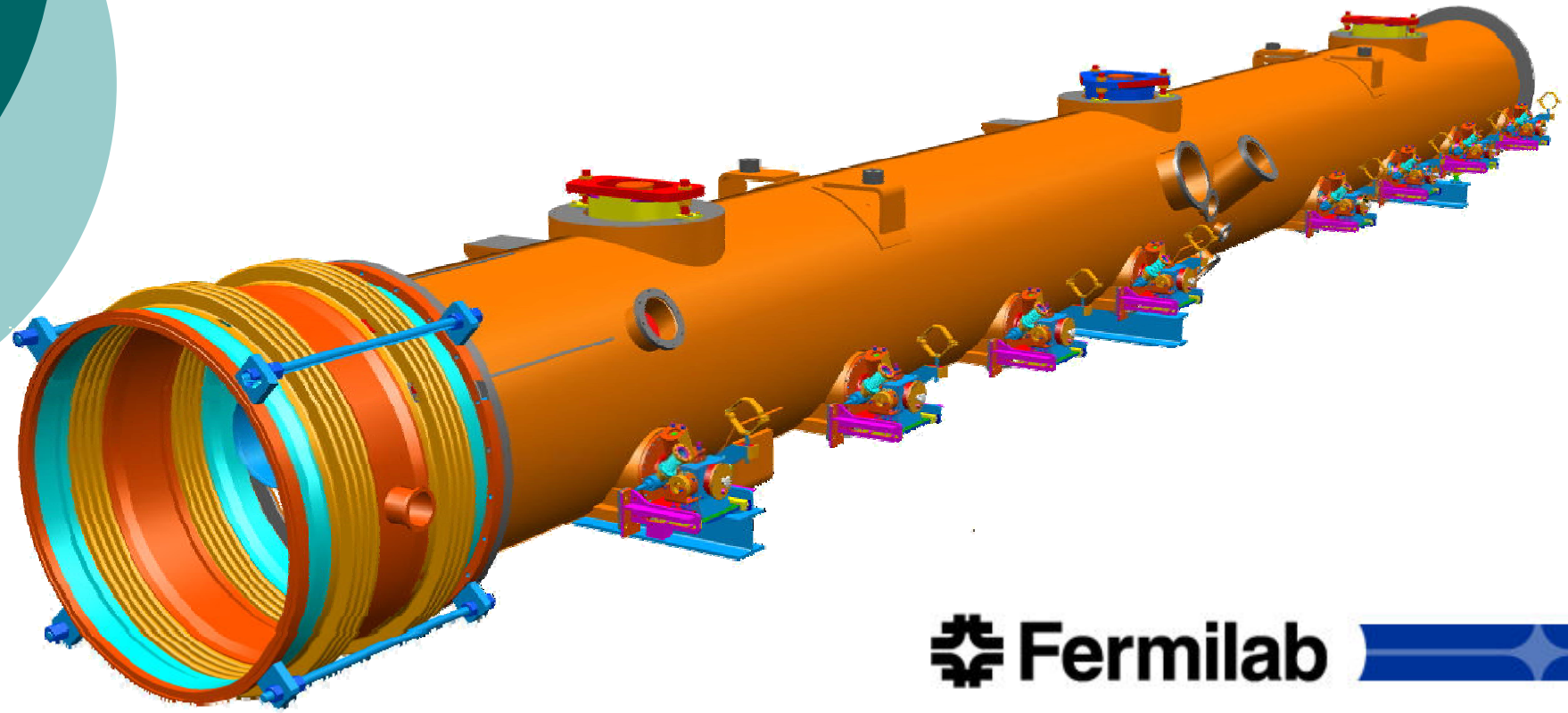
ILC International Linear Collider

Type IV Cryomodule Design Collaboration

(Working within DESY's EDMS)



Fermilab

Don Mitchell, 13 JUL 2006

Collaborations begin with the people!

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

The Fermilab Design Team*

Communication is essential!

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

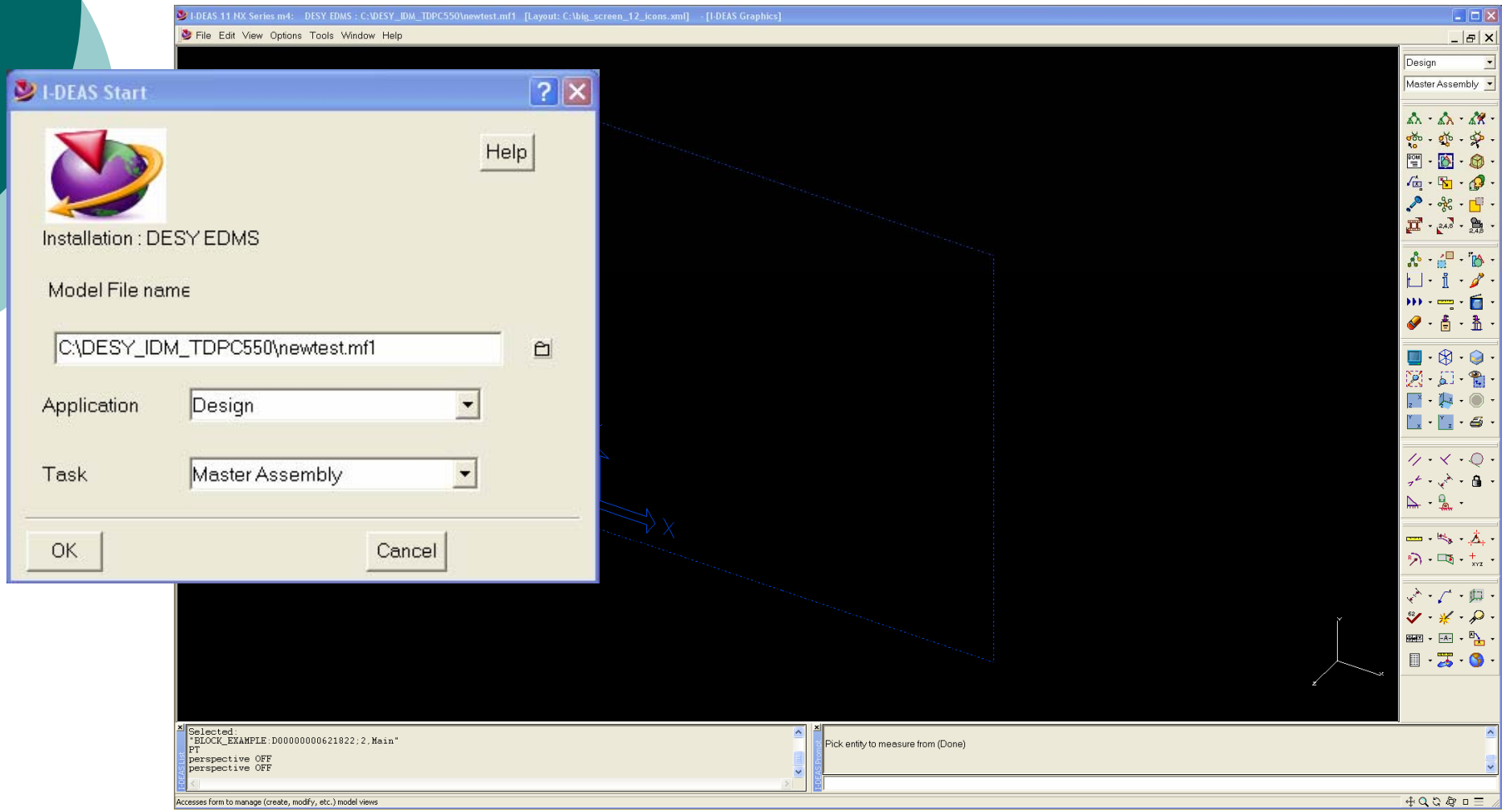
- DESY has been very accommodating and has offered their Team Center Enterprise (EDMS) as well as their IT services as part of their collaboration effort. No cost to the user.

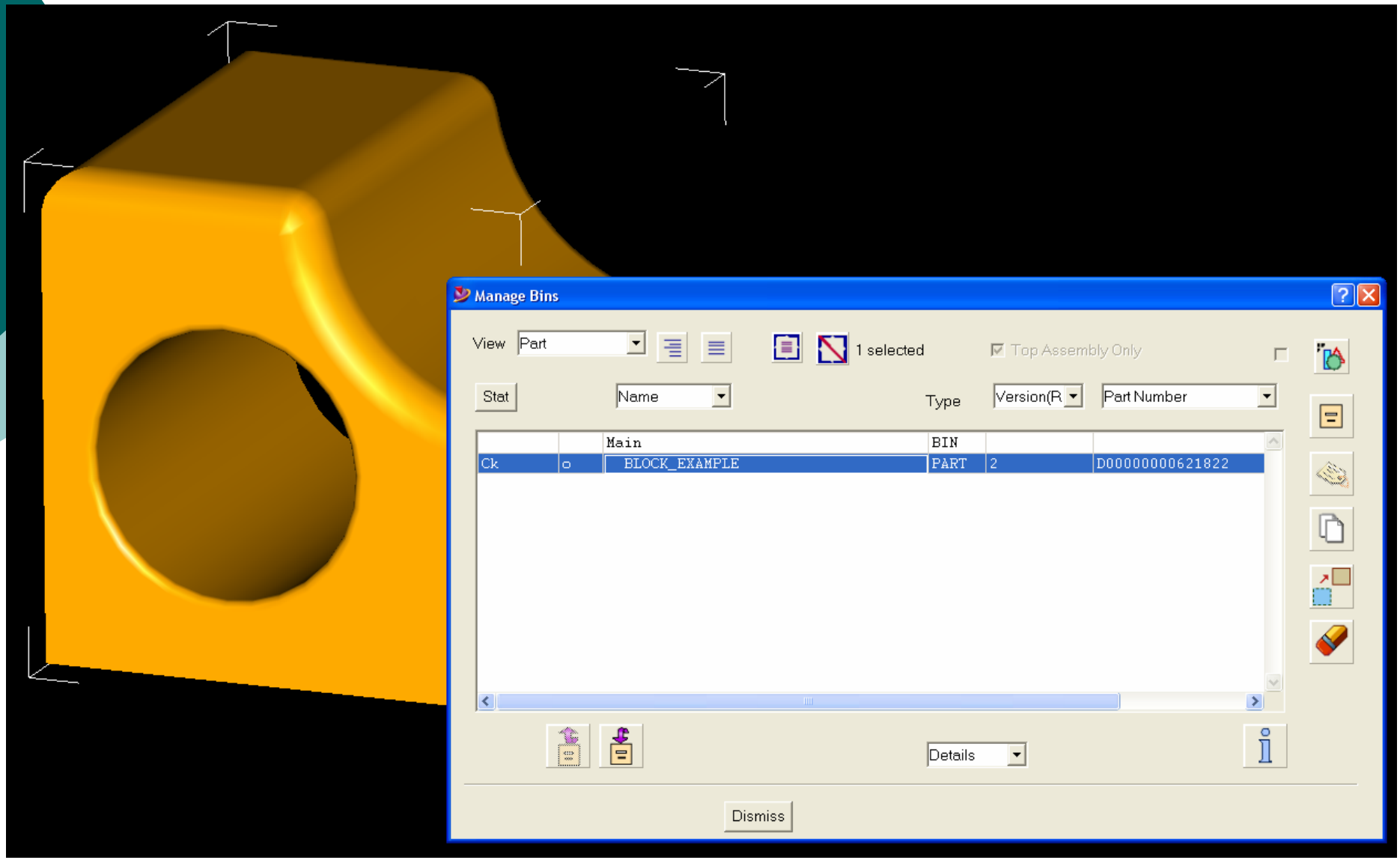
Common CAD tools

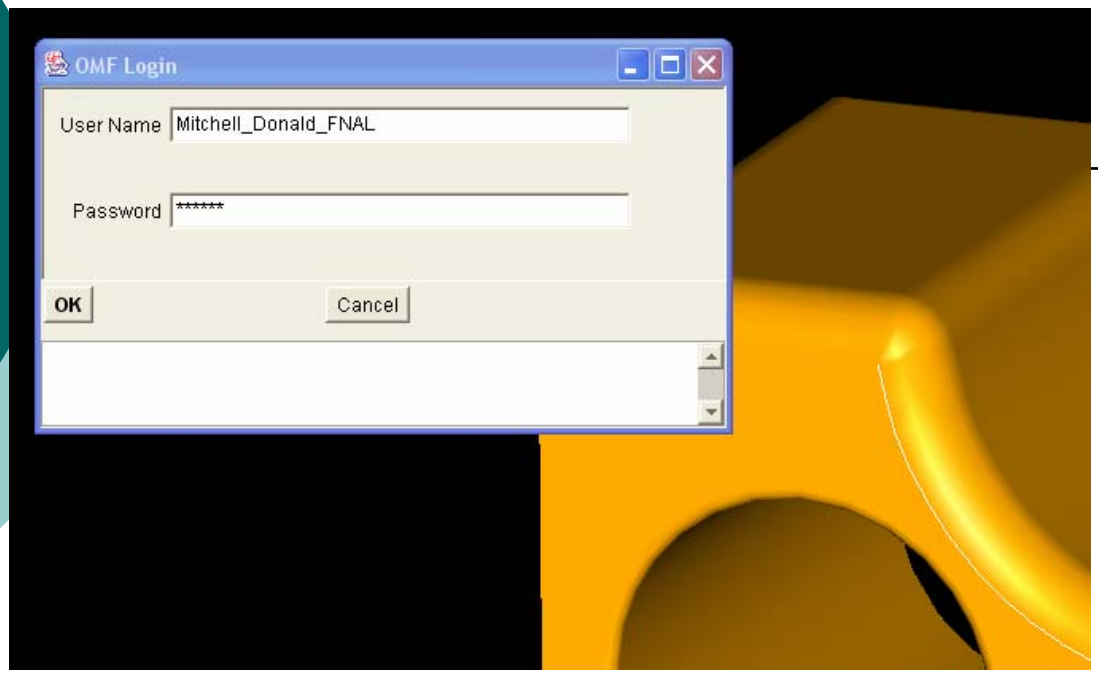
- FNAL: I-DEAS v.11 & v.12
- SLAC: Solidedge
- JLAB: I-DEAS
- INFN Milan: UG-NX (may switch to I-DEAS)
- INFN Pisa: I-DEAS
- KEK: I-DEAS (recent purchase)
- DESY: I-DEAS v.11

Note: These are all UGS CAD products and are “team browser” compatible with Team Center Enterprise.

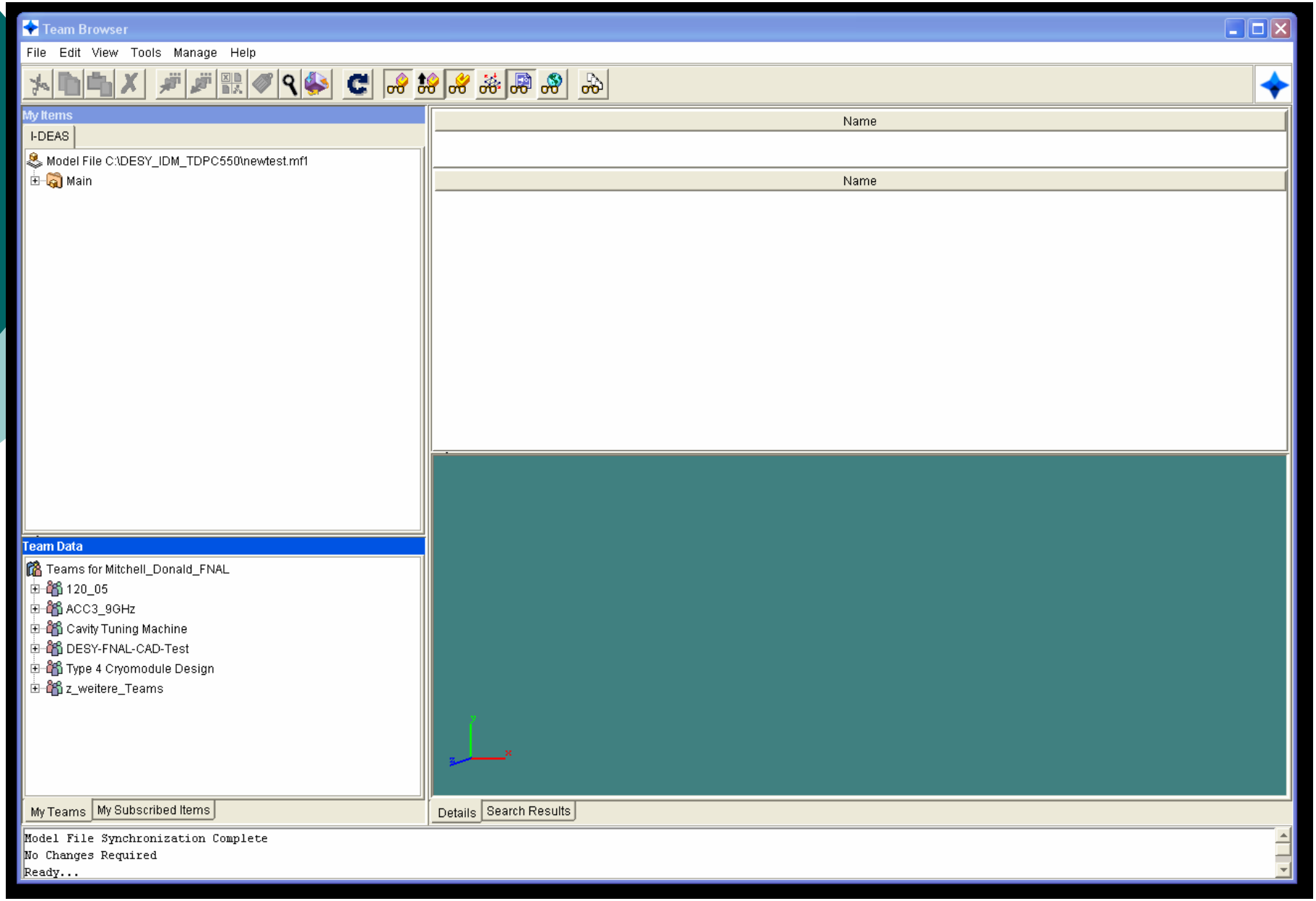
The DESY EDMS Team Browser

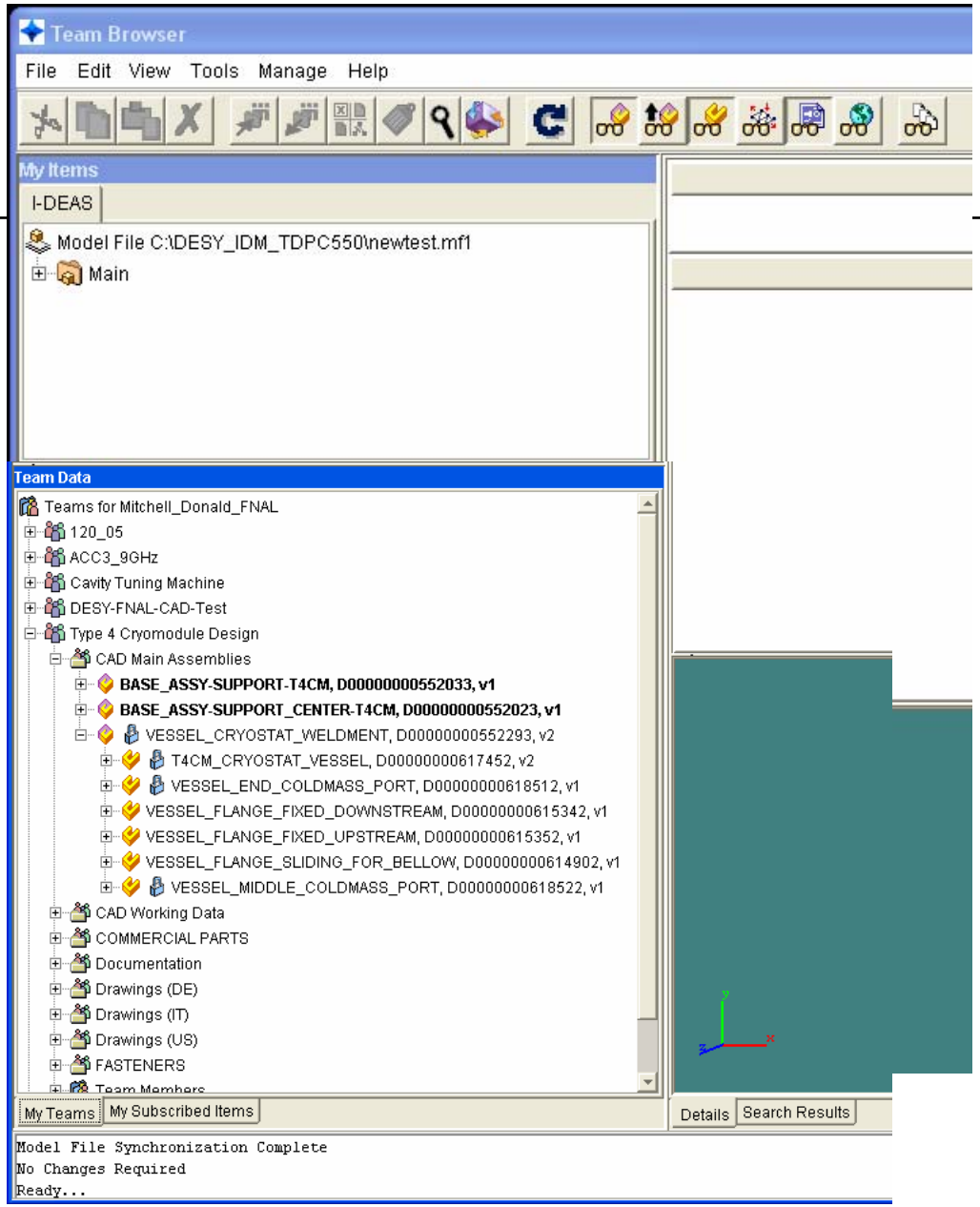



Manage Bins
View
Part
1 selected
Top Assembly Only
Stat
Name
Type
Version(R
Part Number
Main
BIN
Ck
o
BLOCK_EXAMPLE
PART
2
D00000000621822
Details
Dismiss


OMF Login
User Name
Mitchell_Donald_FNAL
Password
******
OK
Cancel

Design
Master Modeler
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...

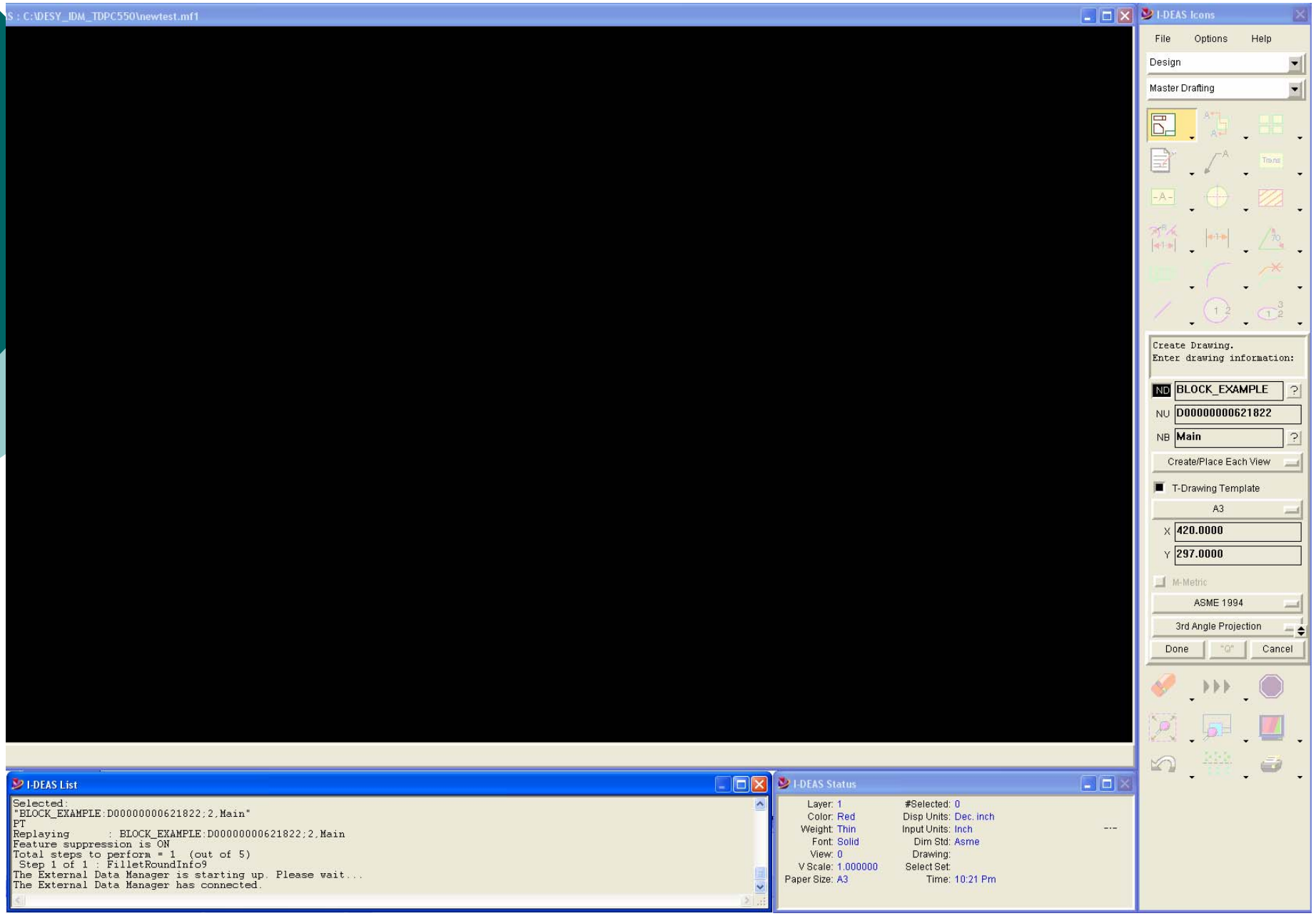

Team Browser
File Edit View Tools Manage Help
My Items
I-DEAS
Model File C:\DESY_IDM_TDPC550\newtest.mf1
Main
Team Data
Teams for Mitchell_Donald_FNAL
120_05
ACC3_9GHz
Cavity Tuning Machine
DESY-FNAL-CAD-Test
Type 4 Cryomodule Design
CAD Main Assemblies
BASE_ASSY-SUPPORT-T4CM, D00000000552033, v1
BASE_ASSY-SUPPORT_CENTER-T4CM, 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

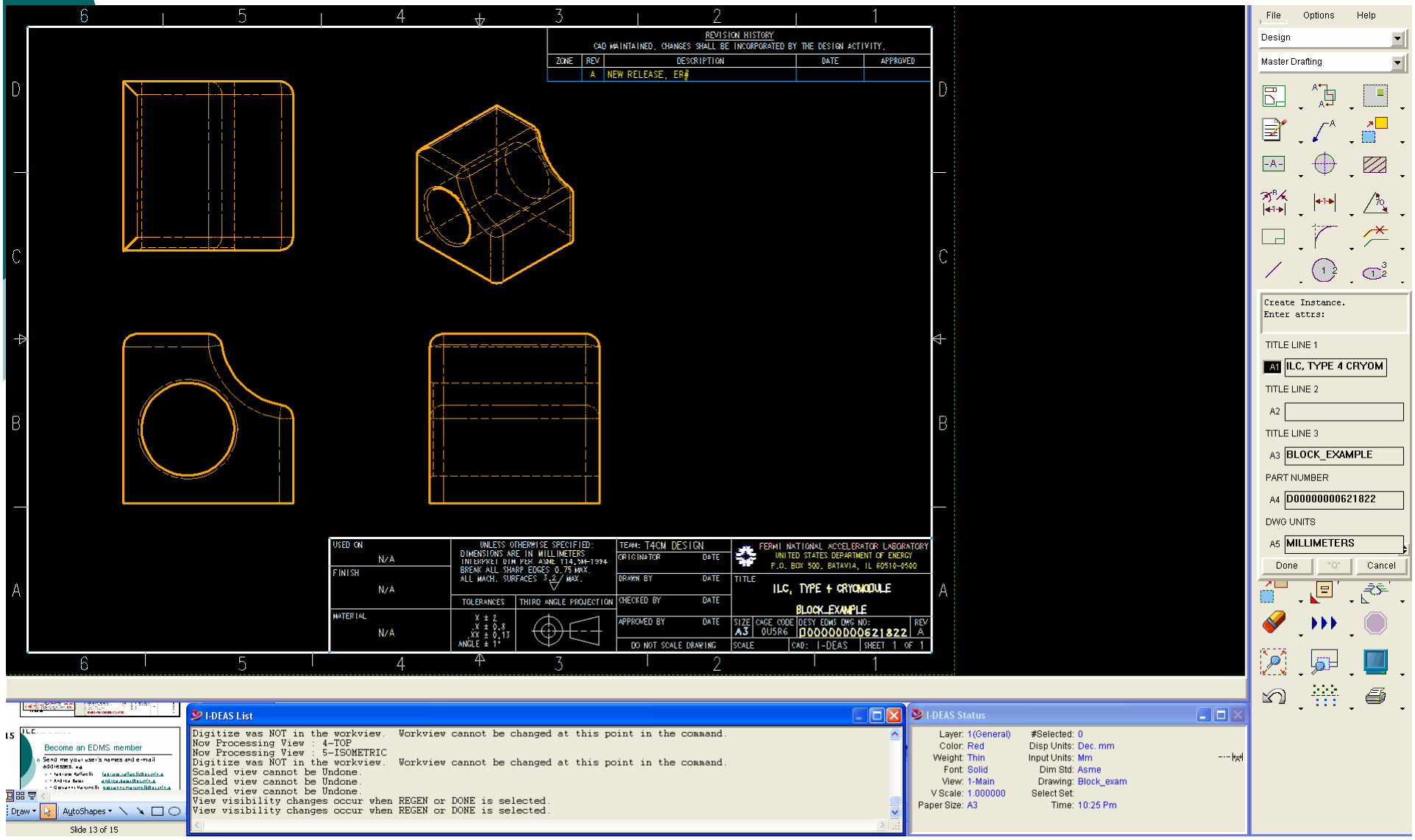
- DESY provides the system, item numbering, and design team area.
- You must provide:
  - the CAD software (I-DEAS v.11)
  - Your own 2-D title blocks
  - Any customization to your CAD setup

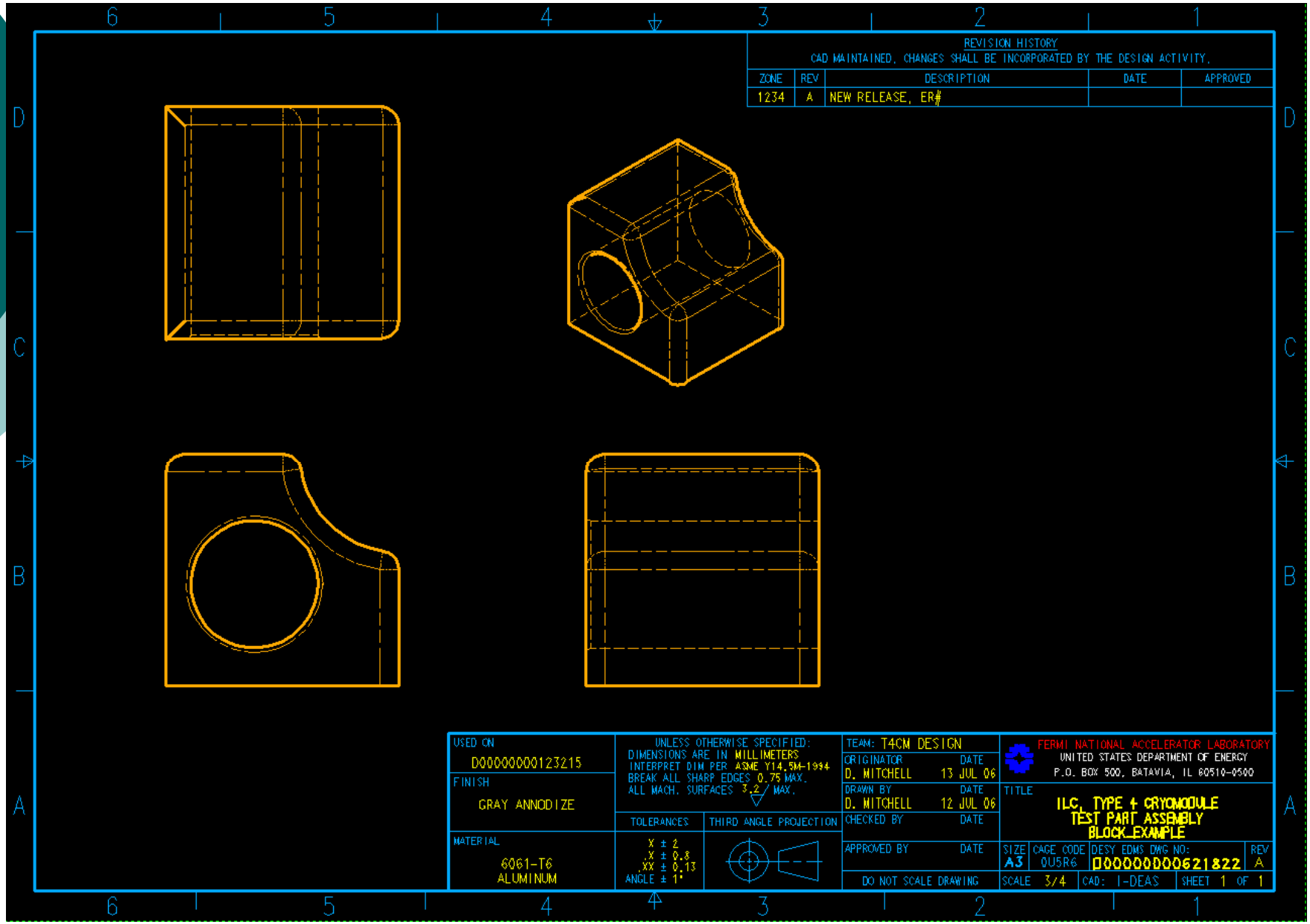
Customization at FNAL

- 1.5 weeks of effort to create:
  - “smart” title blocks
  - Standard note groups
  - PDF batch plot programs
  - Scripts to install the team browser portal onto our users’ computers.
  - Team and folders in DESY’s EDMS
  - Add members and roles to the team
- Trained staff on EDMS usage and how to work with the custom drafting environment.

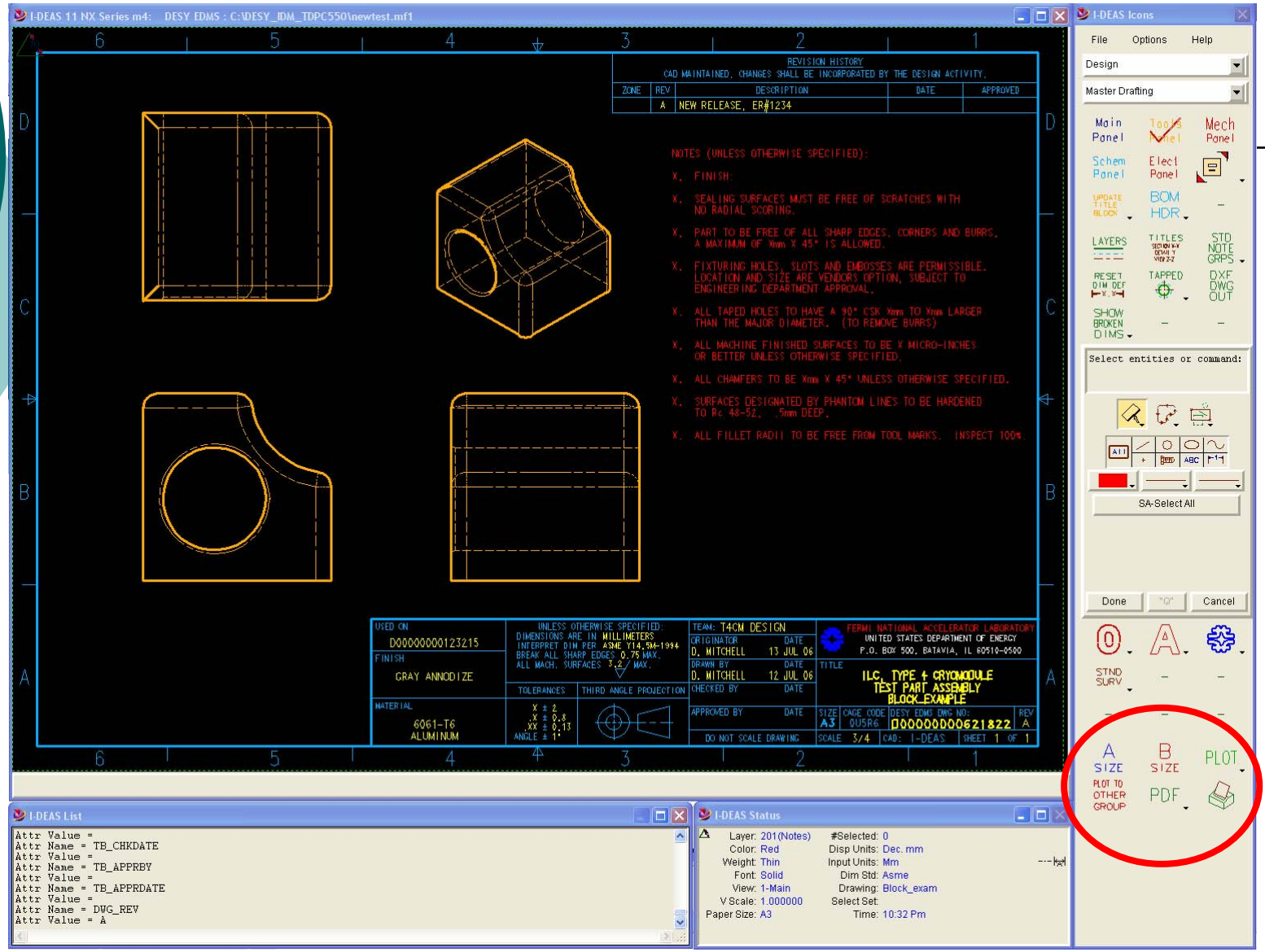

S : C:\DESY_IDM_TDPC550\newtest.mf1
I-DEAS Icons
File
Options
Help
Design
Master Drafting
Create Drawing.
Enter drawing information:
ND
BLOCK_EXAMPLE
NU
D00000000621822
NB
Main
Create/Place Each View
T-Drawing Template
A3
X
420.0000
Y
297.0000
M-Metric
ASME 1994
3rd Angle Projection
Done
Cancel
I-DEAS List
Selected:
"BLOCK_EXAMPLE:D00000000621822;2,Main"
PT
Replaying : BLOCK_EXAMPLE:D00000000621822;2,Main
Feature suppression is ON
Total steps to perform = 1 (out of 5)
Step 1 of 1 : FilletRoundInfo9
The External Data Manager is starting up. Please wait...
The External Data Manager has connected.
I-DEAS Status
Layer: 1
Color: Red
Weight: Thin
Font: Solid
View: 0
V Scale: 1.000000
Paper Size: A3
#Selected: 0
Disp Units: Dec. inch
Input Units: Inch
Dim Std: Asme
Drawing:
Select Set:
Time: 10:21 Pm

“Smart” Title blocks



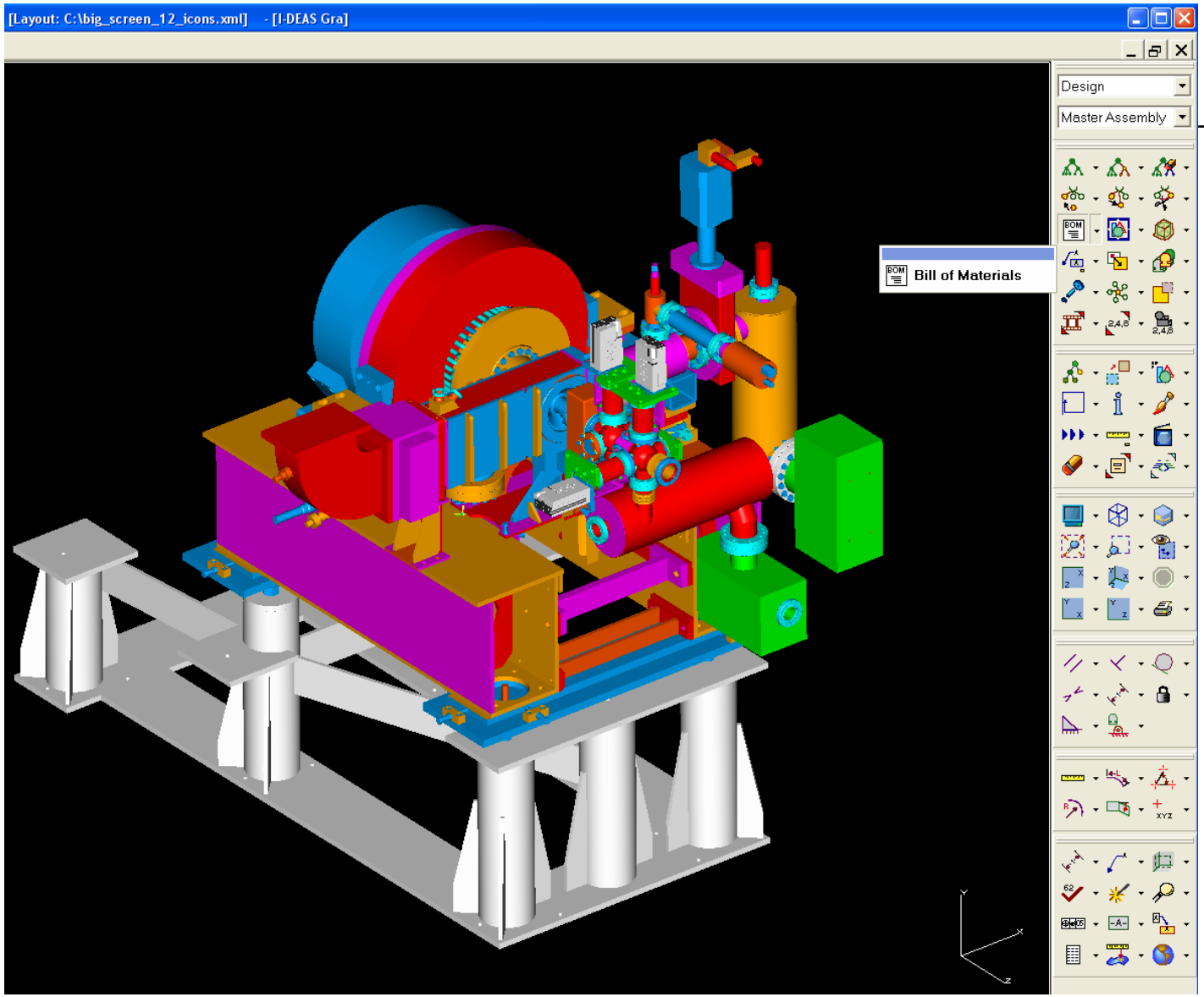

REVISION HISTORY
CAD MAINTAINED, CHANGES SHALL BE INCORPORATED BY THE DESIGN ACTIVITY.
ZONE | REV | DESCRIPTION | DATE | APPROVED
1234 | A | NEW RELEASE, ER#
USED ON
D00000000123215
FINISH
GRAY ANNODIZE
MATERIAL
6061-T6
ALUMINUM
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
INTERPRET DIM PER ASME Y14.5M-1994
BREAK ALL SHARP EDGES 0.75 MAX.
ALL MACH. SURFACES 3.2 MAX.
TOLERANCES
THIRD ANGLE PROJECTION
X ± 2
.X ± 0.8
.XX ± 0.13
ANGLE ± 1°
TEAM: T4CM DESIGN
ORIGINATOR D. MITCHELL DATE 13 JUL 06
DRAWN BY D. MITCHELL DATE 12 JUL 06
CHECKED BY DATE
APPROVED BY DATE
DO NOT SCALE DRAWING
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY
P.O. BOX 500, BATAVIA, IL 60510-0500
TITLE
ILC, TYPE 4 CRYOMODULE
TEST PART ASSEMBLY
BLOCK_EXAMPLE
SIZE A3 | CAGE CODE 0U5R6 | DESY EDMS DWG NO: D0000000621822 | REV A
SCALE 3/4 | CAD: I-DEAS | SHEET 1 OF 1

Custom 2-D Tools



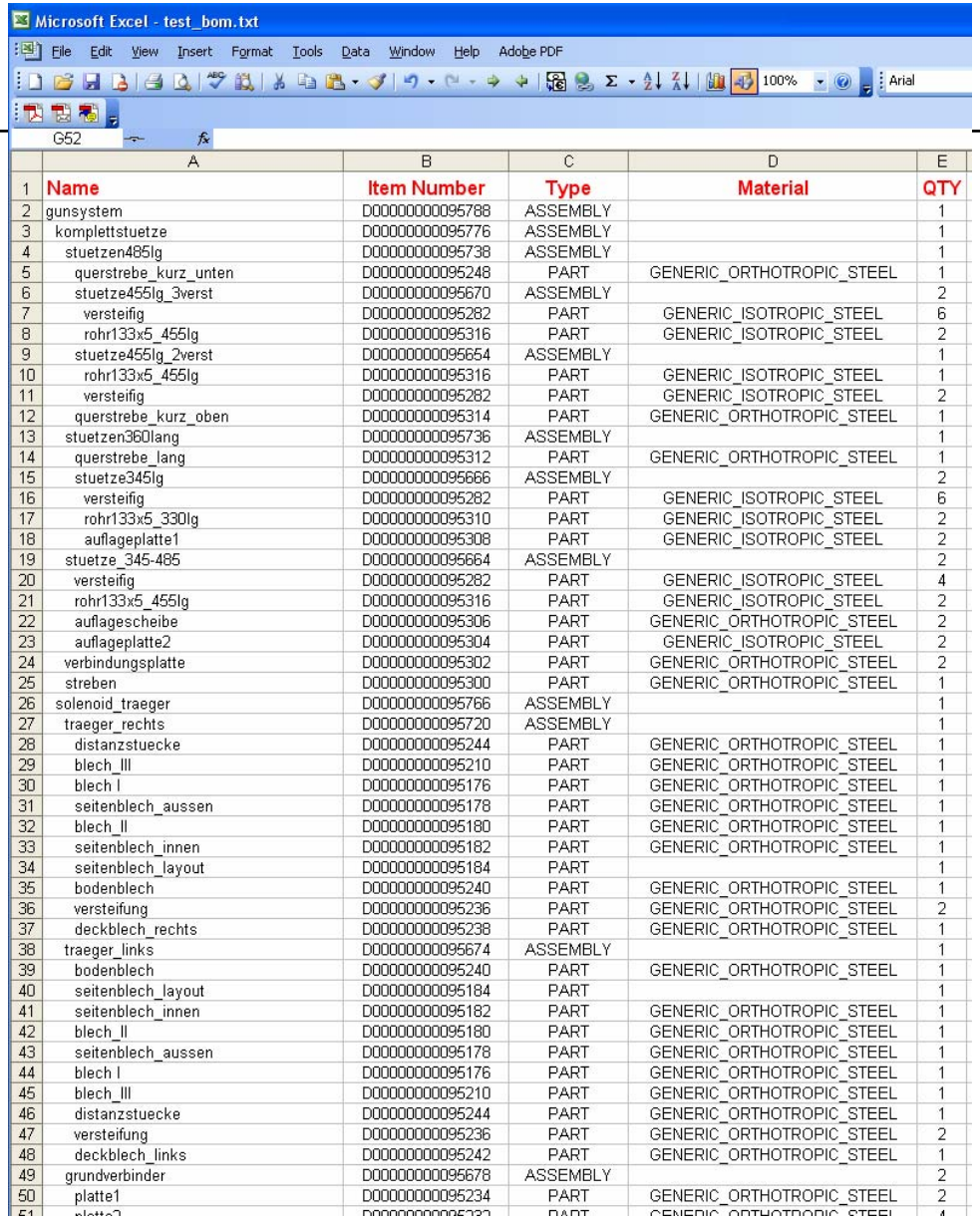
ILC International Linear Collider

Creation of Assembly BOM's



ILC International Linear Collider

Import BOM into Excel

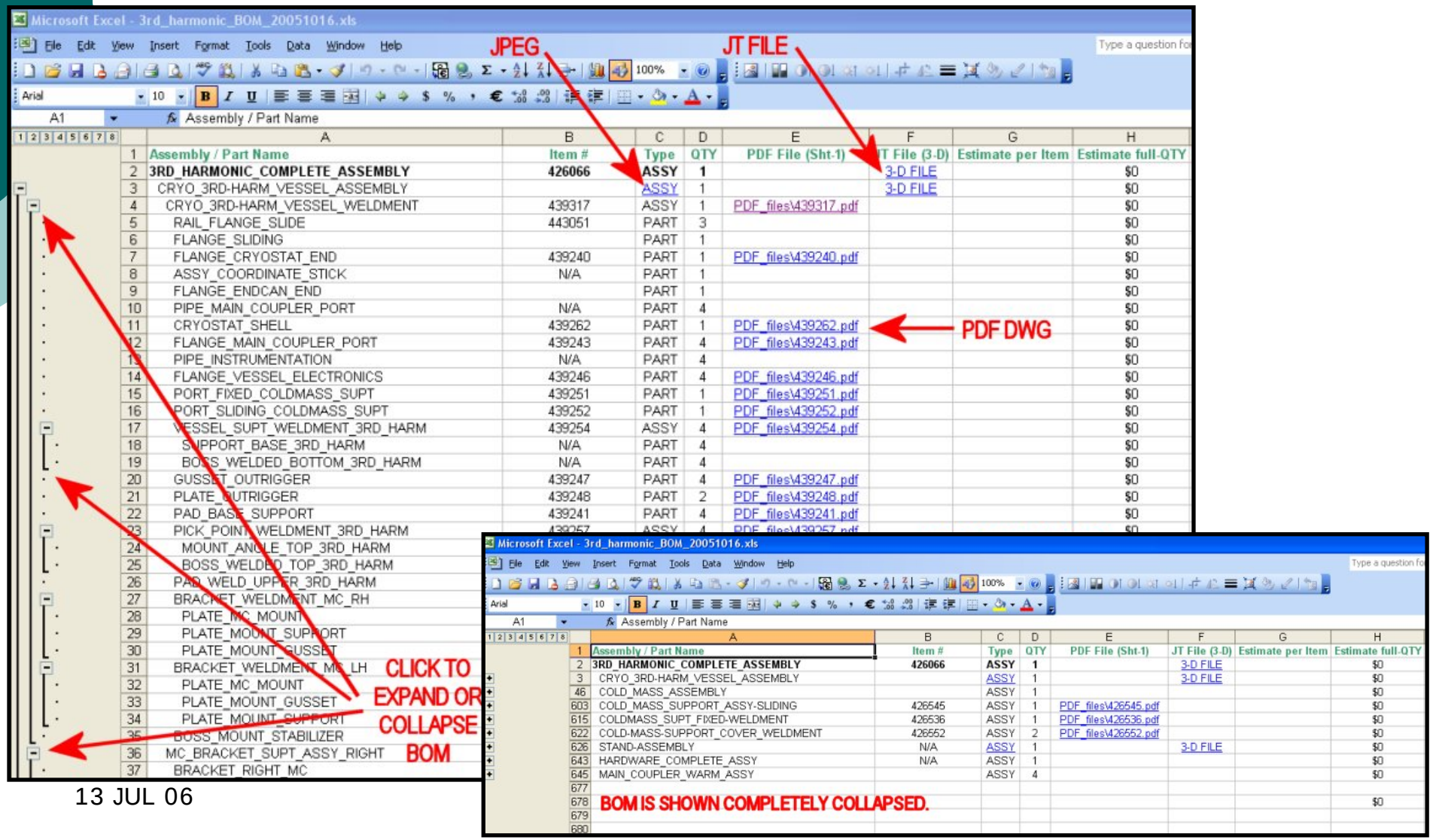


	A	B	C	D	E
1	Name	Item Number	Type	Material	QTY
2	gunsystem	D00000000095788	ASSEMBLY		1
3	komplettstuetze	D00000000095776	ASSEMBLY		1
4	stuetzen485lg	D00000000095738	ASSEMBLY		1
5	querstrebe_kurz_unten	D00000000095248	PART	GENERIC_ORTHOTROPIC_STEEL	1
6	stuetze455lg_3verst	D00000000095670	ASSEMBLY		2
7	versteifig	D00000000095282	PART	GENERIC_ISOTROPIC_STEEL	6
8	rohr133x5_455lg	D00000000095316	PART	GENERIC_ISOTROPIC_STEEL	2
9	stuetze455lg_2verst	D00000000095654	ASSEMBLY		1
10	rohr133x5_455lg	D00000000095316	PART	GENERIC_ISOTROPIC_STEEL	1
11	versteifig	D00000000095282	PART	GENERIC_ISOTROPIC_STEEL	2
12	querstrebe_kurz_oben	D00000000095314	PART	GENERIC_ORTHOTROPIC_STEEL	1
13	stuetzen360lang	D00000000095736	ASSEMBLY		1
14	querstrebe_lang	D00000000095312	PART	GENERIC_ORTHOTROPIC_STEEL	1
15	stuetze345lg	D00000000095666	ASSEMBLY		2
16	versteifig	D00000000095282	PART	GENERIC_ISOTROPIC_STEEL	6
17	rohr133x5_330lg	D00000000095310	PART	GENERIC_ISOTROPIC_STEEL	2
18	auflageplatte1	D00000000095308	PART	GENERIC_ISOTROPIC_STEEL	2
19	stuetze_345-485	D00000000095664	ASSEMBLY		2
20	versteifig	D00000000095282	PART	GENERIC_ISOTROPIC_STEEL	4
21	rohr133x5_455lg	D00000000095316	PART	GENERIC_ISOTROPIC_STEEL	2
22	auflagescheibe	D00000000095306	PART	GENERIC_ORTHOTROPIC_STEEL	2
23	auflageplatte2	D00000000095304	PART	GENERIC_ISOTROPIC_STEEL	2
24	verbindungsplatte	D00000000095302	PART	GENERIC_ORTHOTROPIC_STEEL	2
25	streben	D00000000095300	PART	GENERIC_ORTHOTROPIC_STEEL	1
26	solenoid_traeger	D00000000095766	ASSEMBLY		1
27	traeger_rechts	D00000000095720	ASSEMBLY		1
28	distanzstuecke	D00000000095244	PART	GENERIC_ORTHOTROPIC_STEEL	1
29	blech_III	D00000000095210	PART	GENERIC_ORTHOTROPIC_STEEL	1
30	blech I	D00000000095176	PART	GENERIC_ORTHOTROPIC_STEEL	1
31	seitenblech_aussen	D00000000095178	PART	GENERIC_ORTHOTROPIC_STEEL	1
32	blech_II	D00000000095180	PART	GENERIC_ORTHOTROPIC_STEEL	1
33	seitenblech_innen	D00000000095182	PART	GENERIC_ORTHOTROPIC_STEEL	1
34	seitenblech_layout	D00000000095184	PART		1
35	bodenblech	D00000000095240	PART	GENERIC_ORTHOTROPIC_STEEL	1
36	versteifung	D00000000095236	PART	GENERIC_ORTHOTROPIC_STEEL	2
37	deckblech_rechts	D00000000095238	PART	GENERIC_ORTHOTROPIC_STEEL	1
38	traeger_links	D00000000095674	ASSEMBLY		1
39	bodenblech	D00000000095240	PART	GENERIC_ORTHOTROPIC_STEEL	1
40	seitenblech_layout	D00000000095184	PART		1
41	seitenblech_innen	D00000000095182	PART	GENERIC_ORTHOTROPIC_STEEL	1
42	blech_II	D00000000095180	PART	GENERIC_ORTHOTROPIC_STEEL	1
43	seitenblech_aussen	D00000000095178	PART	GENERIC_ORTHOTROPIC_STEEL	1
44	blech I	D00000000095176	PART	GENERIC_ORTHOTROPIC_STEEL	1
45	blech_III	D00000000095210	PART	GENERIC_ORTHOTROPIC_STEEL	1
46	distanzstuecke	D00000000095244	PART	GENERIC_ORTHOTROPIC_STEEL	1
47	versteifung	D00000000095236	PART	GENERIC_ORTHOTROPIC_STEEL	2
48	deckblech_links	D00000000095242	PART	GENERIC_ORTHOTROPIC_STEEL	1
49	grundverbinder	D00000000095678	ASSEMBLY		2
50	platte1	D00000000095234	PART	GENERIC_ORTHOTROPIC_STEEL	2

After an additional ~20 minutes of formatting and running a PDF macro, you have a very nice “snapshot” of the current design status.

ILC International Linear Collider

Our hope: Bi-weekly, Published, Design status updates



	Assembly / Part Name	Item #	Type	QTY	PDF File (Sht-1)	JT File (3-D)	Estimate per Item	Estimate full-QTY
2	3RD_HARMONIC_COMPLETE_ASSEMBLY	426066	ASSY	1		3-D FILE		$0
3	CRYO_3RD-HARM_VESSEL_ASSEMBLY		ASSY	1		3-D FILE		$0
4	CRYO_3RD-HARM_VESSEL_WELDMENT	439317	ASSY	1	PDF_files\439317.pdf			$0
5	RAIL_FLANGE_SLIDE	443051	PART	3				$0
6	FLANGE_SLIDING		PART	1				$0
7	FLANGE_CRYOSTAT_END	439240	PART	1	PDF_files\439240.pdf			$0
8	ASSY_COORDINATE_STICK	N/A	PART	1				$0
9	FLANGE_ENDCAN_END		PART	1				$0
10	PIPE_MAIN_COUPLER_PORT	N/A	PART	4				$0
11	CRYOSTAT_SHELL	439262	PART	1	PDF_files\439262.pdf			$0
12	FLANGE_MAIN_COUPLER_PORT	439243	PART	4	PDF_files\439243.pdf			$0
13	PIPE_INSTRUMENTATION	N/A	PART	4				$0
14	FLANGE_VESSEL_ELECTRONICS	439246	PART	4	PDF_files\439246.pdf			$0
15	PORT_FIXED_COLDMASS_SUPT	439251	PART	1	PDF_files\439251.pdf			$0
16	PORT_SLIDING_COLDMASS_SUPT	439252	PART	1	PDF_files\439252.pdf			$0
17	VESSEL_SUPT_WELDMENT_3RD_HARM	439254	ASSY	4	PDF_files\439254.pdf			$0
18	SUPPORT_BASE_3RD_HARM	N/A	PART	4				$0
19	BOSS_WELDED_BOTTOM_3RD_HARM	N/A	PART	4				$0
20	GUSSET_OUTRIGGER	439247	PART	4	PDF_files\439247.pdf			$0
21	PLATE_OUTRIGGER	439248	PART	2	PDF_files\439248.pdf			$0
22	PAD_BASE_SUPPORT	439241	PART	4	PDF_files\439241.pdf			$0
23	PICK_POINT_WELDMENT_3RD_HARM	439257	ASSY	4	PDF_files\439257.pdf			$0
24	MOUNT_ANGLE_TOP_3RD_HARM		PART	4				$0
25	BOSS_WELDED_TOP_3RD_HARM		PART	4				$0
26	PAD_WELD_UPPER_3RD_HARM		PART	4				$0
27	BRACKET_WELDMENT_MC_RH		ASSY	1				$0
28	PLATE_MC_MOUNT		PART	1				$0
29	PLATE_MOUNT_SUPPORT		PART	1				$0
30	PLATE_MOUNT_GUSSET		PART	1				$0
31	BRACKET_WELDMENT_MC_LH		ASSY	1				$0
32	PLATE_MC_MOUNT		PART	1				$0
33	PLATE_MOUNT_GUSSET		PART	1				$0
34	PLATE_MOUNT_SUPPORT		PART	1				$0
35	BOSS_MOUNT_STABILIZER		PART	1				$0
36	MC_BRACKET_SUPT_ASSY_RIGHT		ASSY	1				$0
37	BRACKET_RIGHT_MC		PART	1				$0

	Assembly / Part Name	Item #	Type	QTY	PDF File (Sht-1)	JT File (3-D)	Estimate per Item	Estimate full-QTY
2	3RD_HARMONIC_COMPLETE_ASSEMBLY	426066	ASSY	1		3-D FILE		$0
3	CRYO_3RD-HARM_VESSEL_ASSEMBLY		ASSY	1		3-D FILE		$0
46	COLD_MASS_ASSEMBLY		ASSY	1				$0
603	COLD_MASS_SUPPORT_ASSY-SLIDING	426545	ASSY	1	PDF_files\426545.pdf			$0
615	COLDMASS_SUPT_FIXED-WELDMENT	426536	ASSY	1	PDF_files\426536.pdf			$0
622	COLD-MASS-SUPPORT_COVER_WELDMENT	426552	ASSY	2	PDF_files\426552.pdf			$0
626	STAND-ASSEMBLY	N/A	ASSY	1		3-D FILE		$0
643	HARDWARE_COMPLETE_ASSY	N/A	ASSY	1				$0
645	MAIN_COUPLER_WARM_ASSY		ASSY	4				$0
677								
678								$0
679								
680								

Become a DESY EDMS member

- Send me 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). Lars Hagge, DESY
- You're in!