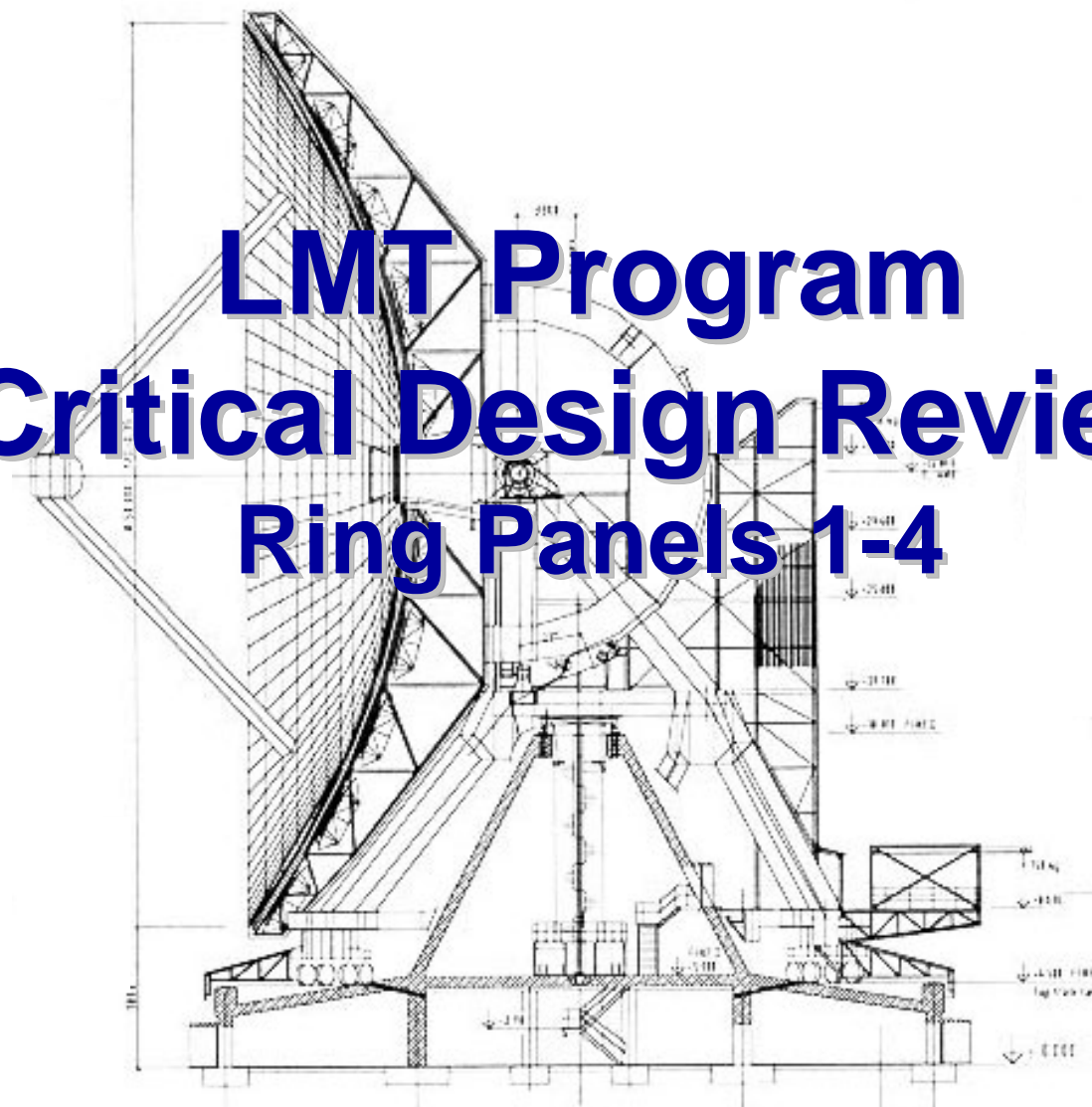




LMT Program Critical Design Review Ring Panels 1-4



December 11, 2003



Report Documentation Page

Form Approved
OMB No. 0704-0188

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1. REPORT DATE 11 DEC 2003	2. REPORT TYPE N/A	3. DATES COVERED -	
4. TITLE AND SUBTITLE LMT - Critical Design Review Ring Panels 1 - 4		5a. CONTRACT NUMBER	
		5b. GRANT NUMBER	
		5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)		5d. PROJECT NUMBER	
		5e. TASK NUMBER	
		5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Composite Optics, Inc. - an Alliant Techsystems Affiliate 9617 Distribution Avenue San Diego, California 92121		8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)	
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited			
13. SUPPLEMENTARY NOTES See also ADM001773, Large Millimeter Telescope Project. , The original document contains color images.			
14. ABSTRACT			
15. SUBJECT TERMS			
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified	UU
			18. NUMBER OF PAGES 28
			19a. NAME OF RESPONSIBLE PERSON

Agenda

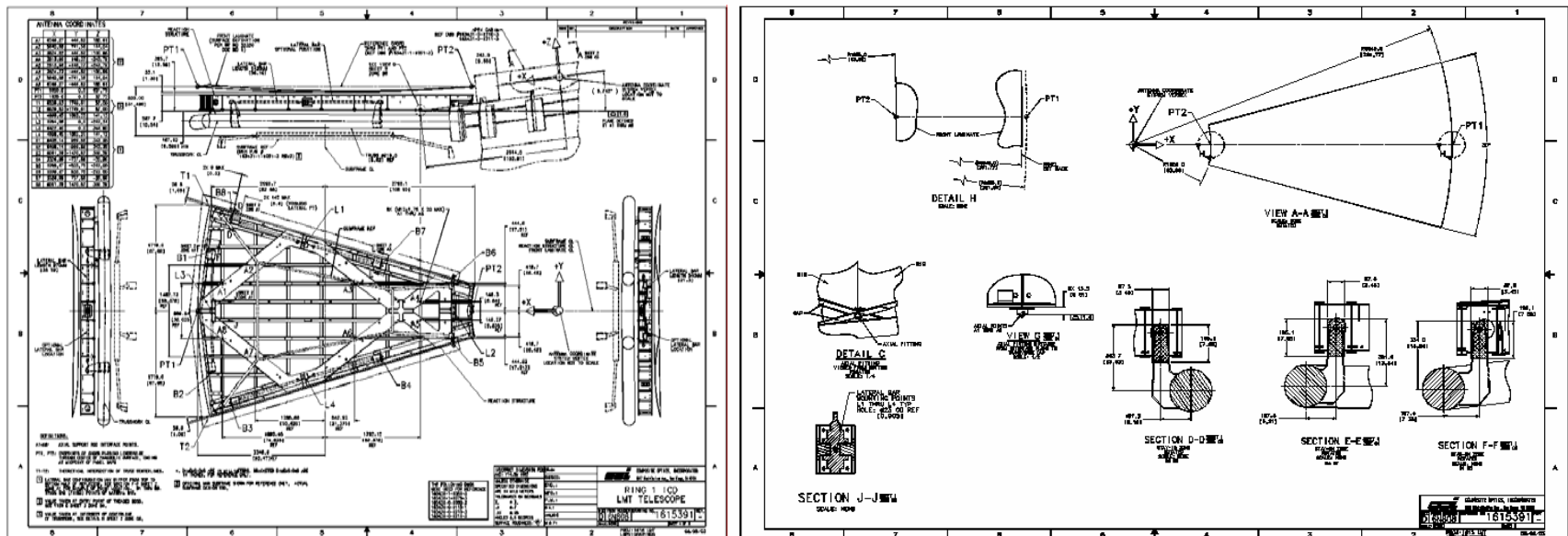
- ◆ **Introductions** 8:00 – 8:15
- ◆ **Rings 1-4 Design Presentation** 8:15 – 9:30
- ◆ **Rings 1-4 Analysis Presentation** 9:30 – 11:30
- ◆ **Lunch** 11:30 – 12:30
- ◆ **Rings 1-4 Analysis Cont.** 12:30 – 2:30
- ◆ **EMT Discussion** 2:30 – 3:00
- ◆ **Wrap Up** 3:00 – 3:30

Rings 1-4 Design Presentation Outline

- ◆ **Interface Control Drawings**
- ◆ **Design Similarities to Ring 5**
- ◆ **Top assembly views**
- ◆ **Truss Clearances**
- ◆ **Mass Summary**
- ◆ **Configuration Status**

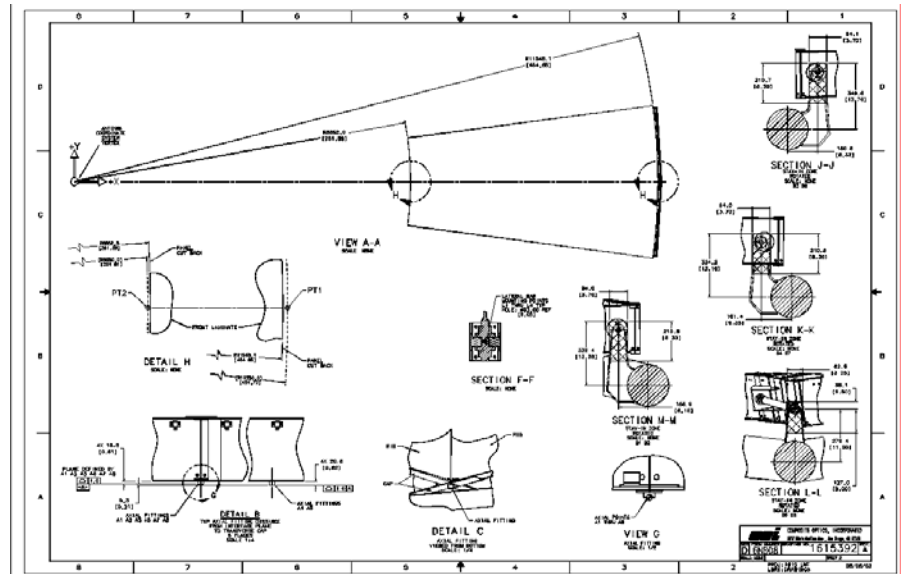
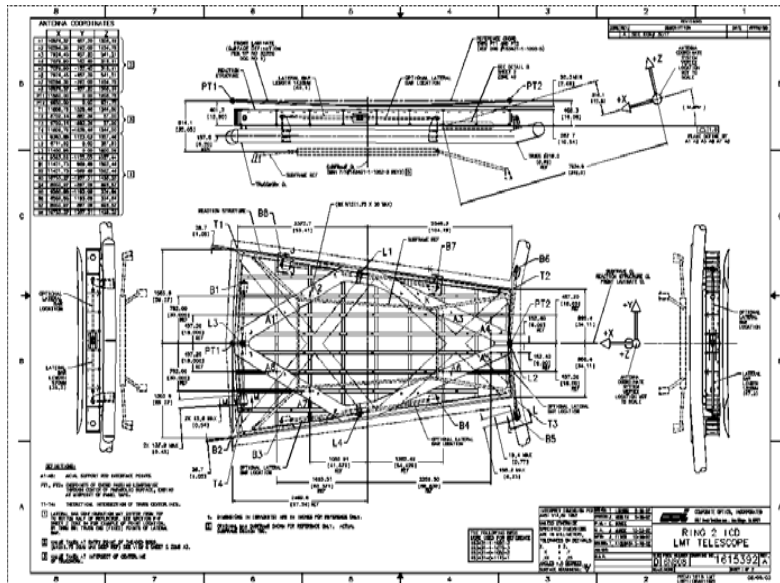
Interface Control

- ◆ Ring 1 ICD — COI Dwg # 1616391 Rev -
 - » Referenced MAN Drawings Which Provided Panel Dimensions
 - » Interfaces Agreed and Locked at Rev – (08/13/03)
 - » Satisfies Dimensional and Interface Requirements



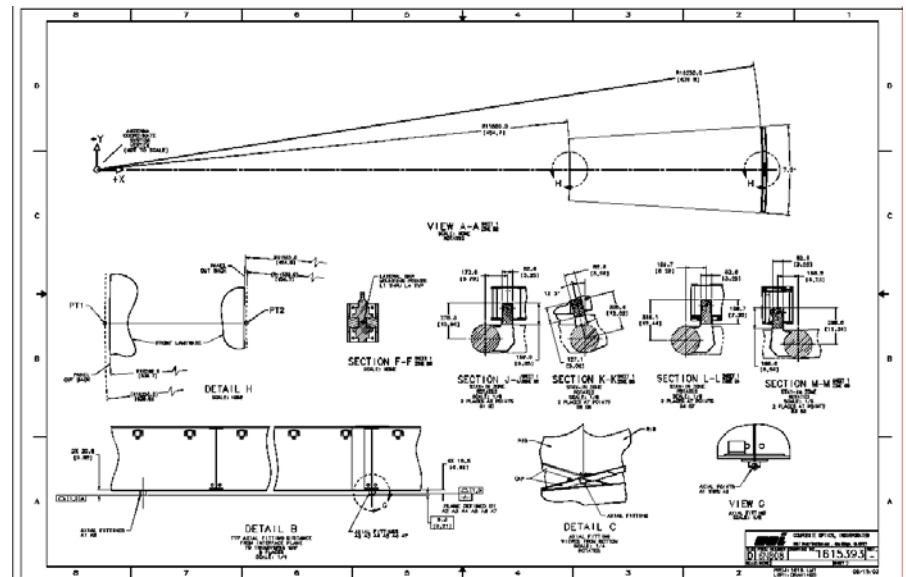
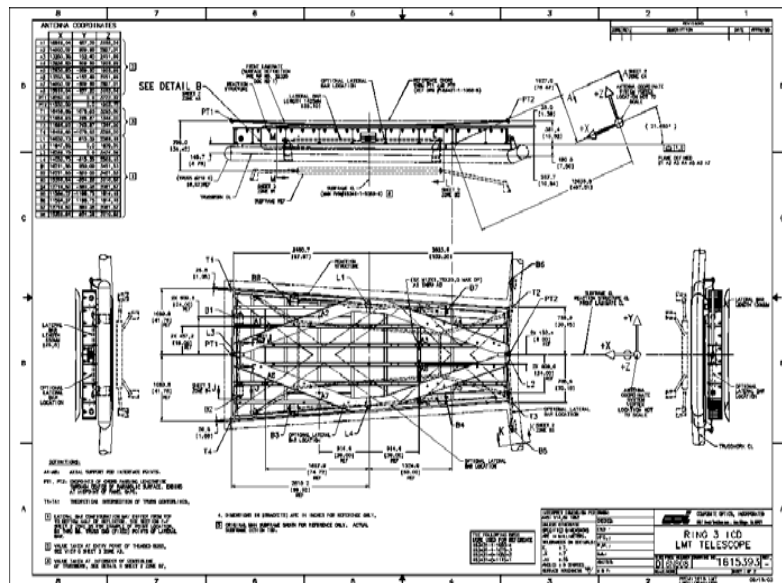
Interface Control

- ◆ Ring 2 ICD — COI Dwg # 1616392 Rev A
 - » Referenced MAN Drawings Which Provided Panel Dimensions
 - » Interfaces Agreed and Locked at Rev – (08/13/03)
 - » Satisfies Dimensional and Interface Requirements



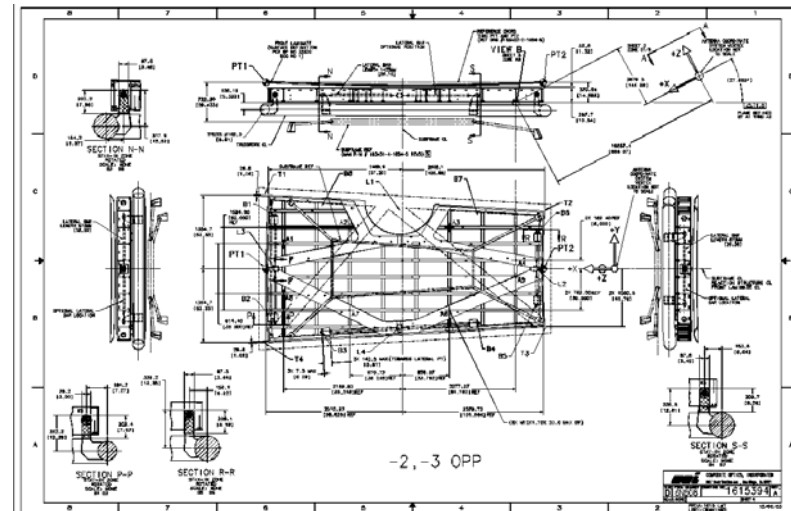
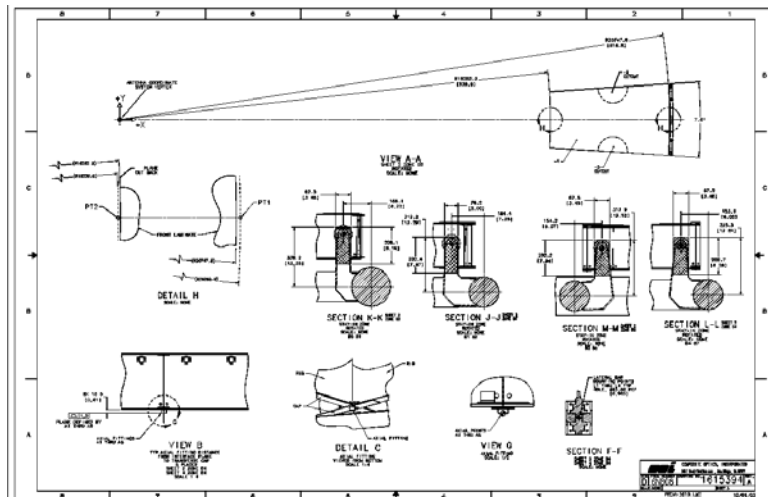
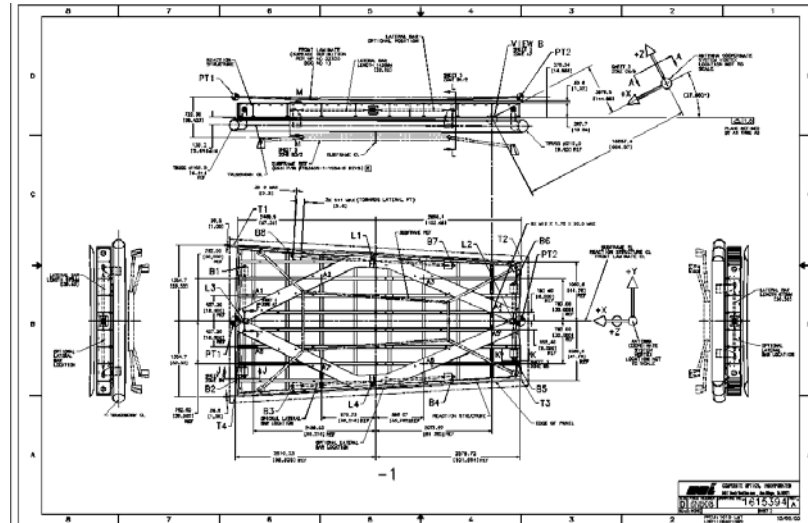
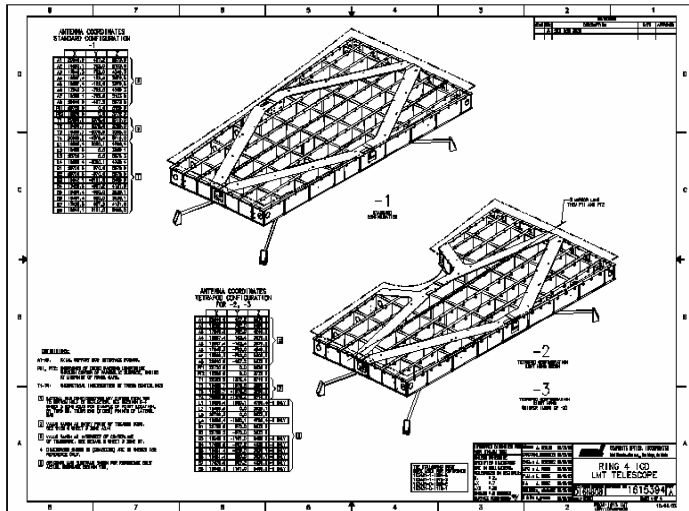
Interface Control

- ◆ Ring 3 ICD — COI Dwg # 1616393 Rev -
 - » Referenced MAN Drawings Which Provided Panel Dimensions
 - » Interfaces Agreed and Locked at Rev – (11/04/03)
 - » Satisfies Dimensional and Interface Requirements



Interface Control

- ◆ Ring 4 ICD — COI Dwg # 1616394 Rev A
 - » Referenced MAN Drawings Which Provided Panel Dimensions
 - » Interfaces Agreed and Locked at Rev A (11/04/03)
 - » Satisfies Dimensional and Interface Requirements

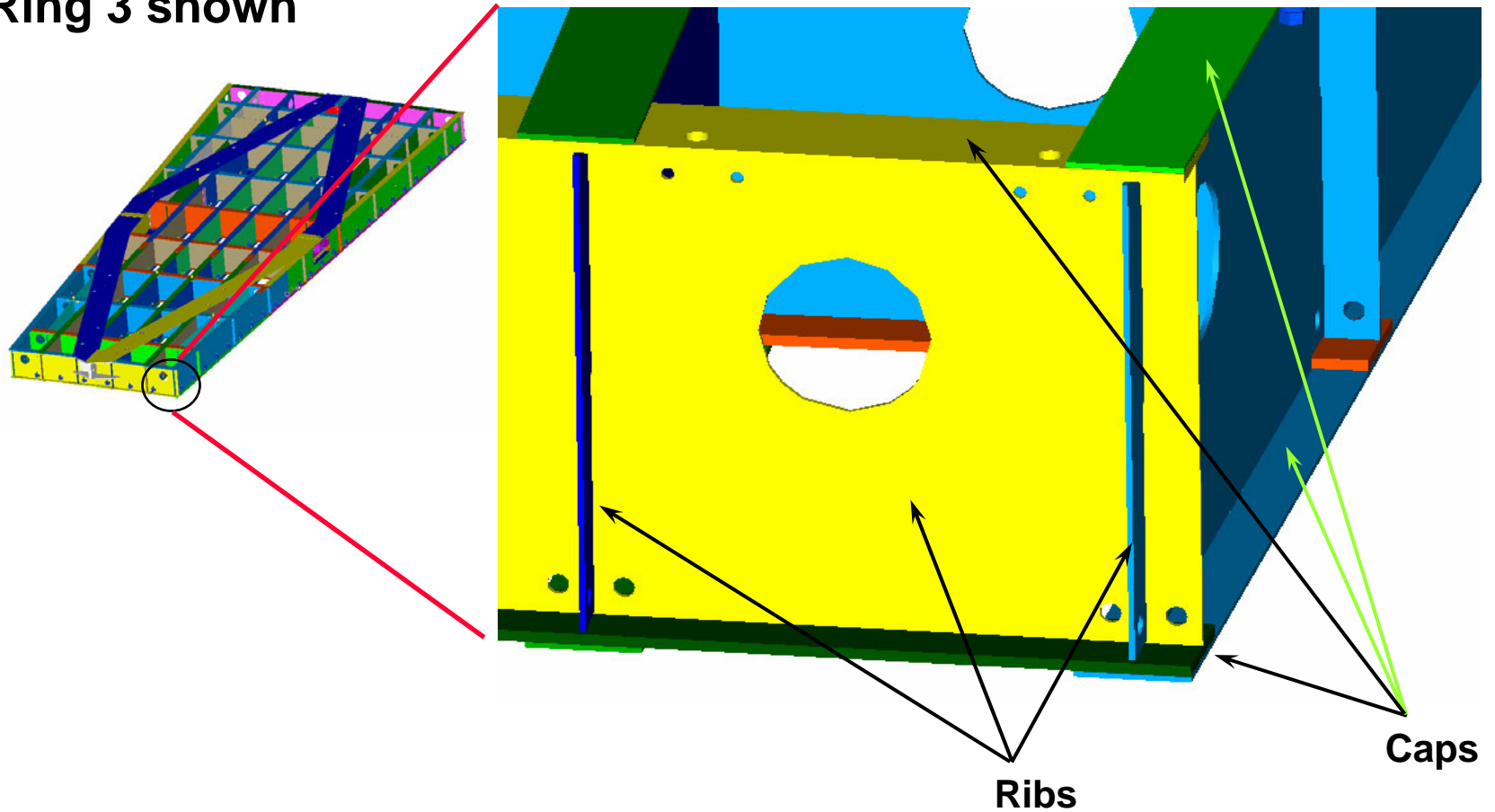


Design Similarities with Ring 5

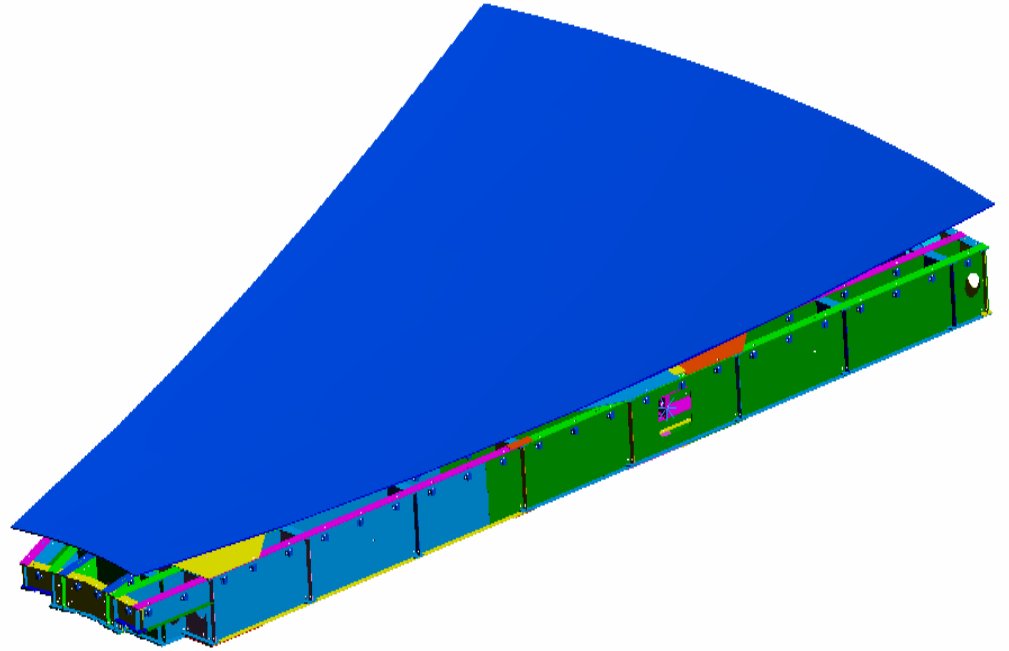
- ◆ Same axial and lateral fittings
- ◆ Same overall rib and cap geometry
- ◆ Same materials used in reaction structures and membranes
- ◆ Panel adjusters are same design:
 - » Ring 1: 176 adjusters per panel
 - » Ring 2: 174 adjusters per panel
 - » Ring 3: 142 adjusters per panel
 - » Ring 4 Generic: 182 adjusters per panel
 - » Ring 4 Tetrapod: 177 adjusters per panel

Reaction Structure Components

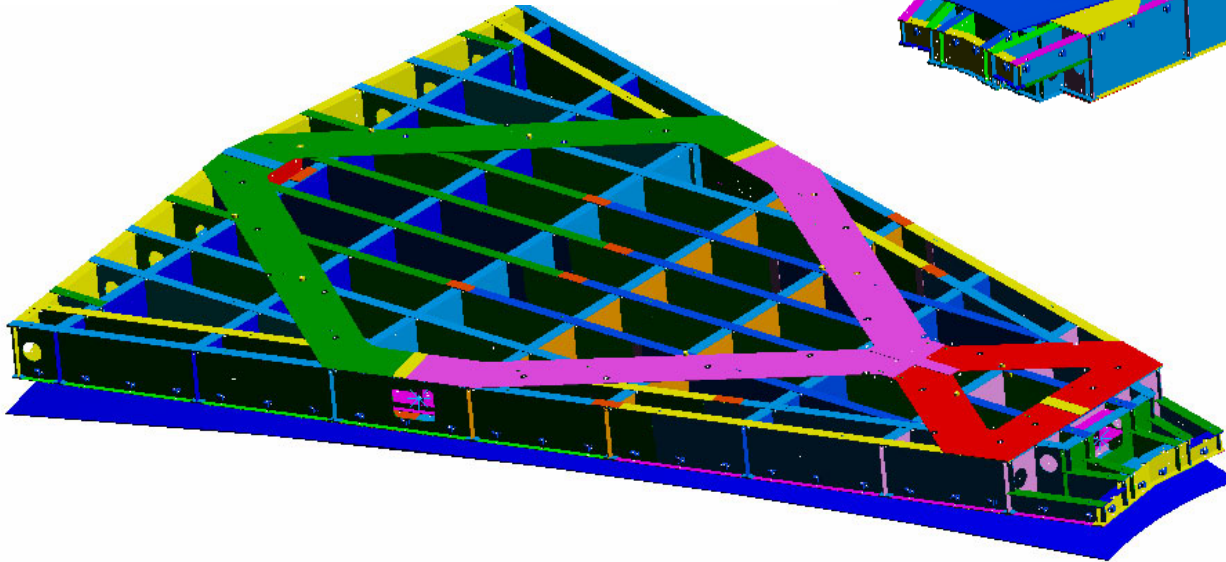
Ring 3 shown



Ring 1 Top Assembly



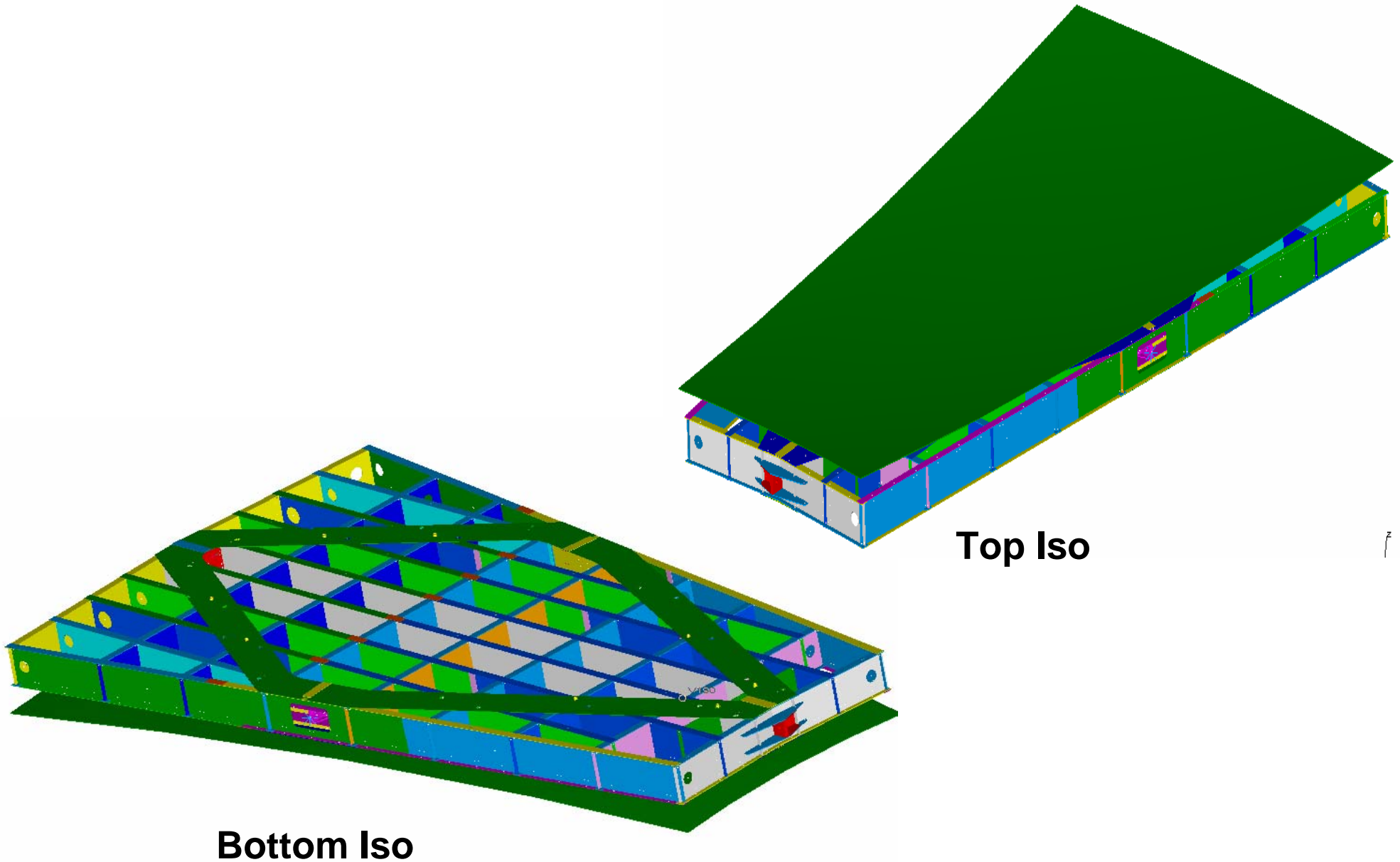
Top Iso



Bottom Iso

Adjusters Omitted for Clarity

Ring 2 Top Assembly

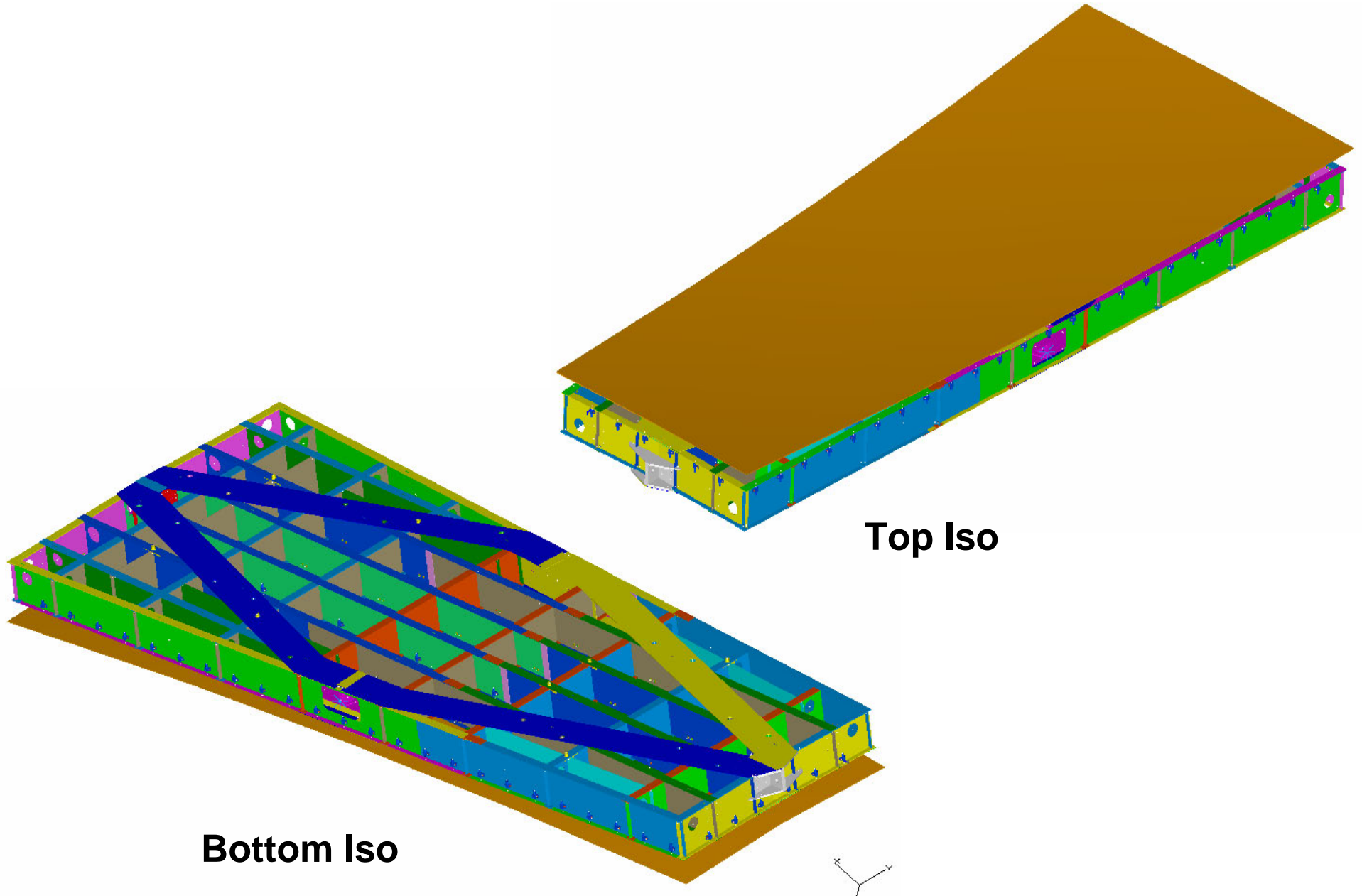


Top Iso

Bottom Iso

Adjusters Omitted for Clarity

Ring 3 Top Assembly

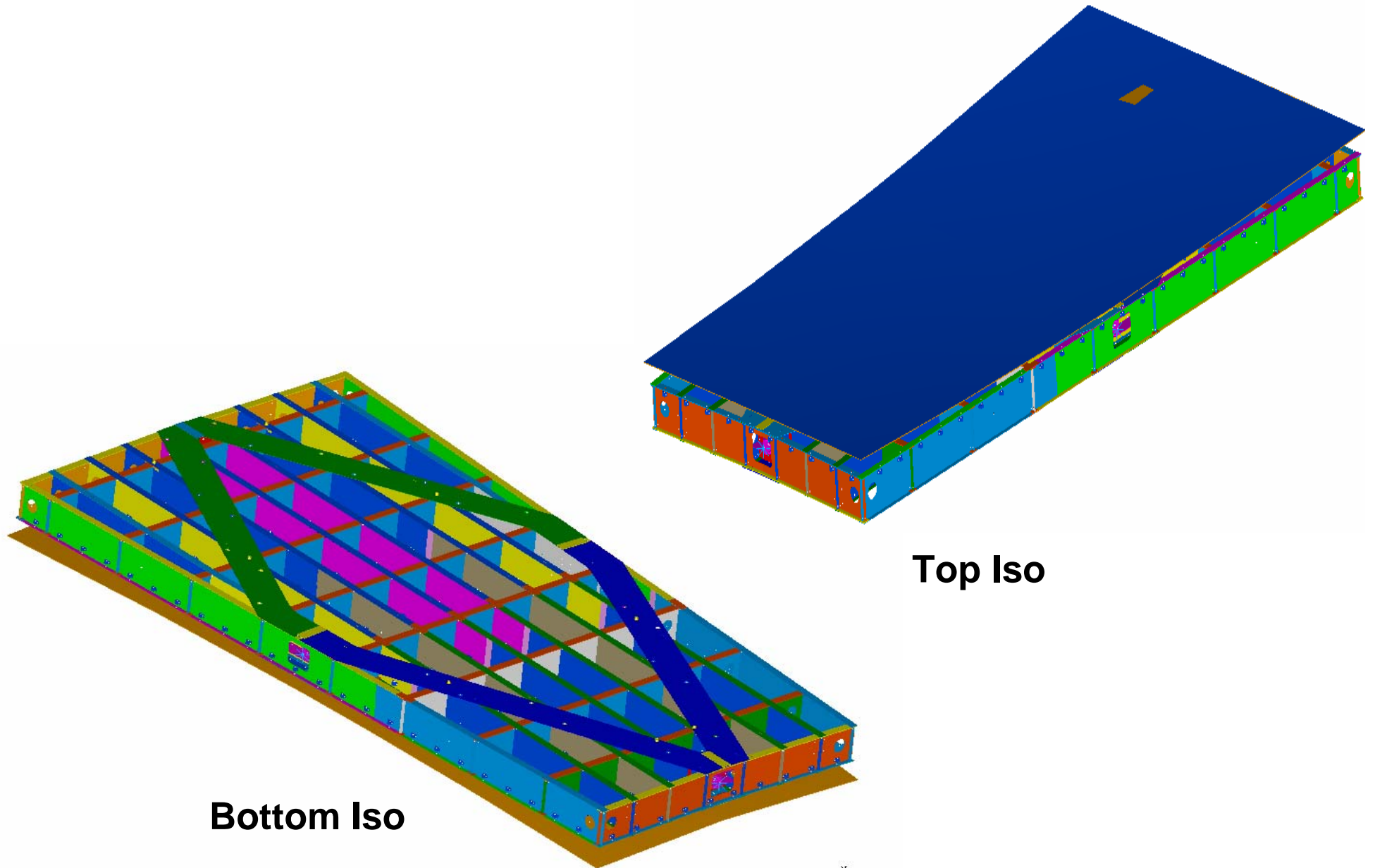


Top Iso

Bottom Iso

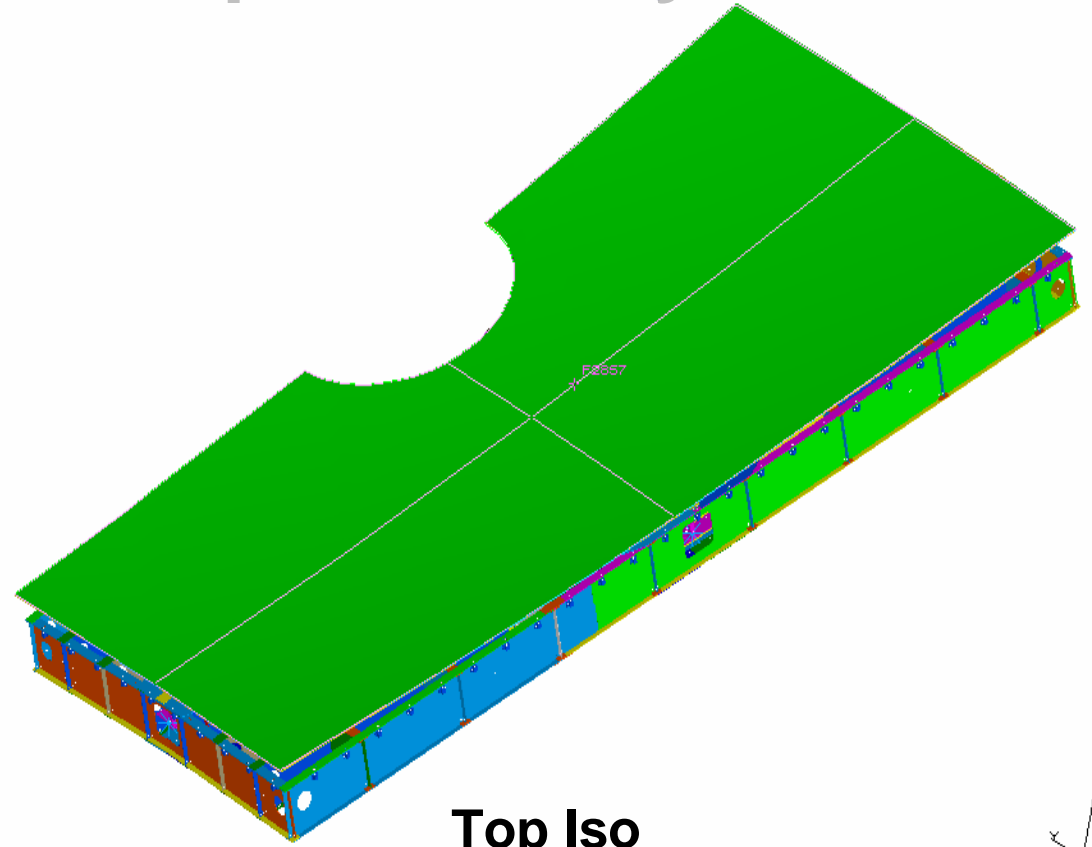
Adjusters Omitted for Clarity

Ring 4 Generic Top Assembly

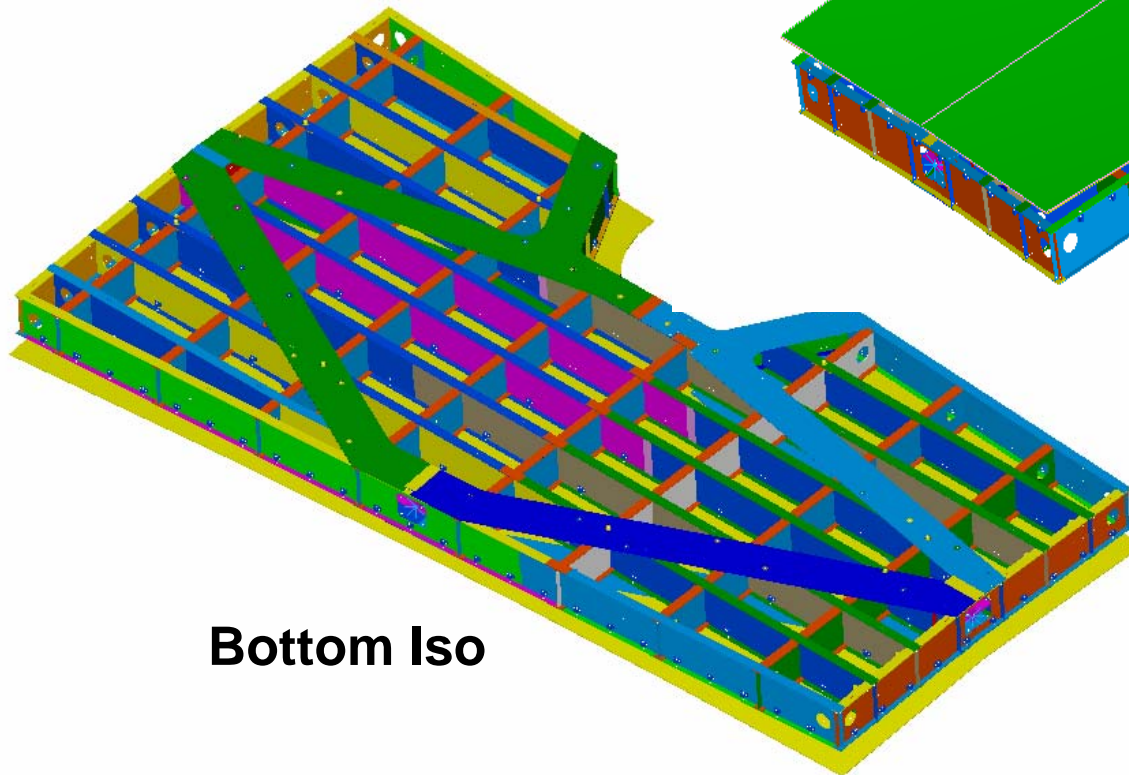


Adjusters Omitted for Clarity

Ring 4 Tetrapod Top Assembly



Top Iso

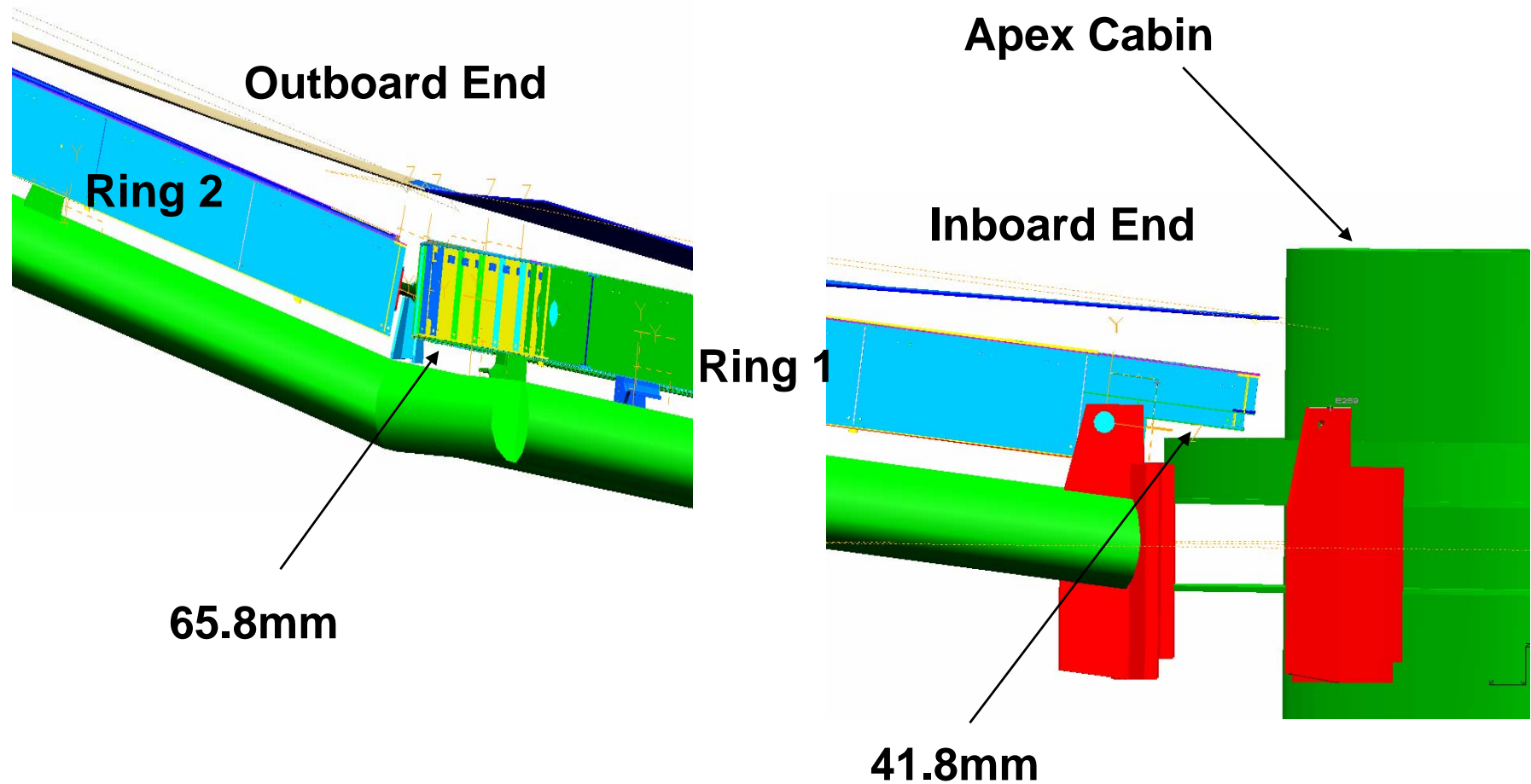


Bottom Iso

Adjusters Omitted for Clarity

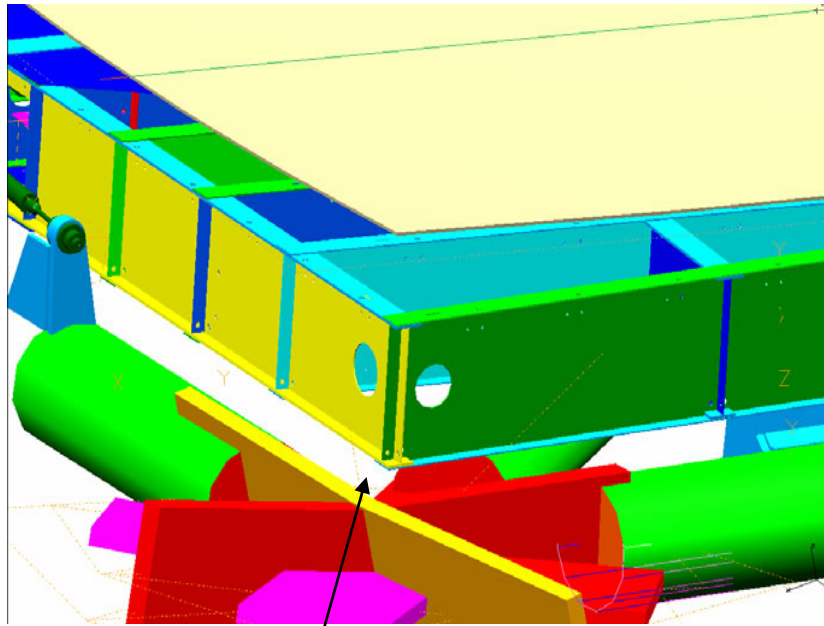
Ring 1 Truss Clearances

- ◆ Values are the closest clearance to truss
 - » Parts modeled from nominal truss and panel dimensions



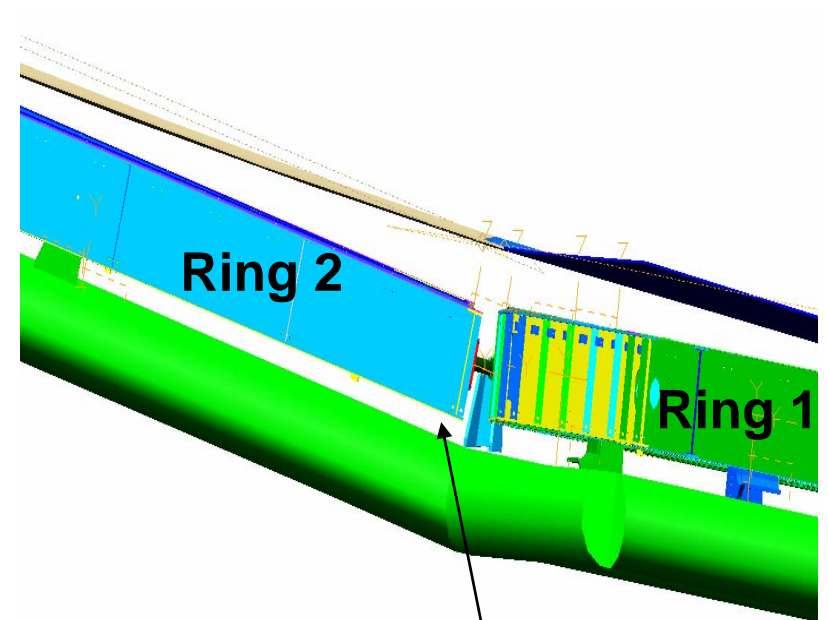
Ring 2 Truss Clearances

- ◆ Values are the closest clearance to truss
 - » Parts modeled from nominal truss and panel dimensions



Outboard End

38.8mm

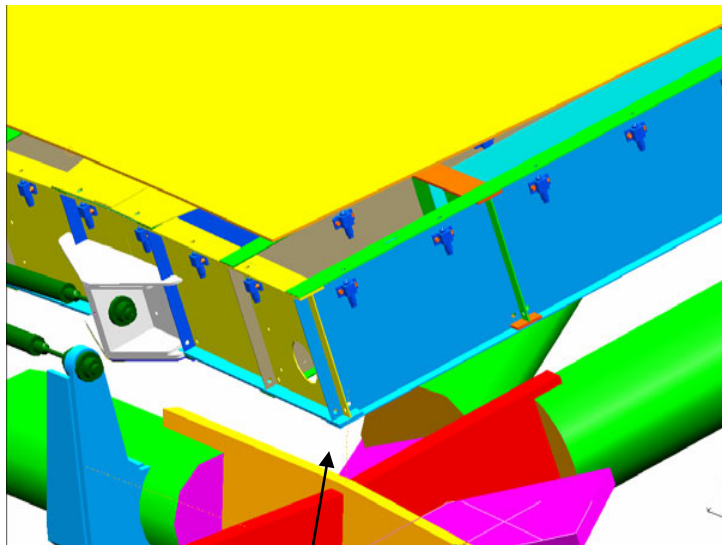


Inboard End

64.6mm

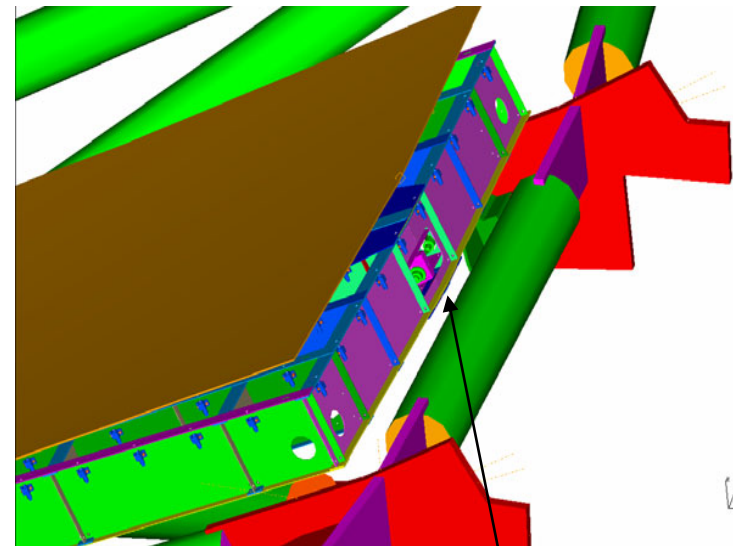
Ring 3 Truss Clearances

- ◆ Values are the closest clearance to truss
 - » Parts modeled from nominal truss and panel dimensions



Inboard End

80.1mm

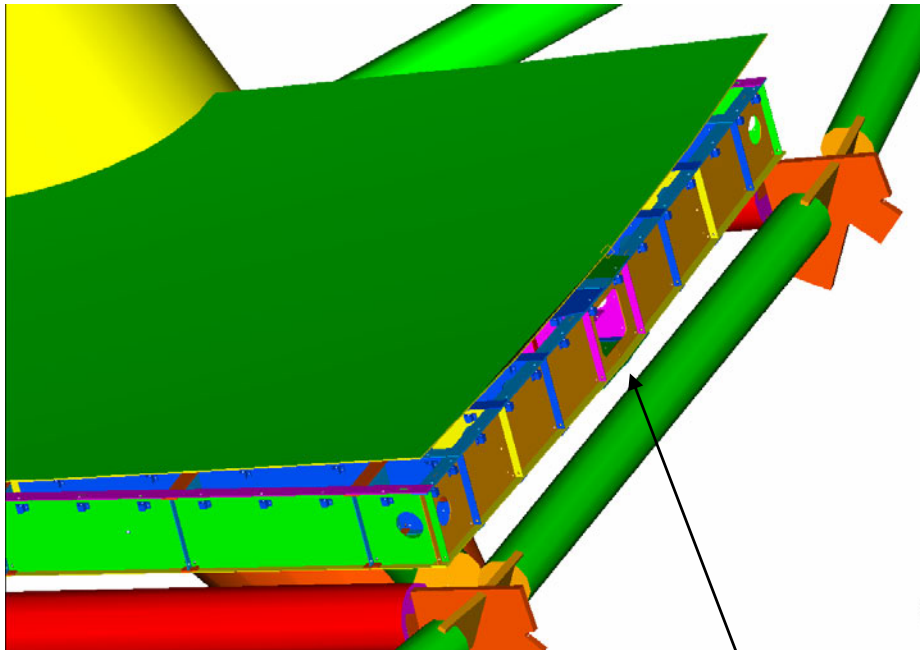


Outboard End

33.0mm

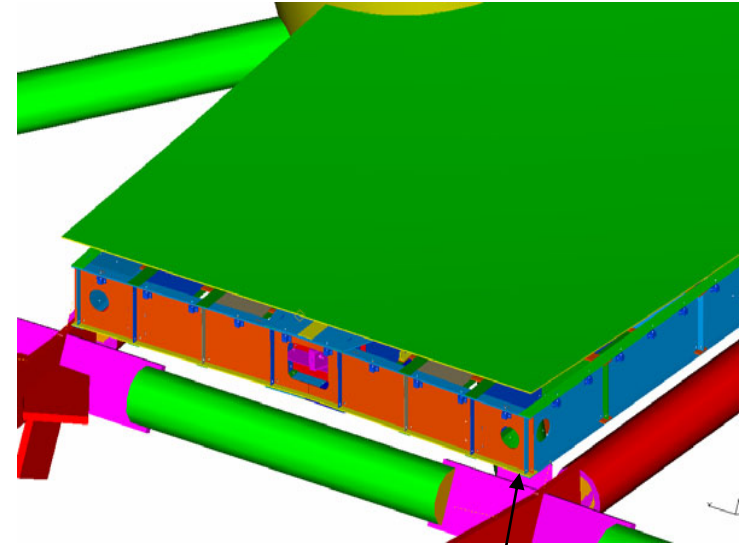
Ring 4 Truss Clearances near Tetrapod (worst case)

- ◆ Values are the closest clearance to truss
 - » Parts modeled from nominal truss and panel dimensions



Outboard End

40.6mm

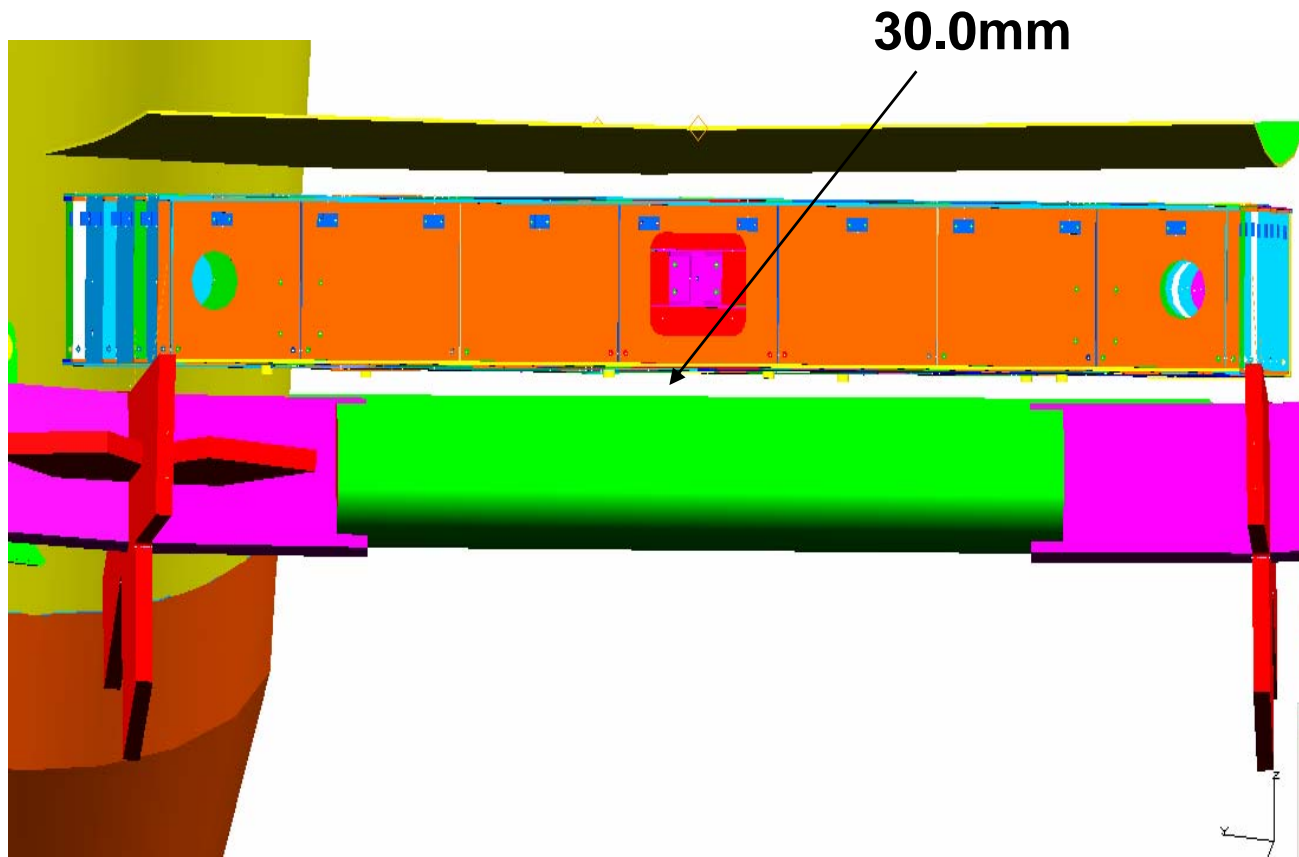


Inboard End

32.7mm

Ring 4 Truss Clearances near Tetrapod Cont. (worst case)

- ◆ Values are the closest clearance to truss
 - » Parts modeled from nominal truss and panel dimensions



Front view showing diagonal truss tube

Ring 1 Mass Summary

	CDR Design Mass
Panel Membrane	117 kg. (257 lbs.)
Fittings	
Lateral	8.4 kg. (18.6 lbs.)
Axial	3.8 kg. (8.4 lbs.)
Adjusters	33 kg. (72 lbs.)
Fasteners + Reinforcements	4.5 kg. (10 lbs.)
Reaction Structure Ribs / Caps / Dia.	132 kg. (292 lbs.)
Total	299 kg. (658 lbs.)
Membrane Area	11.86 m ²
Weight / Area	25.2 kg./m²
Requirement	<=30 kg./m²

Ring 2 Mass Summary

	CDR Design Mass
Panel Membrane	127 kg. (281 lbs.)
Fittings	
Lateral	10.6 kg. (23.3 lbs.)
Axial	3.8 kg. (8.4 lbs.)
Adjusters	32 kg. (71 lbs.)
Fasteners + Reinforcements	4.5 kg. (10 lbs.)
Reaction Structure Ribs / Caps / Dia.	129 kg. (284 lbs.)
Total	307 kg. (677.7 lbs.)
Membrane Area	12.96 m ²
Weight / Area	23.7 kg./m²
Requirement	<=30 kg./m²

Ring 3 Mass Summary

	CDR Design Mass
Panel Membrane	88.9 kg. (196 lbs.)
Fittings	
Lateral	10.6 kg. (23.3 lbs.)
Axial	1.9 kg. (4.18 lbs.)
Adjusters	26 kg. (58 lbs.)
Fasteners + Reinforcements	4.5 kg. (10 lbs.)
Reaction Structure Ribs / Caps / Dia.	116 kg. (255 lbs.)
Total	248 kg. (546 lbs.)
Membrane Area	9.20 m ²
Weight / Area	26.9 kg./m²
Requirement	<=30 kg./m²

Ring 4 GENERIC Mass Summary

CDR Design Mass

Panel Membrane	121 kg. (267 lbs.)
Fittings	
Lateral	8.4 kg. (18.6 lbs.)
Axial	1.9 kg. (4.2 lbs.)
Adjusters	33.5 kg. (74 lbs.)
Fasteners + Reinforcements	4.5 kg. (10 lbs.)
Reaction Structure Ribs / Caps / Dia.	142 kg. (314 lbs.)
Total	312 kg. (688 lbs.)
Membrane Area	12.32 m ²
Weight / Area	25.3 kg./m ²
Requirement	<=30 kg./m ²

Ring 1 Configuration Management

◆ Released Drawings and Revisions

Drawing number	Description	Rev. level
1615301	Panel Assy	-
1615311	Reaction Structure Assy	A
1615501	Panel Adjuster	D
1615505	Lateral Fitting	A
1615515	Axial Fitting	A
1615525	Lateral Fitting	A
1615N801	Rib NC File	-
1615N811	Cap NC File	-
1615N821	Cap NC File	-
1615391	Ring 1 ICD	-
1615401	Membrane	A
Tooling		
1615101-1PDMO	Mold Assy	Not Rel
1615201	Assembly Fixture	Not Rel
1458101 PDMO	Mold Membrane	B
1458221	Panel Trim Tool	-
1615500	PDMO Adjuster	F

Ring 2 Configuration Management

◆ Released Drawings and Revisions

Drawing number	Description	Rev. level
1615302	Panel Assy	-
1615312	Reaction Structure Assy	A
1615501	Panel Adjuster	D
1615505	Lateral Fitting	A
1615522	Lateral Fitting Ring 2	-
1615515	Axial Fitting	A
1615N802	Rib NC File	-
1615N812	Cap NC File	-
1615N822	Cap NC File	-
1615392	Ring 2 ICD	A
1615402	Membrane	A
Tooling		
1615102-1PDMO	Mold Assy	Not Rel
1615202	Assembly Fixture	Not Rel
1458102 PDMO	Mold Membrane	B
1458222	Panel Trim Tool	-
1615500	PDMO Adjuster	F

Ring 3 Configuration Management

◆ Released Drawings and Revisions

Drawing number	Description	Rev. level
1615303	Panel Assy	-
1615313	Reaction Structure Assy	-
1615501	Panel Adjuster	D
1615505	Lateral Fitting	A
1615523	Lateral Fitting Ring 3	-
1615515	Axial Fitting	A
1615N803	Rib NC File	-
1615N813	Cap NC File	-
1615N823	Cap NC File	-
1615393	Ring 3 ICD	-
1615403	Membrane	A
Tooling		
1615103-1PDMO	Mold Assy	Not Rel
1615203	Assembly Fixture	Not Rel
1458103 PDMO	Mold Membrane	C
1458223	Panel Trim Tool	-
1615500	PDMO Adjuster	F

Ring 4 Configuration Management

◆ Released Drawings and Revisions

Drawing number	Description	Rev. level
1615304	Panel Assy	-
1615314	Reaction Structure Assy	-
1615501	Panel Adjuster	D
1615505	Lateral Fitting	A
1615525	Lateral Fitting	-
1615515	Axial Fitting	A
1615N804	Rib NC File	-
1615N814	Cap NC File	-
1615N824	Cap NC File	-
1615394	Ring 4 ICD	A
1615404	Membrane	A
Tooling		
1615104-1PDMO	Mold Assy	Not Rel
1615204	Assembly Fixture	Not Rel
1458104 PDMO	Mold Membrane	B
1458224	Panel Trim Tool	-
1615500	PDMO Adjuster	F

Rings 1-4 Analysis Presentation