# Status of the ILD Technical Documentation

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DESY

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# Overview

- Objectives
- EDMS, a short introduction
- ILD documents and 3D models in EDMS
- Next steps: define workflow processes

# What Purpose?

- **Main objectives**
  - Documentation consistency
    - Keep it current and accurate
    - Structure it for users' needs, and
    - Make it readily available to all who need to know
  - Configuration management

- Project information should be treated as a valuable item, so that it is available to support project reporting and decision making at all times.

# What Type of Documentation?

- All relevant technical documentation to ensure information persistency:
  - Regular documents:
    - Publications, reports, notes, as well as meeting, conference and seminar related files.
  - Engineering documents and data:
    - CAD models, technical drawings, specifications, requirements, standards, engineering calculations, safety documents, quality control reports, contracts, etc.

# What Functionalities are Needed?

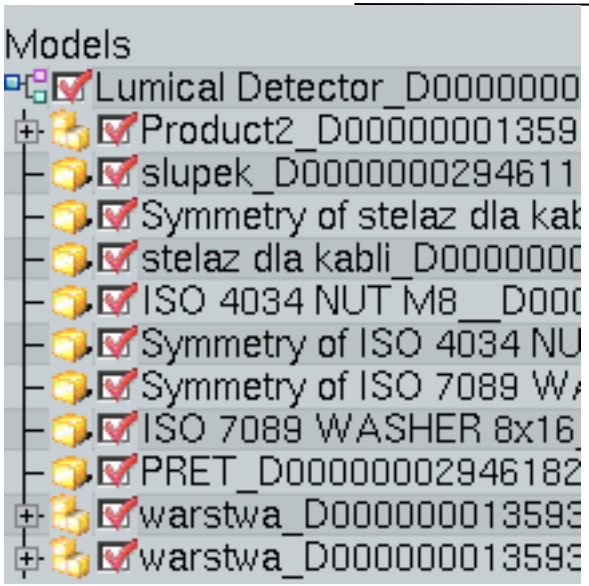
- Management of different categories of documents
- Configuration and version control
- Management of workflows, for instance for approving/releasing, change control, etc.
- Visualization and mock-up possibilities

# Technical Solution

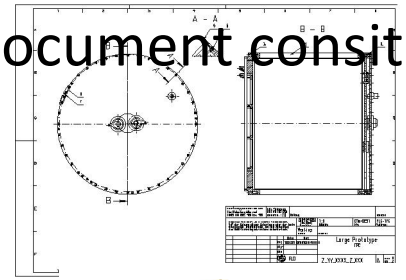
- Agreement to use an Engineering Data Management System (EDMS):
  - A complex software tool which provides functionalities such as:
    - Document and data management, including version control, access control, life cycle support
    - Design and viewing features
    - Collaborative work, including collision analysis.
  - Used at CERN for the design, procurement and construction of LHC, at DESY for the XFEL, etc.

# Benefits

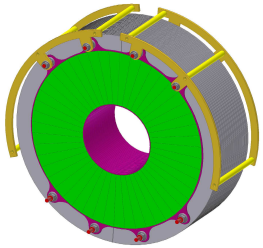
One very important benefit: It ensures document consitency.



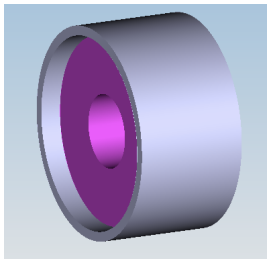

2D Drawings



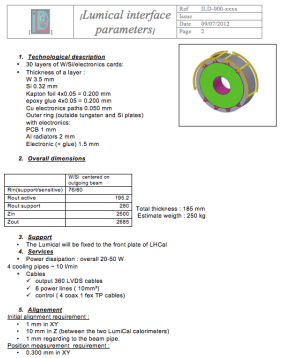
3D Detailed models



3D Simplified models
(For integration work)



Technical documents




Others…

# Create WBS

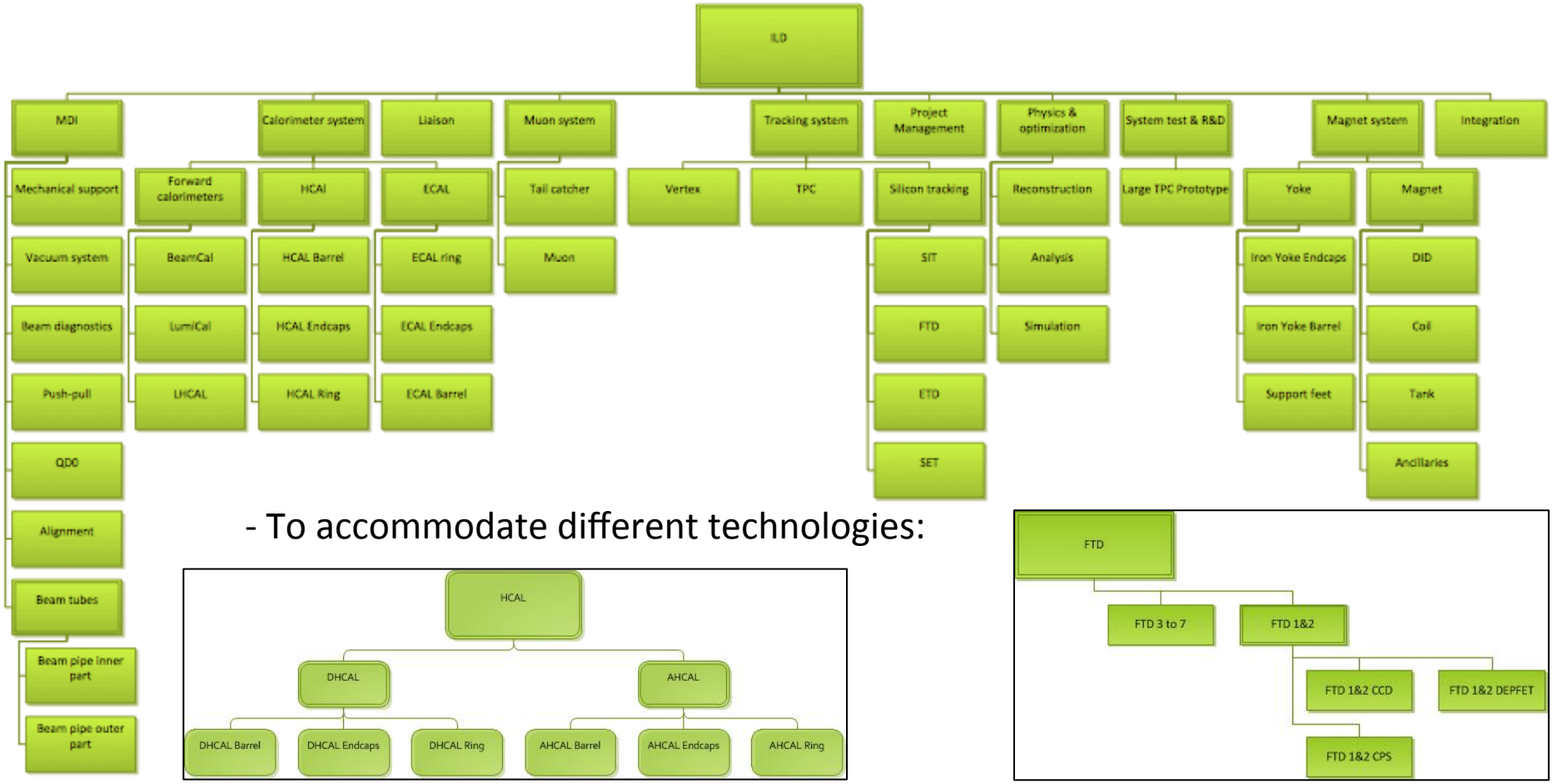
- WBS: very useful visual tool for managing scope
  - Structure which breaks the work to be done into smaller elements
  - It is a graphical way of showing the complete scope of the project
  - There are several ways of dividing the work, including by major deliverables, phase, institutions, by functional sub-systems, etc.
  - The complete WBS should contain placeholders for absolutely every item of work in the project.

- In EDMS: it helps navigation to relevant documents

# ILD WBS

- Progressive elaboration applied to ILD WBS:

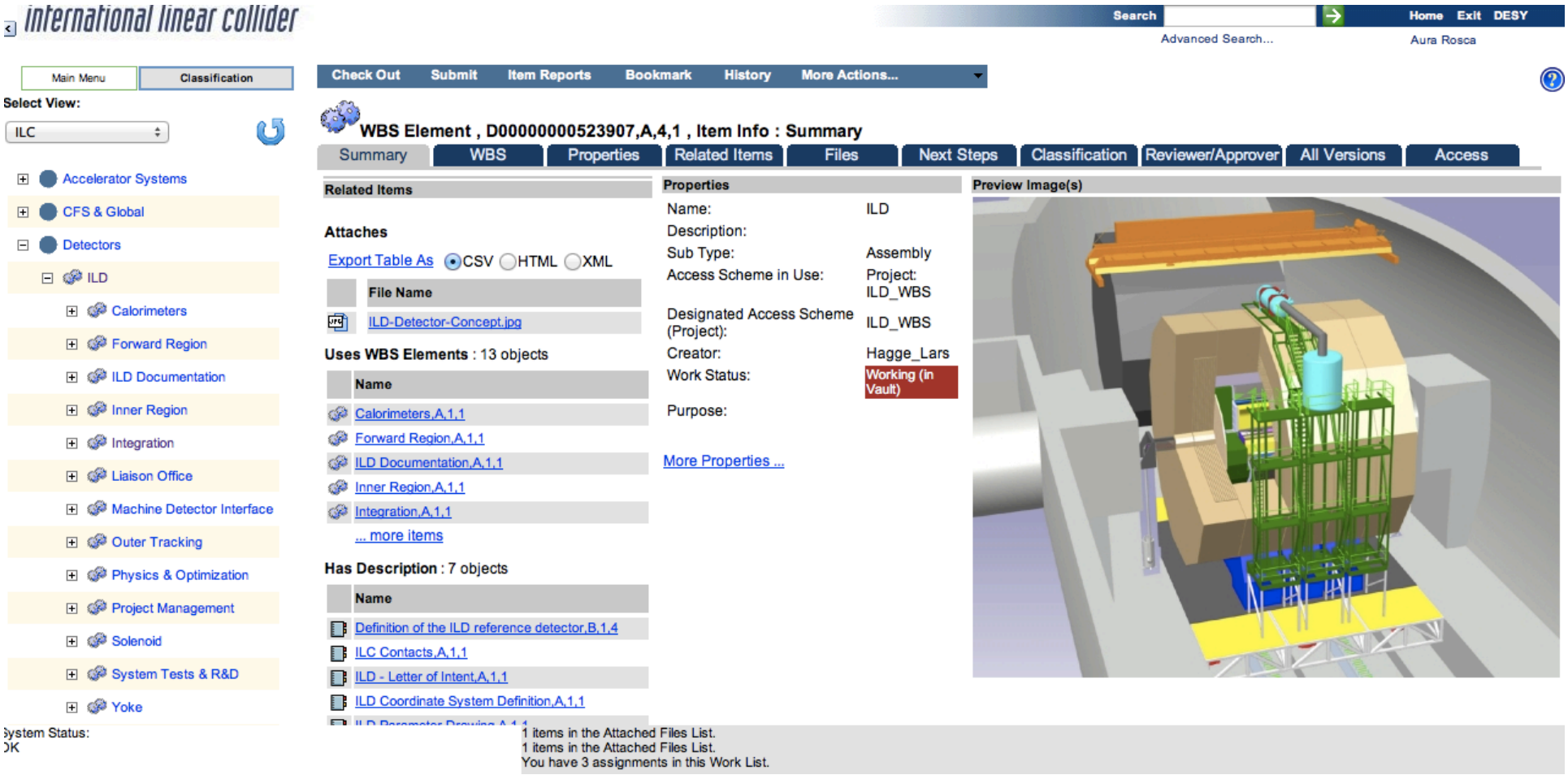
  - Updated WBS structure, implementation within EDMS is ongoing.




- To accommodate different technologies:

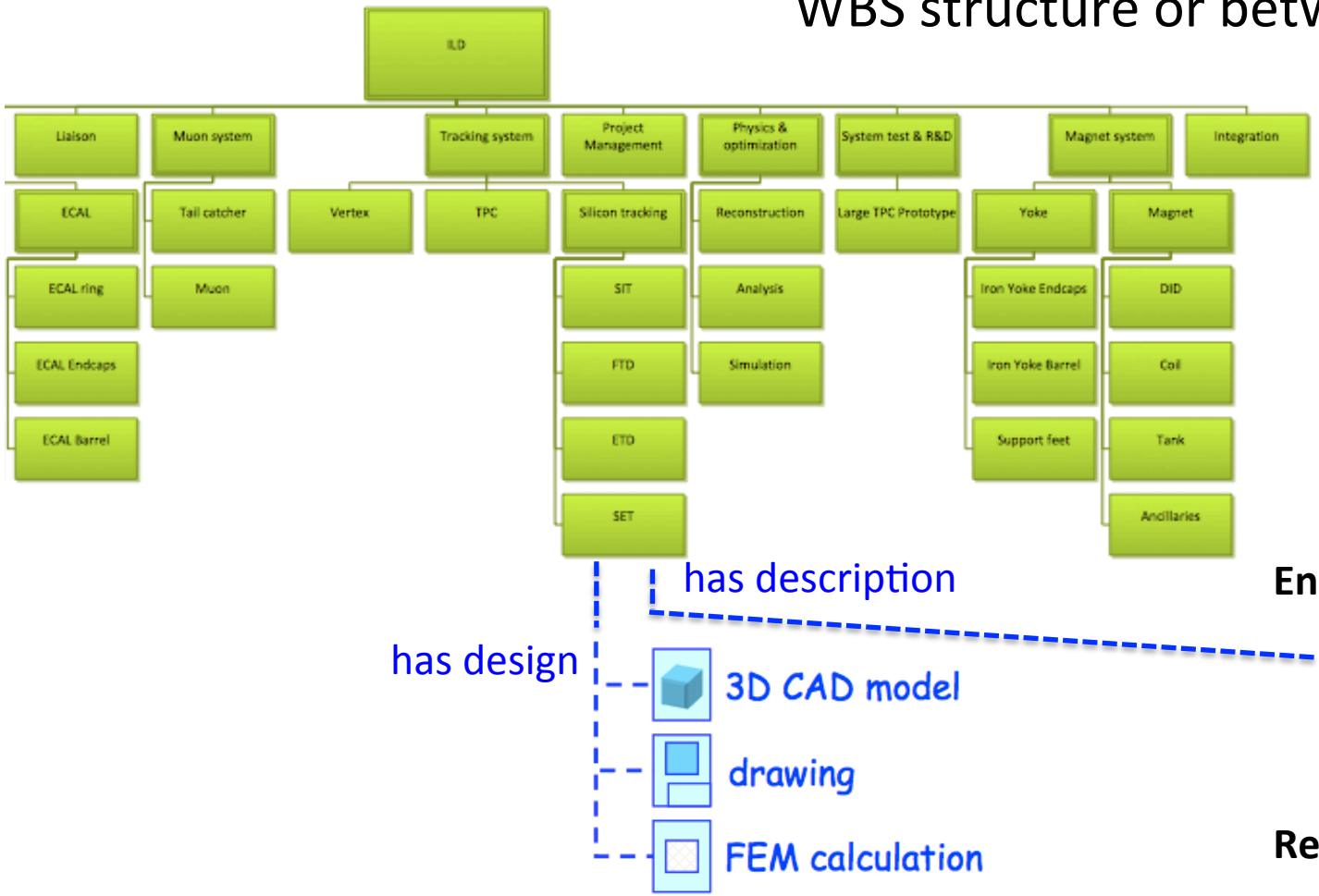
# ILD WBS in DESY EDMS

**First step:** Develop a Work Breakdown Structure or WBS



# ILD Items

- **Second step:** collect documents, upload into EDMS and link to the WBS structure or between themselves.



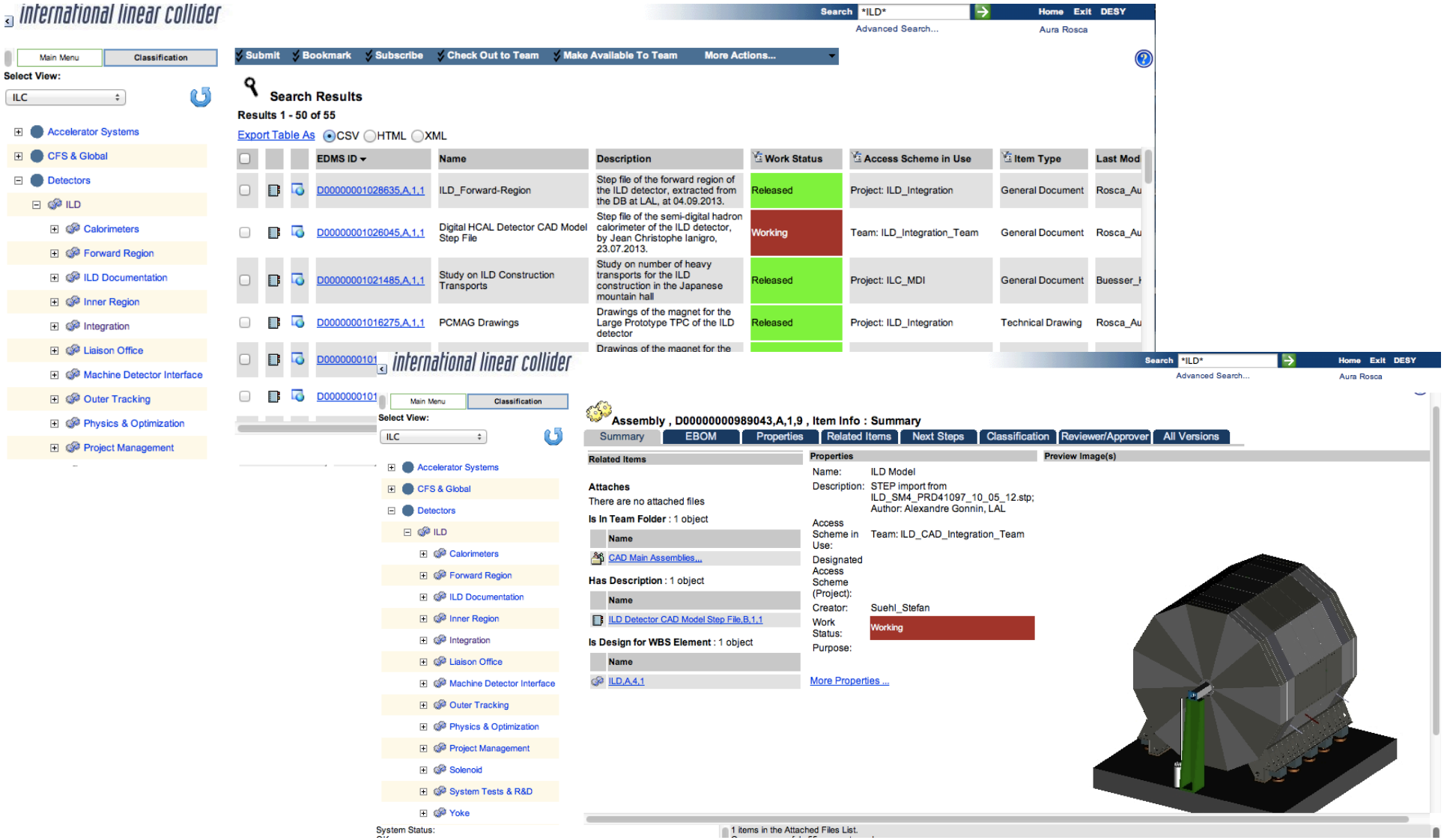

**Engineering documents:**

- Component lists
- Parameter tables
- Specifications
- Requirements

**Regular documents:**

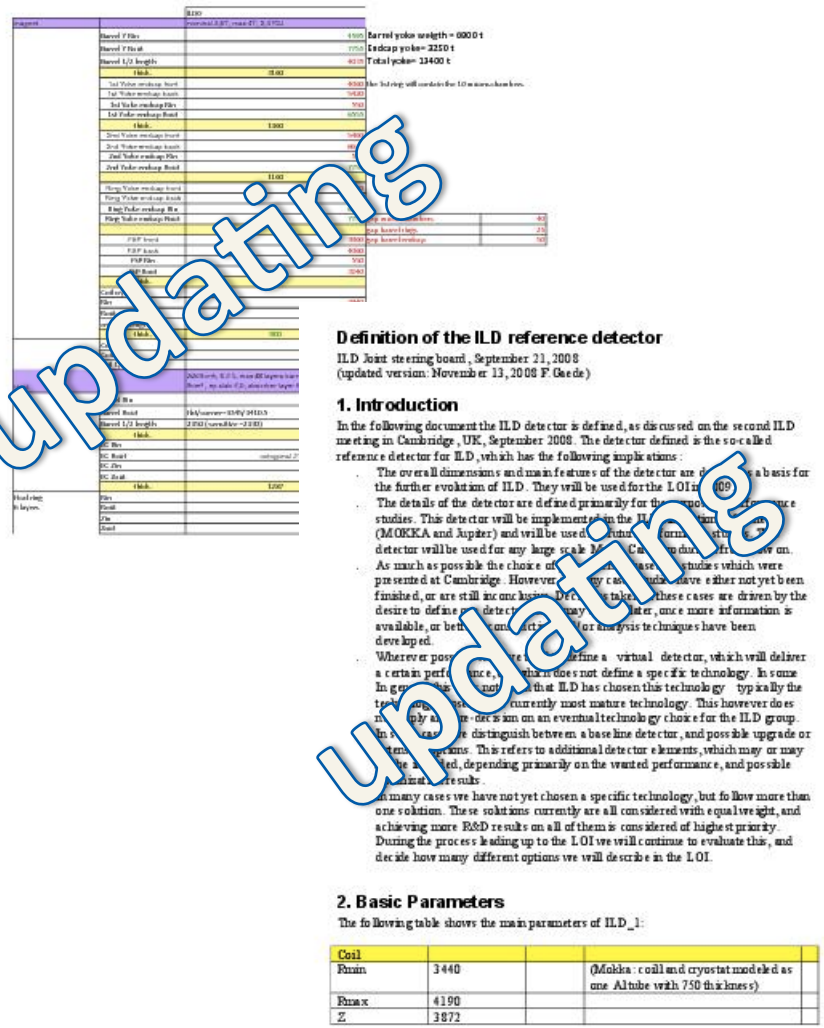
- Notes, reports, etc.

# ILD Items in EDMS



# What ILD Documents in EDMS?

- Technical notes:
  - Notes on the integration of the ILD detector;
  - ILD0dimensions-weight130209: D00000000913606
  - Definition of the ILD reference detector: D00000000913635
    - Such tables are an important tool to synchronize Engineering and Simulation models.

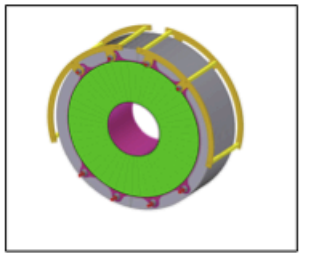



- Updates for the DBD design are ongoing, see next slide.

# New Important Documents

- Sub-system interface parameter documents, example shown for LumiCal.
  - For each sub-system and every technology
- Requirements for the detector integration, installation steps, requirements on working space, etc.
- PM documents, for now the documents relevant for the cost estimation.

| | *Lumical interface parameters* | Ref | ILD-000-xxxx |
|---|---|---|---|
| | | Issue | |
| | | Date | 09/07/2012 |
| | | Page | 2 |



1. ***Technological description***
   - 30 layers of W/Si/electronics cards:
   - Thickness of a layer :
     W 3.5 mm
     Si 0.32 mm
     Kapton foil 4x0.05 = 0.200 mm
     epoxy glue 4x0.05 = 0.200 mm
     Cu electronics paths 0.050 mm
     Outer ring (outside tungsten and Si plates) with electronics:
     PCB 1 mm
     Al radiators 2 mm
     Electronic (+ glue) 1.5 mm

2. ***Overall dimensions***

| | W/Si centered on outgoing beam |
|---|---|
| Rin(support/sensitive) | 76/80 |
| Rout active | 195.2 |
| Rout support | 280 |
| Zin | 2500 |
| Zout | 2685 |

Total thickness : 185 mm
Estimate weigth : 250 kg

3. ***Support***
   - The Lumical will be fixed to the front plate of LHCal
4. ***Services***
   - Power dissipation : overall 20-50 W

4 cooling pipes ~ 10 l/min

   - Cables
     - ✓ output 360 LVDS cables
     - ✓ 6 power lines ( 10mm²)
     - ✓ control ( 4 coax 1 fex TP cables)

5. ***Alignement***

Initial alignment requirement :
   - 1 mm in XY
   - 10 mm in Z (between the two LumiCal calorimeters)
   - 1 mm regarding to the beam pipe.

Position measurement requirement :
   - 0.300 mm in XY

# What ILD 3D Models in EDMS?

Currently linked to ILD top node:

- D00000000989043,A,1,9: Full ILD detector 3D model from Alexandre Gonnin, which is a placeholder model.
- D00000000872433,A,1,4: Placeholder model, old unmaintained version.
- D00000000952125: Mokka simulation model of ILD_01_pre01, updates for the DBD versions ILD_o1_v05, ILD_o2_v05, ILD_o3_v05 cannot be obtained from the wrl files generated by GEANT4 – many details in these models, generated files are very too big, very too slow and practically useless for anyone.

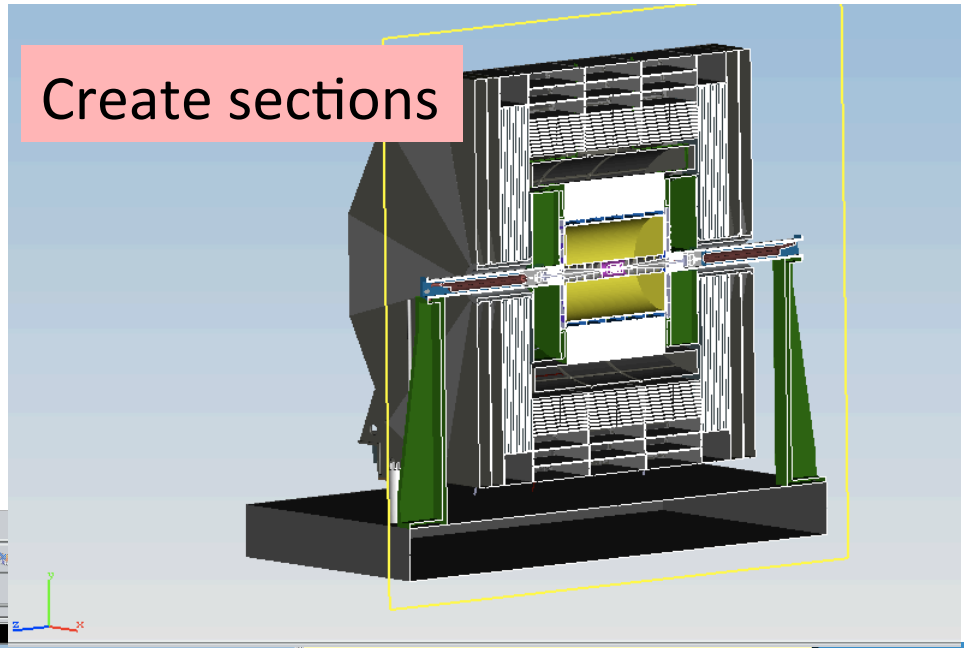
Collection of existing detailed CAD models for sub-detectors ongoing, already uploaded for several systems.

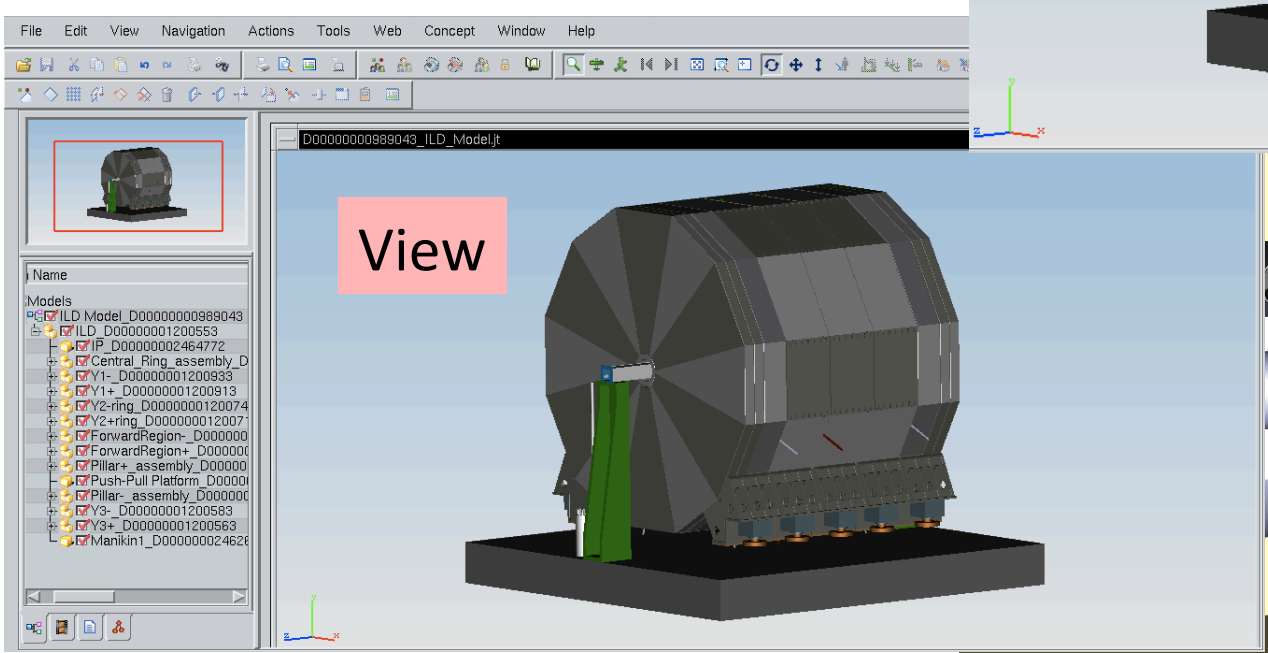
# Exchange of Data

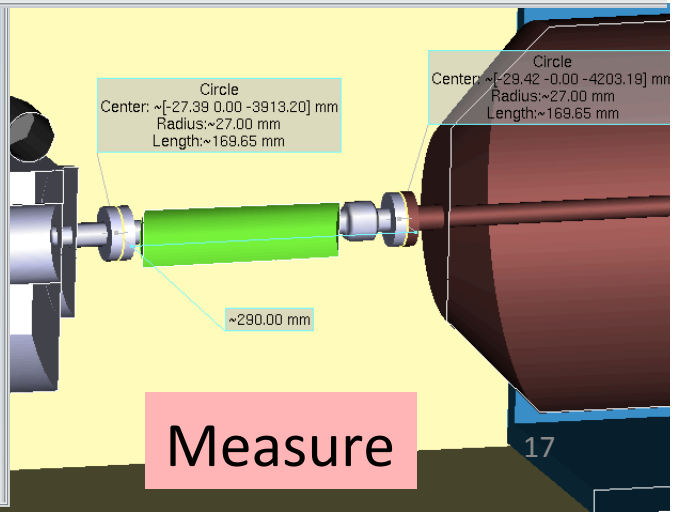
- Sub-system models are contributed by designers at different laboratories.
- We need to define rules for the CAD data exchange
  - Some issues that came up several times recently:
    - Data exchange format.
      - Recommended: STEP AP214.
    - Definition of the reference coordinate system.
      - There is an official document defining the ILD coordinate system for physics studies, but no document for the CAD integration work.

# 3D Viewers: iSeries and JT2Go

- Every CAD part and drawing has visualization files that can be viewed without using a CAD system.



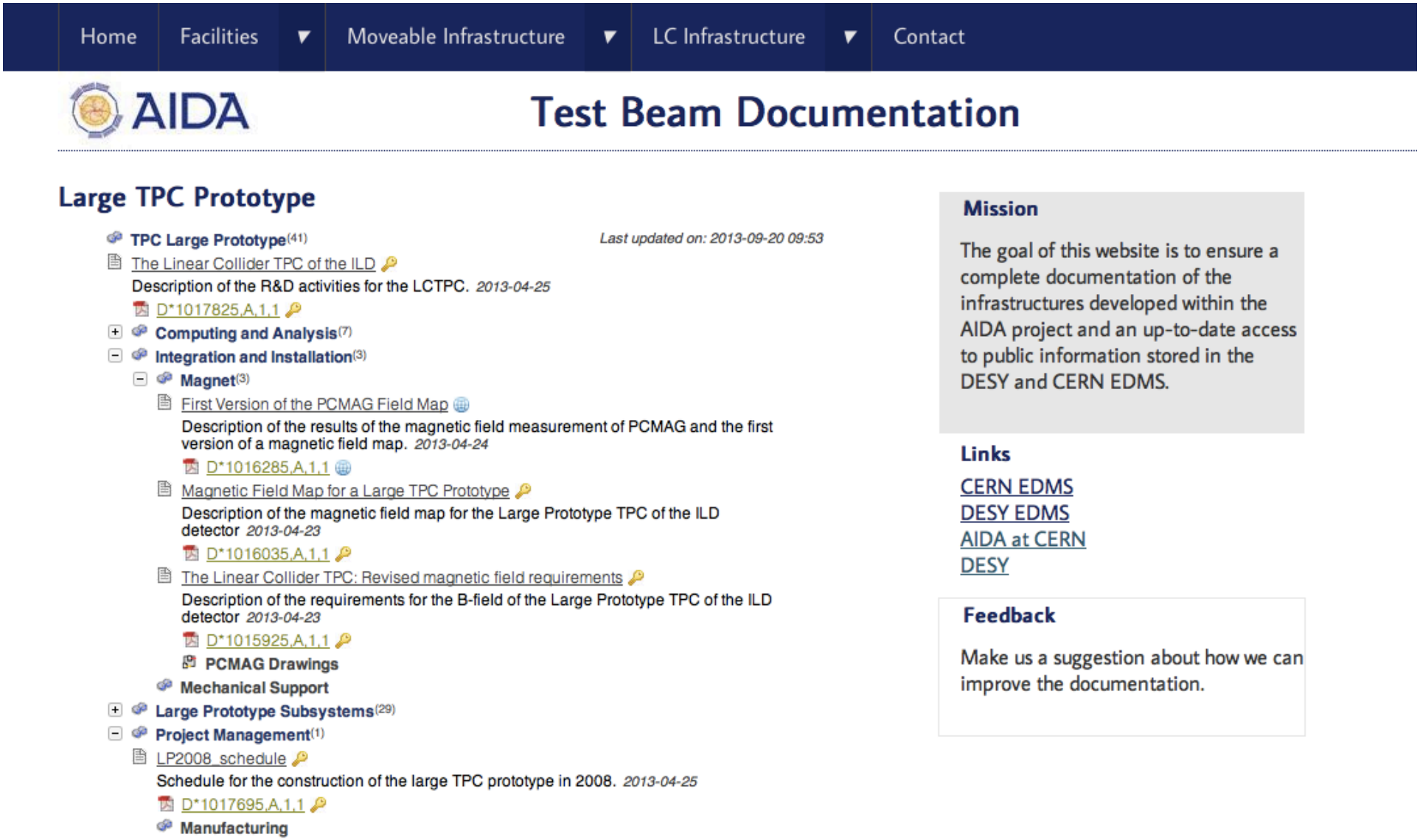



# Web Interface

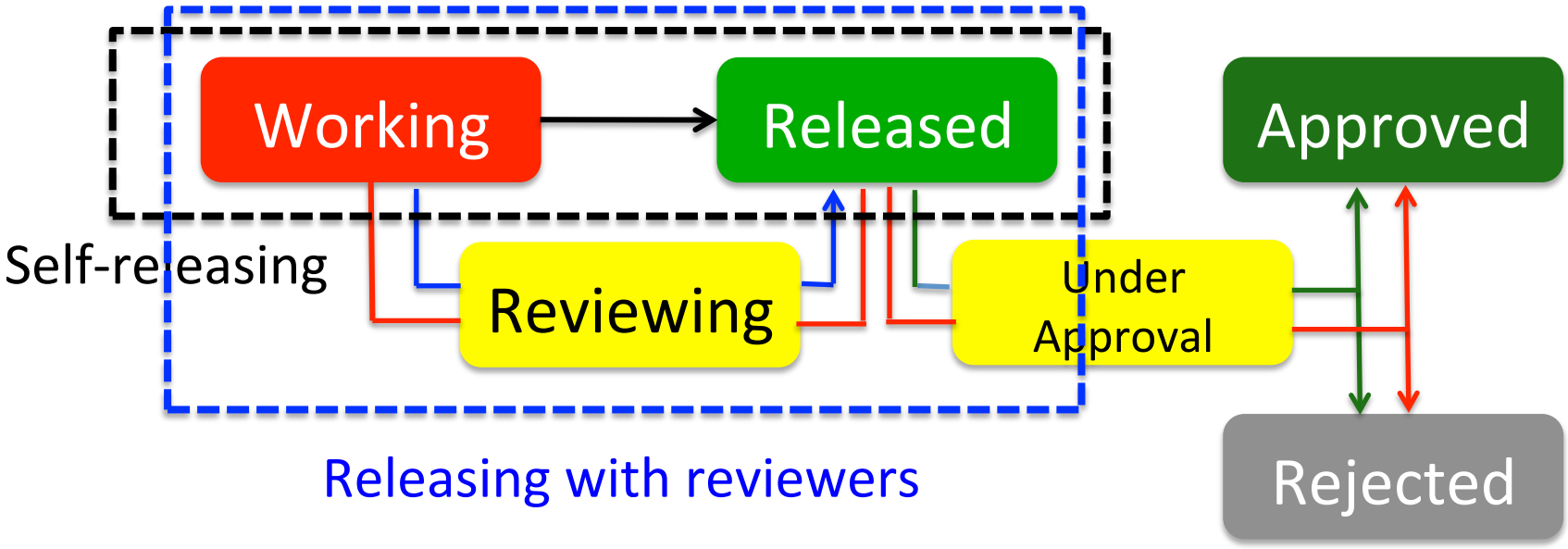
- Support for easy and up-to-date access into the EDMS for the experimental community:
  - Web interface:
    - http://ippapprd03.desy.de/EDMSTreeBrowser/?no=D000000000546957&conf=getGePartFull
    - interface developed by the IPP group at DESY
- URL to be embedded into an access web site.

# How it Looks for the R&D Activities



# Releasing Procedures

- Need to define formal releasing procedure for official documents, as the engineering documents.
- Life cycles available in EDMS:
  - Involve specific roles in EDMS



# Summary

- **Many documents and CAD models uploaded in EDMS:**
  - Collection and uploading of documents relevant for the DBD is on going
- **Documentation organized according to a WBS:**
  - Most of the existing ILD documents need to be connected to the WBS, work in progress.
- **Need to start development of processes to support our activities:**
  - Start with releasing with reviewers for the engineering documents.