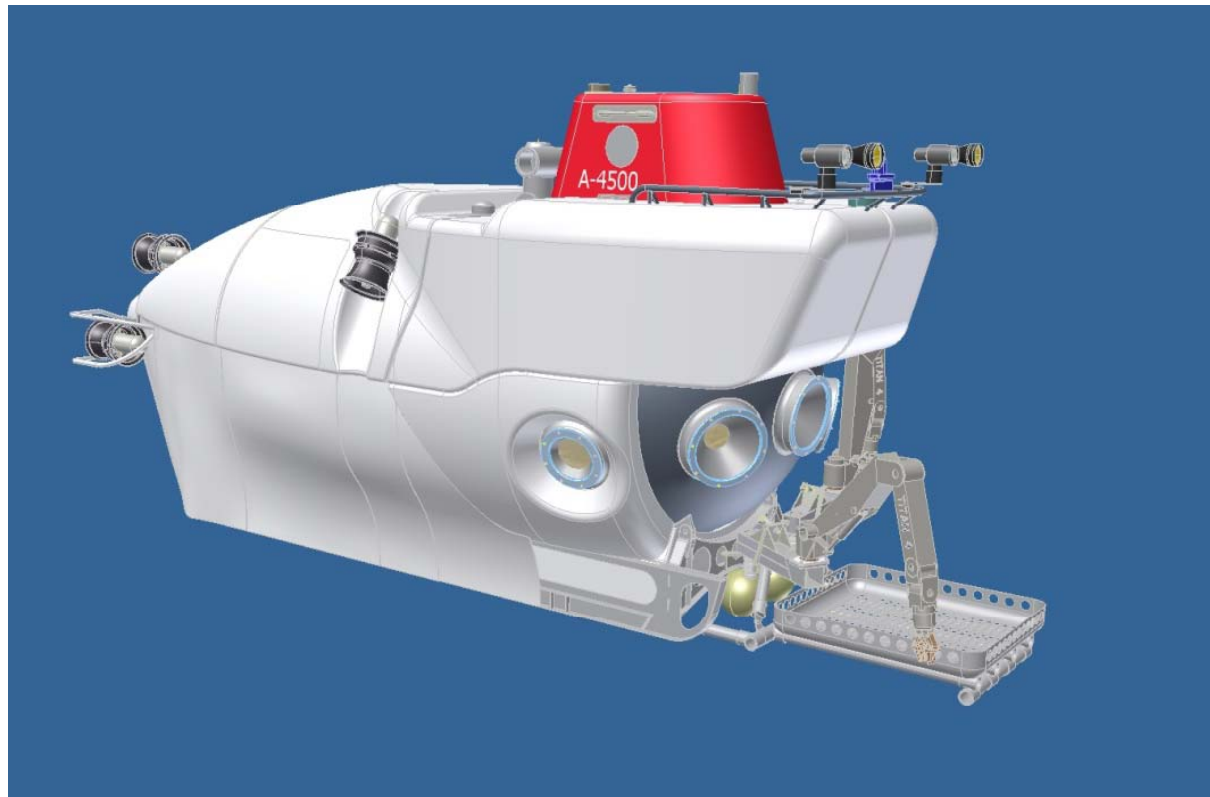


A-4500 HOV Project

Design, Fabrication and Testing of the New Vehicle
WHOI has assumed the role of Primary Builder



Vehicle Design

WHOI is designing and will build a vehicle in a 2-Phased approach.

Phase I (A-4500HOV)

- Install new sphere
- Cross deck key systems to reduce cost
- Deliver 4500 meter vehicle

Phase II (A-6500 HOV)

- Upgrade all 4500 meter components
- Add desired enhancements
- Reclassify vehicle for 6500 meter operations



New Components

- Sphere
- Video and Lighting System
- Penetrators
- Syntactic foam (6500m)
- Forward Section of frame
- Command and Control System
- Pressure vessels (6500m)
- Junction Boxes
- Compensation System

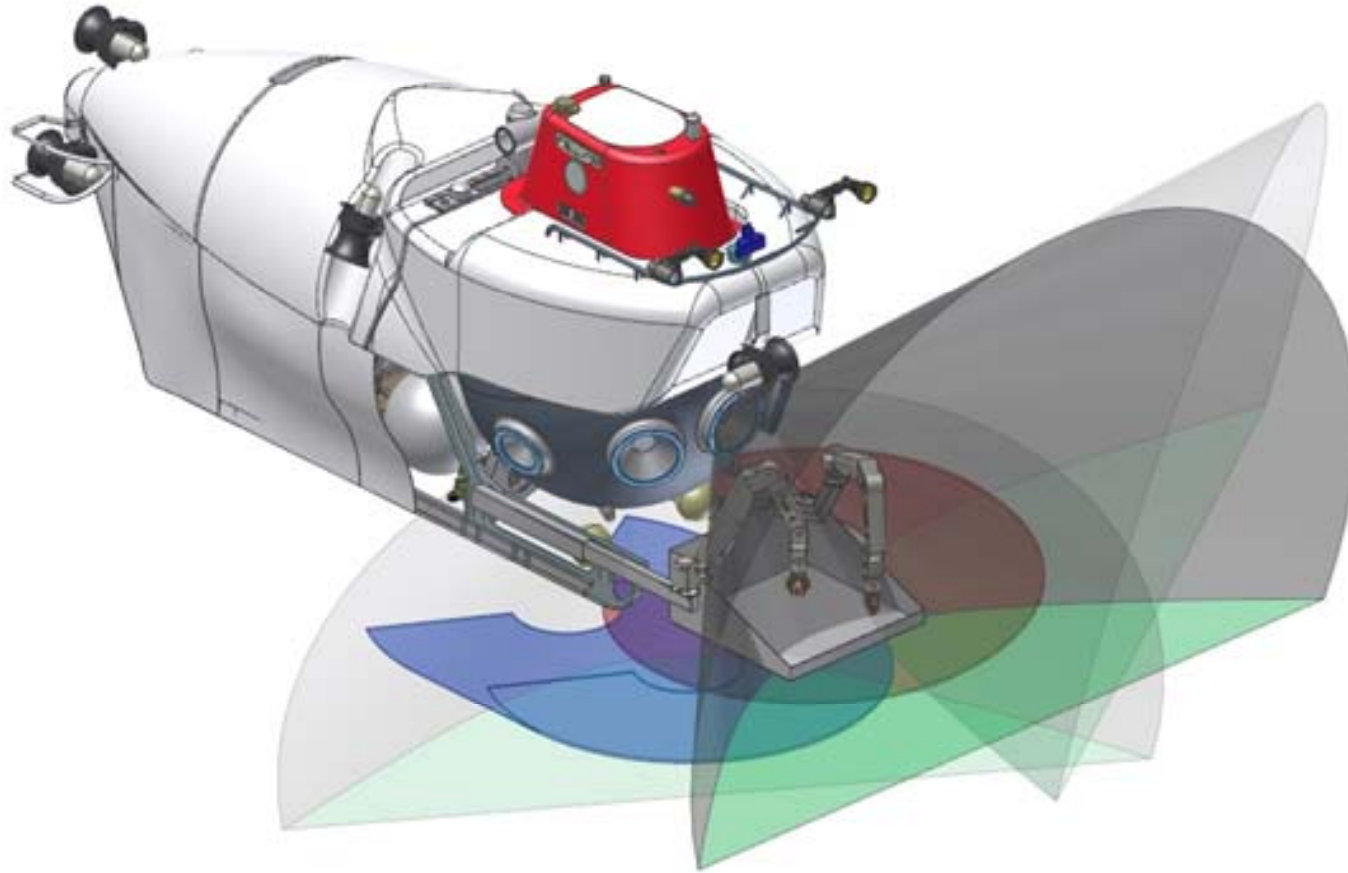


Alvin Cross Decked Components

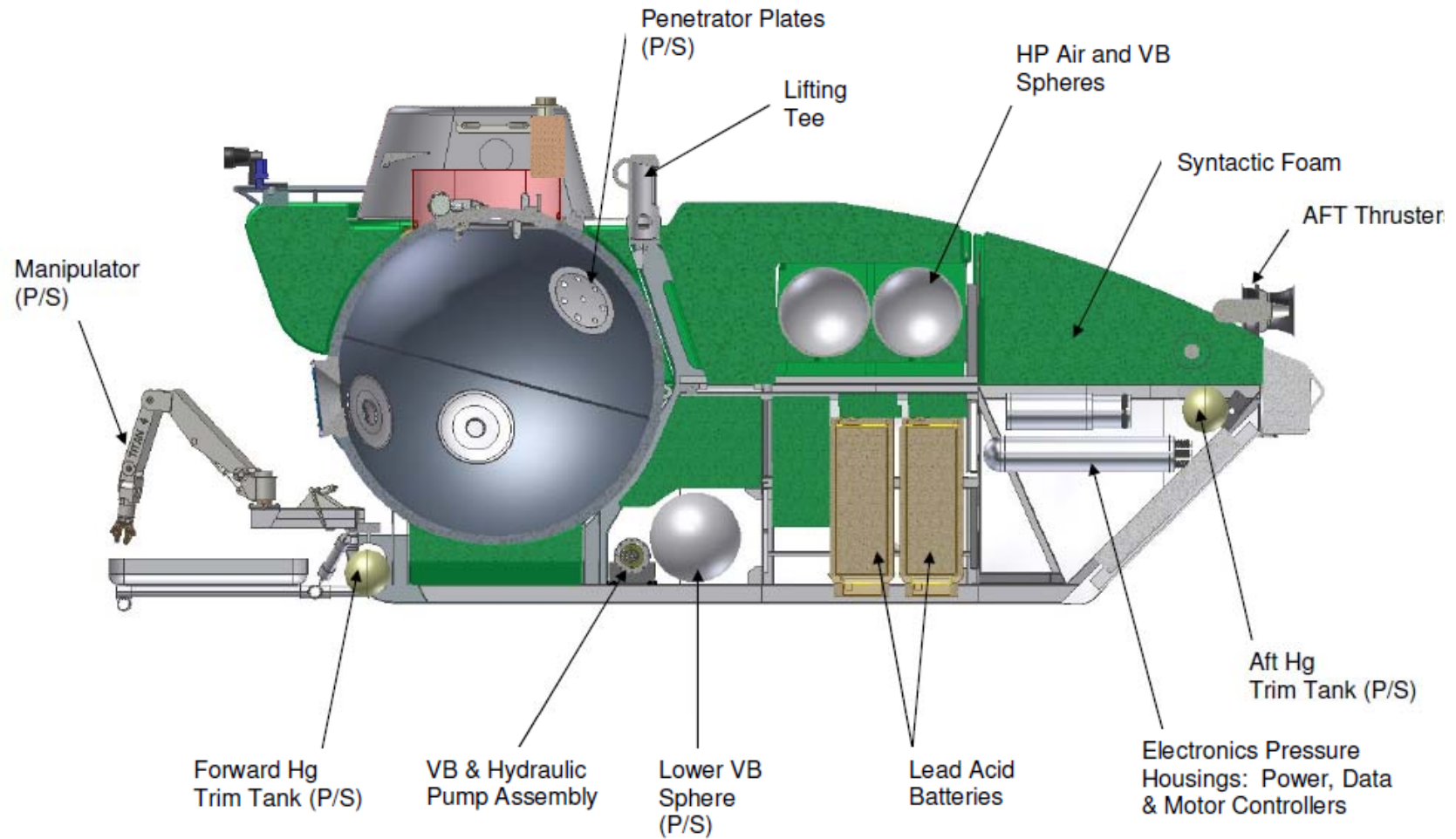
- Main Battery System
- Mercury Trim system
- Hydraulic System
- Aft section of frame
- Pressure Vessels (4500m)
- VB System
- HP Air System
- Propulsion System



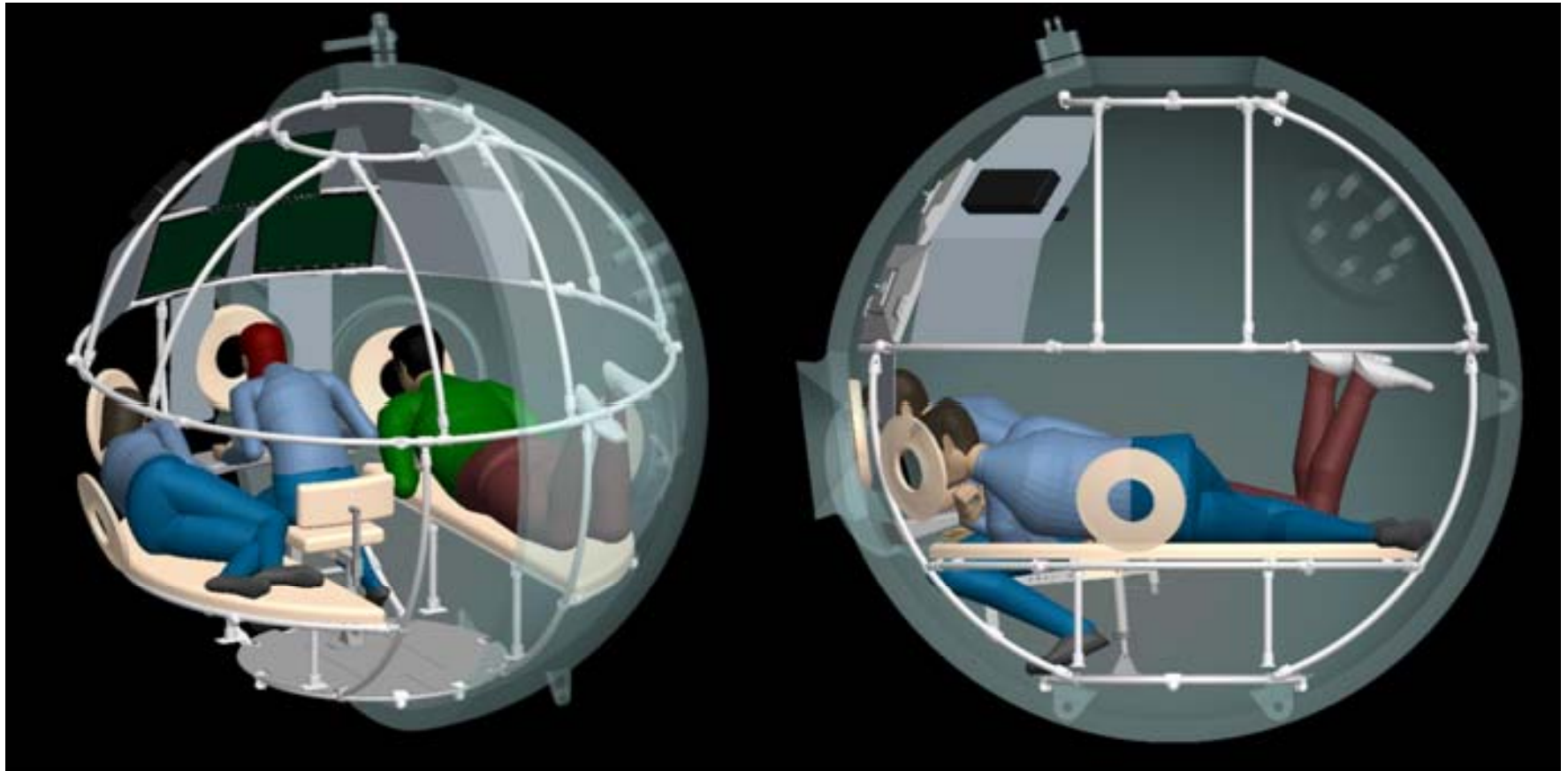
Workspace Concept



General Arrangement



Internal Arrangement



Vehicle Milestones

- ✓ Preliminary Design Review December 2009
- Final Design Review September 2010
- Begin Disassembly April 2011
- Begin Assembly July 2011
- Sea Trials September 2011



A-4500 HOV Project

Design, Fabrication and Testing of the Personnel Sphere
Southwest Research Institute (SwRI) is prime contractor



Sphere Fabrication



**7-inch Viewport
Reinforcement**



Hatch & Reinforcement



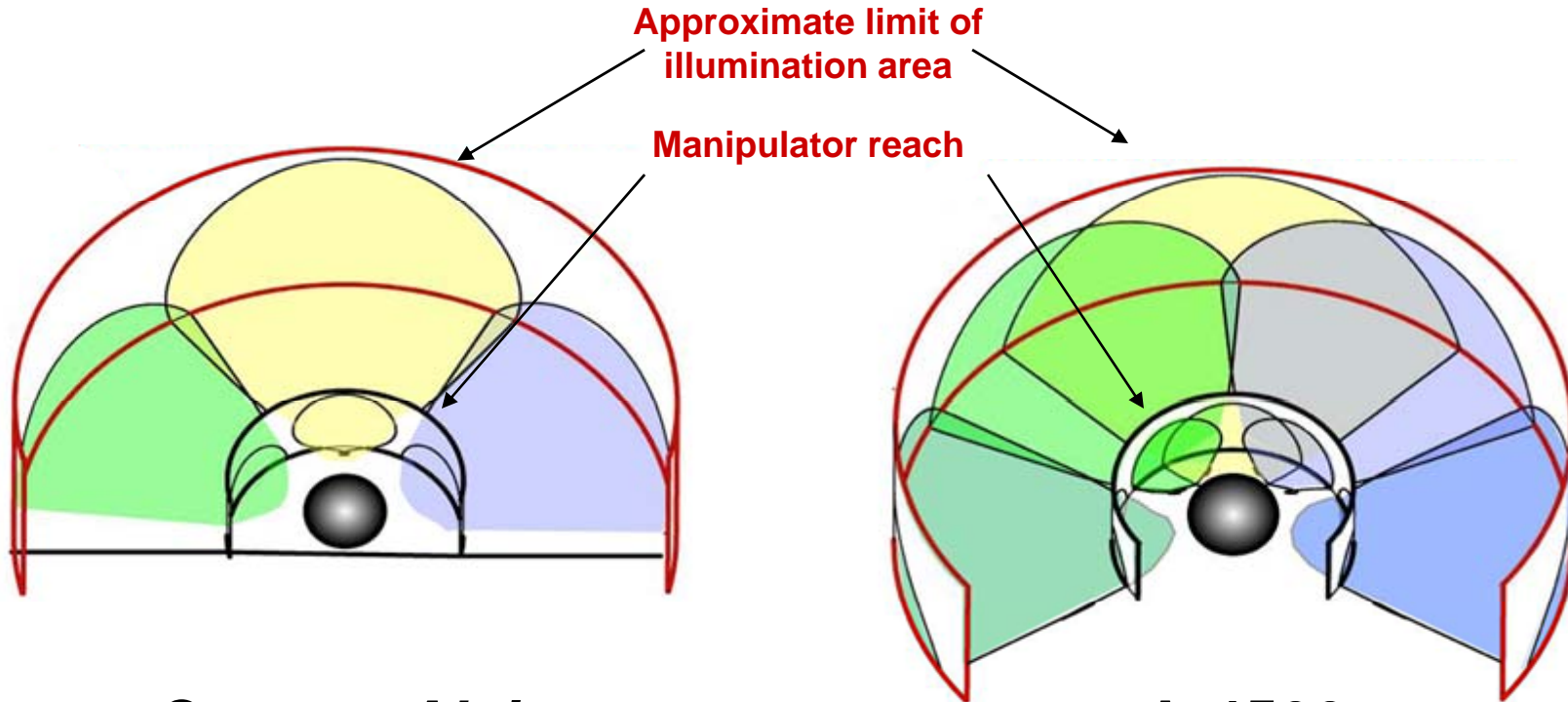
**5-inch Viewport
Reinforcement**



Penetrator Plate



Viewport Field of View Comparison



Current *Alvin*

180° field of view

A-4500

245° field of view



Forged Hemisphere



Final Forged Hemisphere
with ≈ 6 inch prolongation



Hemisphere Heat Treatment
and Water Quench



Machining and Welding



Final Machining of Hemisphere



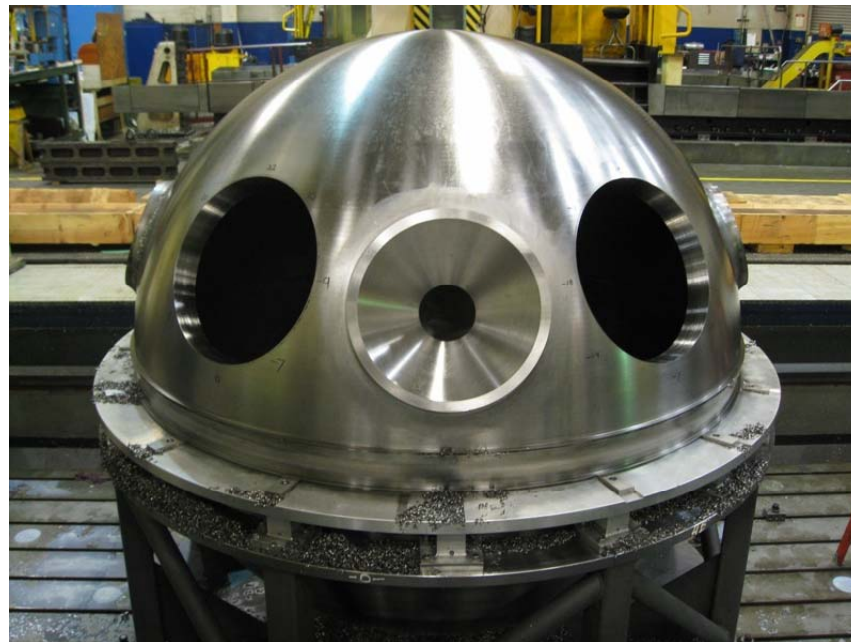
Electron Beam Welded Sphere



Machining and Welding



Machining Insert Holes



Sphere with Port and
Starboard
Viewport Insert Holes
(Sphere is upside down)



Sphere Milestones

- Major Welds Complete June 2010
- Post Weld Stress Relief July 2010
- Final Assembly February 2011
- Hydrostatic Test March 2011
- Ship to WHOI March 2011

