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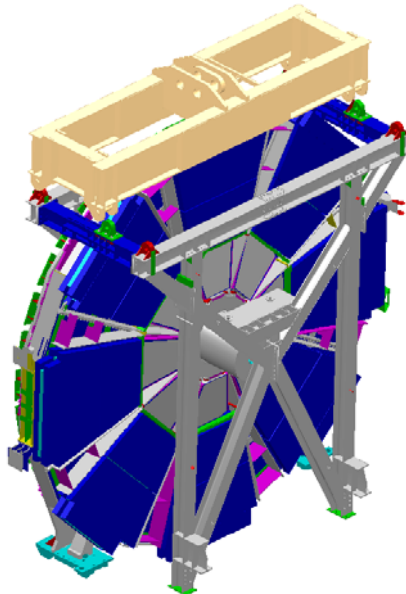
PH/ATI



## SW + JD Disk Installation

# REPORT (updated)

## of Dynamical Conflict Checking



**Done by:** Georgian CAD/CAM Engineering Center

**Platform:** Dassault System CATIA V5R12

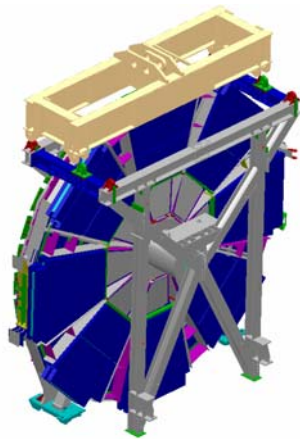
## 1. Dynamical Conflict Checking Strategy

- Two type of conflicts where considering - Clashes and Clearances
- Dynamical conflict checking is carrying out separately for each segment of SW+JD lifting path
- Cases, when the clearance between the moving SW+JD and the estimated environment around, was less than 80mm was not considered in detailed

## 2. Environment

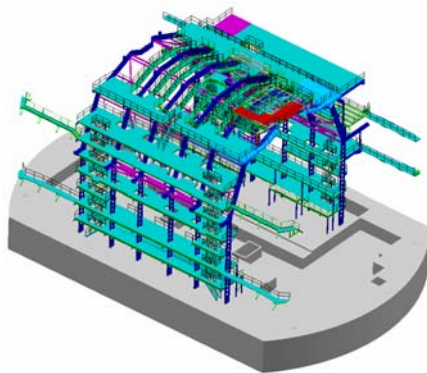
Environment for checking was chosen according to close location of objects to assumed path of SW+JD lifting.

1.



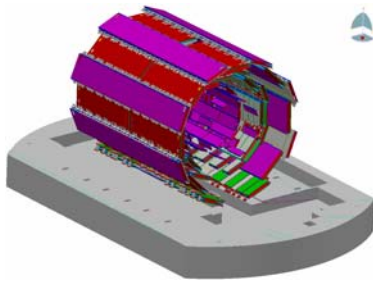
**To be lifted Small Wheel + JD assembly with support structures**

(Paloneer placed on 368mm from the frame according to Ian Palla's recommendation)



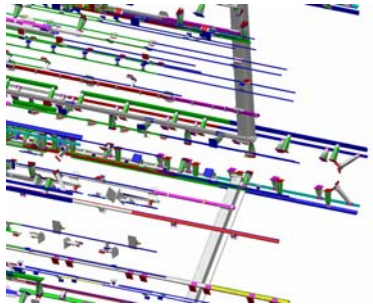
**HS Structure + Civil Engineering**

2.



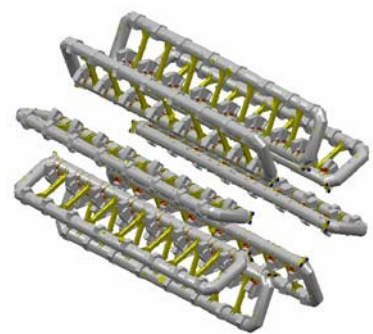
**Muon Chambers**

3.



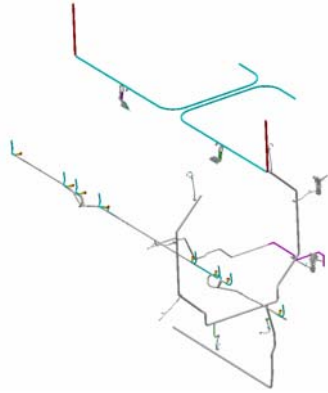
**Muon Brackets**

4.



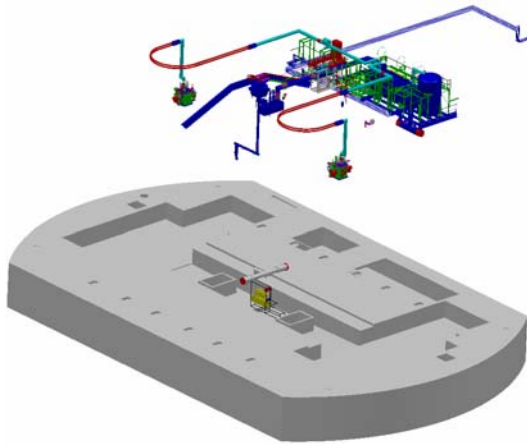
**Vacuum Vessels**

5.



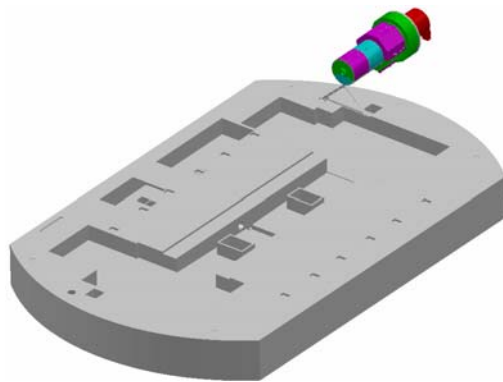
**Services for Extended Calorimeter and Muon Spectrometer**

6.



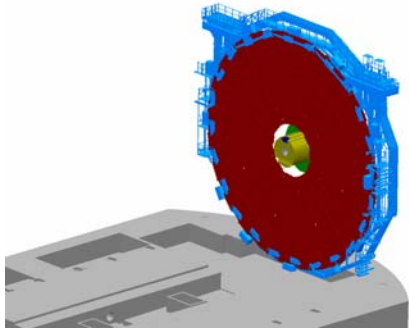
**Cryogenics**

7.



**TX1S Shielding**

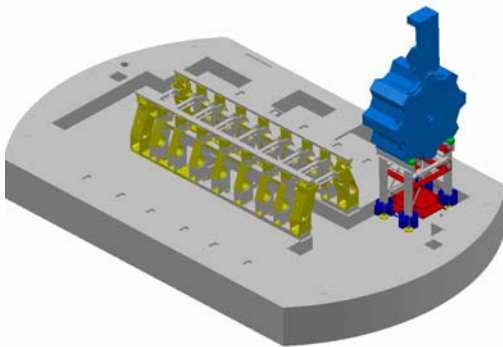
8.



### **TGC3 Chambers + BW Assembly**

Chambers are positioned on  $Z=19'046\text{mm}$  from  $Z0$  according to Tatiana Kliutchnikova's information.

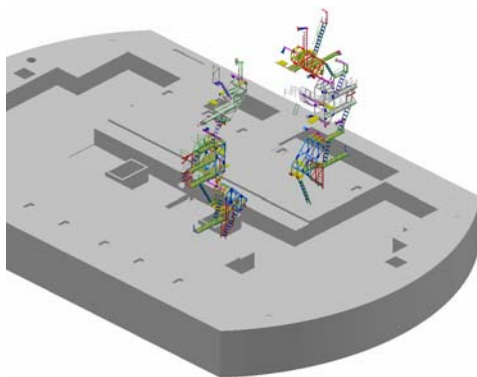
9.



### **End-Cap Toroid**

Positioned in  $Z=5'470\text{mm}$  and  $X=-10'180\text{mm}$  from  $Z0$  according to Tatiana Kliutchnikova's information.

10.

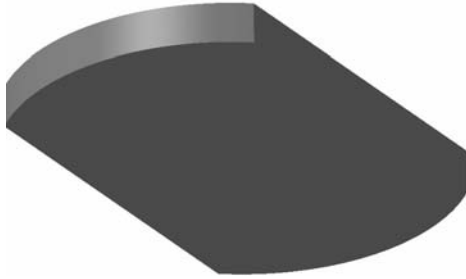


### **Forward Platforms**

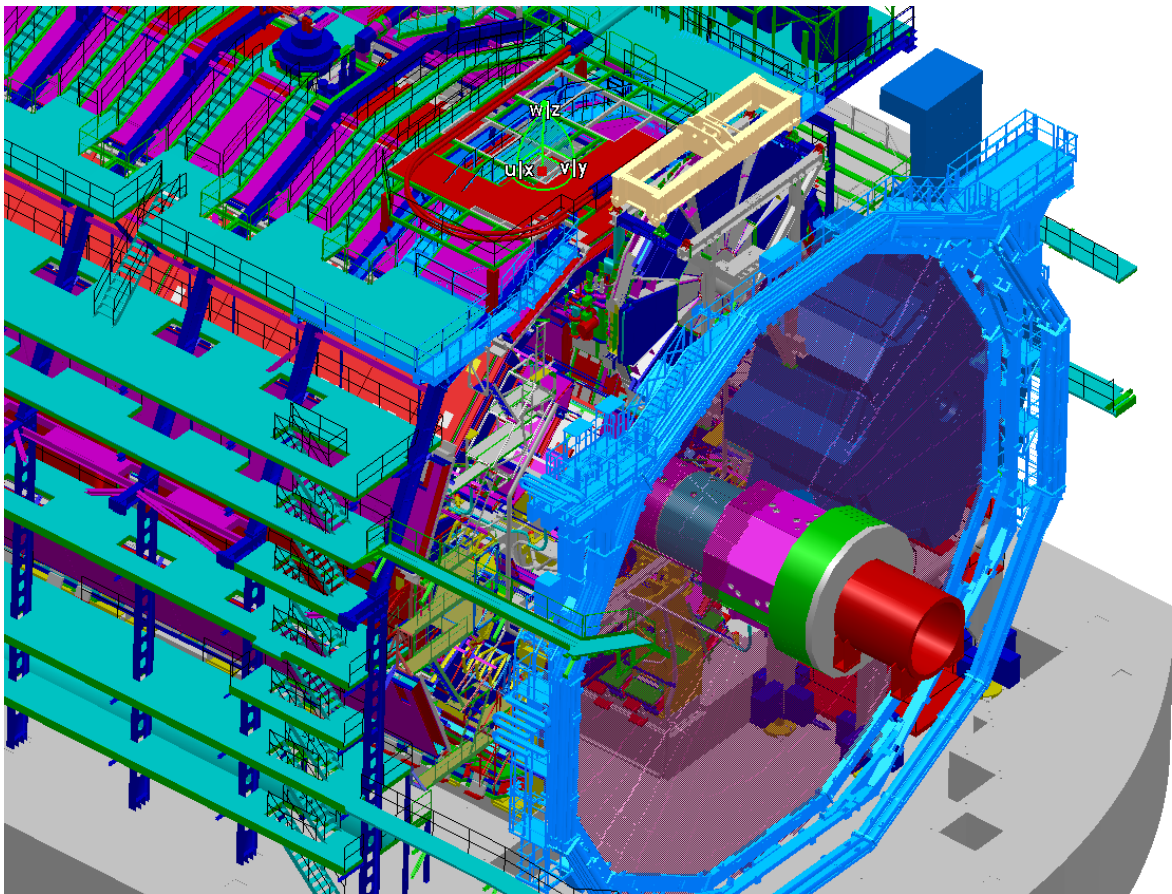
11.



**Jib movement limitations**  
(Yellow ellipsoid)



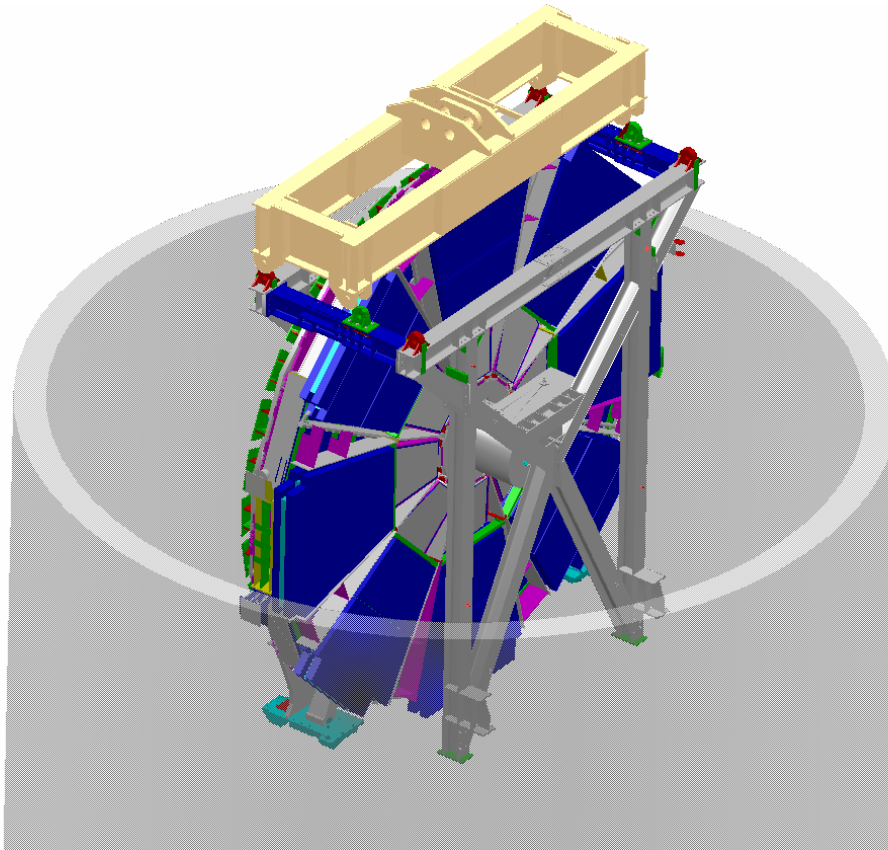
Final environment for checking looks like above,



### 3. Predefined Path of ECT Lifting

5 segments have been separated.

1. On the segment#1 SW+JD is moving down starting from the on ground surface (figure.1). In this point altitude is 0 and SW+JD central point is coincidence with SCX1 ground floor. But it is not coincidence with beam



*Figure 1 Start point of Segment#1*

- and positioning on  $X=298\text{mm}$  to avoid CLASH with ECT on segment#3. Movement is going on along the Z axis and finished on the altitude = 61.2m of SW+JD central point. Further vertical movement of SW+JD is restricted by the handrails of big wheel supports (figure 2). Distance between SW+JD and handrails is  $\sim 1'900\text{mm}$ .
2. Movement on segment#2 is carrying out along the Y axis in Z0 direction on the same altitude 61.2m. This is necessary to avoid conflicts with Big

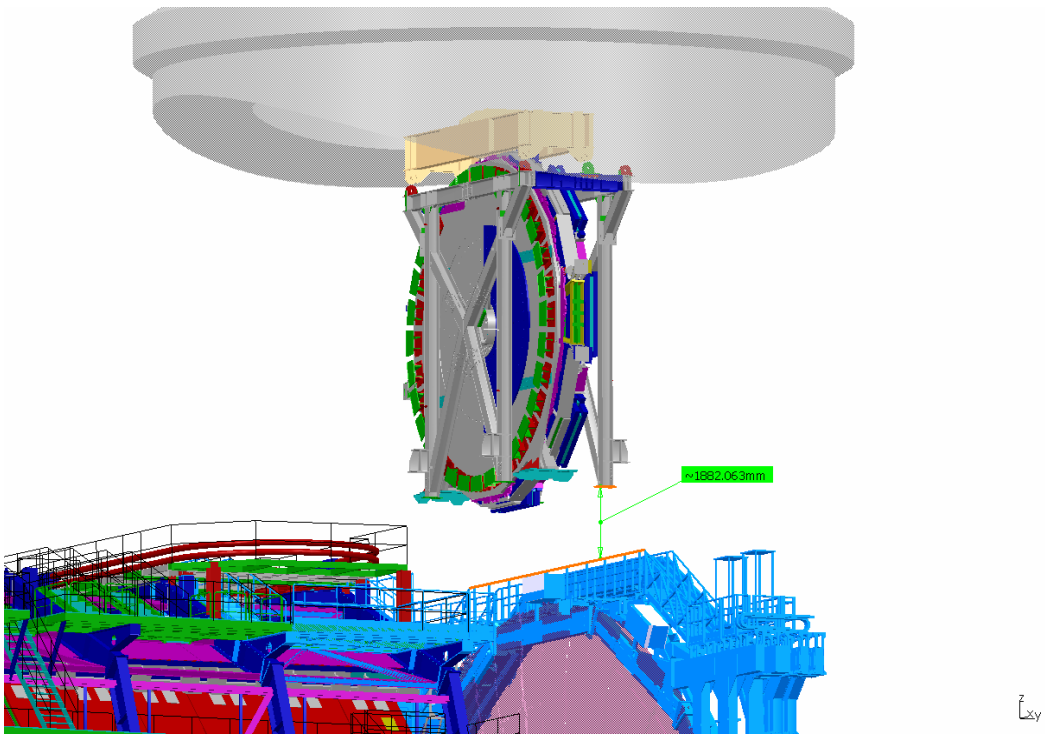


Figure 2 End point of Segment#1

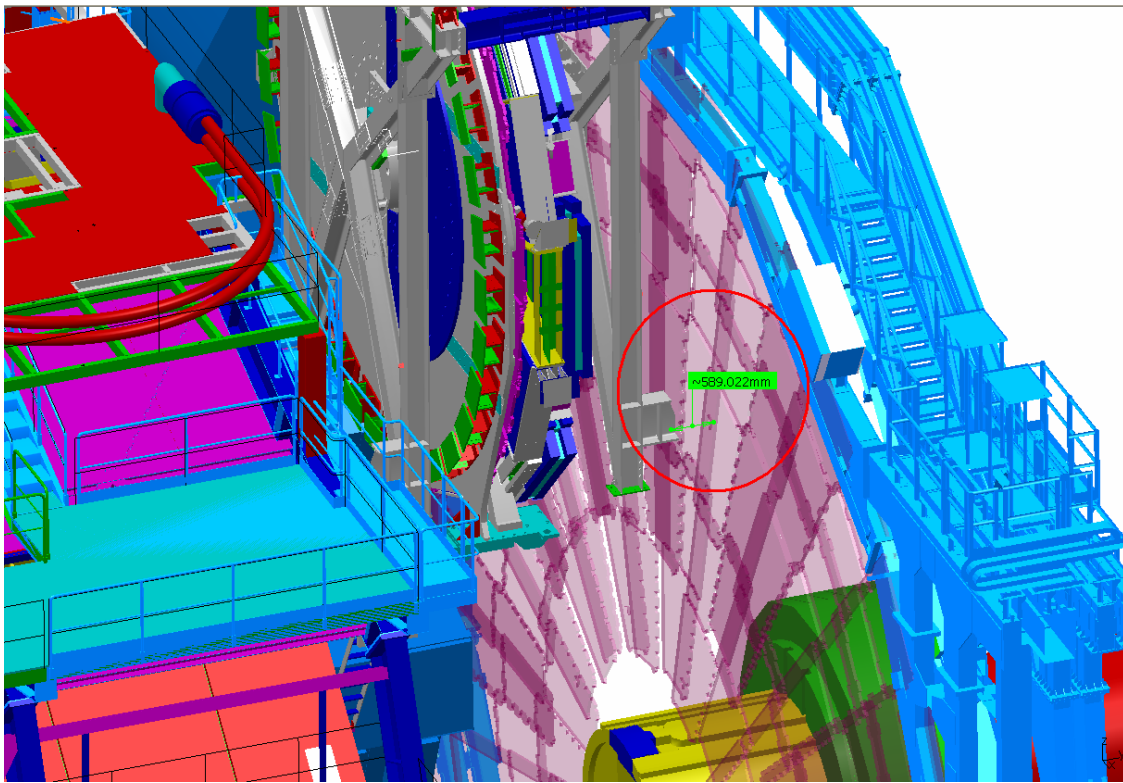


Figure 3 Clearance 589mm with Big Wheel Chambers, segment#3 altitude 70m



- Wheel Chambers during the vertical movement down on segment#3. Length of segment is 1.91m. This value makes possible to set the clearance up to 589mm between SW+JD and Big Wheels chambers during the further vertical movement on segment #3 (figure 3).
3. Movement on segment #3 is carrying out vertically down along the Z. It is starting on altitude 61.2m and finishing on altitude 80.0m. So SW+JD will be lifted down up to the truck (central point of assembly will be on  $Z=189\text{mm}$ ). During the movement on the altitude 80.5m there is a clearance with ECT 100mm (figure 4).
  4. Finally at the end of segment#3 JD frame is positioning lower than the edge of ECT and movement on -X direction up to beam becomes possible. This is segment#4. So, Altitude is the same (80m). Length of movement is 294mm.

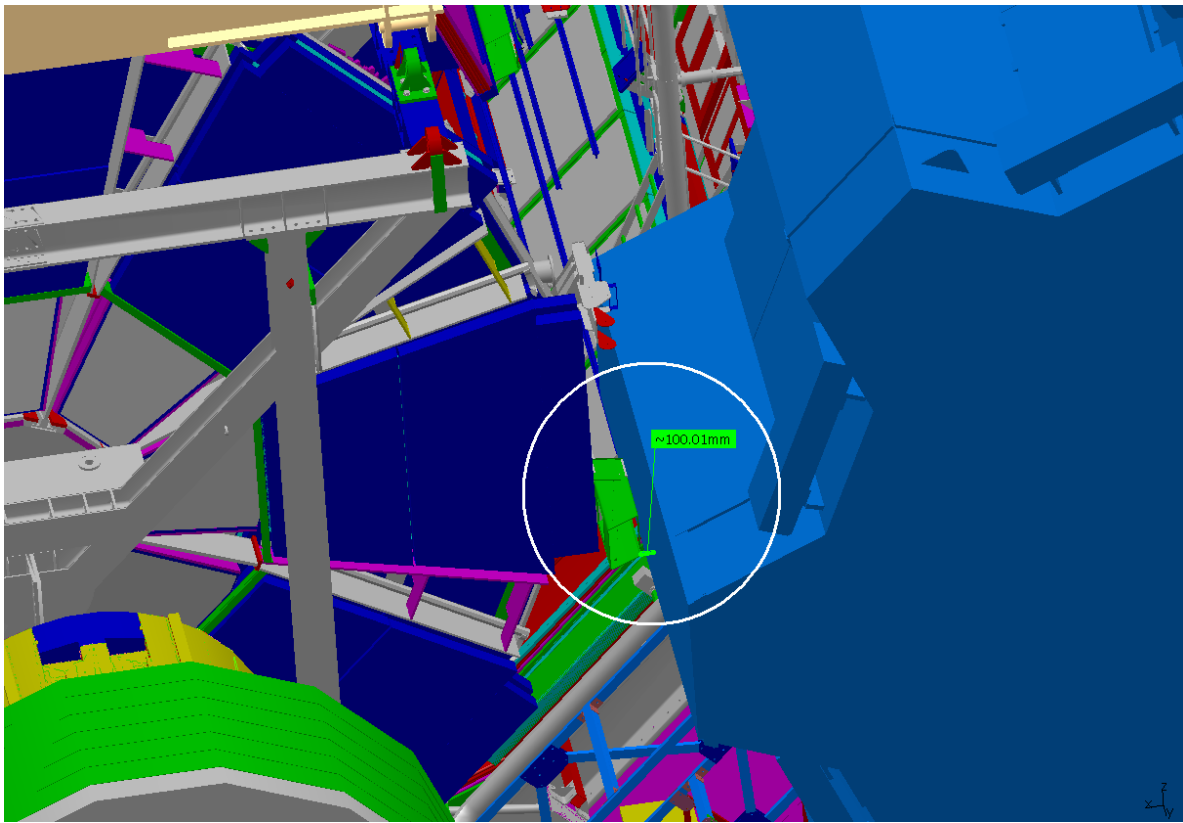
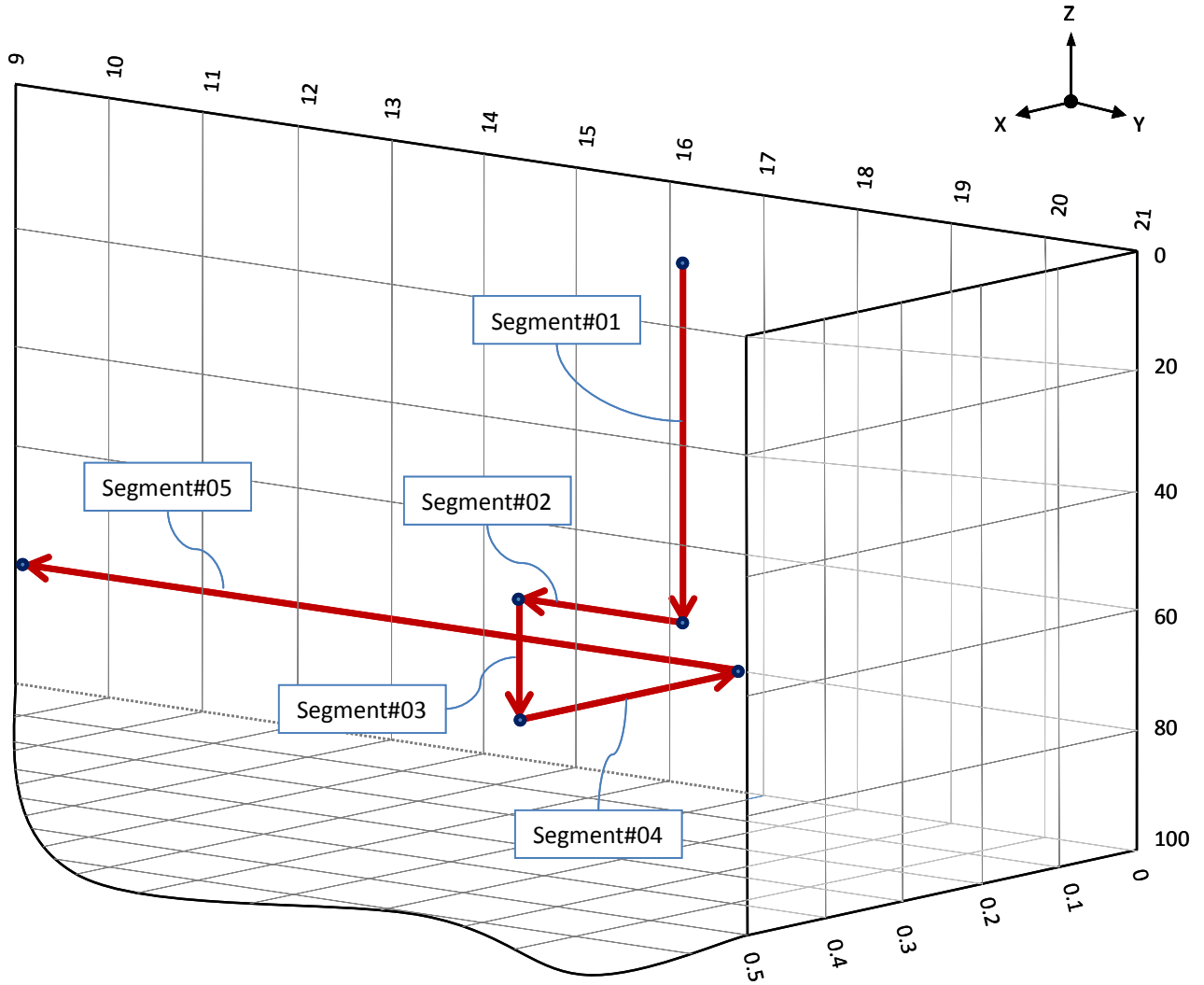


Figure 4 Clearance 100mm with ECT, segment#3 Altitude 80.5m

## 4 . Path Diagram

Thus, final path will be as follow,

*All dimensions are given in meter*



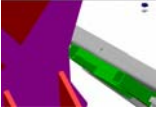
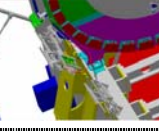

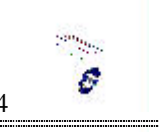


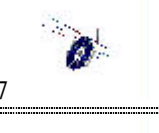

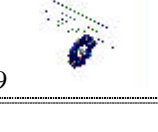
Coordinates in Z0 of support points of ECT Lifting path are presented in table.

Points	X	Y	Z
1	0mm	17'700.00mm	80'211.00mm
2	0mm	17'700.00mm	19'890.00mm
3	0mm	16'181.00mm	19'890.00mm
4	0mm	16'181.00mm	7'890.00mm
5	0mm	15'876.00mm	7'890.00mm
6	0mm	15'876.00mm	190.00mm

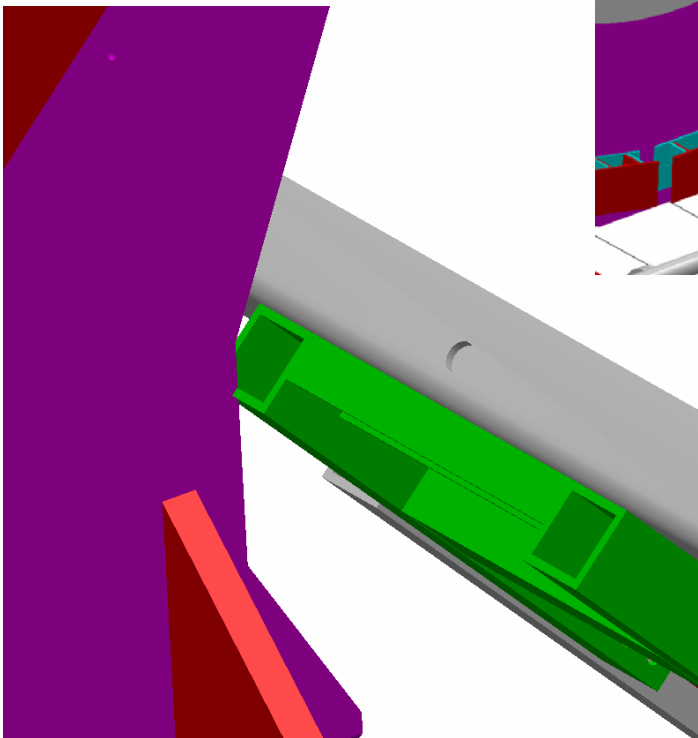
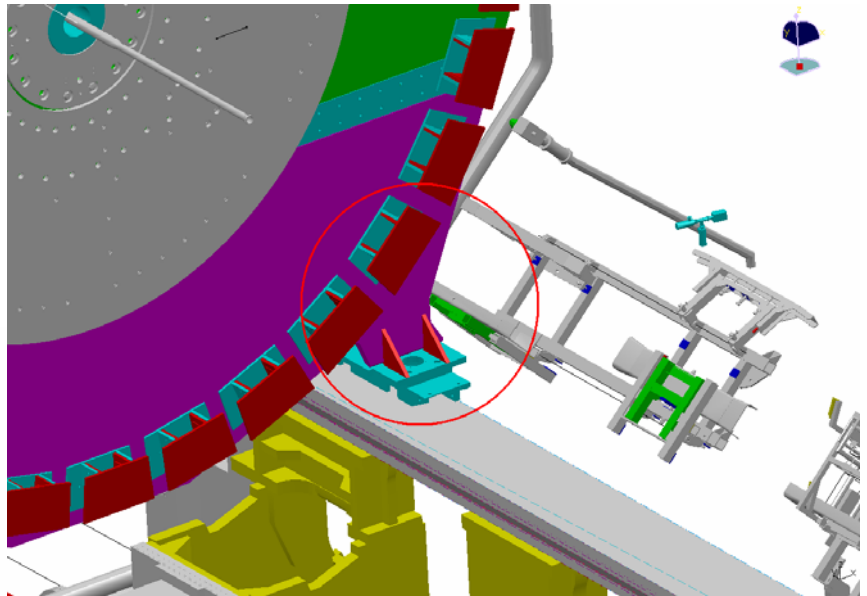
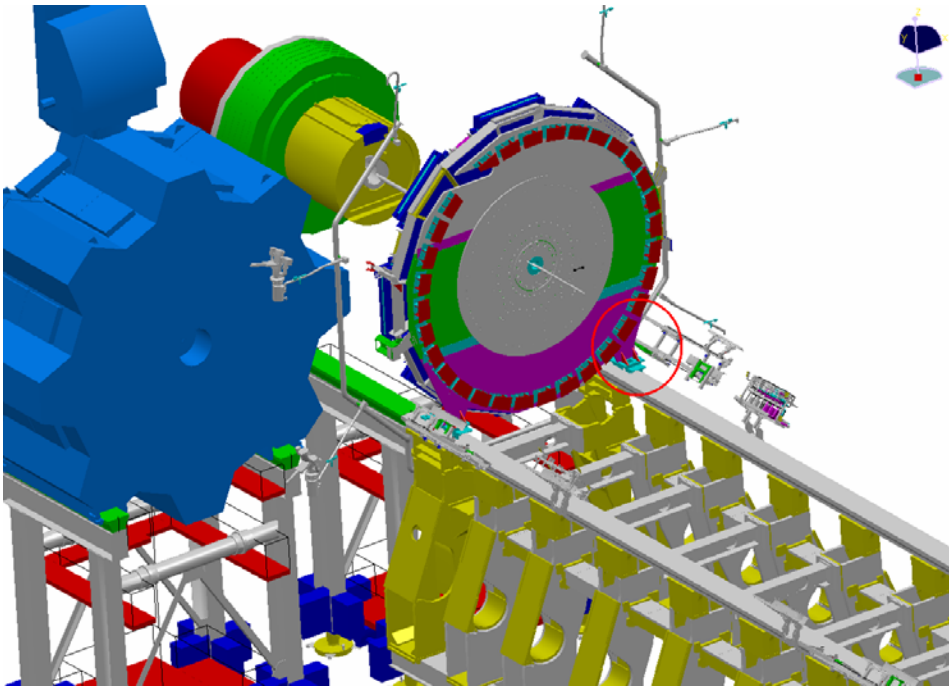
## 5. CONFLICTS SUMMARY

There are no conflicts on segments: #1, #2, #3, #4.

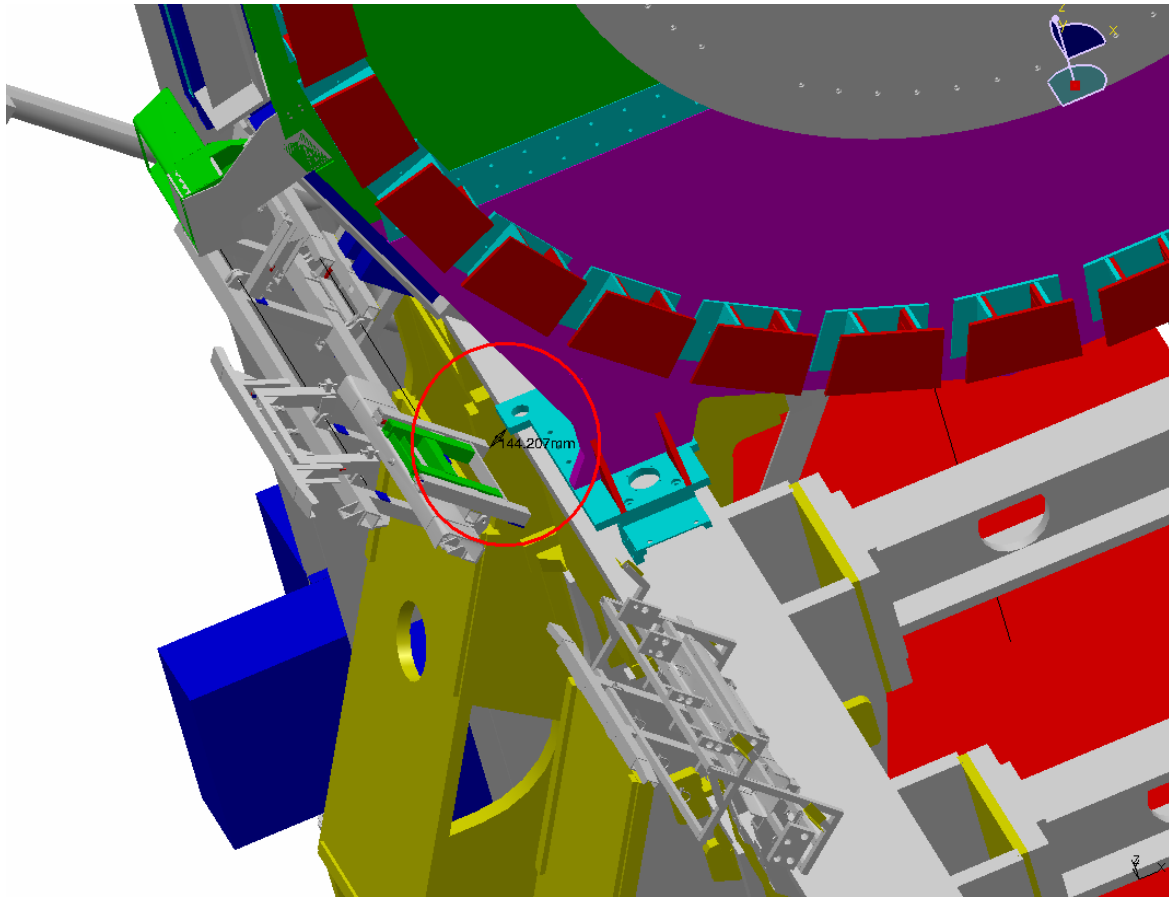
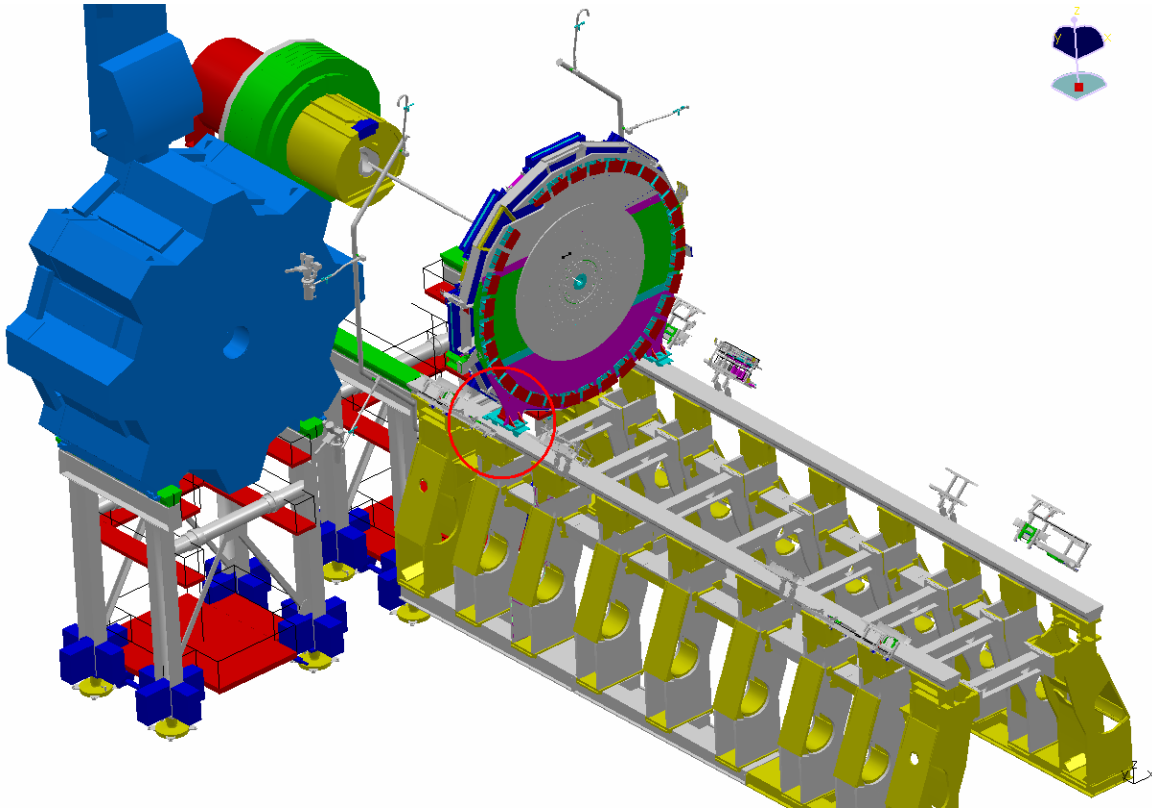
2 Clashes and 7 Clearances were detected on Segment#5.

Interference	Product 1	Product 2	Type	Value	Status
	SW+JD	AT732762MQ (SUPPORTS OUTER, S.11/S.15 FC INTER)	Clash	6.4 mm	Not inspected
	SW+JD	AT732762MQ (SUPPORTS OUTER, S.11/S.15 FC INTER)	Clearance	144 mm	Not inspected
	SW+JD	AT612360MQ (ATL_MUONS,BARREL_SUPPORTS, Sector 10)	Clearance	24.4 mm	Not inspected
	SW+JD	AT612361MQ (ATL_MUONS,BARREL_SUPPORTS, Sector 6)	Clearance	78.9 mm	Not inspected
	SW+JD	AT612362MQ (ATL_MUONS,BARREL_SUPPORTS, Sector 8)	Clearance	11.3 mm	Not inspected
	SW+JD	AT612363MQ (ATL_MUONS,BARREL_SUPPORTS, Sector 2)	Clearance	41 mm	Not inspected
	SW+JD	AT612364MQ (ATL_MUONS,BARREL_SUPPORTS, Sector 10)	Clearance	31.5 mm	Not inspected
	SW+JD	AT612365MQ (ATL_MUONS,BARREL_SUPPORTS, Sector 16)	Clearance	76.2 mm	Not inspected
	SW+JD	AT612369MQ (ATL_MUONS,BARREL_SUPPORTS, Sector 10)	Clash	1.3 mm	Not inspected

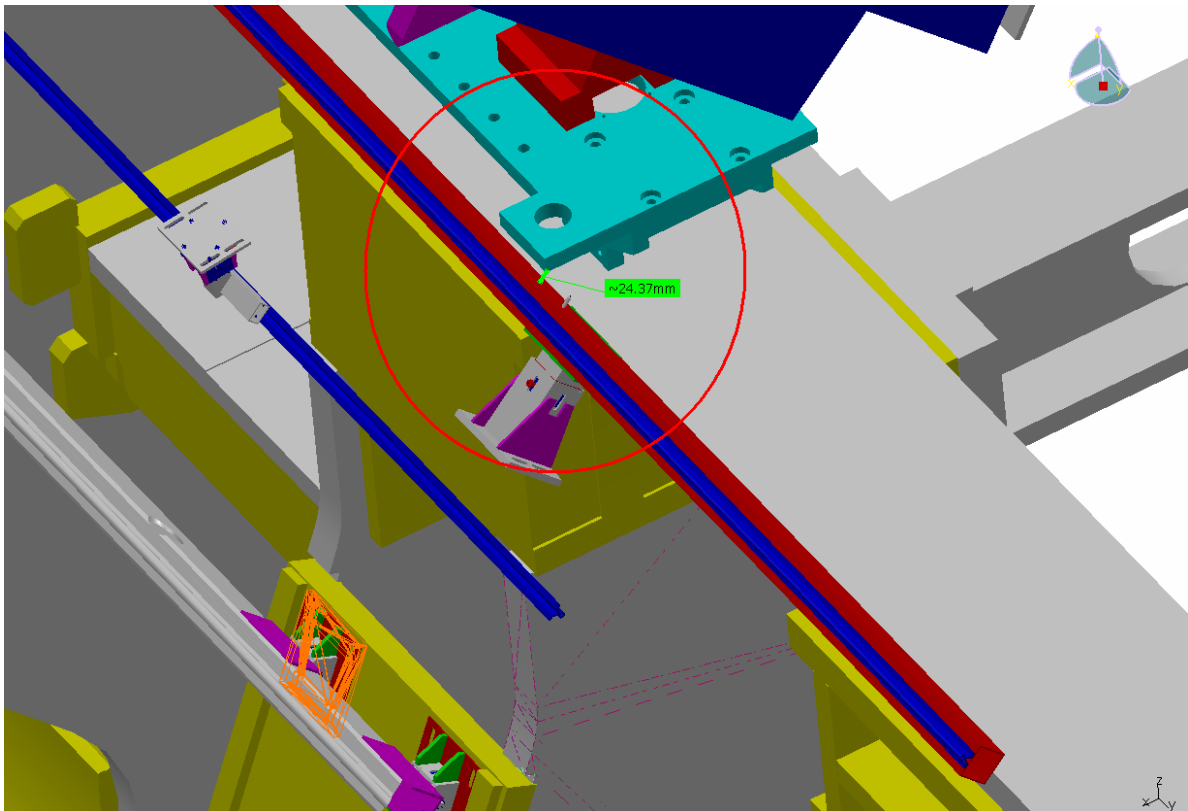
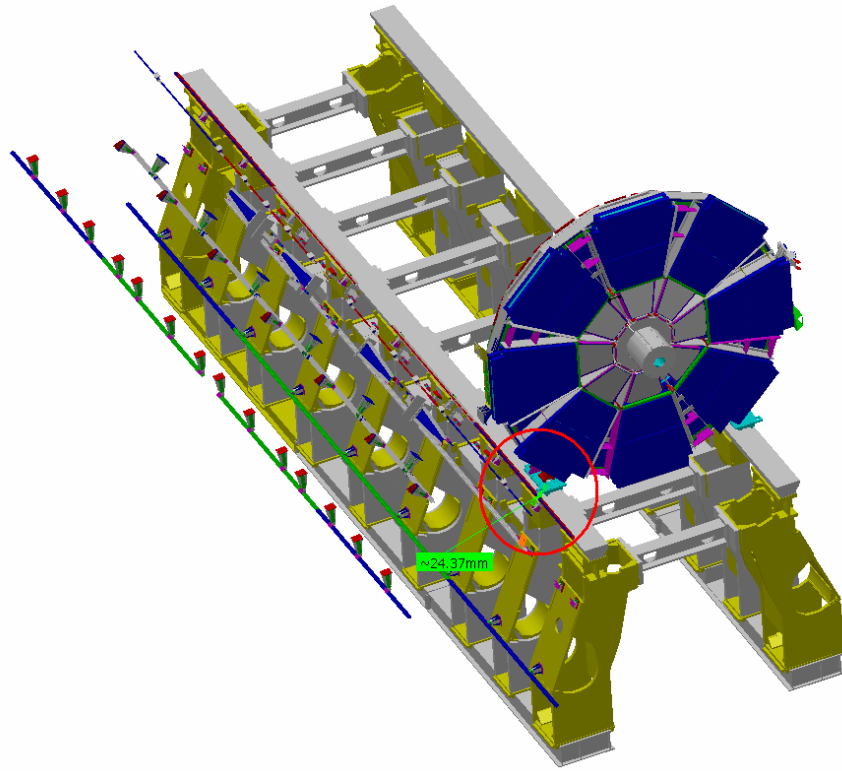
1	SW+JD	AT732762MQ (SUPPORTS OUTER, S.11/S.15 FC INTER)	Clash	6.4 mm	Not Inspected
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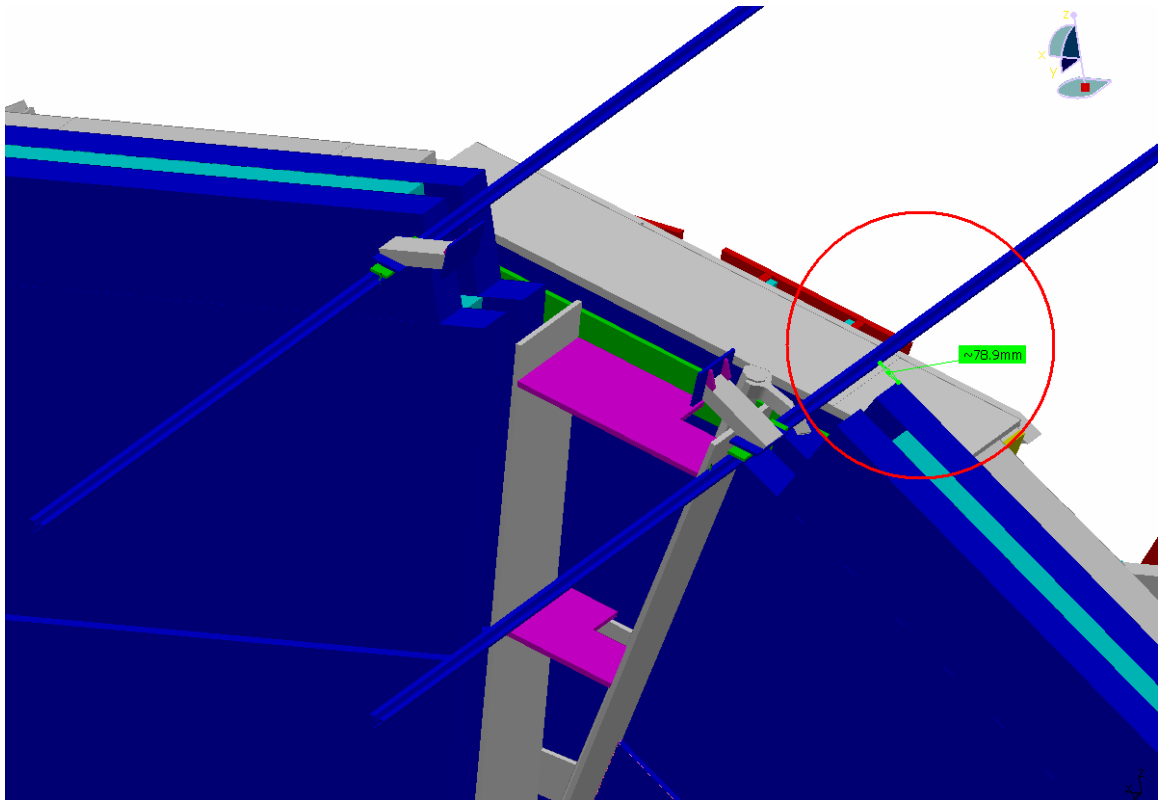
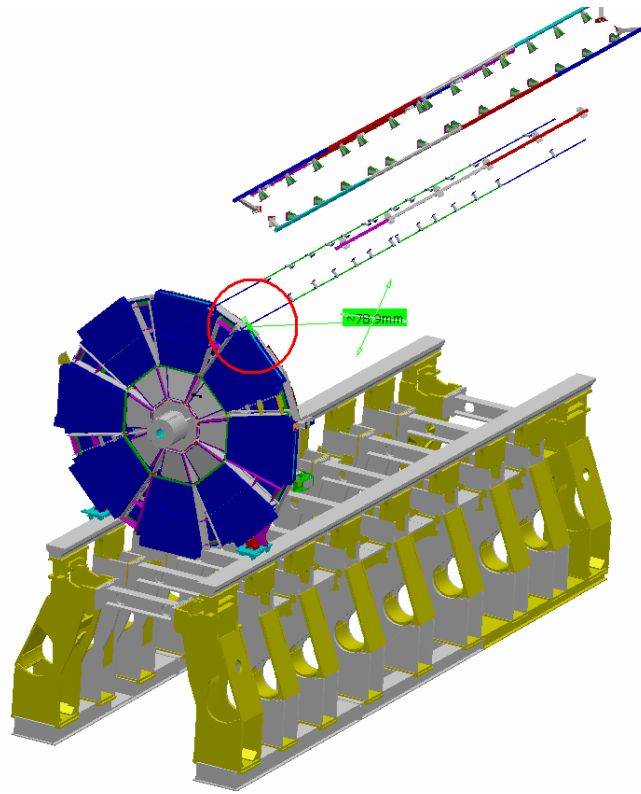
2	SW+JD	AT732762MQ (SUPPORTS OUTER, S.11/S.15 FC INTER)	Clearance	144 mm	Not Inspected
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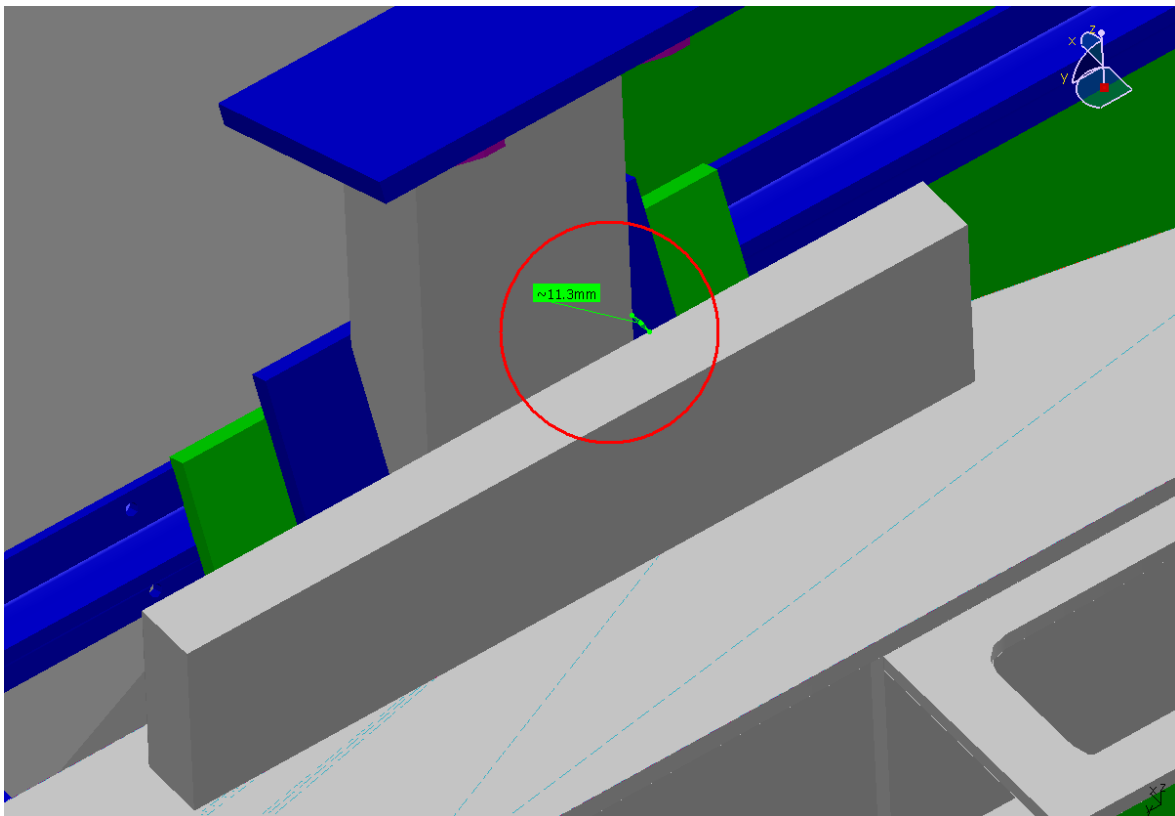
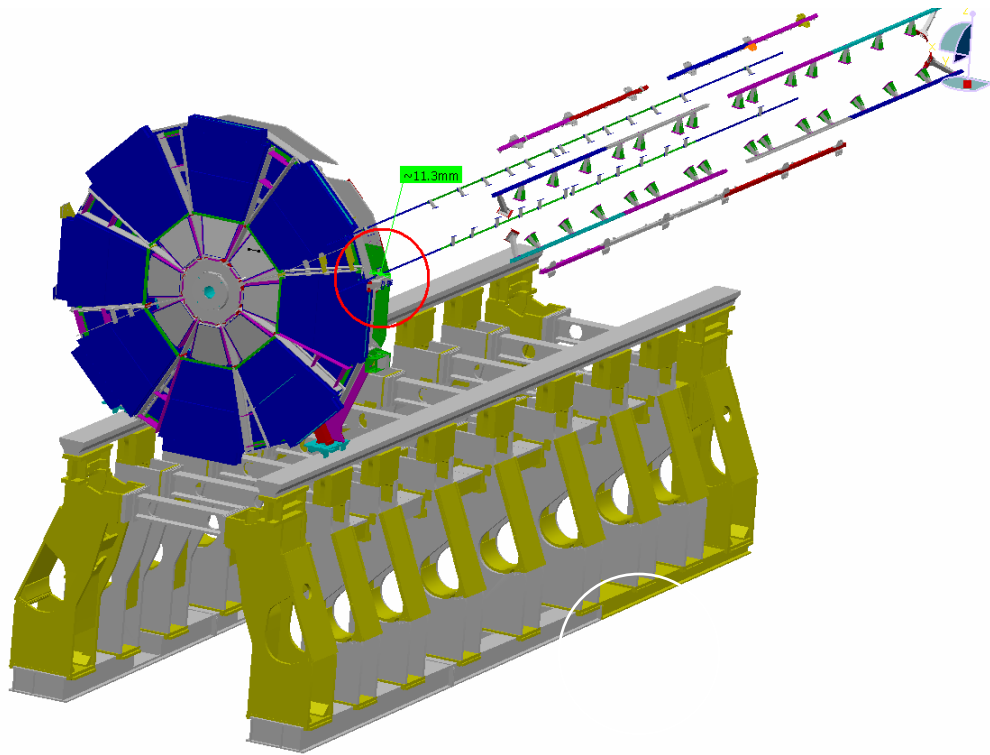
3	SW+JD	AT612360MQ (ATL_MUONS,BARREL_SUPPORTS, Sector 10)	Clearance	24.4 mm	Not Inspected
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4	SW+JD	AT612361MQ (ATL_MUONS.BARREL_SUPPORTS, Sector 6)	Clearance	78.9 mm	Not inspected
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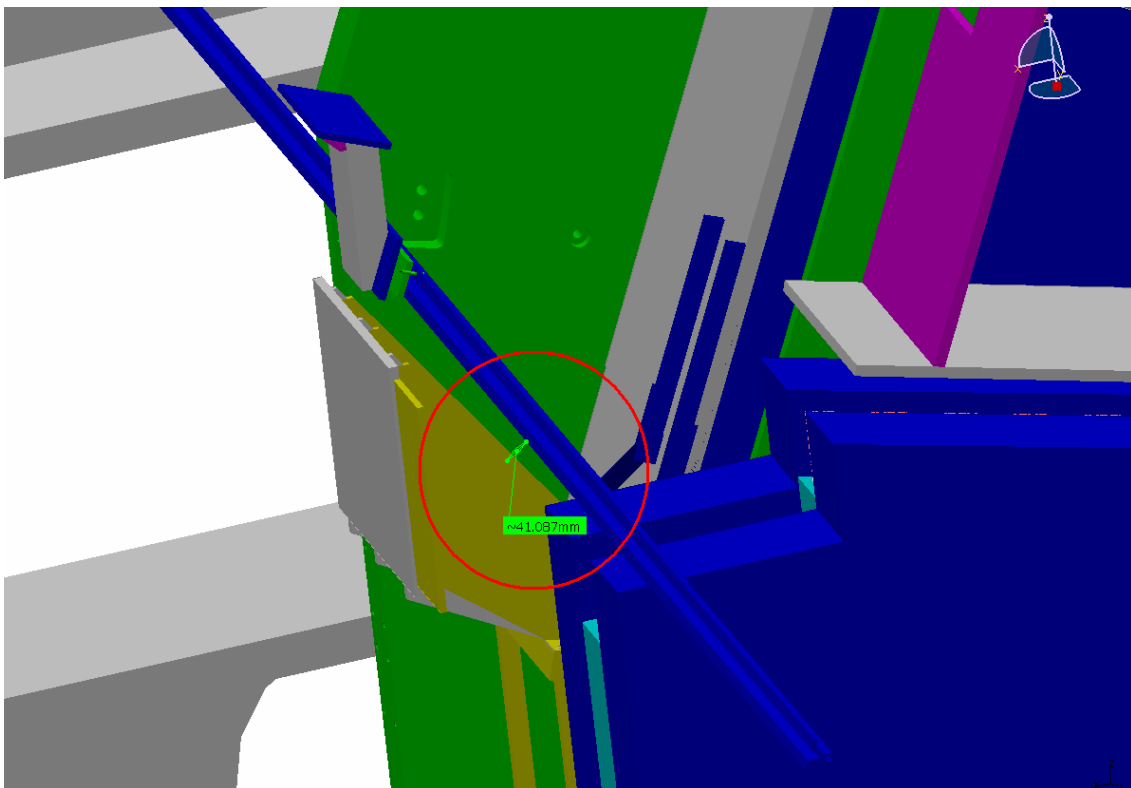
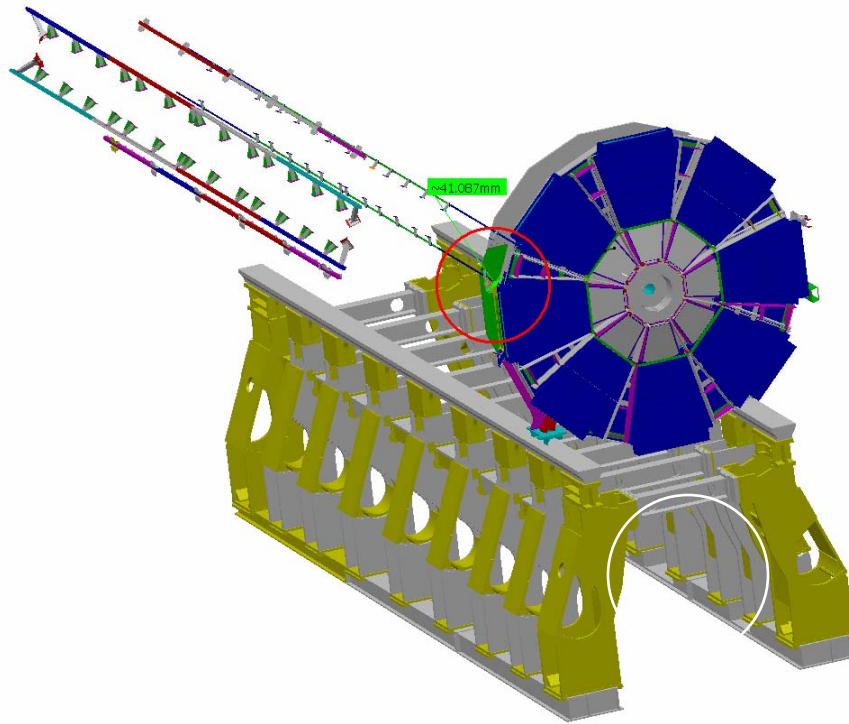


5	SW+JD	<b>AT612362MQ</b> (ATL_MUONS,BARREL_SUPPORTS, Sector 8)	Clearance	11.3 mm	Not inspected
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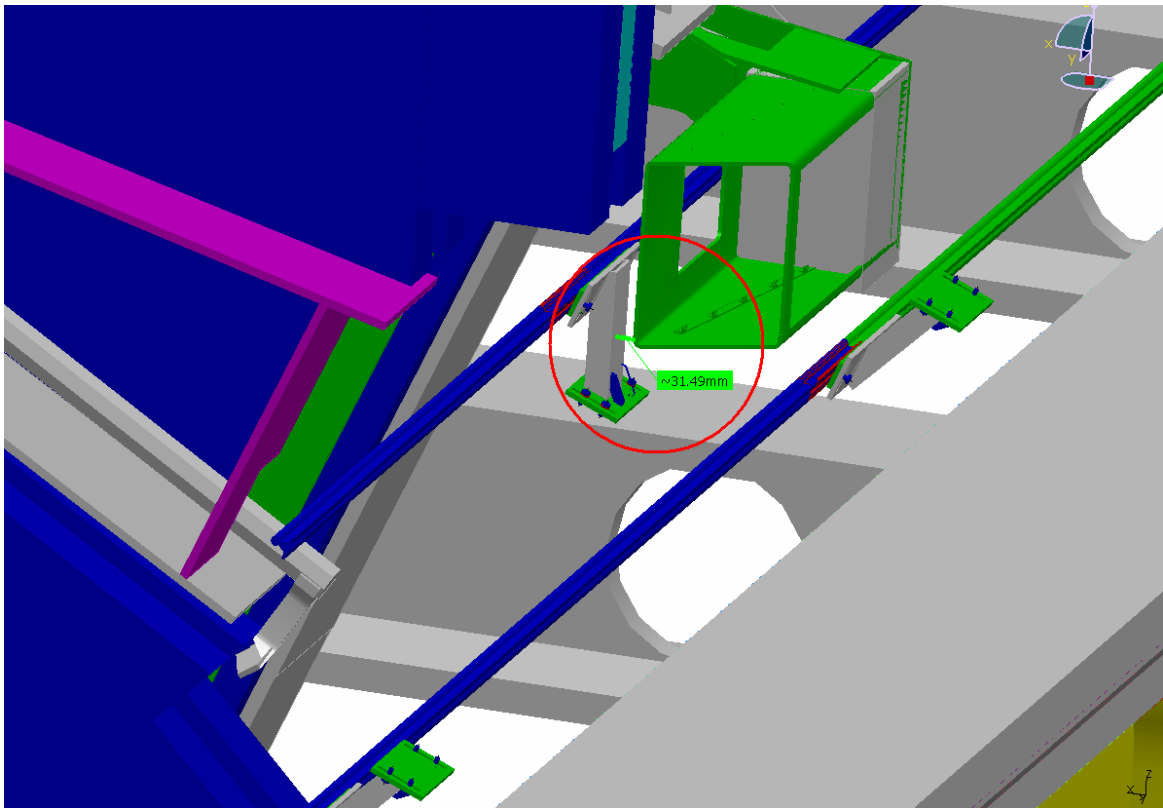
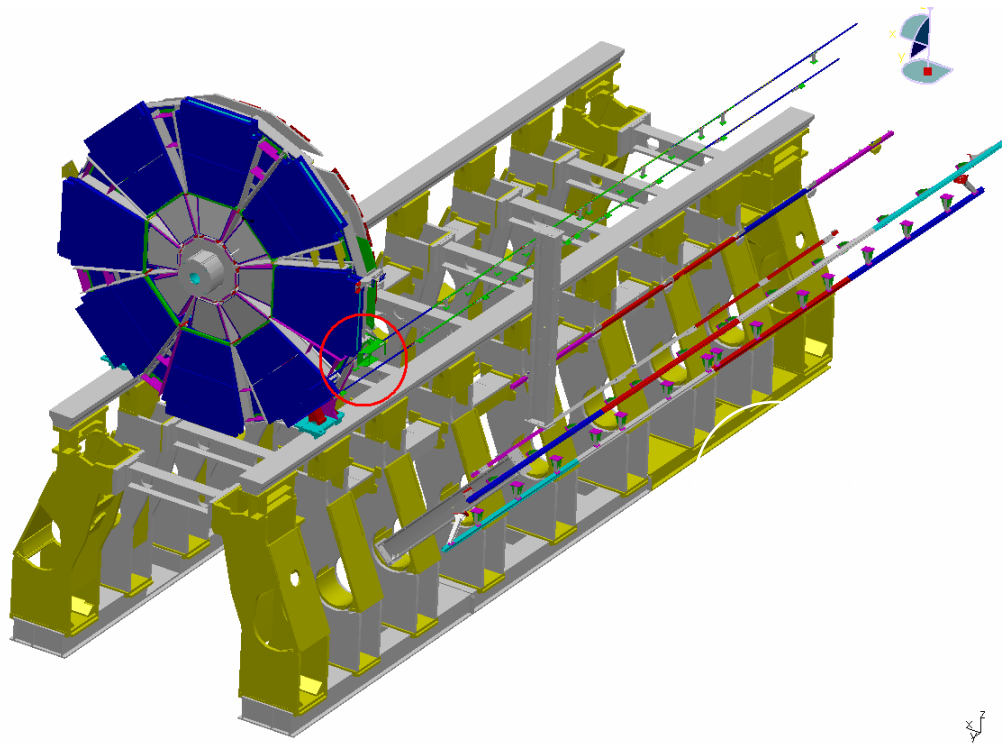




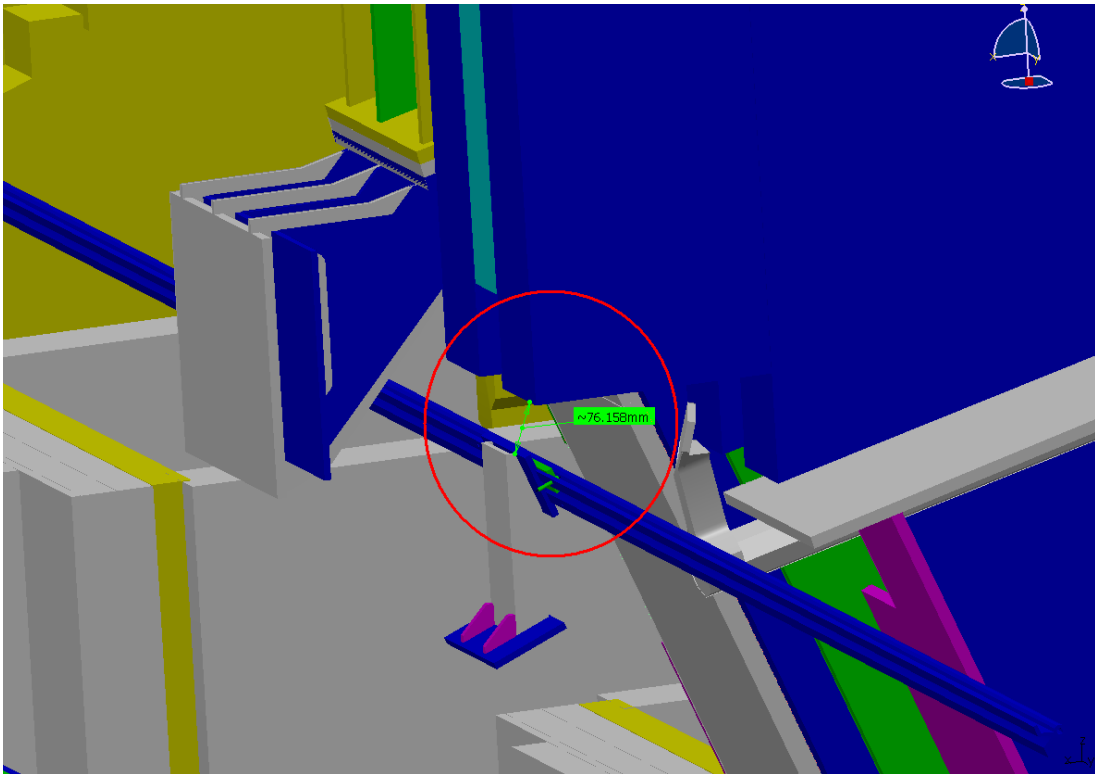
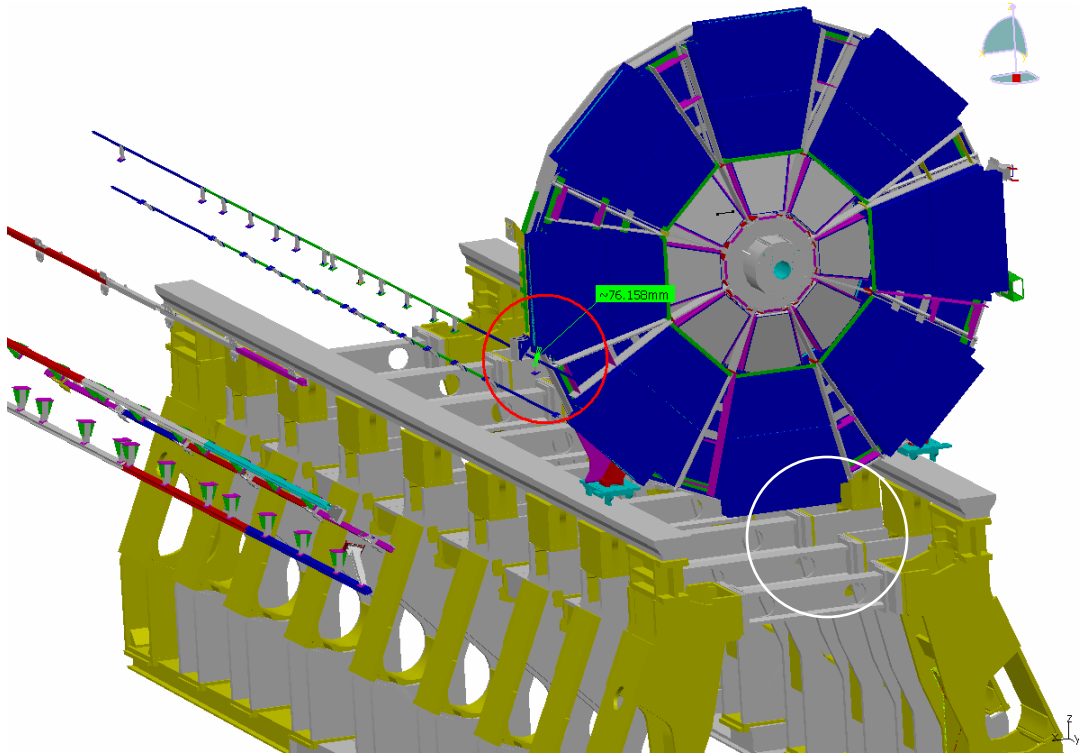
6	SW+JD	AT612363MQ (ATL_MUONS,BARREL_SUPPORTS, Sector 2)	Clearance	41 mm	Not inspected
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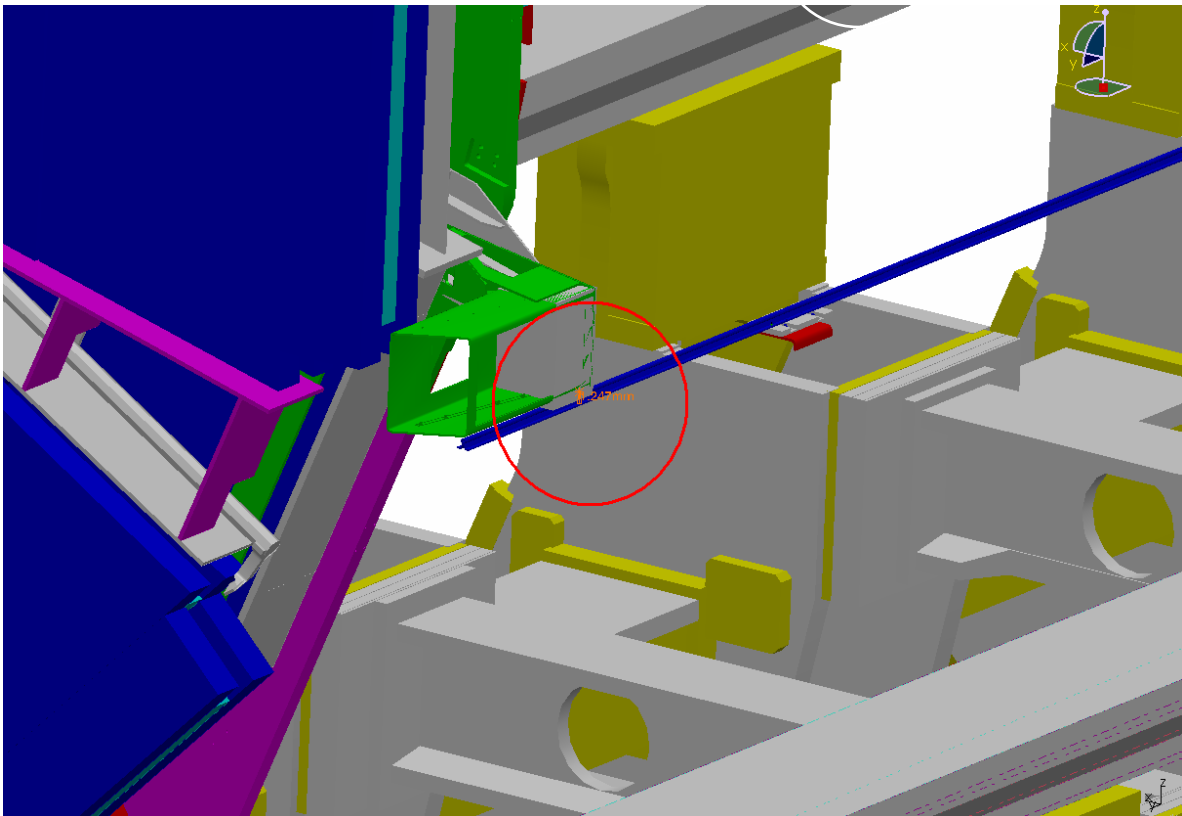
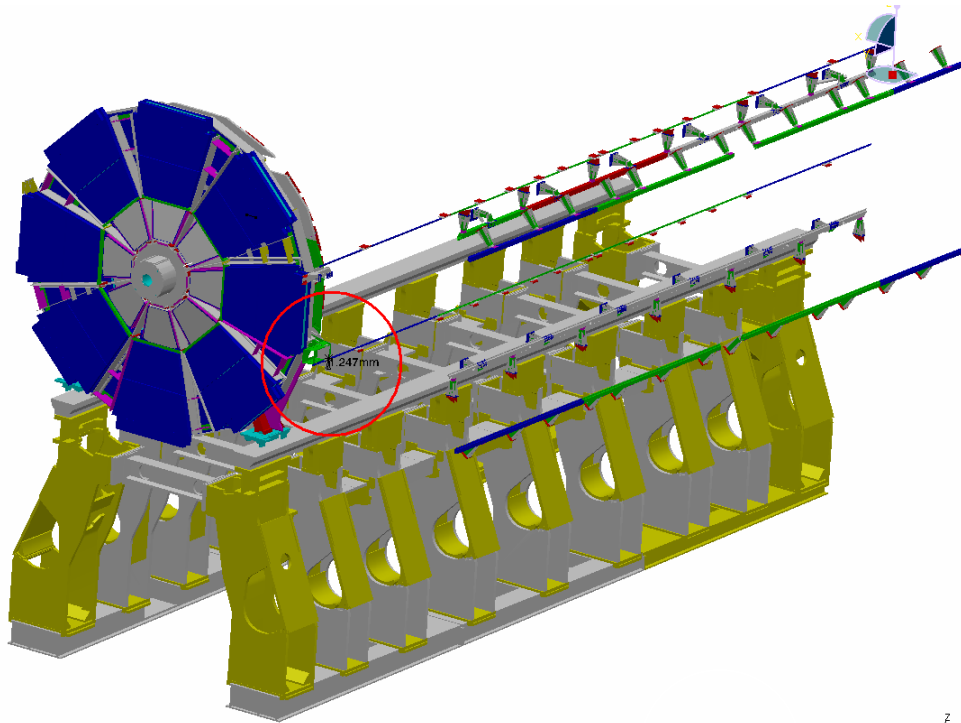
7	SW+JD	<b>AT612364MQ</b> (ATL_MUONS,BARREL_SUPPORTS, Sector 10)	Clearance	31.5 mm	Not inspected
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8	SW+JD	<b>AT612365MQ</b> (ATL_MUONS,BARREL_SUPPORTS, Sector 16)	Clearance	76.2 mm	Not inspected
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9	SW+JD	<b>AT612369MQ</b> (ATL_MUONS_BARREL_SUPPORTS, Sector 10)	Clash	1.3 mm	Not inspected
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## **5. CONCLUSIONS**

SW+JD lifting down can be realized according to suggested path of movement in case of fixing Clash/Clearance conflicts with Muon Brackets&Rails and with Support structures during the final movement inside the detector.