

ALVIN PROGRAM UPDATE

UNOLS FIC BRIEF

17 November 2022



WOODS HOLE
OCEANOGRAPHIC
INSTITUTION

6500M Milestone

- Alvin loaded onto Atlantis 29 June 2022
- Dockside harbor testing same day
- 6500M dive #5086 completed 21 July 2022
- **NAVSEA certification approval received 25 July 2022**

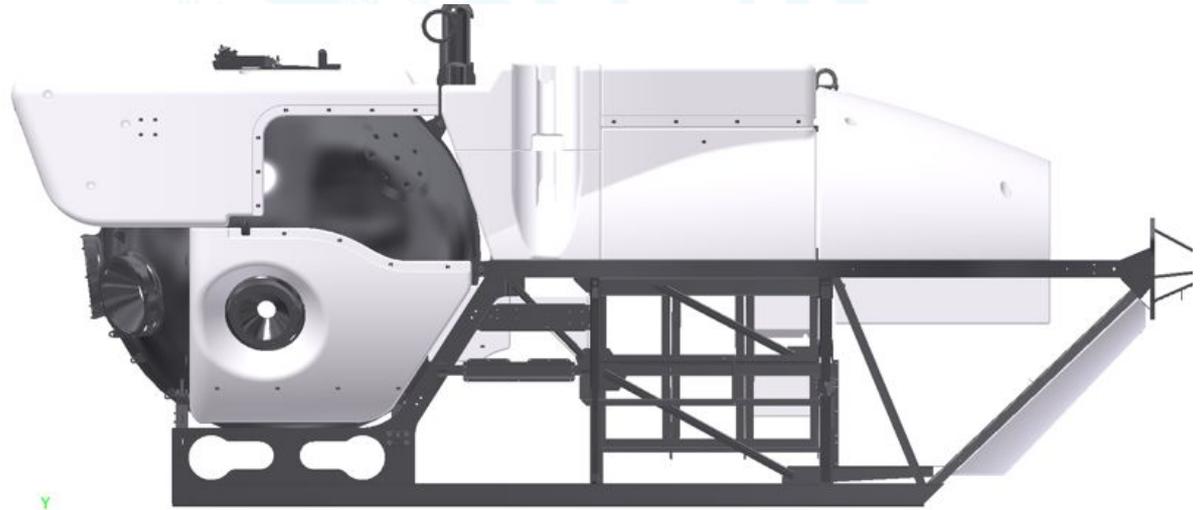
WE DID IT!

2021 Sea Trial Events

- 10/28/21 – 10/31/21** Tethered Trim Dives (Dives 5066-5068)
- 11/1/21** Inclining Experiments (Dive 5069)
- 11/2/21** Harbor Dives (Dive 5070)
- 11/3/21 – 11/13/21** Ocean Trials (Dives 5071-5075)
- 11/11/21** First foam crack identified (Dive 5074)
- 11/12/21** DFS 025-21 Approved resuming manned operations
- 11/13/21** Additional foam cracks identified (Dive 5075)
- 11/14/21** Sea Trials Suspended
- 11/22/21** Incident Report 005-21 provided to NAVSEA
- 11/29/21** DSV ALVIN returns to Woods Hole, MA



- 20 individual pieces
- 10 pieces are either new or modified during most recent overhaul
- 1/3 of the total weight of Alvin is syntactic foam
- 332 cubic feet



Root Cause Evaluation

Non-uniform Loading of Syntactic Foam Material

Multiple fixed mounting points introduces shear stresses
Syntactic foam has limited tolerance for shear stress

Action: New formal requirement to allow foam dimensional change at depth

Path to 6500M

- Alvin disassembled
- Engineering foam analysis performed and vetted with NAVSEA
 - Foam mounts redesigned to relieve constraints
- Foam sent for repairs
- Information gathered for other systems needing update during foam repairs
- Detailed project plan/schedule developed
- Plan executed
- Two program team retreats held and working groups activated

Science Verification Expedition

▣ Successes

- ▣ Repeatedly dove for science to 6500m (14 dives, 9 dive at 4500m or deeper)
 - New proposals already in the works
- ▣ 11 first time observers (also a challenge!)
- ▣ New LED lights installed
- ▣ INS-enabled navigation
- ▣ SeaLog

▣ Challenges

- ▣ “Shakedown cruise”
- ▣ Only 2 pilots and lots of training of Alvin personnel and ship crew
- ▣ Equipment issues: UQC, manipulator, window temperature sensors, suction samplers, major samplers, laser scalers
- ▣ AIS ▣ a lot of struggles



Alvin Near-term Cruise Schedule

- Valentine Cruise (24 Sept. – 9 Oct.) - Complete
- Young Cruise (13 Oct. – 1 Nov.) - Complete
- Maintenance (Charleston) and Transit to Puntarenas
- Arellano Cruise (3 Dec. – 1 January 2023)
- Fornari (7 Jan. – 1 Feb.)
- Scheduled Maintenance during Galapagos transit
- Galapagos (30 Mar. – 20 Apr.)
- Maintenance (San Diego)
- Treude (24 June – 12 July, SD to SD)
- Levin (16-29 July, SD to SD)