Compare Analysis between *as-built* geometry and *Geant4* Description

Dr. Niko Tsutskiridze

Georgian Technical university

To-Do list for WP2

To-Do list

Completed:

1. Flexible Chain in Sector 9
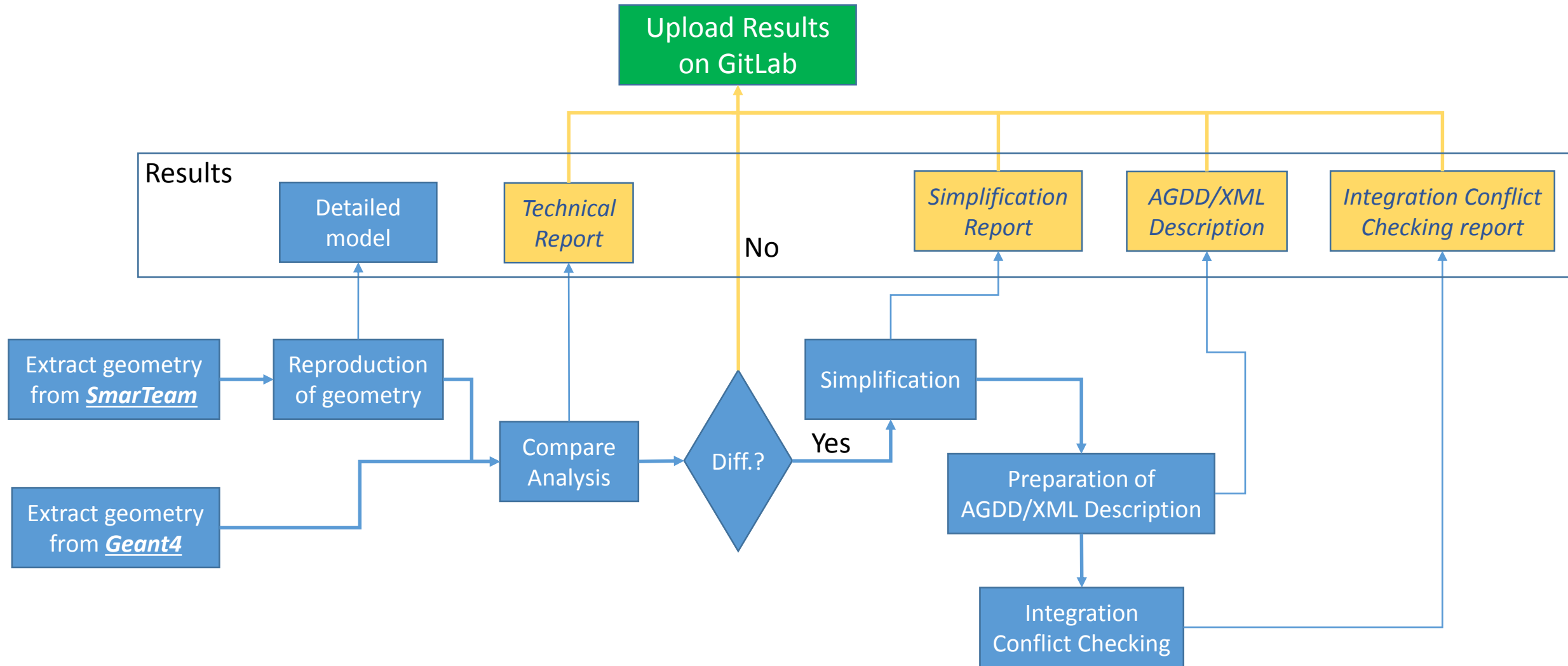
Current:

2. Feet and additional boxes

Upcoming:

3. CALO Services
4. Services of Magnet system in sector 7
5. JD Services in Sectors 7 and 9
6. Platforms in sectors 5 and 13

Deliverables:

1. *Technical report of compare analysis between as-built and geant4 description*
2. *Technical report of Simplification*
3. *AGDD/XML Description*
4. *Technical report of Integration Conflict Checking*
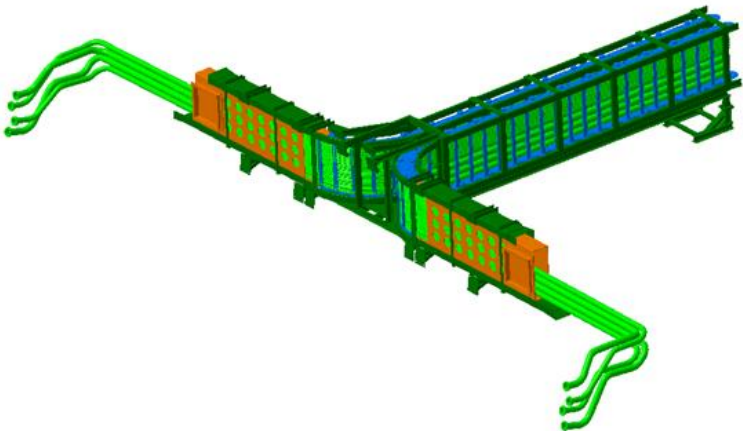
Life Cycle of Compare analyses

Completed. Compare analyses of *Flexible Chain (Sector 9)*
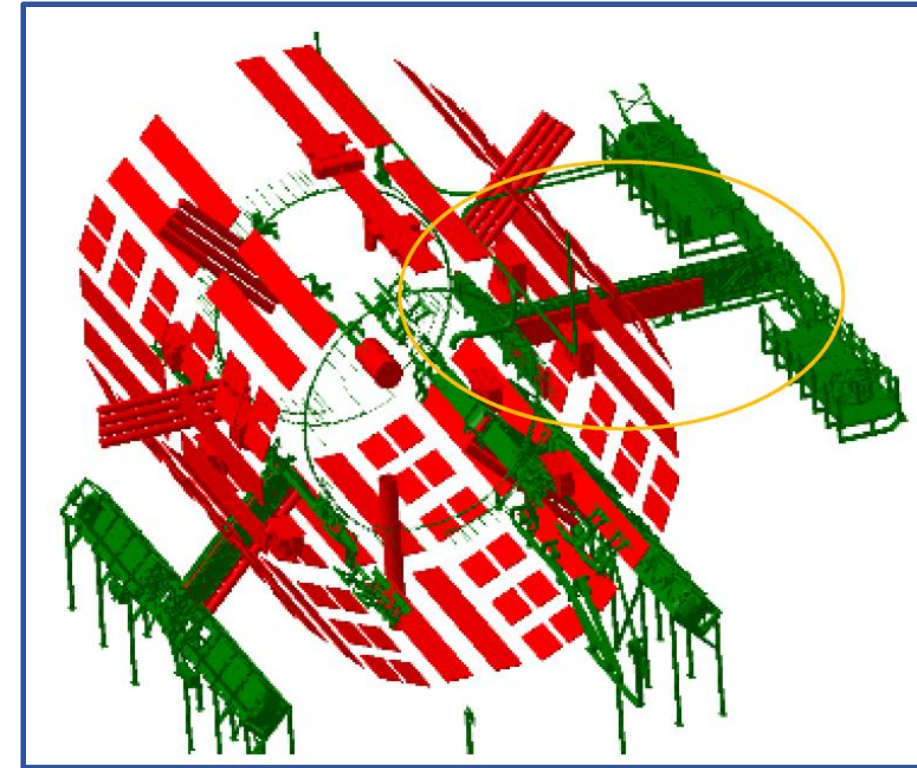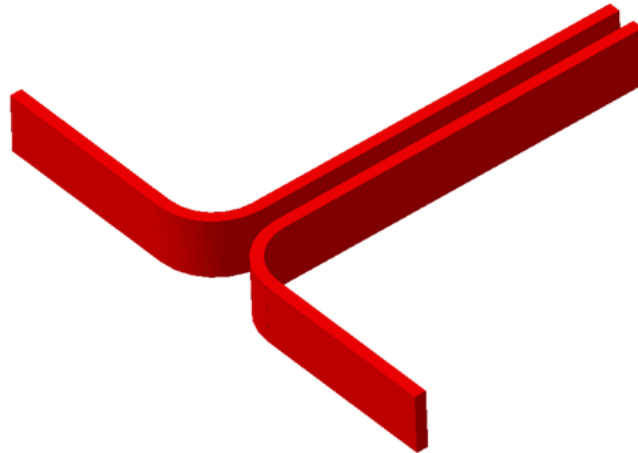
To-Do list

1. Flexible Chain in Sector 9
2. Feet and additional boxes
3. CALO Services
4. Services of Magnet system in sector 7
5. JD Services in Sectors 7 and 9
6. Platforms in sectors 5 and 13

CATIA

Geant4

VS

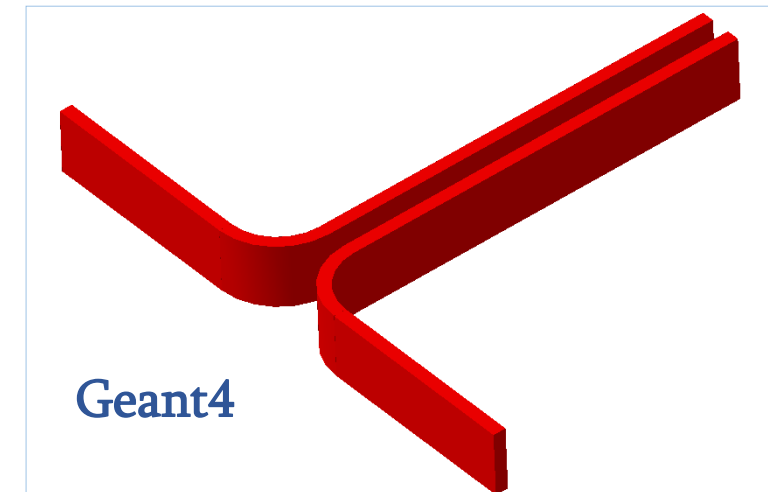More than 3 months for reproduction of detailed model

To-Do list

1. Flexible Chain in Sector 9
2. Feet and additional boxes
3. CALO Services
4. Services of Magnet system in sector 7
5. JD Services in Sectors 7 and 9
6. Platforms in sectors 5 and 13

		CATIA	Geant	Difference
1	Support	1'968 kgs	11'877 kgs	83.4%
2	Drag Chain	1'608 kgs	- kgs	- 100%
3	Towing Arm	680 kgs	- kgs	- 100%
4	Pipes	172 kgs	- kgs	- 100%
5	Cables	825 kgs	- kgs	- 100%
	Total	**5'253**	**11'877**	**97%**

CATIA
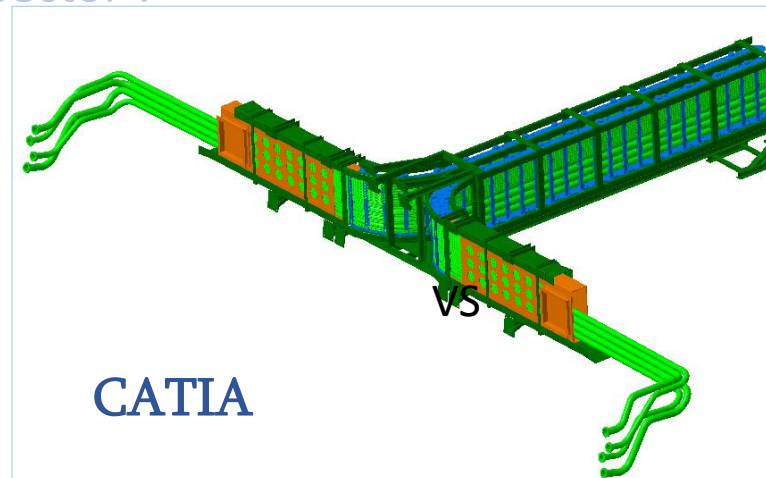
Volume (m³)	0.6456
Mass (kg)	5'253
Material	Stainless Steel/Cooper
Density (kg/m³)	8'000/8960

Geant4

Volume (m³)	4.399
Mass (kg)	11'877.3
Material	Aluminum
Density (kg/m³)	2'700

VS

5
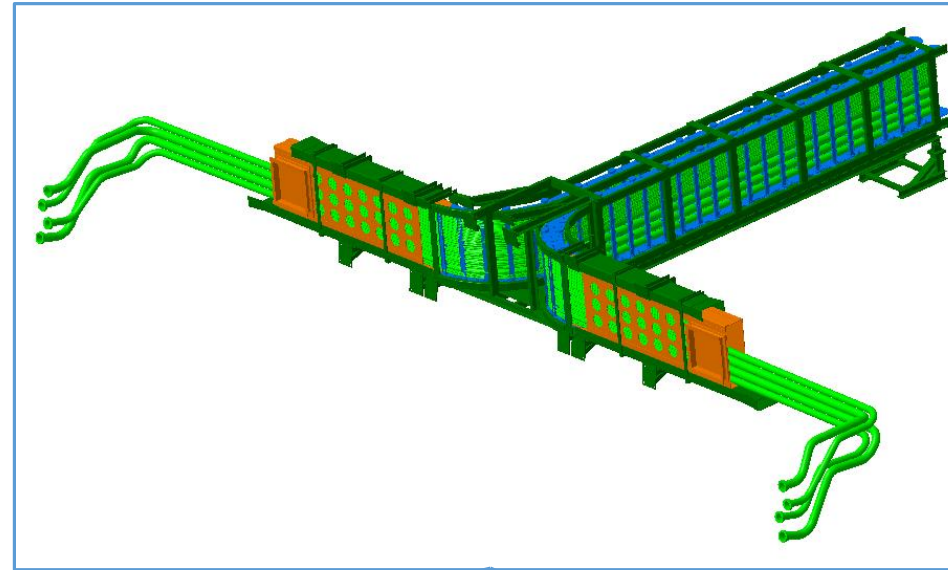
To-Do list

1. Flexible Chain in Sector 9
2. Feet and additional boxes
3. CALO Services
4. Services of Magnet system in sector 7
5. JD Services in Sectors 7 and 9
6. Platforms in sectors 5 and 13

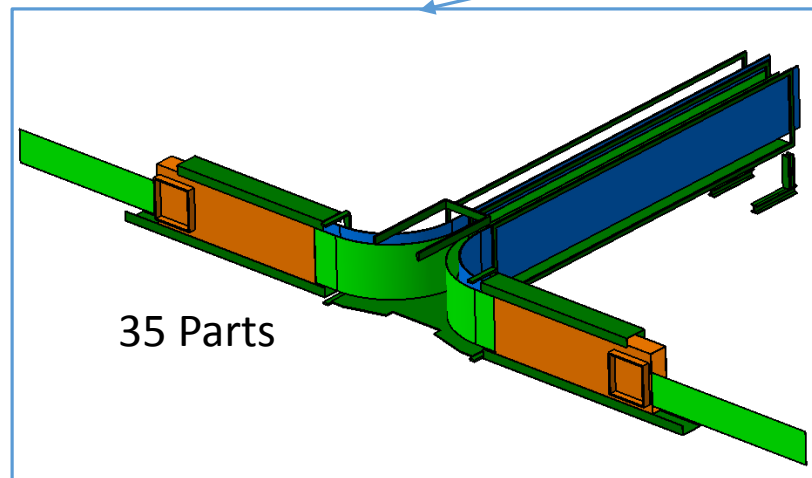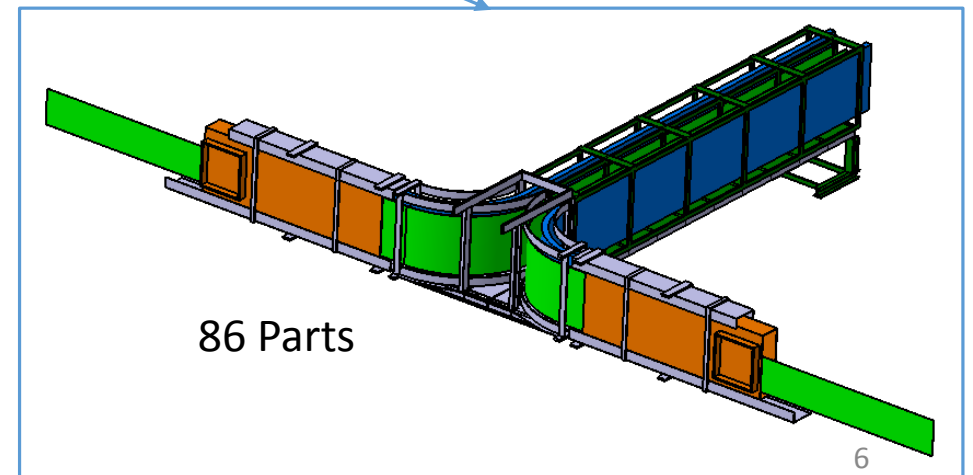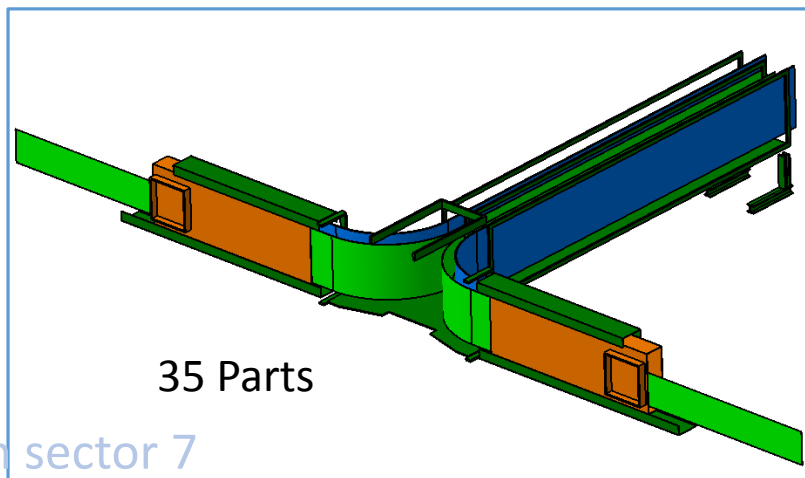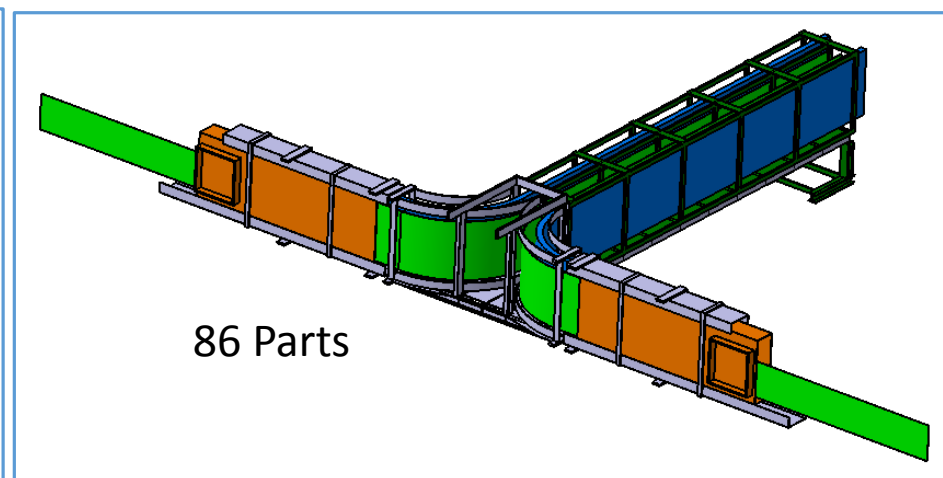Version I

Version II

35 Parts

86 Parts

Completed. Compare analyses of _Flexible Chain (Sector 9)_

To-Do list

1. Flexible Chain in Sector 9
2. Feet and additional boxes
3. CALO Services
4. Services of Magnet system in sector 7
5. JD Services in Sectors 7 and 9
6. Platforms in sectors 5 and 13

35 Parts

Version I

86 Parts

Version II

The results were reviewed at Muon Software meeting in March

Current. Compare analyses of *Feet and additional boxes*

To-Do list

1. Flexible Chain in Sector 9
2. Feet and additional boxes
3. CALO Services
4. Services of Magnet system in sector 7
5. JD Services in Sectors 7 and 9
6. Platforms in sectors 5 and 13

		CATIA	Geant4	Difference
1	Standard Foot	213'248 kgs	186'401 kgs	-12.6 %
2	Extremity Foot	66'864 kgs	58'647 kgs	-12.3 %
3	Rail Support	31'944 kgs	31'448 kgs	-1.6 %
4	Extremity Rail Support	11'040 kgs	10'900 kgs	-1.3 %
5	Girder	24'096 kgs	18'305 kgs	-24 %
6	Extremity Girder	4'576 kgs	4'430 kgs	-3.2 %
7	FEET_Standard Strut	8'523.9 kgs	16'611 kgs	+48.7 %
8	FEET_Extremity Strut	24'48.9 kgs	4'427.5 kgs	+44.7 %
9	Bolts	3'912 kgs	- kgs	- 100 %
10	Slanted ConnPlate Bracket	- kgs	138 kgs	+ 100 %
	Total	**366'652 kgs**	**331'307 kgs**	**34.84 %**

CATIA

Geant4

8

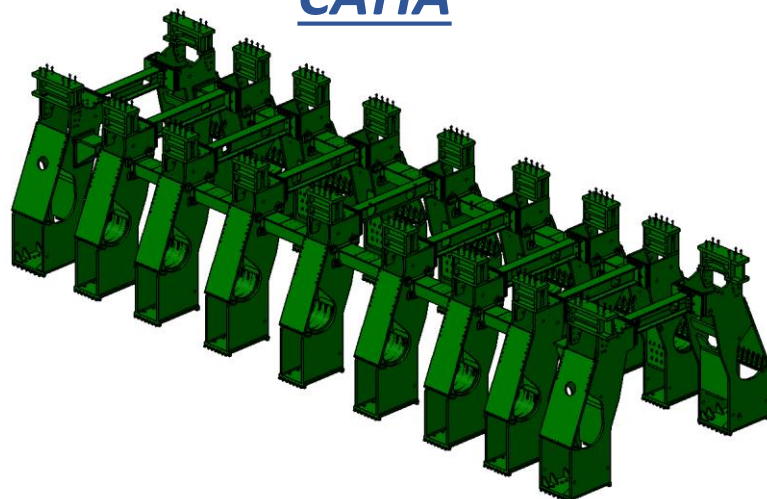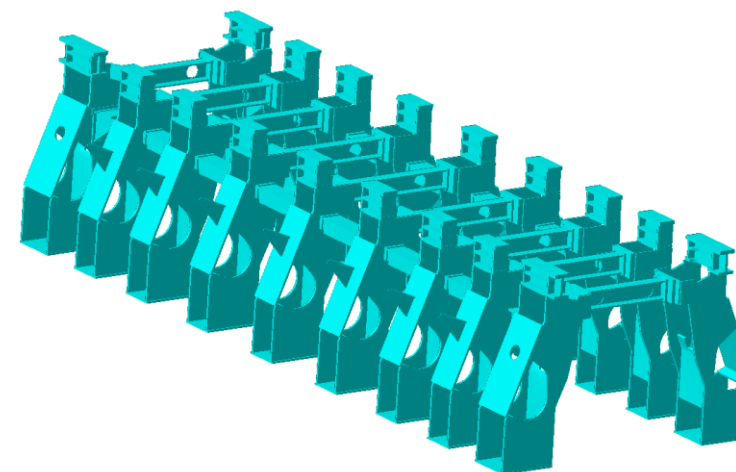# Completed/Upcoming. Compare analyses of _CALO Services_

To-Do list

1. Flexible Chain in Sector 9
2. Feet and additional boxes
3. CALO Services
4. Services of Magnet system in sector 7
5. JD Services in Sectors 7 and 9
6. Platforms in sectors 5 and 13

El. Boxes	XML	CATIA	Difference
both side	Weight kg	weight kg	weight %
Part1	1037	778	**33%**
Part2	4623	4985	**-7%**
Total	5660	5763	

CATIA

Geant4

Part 1

Part 2

Geant4

The results were reviewed at Muon Software meeting in March

Gap Region

Segment 1

Segment 1	Volume	Wieght kg	Material	density
Service part 1	0.18	63.0	LArServices8	350
Service part 2	0.258	9.0	LArServices17	35
Supports	0.014	38.6	Aluminum	2700
Total	0.45	110.6		

Simplified CATIA model

Difference 37%

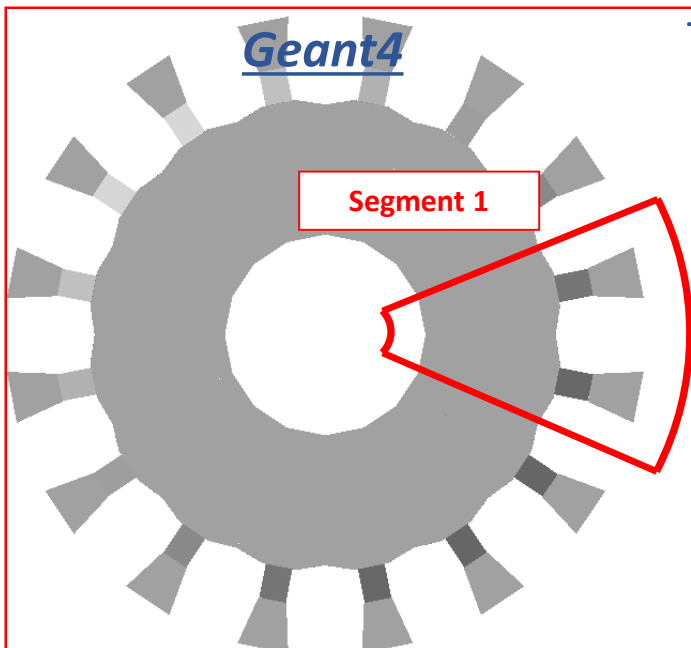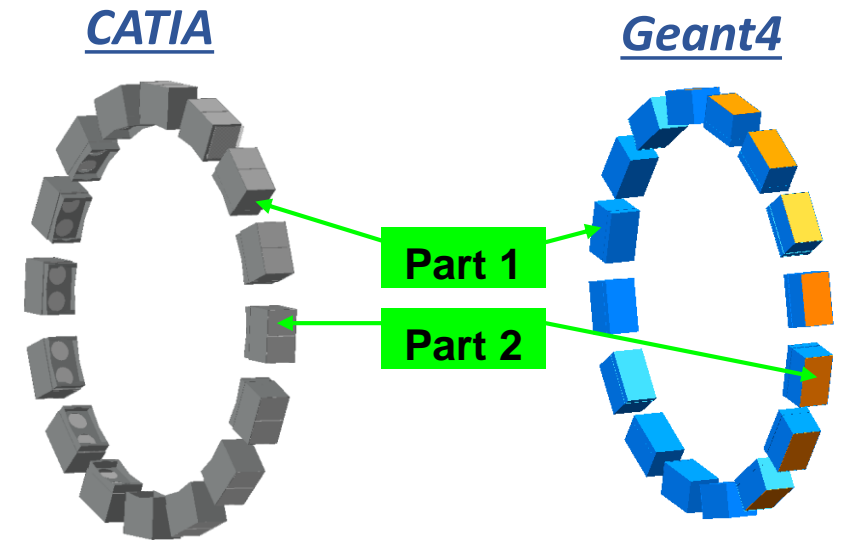| Segment 1	Volume	Wieght kg	Material	density
Supports	0.014	38.6	Aluminum	2700
Cables	0.005	44.8	Copper	8960
Pipes 1	0.002	17.0	Stainles steel	8000
Pipes 2	0.006	51.4	Cooper	8960
Total	0.027	151.8		
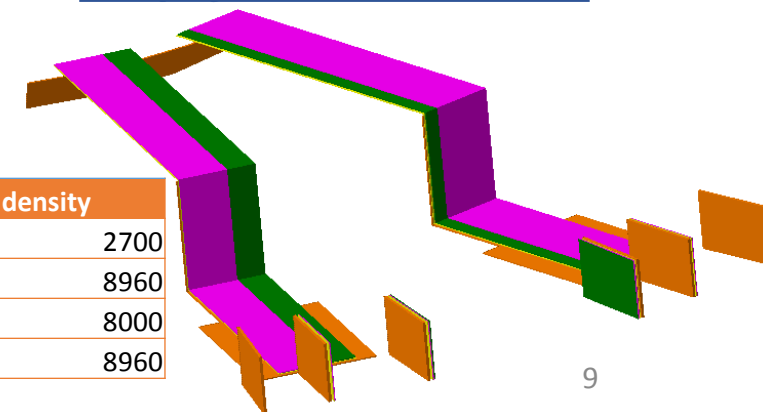
9

Completed/Upcoming. Compare analyses of *CALO Services*

To-Do list

1. Flexible Chain in Sector 9
2. Feet and additional boxes
3. **CALO Services**
4. Services of Magnet system in sector 7
5. JD Services in Sectors 7 and 9
6. Platforms in sectors 5 and 13

Other Services of CALO will be investigated
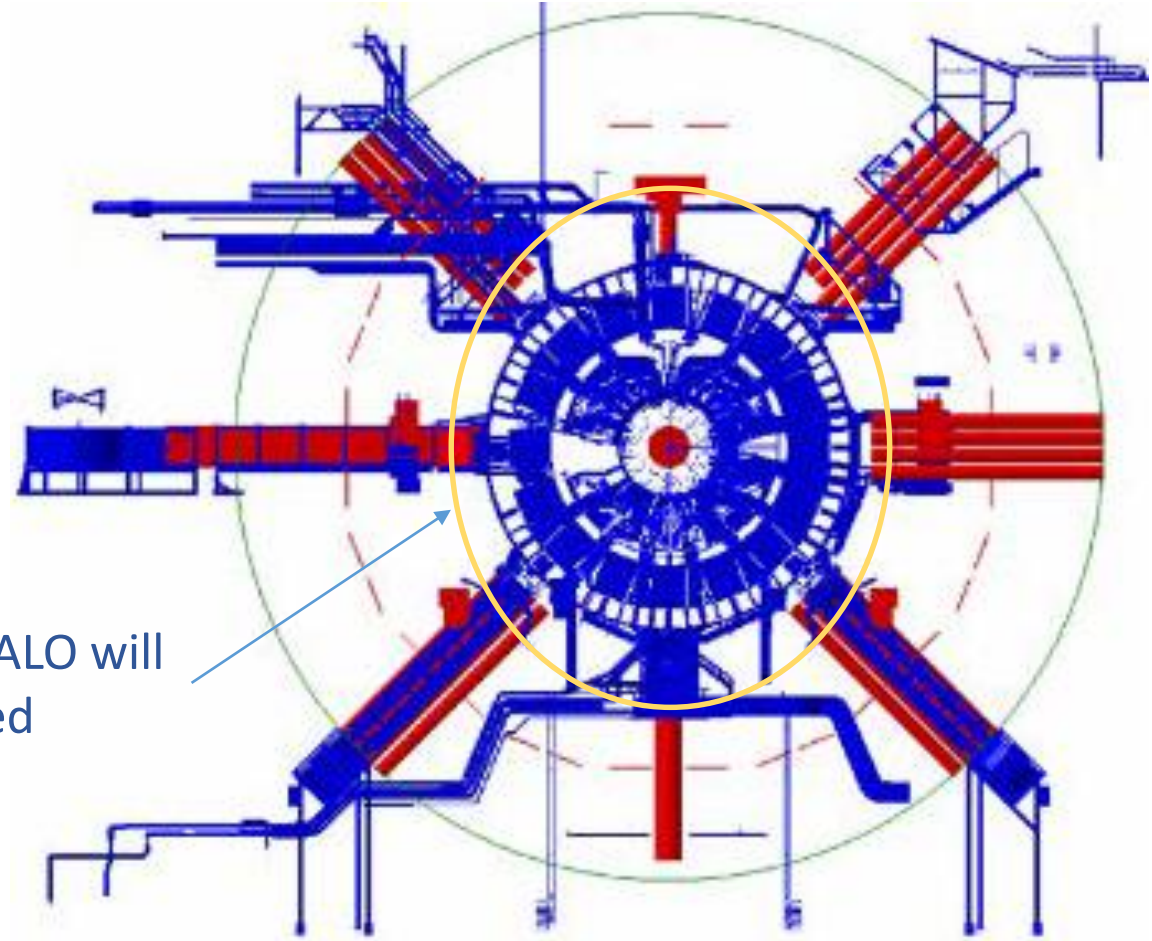
Upcoming. *Services of Magnet system in sector 7*

To-Do list

1. Flexible Chain in Sector 9
2. Feet and additional boxes
3. CALO Services
4. Services of Magnet system in sector 7
5. JD Services in Sectors 7 and 9
6. Platforms in sectors 5 and 13

Upcoming. *JD Services in Sectors 7 and 9*

To-Do list

1. Flexible Chain in Sector 9
2. Feet and additional boxes
3. CALO Services
4. Services of Magnet system in sector 7
5. JD Services in Sectors 7 and 9
6. Platforms in sectors 5 and 13

Upcoming. *Platforms in sectors 5 and 13*

To-Do list

1. Flexible Chain in Sector 9
2. Feet and additional boxes
3. CALO Services
4. Services of Magnet system in sector 7
5. JD Services in Sectors 7 and 9
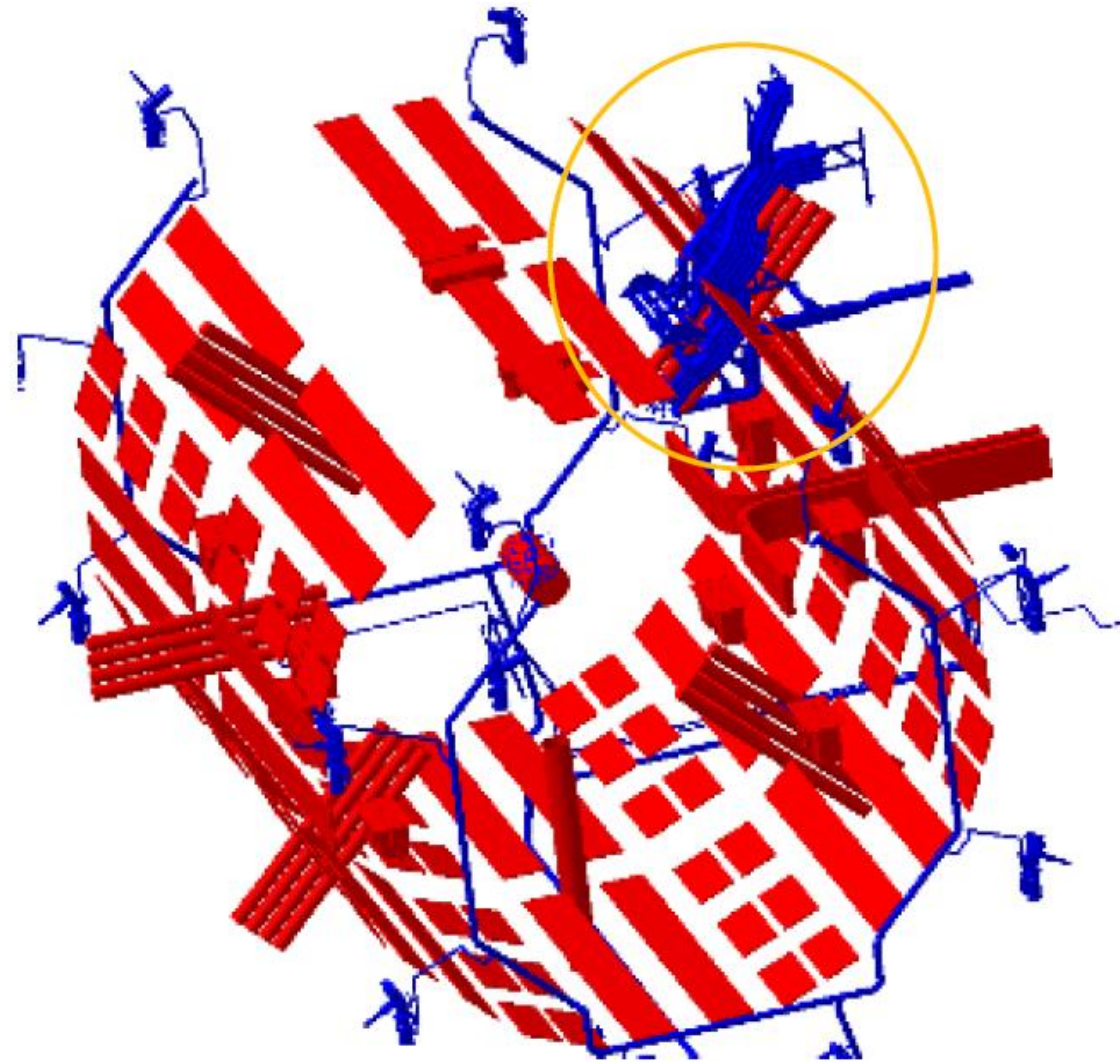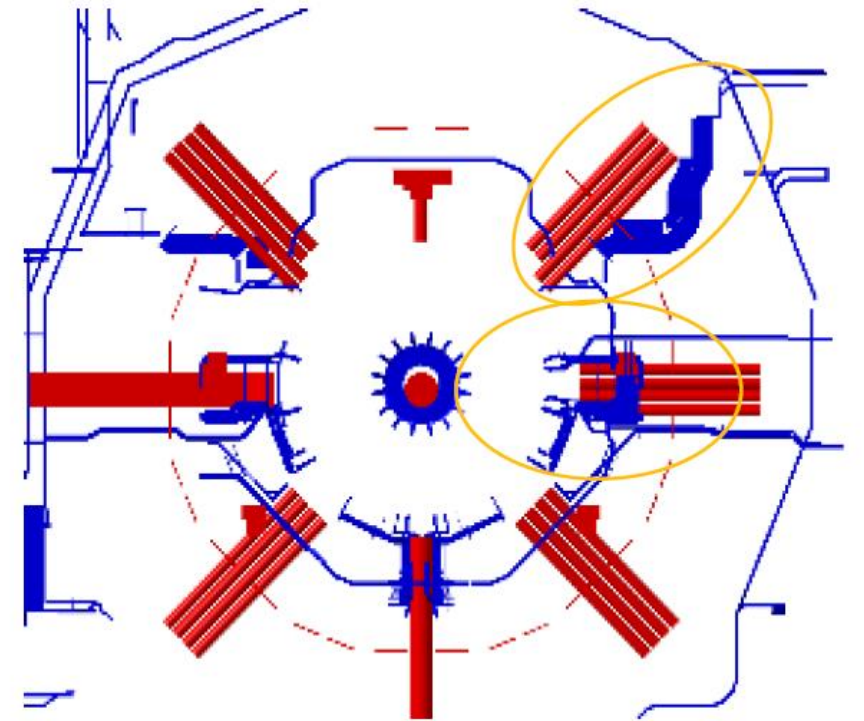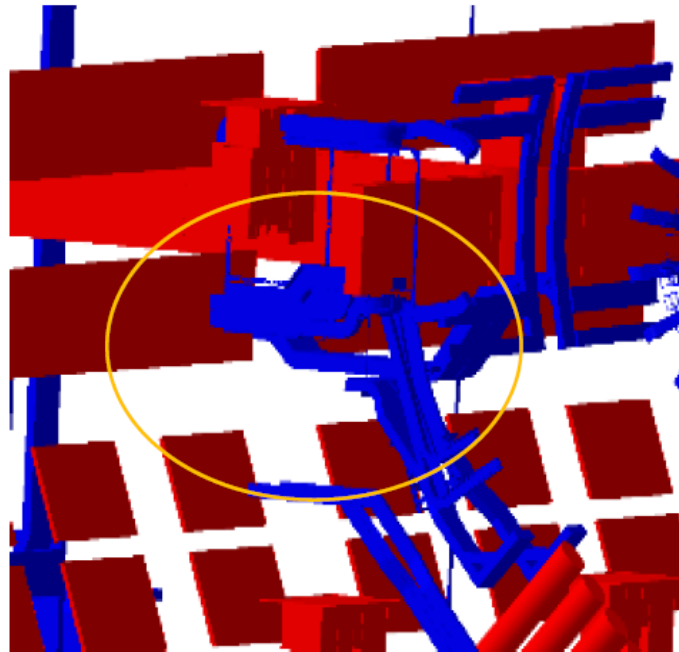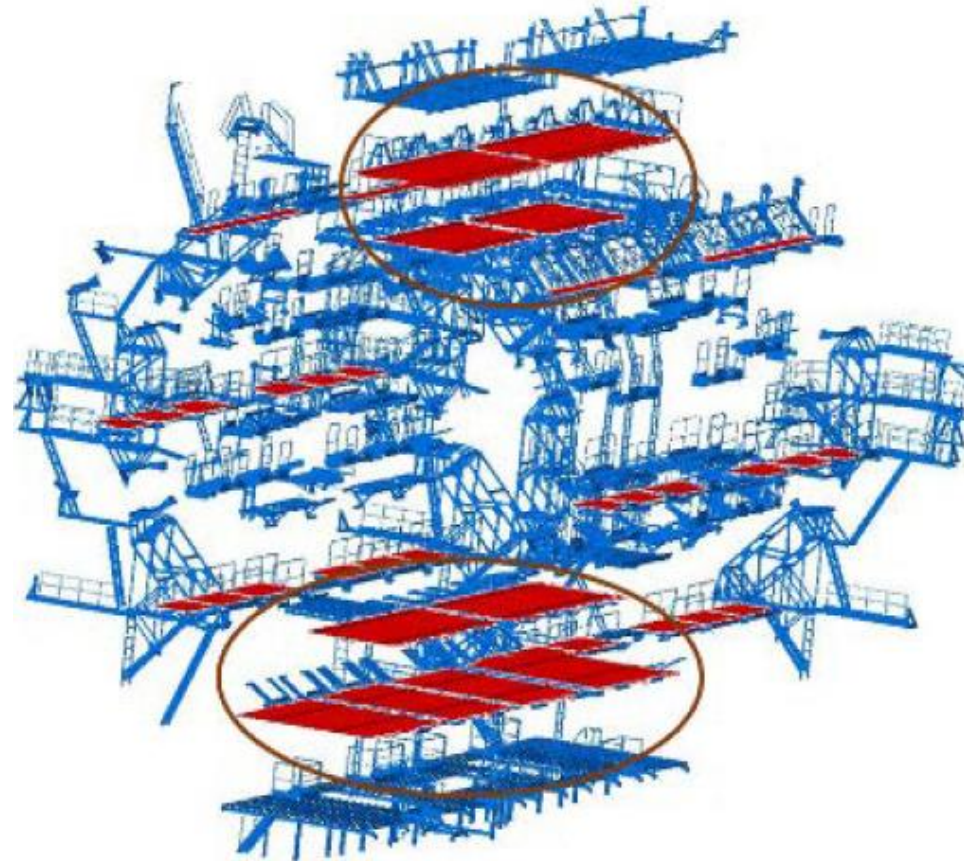6. Platforms in sectors 5 and 13

Upcoming. Compare analysis of Active Parts of ATLAS Detector

To-Do list

1. Inner Detector   ->   Pixel Detector
                                   SCT Detector
                                   TRT

2. Calorimeters   ->   Large Calorimeter
                                   Tile Calorimeter

3. Muon Chambers   ->   Barrel Region – 3 Layers
                                   ECT Region – 4 Layers

Manpower

To-Do list

Completed:

1. Flexible Chain in Sector 9

Current:

2. Feet and additional boxes

Upcoming:

3. CALO Services

4. Services of Magnet system in sector 7

5. JD Services in Sectors 7 and 9

6. Platforms in sectors 5 and 13

Manpower in Georgian Team:

1.5FTE - CATIA designers, programmers

Thank You for Your Attention!

მადლობთ ყურადღებისათვის!

niko.tsutskiridze@cern.ch