

Vacuum Vessel / Diagnostics

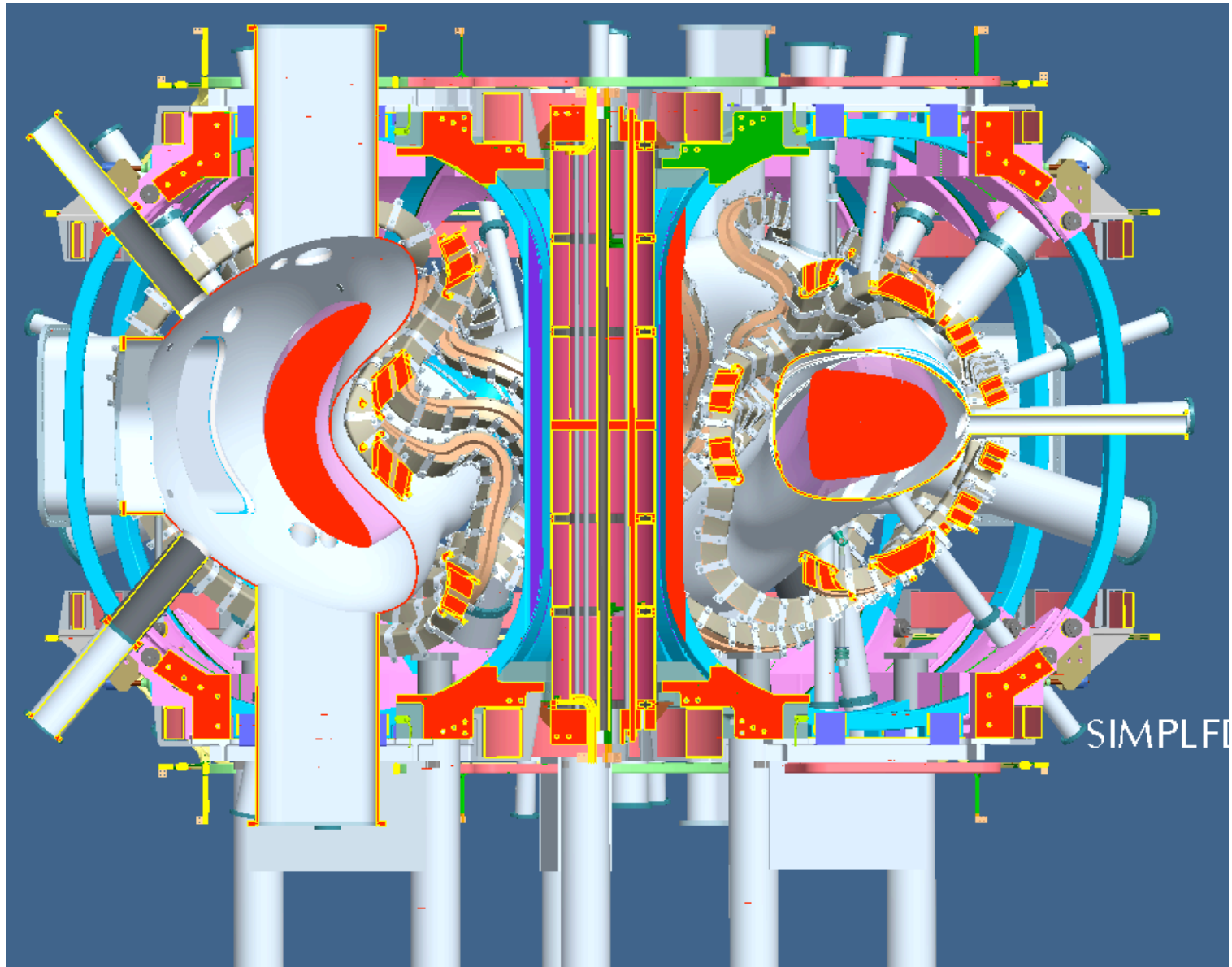
David Johnson

12/1/05

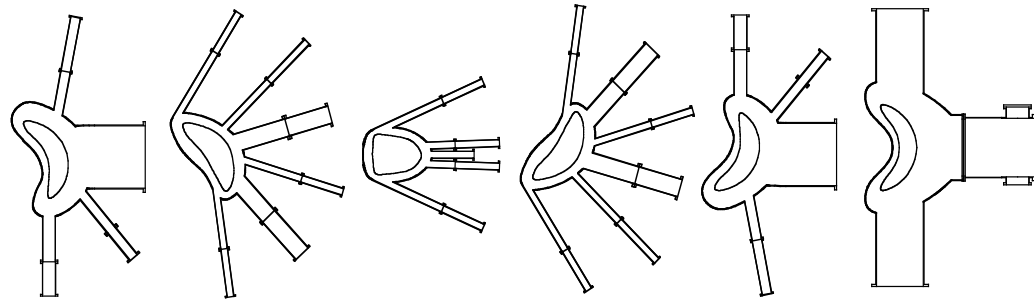
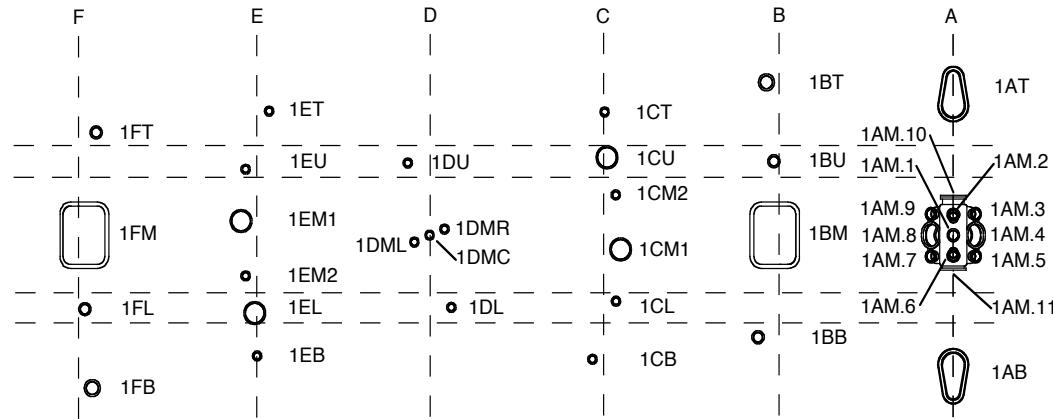
Interface List

- Inner port locations, sizes, orientations, outer port extensions, load limits
- Spacer modifications for diagnostics
- Clearance for magnetic sensors, leads, terminations
- Metrology landmarks
- Grounding

Ports Installed in All Possible Locations



Port Access Adequate Compared to Projected Diagnostic Usage



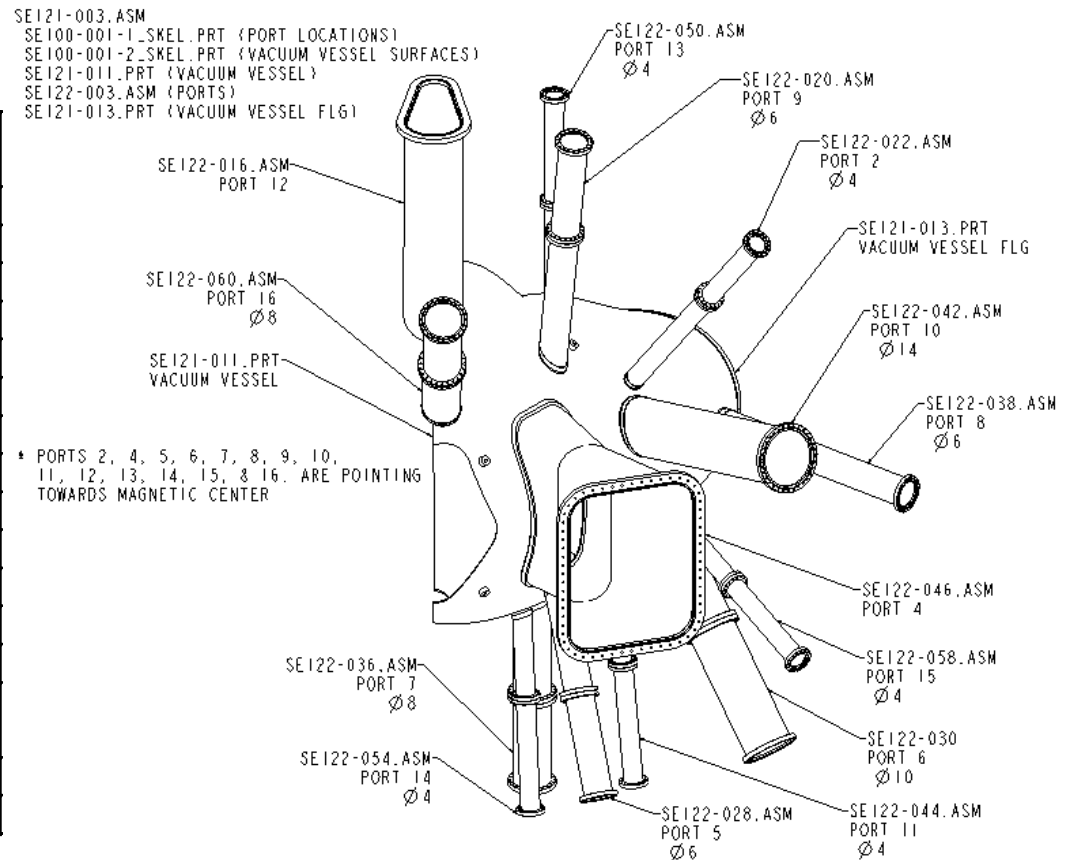
F	E	D	C	B	A	
1FT inboard gas or pellet inj.	1ET equil. magn. (120 MI)		1CT Mirnov coils (90 tp)	1BT	1AT div. bolometer div. camera	
		1DU RF antenna feedthrough			1AM.10	
	1EU gas inj. (reg. & supersonic)		1CU	1BU core UV spectroscopy	1AM.2	
		1DMR SXR arrays (90 tp)	1CM2		1AM.9 thermocouples (45 tp)	1AM.3 ion gauge
1FM MPTS view	1EM1 1-D filtered (H α , C) camera	1DMC SXR arrays (90 tp)	1CM1	1BM fluctuation diag. (BES)	1AM.8 heating neutral beam	1AM.4 heating neutral beam
	1EM2 fast pressure gauges	1DML SXR arrays (90 tp)			1AM.7 fast pressure gauges	1AM.5 compact IR camera
1FL Mirnov (20 tp) thermo (15 tp)	1EL		1CL visible spectroscopy		1AM.6 vacuum pump, ion gauge	
		1DL RF antenna feedthrough			1AM.11	
1FB	1EB		1CB equil. magn. (120 MI)	1BB	05 div. UV Spect. div. IR camera	

Electrical feedthroughs: tp=twisted pair, MI=mineral insulated cable, c= single conductor

Load Limits at Outer Port Extension

Have these limits been reviewed?

Port Number	Port Diameter	Flange Size	Max Dead Load
NB	NA	NA	250*
PORT 12A/12B	NA	NA	250*
PORT 4A/BB	NA	NA	250*
PORT 2A/2B	3.5	6	90
PORT 5A/5B	6	8	175
PORT 6A/6B	10	12	200
PORT 7A/7B	8	10	200
PORT 8A/8B	3.5	6	90
PORT 9A/9B	6	8	175
PORT 10A/10B	10	12	200
PORT 11A/11B	2.5	4.63	60
PORT 15A/15B	3.5	6	90
DOMA A/B PORTS17	3.5	6	90
18	3.5	6	90
SPACER PORT	3.5	6	90



- analysis needed to exceed this limit

- Note: For Port 4, blank exceeds this limit

NCSX VV interface meeting 12/1/05

Port Extension Issues

- What is the strategy for the outer port extensions? Will they be present when cryostat first installed? What are heating requirements?
- Load limits may need review?

1

2

3

SEE NOTE 3

SEE NOTE 2

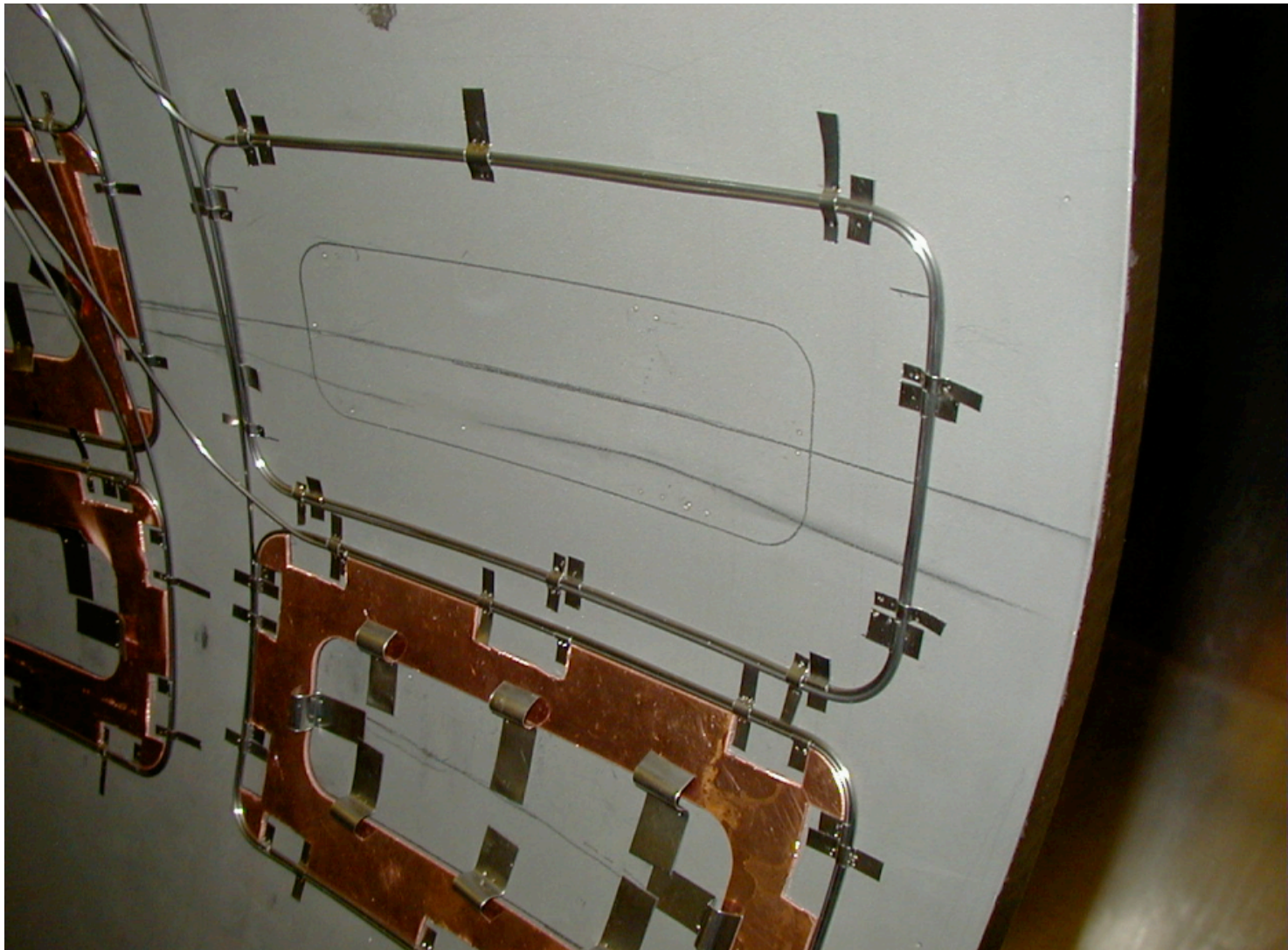
SEE NOTE 1

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NOT FOR FABRICATION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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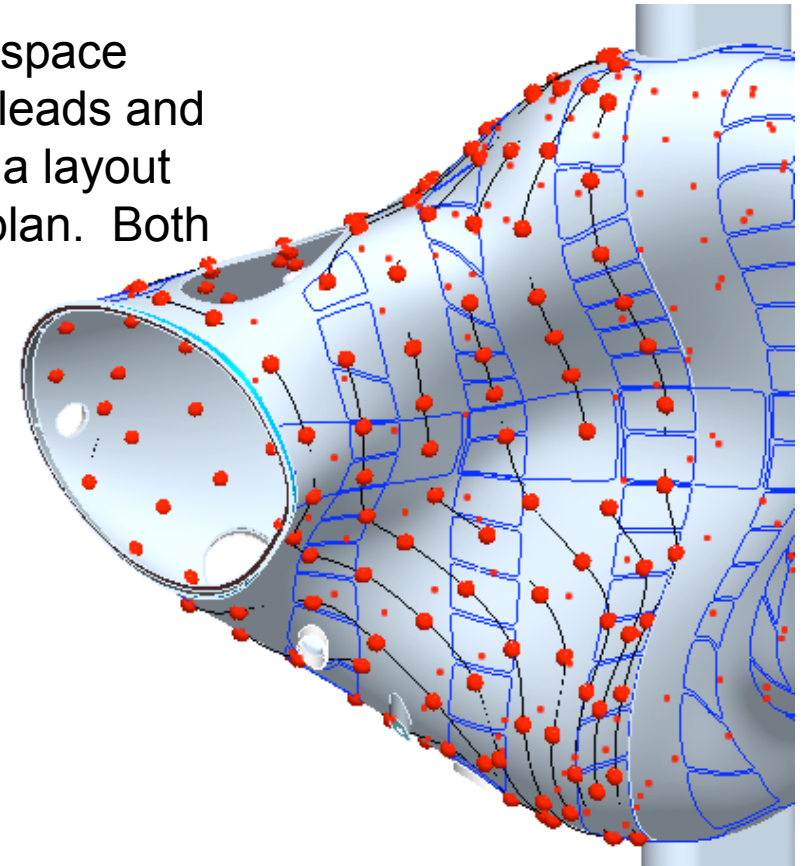
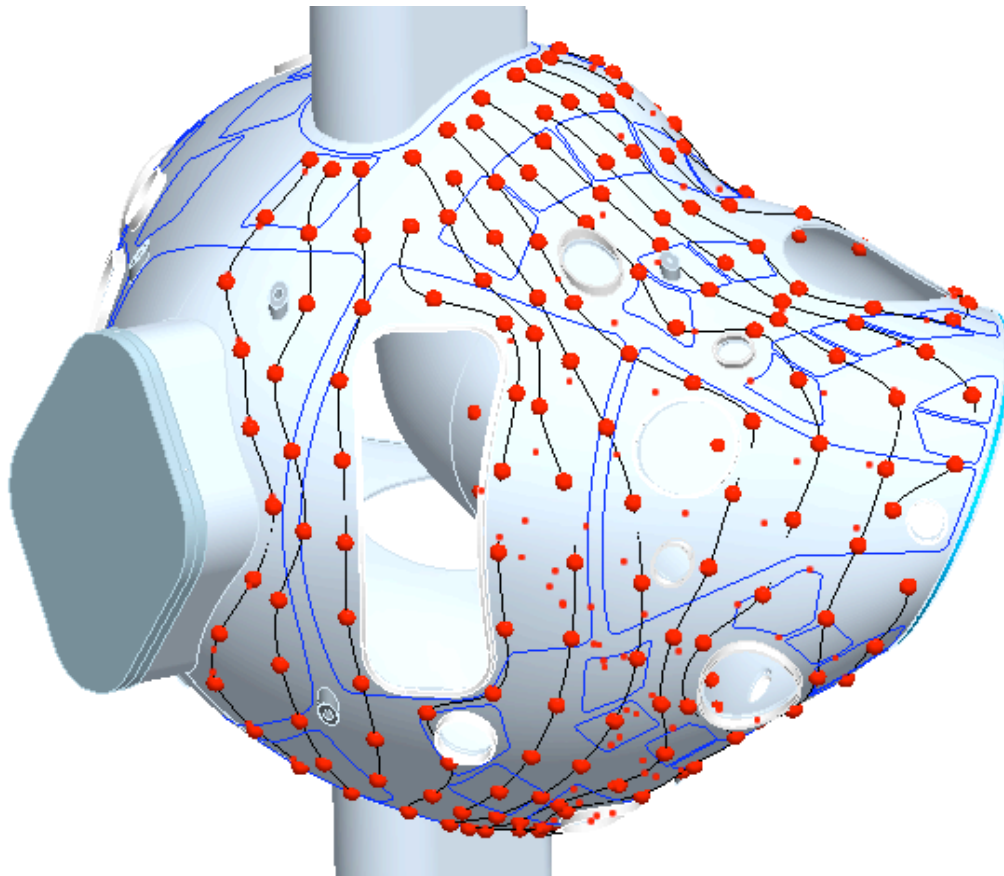
All three spacers will feature 16 multi-turn loops of MI cable as part of the ex-vessel saddle loop sensor set. Leads will exit along the port extension.

Clearance of 1/8" is provided for for ex-vessel, saddle loop magnetic sensors and leads



Clearance for magnetic sensors, leads, and feedthroughs

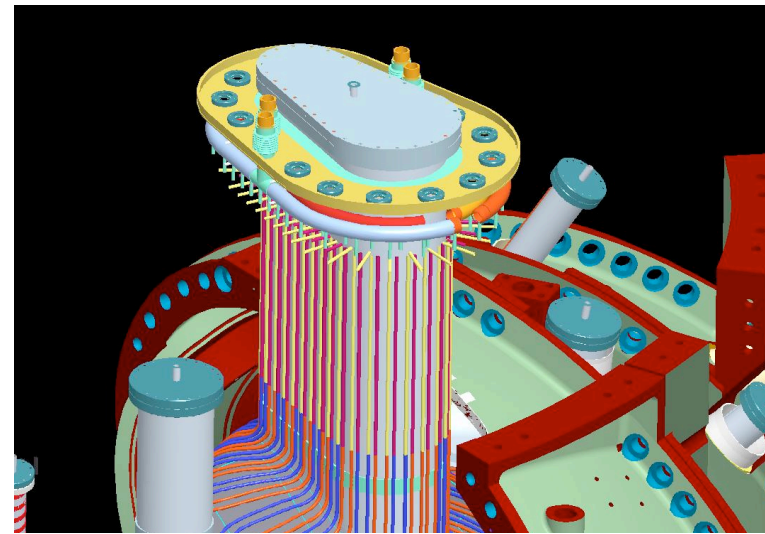
Only remaining issue is assuring that adequate space exists and is utilized for both the saddle sensor leads and the heating attachment brackets. This involves a layout in the model and development of an assembly plan. Both to be covered in an FDR next week.



This slide shows an overlay of the coolant lines over the diagnostic loops with the red spheres indicating the size of the coolant line attachment brackets.

Saddle Loop Termination

- MI leads will run vertically clamped to Port 12 nozzle.
- Loops will terminate in junction boxes on up to seven conflats on “collar”.
- Sensor leads installed prior to heating tubes.



Magnetic Sensor Interface Issues

- Satisfactory FDR addressing coexistence of ex-vessel sensor loops, leads with heating tubes, brackets. FDR scheduled for week of 12/12.
- In-vessel sensor mounting - not yet designed, but much simpler without internal heating tubes.

In-Vessel Metrology Landmarks

- Need to consider how we will be referencing diagnostic sightlines to magnetic geometry. Strategy may include installation of internal landmarks.
- Number and location of landmarks will depend on available metrology tools.

Ground Isolation

- Isolated VV ground is required.
- Separate isolated diagnostic ground also required.
- There will be classes of diagnostics reference to both grounds.