

Alvin 6500m White Paper



Ongoing need for a 6500m submersible

Effort to reevaluate the science justification outlined in the original Alvin Upgrade Project Execution Plan (2009).

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Original Science Use Cases:

Mid Ocean Ridges

Ridge-flank Hydrothermal Processes

Subduction Margins (& Methane Hydrate Systems)

Biodiversity in Marine Ecosystems (& Deep Sea Corals)

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Additional Science Use Cases:

Marine Mining: Large tracts of the seafloor have been claimed by nations for mining rights. Deep submergence tools that can access the deepest of these sites (e.g., Clarion-Clipperton Zone) will be critical in the development of the fundamental knowledge needed to effectively characterize and monitor these sites.

Transform Faults: Transform faults expose thick sections of the oceanic crust and upper mantle and are thought to be sites of extensive serpentinization. Intra-transform spreading centers provide a unique picture of upper mantle melting and host isolated and unique chemosynthetic ecosystems.

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Expressions of interest from community groups

DESCEND2: The DESCEND2 Workshop, held in January 2016, recommended increased access to hadal regions (>6000m); 2) increased access to the mid-water, comprising most of the habitable volume of Earth; 3) better understanding of the linkages between geological processes and geochemical fluxes, such as at MORs.

ERUPT: "Monitoring of submarine volcanoes, repeat high-resolution bathymetric surveys with autonomous vehicles, sampling submarine volcanic deposits with human-occupied and remotely operated vehicles, and ocean drilling would expand our understanding of the history and nature of submarine volcanism."

SZ4D: The findings from the SZ4D workshop are that there is a pressing need to understand subduction zones given the significant hazards they pose from large earthquakes and explosive volcanic eruptions. The workshop report recommends access to deep submergence vehicles for instrument deployment/recovery and direct observation.