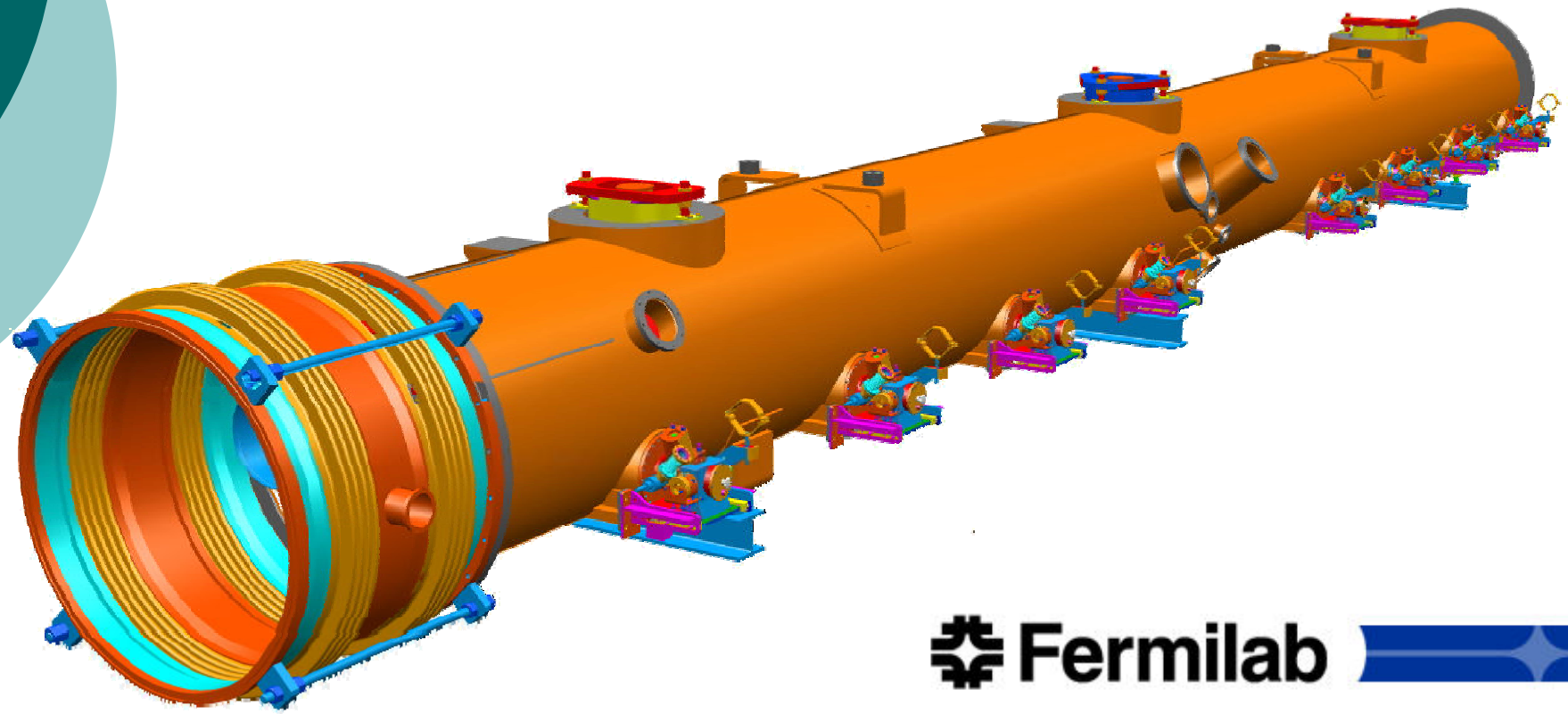
ILC International Linear Collider

Type IV Cryomodule Design

(Working within an international collaboration)



Fermilab

Don Mitchell, 22 JAN 2007

Collaborations begin with the people!

- FNAL
- SLAC
- JLAB
- INFN Milan, Pisa
- KEK
- DESY
- And more to join

The Fermilab Design Team*

Communication is essential!

- We needed a way to share information.
- We needed common tools.

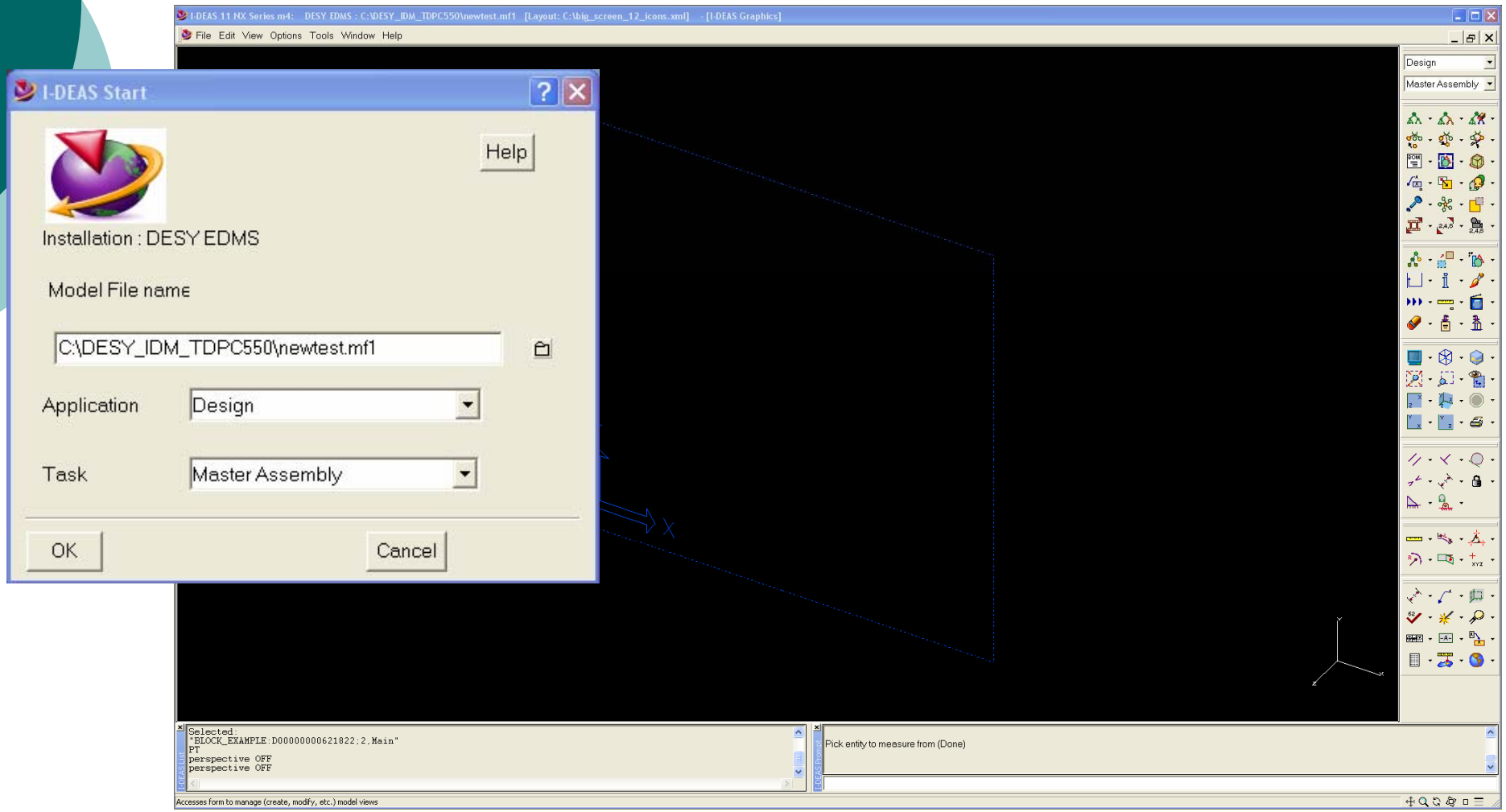
- DESY has been very accommodating and has provided their Team Center Enterprise (EDMS) as well as their IT services as part of their collaboration effort. No cost to the user. –Thanks!

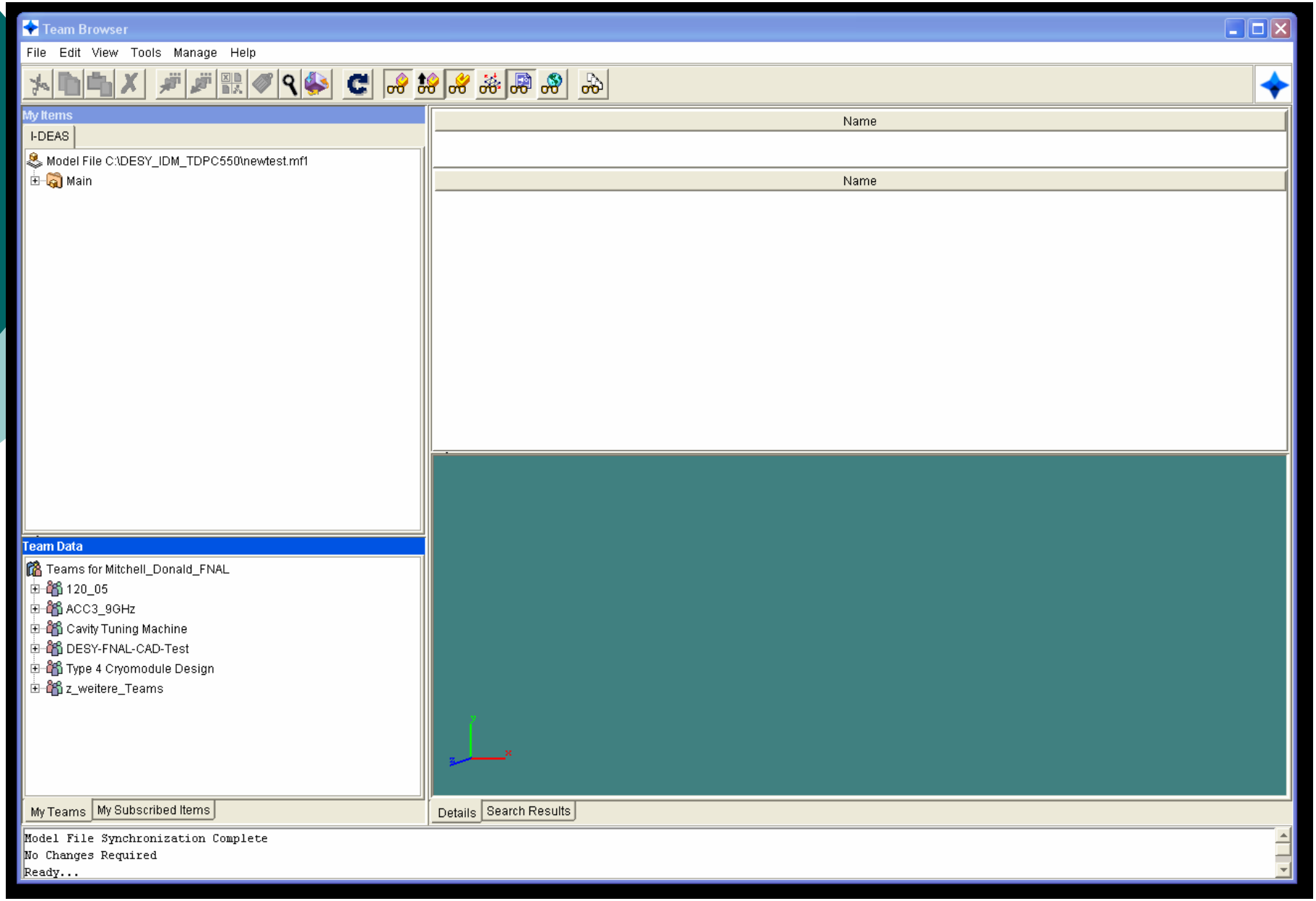
Common CAD tools

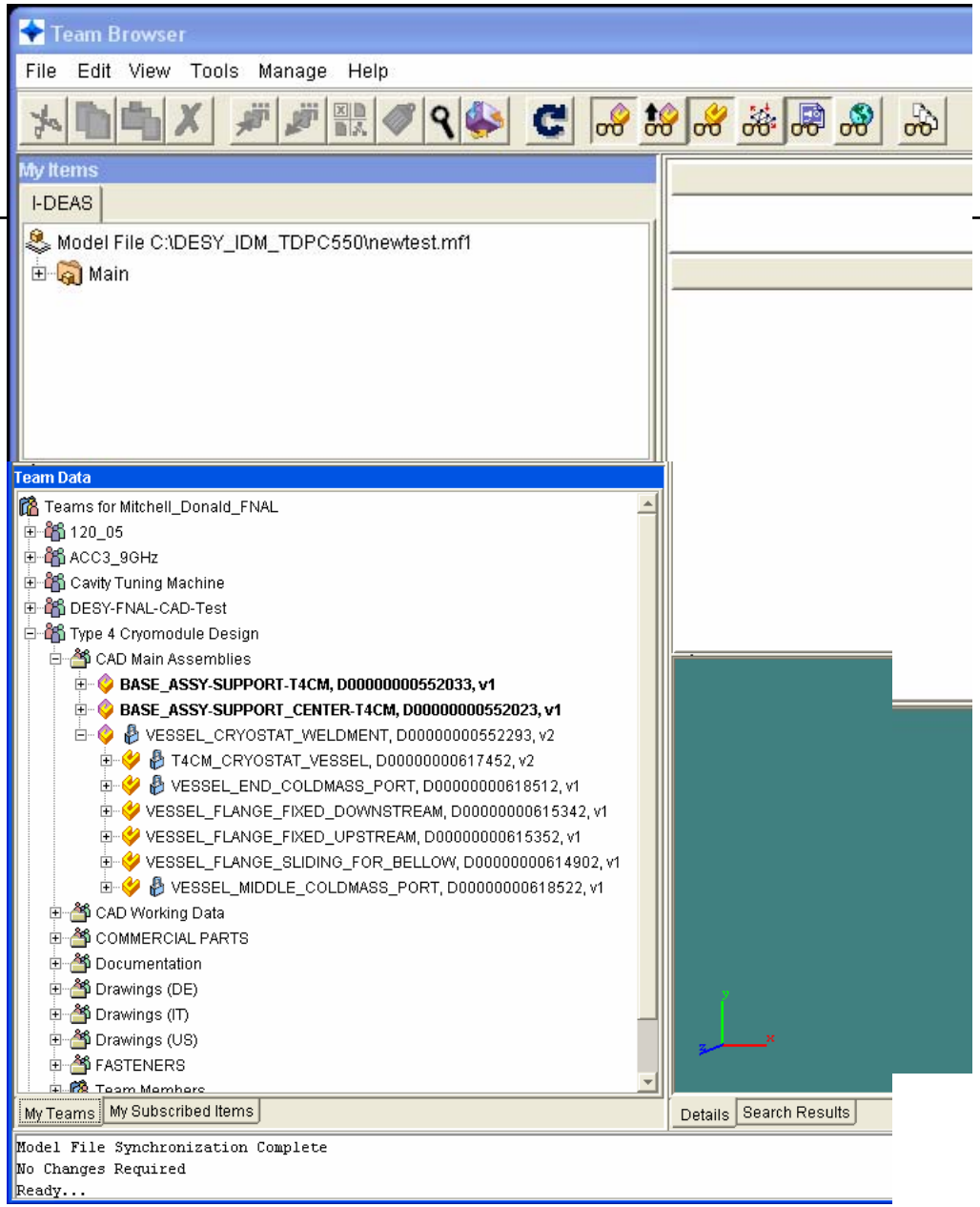
- FNAL: I-DEAS v.12
- SLAC: Solidedge
- JLAB: I-DEAS
- INFN Milan: UG-NX & I-DEAS v.12
- INFN Pisa: I-DEAS v.12
- KEK: I-DEAS (recent purchase)
- DESY: I-DEAS v.12

Note: These are all UGS CAD products and are “team browser” compatible with Team Center Enterprise. However, the current supported platform is I-DEAS v.12 with plans to add other CAD packages soon.

The DESY EDMS Team Browser




Team Browser
File Edit View Tools Manage Help
My Items
I-DEAS
Model File C:\DESY_IDM_TDPC550\newtest.mf1
Main
Name
Name
Team Data
Teams for Mitchell_Donald_FNAL
120_05
ACC3_9GHz
Cavity Tuning Machine
DESY-FNAL-CAD-Test
Type 4 Cryomodule Design
z_weitere_Teams
My Teams
My Subscribed Items
Details
Search Results
Model File Synchronization Complete
No Changes Required
Ready...


Team Browser
File Edit View Tools Manage Help
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Main
Team Data
Teams for Mitchell_Donald_FNAL
120_05
ACC3_9GHz
Cavity Tuning Machine
DESY-FNAL-CAD-Test
Type 4 Cryomodule Design
CAD Main Assemblies
BASE_ASSY-SUPPORT-T4CM, D00000000552033, v1
BASE_ASSY-SUPPORT_CENTER-T4CM, D00000000552023, v1
VESSEL_CRYOSTAT_WELDMENT, D00000000552293, v2
T4CM_CRYOSTAT_VESSEL, D00000000617452, v2
VESSEL_END_COLDMASS_PORT, D00000000618512, v1
VESSEL_FLANGE_FIXED_DOWNSTREAM, D00000000615342, v1
VESSEL_FLANGE_FIXED_UPSTREAM, D00000000615352, v1
VESSEL_FLANGE_SLIDING_FOR_BELLOW, D00000000614902, v1
VESSEL_MIDDLE_COLDMASS_PORT, D00000000618522, v1
CAD Working Data
COMMERCIAL PARTS
Documentation
Drawings (DE)
Drawings (IT)
Drawings (US)
FASTENERS
Team Members
My Teams
My Subscribed Items
Details
Search Results
Model File Synchronization Complete
No Changes Required
Ready...

Customizing your own environment

- DESY provides:
  - Data storage system (EDMS)
  - Item numbering
  - Design team folders
  - VisView licensing
  - EDMS Support
- You must provide:
  - the CAD software (I-DEAS v.12)
  - Your own 2-D title blocks
  - Any customization to your CAD setup

Web based “Thin-Client”

- All team members, not just CAD users, can have immediate access to ALL electronic files, not just the 3-D and 2-D data.
- Via the web, the data is viewable.
  - BOM review
  - 3-D model and 2-D drawing file viewing and markups
  - Data file upload and download

“Thin Client” look

Current Collaboration Status

- December ’06: New release of TC Enterprise and upgraded I-DEAS to the latest version (v.12).
- Rolled out EDMS patches and *.JAR files to our community so that all users can continue to work.
  - All institutions need to get on DESY’s software update distribution list!
- Spreading the unified EDMS concept to the ILC community.

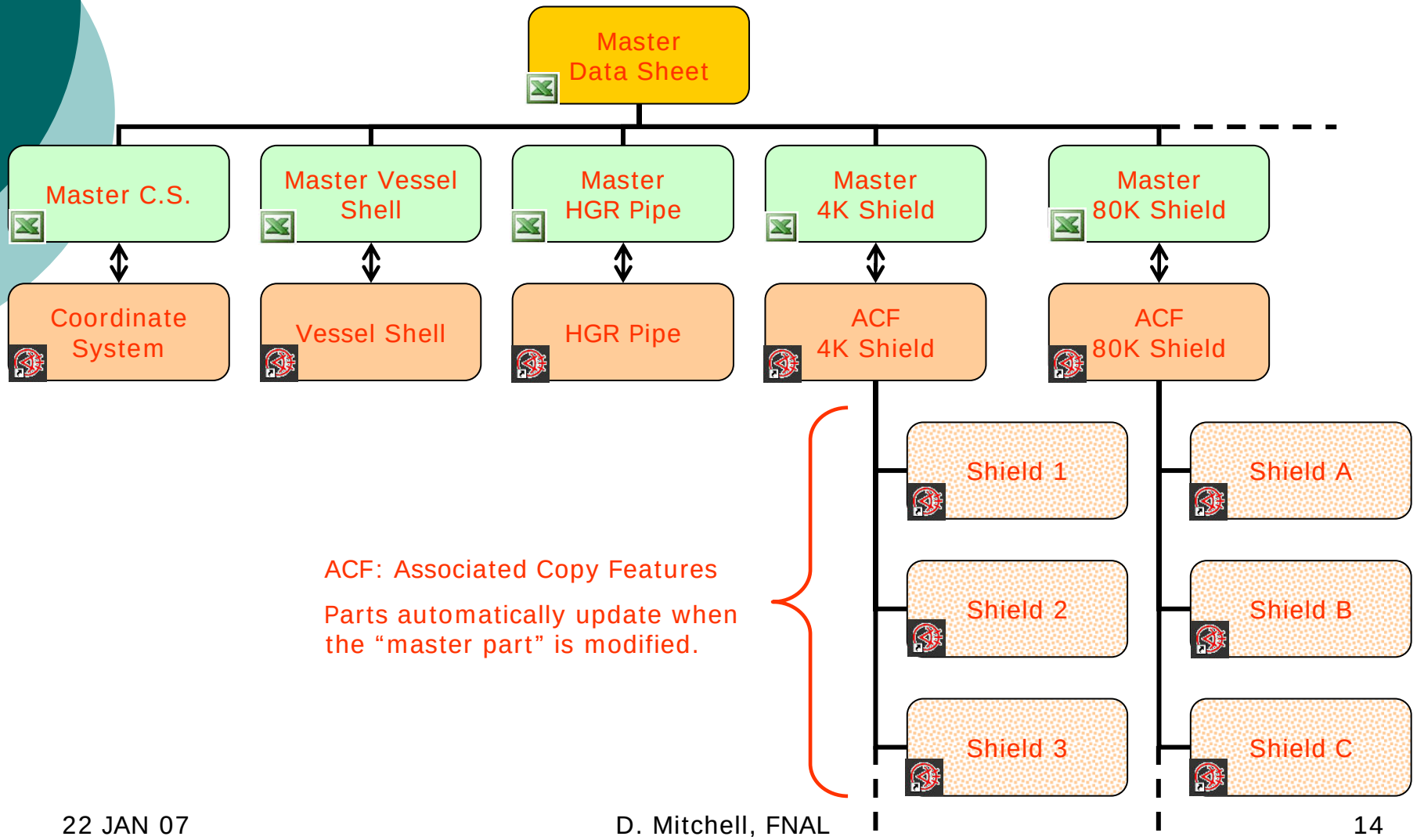
Bringing Our Collaboration Together

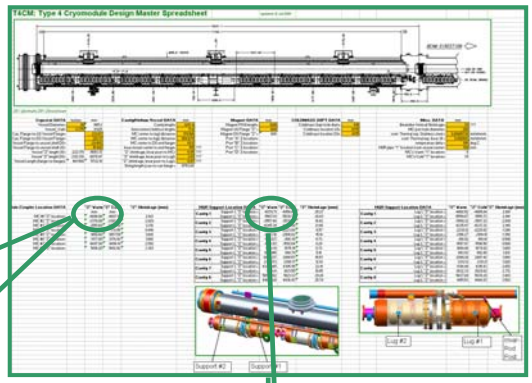
- November ’06: Training at FNAL
  - EDMS usage
  - VisView usage & “conferencing”
  - I-DEAS 3-D training
  - Excel driven I-DEAS models
- Next steps:
  - Each institution must now work with DESY to connect into the EDMS.
  - All 3-D models need to be stored in EDMS in the native, I-DEAS format.
  - Any non I-DEAS drawing data needs to be “related” to the 3-D model for easy access to the data by all collaborators.

Data Example with ACAD dwgs

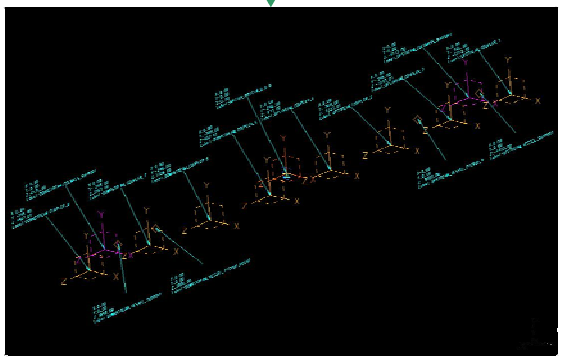
- Big Bertha was drawn without a 3-D model.
- The 3-D model was created using the 2-D drawings, but the model and drawings were not associated.
- The drawings were converted into I-DEAS drawings and a simple view was added to link the 3-D and 2-D data.
- The native ACAD drawings were also “related” to the parts and assemblies in EDMS using the “thin-client” tools.
- Now, the original drawings and the 3-D model are all accessible from within EDMS.

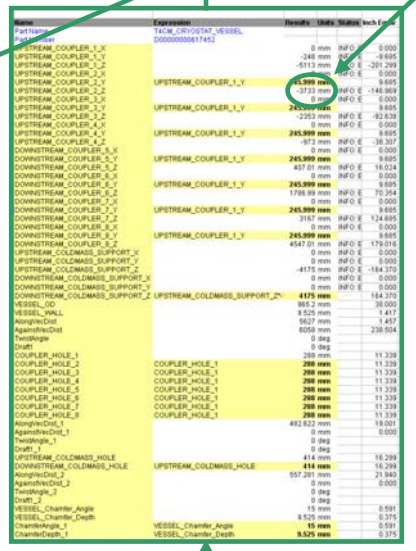
Managing the CAD Model with Excel & I-DEAS

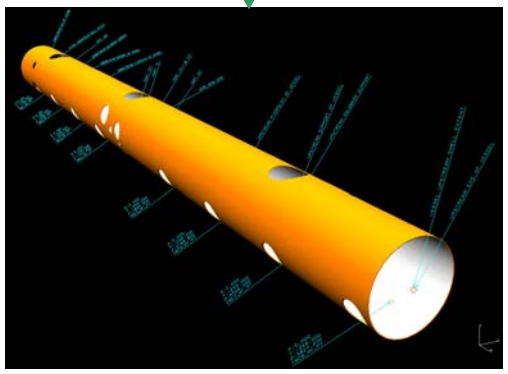


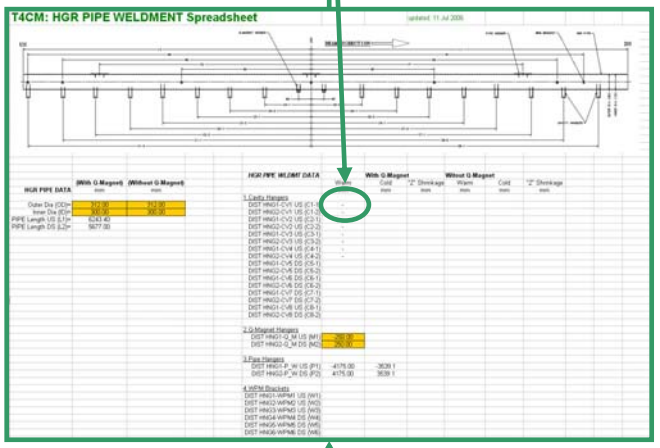


Name	Expression	Results	Units	Status	Inch Equiv
Part Name	T4CM_MASTER_COORDINATE_SYSTEM				
Part Number					
UPSTREAM_COUPLER_1_X		0	mm		0.000
UPSTREAM_COUPLER_1_Y		-246	mm		-9.685
UPSTREAM_COUPLER_1_Z		-5113	mm		-201.299
UPSTREAM_COUPLER_2_X		0	mm		0.000
UPSTREAM_COUPLER_2_Y	UPSTREAM_COUPLER_1_Y	245.999	mm		9.685
UPSTREAM_COUPLER_2_Z		-3733	mm		-146.969
UPSTREAM_COUPLER_3_X		0	mm		0.000
UPSTREAM_COUPLER_3_Y	UPSTREAM_COUPLER_1_Y	245.999	mm		9.685
UPSTREAM_COUPLER_3_Z		-2353	mm		-92.638
UPSTREAM_COUPLER_4_X		0	mm		0.000
UPSTREAM_COUPLER_4_Y	UPSTREAM_COUPLER_1_Y	245.999	mm		9.685
UPSTREAM_COUPLER_4_Z		-973	mm		-38.307
DOWNSTREAM_COUPLER_5_X		0	mm		0.000
DOWNSTREAM_COUPLER_5_Y	UPSTREAM_COUPLER_1_Y	245.999	mm		9.685
DOWNSTREAM_COUPLER_5_Z		407.01	mm		16.024
DOWNSTREAM_COUPLER_6_X		0	mm		0.000
DOWNSTREAM_COUPLER_6_Y	UPSTREAM_COUPLER_1_Y	245.999	mm		9.685
DOWNSTREAM_COUPLER_6_Z		1786.99	mm		70.354
DOWNSTREAM_COUPLER_7_X		0	mm		0.000
DOWNSTREAM_COUPLER_7_Y	UPSTREAM_COUPLER_1_Y	245.999	mm		9.685
DOWNSTREAM_COUPLER_7_Z		3167	mm		124.685
DOWNSTREAM_COUPLER_8_X		0	mm		0.000
DOWNSTREAM_COUPLER_8_Y	UPSTREAM_COUPLER_1_Y	245.999	mm		9.685
DOWNSTREAM_COUPLER_8_Z		4547.01	mm		179.016
UPSTREAM_COLDMASS_SUPPORT_X		0	mm		0.000
UPSTREAM_COLDMASS_SUPPORT_Y		0	mm		0.000
UPSTREAM_COLDMASS_SUPPORT_Z		-4175	mm		-164.370
DOWNSTREAM_COLDMASS_SUPPORT_X		0	mm		0.000
DOWNSTREAM_COLDMASS_SUPPORT_Y		0	mm		0.000
DOWNSTREAM_COLDMASS_SUPPORT_Z	UPSTREAM_COLDMASS_SUPPORT_Z*-1	4175	mm		164.370









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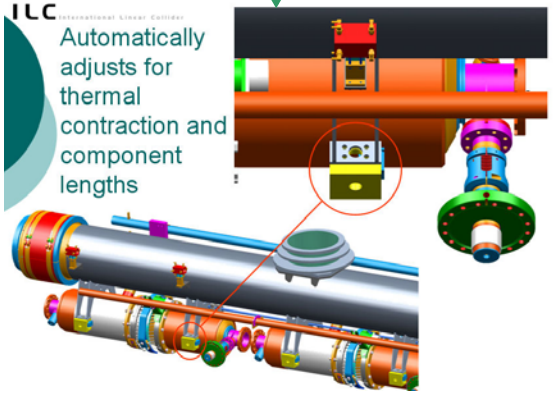
Automatically adjusts for thermal contraction and component lengths



Become a DESY EDMS member

- Send Don Mitchell (dmitchel@fnal.gov) your user's names and e-mail addresses. e.g.
  - - Fabrizio Raffaelli fabrizio.raffaelli@pi.infn.it
  - - Andrea Basti andrea.basti@pi.infn.it
  - - Giovanni Martinelli giovanni.martinelli@pi.infn.it
- I forward them to DESY.
- DESY sets up the accounts.
- I add your name to the design team.
- You work with DESY to setup your "team browser" (portal into EDMS).
  For help: ipp-support@desy.de
- You're in!

Upcoming ILC EDMS Roll-out

- Soon, the ILC will have its own EDMS, separate from the DESY EDMS.
- Lars Hagge (DESY) will talk to this point later today.
- The main difference will be the added “release” capabilities.
  - We wish to have a separate meeting later today to help develop the release process.
  - Planning for this began in August 2006 at FNAL.