

NDSF NATIONAL DEEP SUBMERGENCE FACILITY

A federally funded center of excellence that provides the scientific community with access to the deep sea



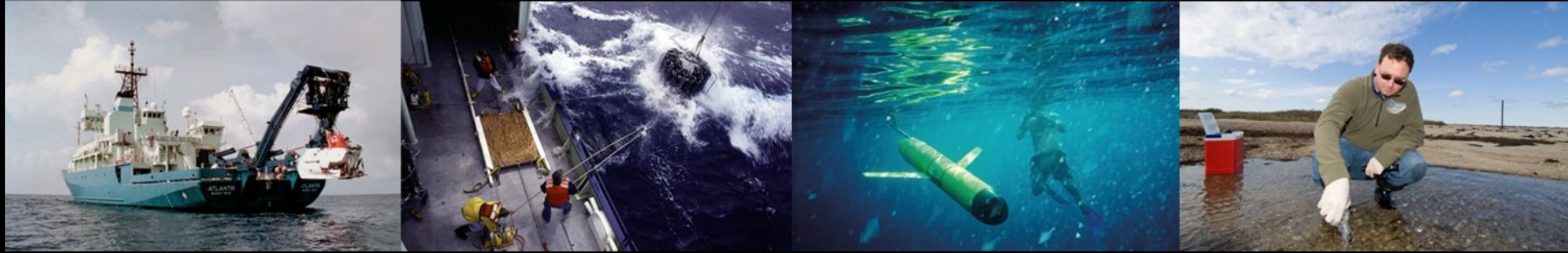
ROV JASON

DSV ALVIN

AUV SENTRY



Woods Hole Oceanographic Institution (WHOI)



- Leading efforts to explore and understand the ocean since 1930
- Home to more than 450 ocean scientists and engineers
- \$280 million annual operating budget, nearly \$220 million sponsored research (~800 projects)
- Broad range of ocean experience, expertise, capabilities, and resources
- Goal to advance knowledge of ocean science and technology
- Unparalleled research facilities, technology, and sea-going capabilities
- MIT-WHOI Joint Program in Oceanography, over 900 students since 1969

Woods Hole Oceanographic Institution

Ocean Research. Discovery. Education.



Exploring the Deep Ocean

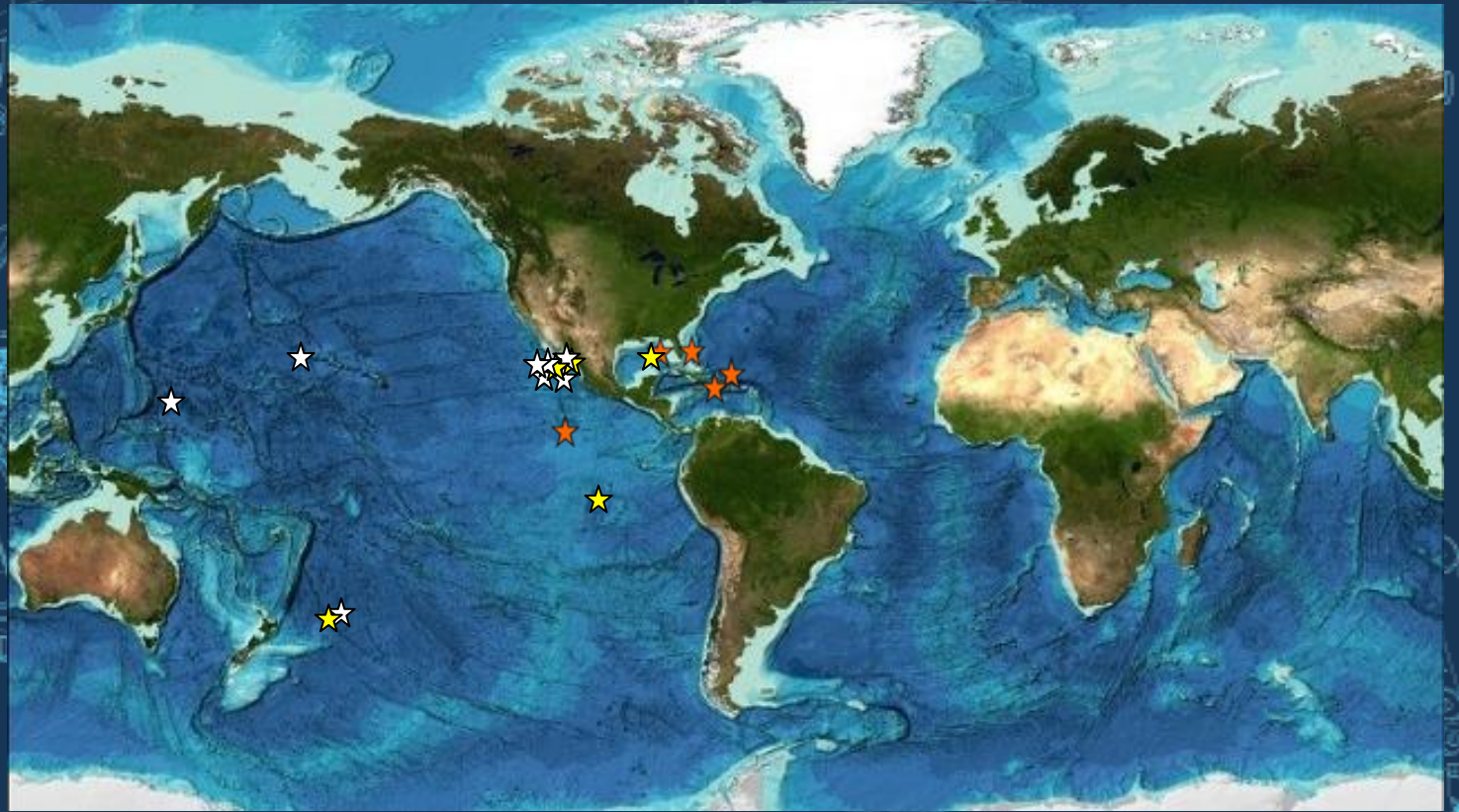
NATIONAL DEEP SUBMERGENCE FACILITY VEHICLES



Medea



2022 Alvin, Jason & Sentry Operation Areas



★ 183 Sentry days/ 6 Cruises – ★ 226 Jason days/ 7 Cruises – ★ 113 Alvin days/ 5 Cruises

NDSE NATIONAL DEEP SUBMERGENCE FACILITY



The Evolution of Alvin



1964



1968



1970



1977



1984

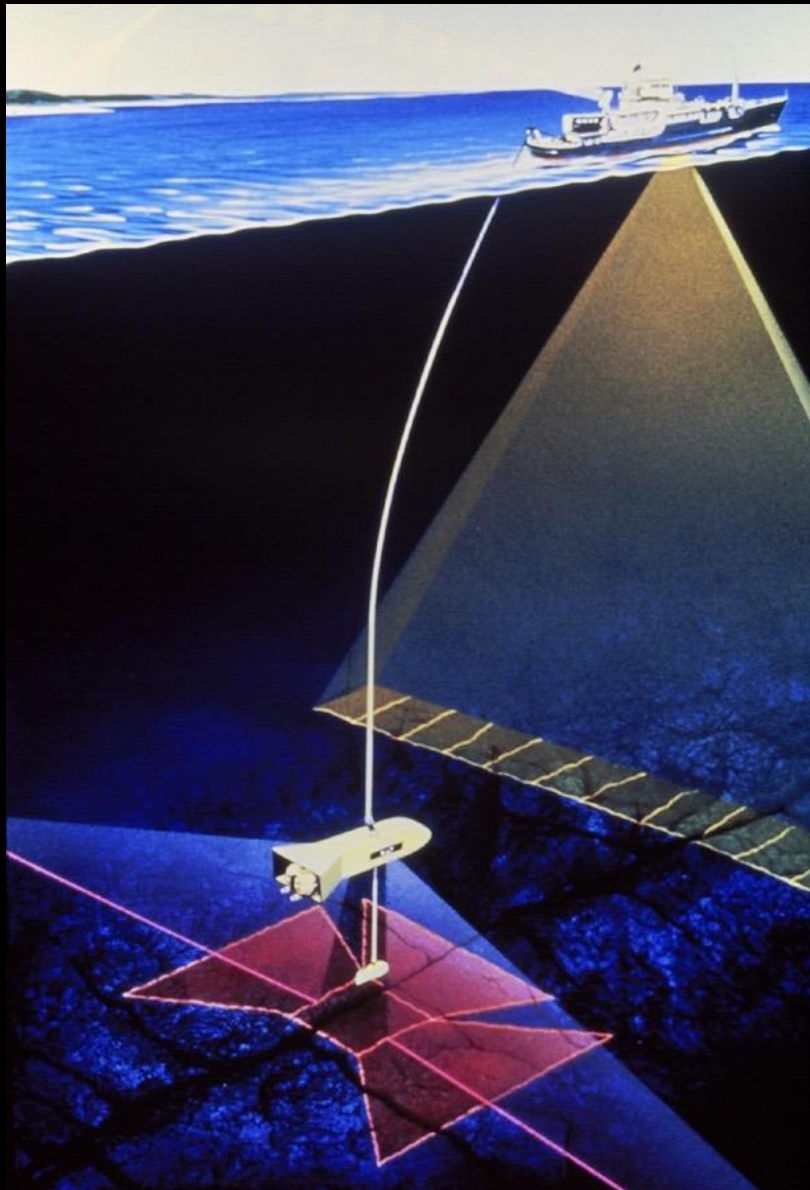


1989

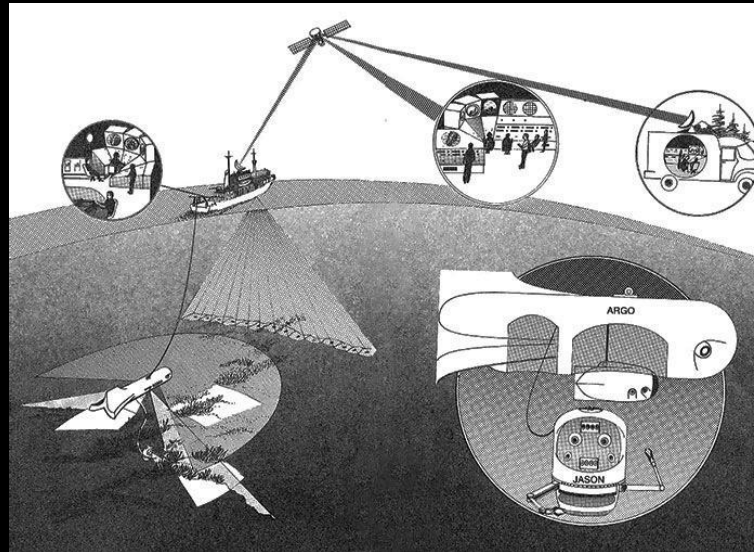


Today

Argo and Jason are Born



Dr. Robert Ballard
builds a team



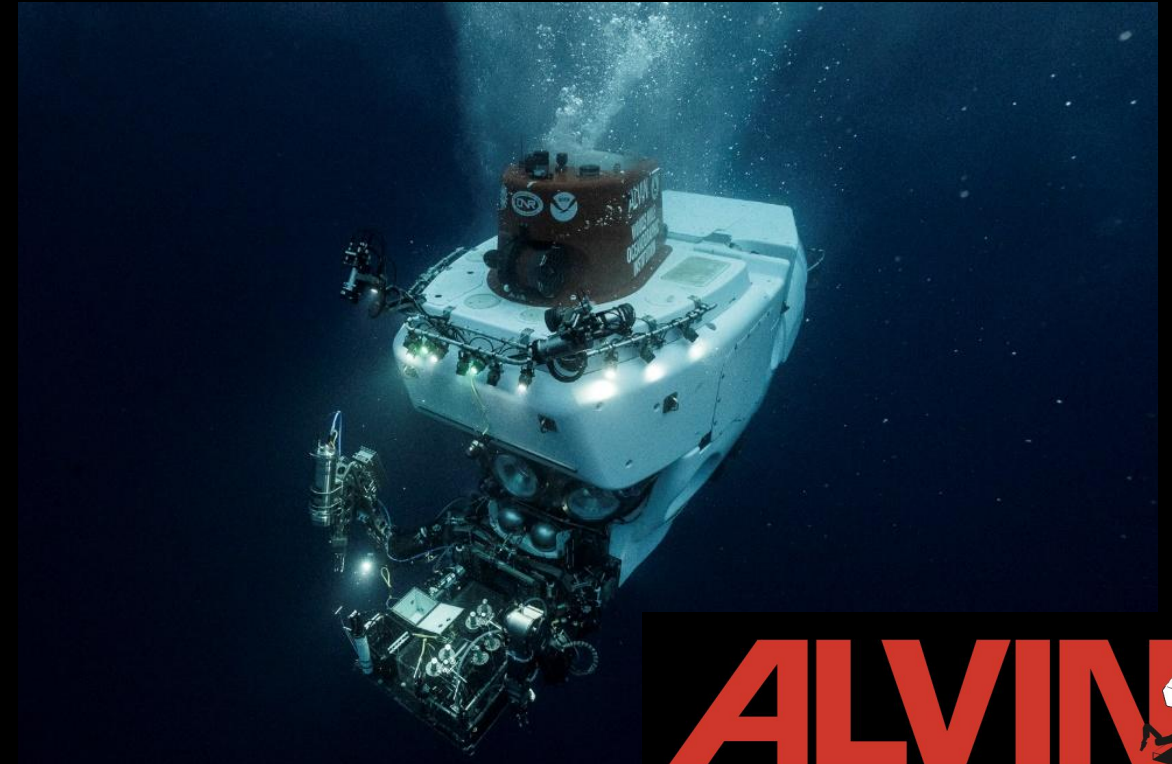
NDSF 2022 Vehicle Operations Summary

Alvin Operations

5 Cruises in 2022/2023

- Fornari (January)
- Arellano (December)
- Young (October/November)
- Valentine (September/October)
- Alvin SVC (July/August)

- **Dives Since Certification: 68**
- **Average Time Submerged: 7.08 hrs**
- **Average Bottom Time: 4.71 hrs**
- **Max Depth: 6,310 m**
- **Average Depth: 2,555 m**



ALVIN 

Woods Hole Oceanographic Institution



Alvin is a high-tech marvel for deep sea research



NDSF 2022 Vehicle Operations Summary

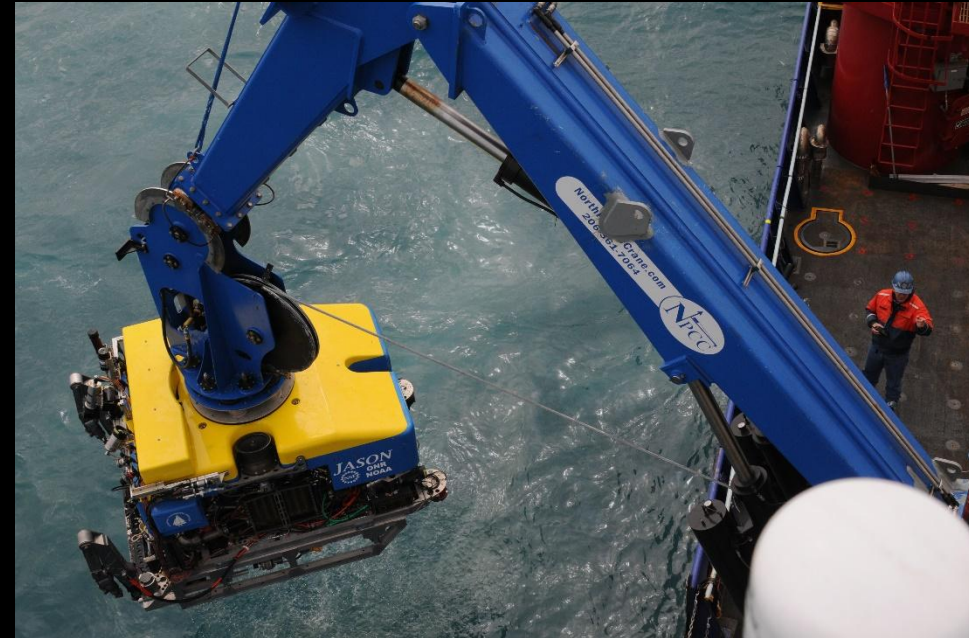
Jason Operations

78 dives

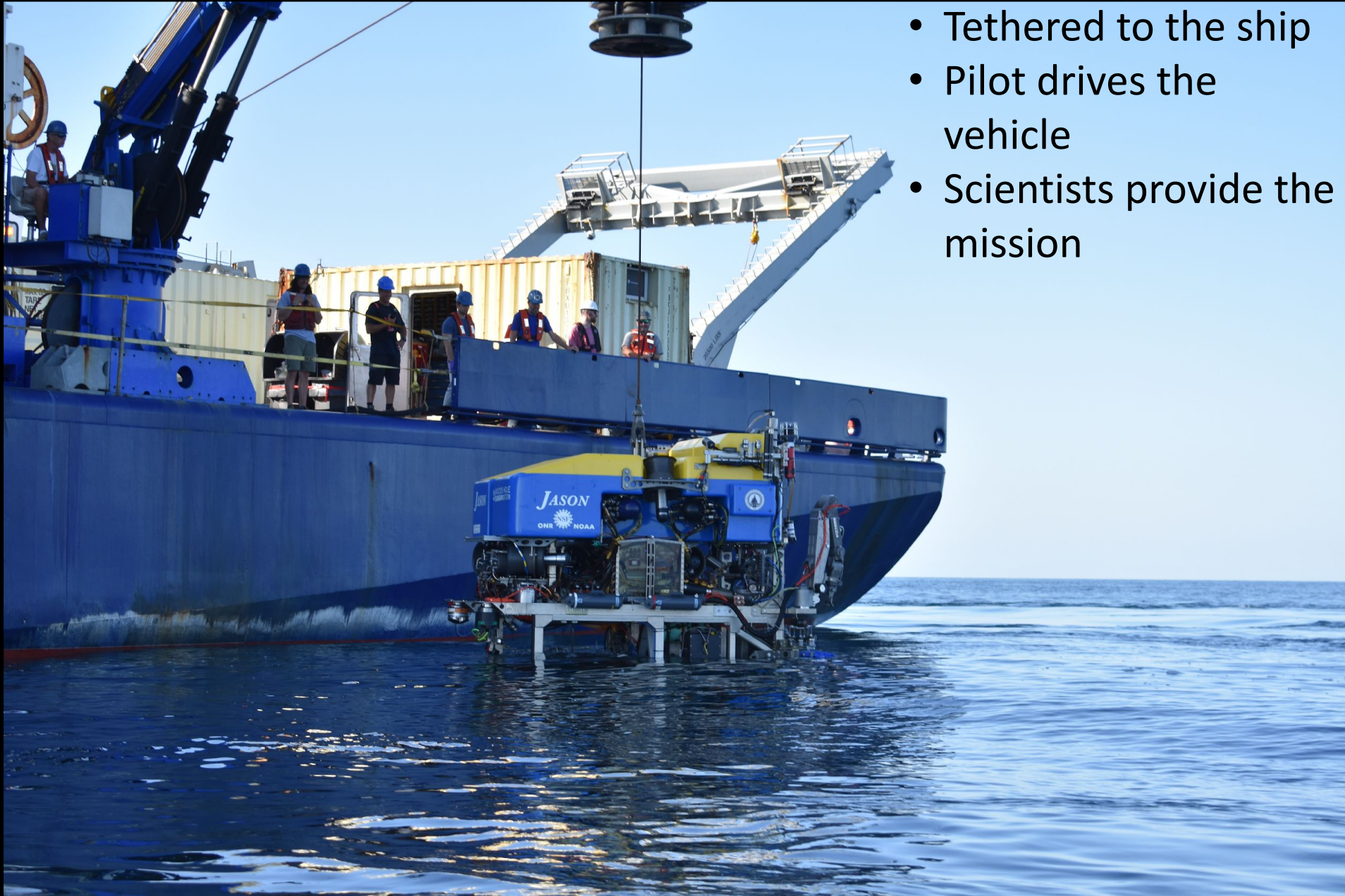
1089.3 hours of bot

1708.6 meters avg

- **158 operating days**
- **7 cruises**
- **78 dives**
- **On bottom: 1089 hrs**
- **Longest: 71 hrs**
- **Average: 12 hrs**
- **Vessels used: *Thompson, Kilo Moana***



Remotely Operated Vehicle (ROV) Jason



- Tethered to the ship
- Pilot drives the vehicle
- Scientists provide the mission

NDSF 2022 Vehicle Operations Summary

Sentry Operations

183 operating days 2022

26 operating days 2023 so far

2022 Cruises Completed

Boettcher - GOFAR

Beinart - Lau Basin

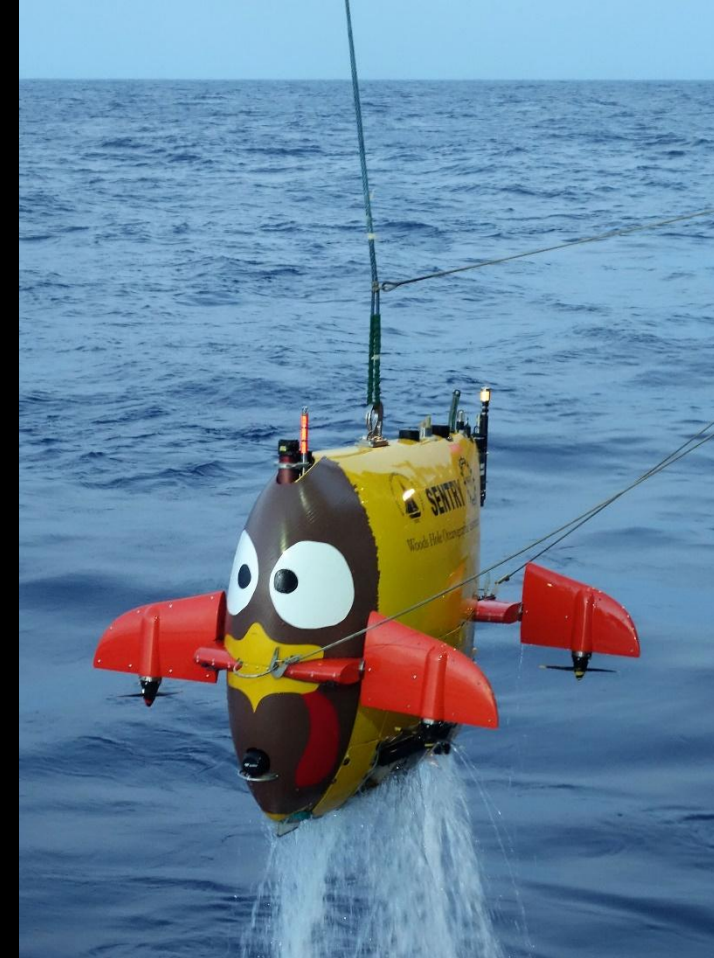
Gartman – Escanaba Trough

Nooner – Axial

Valentine - GoM

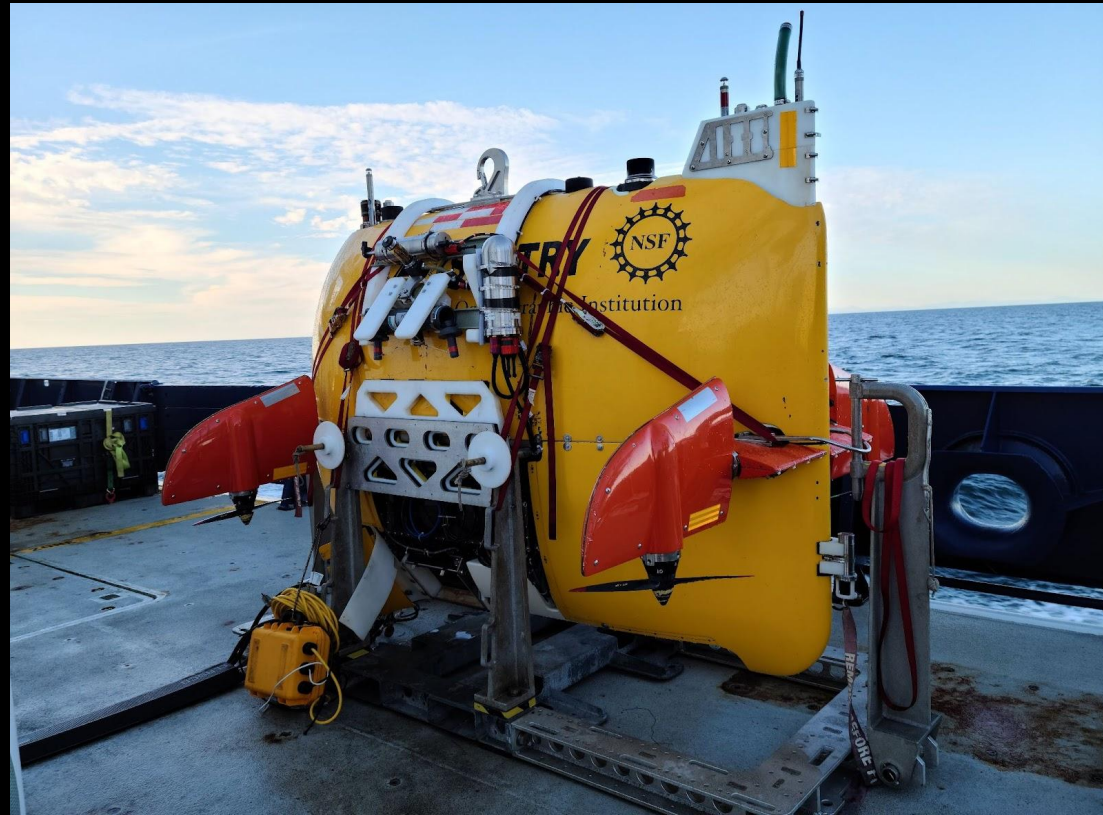
43 dives -2022

Total survey time: 740 hrs

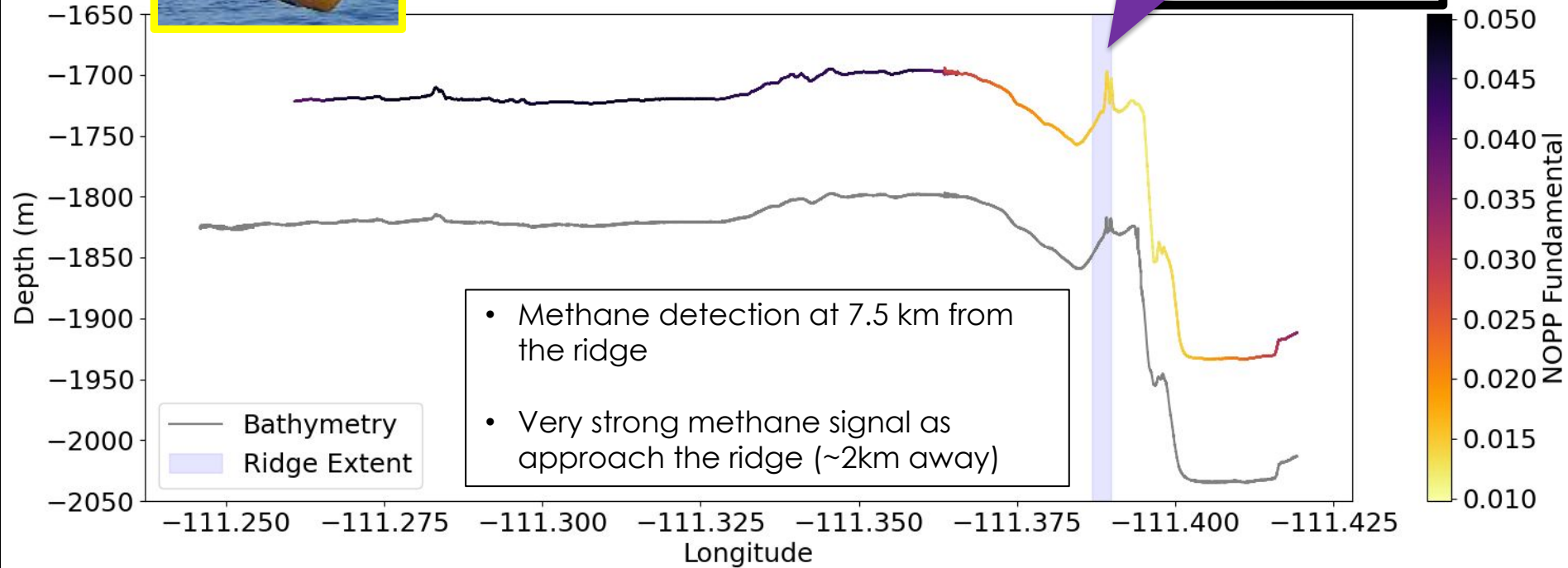
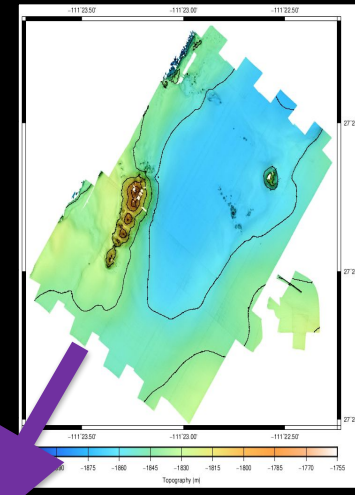


Types of Missions

- Geological / bathymetric mapping
- Biological Surveys
- Exploration
- Autonomy



How do we find plumes/venting?



Diversity, Equity, and Inclusion at NDSF

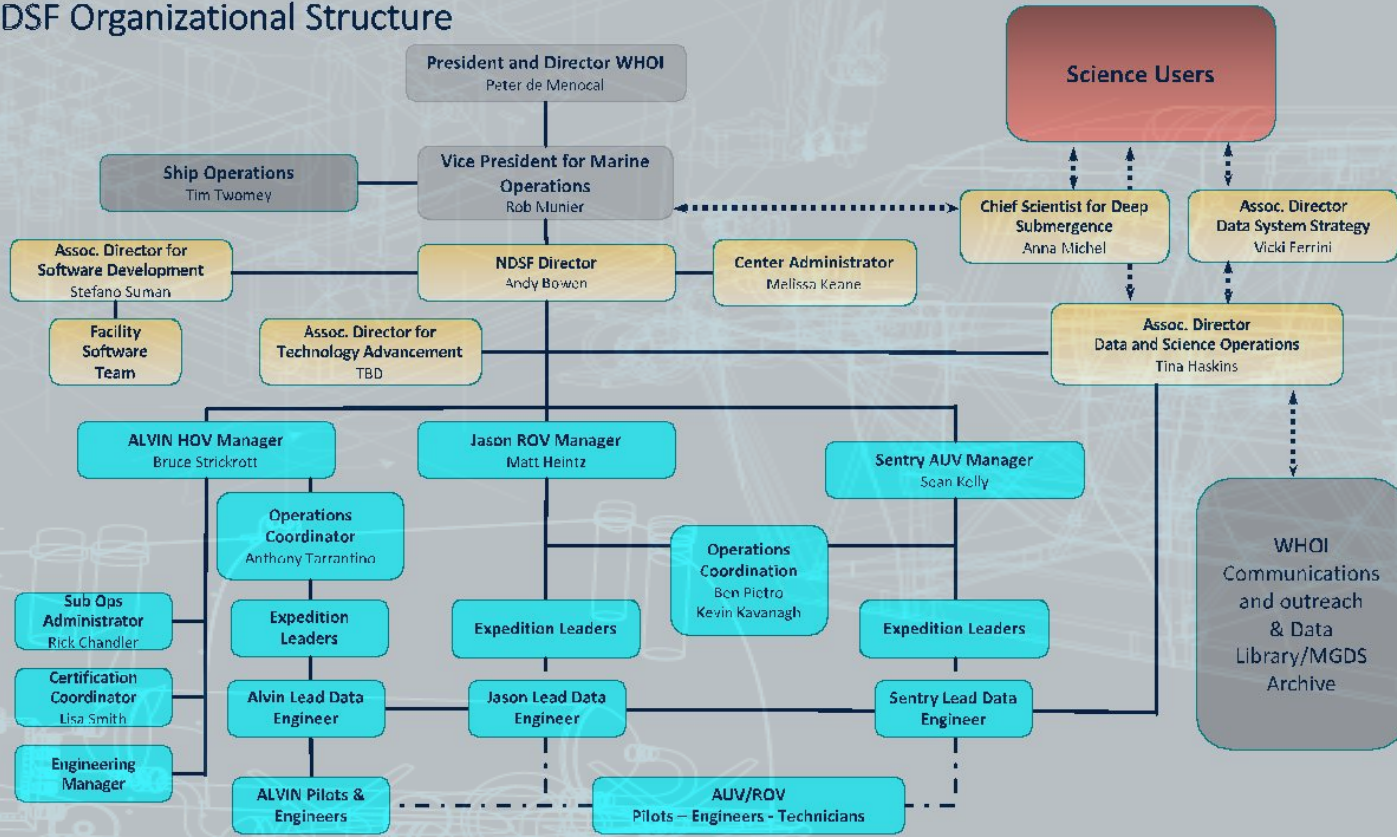
- Intentionally building a more diverse generation of engineers and technicians
- Making internal processes more equitable in hiring and recruitment
- Providing training in every one of our groups
- Developing outreach efforts to engage historically marginalized student populations
- Building a culture that invites and nurtures the potential of all the engineers and technicians

NDSF NATIONAL
DEEP SUBMERGENCE
FACILITY



National Deep Submergence Facility

NDSF Organizational Structure



NDSF NATIONAL DEEP SUBMERGENCE FACILITY

