th>
<th>Signature</th>
<th>Date</th>
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<tbody>
<tr>
<td>P. Duffy</td>
<td>(LCLS LLNL)</td>
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<td>6-9-05</td>
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<tr>
<td>M. Dutcher (Author)</td>
<td>(MD SLAC)</td>
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<td>D. Walters (LCLS ANL)</td>
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<td>5/11/05</td>
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<tr>
<td>Donn McMahon (LCLS LLNL)</td>
<td>Authors</td>
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<td>Electron Beam System Manager</td>
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<tr>
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<td>5/23/05</td>
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<tr>
<td>Steve Milton</td>
<td>Undulator System Manager</td>
<td></td>
<td>2/25/05</td>
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<tr>
<td>Richard Bionta</td>
<td>X-Ray TOD System Manager</td>
<td></td>
<td>May 11, 2005</td>
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<td>John Arthur</td>
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<td>5-24-05</td>
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<td>David Saenz</td>
<td>Conventional Facilities System Manager</td>
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<td>4/18/05</td>
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<tr>
<td>Mark Reichanadter</td>
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Date: 6-8-05
John Galayda
Project Director
Darren Marsh
Quality Assurance Manager

Brief Summary: This specification outlines the minimum requirements for the numbering of LCLS project drawings. It outlines the project's plan as to how and when to recover drawings from all LCLS collaborators and explains how these documents will be stored at SLAC.

Keywords: Drawing Numbers, Drawings, Design Files, Step, DXF, PDF, Drawing Storage

Key WBS#'s: 1.1; 1.2; 1.3; 1.4; 1.5; 1.6; 1.9
Introduction

The LCLS project is a collaboration of three (3) major national laboratories; SLAC, ANL, and LLNL. These organizations will use different engineering/design software packages to model, document, and control the construction of specific LCLS systems.

With the acceptance of collaboration hardware at SLAC, control of drawing documents and related digital data files for the entire project will become SLAC’s responsibility. Prior to hardware delivery at SLAC, responsibility for drawing document control resides solely with the individual author.

The SLAC Mechanical Design Department will address this responsibility in two ways:

1. All LCLS collaboration released documents will be electronically stored and revision controlled through the SLAC MD Drawing system.
2. SLAC MD will create and maintain a PDM Server that will manage related digital data files of different formats. This server and its contents will be viewable via the web thru a VPN account using appropriate security restrictions. This server will provide additional features, with files suitably constructed, to those using Solid Edge software and the appropriate SLAC user identification.

In order to successfully accomplish these tasks SLAC Mechanical Design requires:

1. A SPIRES compatible drawing name assigned to all LCLS drawing documents.
2. A SLAC drawing number assigned to all LCLS drawing documents in the LCLS WBS assigned hierarchy.
3. An updated drawing tree that correlates the SLAC drawing number with the collaborator identification. This will greatly facilitate the absorption of collaboration files into a single, accessible system that will reside at SLAC.
4. All 3D models and 2D files will be in the following formats:
   a. 3D = STEP or IGES
   b. 2D = DXF or IGES and a PDF

SLAC/LCLS Contacts

Mike Dutcher will be the SLAC site contact for LCLS Collaboration Drawing Control. He will directly assist and or direct problems with the handling and the eventual archiving of all LCLS drawings to the proper LCLS resource. Mike can be reached at (650) 926-3810 or by E-Mail at: mdutcher@slac.stanford.edu.
**Drawing Numbers / Hierarchy**

**Figure 1** represents a numerical distribution of core SLAC drawing numbers at System Level of the LCLS WBS.

**SLAC Drawing Number**

All drawings necessary for each LCLS System will be assigned a complete SLAC Drawing Number from each system’s section. All LCLS System collaborators will organize a System Drawing Tree within their assigned section of drawing numbers.

A complete SLAC drawing number requires a Drawing Type prefix as defined in SLAC Specification DS-016-110-04 / Section 2. A revision number suffix is also necessary to create a complete SLAC drawing number.

**Spires Drawing Name**

SPIRES is the SLAC database system list of released drawings. A SPIRES Title is a condensed, 30 character version of the three-line drawing title abbreviated per ASME Y14.38, 1994.
All drawing formats require a SPIRES Title to preferably appear approximately below the format border and underneath the drawing title block. SLAC CAD drawing formats have a defined, 30-character data field in which SPIRES Title text can be placed.

Due to the limitation of 30 characters maximum, use approved abbreviations to fully describe the drawing title whenever possible.

Collaborators must uniquely assign, record, status, and correlate SLAC drawing numbers and SPIRES Titles with their own unique system of document control. This correlation is best included within the System’s Drawing Tree.

Drawings with assigned numbers that are not required after System Commissioning are to be identified as obsolete. Model Name and/or Electronic File Name for each necessary drawing are also important identities to be included in the final version of the Drawing Tree supplied to SLAC.

**Drawing Transfer to SLAC**

LCLS is concerned with only three cases of drawing transfer from collaborators:

1. Working
2. Released
3. As Built

**Working**

During the design cycle, graphical information will need to be shared between collaborators. LCLS Management considers this exchange to be a point-to-point concern between collaboration members. Working information can be exchanged in many mutual formats and by many methods. Since working files are temporary to the design cycle, there will be no attempt to archive these transfers.

To assist in the ‘working’ transfer of files, LCLS will establish a System Drop Box on the LCLS Home page.

All registered LCLS Users can have read access to the project Drop Box. Under each system a folder structure that will best facilitate information exchange should be established by each collaborator.

A consistent naming convention should be used to identify working files on the SLAC “V: Drive” as defined by each Lab’s Design Tree.
**Released**

At the collaborator defined point of document release, the responsible collaborators will deliver a sufficient package of ‘released’ drawings to LCLS Project Management. This delivery will include electronic files in Adobe PDF format that represent the sub-system.

These copies and files are considered temporary and will be purged with the delivery of ‘As Built’ drawings.

**As Built**

All final collaboration drawings will represent the ‘As Built’ condition.

Complete ‘As Built’ documents and drawing tree will be delivered to LCLS Project Management Office Drawing Manager. This should occur no later than upon delivery of collaboration hardware to SLAC.

SLAC’s minimum requirement will be a half size paper copy (not to exceed “C” size), Adobe PDF file, STEP or IGES file, and a DXF file for every LCLS component delivered.

Given the transient state of the neutral file formats within the CAD industry, the specific format will be agreed upon by LCLS Project Management and each collaborator at the time of delivery and should be consistently applied.

Until the acceptance of ‘As Built’ drawings, each collaborator is responsible for documentation and revision control within their local system.

**SLAC Mechanical Design Archive**

All released drawings and associated electronic files will be controlled by the SLAC Mechanical Design Department.

Meta data for these documents will be managed and controlled using SLAC data management systems. Once integrated, LCLS engineering drawings will be searchable and viewable through a Web interface.

Revision control for final LCLS drawings will become a SLAC responsibility.
Appendix

The appendix includes a sample of each collaborator's Drawing Title Block and Web page Drop box and instructions for uploading files.
### LCLS Project Home Page

#### LCLS Project Office
- Project Office Page
- Upload Files to Project Office
- PMCS
- WEB Development

#### Project Databases
- Parameters
- Drawings (Index)
- Upload Drawings (ANL)
- Upload Drawings (LLNL)
- Controls
- Racks, Crates, Cabling
- DEPOT (Manual)
- Purchasing Requisitions

#### Announcements Meetings
- EIR
  - January 25-27 LCLS Week
- April 4-6 LCLS Week
- April 7-8 FAC Mtg
  - April 17-22 COMM2005
- April 27-29 EPICS Meeting
  - May 10-12 DOE Review
    - June 6-8 WUS2005
  - August 21-26 FEL2005

#### Technical Systems
- Injector
- Linac
- Undulator
- X-Ray TOD
- X-Ray End Station
- Conventional Facilities

#### Technical Integration
- FEL Physics
- Alignment
- Controls

#### Organization Documents
- CDR
- DOE Documents
- Major DOE Approvals
- DOE Reviews
- Project Documents

#### Advisory Committees
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### Upload Drawings from LLNL

Uploading of file to the LCLS Project office is done using the Microsoft Internet Explorer. Unfortunately, it will not work with any other browser.

It is also necessary that you are connected into the SLAC network via VPN.

Follow these steps:

1. Make sure that your computer is connected into the SLAC network. Start a VPN session, if necessary.
2. Display this page in the Microsoft Internet Explorer.
3. Double-Click the "My Computer" icon on your desktop and find the files that you want to upload.
4. Click: LLNL Dropbox to open a window to the LLNL Drawings Dropbox. You may be asked to authenticate yourself. Enter slaclabname and password for your slac windows account.
5. Drag and drop your file(s) from the "My Computer" window to the "LLNL Dropbox" window.
6. Send an email to notify the Michael Dutcher to report your upload.
7. You can close the windows when you are done.

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