



DeSSC Update

Alvin Upgrade Project





DeSSC Update

Staged Approach



Upgrade *Alvin* using the 6,500m rated personnel sphere while:

- Satisfying as many original HOV design goals as possible
- Plan for upgrade to full 6,500m vehicle (when approved)
- Double classification with ABS and NAVSEA

Phase I - Sphere

4,500m *Alvin* Upgrade

Stage 1

6,500m *Alvin*

Stage 2



DeSSC Update **New System Designs**



Vehicle new designs:

- Personnel sphere (6,500m)
- Penetrators (6,500m)
- Syntactic foam (6,500m)
- Frame forward section
- Pressure vessels (6,500m)
- Video and lighting system upgrade to HD
- Modernize the command and control system
- Upgrade the electrical system

Safe, Simple, Reliable



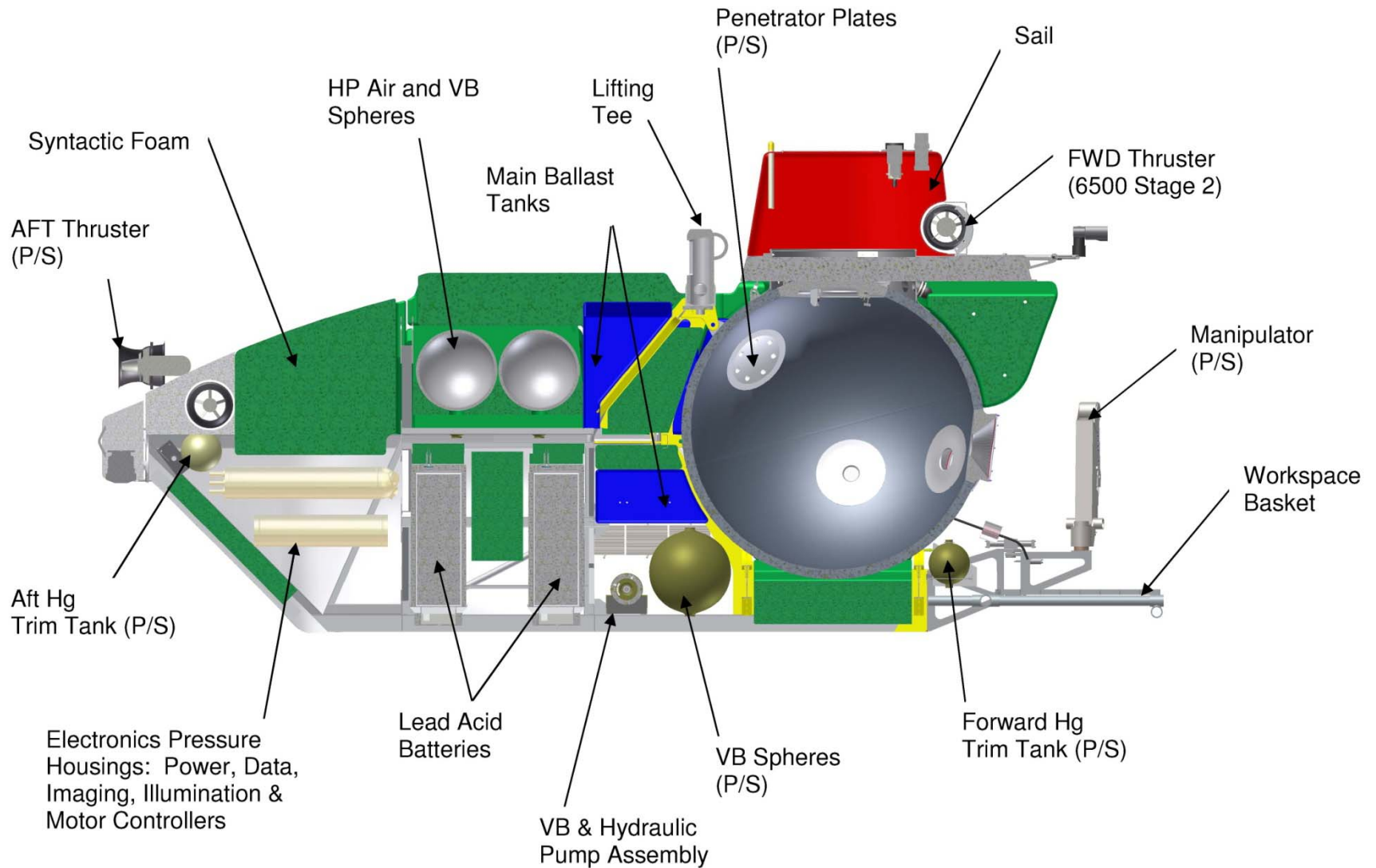
Vehicle Design Comparison

Dimensions - similar to existing *Alvin* to fit *R/V Atlantis*
27' long 11' tall 8.5' wide

Design	DSV <i>Alvin</i>	Stage 1 Upgrade
Operating Depth	4,500 meters	4,500 meters
Sphere Rating	4,500 meters	6,500 meters
Interior Volume	144 ft ³	171 ft ³
Pressure Housings	4,500 meters	6,500 meters
Foam Rating	4,500 meters	6,500 meters
Foam Density	38 lb/ft ³	36 lb/ft ³
Air Weight	35,000 lbs	45,000 lbs
Dive Time (normal)	8-10 hours	8-10 hours
Science Payload	200 lbs	400 lbs
Cruising Speed	.5 knot	.5 knot



DeSSC Update Vehicle Layout





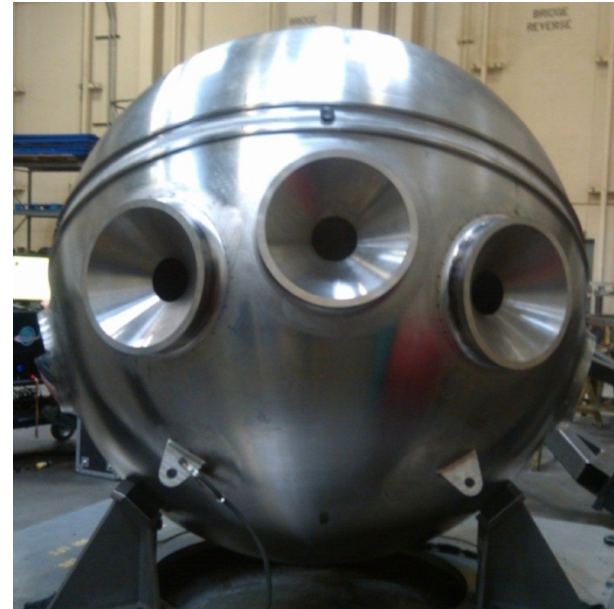
DeSSC Update Personnel Sphere



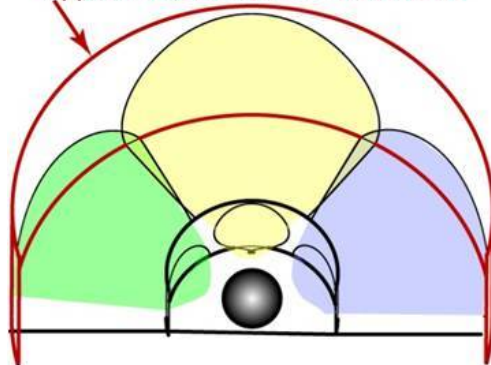
Existing hull = 144 ft³



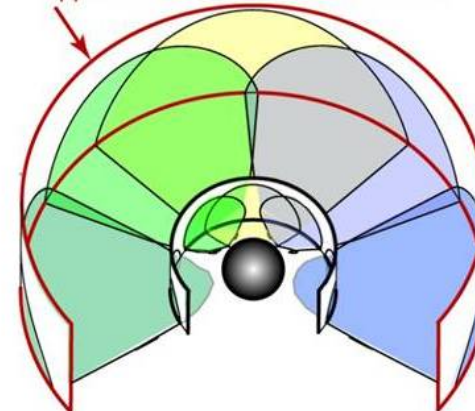
New hull = 171 ft³



Current Alvin
180° Field of View
Approximate Limit of Illuminated Area

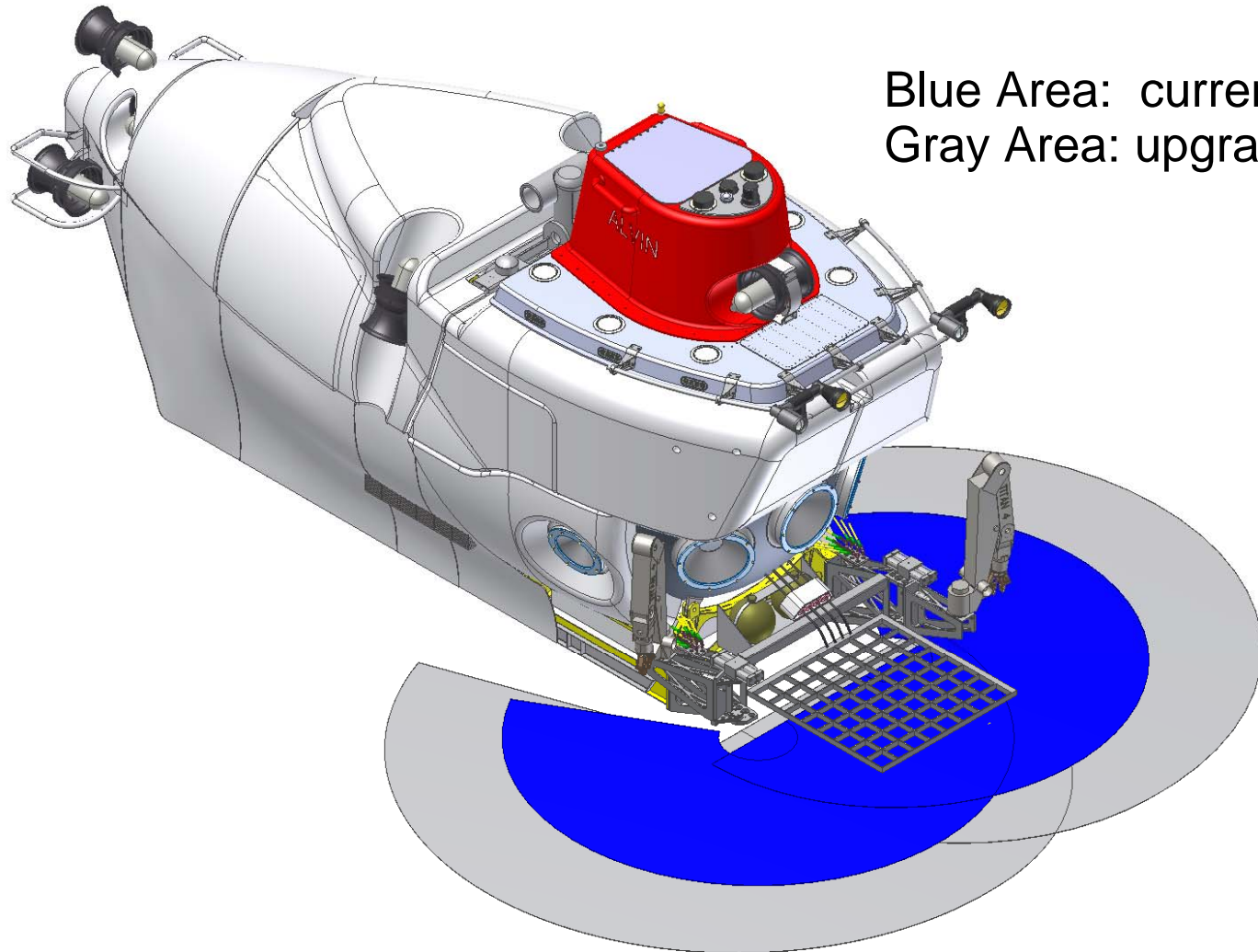


New Alvin
245° Field of View
Approximate Limit of Illuminated Area





DeSSC Update Manipulator Reach

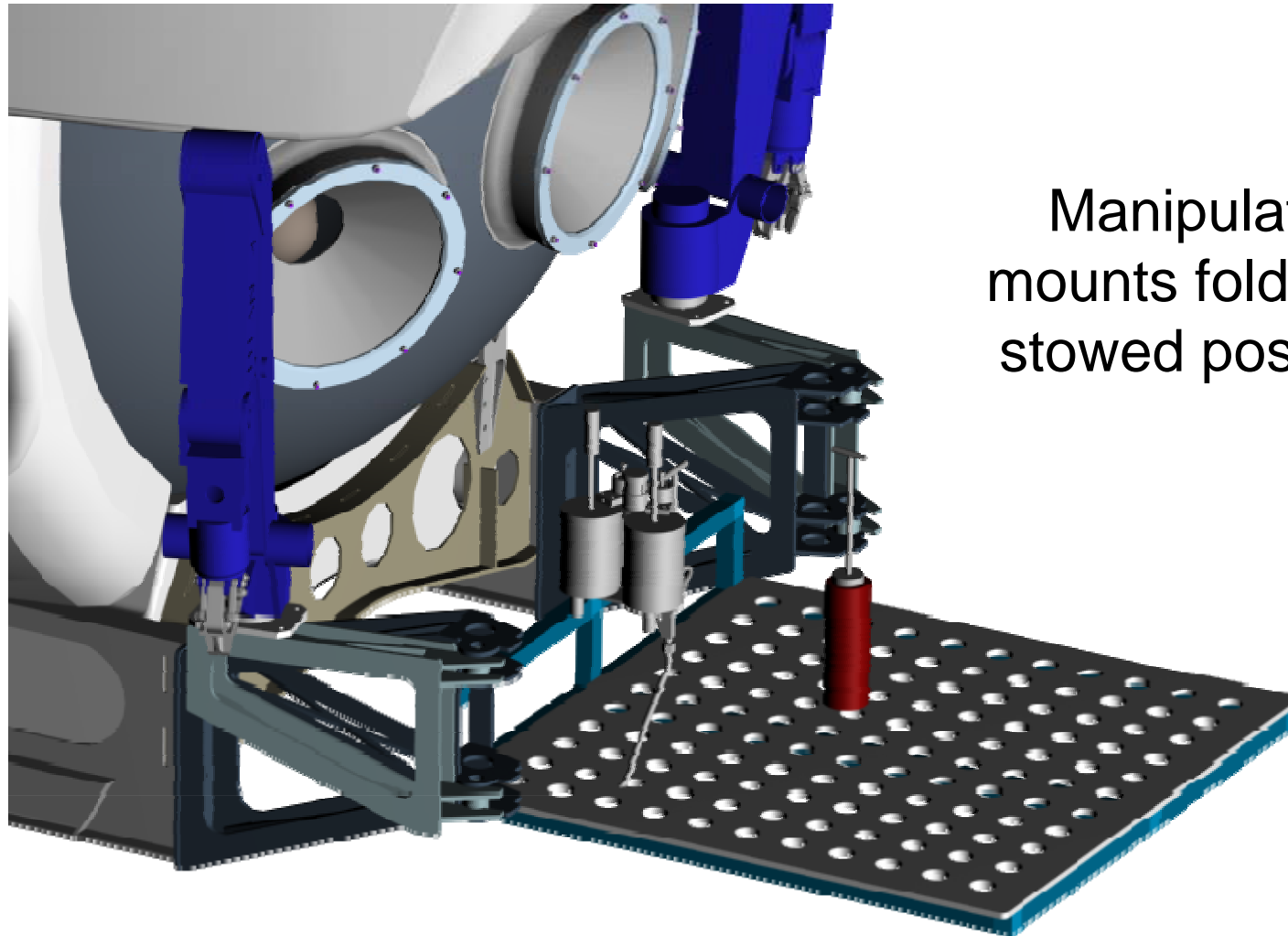


Blue Area: current 60 ft²
Gray Area: upgrade 114 ft²





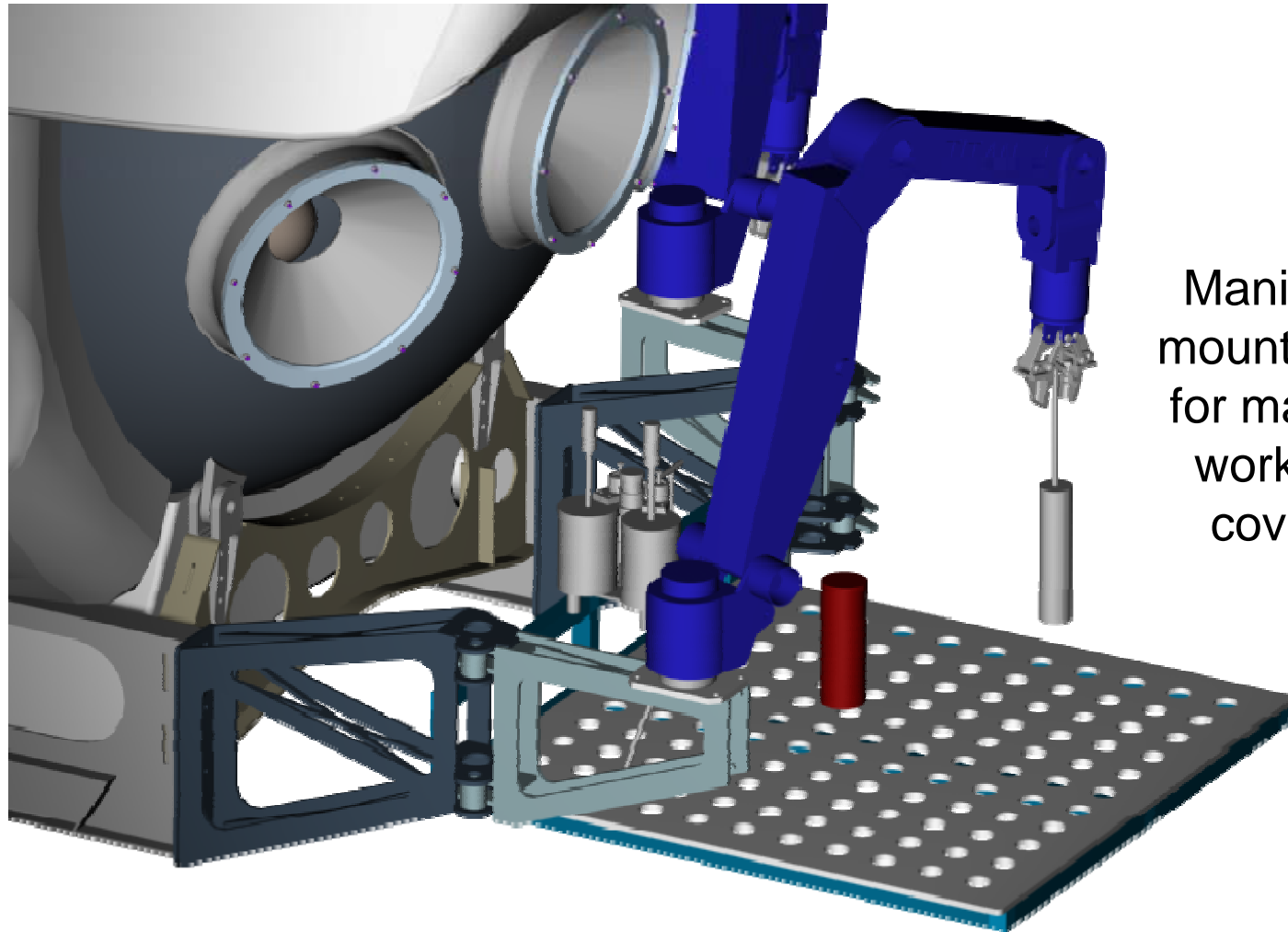
DeSSC Update Manipulators



Manipulator
mounts folded in
stowed position



DeSSC Update Manipulators

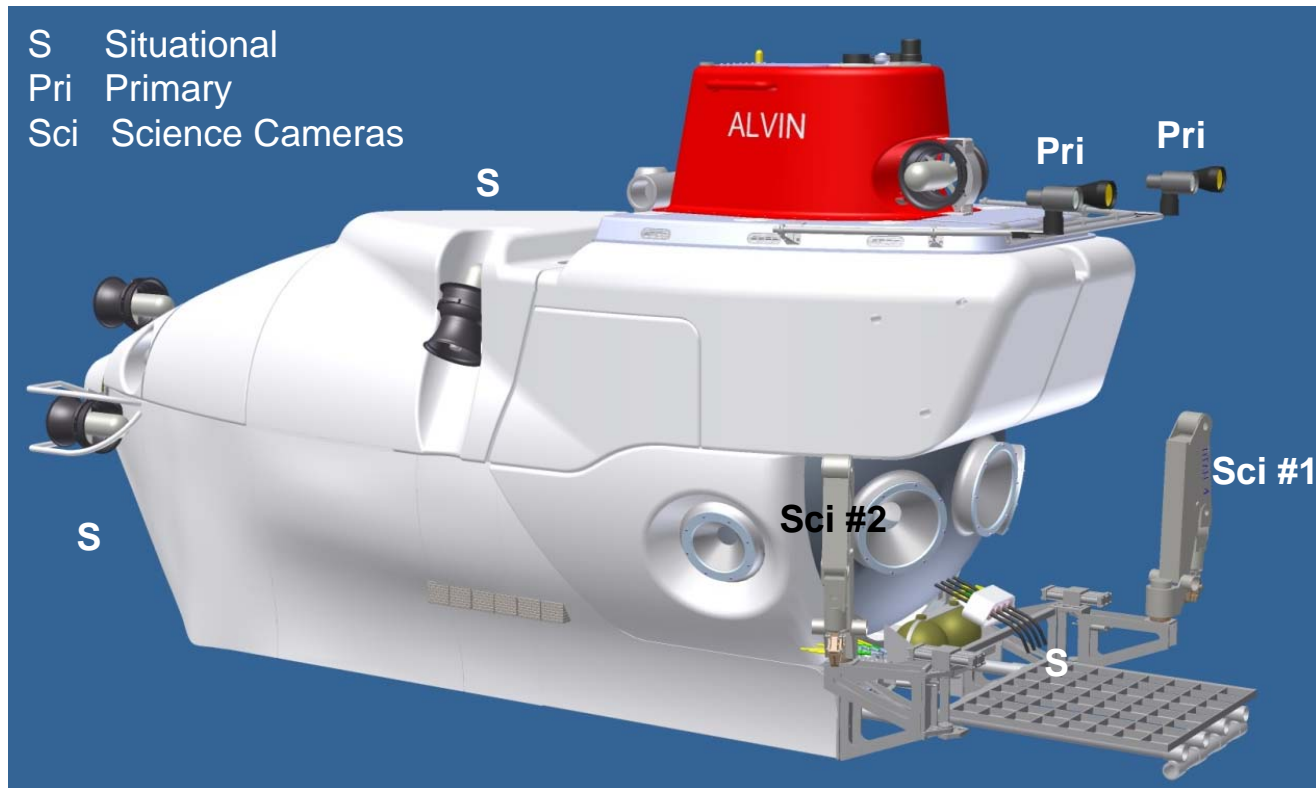


Manipulator
mount pivoted
for maximum
workspace
coverage

Overall reach increased from 93" to 118"



DeSSC Update Imaging & Illumination



- File-based image storage to reusable HDD
- Long-term data storage
- Primary Cameras: 1920 x 1080 HD, 10x zoom
- Science Cam #1: 1920 x 1080 HD, video optimized
- Science Cam #2: Still image optimized plus HD video



DeSSC Update Current Status





DeSSC Update Current Status





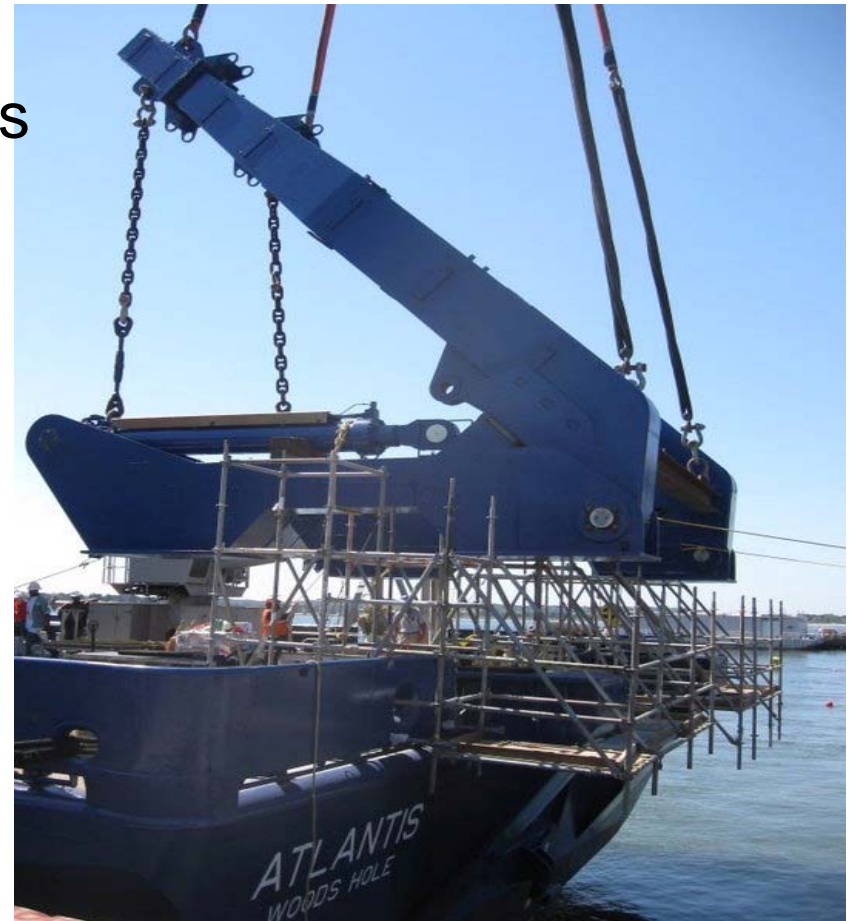
DeSSC Update

R/V Atlantis Status



Tasks Accomplished to Date

- A-Frame system (minus swinging beam) upgraded to 50,000 lb rating:
 - Hydraulic piping, hoses, fittings
 - HPU motors & pumps
 - Pins, bushings, and fasteners
 - Main luffing cylinders
 - A-Frame leg structure
- Deck reinforcements under transfer tracks



Reinstalling the A-Frame, March 2011



DeSSC Update

R/V Atlantis Status



Tasks Planned for the Future

- Modify swinging beam assembly to 50,000 lb rating:
 - Lift line replacement
 - Winch replacement (gearbox on hand)
 - Anti-pitch cylinder addition (on hand)
 - Structural reinforcements
- PLC modernization (controls)
- Reinstall the swinging beam assembly
- Certification of A-Frame system (ABS Plus)
- Hangar modifications (piping & catwalk)



Testing the A-frame
April 2011



DeSSC Update **R/V *Atlantis* Status**



Schedule and Funding

- Supplemental funding request submitted to NSF: Jun 2011
- Begin swinging beam modifications: Jul 2011
- Deliver modified swinging beam and updated PLC: Jan 2012
- Reinstall swinging beam onto A-Frame and PLC: Feb 2012
- Reinstall transfer tracks and certify system: Spring 2012
- Address adjustments in hangar post-*Alvin* delivery: TBD



Status of Major Components



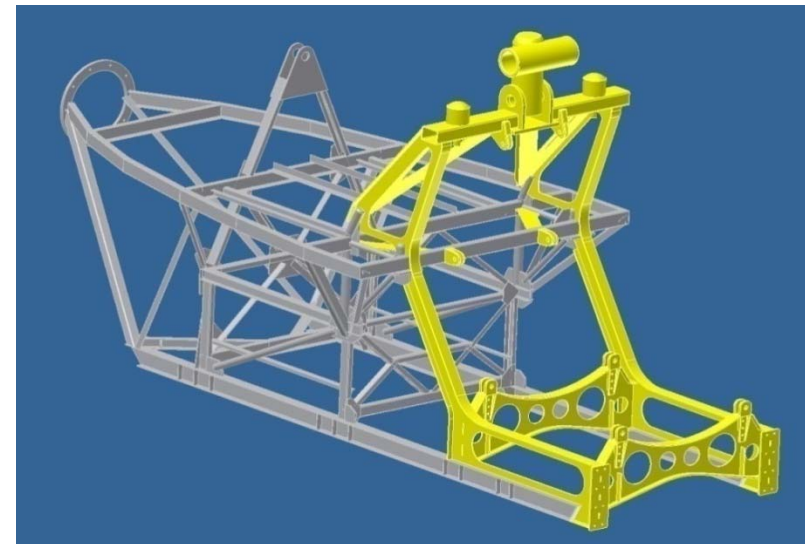
Sphere – 97% complete, prep for hydrostatic testing

Penetrators – 1st article electrical received & tested
- Optical being manufactured

Foam – 1st order received
- 2nd order issued



Frame – RFP released
- quotes due in July





DeSSC Update **Challenges Ahead**



Frame design & analysis

- Completing structure finite element analysis
- Preparing submittals for ABS and NAVSEA

Foam shaping – 26 shapes

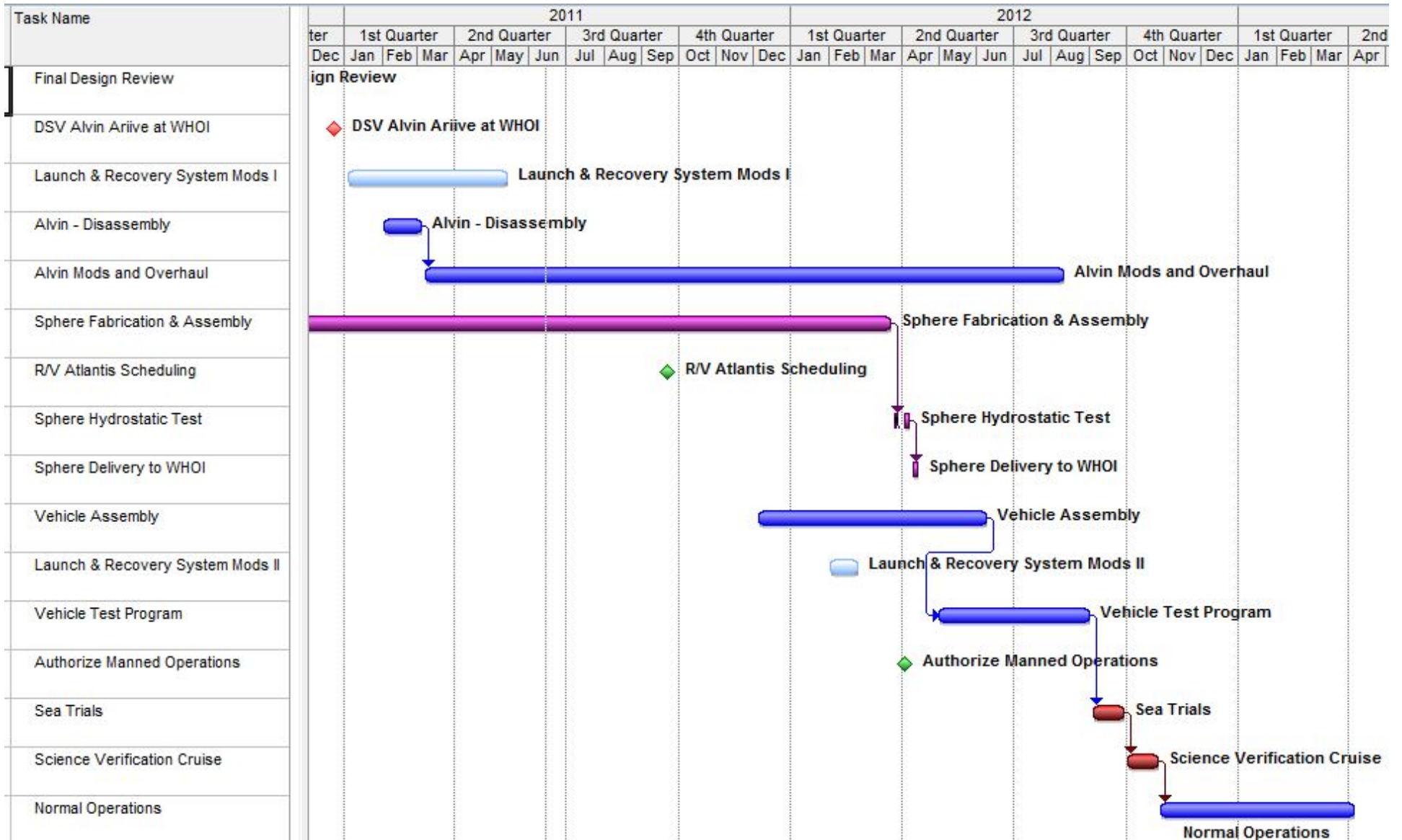
- Updating quotes, releasing shapes for fabrication

NAVSEA certification support (WHOI)

- Integrating key certification milestones
- Assumptions from FDR are invalid
- The vehicle is treated as a new construction project



DeSSC Update Timeline





DeSSC Update **Back to *Alvin* Operations**

