Investigation of Geometry Discrepancies in ATLAS End-CAP Toroid Structures
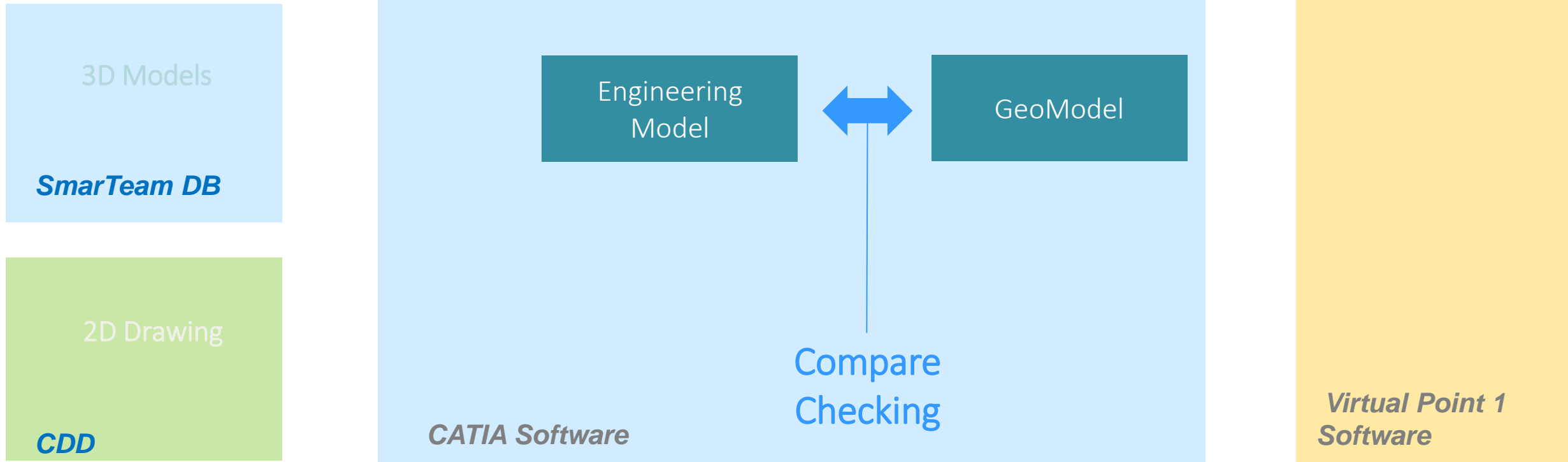
Archil Surmava
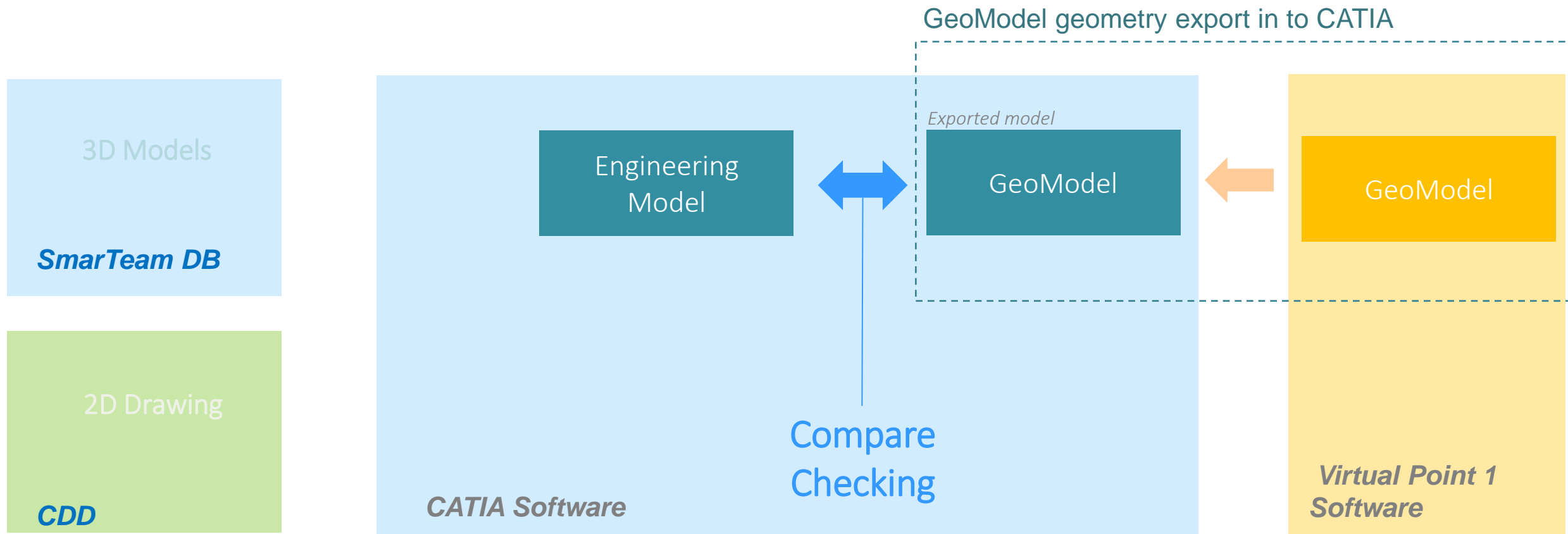
Georgian Technical University

23 october 2014

Working Package (WP04) Overwiev

Comparison of Existing GeoModel Geometry with CATIA Geometry and make Correction of volumes into Packages used in ATLAS Software

3D Models

SmarTeam DB

2D Drawing

CDD

Engineering Model

GeoModel

Compare Checking

CATIA Software
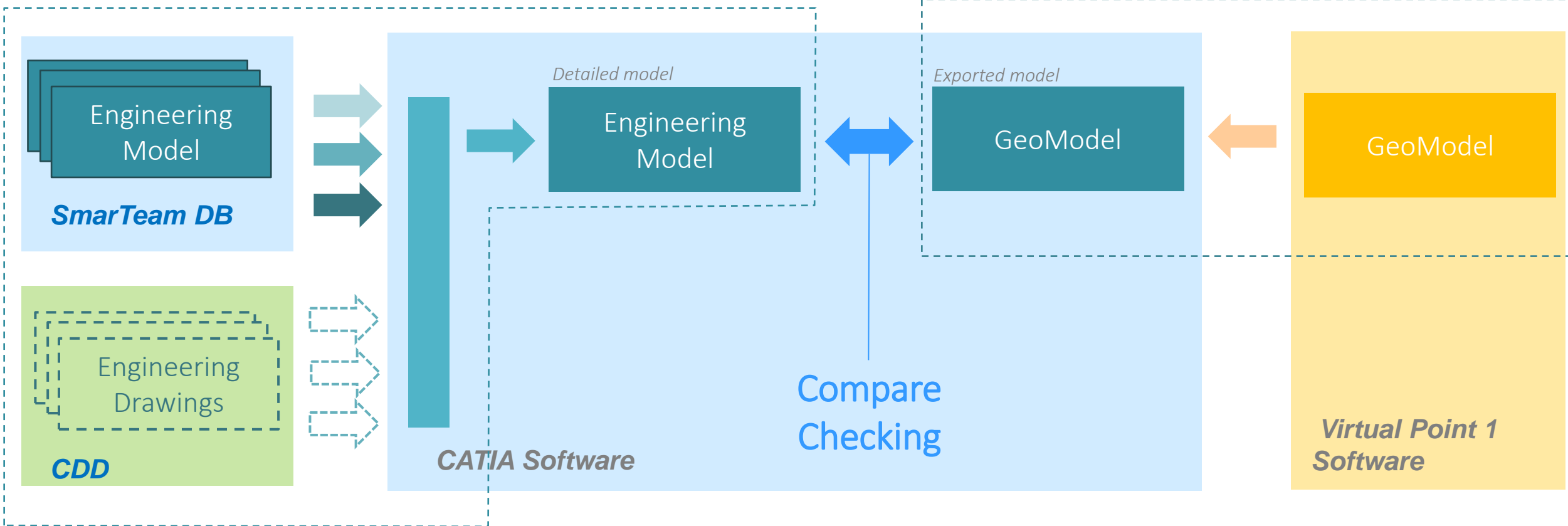
Virtual Point 1 Software

Working Package (WP04) Overwiev

Comparison of Existing GeoModel Geometry with CATIA Geometry and make Correction of volumes into Packages used in ATLAS Software

Working Package (WP04) Overwiev

Comparison of Existing GeoModel Geometry with CATIA Geometry and make Correction of volumes into Packages used in ATLAS Software

Investigation of geometry description
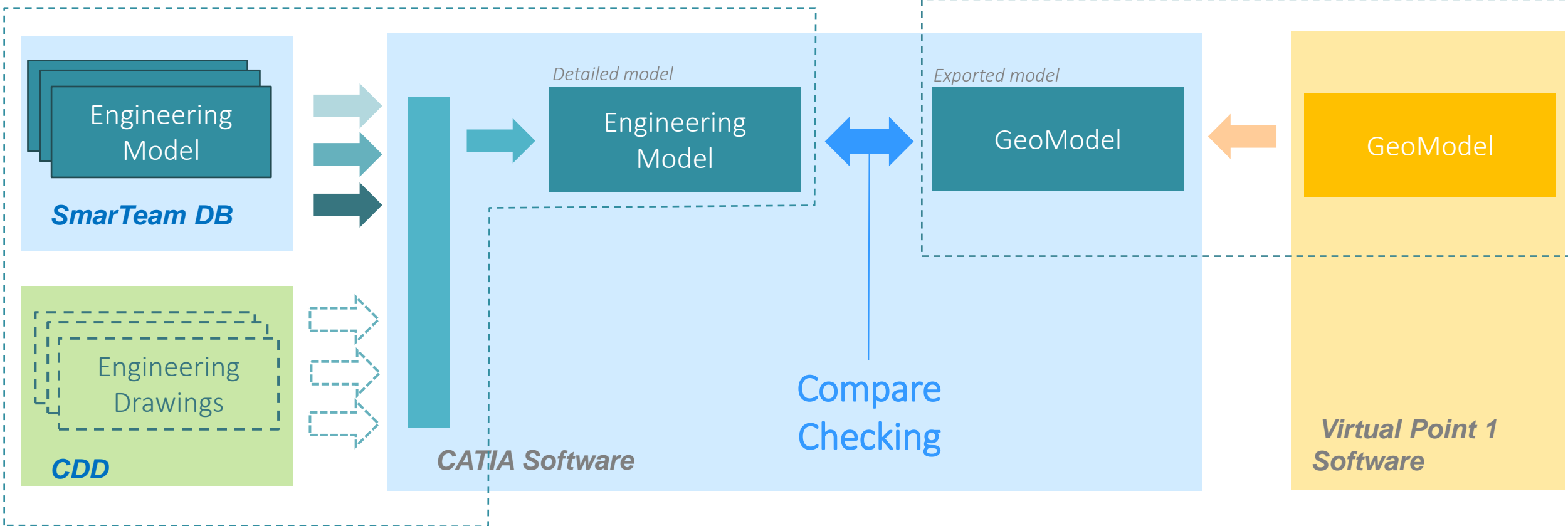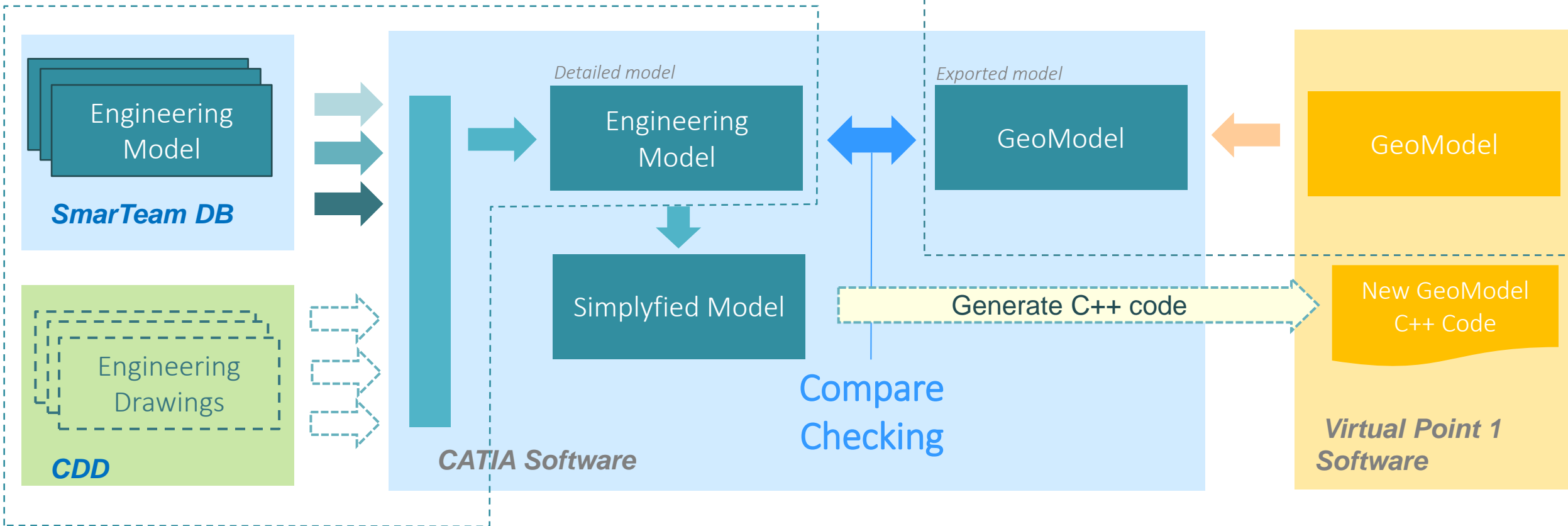
GeoModel geometry export in to CATIA

Engineering Model

SmarTeam DB

Engineering Drawings

CDD

Detailed model

Engineering Model

CATIA Software

Exported model

GeoModel

GeoModel

Compare Checking

Virtual Point 1 Software

Working Package (WP04) Overwiev

Comparison of Existing GeoModel Geometry with CATIA Geometry and make Correction of volumes into Packages used in ATLAS Software

Working Package (WP04) Overwiev

Comparison of Existing GeoModel Geometry with CATIA Geometry and make Correction of volumes into Packages used in ATLAS Software
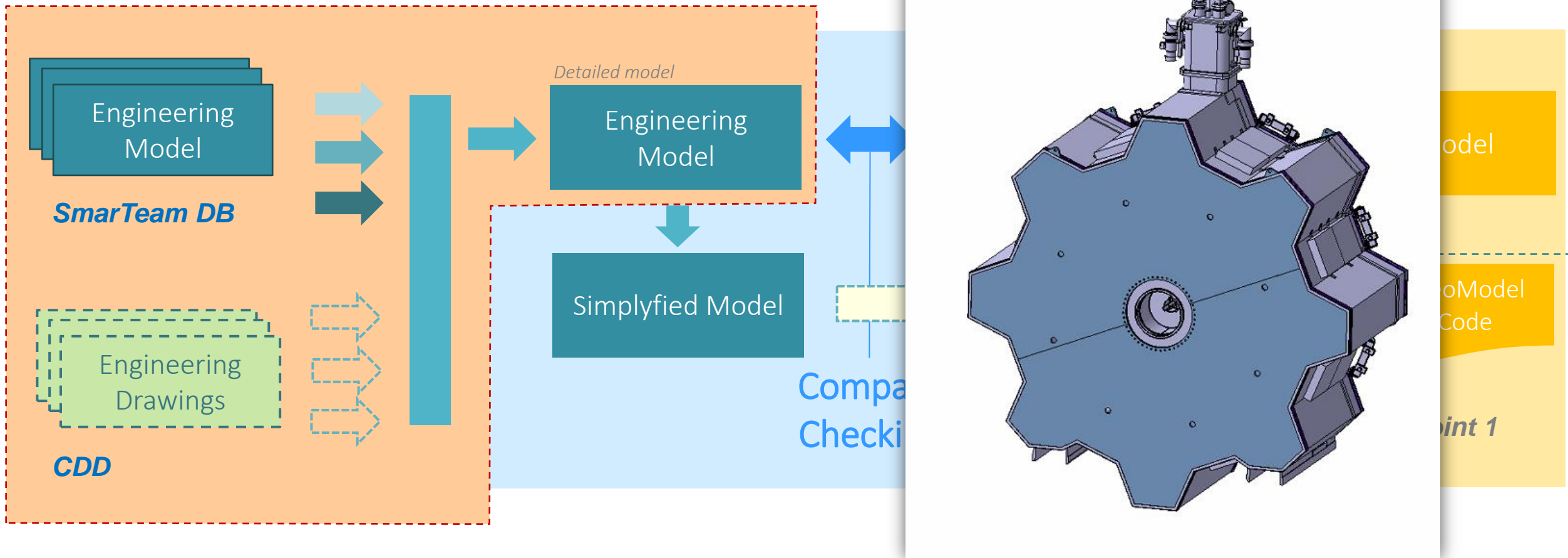
Our current Task
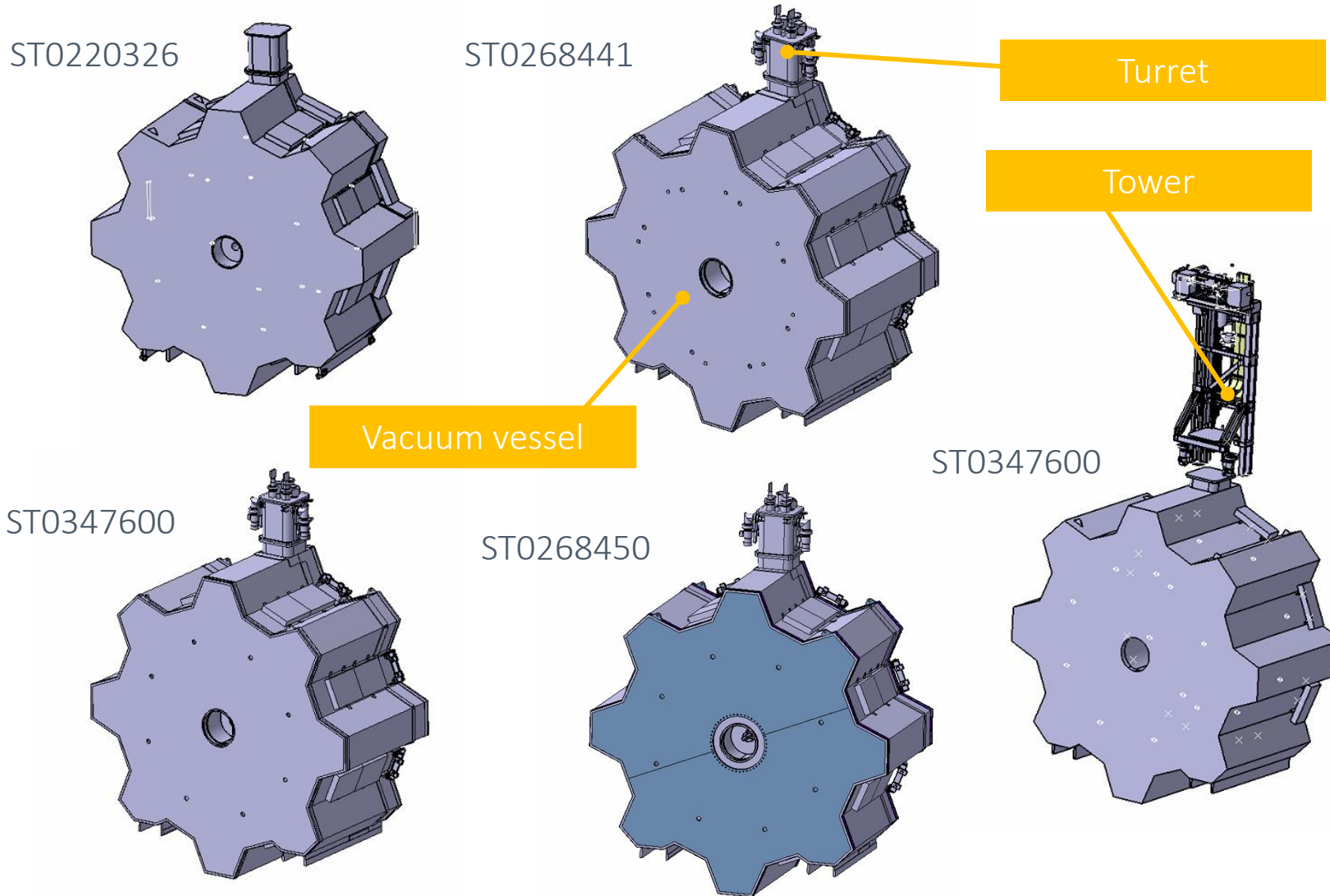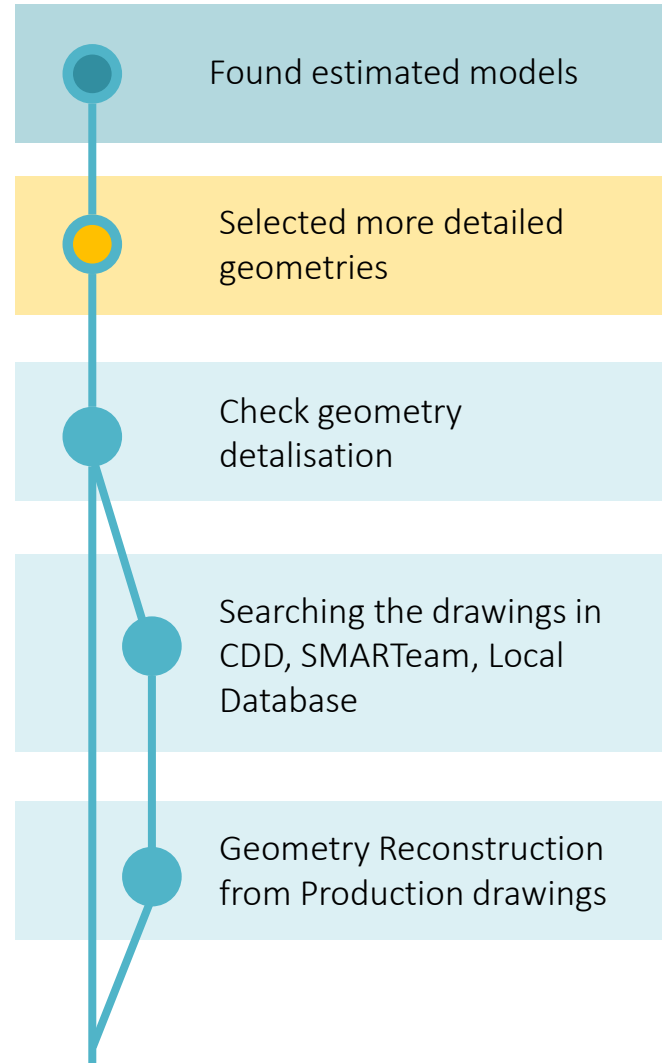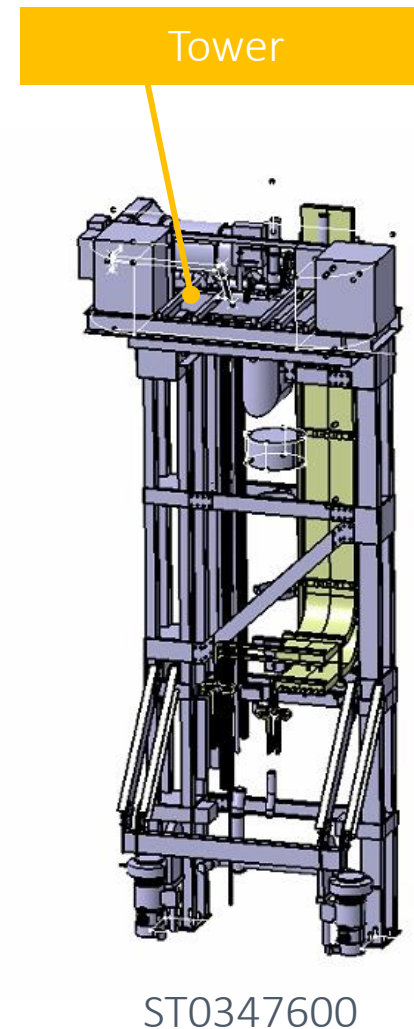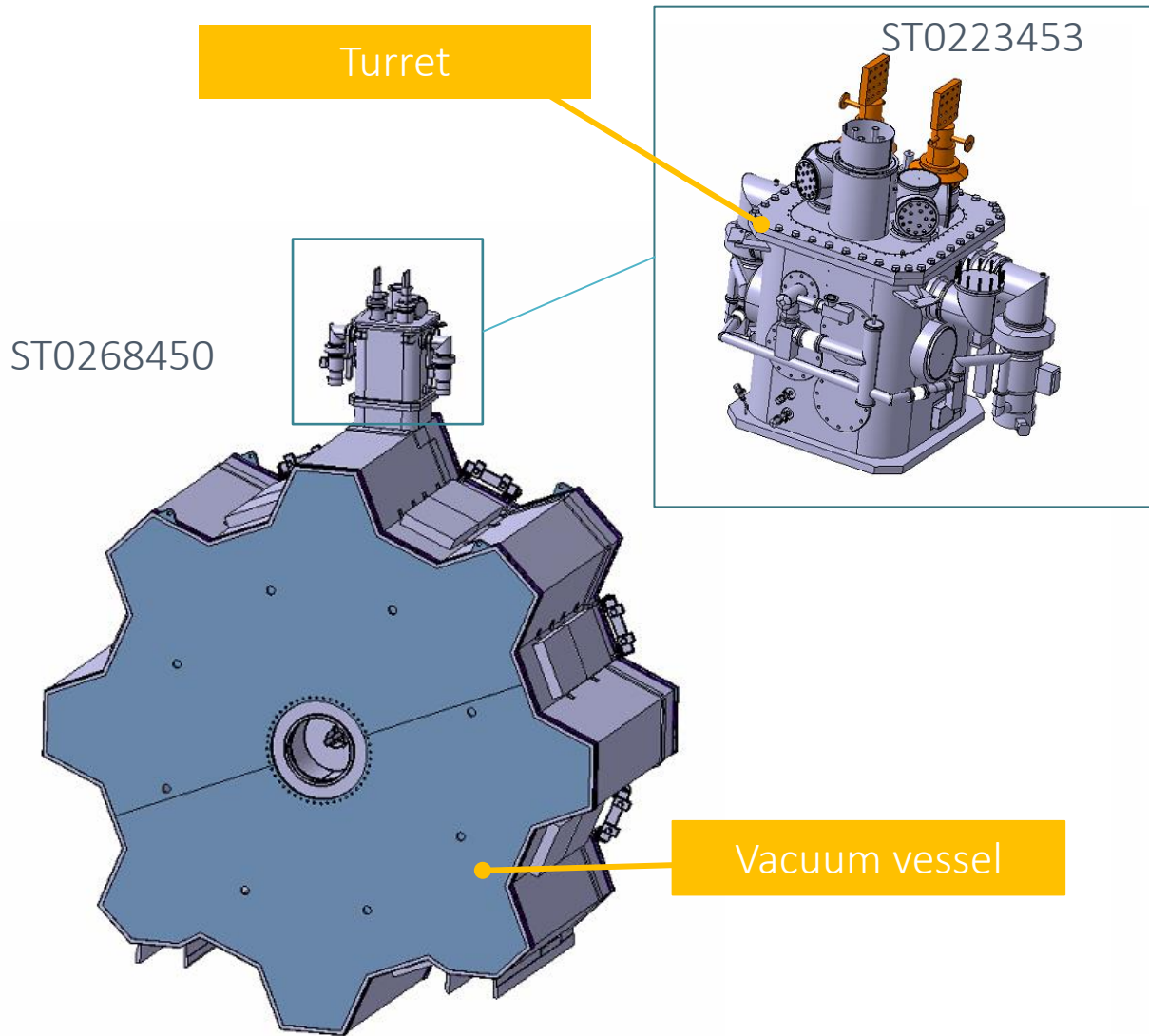
Investigation of EndCap Toroid geometry description

Finding all estimated models of ECT from SmarTeam

ST0220326

ST0268441

Turret

Tower

Vacuum vessel

ST0347600

ST0347600

ST0268450

Finding estimated models

Choose more detailed geometry

Check geometry detalisation

Searching the drawings in CDD, SMARTeam, Local Database

Geometry Reconstruction from Production drawings

Selecting more detailed geometries

Turret

ST0223453

Tower

ST0268450

Vacuum vessel

ST0347600

Found estimated models

Selected more detailed geometries

Check geometry detalisation

Searching the drawings in CDD, SMARTeam, Local Database

Geometry Reconstruction from Production drawings
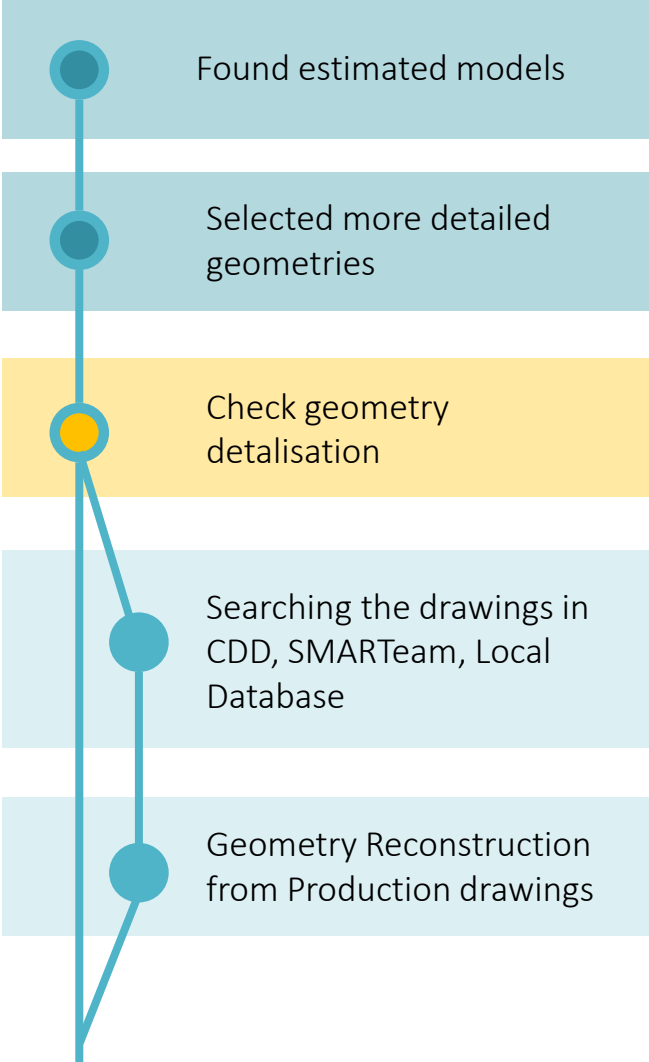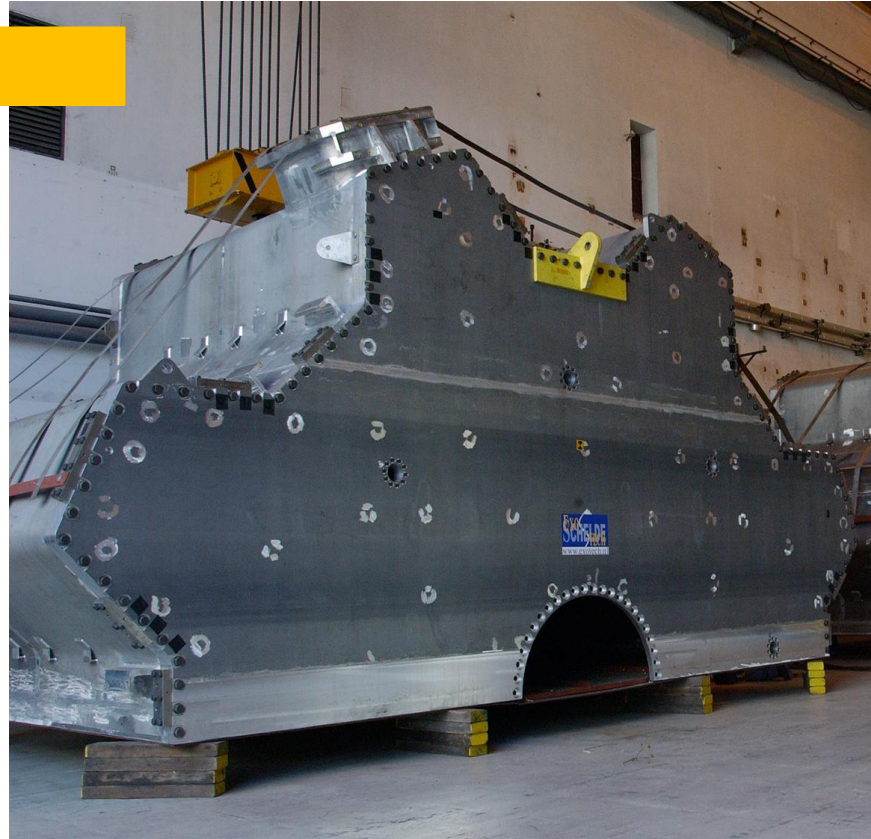
Chaking geometry detalisation

Cover has missed some details

Cover

Found estimated models

Selected more detailed geometries

Check geometry detalisation

Searching the drawings in CDD, SMARTeam, Local Database
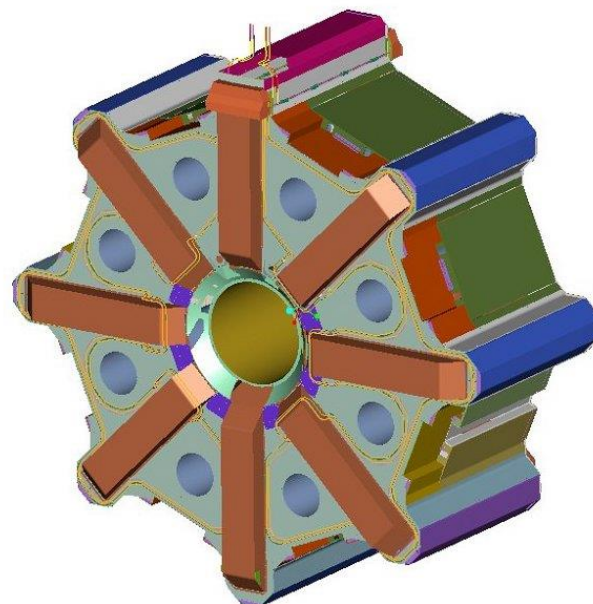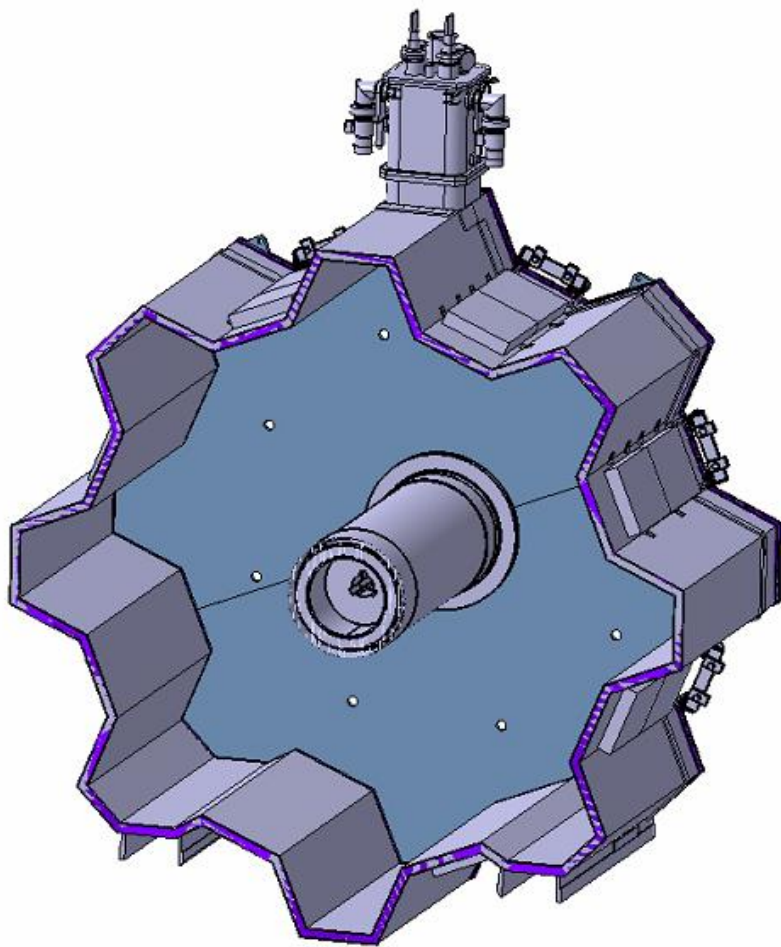
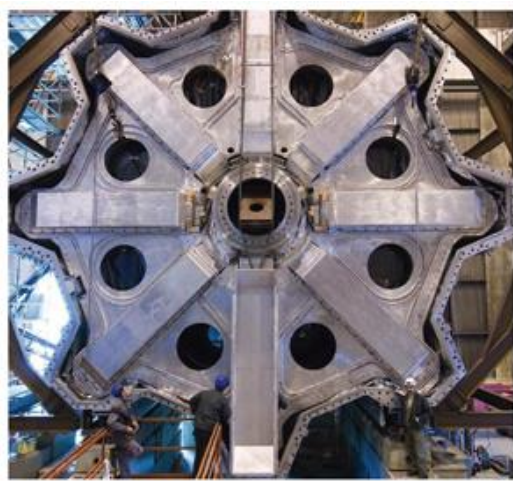Geometry Reconstruction from Production drawings
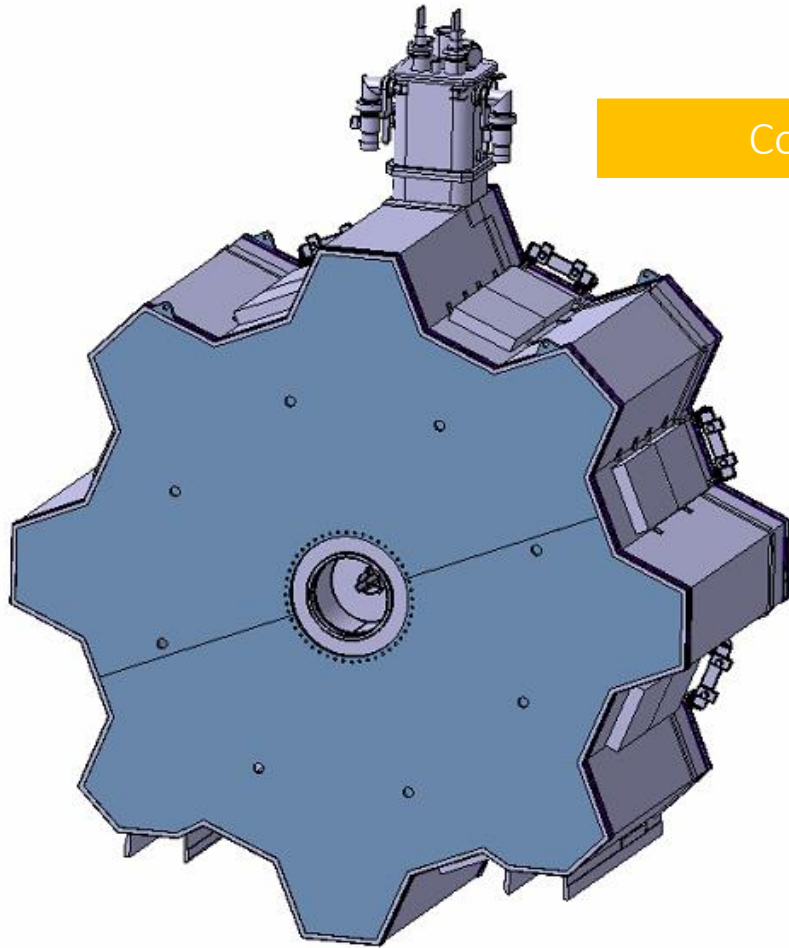
The geometry needs some modifications

Chaking geometry detalisation

Shilding

- Found estimated models
- Selected more detailed geometries
- Check geometry detalisation
- Searching the drawings in CDD, SMARTeam, Local Database
- Geometry Reconstruction from Production drawings

Chaking geometry detalisation

Cold mass

Cooling Circuit
Axial Force Tie Rods
Coil Modules
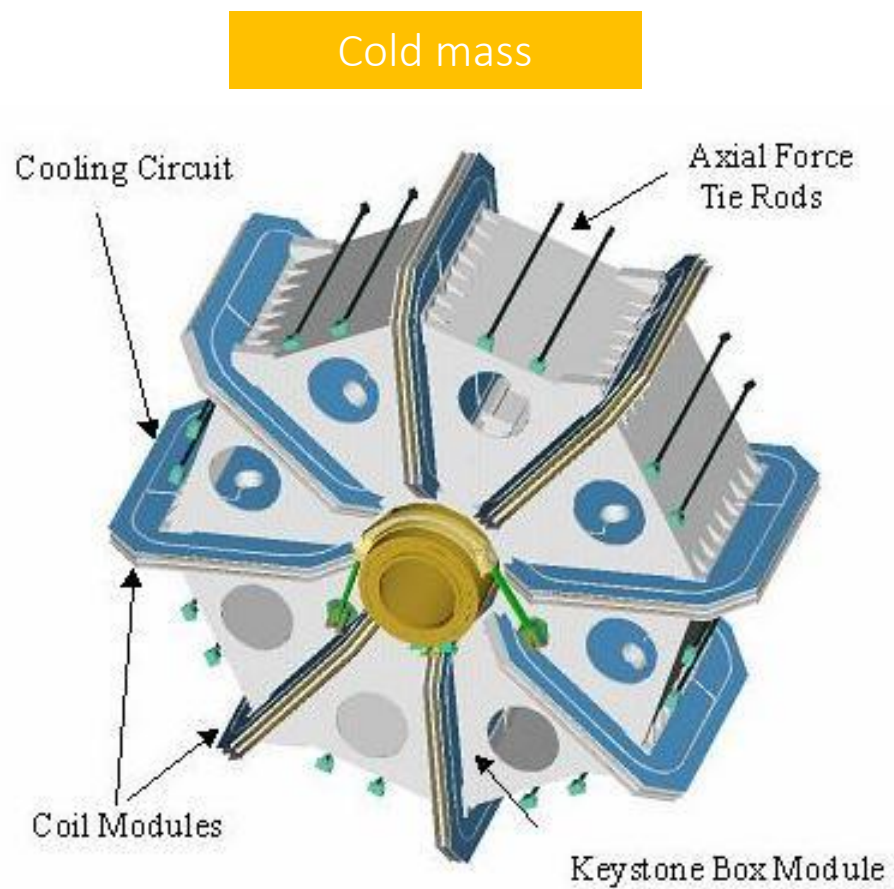Keystone Box Module
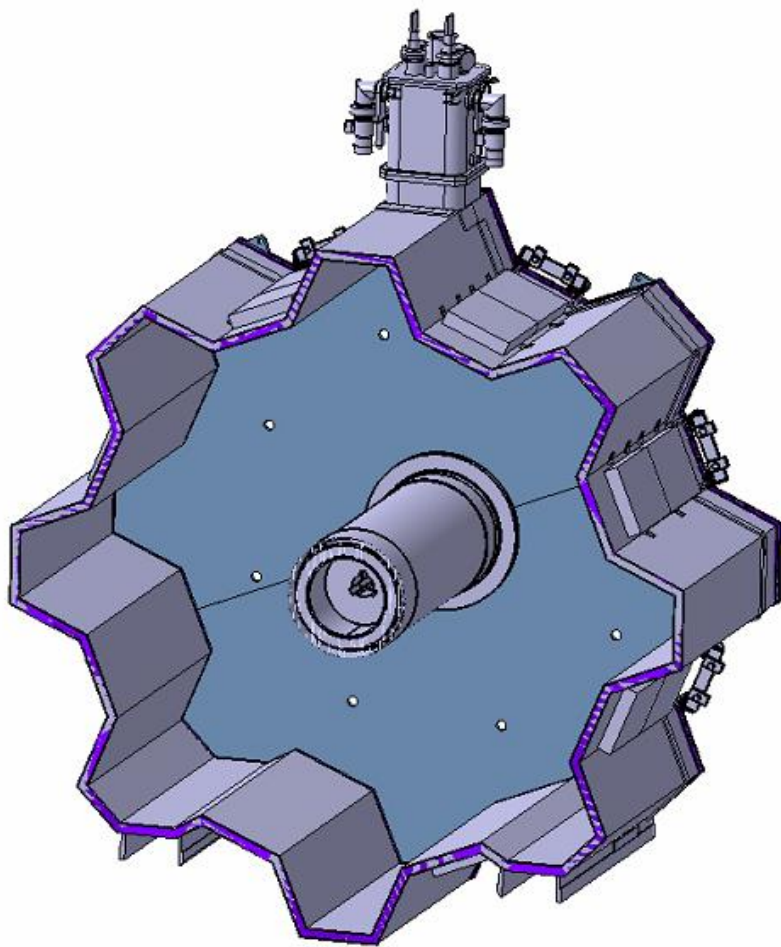
- Found estimated models
- Selected more detailed geometries
- Check geometry detalisation
- Searching the drawings in CDD, SMARTeam, Local Database
- Geometry Reconstruction from Production drawings

Chaking geometry detalisation

The Geometry Reconstruction from Production drawings

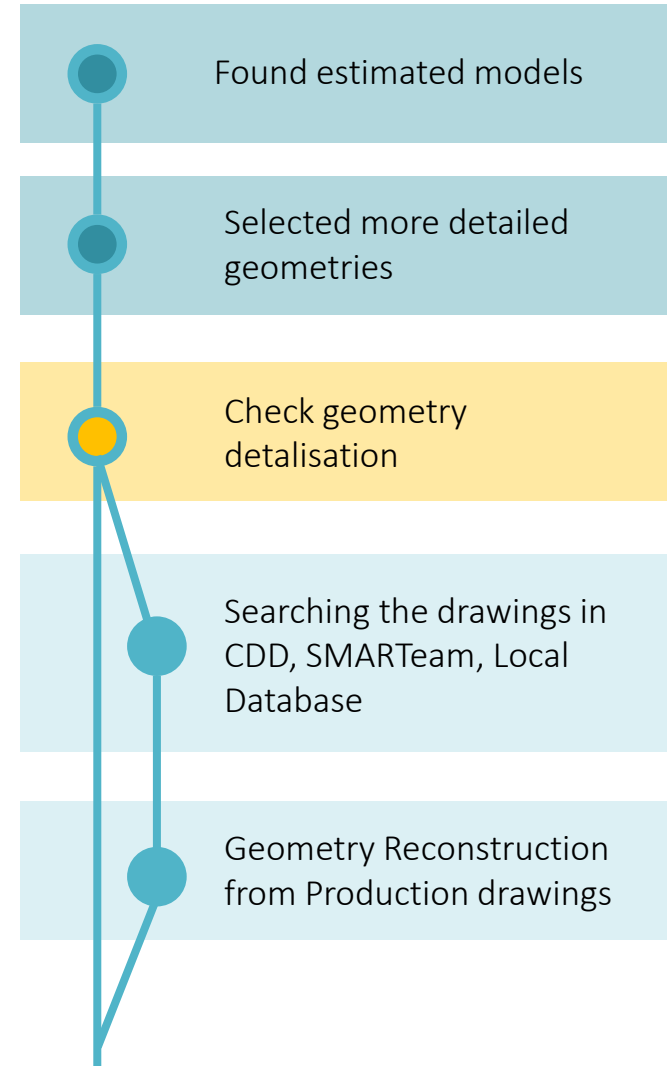Found estimated models

Selected more detailed geometries

Check geometry detalisation

Searching the drawings in CDD, SMARTeam, Local Database
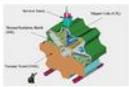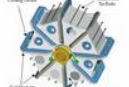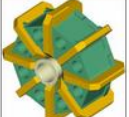
Geometry Reconstruction from Production drawings

We have found 902 Production drawings
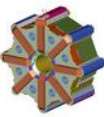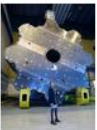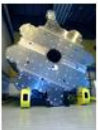
Design				
Toroid Design	ECT Layout	Cold Mass Layout	Cold Mass	Shield

Vacuum Vessel				
Vacuum Vessel (1)	Vacuum Vessel (2)	Vacuum Vessel (3)		
Shield	Cover	Bore Tube	Tie Rods	Superinsulation

Coil				
Winding (1)	Winding (2)	Coil (1)	Coil (2)	Coil (3)

Cold Mass				
Cold Mass (HMA) (1)	Cold Mass (HMA) (2)	Keystone Box (1)	Keystone Box (2)	

Finding estimated models

Selecting more detailed geometries

Checking geometry detalisation

Searching the drawings in CDD, SMARTeam, Local Database

Geometry Reconstruction from Production drawings

Searchind the drawings in CDD, SMARTeam, local DB

We have sorted 902 Production drawings
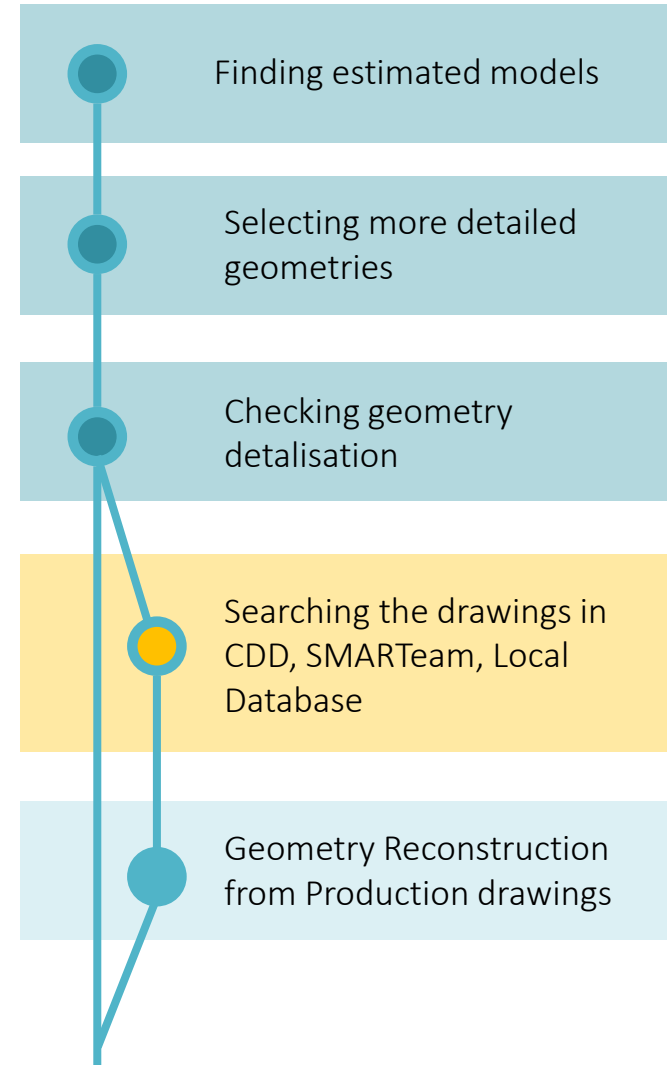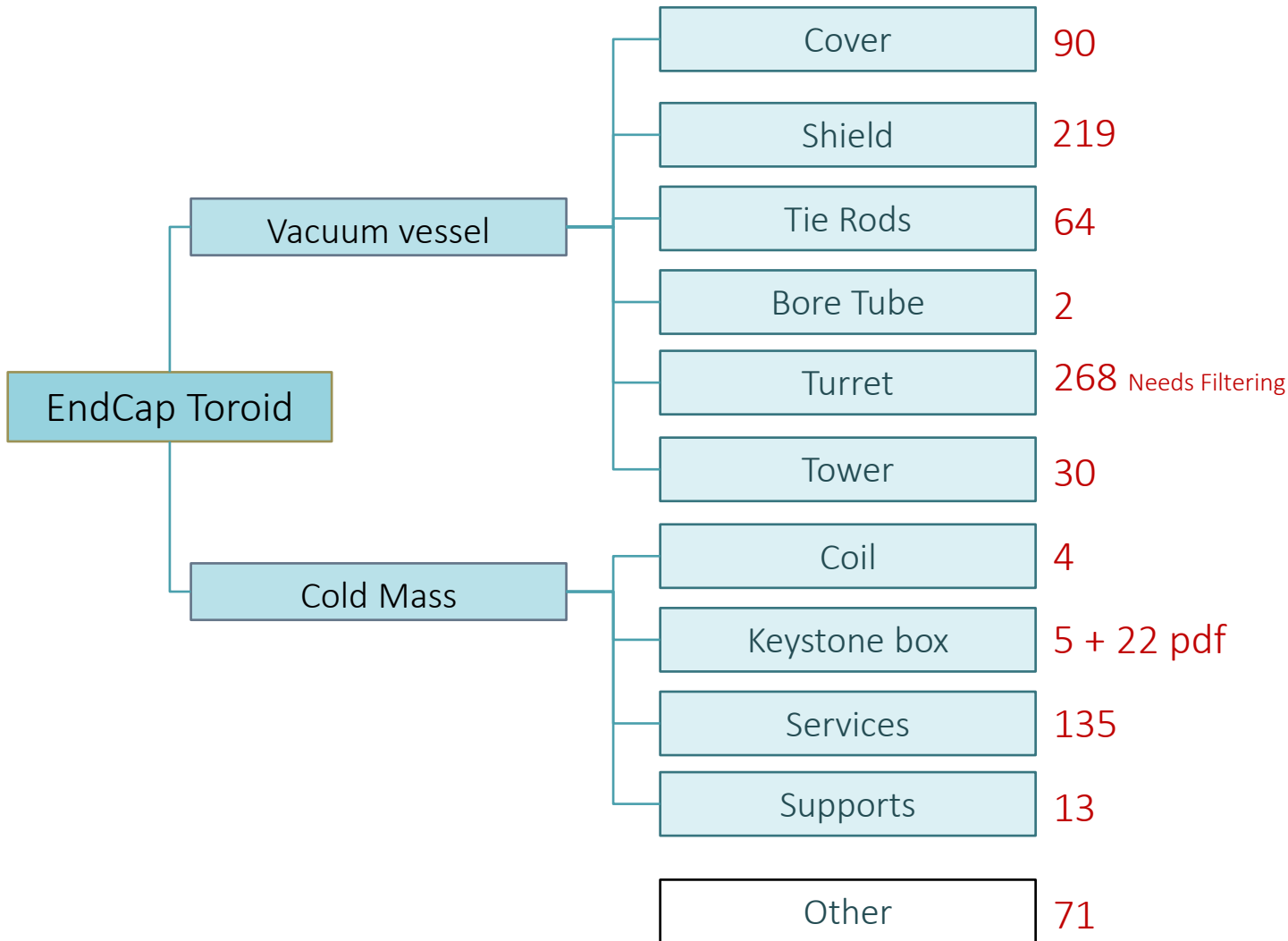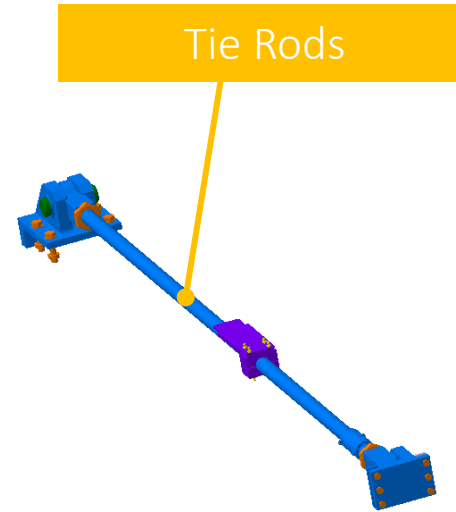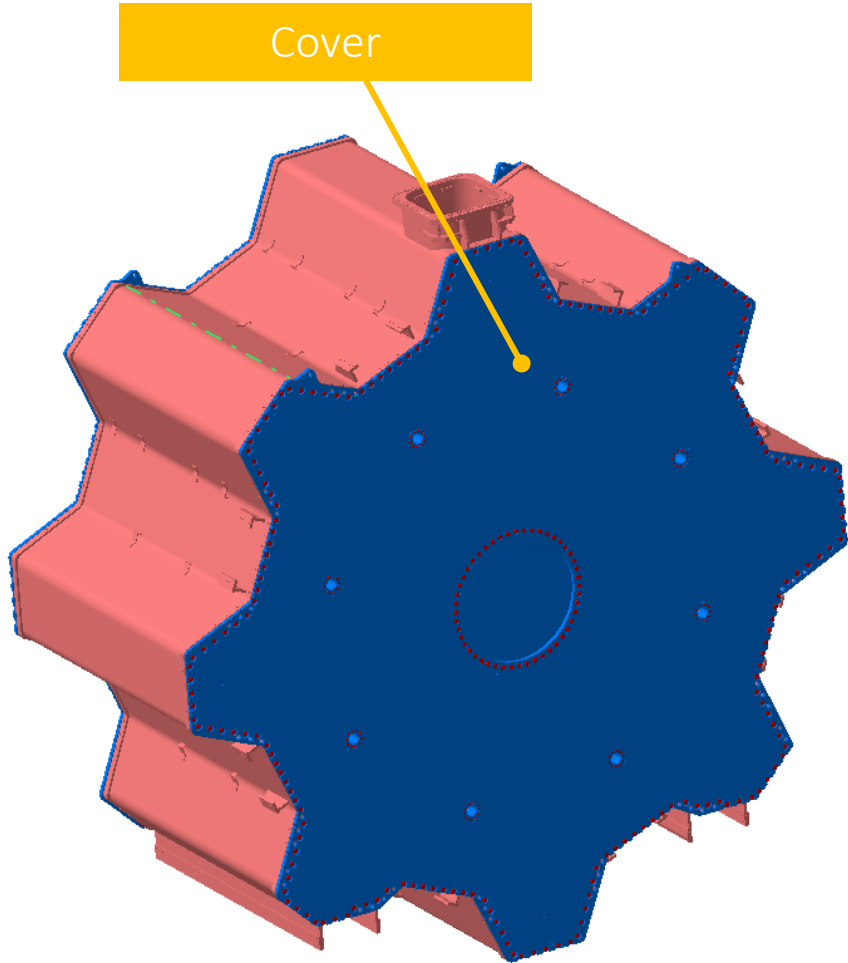
EndCap Toroid

Vacuum vessel
- Cover — 90
- Shield — 219
- Tie Rods — 64
- Bore Tube — 2
- Turret — 268 Needs Filtering
- Tower — 30

Cold Mass
- Coil — 4
- Keystone box — 5 + 22 pdf
- Services — 135
- Supports — 13

Other — 71

- Finding estimated models
- Selecting more detailed geometries
- Checking geometry detalisation
- Searching the drawings in CDD, SMARTeam, Local Database
- Geometry Reconstruction from Production drawings

Geometry Reconstruction from Production drawings

Cover

Tie Rods

- Finding estimated models
- Selecting more detailed geometries
- Checking geometry detalisation
- Searching the drawings in CDD, SMARTeam, Local Database
- Geometry Reconstruction from Production drawings

Geometry Reconstruction from Production drawings

Shilding

Keystone

Coil

Finding estimated models

Selecting more detailed geometries

Checking geometry detalisation

Searching the drawings in CDD, SMARTeam, Local Database

Geometry Reconstruction from Production drawings

Summary and next steps

```
                                    ┌──────────────┐
                                    │    Cover     │  Done
                                    └──────────────┘
                                    ┌──────────────┐
                                    │    Shield    │  Done
                                    └──────────────┘
                  ┌──────────────┐  ┌──────────────┐
                  │ Vacuum vessel│  │   Tie Rods   │  Done
                  └──────────────┘  └──────────────┘
                                    ┌──────────────┐
                                    │   Bore Tube  │  In process
                                    └──────────────┘
┌──────────────┐                    ┌──────────────┐
│ EndCap Toroid│                    │    Turret    │  268 Needs Filtering
└──────────────┘                    └──────────────┘
                                    ┌──────────────┐
                                    │    Tower     │  Done
                                    └──────────────┘
                                    ┌──────────────┐
                                    │     Coil     │  Done
                                    └──────────────┘
                  ┌──────────────┐  ┌──────────────┐
                  │  Cold Mass   │  │ Keystone box │  Done
                  └──────────────┘  └──────────────┘
                                    ┌──────────────┐
                                    │   Services   │  135
                                    └──────────────┘
                                    ┌──────────────┐
                                    │   Supports   │  13
                                    └──────────────┘
                                    ┌──────────────┐
                                    │    Other     │  71
                                    └──────────────┘
```