

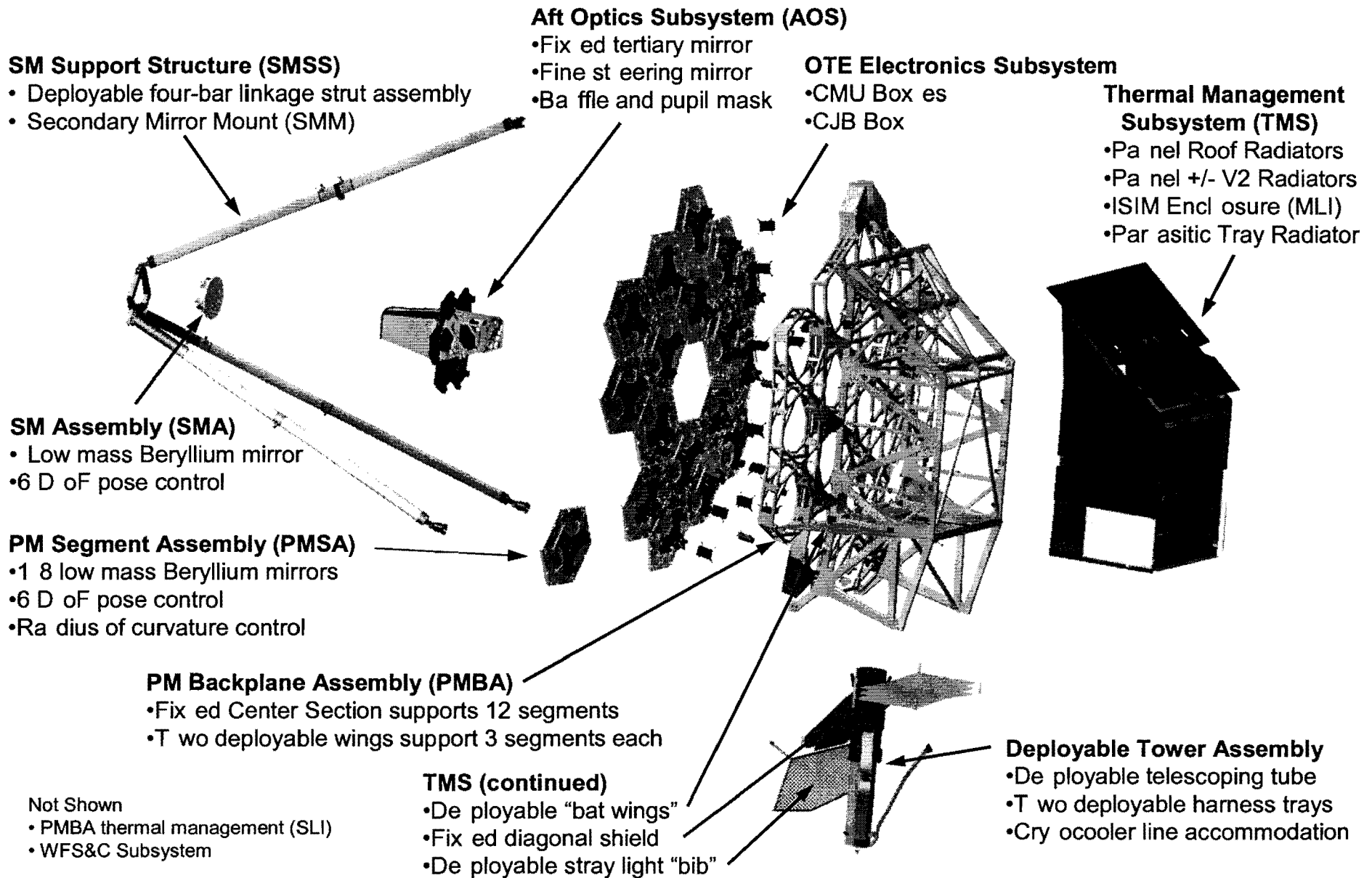
JWST OTE Development Status

Ritva Keski-Kuha
JWST Deputy OTE Manager
May 19, 2009

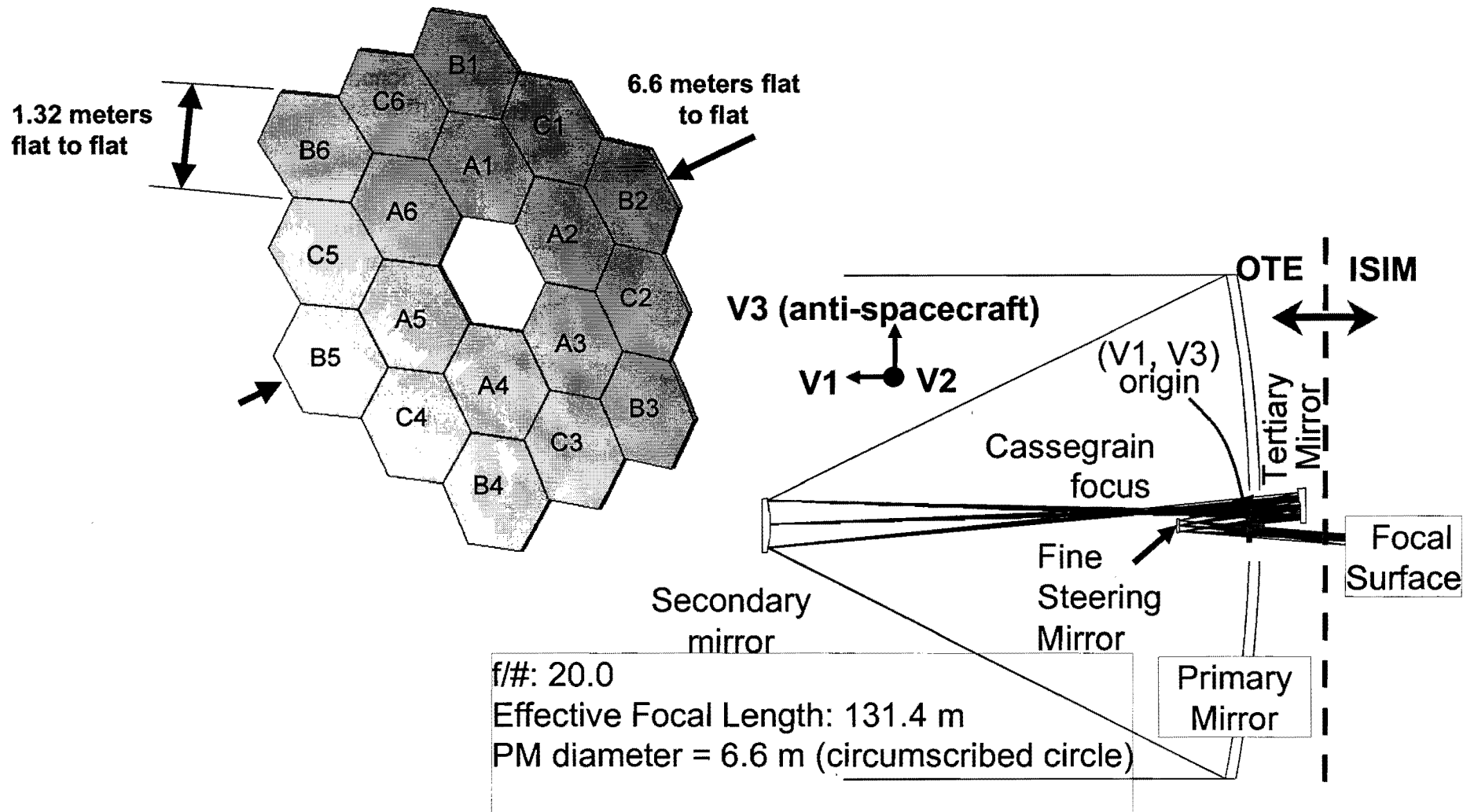
Topics

1. **OTE Architecture Refresher**
2. **Mirror Status**
3. **Backplane Status**
4. **I&T Status**
5. **Schedule**
6. **Summary**

OTE Architecture Overview



Three Mirror Anastigmat Optical Design Provides a Wide Field-of-View



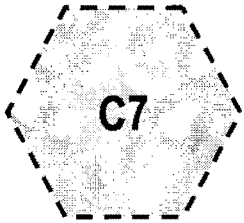
Mirror Status

- **First Cryo test of Flight mirrors has been completed**
- **Hexapod performed well at cryo, cryo distortions of A1 and EDU at XRCF as expected.**
- **All PMSAs have completed grinding and are in the polishing and testing phase which includes fabrication at Tinsley, Integration and Test at Ball, Testing at the XRCF.**
- **The secondary mirror-1 was shipped from Tinsley to Ball. The mirror figure is below the specification.**
- **Tertiary mirror and Fine Steering Mirror making good progress at Ball.**

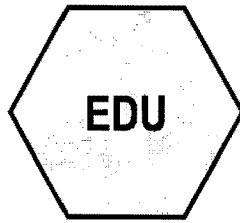
Significant Accomplishments/Status

L-3 SSG-Tinsley

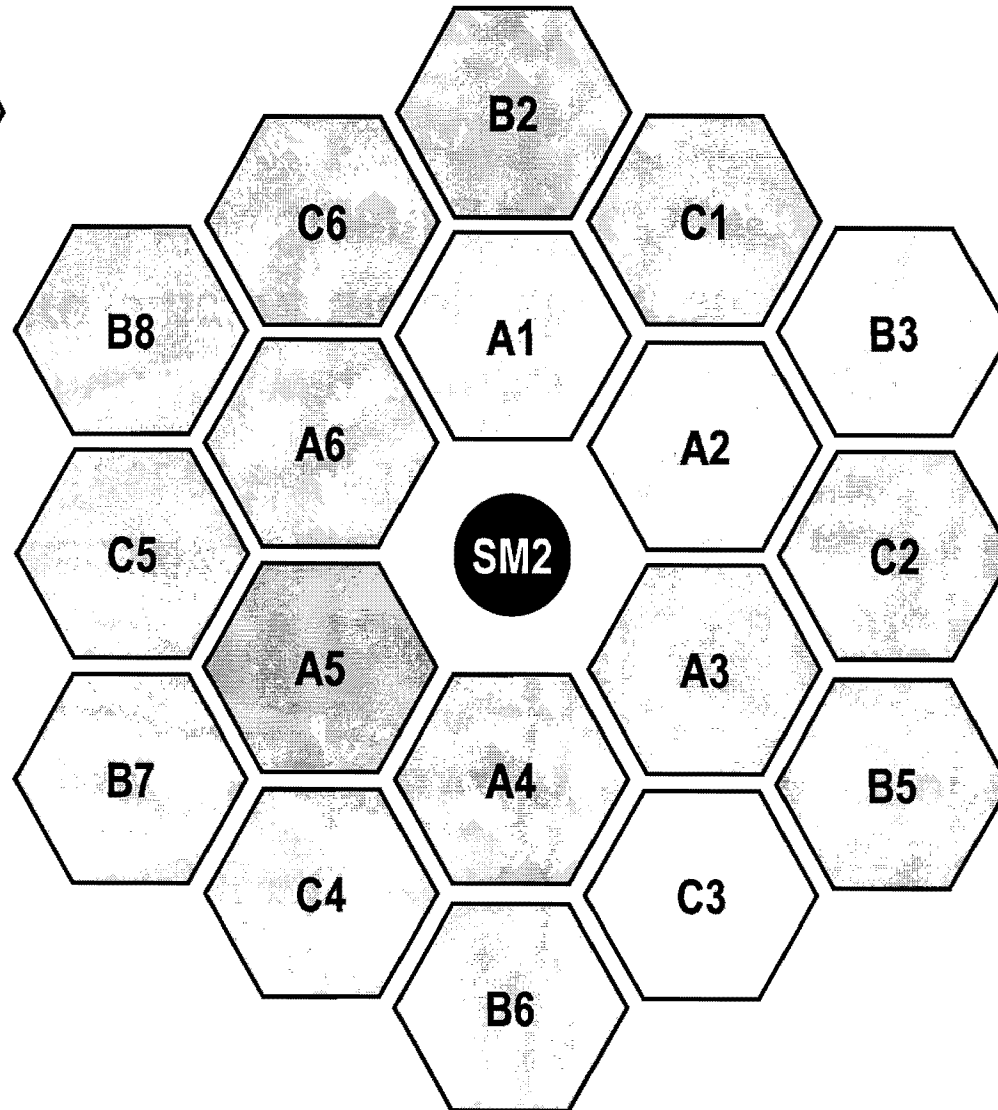
Pathfinder



EDU



Flight



Flight



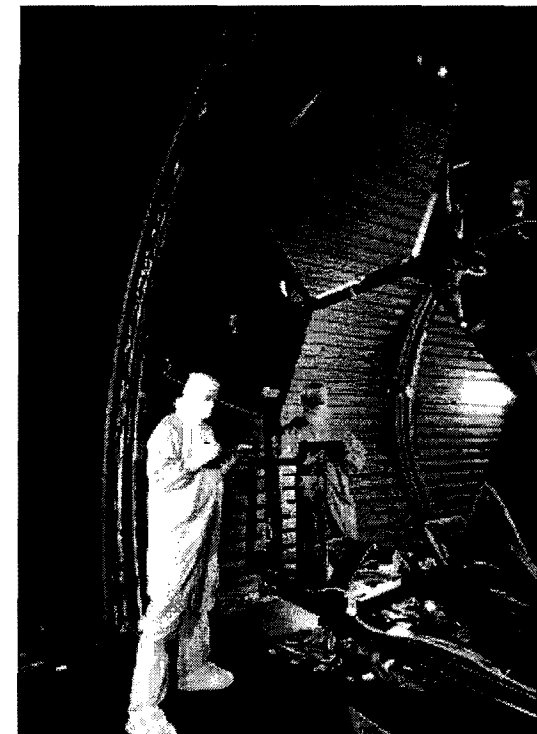
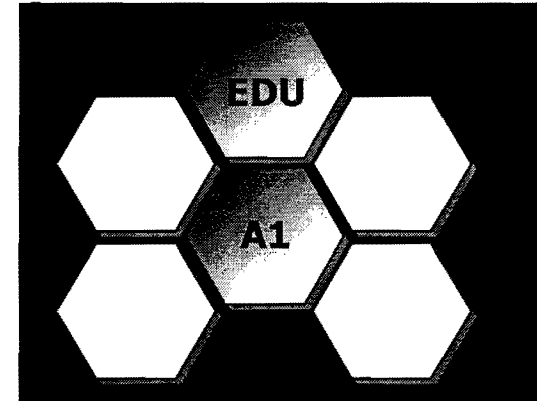
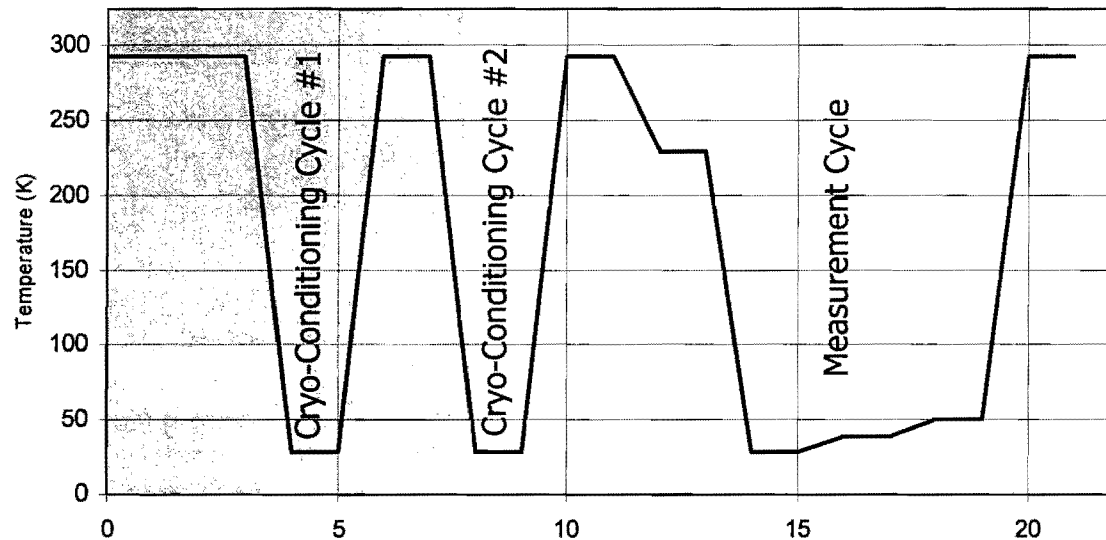
LEGEND
Not at L-3 SSG-Tinsley
Even Slice
Figure Grind
Smooth Out Grind
Rough / Smooth Out Polish Interleave
Fine Figure Polish
Shipped to BATC
Cryo Null Figure
Final Optical Test
Delivered
-----Pathfinder

As of 4/18/09

Cryotest #1 Summary

- First Cryo Conditioning Cycle,
 - Mirrors taken to <25K
 - Measurements made at 28K

XRCF Cryogenic Test #1 Timeline



Cryo-Deformation of EDU

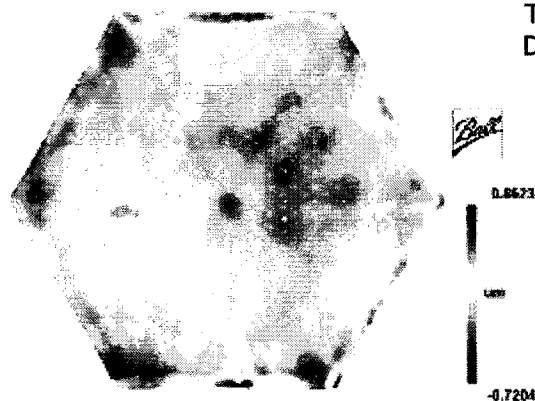
MEASUREMENTS

EDU AMBIENT

(Piston, Tilt, Power, Astigmatism, & Gravity Removed)

Figure	163.3	nm rms
Astigmatism	124.7	nm rms
As-Measured Δ ROC	-3.832	mm

Temperature = 292K
Dataset: 7040.407AB

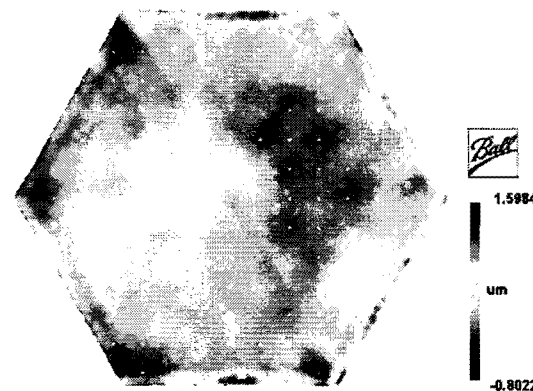


EDU CRYO

(Piston, Tilt, Power, Astigmatism, Gravity Removed)

Figure	182.0	nm rms
Astigmatism	79.4	nm rms
As-Measured Δ ROC	-2.636	mm

Temperature = 29K
Dataset: 7040.410



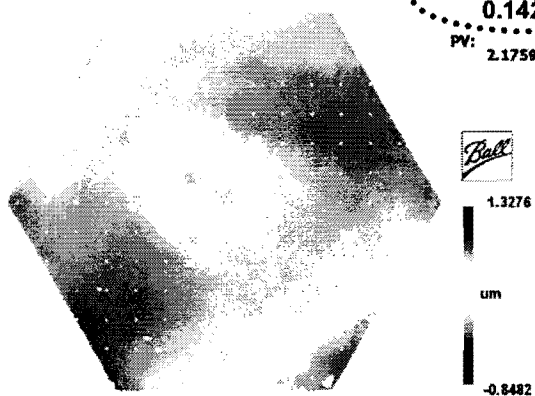
DIFFERENCE

Cryo-Deformation

(Piston, Tilt, Power Removed)

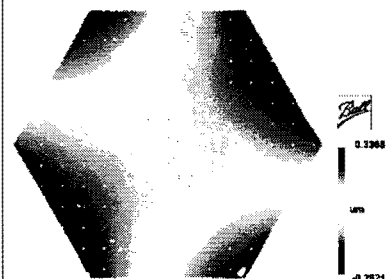
RoC Change
-18.997 mm
RMS: 0.1427 um
PV: 2.1759 um

Total Cryo-deformation = 142.7 nm rms



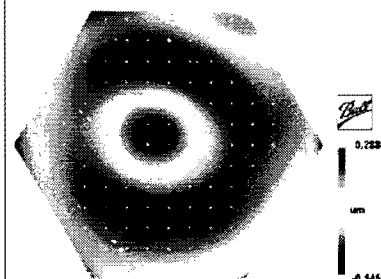
Astigmatism

RMS: 115.4 nm rms



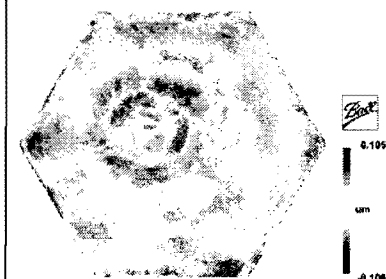
Mid/Low Figure

RMS: 82.0 nm rms



High Freq Figure

RMS 25.0 nm rms



Completed 1st PMSA Tests at XRCF

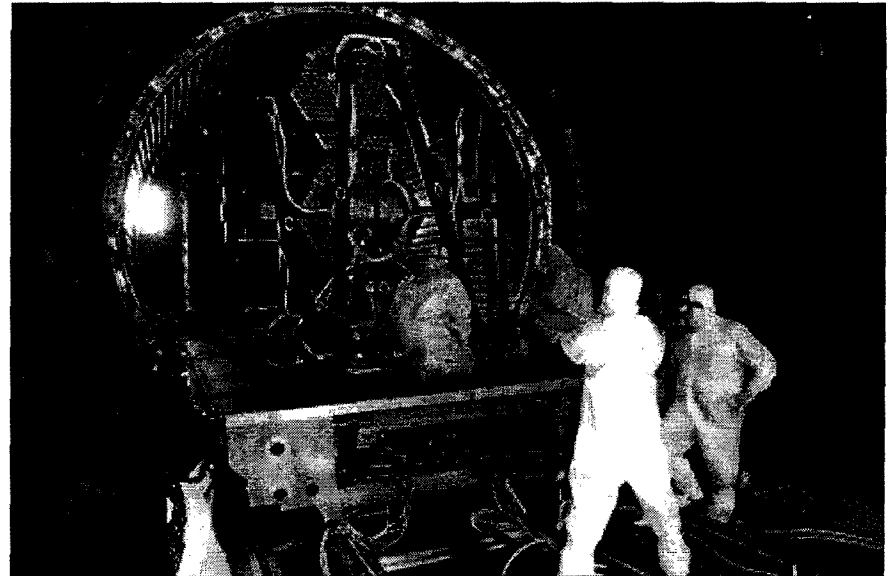
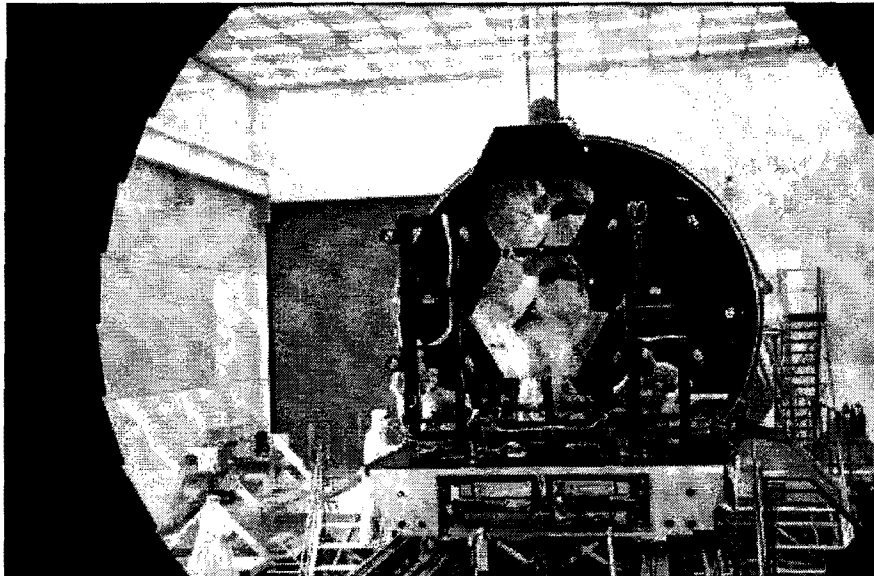
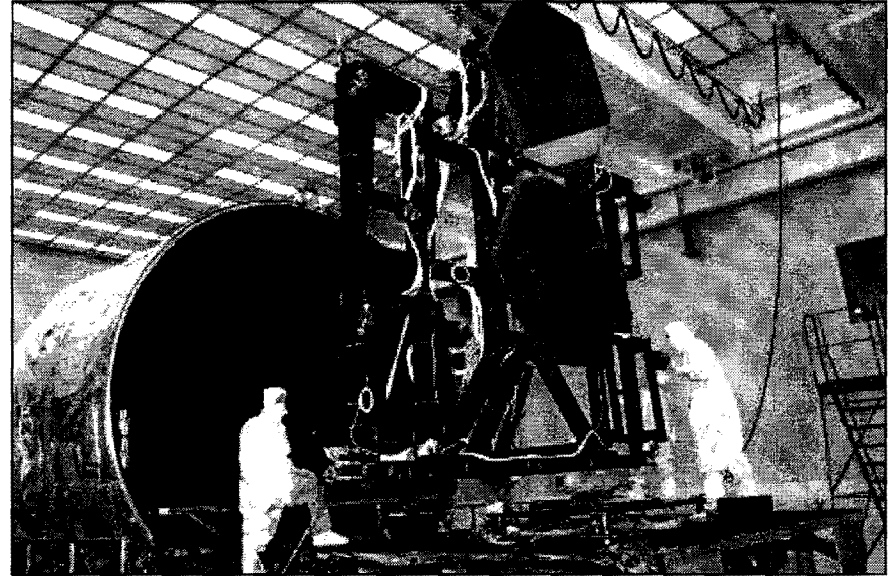
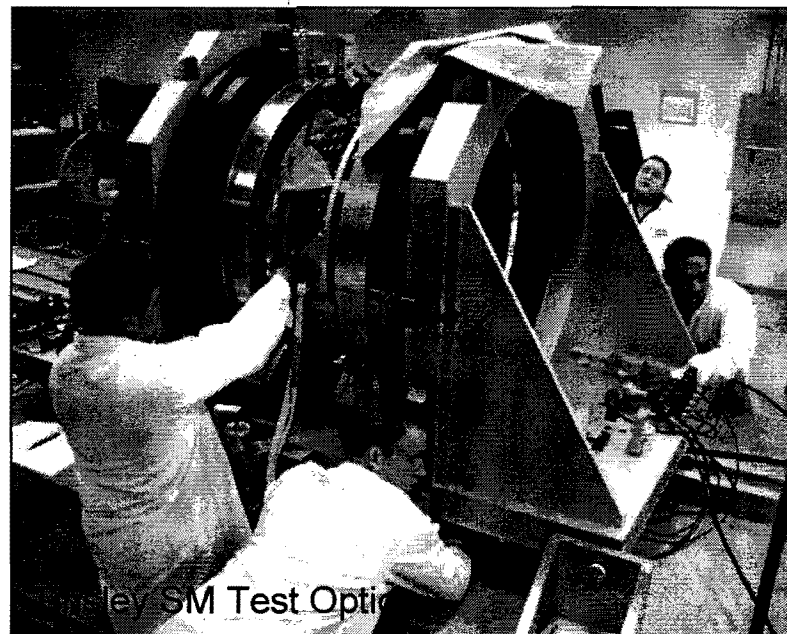
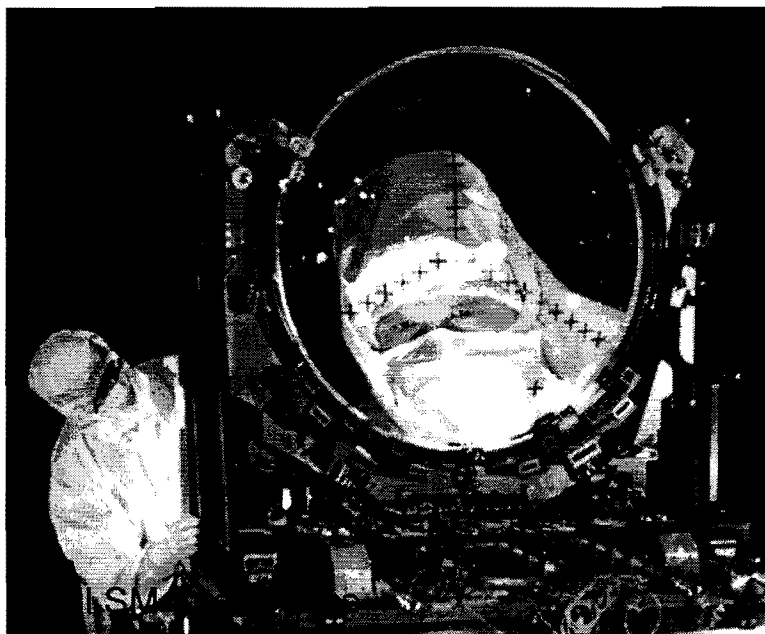


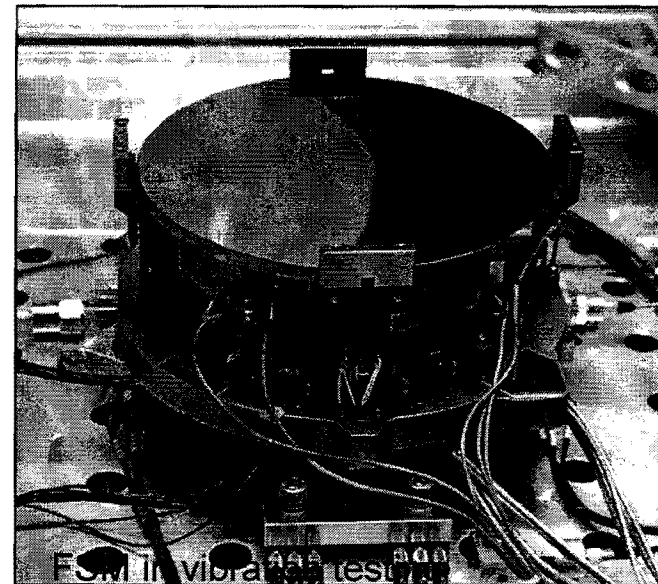
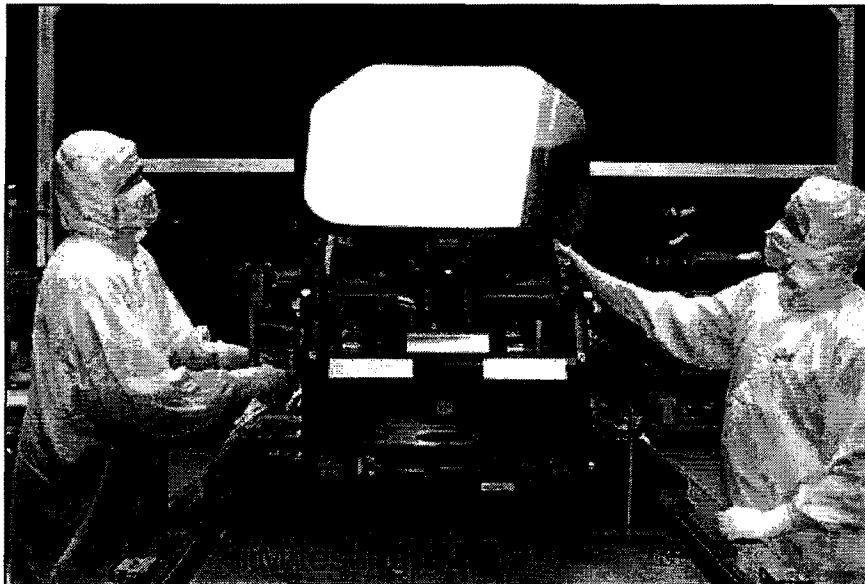
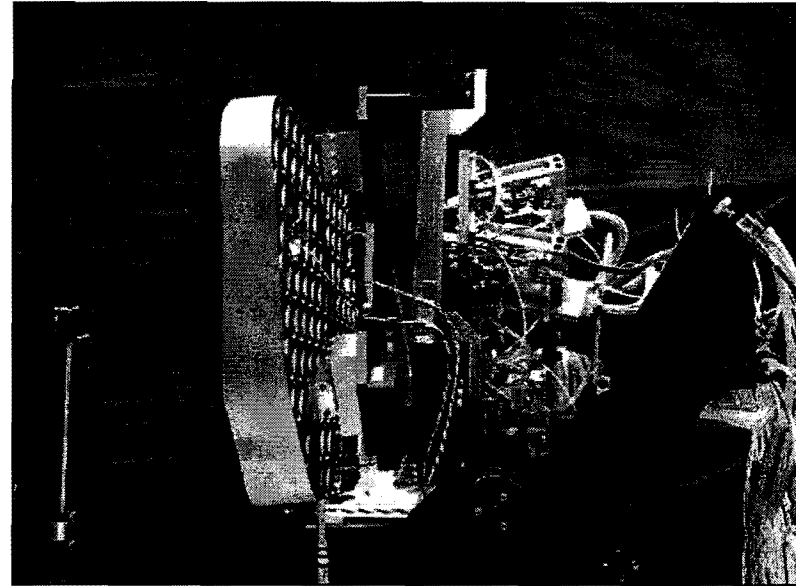
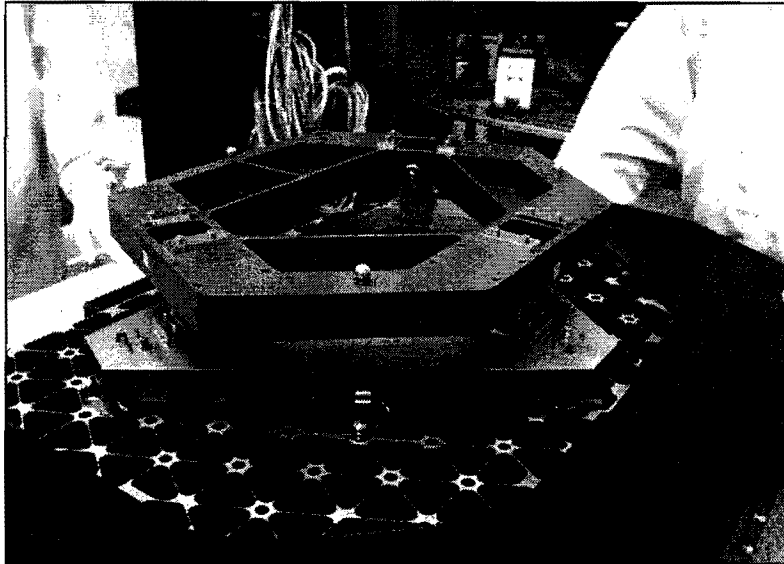
Photo Credit MSFC

JWST_ISIM.May.MPR/9

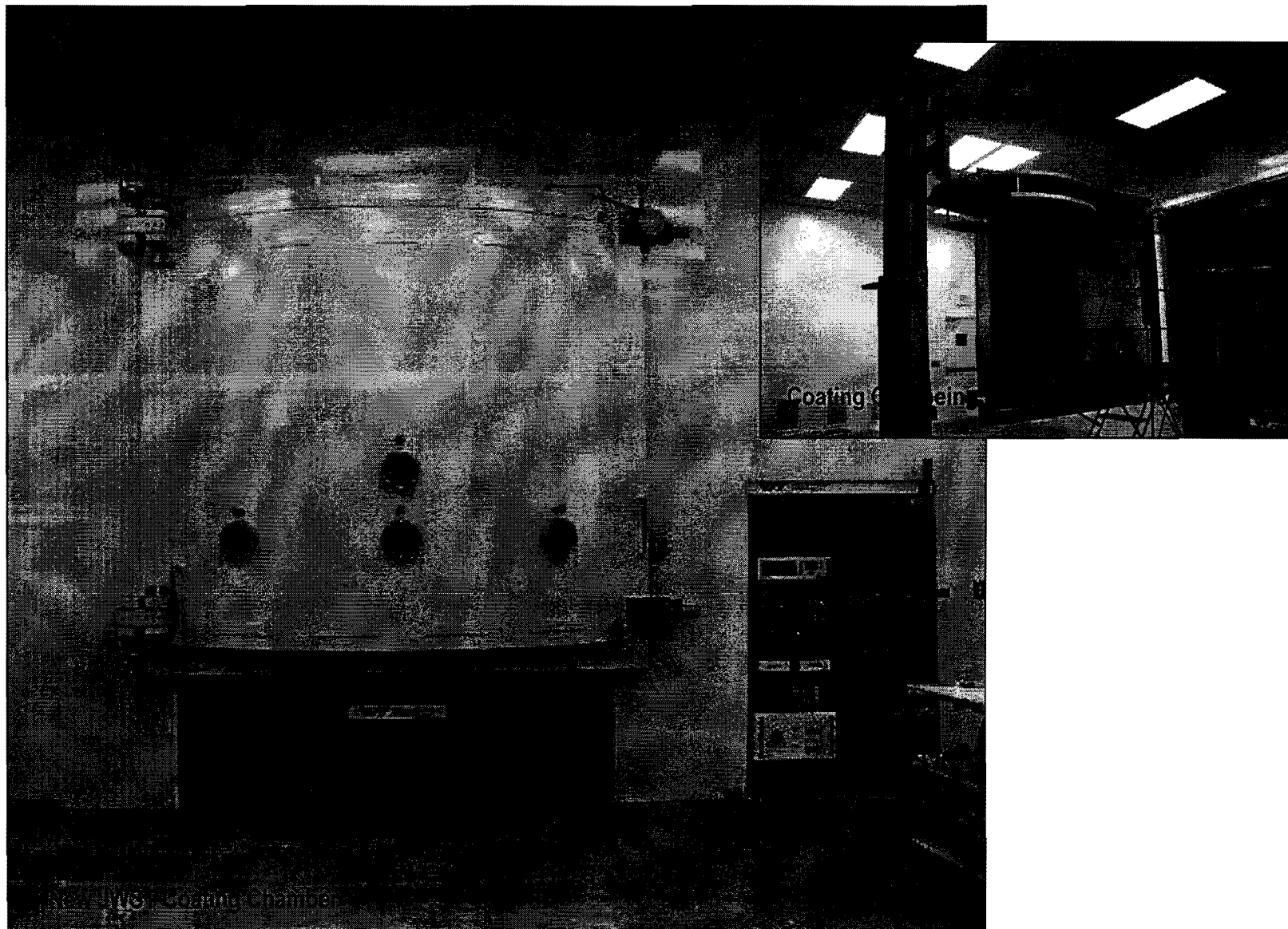
Secondary Mirror Assembly Progress



Tertiary Mirror and Fine Steering Mirror

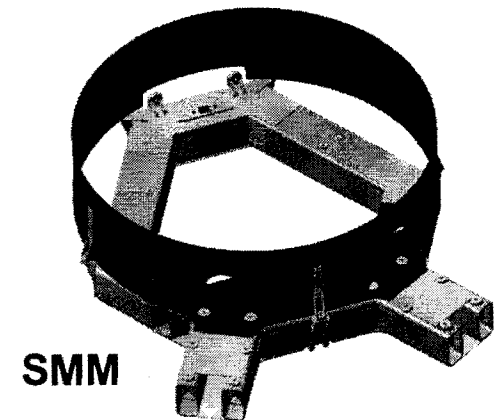


Mirror Coating Preparation is Progressing at QCI-Denton



Structures Status

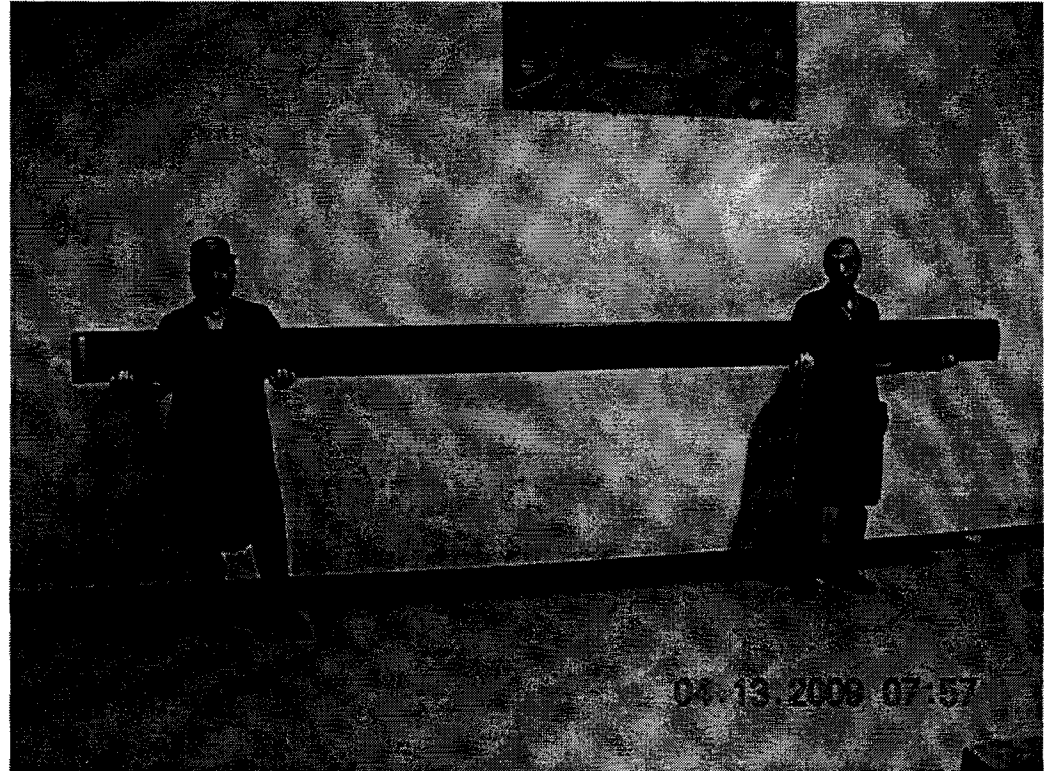
- **Backplane making good progress at ATK**
 - Flight Center Section bonding in progress
 - Pathfinder CS bonding going well
- **Completed layup and cure of the first Pathfinder SMSS strut**
- **Completed SMM (Secondary Mirror Mount) CDA 4/28/09**
- **Near term reviews**
 - SMSS/PMBA CDA August 2009
 - DTA CDA August 2009
 - PMBSS CDA September 2009



Tube Billets and SMSS Pathfinder Strut

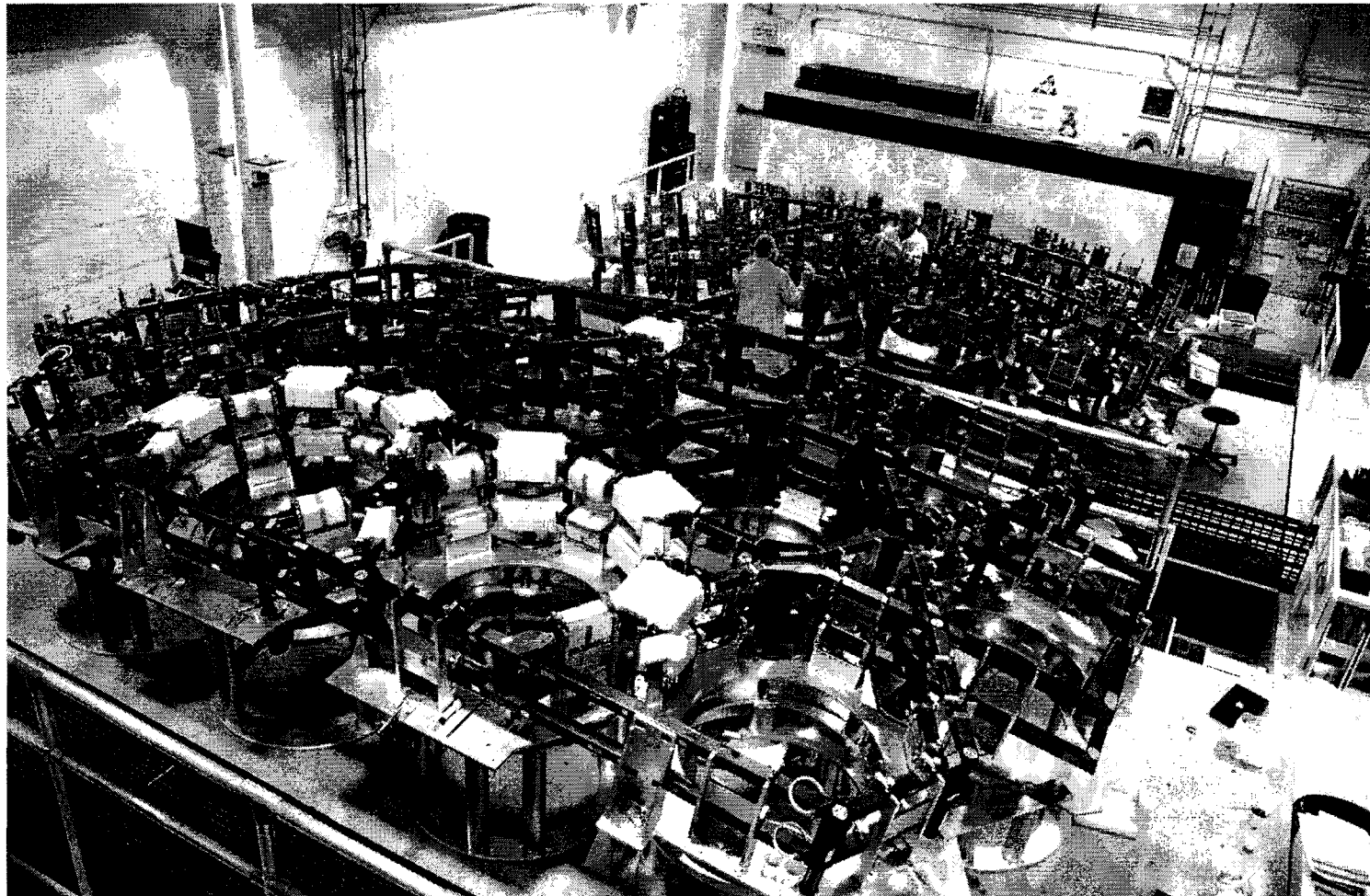


Tube billet storage rack



First SMSS Pathfinder Strut

Pathfinder and Flight Backplane Assembly



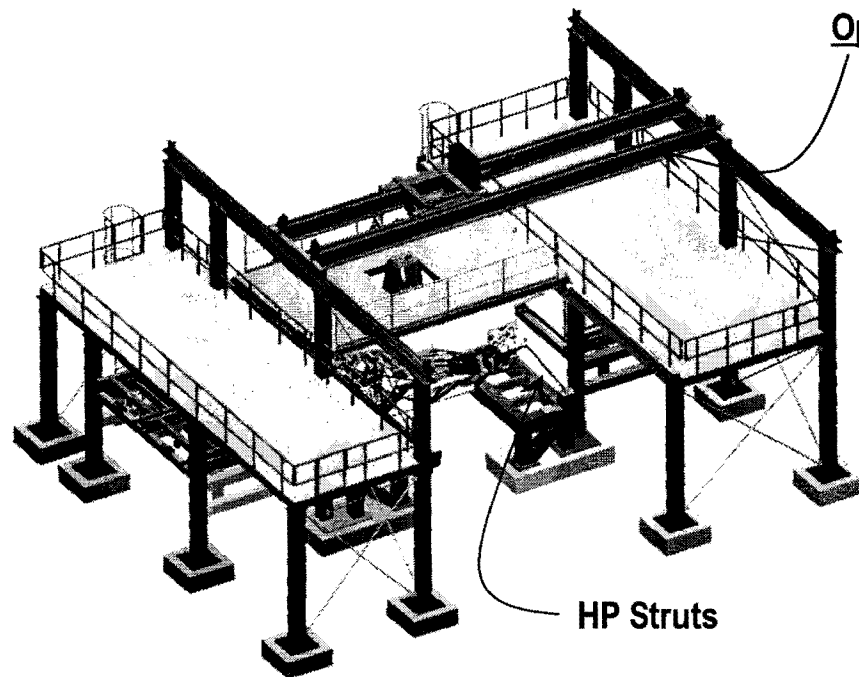
I & T Status



- **Completed CDA for majority of the SSDIF Alignment and Integration Hardware and JSC Test Hardware.**
- **Null lens optics have been ordered**
- **ACF#1 Skip Test execution starting in November 2009**
 - ACF Mirror Blanks are in procurement
- **Chamber isolator demonstration is in progress.**
- **PIT Review scheduled for July 2009**

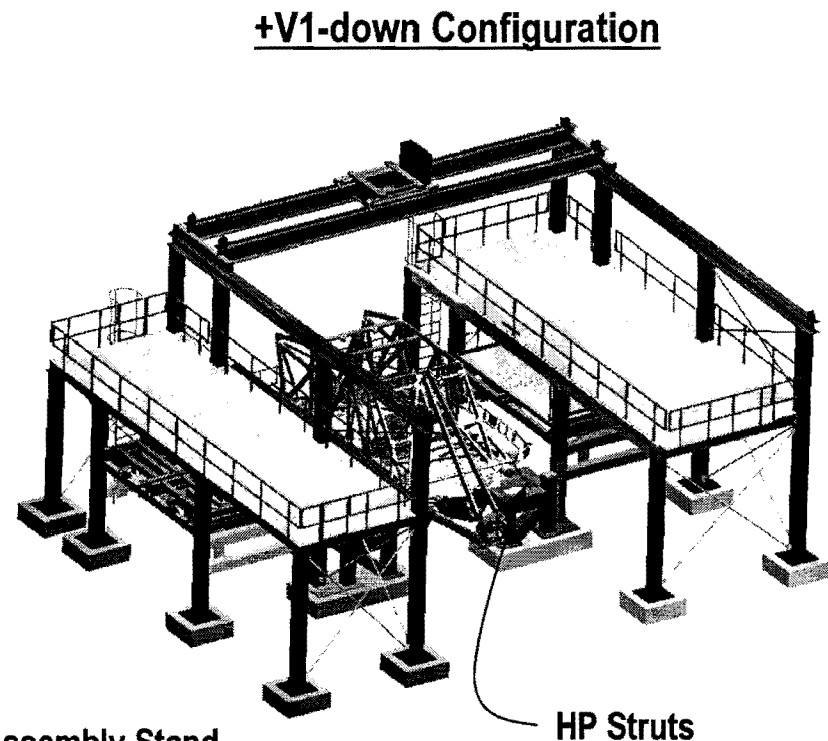
Ambient Assembly Stand

Assembly Support Structures



+V1-up Configuration

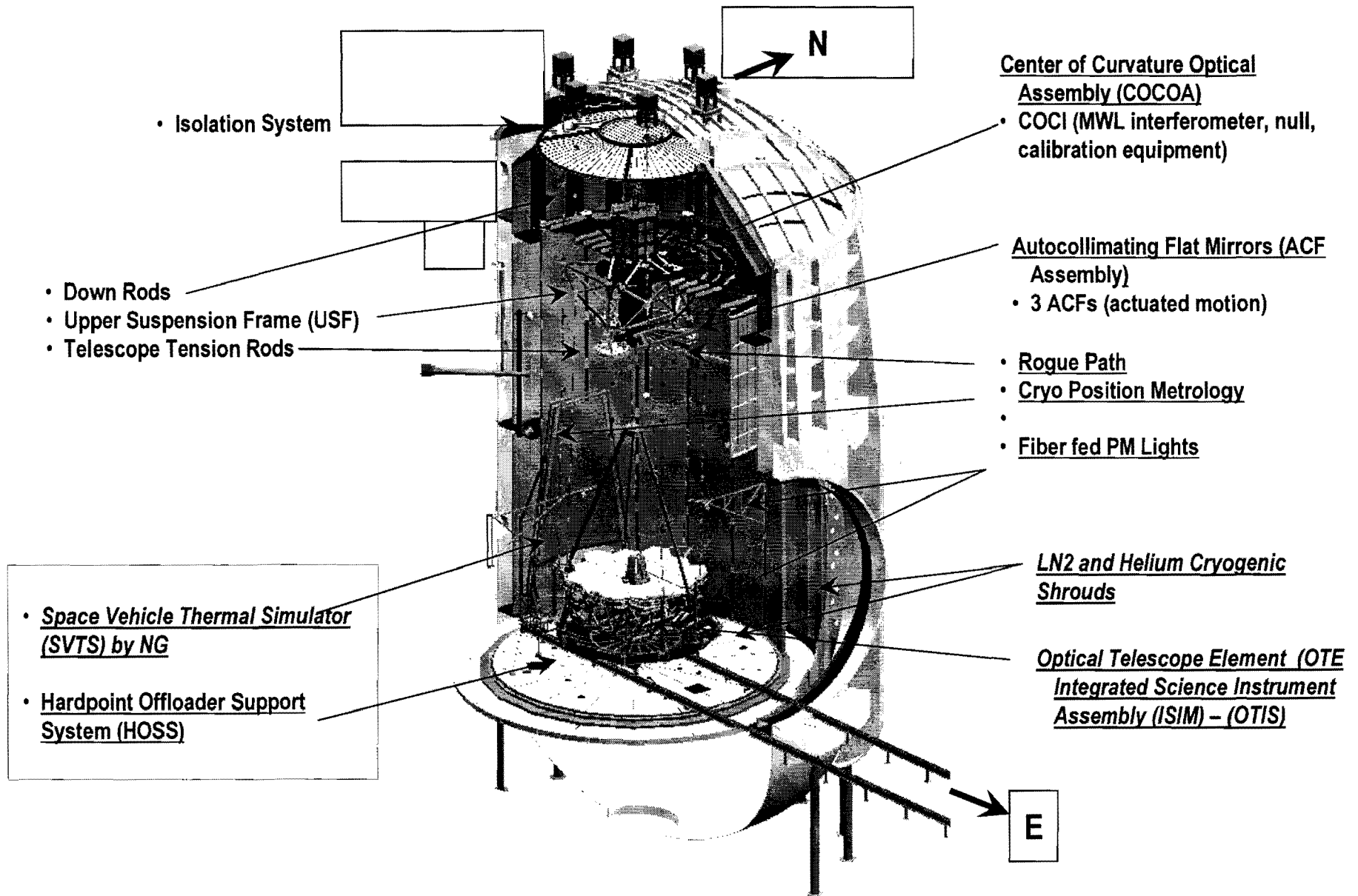
Optics Integration Gantry System



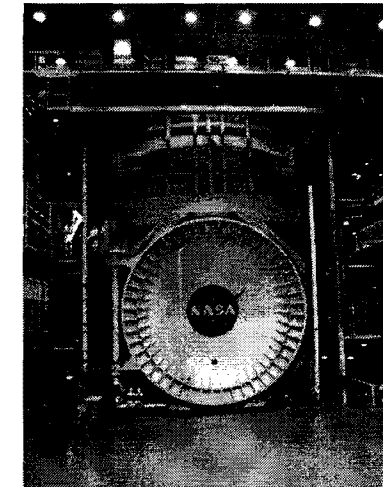
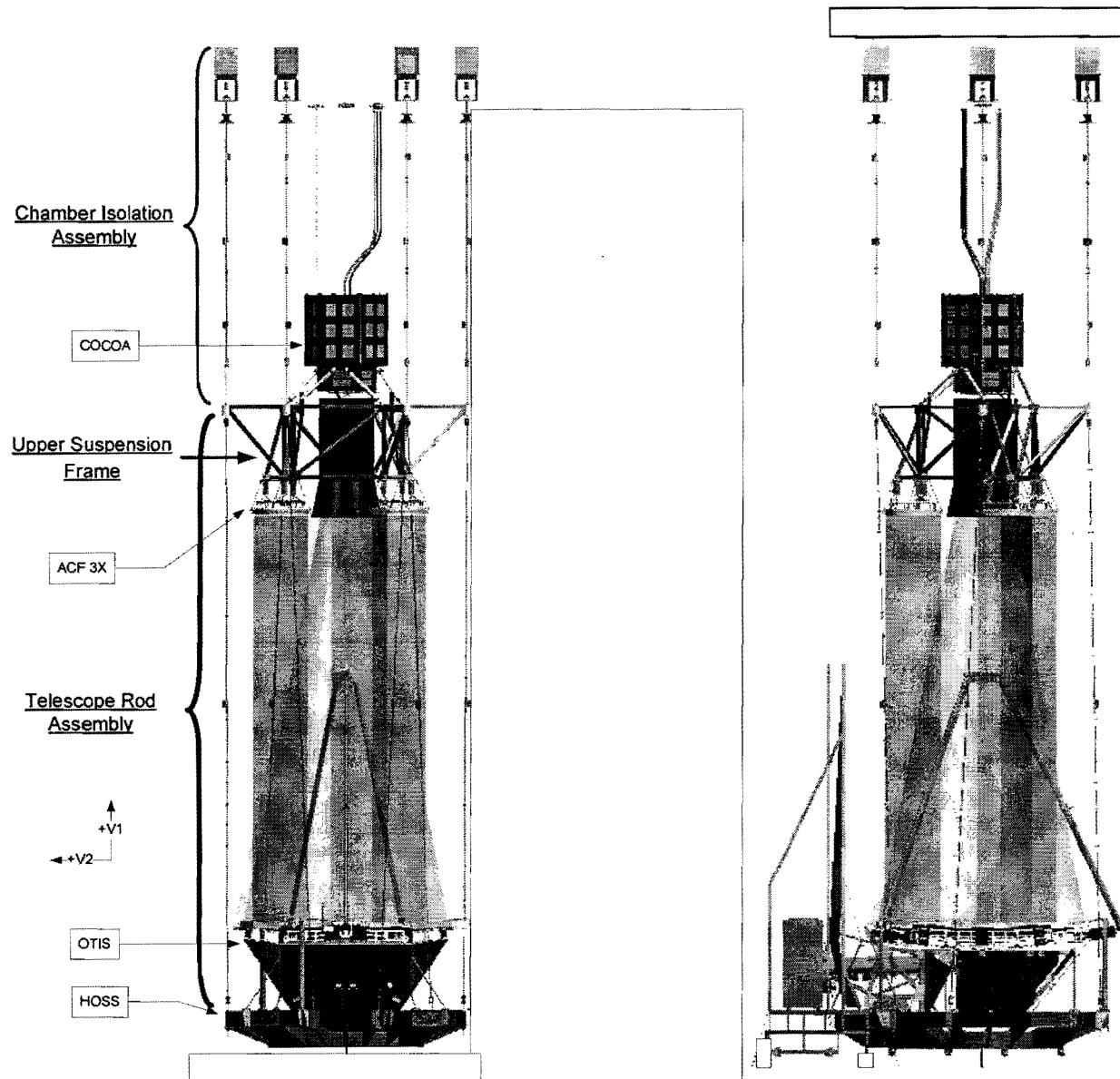
+V1-down Configuration

Ambient OTE Assembly Stand
& Hardpoint Struts

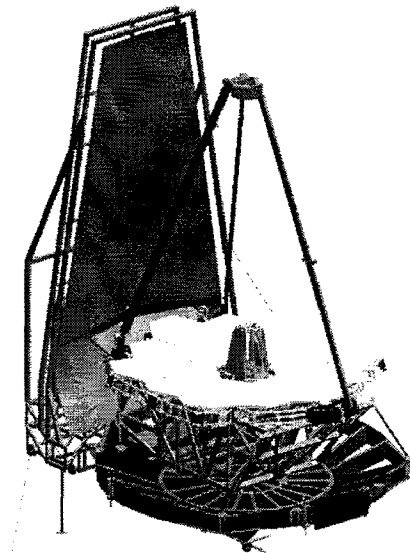
Test GSE Architecture and Subsystems



Architecture Layout

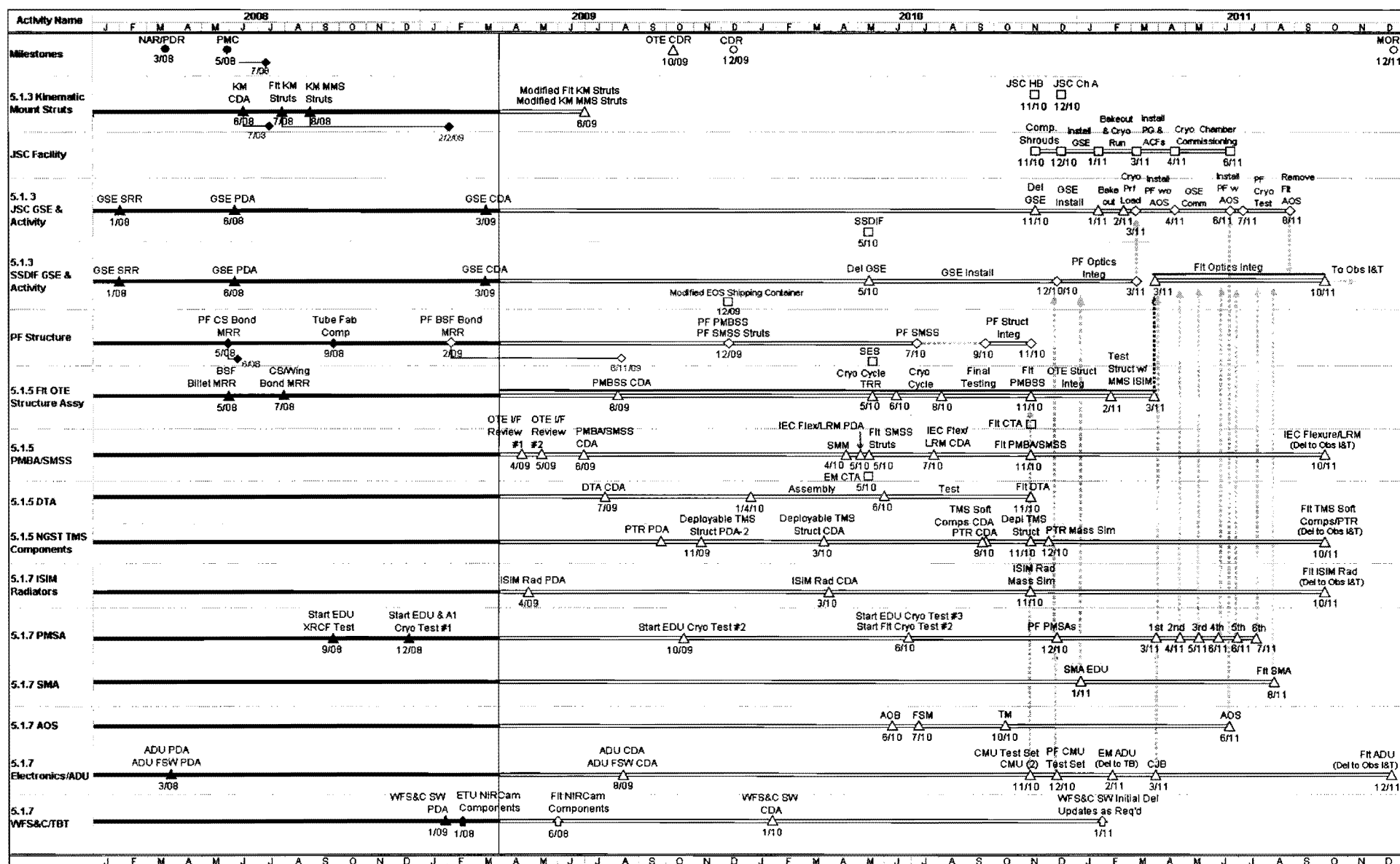


Ref. - JSC Chamber A



Ref. - OTIS and Thermal Sim(s).

NGST OTE Intermediate Schedule



Summary

- **First Cryo test of Flight mirrors has been completed**
- **All PMSAs have completed grinding and are in the polishing and testing phase which includes fabrication at Tinsley, Integration and Test at Ball, Testing at the XRCF**
- **The flight backplane fabrication is in progress**
- **CDA for the majority of the SSDIF Alignment and Integration Hardware and JSC Test Hardware has been completed**
- **OTE CDA Scheduled for October 2009**