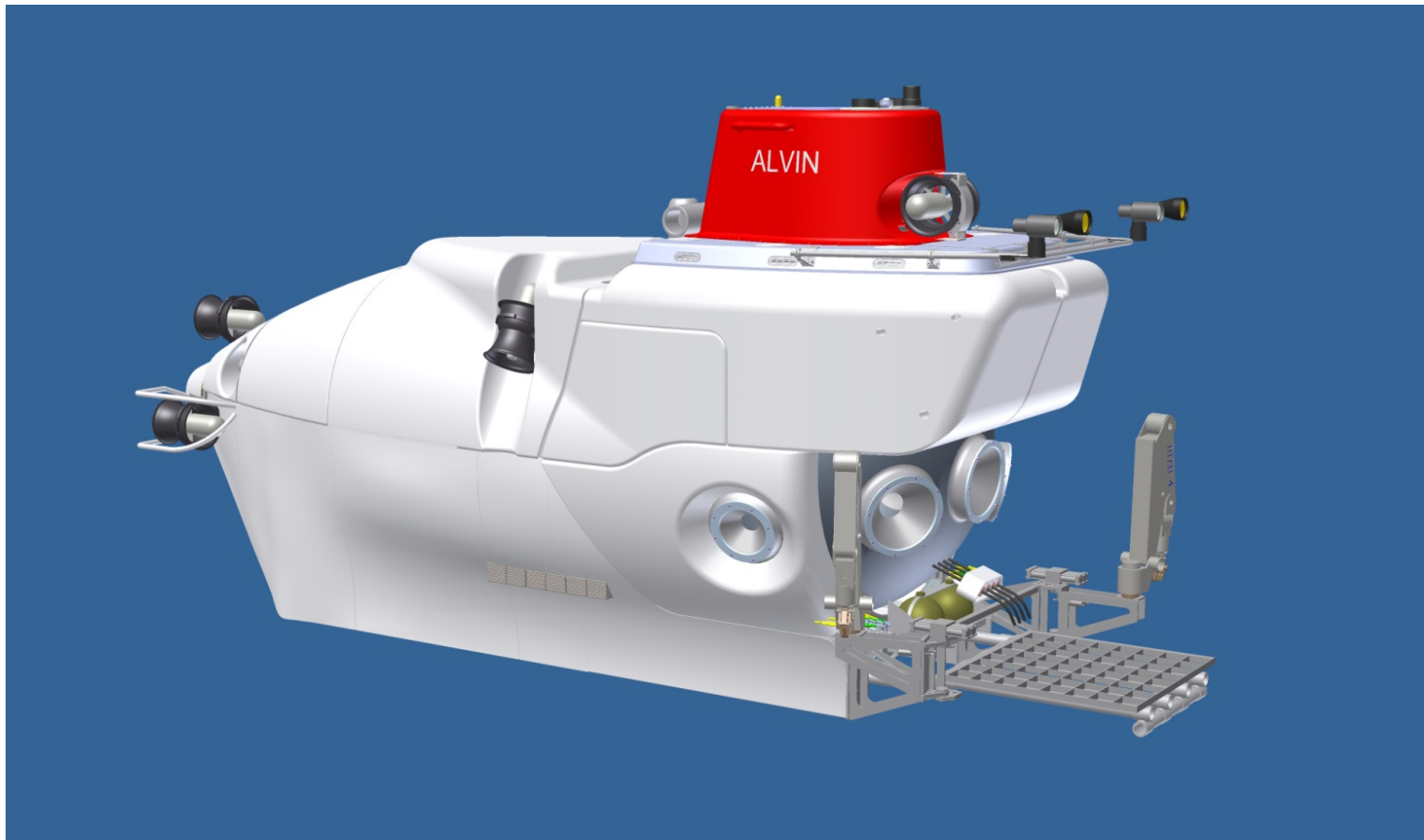




Alvin Upgrade Project

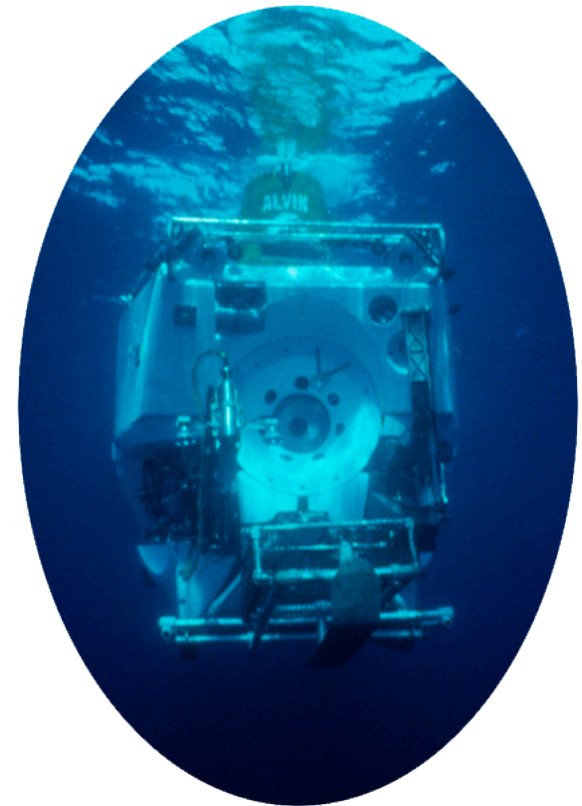
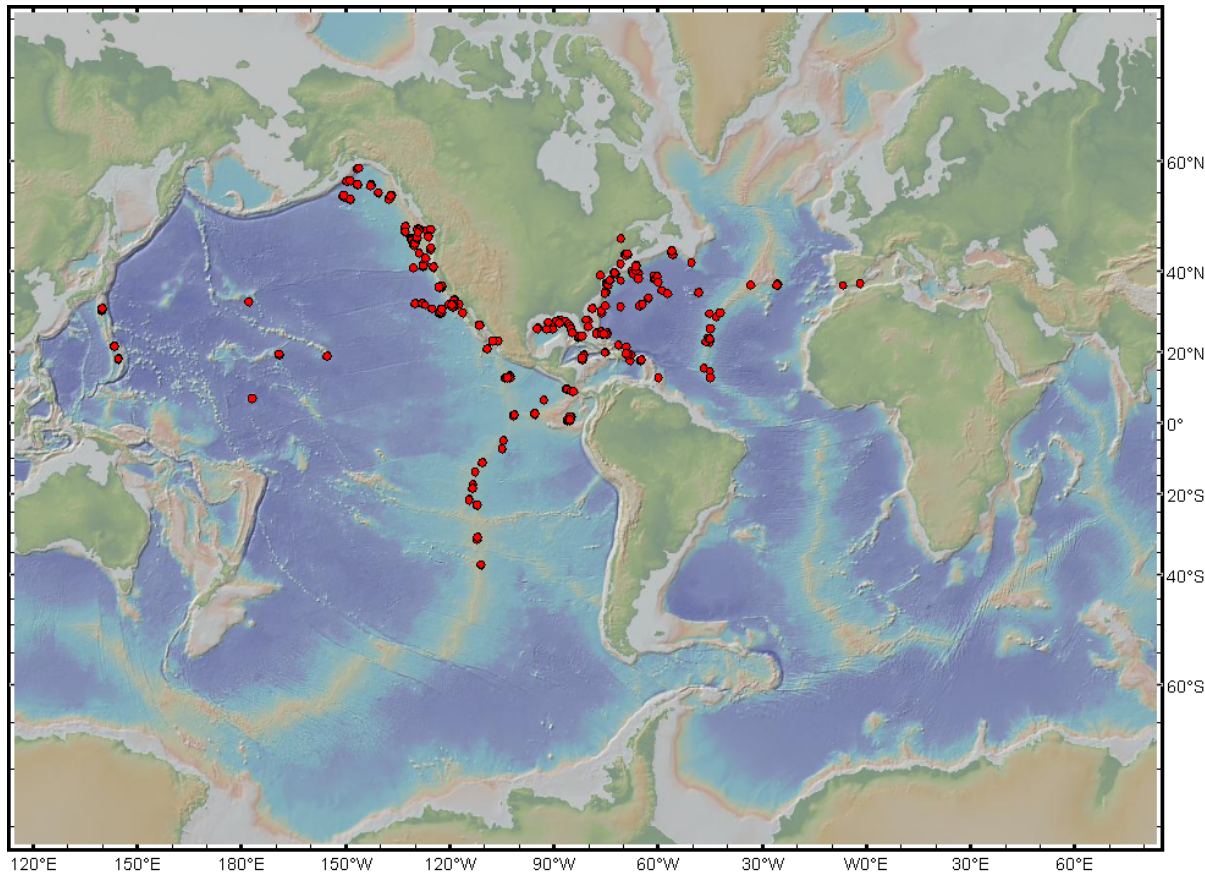


Susan Humphris

Principal Investigator



Alvin Upgrade Project HOV *Alvin*'s Record



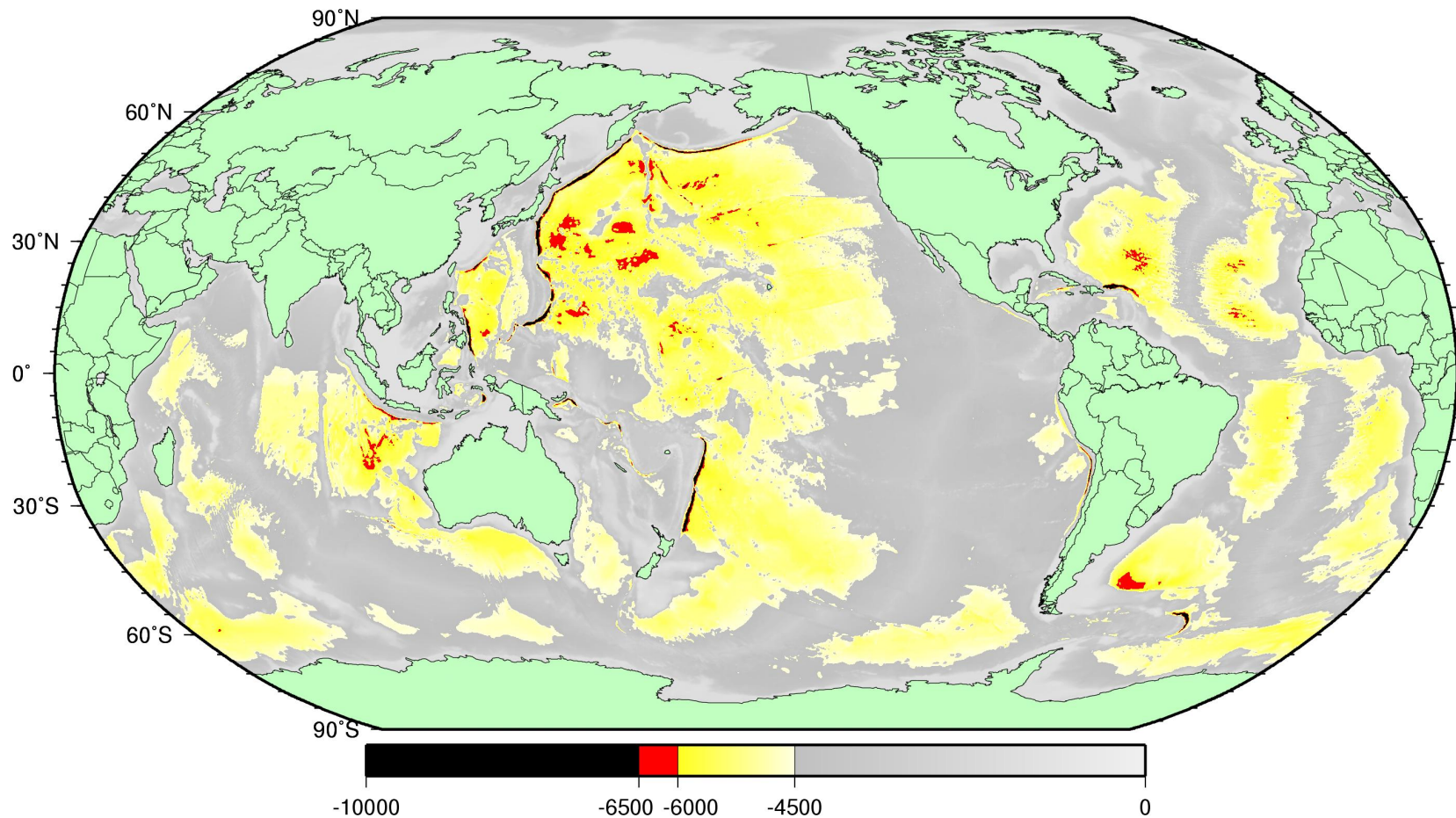
• **>4650 Dives**

• **>32,000 Hrs. Submerged**



Alvin Upgrade Project

Capabilities Desired by the Scientific Community



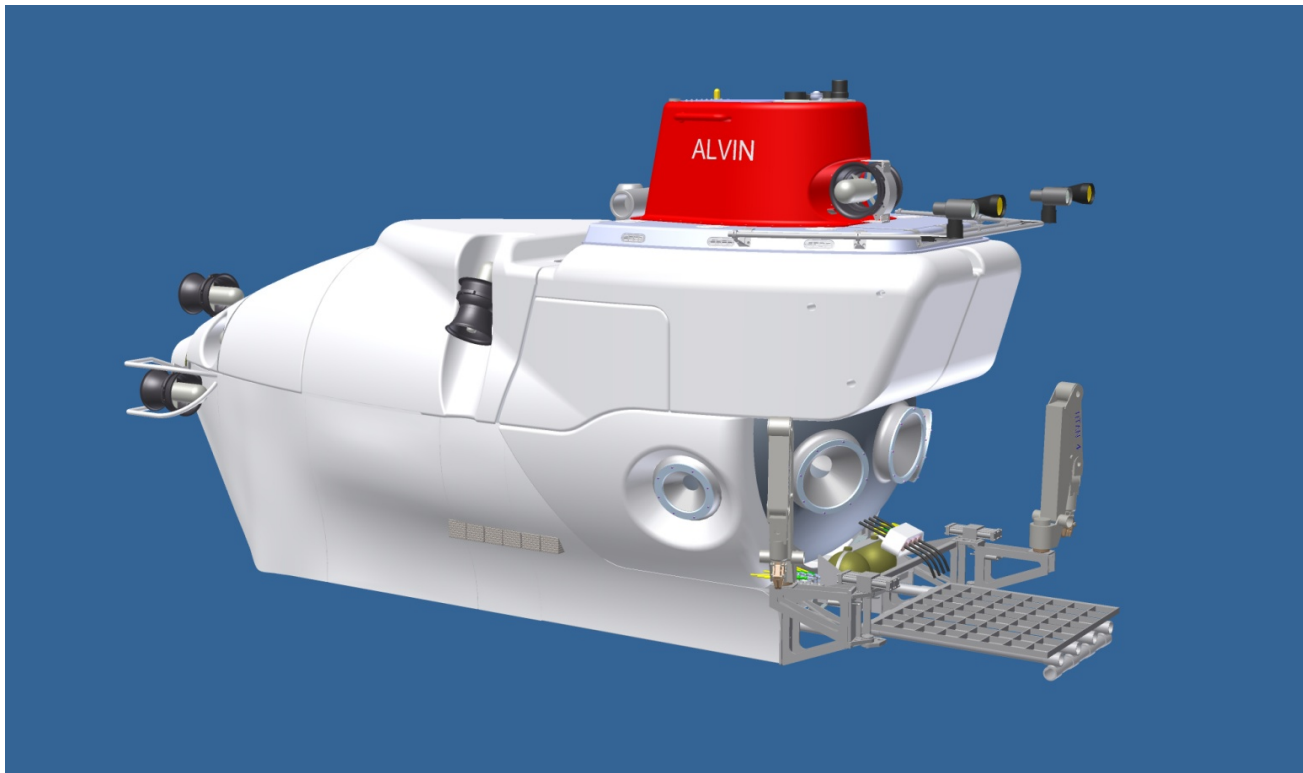
Access to Ocean and Seafloor Increases from 65% to 98%



Alvin Upgrade Project Objective



- A significantly enhanced submersible for the scientific community built in 2 stages:
 - Stage 1 4500 m *Alvin* Upgrade: Early 2012
 - Stage 2 6500 m *Alvin* Upgrade: At a later time





Alvin Upgrade Project Vehicle Upgrade



Phase I - Sphere

4500 m *Alvin* Upgrade

Stage 1

- New personnel sphere
- New syntactic foam
- New command and control system
- New data and power pressure housings
- New illumination system
- Upgrade to HD cameras
- New internal video infrastructure
- Upgrade to shipboard video duplicating system
- Upgrade to shipboard science video processing station

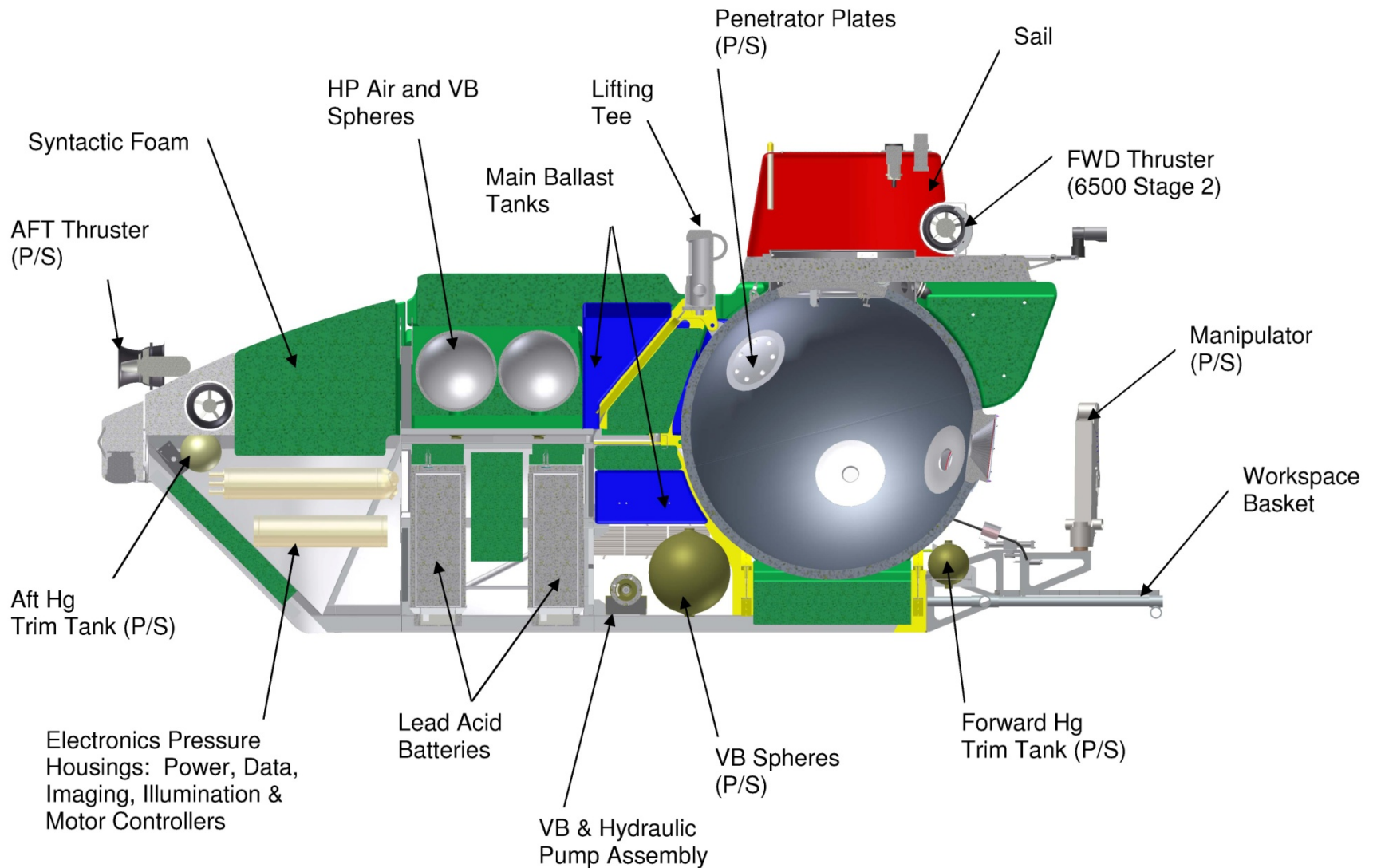
6500 m *Alvin* Upgrade

Stage 2

- New Li-ion batteries
- Increased horsepower thrusters and motors
- Upgrade of remaining components to 6500 m (e.g., variable ballast and HP air spheres)
- New ultra-high resolution digital still camera
- Addition of photomosaicing cameras



Alvin Upgrade Project Arrangement Concept





Alvin Upgrade Project Present Personnel Sphere

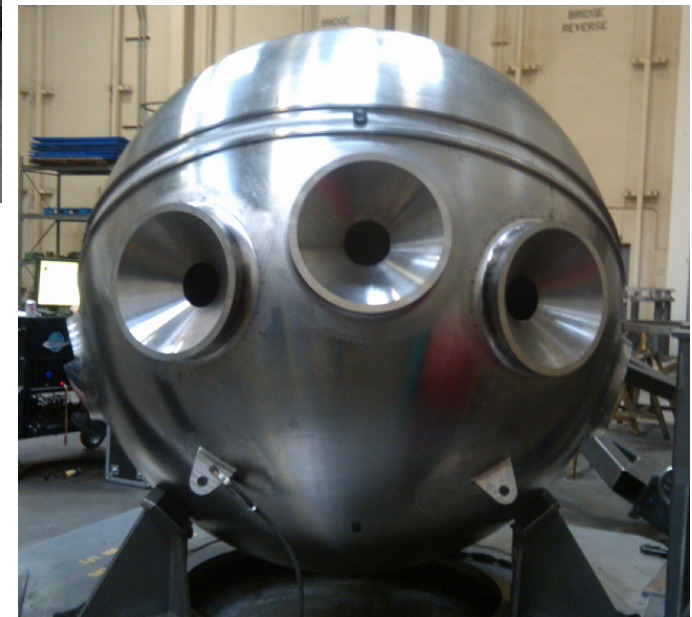




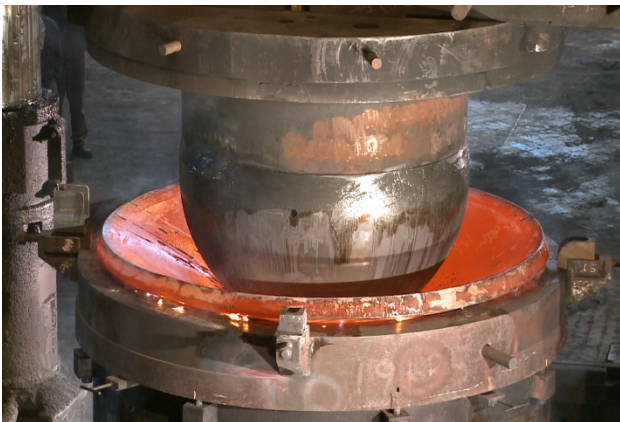
Alvin Upgrade Project Personnel Sphere Construction



Ti Ingots



December 2010



June 2008



August 2009



Alvin Upgrade Project Personnel Sphere Comparison



Current Sphere



New Sphere



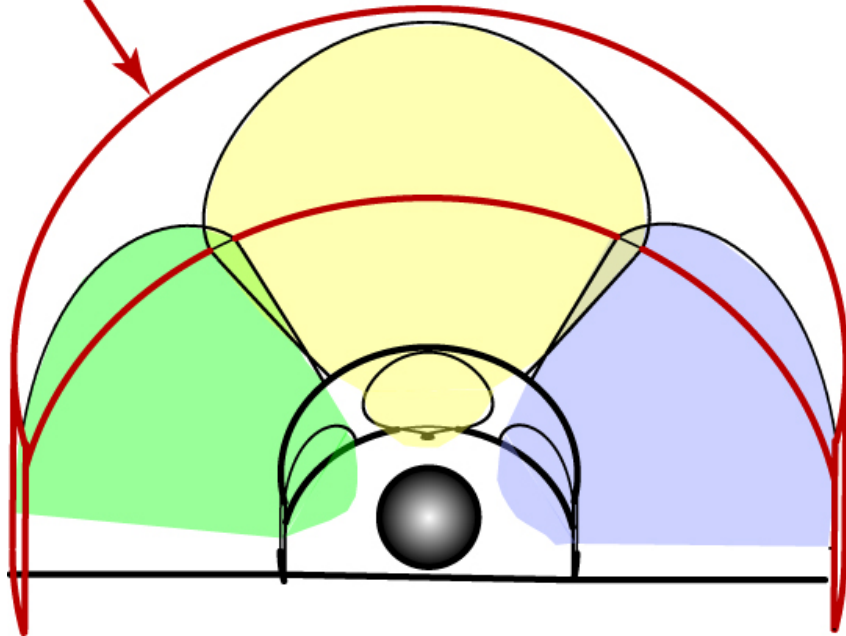


Alvin Upgrade Project Field of View Comparison



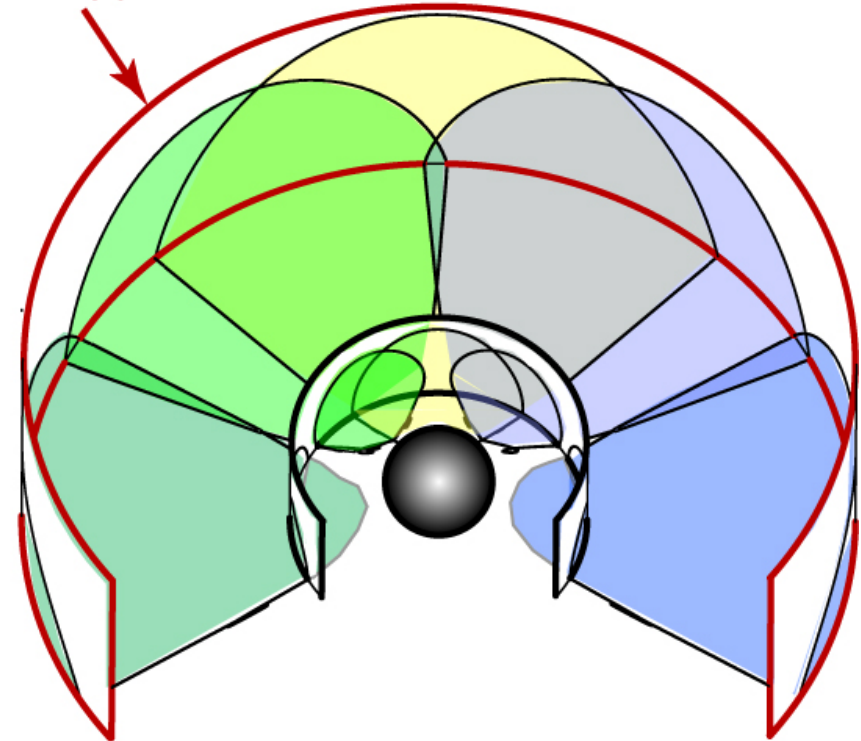
Current Alvin
180° Field of View

Approximate Limit of Illuminated Area



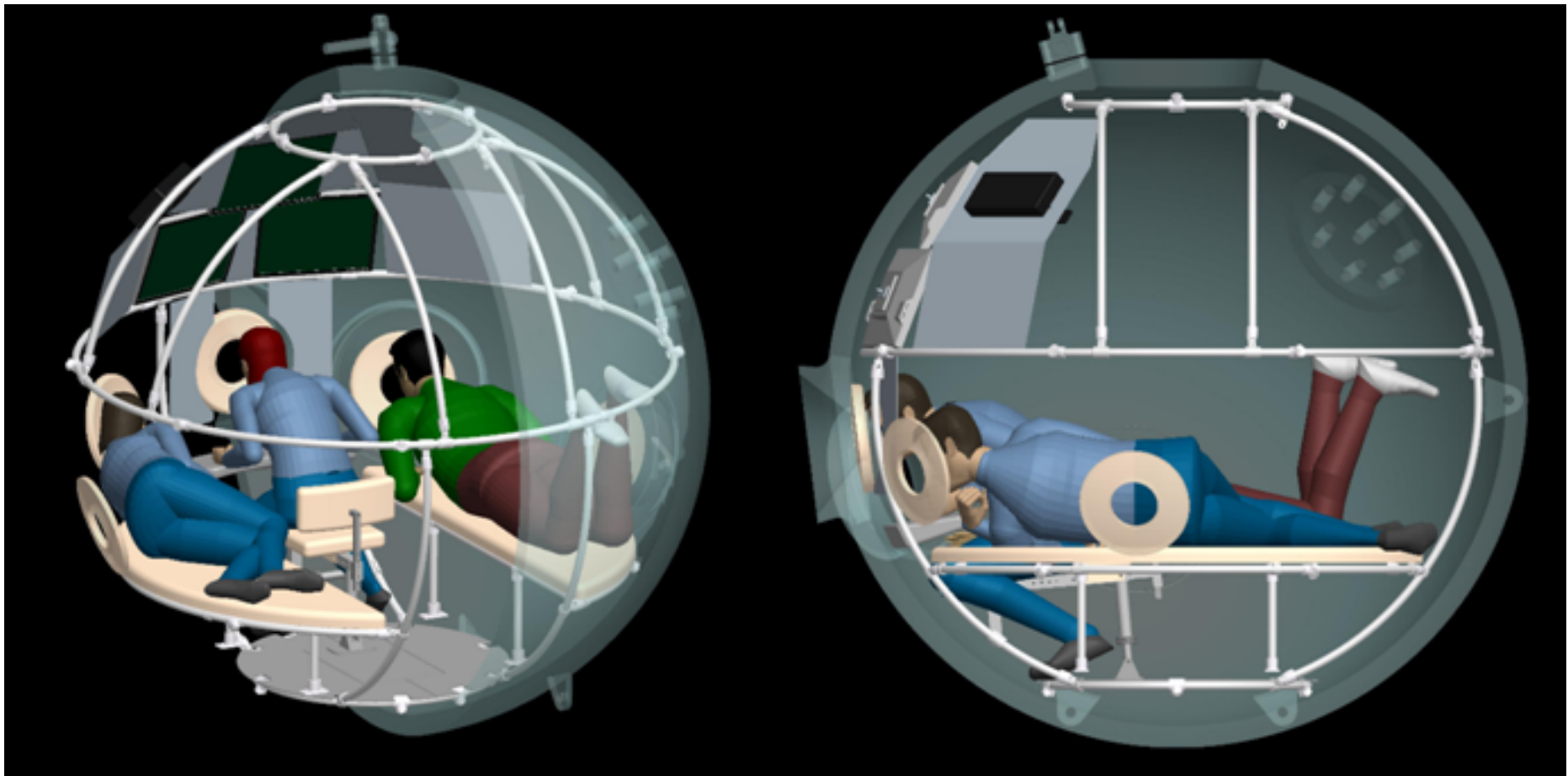
New Alvin
245° Field of View

Approximate Limit of Illuminated Area



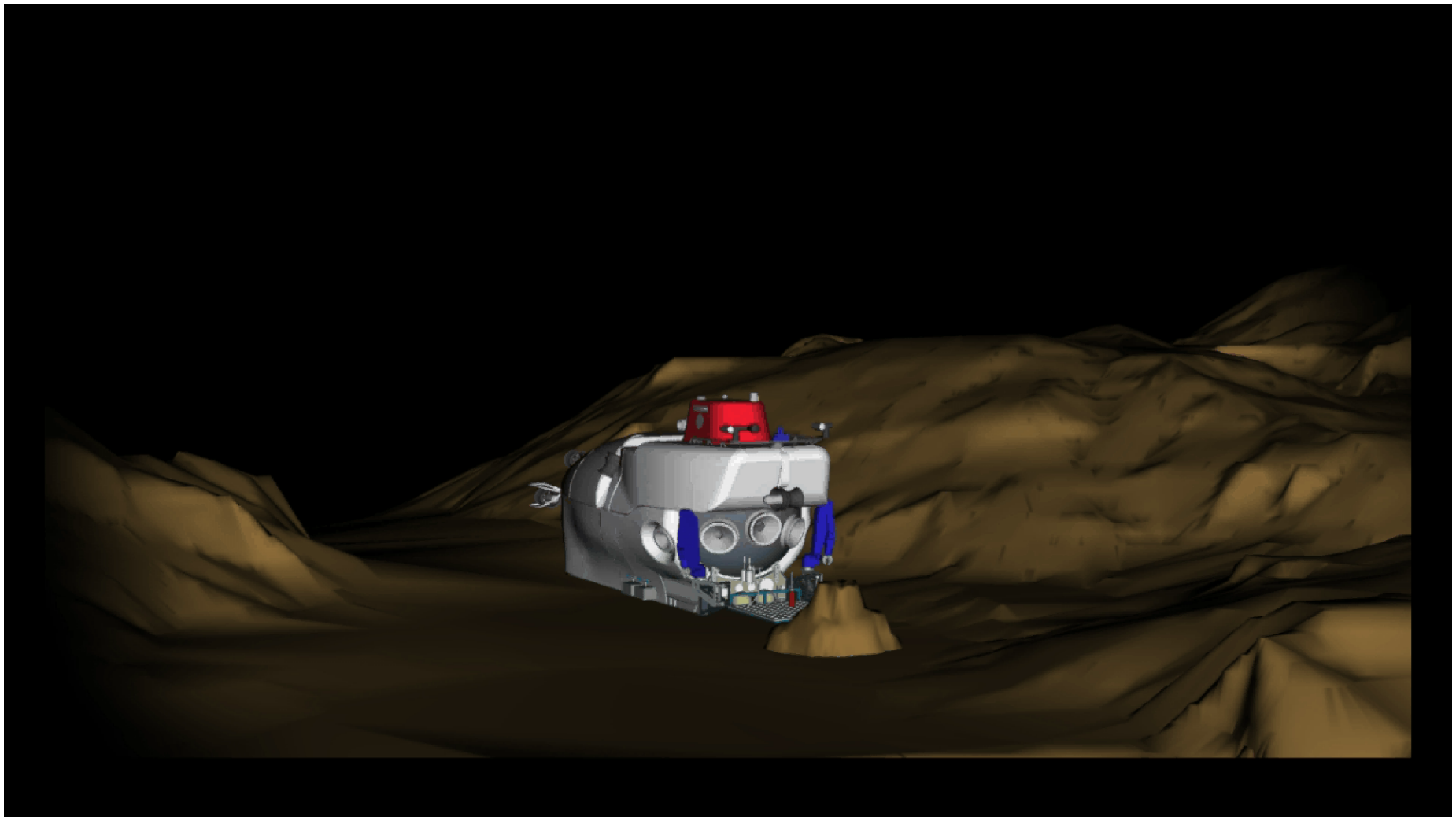


Alvin Upgrade Project Internal Arrangement



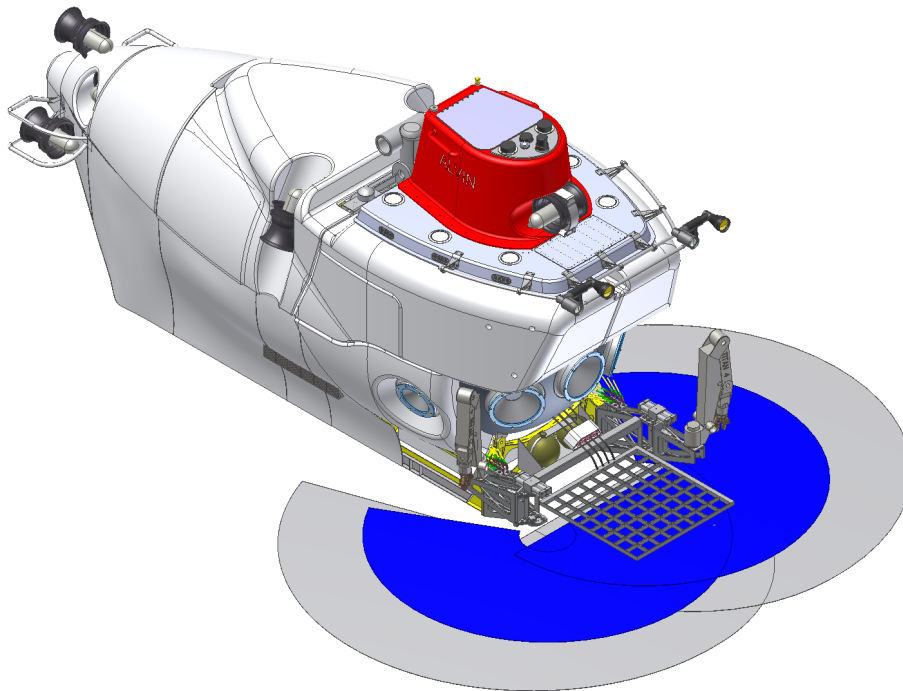


Alvin Upgrade Project Manipulator Swing Arm Mount



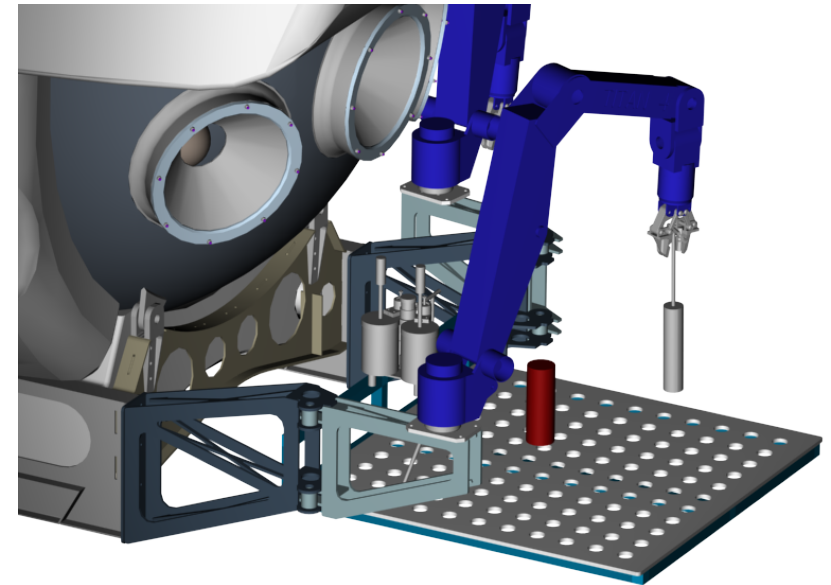


Alvin Upgrade Project Workspace and Payload



Blue Area: current - 60 ft³

Gray Area: updated - 114 ft³



Overall manipulator reach increased from 93" to 118"

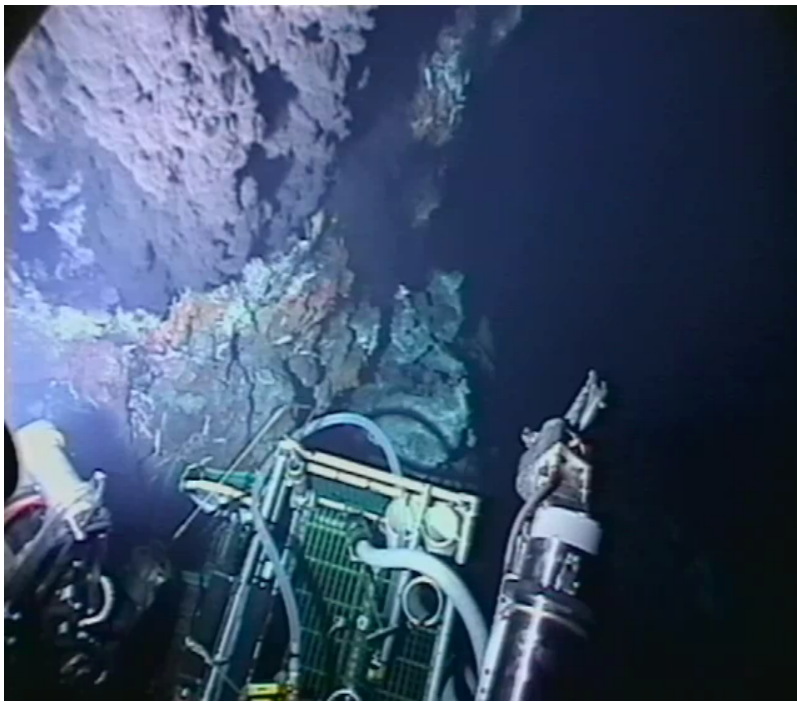
Science basket payload increased from 200 lb to 400 lb



Alvin Upgrade Project Science Missions



Mid-Ocean Ridges



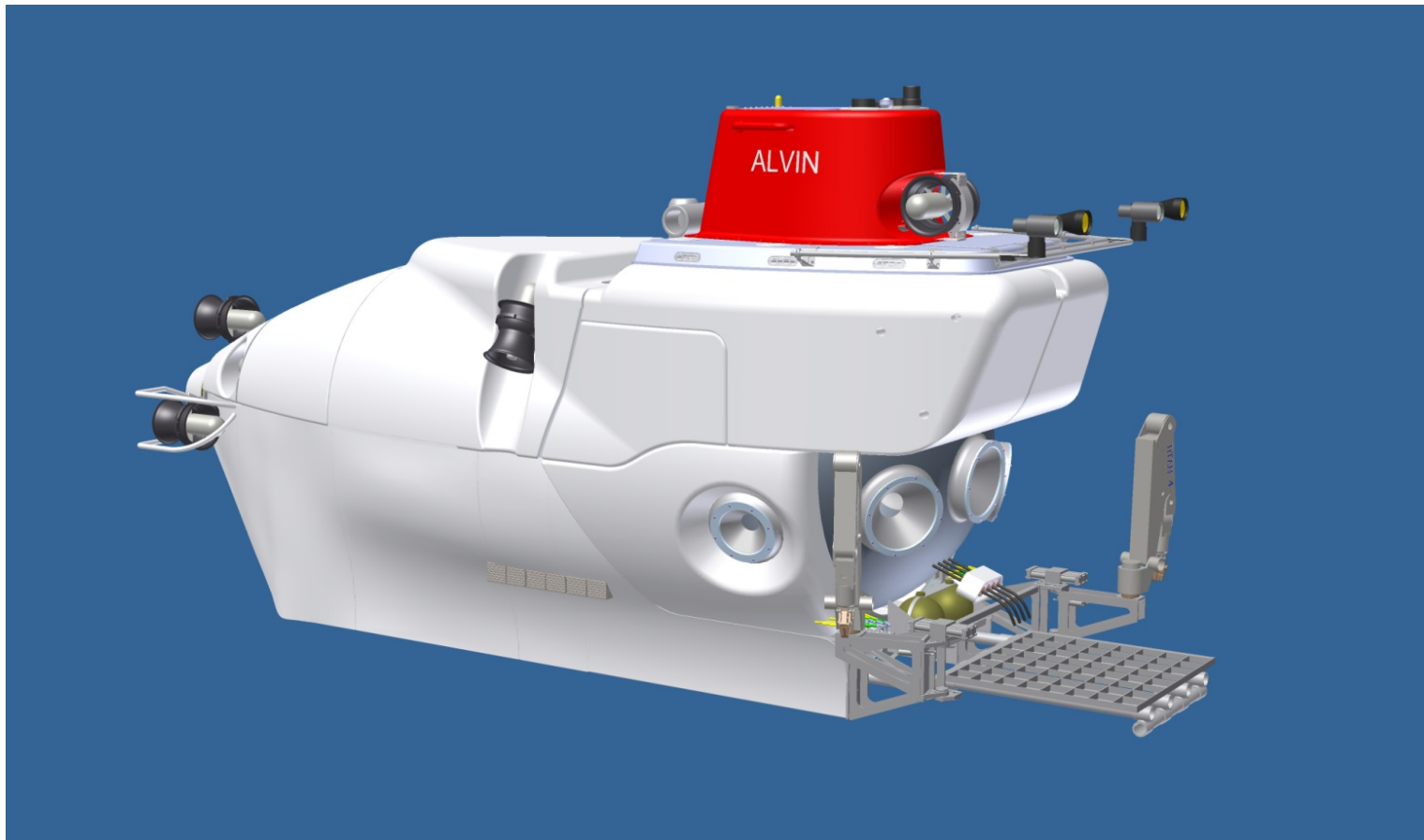
TAG, Mid-Atlantic Ridge



Edmond, Central Indian Ridge



Alvin Upgrade Project



Project Completion: Late Spring 2012