



# NATIONAL DEEP SUBMERGENCE FACILITY

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WOODS HOLE  
**OCEANOGRAPHIC**  
INSTITUTION

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**AUV  
SENTRY**



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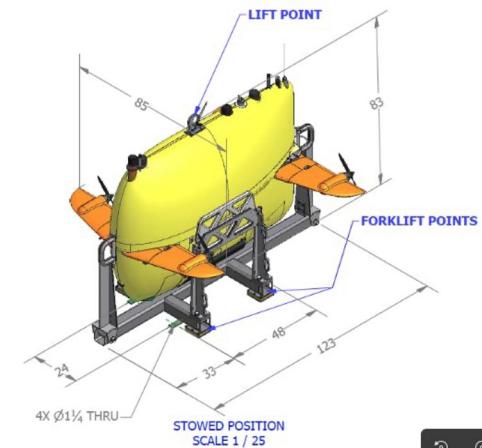
**Sean Kelley**

**AUV Sentry Program Manager**

# AUV SENTRY

6000M AUV

**AUV Sentry serves as a workhorse for ocean science, consistently delivering high-quality data across a wide range of missions. Its robust design and adaptability have made it a cornerstone for seafloor exploration.**



**780 DIVES**

**20 YEARS OF OPERATIONS**

**9,462 HOURS OF SURVEY**

**23,511 KM OF TOTAL TRACKLINE**

**Highly maneuverable platform**

**Large and flexible payloads**

**6,000m depth rating**

**Fly away system**

**Concurrent Operations**

**Superior data processing pipelines**

As of Dec 2025\*

# SENTRY PAYLOADS

Standard sensor suite designed around the large scale needs of the scientific community. Large payload to accommodate as many sensors as possible, at the same time. Enabling science discovery at scale.

## SONARS

**Workhorse DVL 300Khz**

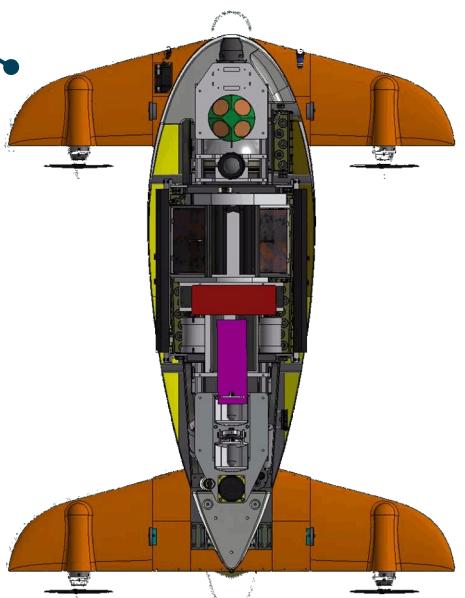
**Edgetech Sub-Bottom 4-24Khz**

**Edgetech Sidescan**

**120/230/540Khz**

**EM2040 Multibeam 400Khz**

**OA Sonar - 900Khz**



**Magnetometer (x3)**

**Oxygen Concentration**

**Optical Backscatter**

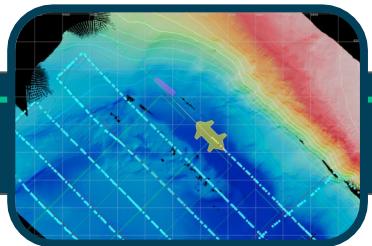
**CTD**

**Camera**

## SENSORS

# DATA PRODUCTS

AUV Sentry not only collects high-resolution data during its dives, but also processes and delivers a suite of standardized data products to the scientific community.

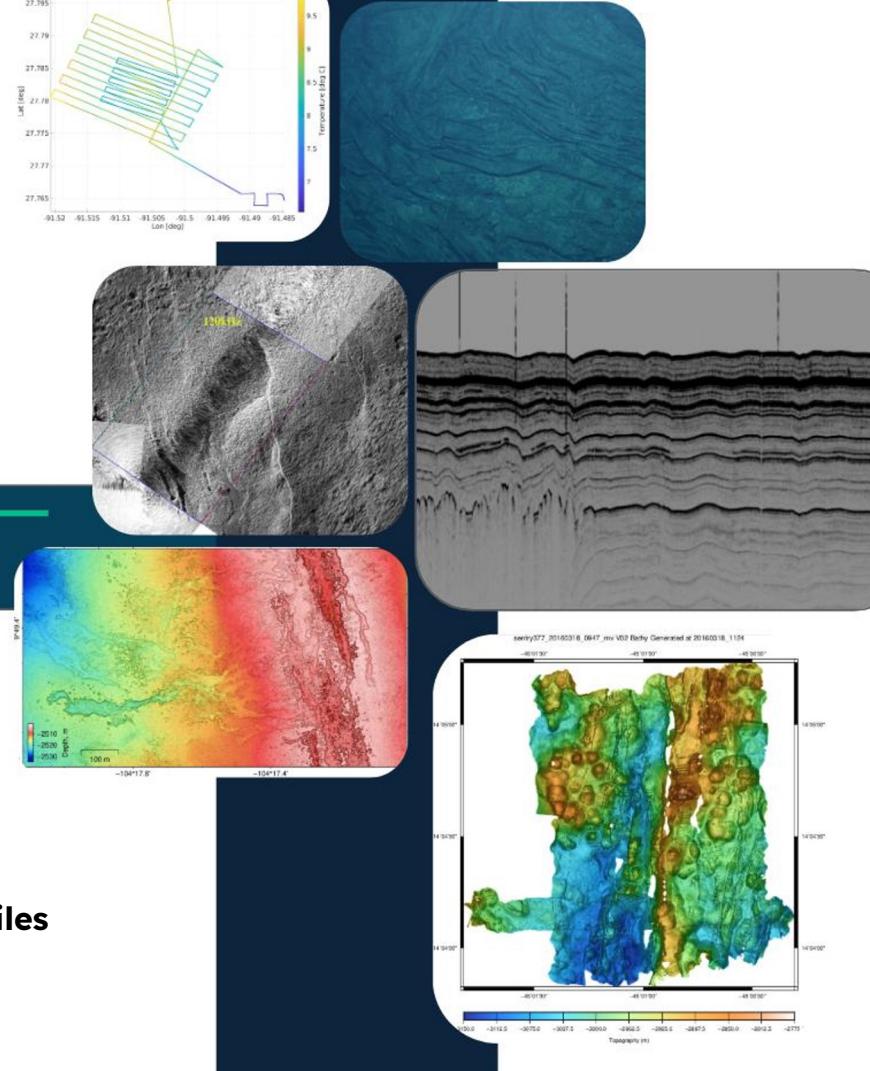


## Standard Data Products

Multibeam  
Sidescan  
Photo processing

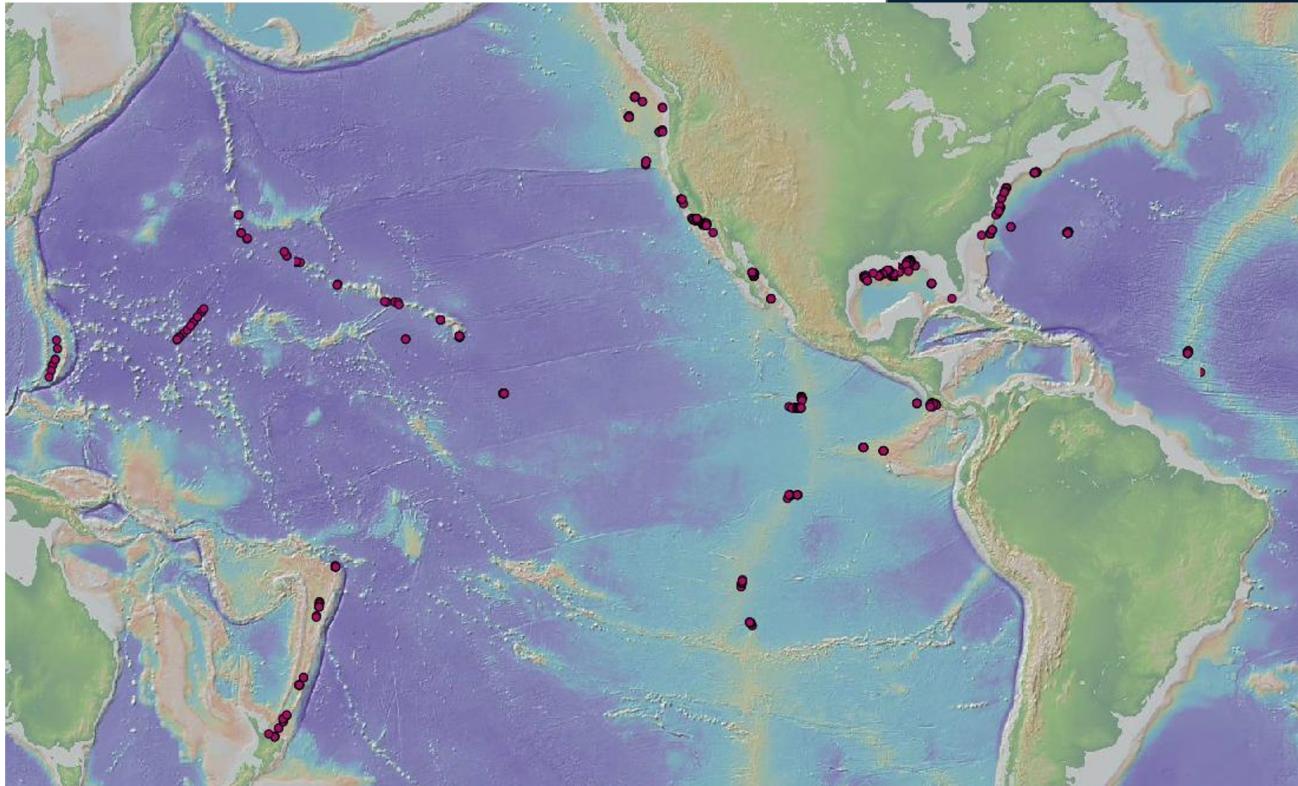
Re-navigation  
Science data plots  
Engineering plots

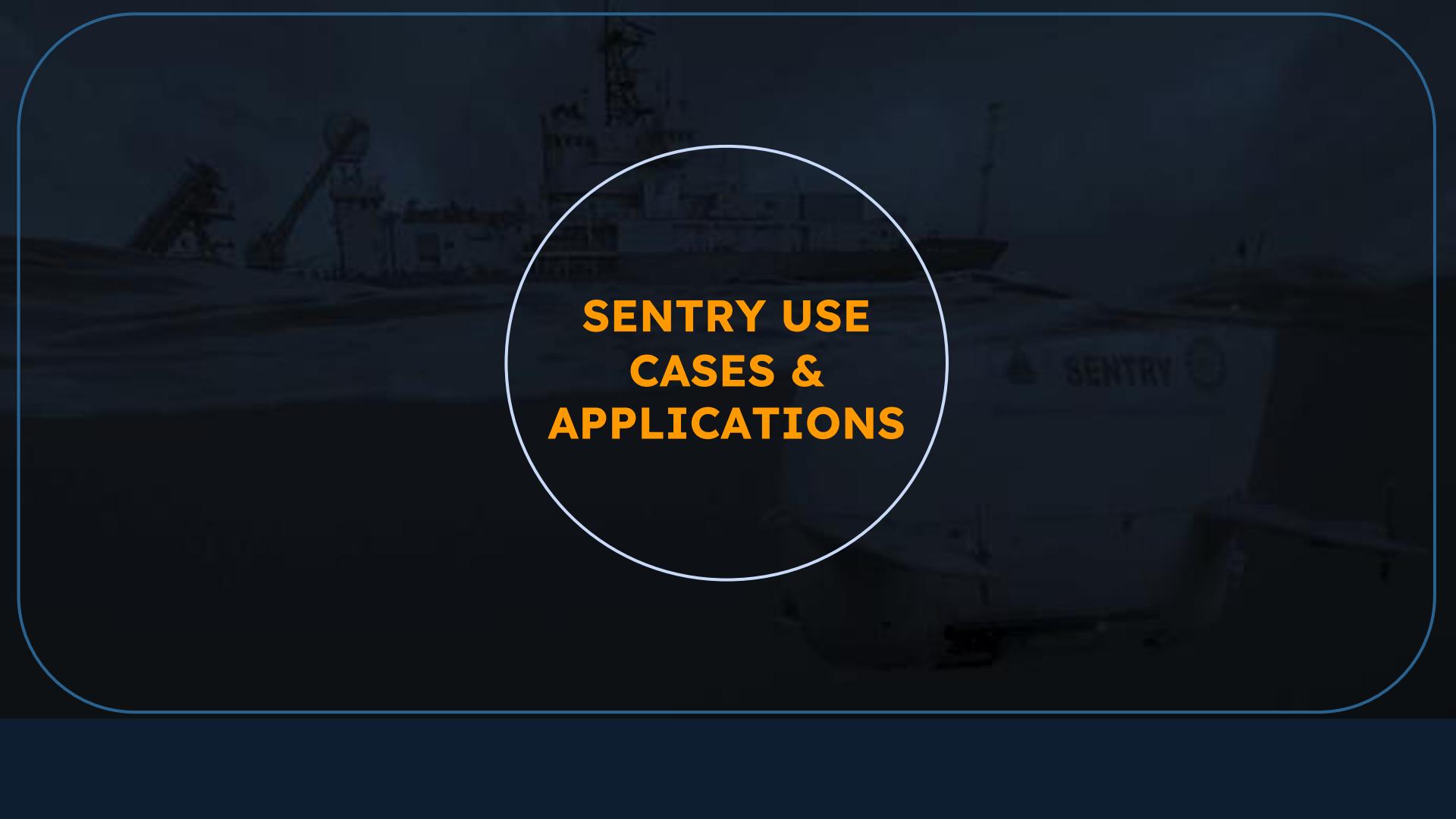
Matlab files  
CSV files



# WHERE DO WE OPERATE?

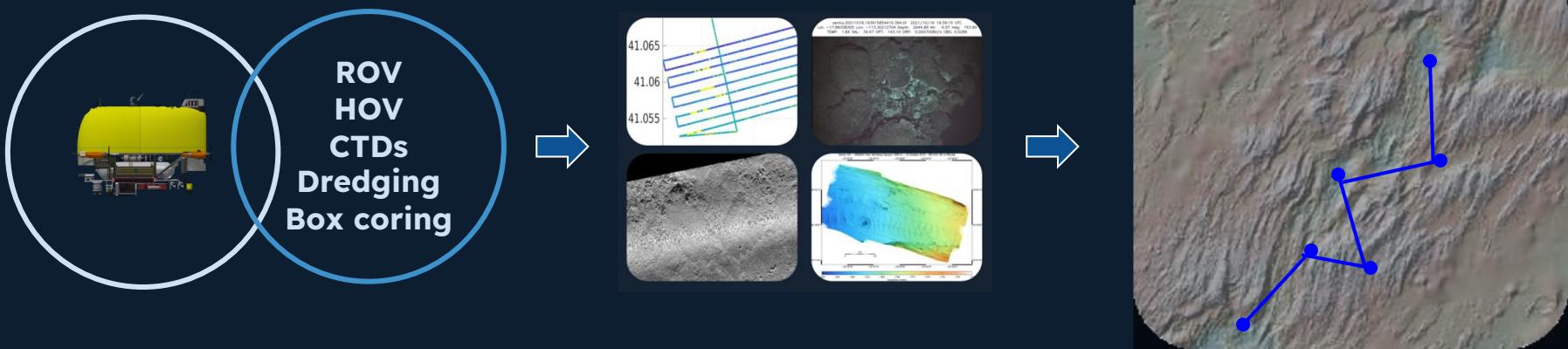
20 Years of Sentry Dives





# **SENTRY USE CASES & APPLICATIONS**

# SENTRY & ROV/HOV OPERATIONS



## COMBINED OPS

Sentry can be added to many programs to increase efficiency, add a high level view of the worksite, and create a better data product

## DATA

Data products are produced after each dives, photos, MB, Sidescan, sensor plots over navigation and available to the science user

## DIVE PLANNING

Better informed with high fidelity data about your worksite

# CONCURRENT OPERATIONS

AUV Sentry enables concurrent operations—mapping the seafloor at high resolution while ROVs, CTDs, dredges, and coring operations collect samples and observations in parallel, saving time and enabling more efficient use of ship time.

70 %  
of Sentry cruises  
include Concurrent  
operations  
(CTDs, Dredging, ROVs)

60 %  
of Sentry cruises  
include ROV or HOV

## Operating with Alvin - AT50-21

DeSSC-McDermott-SimOps-May-2024\_FINAL.pdf

Collected vent fluids

Recovered & redeployed  
temperature loggers, tide  
gauge, current meter

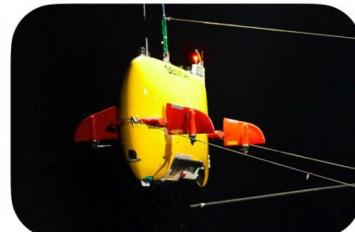
Imaging

HOV Alvin



Mapping: multibeam and other  
bathymetry products

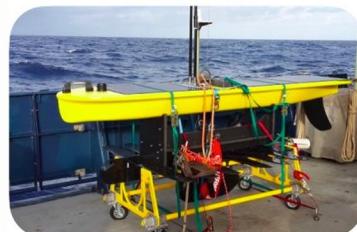
AUV Sentry



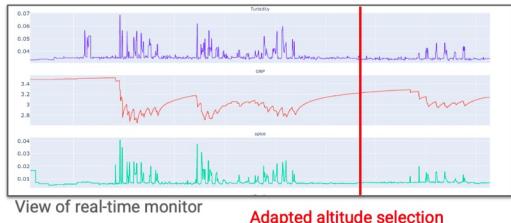
'Over the horizon'  
communications with Sentry  
during rock coring, CTD  
deployments

Monitor Sentry during full,  
simultaneously-operated Alvin dive

WaveGlider



During "waffle" characterization, Sentry altitude was adapted to uncover  
complex plume morphology by monitoring streaming *in situ* measurements



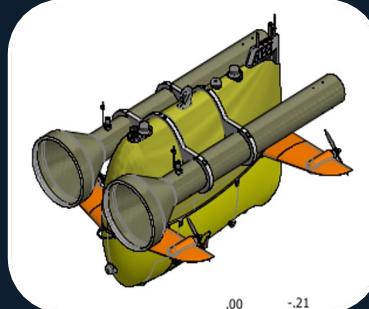
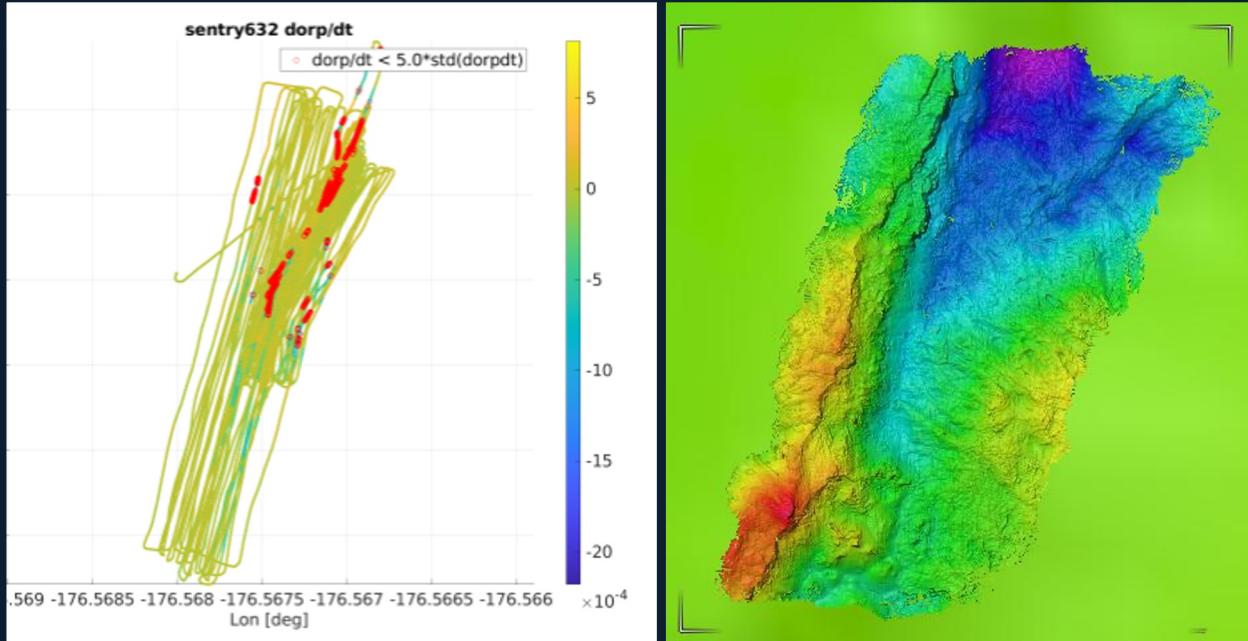
By operating independently yet in coordination with the ROV, Sentry can map, survey, or scout ahead in parallel with ROV activities, dramatically increasing the efficiency of seafloor exploration. This approach provides a multi-scale view of the seafloor environment that neither vehicle could achieve alone.

# LARVAL SAMPLING

Larval sampler developed at WHOI allows for near bottom larval samples, allowing Sentry to pump significant volumes of water over the course of the dive.

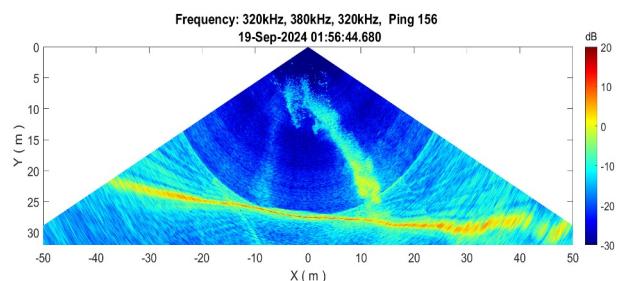
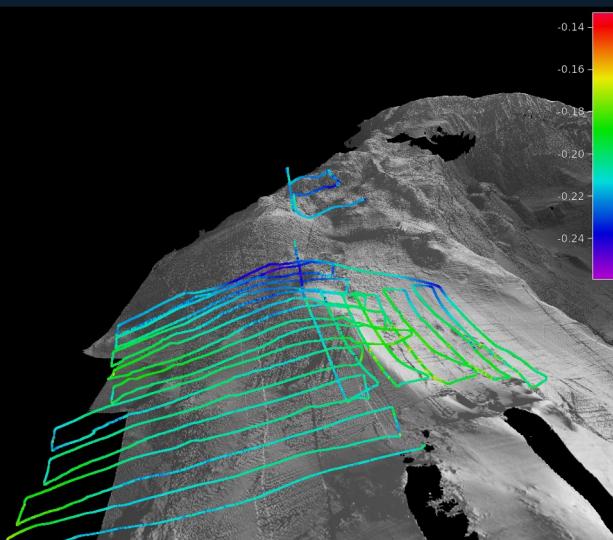
## SENSORS

- SyPRID
- Optical BackScatter
- CTD
- Optode



# Autonomous Plume Hunting

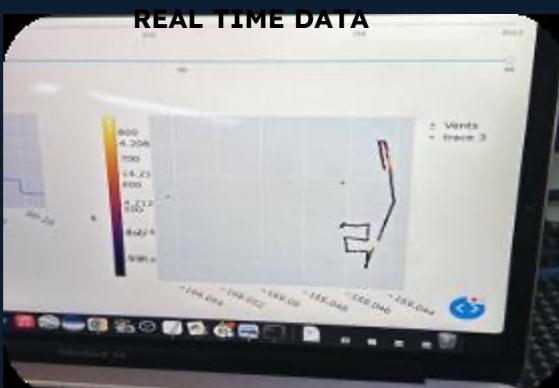
- **Two dives over the vent**
- **Water Column Data**
- **Real Time Sensor data topside and to shore**
- **Developed algorithms for plume detection**



## Water column data



## CO<sub>2</sub> Sensor

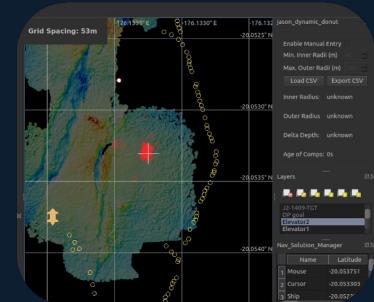
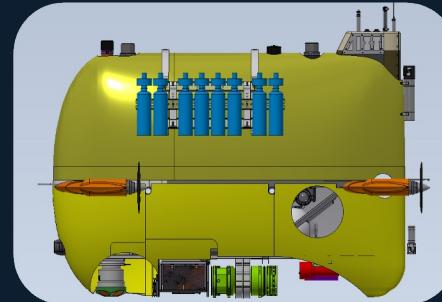
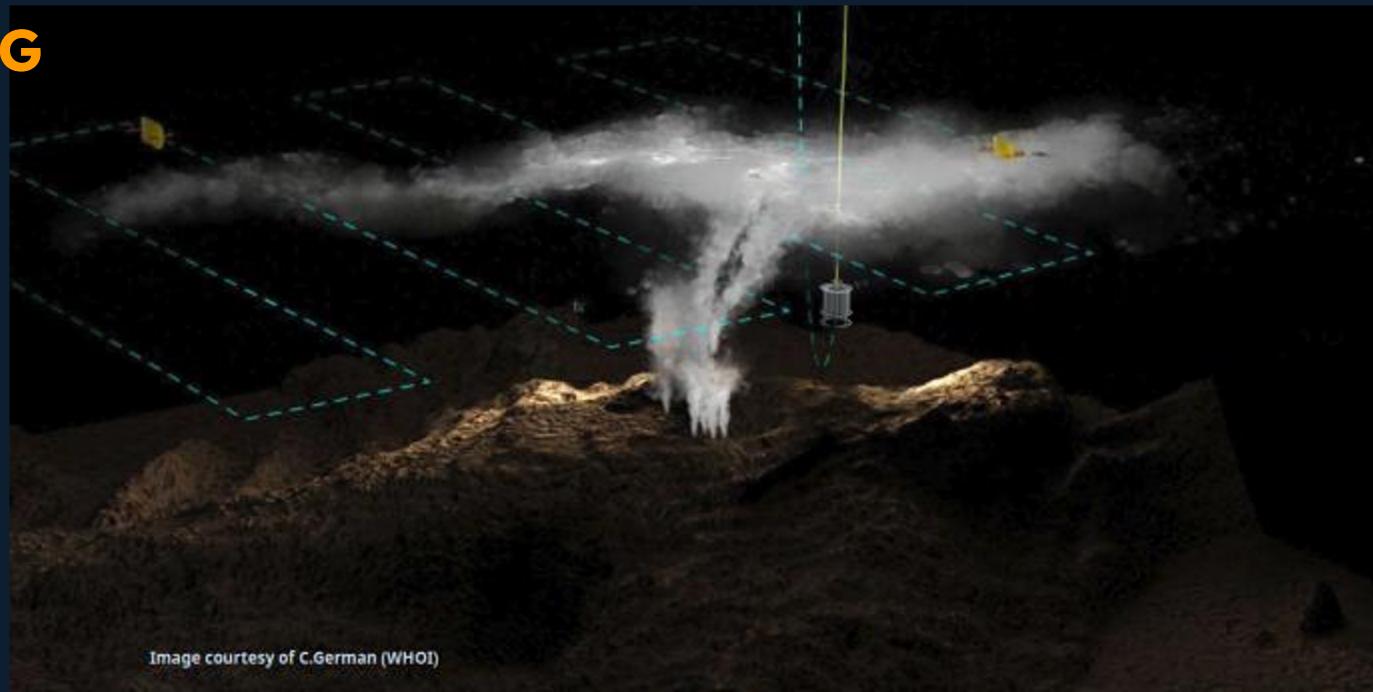


# PLUME HUNTING

**Sentry used as a plume sniffing and hunting vehicle that can cover large areas around a known vent field to identify and characterize plume dispersal.**

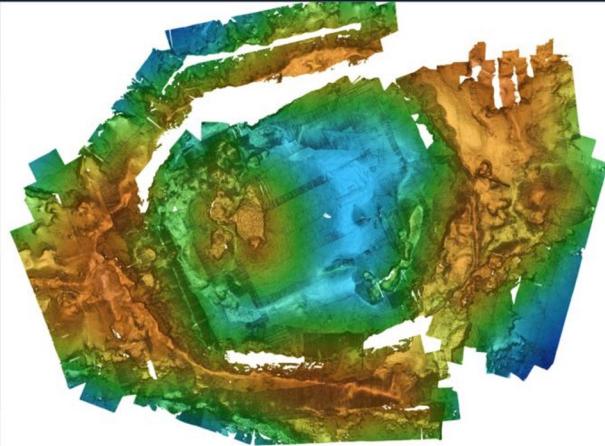
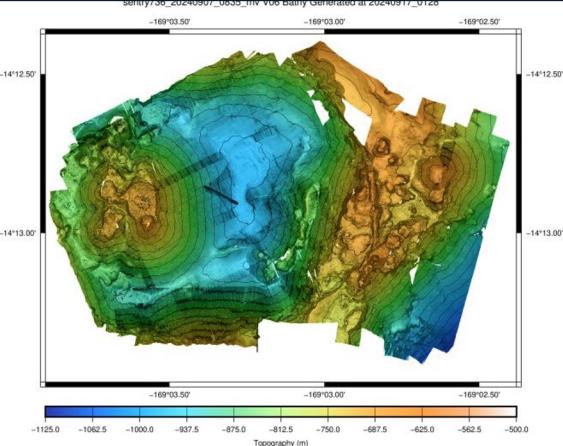
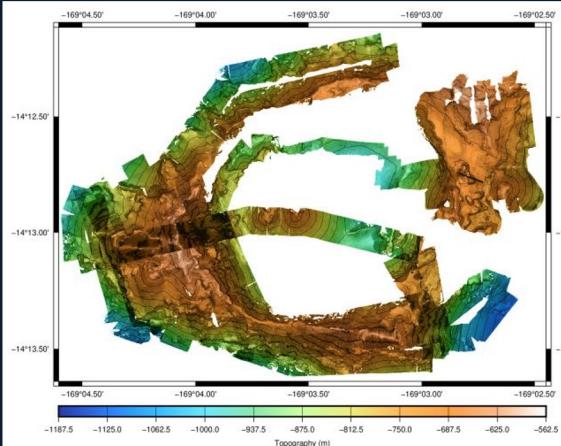
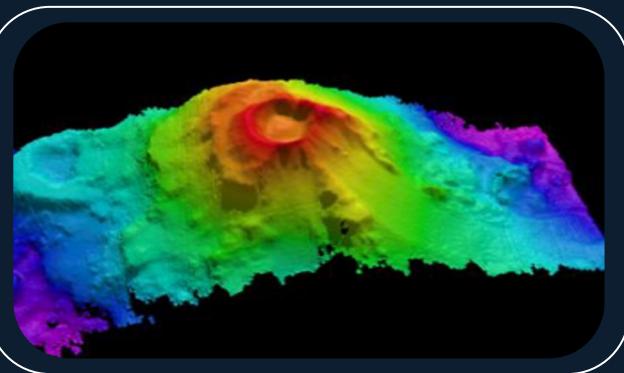
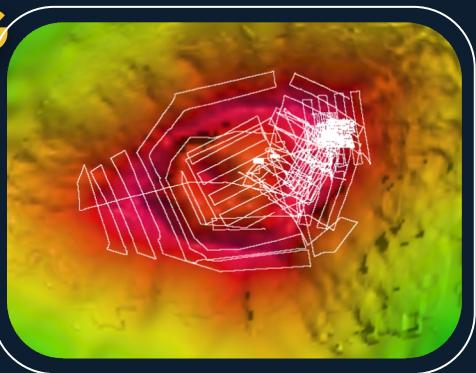
## SENSORS

- Methane Sensor
- Water Sampler
- Real time vehicle data
- Optical Backscatter
- CTD



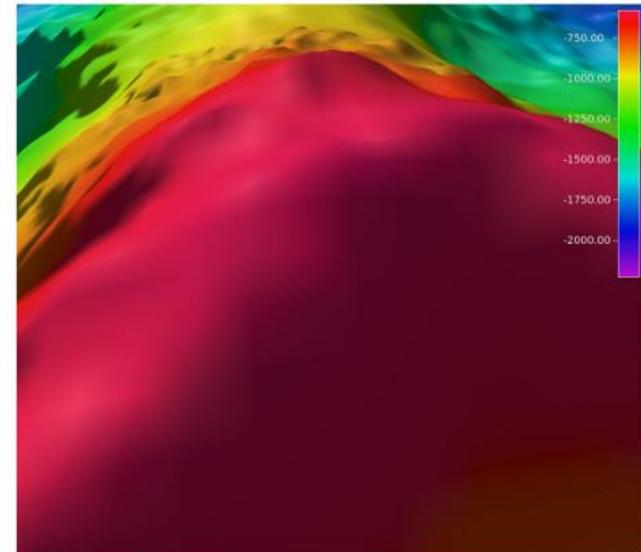
# VAILULU'U -- MAPPING

- **Sentry736/Sentry740/Sentry741/Sentry742**
- **Multibeam and scalar science data**
- **Very successful in a high relief environment**



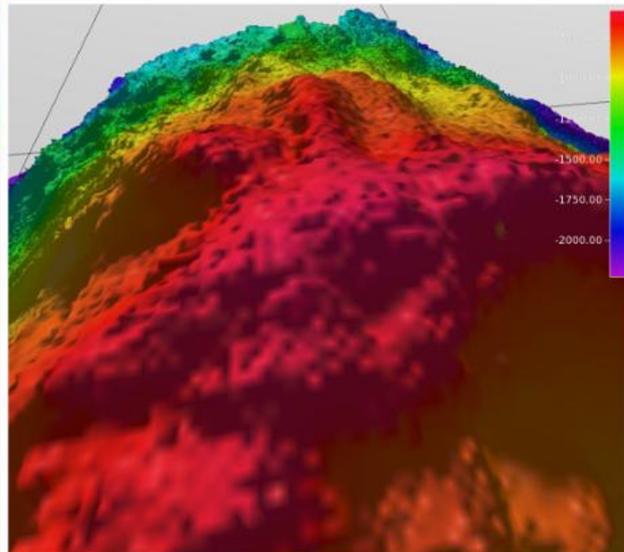
# HIGH FIDELITY AUV DATA EXAMPLE IN RUGGED ENVIRONMENTS

E/V NAUTILUS



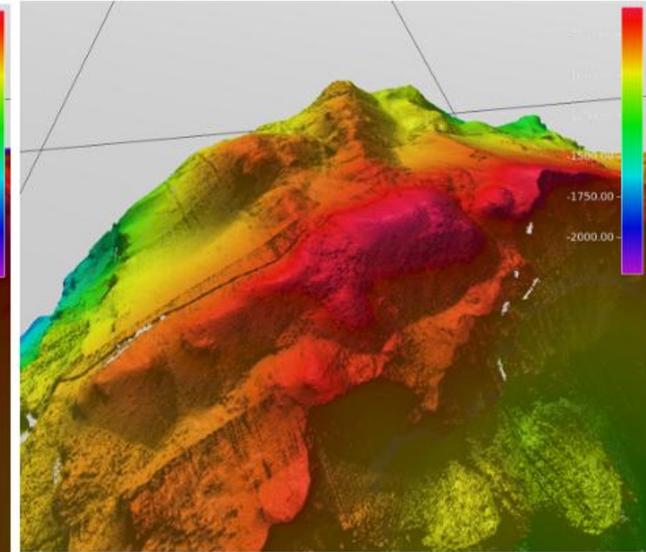
Vessel

ASV DriX



Surface Vehicle  
10m Grid

AUV SENTRY



AUV Sentry  
1m Grid

Multibeam data collected at Vailulu'u, the most active Samoan submarine volcano, during NA164 & NA165 from the E/V Nautilus

# IMAGING AND CAMERA SURVEYS

- Color corrected and annotated photos

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sentry.20230706.033758924724.145.tif 2023/07/06 03:37:58 UTC  
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THANK YOU



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