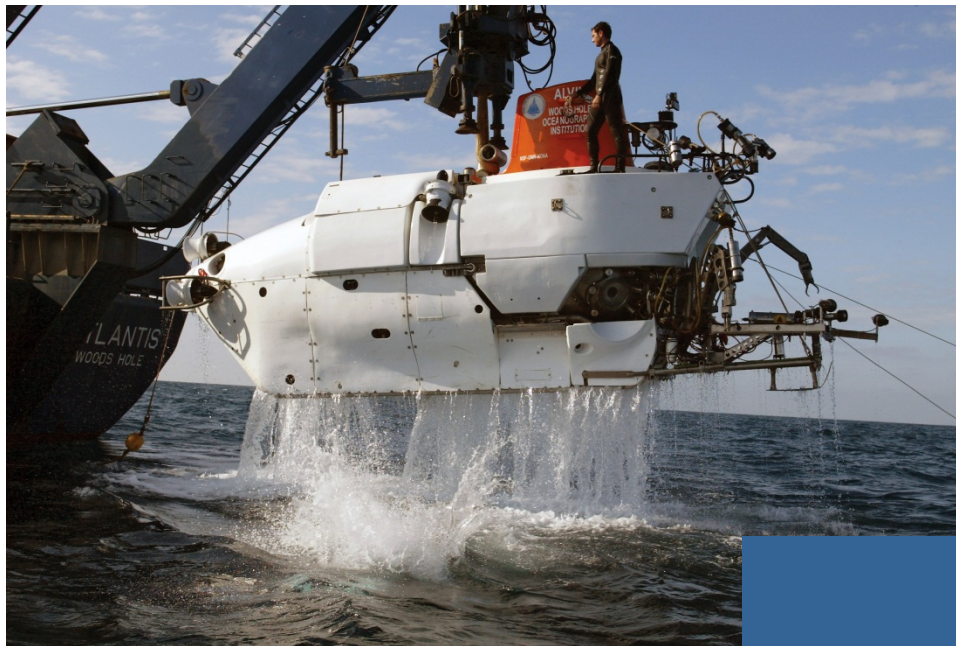




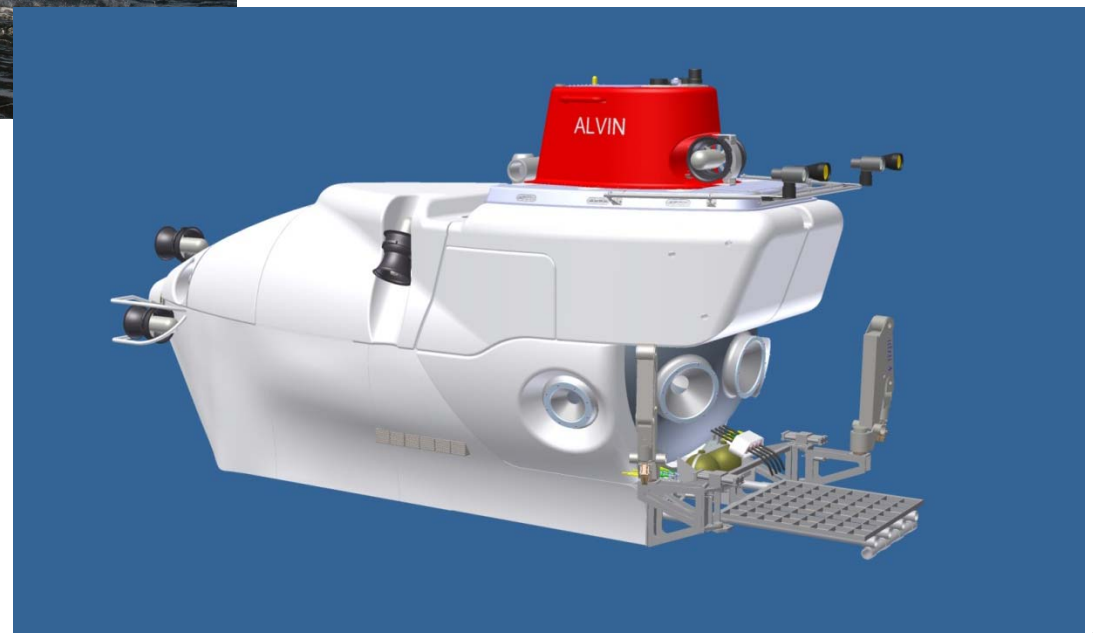
# DeSSC Update

## Alvin Upgrade Project



**Susan Humphris**  
*Principal Investigator*

**Kurt Uetz**  
*Project Manager*



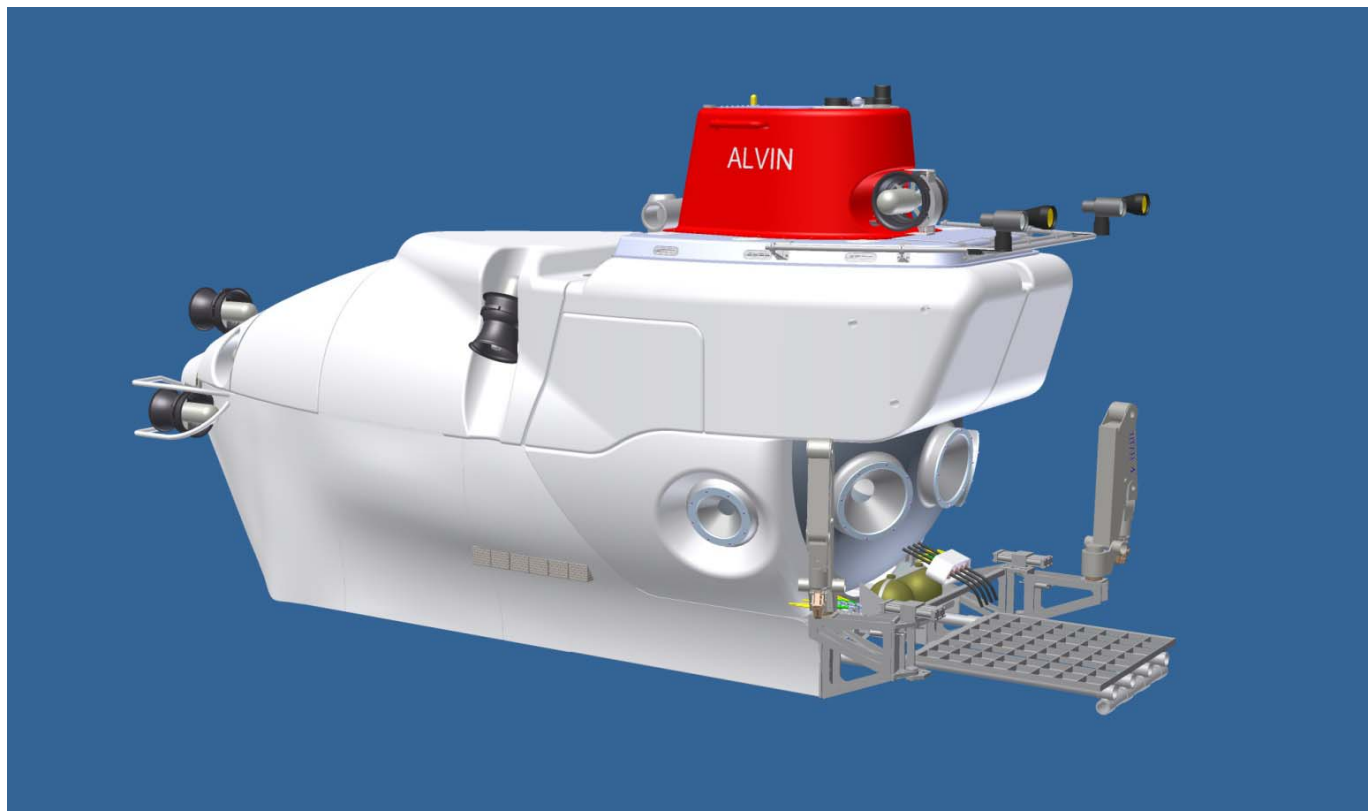


# DeSSC Update

## Project Objectives



- A significantly enhanced submersible for the scientific community built in two stages:
  - Stage 1 4,500 m *Alvin* Upgrade: Late fall 2012
  - Stage 2 6,500 m *Alvin* Upgrade: At a later time





# DeSSC Update

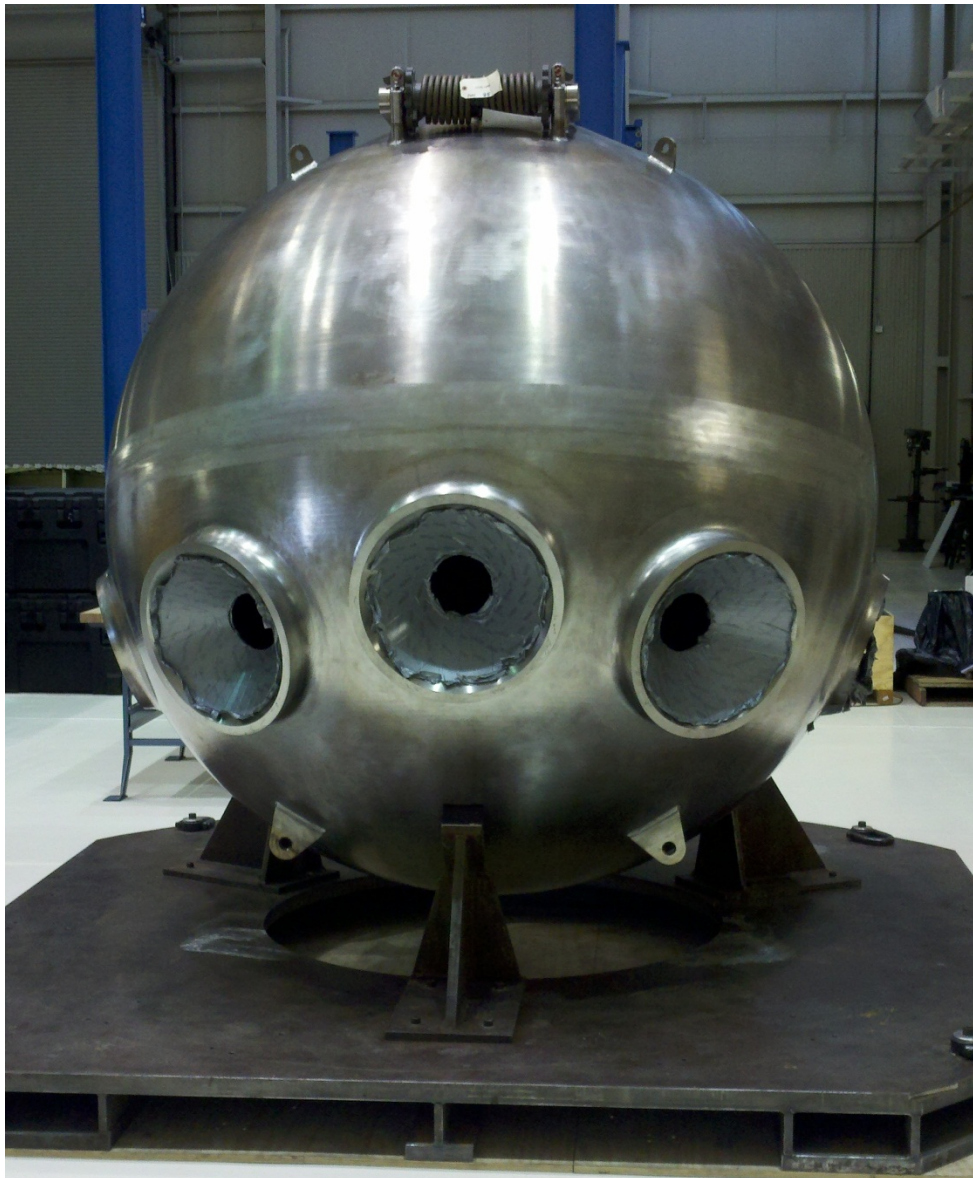
## Vehicle Characteristics



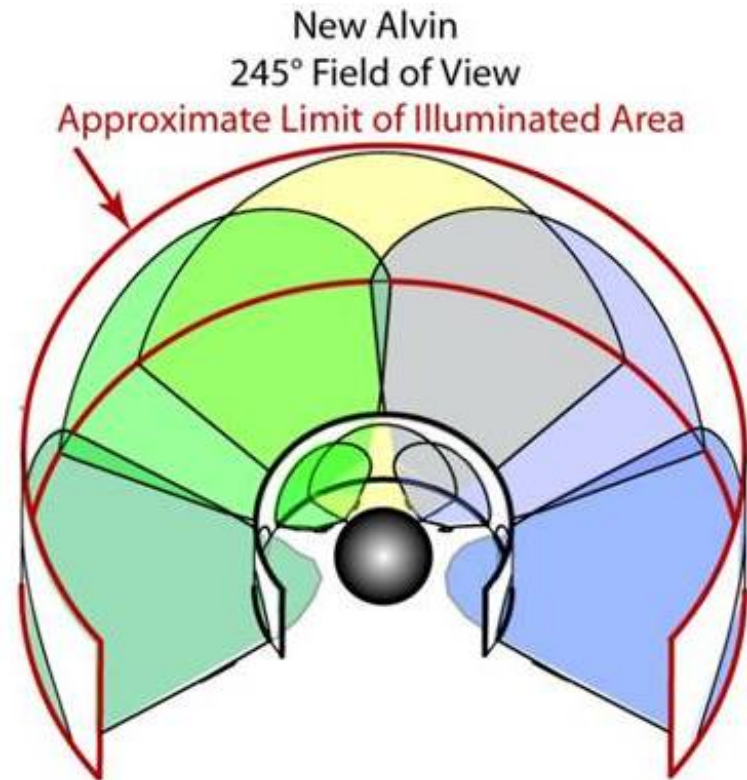
Project Objective	Stage 1 Vehicle	Stage 2 Vehicle	Remarks
6,500 meter depth capability		X	Stage 1 designs and fabricates select 6,500 meter components (sphere, penetrators, syntactic foam)
Larger personnel sphere, improved interior ergonomics	X		18% increase in interior volume; redesign of observer and pilot seating
Better visibility and overlapping views	X		Three 7" forward viewports with overlapping fields of view; two 5" side port
Improved interior electronics	X		Fiber optic network, touch screen controls, and upgraded observer monitors
Increased science payload	X		Double the vehicle payload to 400 pounds as well as expand the manipulator work area
Improved lighting and imaging	X		HD video, publication quality still imaging, and increased lighting output (LED)
Improved data collection, logging, and science interface	X		A fiber optic network and upgrades to the data recording and logging systems
Increased bottom time; mid-water capability		X	Requires increased battery capacity
Increased thruster horsepower		X	Requires increased battery capacity
Increased hydraulic plant capacity		X	Requires increased battery capacity
Automatic station keeping		X	Stage 1 includes auto-heading control
Double classify with ABS and NAVSEA	X	X	NAVSEA certification added at FDR



# DeSSC Update Personnel Sphere

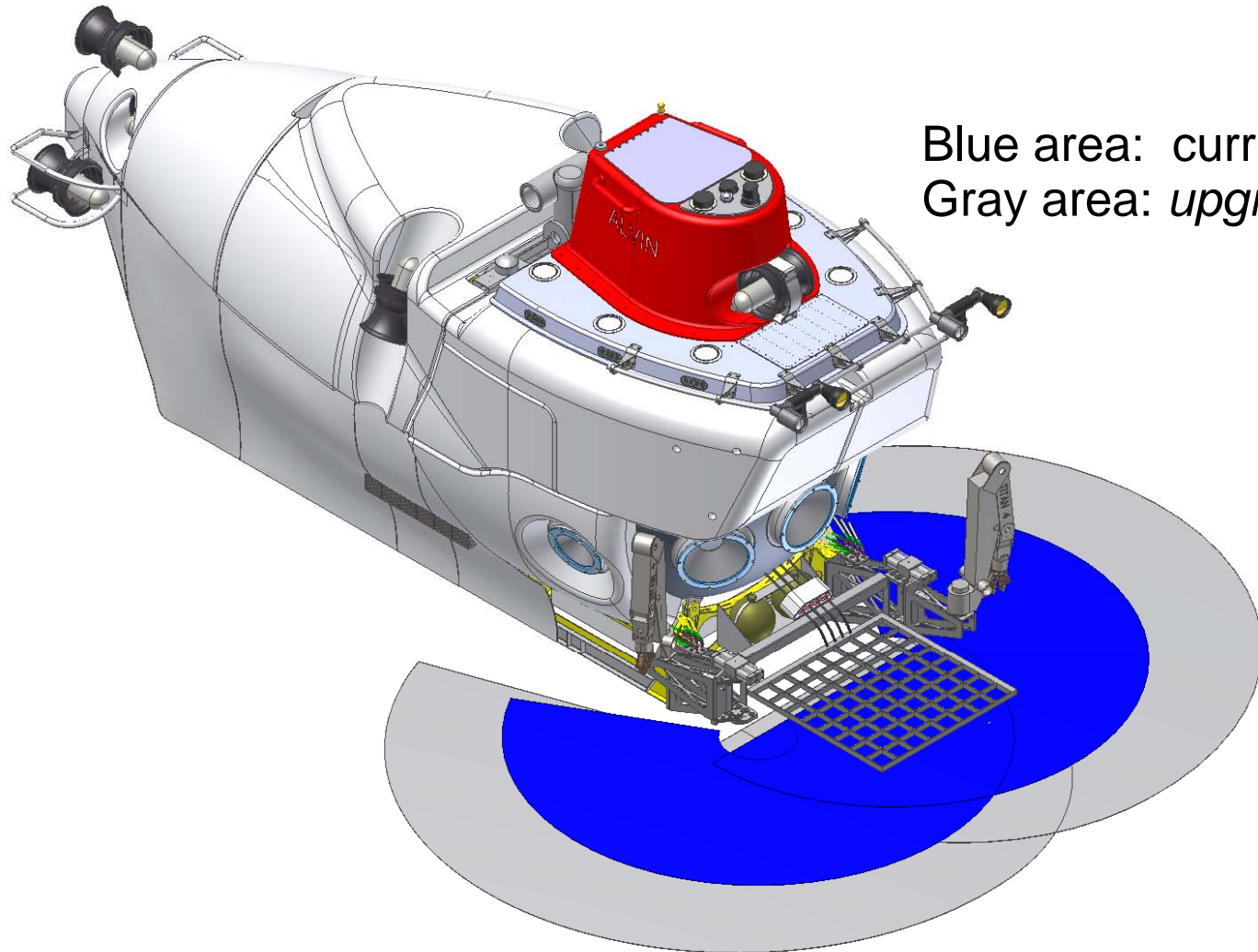


New hull volume = 171 ft<sup>3</sup>





# DeSSC Update Manipulator Reach

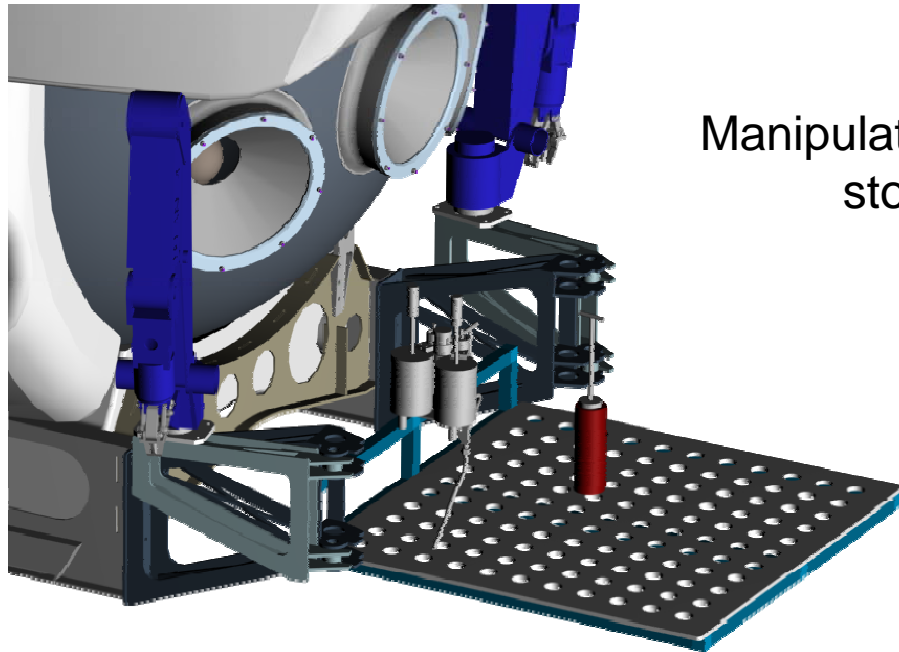


Blue area: current 60 ft<sup>2</sup>  
Gray area: upgrade 114 ft<sup>2</sup>



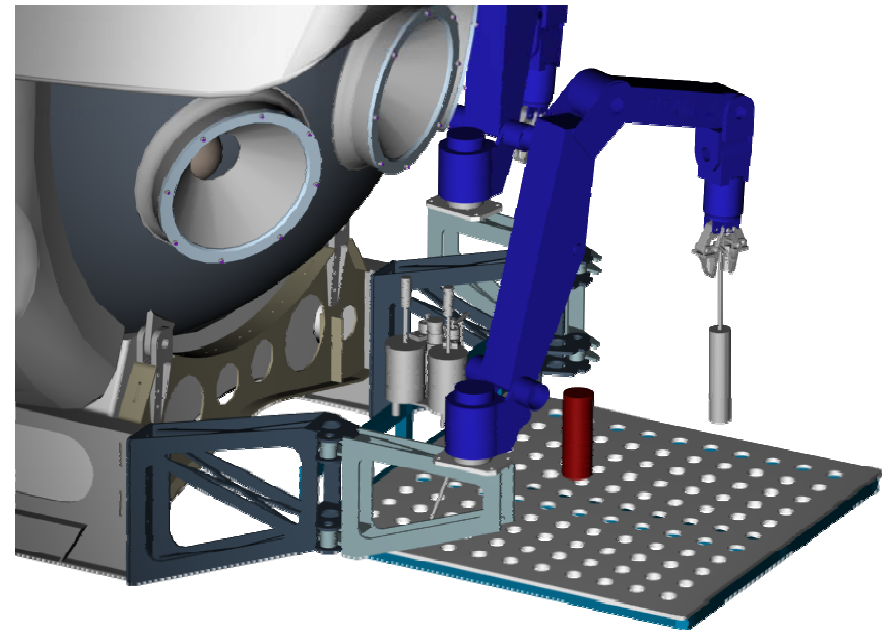


# DeSSC Update Manipulator Reach



Manipulator mounts folded in stowed position

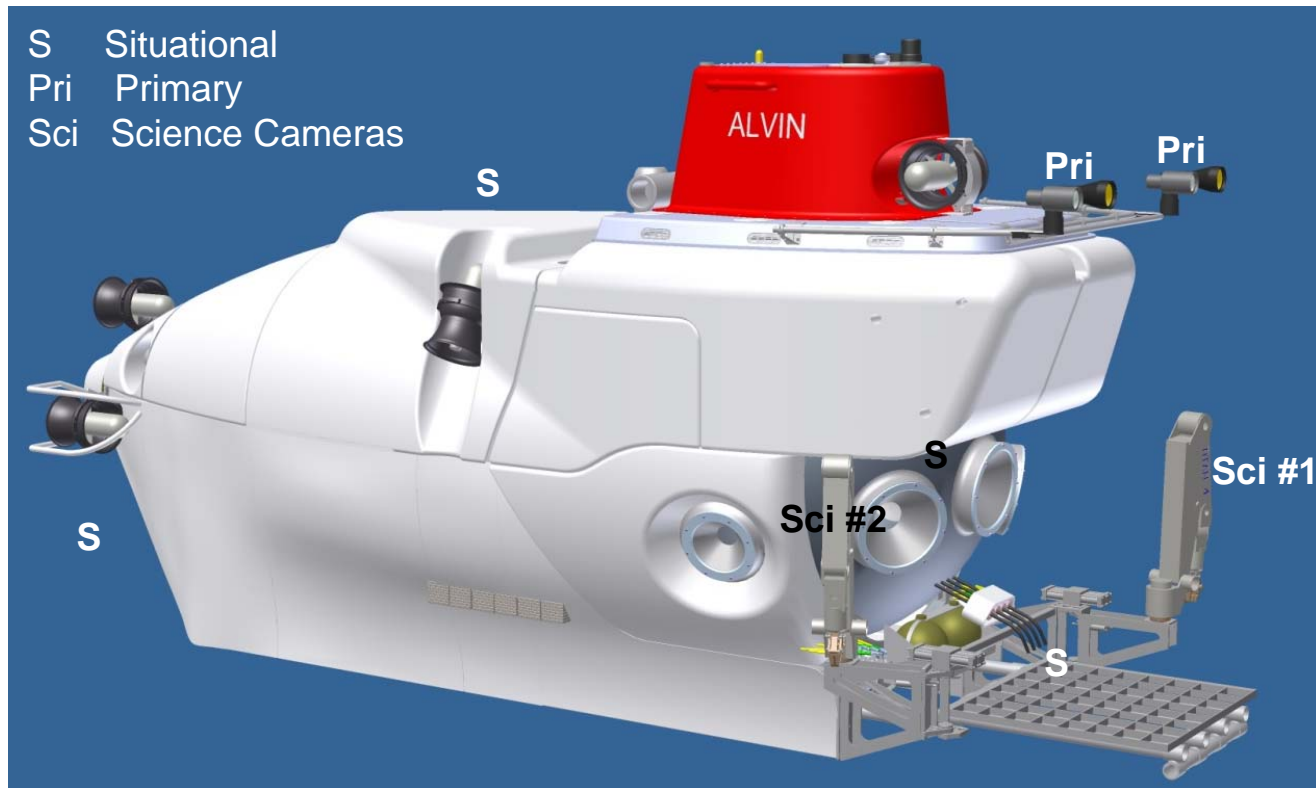
Manipulator mount pivoted for maximum workspace coverage



**Overall reach increased from 93" to 118"**



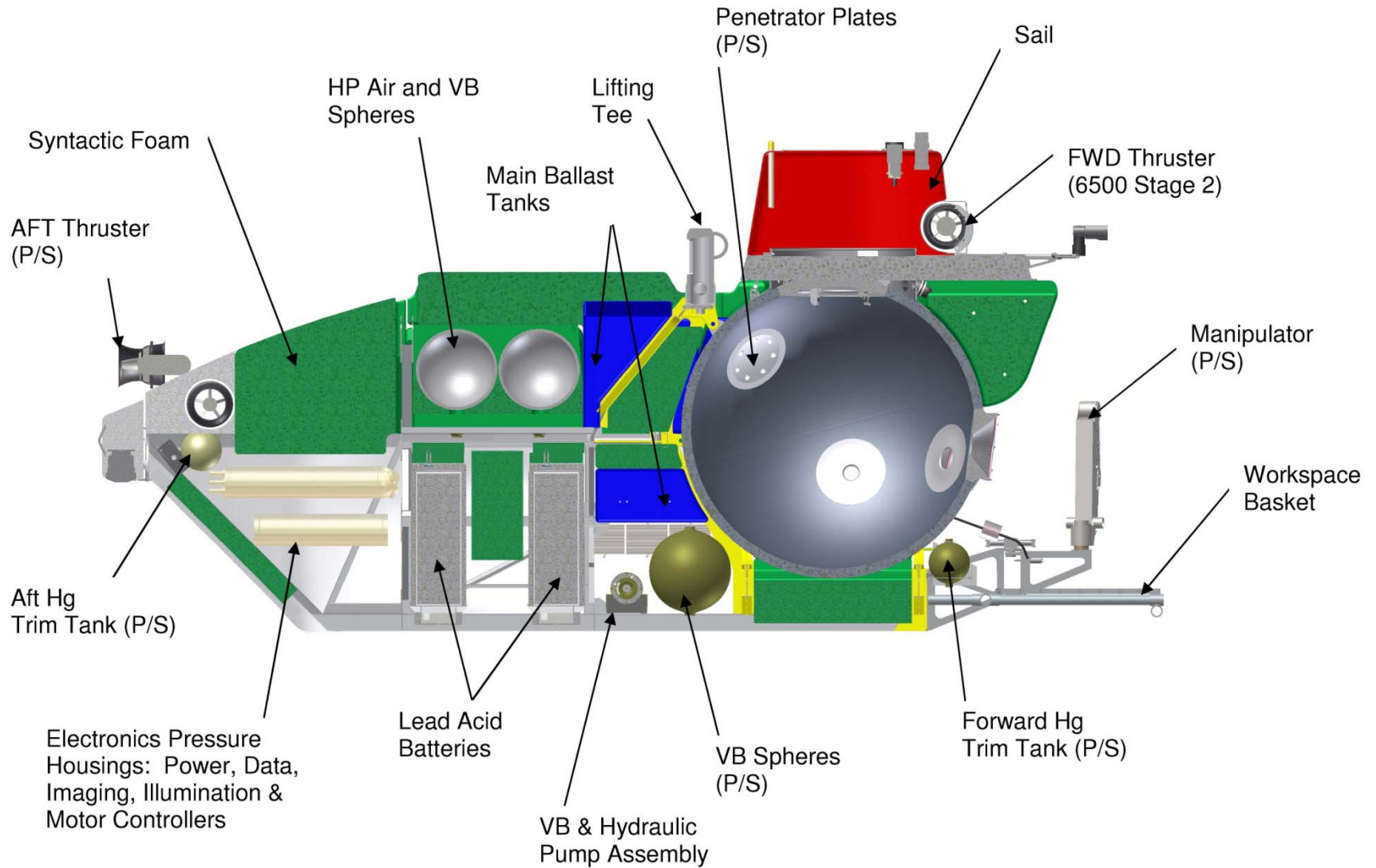
# DeSSC Update Imaging & Illumination



- 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 Vehicle Layout



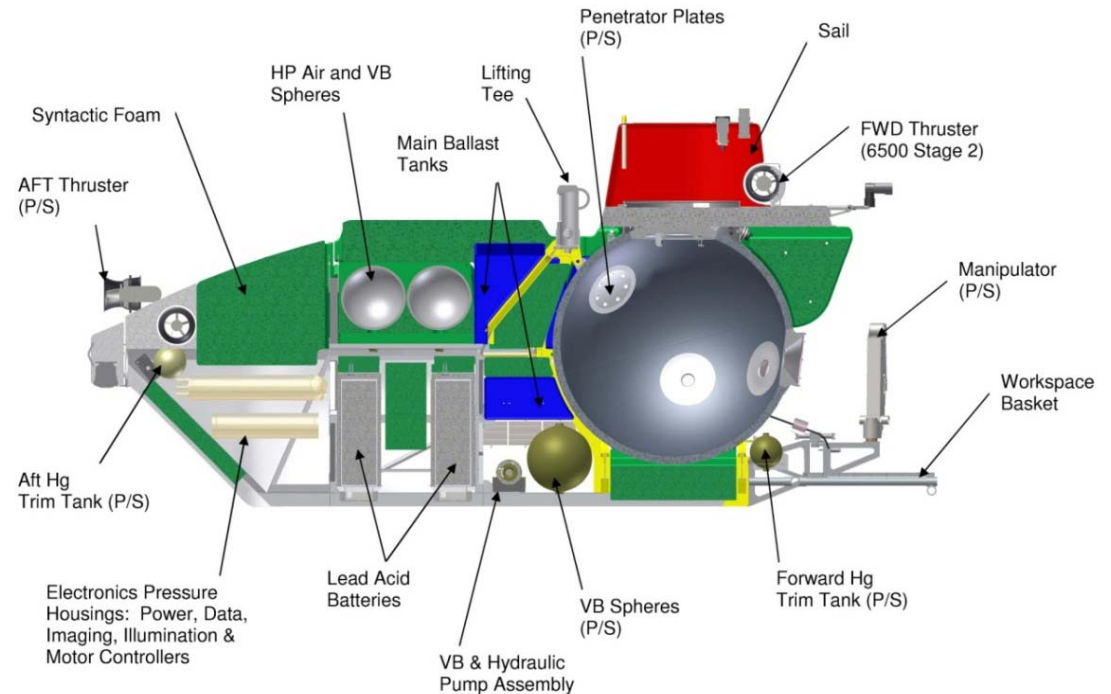




# DeSSC Update New Designs & Upgrades



- Personnel sphere
- Penetrators
- Forward frame section
- Syntactic foam
- Electrical system
- Command & control
- Pressure vessels
- Skins and fairings

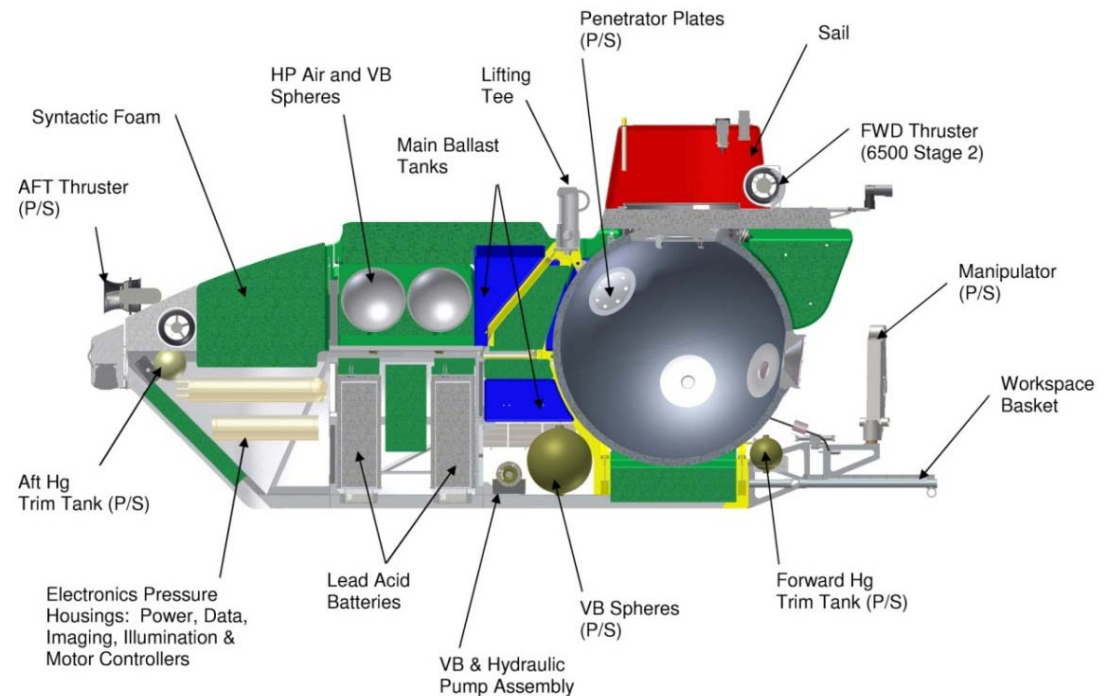




# DeSSC Update Systems Overhauled



- Aft section of frame
- Main batteries
- Emergency releases
- Weight droppers
- Variable ballast
- Main ballast
- Propulsion
- Mercury trim
- Main hydraulics





# *DeSSC Update* Return to Woods Hole





# DeSSC Update Disassembly of *Alvin*

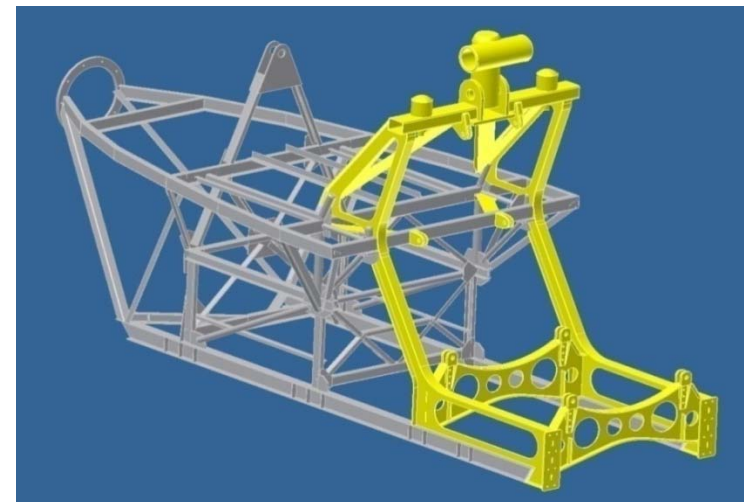




# Status of Major Components



- Sphere – nearly complete; assembly and preparation for hydrostatic testing
- Penetrators – electrical next delivery mid-December; optical final delivery mid-December
- Foam – all foam purchased, tested, and accepted; first three shaping PO's issued
- Frame – vendor selected; final design analysis early December





# 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



Installing the A-frame March 2011



# DeSSC Update

## R/V Atlantis Status



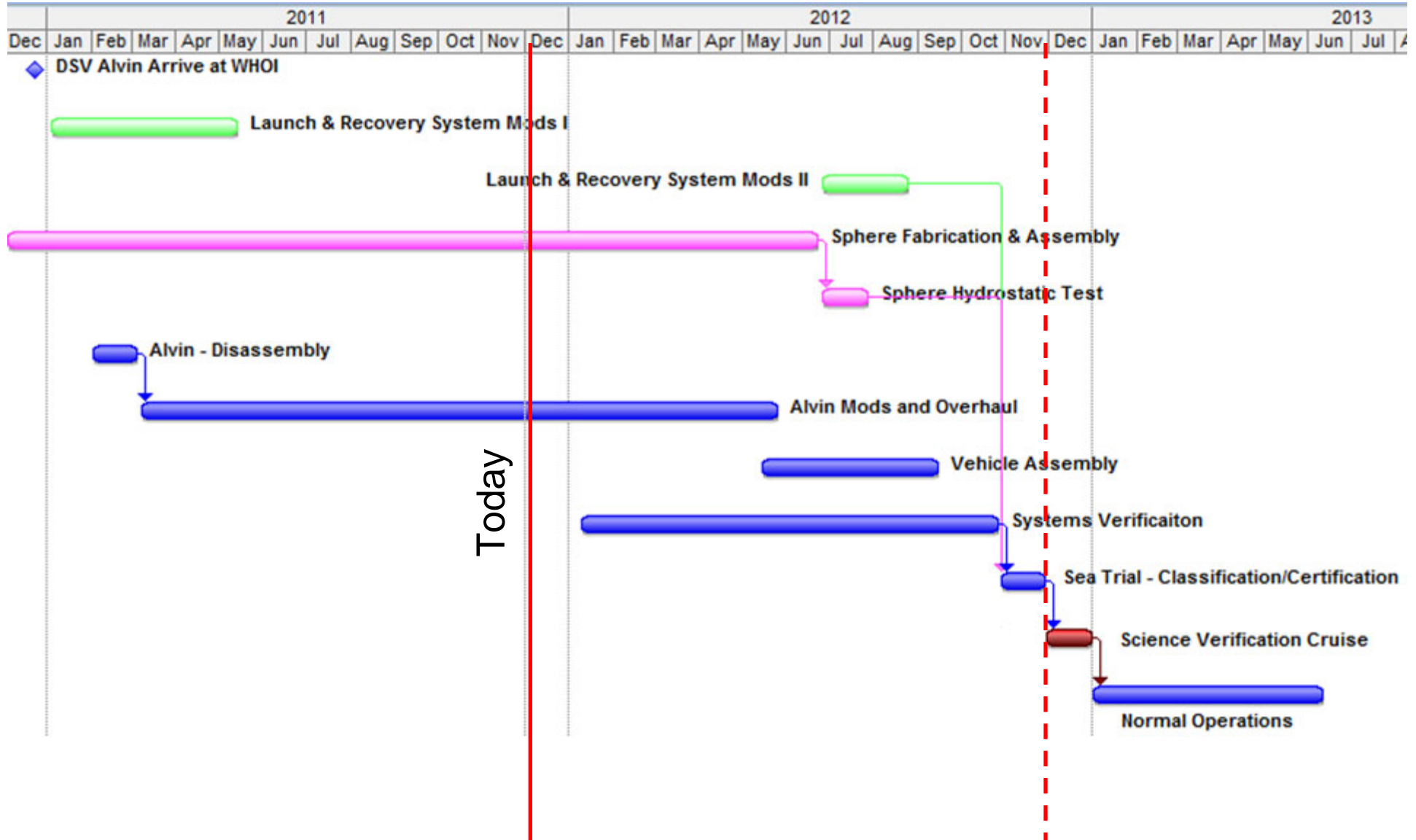
### Schedule

- Begin swinging beam modifications Oct 2011
- Interagency agreement on NAVSEA/ABS Certification/Classification Requirements Nov 2011
- Deliver modified swinging beam May 2012
- Reinstall swinging beam onto A-frame Jul 2012
- Complete LARS integration Aug 2012  
ABS Classified and NAVSEA Certified





# DeSSC Update Project Timeline







# *DeSSC Update* **Challenges Ahead**



## **Double Classification: ABS & NAVSEA**

- unforeseen and unpredictable scope of effort
- balancing unpredictability in cost and schedule
- integrating certification tasks with construction

## **Frame Modifications**

- acceptance of new design by ABS and NAVSEA before modifications can begin

## **Foam Shaping**

- 26 shapes

## **R/V *Atlantis* LARS**

- Timely completion of swinging arm modifications
- Acceptance by ABS and NAVSEA



# *DeSSC Update* Ready for *Alvin* Operations

