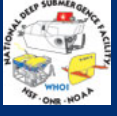




DeSSC Update Alvin Upgrade Project

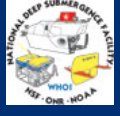


Susan Humphris

Principal Investigator



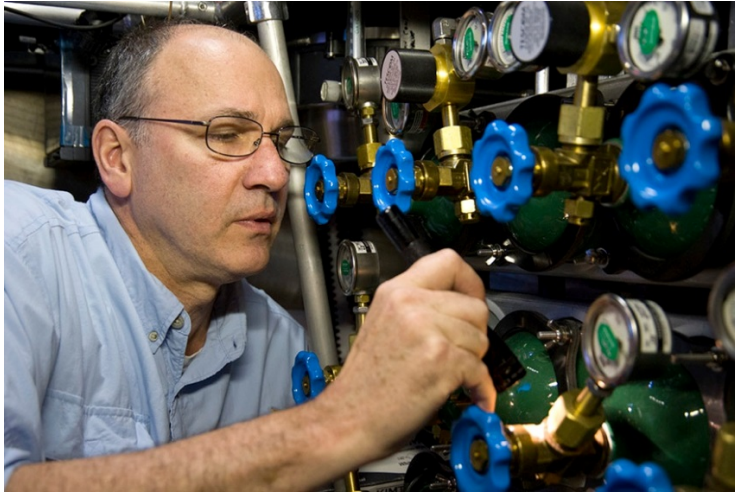
DeSSC Update Milestones



- 07/04: NSF establishes Replacement HOV Oversight Committee (RHOC)
- 08/04: WHOI receives initial funding for construction of a 6500m HOV
- 10/05: Contract signed with SwRI for sphere design, fabrication & testing
- 06/07: Contract with Lockheed Martin for preliminary design and cost estimate
- 11/07: Preliminary Design Review with Lockheed Martin
- 01/08: Cost estimate for detailed design and construction of vehicle
- 06/08: Personnel sphere hemispheres forged
- 07/08: WHOI submits requested for change of scope: Stage 1 & 2 strategy
- 08/09: Personnel sphere hemispheres electron beam welded
- 12/09: Preliminary Design Review
- 09/10: Final Design Review: Sea trials planned for 11/11; dual certification NAVSEA-ABS
- 12/10: *Alvin* returns to WHOI
- 06/12: Personnel sphere hydrostatic test at Northrup Grumman
- 06/12: Personnel sphere delivered to WHOI
- 06/12: Certification effort de-scoped to be NAVSEA certified only
- 09/12: Modified frame delivered to WHOI
- 03/13: Unmanned off-gas testing of personnel sphere
- 05/01: *Alvin* transitions to Operations Group
- 05/13: *Alvin* and *Atlantis* leave WHOI



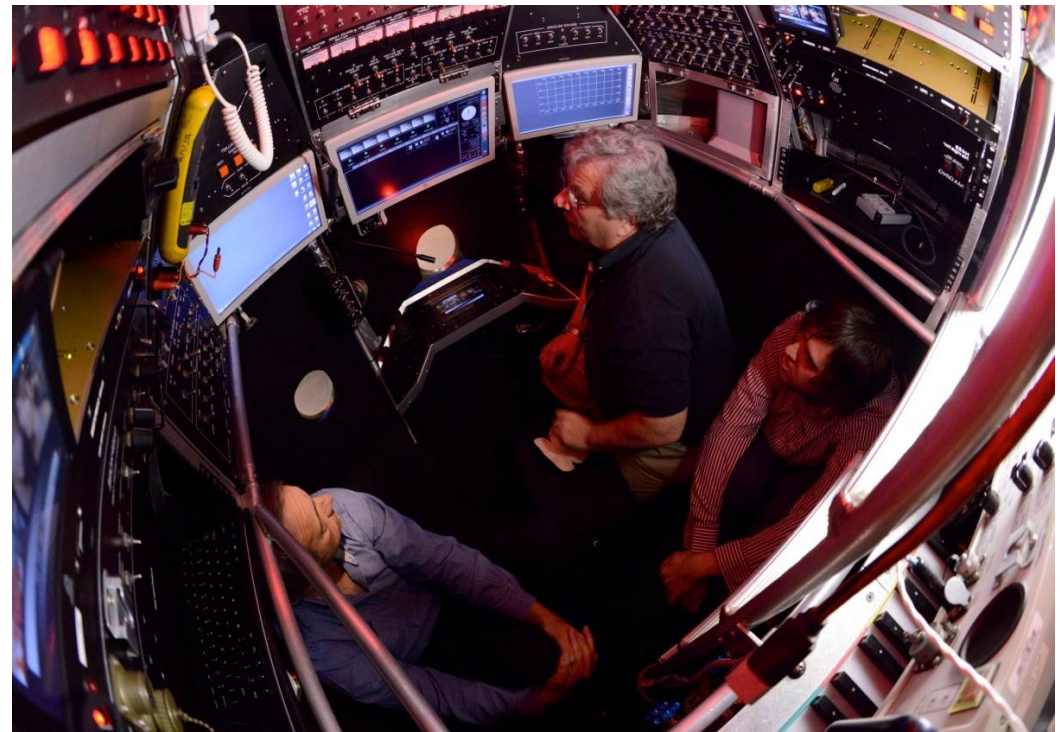
DeSSC Update Personnel Sphere



Installing life support system



Installing viewports



Assembled interior



DeSSC Update Electrical System



Installing electronics pressure housing racks



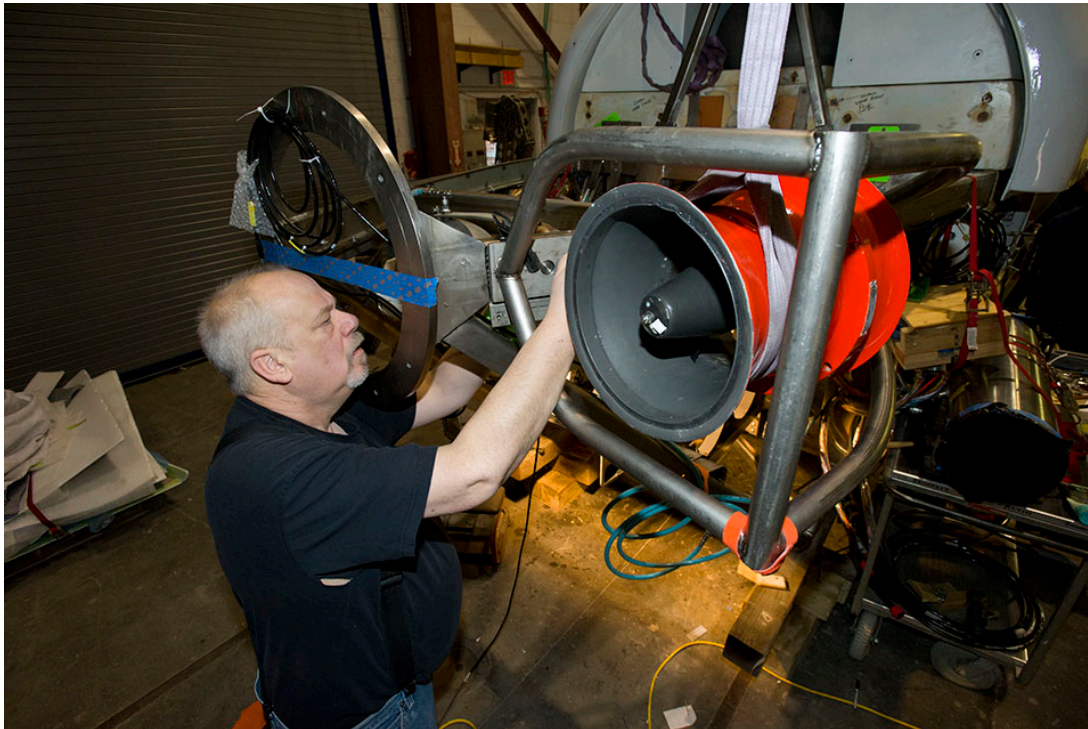
Conducting POELCO



Installing power distribution controller



DeSSC Update Thrusters



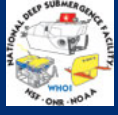
Mounting Thrusters



Testing Emergency Releases



DeSSC Update Syntactic Foam



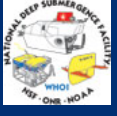
Installing top-forward section of foam



Measuring hole spacing for inserts (used for attaching lower skins) installed in the lower forebody foam block



DeSSC Update Imaging



2 x Insite MiniZeus (on lightbar – 4500m)

- HD (1920x1080)
- 220° optical viewing angle
- 5.1-51 mm focal length
- 10x optical zoom

2 x Kongsberg Internal Pan and Tilt (above viewports – 6500m)

- HD (1920x1080)
- 220° optical viewing angle
- 5.1-51 mm focal length
- 10x optical zoom

1 x SubC Imaging 1CamAlpha (on manipulator – 4500m)

- HD (1920x1080)
- 60° max. viewing angle
- Max. still picture resolution: 24 megapixels
- 10x optical zoom

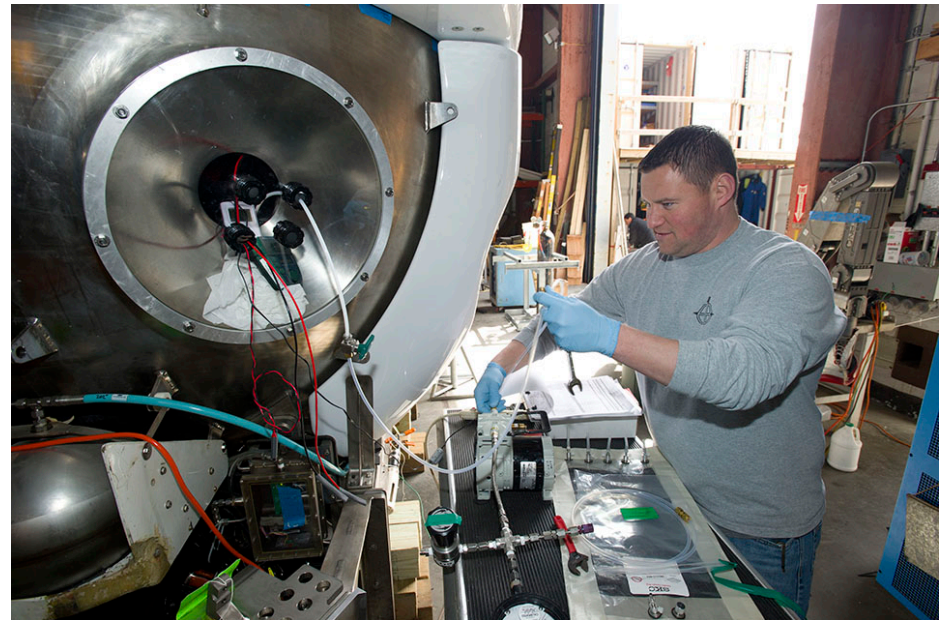
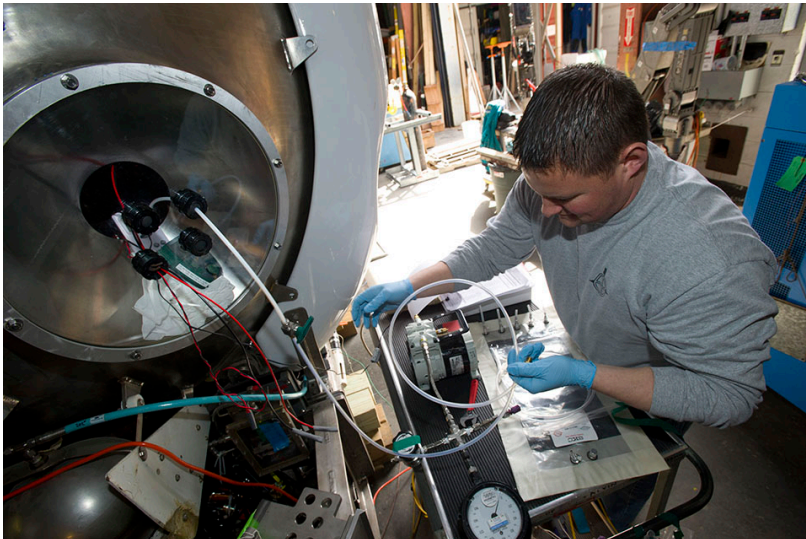




DeSSC Update Gas Testing

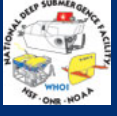


March 2013:
24-hour off-gassing test of personnel
sphere conducted by Electric Boat



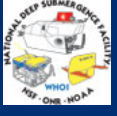


DeSSC Update Loading *Alvin* on *Atlantis*





DeSSC Update Fit-up of *Alvin* to LARS





DeSSC Update Bon Voyage: 25 May 2013





DeSSC Update

Stage 1 Challenges Ahead



- **NAVSEA Certification**

- Approval of remaining Vehicle ECAs: sphere, viewports, life support, CO₂ scrubber, EBAs, emergency battery, emergency releases
- Approval of remaining Certification Products: SOC notebook, maintenance manual, hazards analysis, operations manual, weight and balance
- Certification Sea Trials (including tethered trim dives and inclining experiment): 31 August – 19 September 2013 (Astoria to San Francisco)
- LARS received full certification on 5/31

- **Science Verification Cruise**

- 21 October – 5 November 2013 (San Diego to San Diego)



DeSSC Update

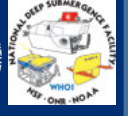
Vehicle Characteristics



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
Vehicle Certification: NAVSEA	X		Potential double classification with ABS in Stage 2



DeSSC Update Stage 2 Upgrade Requirements



- Batteries with higher power density/gm weight
- New Variable Ballast (VB) system
- Upgrade to 200 volt DC bus (currently 120 volt DC)
- New motor controllers and housings
- Remaining syntactic foam upgrade (around new VB system)

These are largely technically independent efforts – could be accomplished as smaller separate projects with lower risk



DeSSC Update Good Diving!

