NDSF SENTRY Update

NDSF NATIONAL DEEP SUBMERGENCE FACILITY

OPERATIONS SUMMARY

2024

50 Dives
6 Cruises
165 Op Days
658 h Surveying
1,689 Km Covered

LOCATIONS
- EPR-9N (McDermott)
- Sea of Cortez (Joye)
- Gulf (Dilorio)
- Axial (Chadwick)
- Samoa (Soule)
- SEPR (Bowles)

VESSELS
- R/V Atlantis
- R/V Revelle
- E/V Nautilus

SENTRY MOBILIZATION ON E/V NAUTILUS - SAMOA

2025

26 Dives
3 Cruises out of 5
52 out of 113 ops days
166 h Surveying
540 Km Trackline

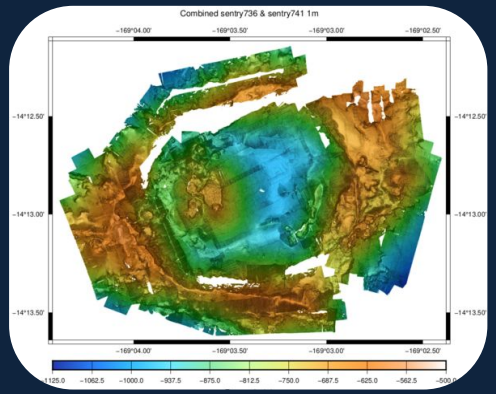
LOCATIONS
- EPR 9N (Achberger)
- San Diego – Engineering
- Axial (Langmuire)

VESSELS
- R/V Atlantis
- R/V Sally Ride

SENTRY 2024 OPERATIONS HIGHLIGHTS

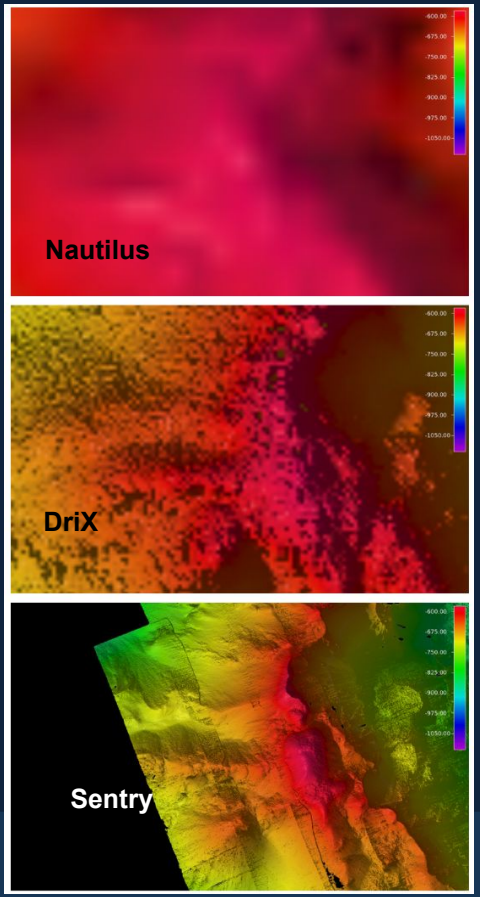
- Past 700 Dive Count
- BOEM Dives in Abyssal Plane
- E/V Nautilus integration and operations
- Remote Operations
- Real Time data to Shore
- Survey around Vailulu'u Caldera
- Continued EPR Surveys
- Axial time series
- Water Column Data collection and Surveys

Vailulu'u Survey (Samoa)



METHANE SENSOR INTEGRATION

Vailulu'u Multibeam Comparison



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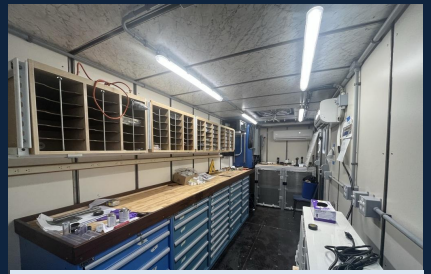
ENGINEERING UPDATES



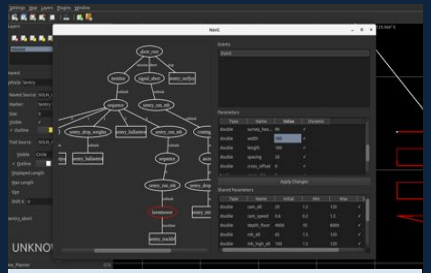
Replacement support van

Teledyne Tasman DVL

Harmonic Servo Pressure testing

- Server Van replacement
- Tasman/Nortek DVL to replace Workhorse
- Legacy hardware replacement (XRM/Servo)
- Mission controller upgrade/replacement
- Electrical switches development
- Chassis replacement
- Phins C7 purchase
- Processing/Storage upgrades

- Engineering Cruise was very successful and critical for moving our engineering program forward.
- 6km Updates and testing
- Wireless link hardware replacement
- WaterColumn Data collection (Done PCAR)
- Waveglider Integration



Mission planner

New Chargers

Processing computer/NAS

NDSF NATIONAL DEEP SUBMERGENCE FACILITY

SENTRY STAFFING

SUPPORT PERSONELL

Sean Kelley – *Program Manager*
Justin Fujii – *Mechanical Engineer*
Zac Berkowitz – *Electrical Engineer*
Matt Silvia – *Mechanical Engineer*
Mike Skowronski – *Electrical Engineer*
Renee Gruner-Mitchell – *Mechanical Engineer*
Isaac Vandor – *Software Engineer*
Tim Joyce – *Software Engineer*
Chris Thierauf – *Software Engineer*
Allisa Dalpe – *Software Engineer*
Rosemary Loer – *Mechanical Engineer*
Noah Bourassa – *Mechanical Engineer (New Hire from MATE)*

INITIATIVES / DEVELOPMENT

- Continued to use MATE program for development of early career personel
Norman Chung – Dilorio Cruise 2024

- Isaiah Ortiz – Summer 2025 Guest student
- Shea Stanley – Summer 2025 - Community College Research Experience at WHOI (CC-CREW)

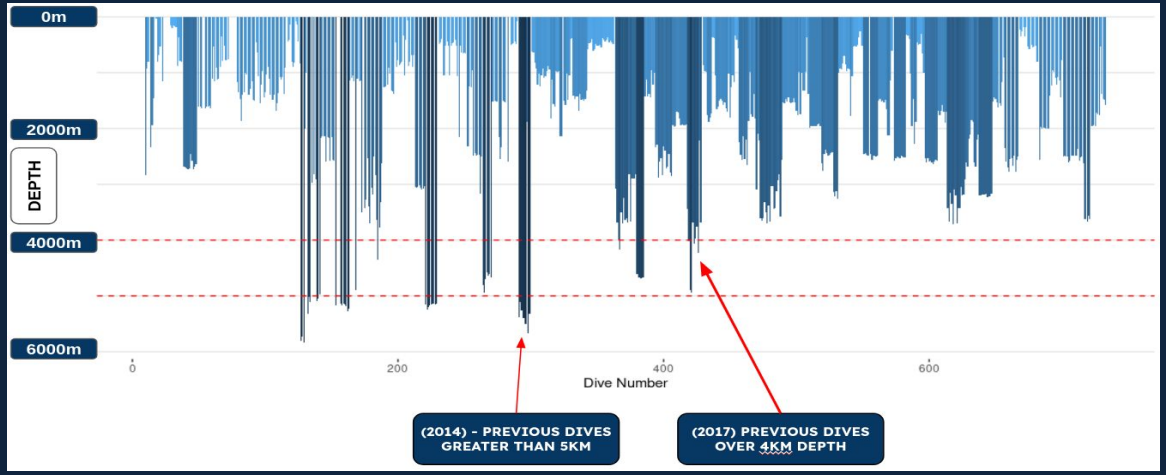
DEEP DIVE FAILURE ANALYSIS

Root cause analysis completed following NA165 and failure to complete 3 out of the 4 dives for BOEM.

Addressing technical failures at ~55000 to 6000m depth

Technical Issues included
1. Thruster water ingress
2. Descent weight failure to release
3. Failure of comp tube

Many lessons learned, repairs and testing largely completed and ready for deep water dives.



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External Root Cause Analysis – Technical Failures at Abyssal Depths

INTRODUCTION

During cruise NA165 on board the E/V Nautilus, AUV Sentry conducted a series of dives funded by the Bureau of Ocean Energy Management (BOEM) to perform surveys of the abyssal plain in the South Pacific US EEZ. These dives reached near AUV Sentry's maximum depth, ranging from 5,400 to 5,700 meters posing significant challenges to achieving our mission objectives. This document outlines the technical obstacles encountered during the dives, highlighting specific failures, their conditions, and the lessons learned. By examining these issues, we aim to provide insights that will guide future operations in similar environments and mitigate potential risks.

TECHNICAL TERMS AND DEFINITIONS

- **Thruster** – The primary propulsion device used by AUV Sentry to move through the water