



2009 Linear Collider Workshop of the Americas

2D & 3D Drawing Status Americas Region

Conventional Facilities and Siting Group



Objective

- ***Prepare CFS design drawings:***
 - *2D drawings in AutoCAD*
 - *3D models in Revit*
- ***Interface with 3D equipment designs furnished by physicists using 3D mechanical CAD software. These are imported into Revit via ISO 10303 (STEP) AP 214 and used as ‘backgrounds’ upon which to develop the CFS 3D model in Revit***



3D Model Exchange Strategy

- **Receive STEP file in Physics Coordinate System (PCS)**
- **Import from STEP into Revit**
 - **Import STEP into Autodesk Inventor**
 - **Rotate and translate model from PCS into Engineering Coordinate System (ECS)**
 - **Export shrink wrapped model from Inventor to .ADSK (ADSK is an XML-based file format defined by Autodesk and used for transferring data between Inventor, Revit, Civil 3D and AutoCAD Architecture)**
 - **Import .ADSK into Revit**
- **Develop CFS model using Revit in ECS**



3D Model Exchange Strategy

- **Export from Revit to STEP**
 - **Export from Revit to ACIS (.SAT) file**
 - **Import ACIS to Inventor**
 - **Rotate and translate model from ECS into PCS**
 - **Export from Inventor to STEP (option to 'shrink-wrap' this model)**
- **Transmit STEP file in Physics Coordinate System (PCS)**



Problem Summary

#	Problem Description	Status
1	<i>Incorrect Scaling</i>	<i>Resolved</i>
2	<i>Meaningless Part Names</i>	<i>In progress</i>
3	<i>Incomplete Geometry</i>	<i>In progress</i>
4	<i>Unclear Origin</i>	<i>Needs clarification</i>



Problem 2: Meaningless Part Names

- **Status: In Progress**
- **Input from STEP files include meaningless part names such as base1, base2,....**
- **Used Inventor to rename the parts with relevant names**
- **Exported to SAT but still naming problems exist**
- **Next step: Identify source of problem:**
 - **Export to STEP**
 - **Import from STEP**
 - **Issue with STEP specification**
 - **Issue in model**



Problem 3: Incomplete Geometry

- ***Status: In progress***
- ***STEP provides mass-related data only and may be related to the part name issue***
- ***Next step: Identify source of problem:***
 - ***Export to STEP***
 - ***Import from STEP***
 - ***Issue with STEP specification***
 - ***Issue in model***



Problem 4: Unclear Origin

- **Status: Need clarification of issue**
- **Understand from 27-Aug meeting that an updated definition of coordinate systems may be available.**
- **Request a 'target' model that contains locatable elements in PCS and ECS. This will be used to translate and rotate the models. For example a coordinate system can be defined by three points.**
 - **Point 1: System origin (X=0, Y=0, Z=0)**
 - **Point 2: (X=+100,000, Y=0, Z=0)**
 - **Point 3: (X=0, Y = + 100,000, Z=0)**



Current

- *Developing a standardized, repeatable process for properly exchanging 3D files*
- *Have sent STEP AP 214 format file of a 3D model to determine status of corrective actions*



Next Steps

- *Identify problems or conflicts associated with 03-Sep STEP submittal*
- *Receive updated Coordinate System Definition document discussed during 27-Aug coordination meeting*
- *Identify frequency of 3D Model exchange*
- *Proceed with 3D modeling*

