Abstract

The team in charge of the LHC integration largely uses 3D scenes combining functional positions of equipments and the 3D CAD model issued from the CERN Drawing Directory (CDD) repository. This is made possible through the Digital Mock-Up tool developed at CERN. Giving dimensions in 3D context is a challenge with the current 3D CAD tools used at CERN. Requirements from users groups have made clear a need for automatic production of 2D layout drawings. This paper presents the retained solution to create on-request dimensioned drawings, to publish them, while maintaining coherence and consistency with the 3D integration scenes. Reliability of the information, on-line availability of the latest layout changes on dimensions and positions of equipments, and the maintenance of the facility is also described.

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Objective
New requirements from the Digital Mock-Up (DMU) user groups have set new objectives for the usage of the DMU toolkit and the CAD models:
- 2D layouts of all machine systems
- Dimensioning
- Top and front views
- Reference number for official and non official drawings
- History of changes
- Reliable and fast service to users

Creation of the Geometry
1. Creation of front and top views of elements
2. Connection of elements
3. Flattening of the whole view
4. Creation of the tunnel lines

Automatic Creation of Dimensions
The dimensions and notes are automatically created using the equipment data obtained from the LHC Reference Database. When a view is created, the required dimensions and notes are retrieved from this Oracle Database and dynamically arranged in order to get an optimal display. All the dimensions needed for creating the LHC layout are defined in two Oracle Tables:

1. Dimension and Note Table
All created dimensions and notes with the parameters needed for their representation

2. Attach Point Table
Positioning of the dimension lines within the global CERN coordinate system.

Types of Drawings
1. Official Drawings
Official 514 half-cells defined in an Oracle table and kept up to date the drawings concerned by the changes between two collider versions.

2. On-the-fly Drawings
Generated every time a user requests a certain kind of drawing for a region of the collider.

The drawings will be retrieved via a Web Service whose sole user will be the Integration Team, which will serve the requested drawings to the user groups.