NDSF Data & Software Initiatives Update

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NDSF NATIONAL DEEP SUBMERGENCE FACILITY

General Data & Software Updates

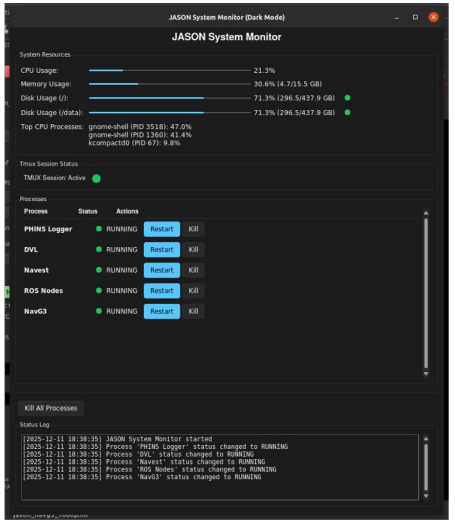
- Enthusiastic reviews for improvements to Alvin Data package **PCAR 2025**
  - Echoing these changes across vehicles
- Evaluating reduced shipboard science party watch responsibilities for Jason cruises **PCAR 2025**
- Request for video data to be hosted online so data is accessible to everyone **PCAR 2024**
  - Opening the door with changes to non-commercial licensing
  - Paving the way for use of AI/ML Pipelines
- AIS Overhaul underway working to deliver more consistent results across cruises. **PCAR 2025**

General Data & Software Updates

2025 Software Focus: Vehicle and System Stability

Enhance reliability through critical bug fixes and improved topside UI tools that reduce troubleshooting time and maximize science productivity

Initiative	Implementation	Impact
Core stability fixes	Alvin C&C crash reduction, Jason dead-reckoning navigation jump fixes, and Sentry DVL logic improvements	Improved data quality and increased time available for science operations
Standardized data processing pipelines	Continued DSLPP pipeline rollout enables platform-independent sensor data analysis and cross-vehicle comparison	Enables comparative analysis, consistent quality control, and lays foundation for ML on NDSF datasets across vehicles
Refined topside interfaces	Process monitoring for Jason and new NavG3 features simplify system monitoring and reduce troubleshooting time	Operators spend less time monitoring system performance and diagnosing issues
Improved mapping tools	mbquickmap provides tighter mbsystem integration, reproducible workflows, and faster feature rollout	Simpler customization and re-processing by science parties; development tracks core mbsystem updates



2026 Software Preview: Foundations for a “train once, deploy everywhere” future

ROS2 migration	Vehicle software overhaul in collaboration with WHOI Oceanographic Systems Lab and Acoustic Communications group	Accelerated innovation cycle for science driven features across multiple platforms

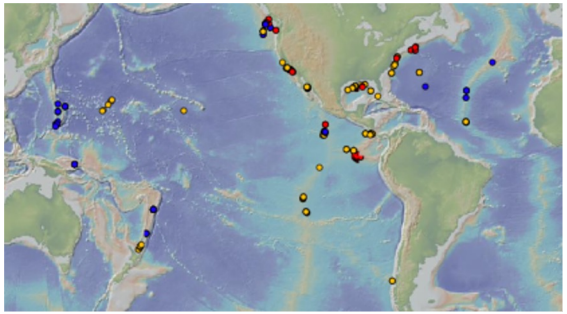
Deep Submergence Community Engagement

- Fall Data Workshop in conjunction with Ocean Floor Explore
  - Shifting the philosophy to regard data management as a core tenet of ocean science.
- Workshop brought together a divers group of scientists, data managers, engineers, and vessel operators from various institutions.
  - 26 participants from 8 countries
  - 46% mid-career, 36% early career, 18% PI/Chief Sci
- Motivation
  - Address friction points in the entire data continuum
  - Improve cross-platform user experience
  - Efficiency, lessons learned
- Main Outcomes
  - SubSea Data Collective Wiki - under development
  - Development of Tool & Application priorities
  - White paper
- Big thanks to Schmidt Ocean Institute (funding and logistics)
- Two AGU Sessions, Friday: OS51C & OS52A

Streamlining NDSF Data into FAIR Access at MGDS

Historical Challenges:

- Heterogeneous data sources
- Legacy media formats
- Fragmented metadata
- Manual MGDS file set curation



MGDS
MARINE GEOSCIENCE DATA SYSTEM

The Solution:

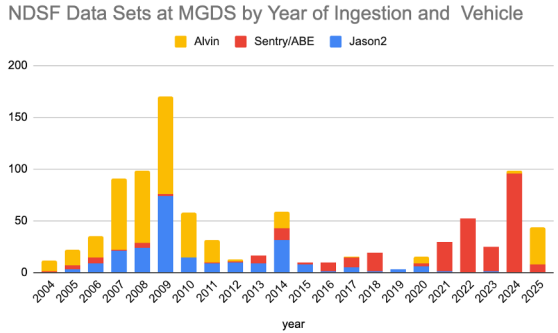
Semi-automated Python pipeline creates YAML serialization files:

- API & lookup queries harvest metadata from R2R, WHOI DLA, MGDS; operator verifies
- Pattern matching detects data file presence
- Cruise addenda record file modifications

```
SAMPLE_cruise_config.yaml
entry_id: AT99-99
dms_release_date: 2025-12-14
investigators:
  person_id: Livingston_Kingston
  institution: edu.sesame
Platform_folder: Atlantis
data_sets:
  suffix: scc
```

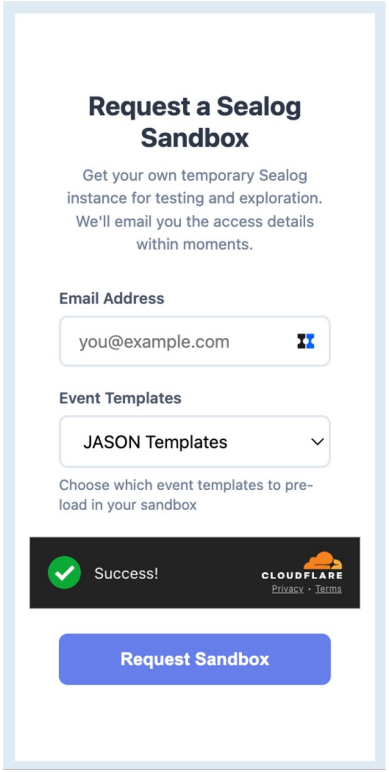
What's next:

- Systematic processing of historical backlog
- Additional cross-vehicle standardization
- New vehicle support
- Addendum annotations

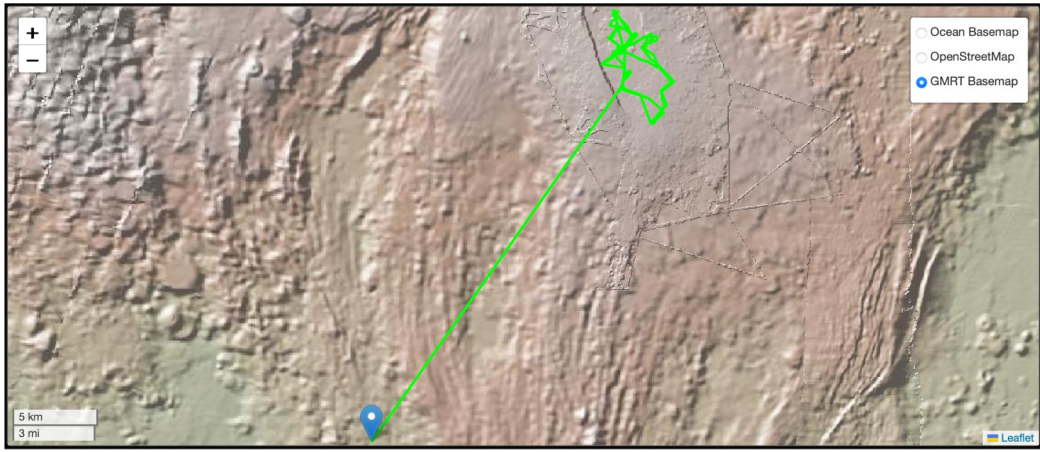


Sealog Updates

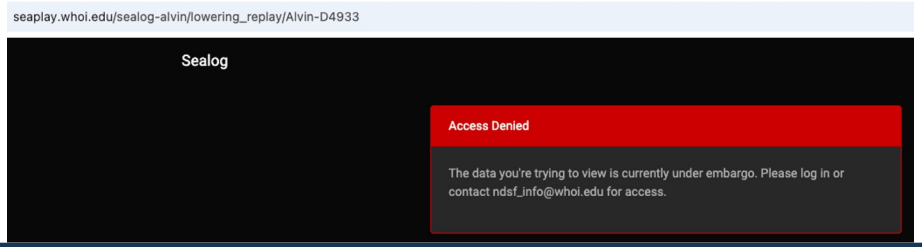
- Stable platform
- Scoping plan to migrate database from MongoDB to PostgreSQL
- Successful deployment of Sealog Sandbox



- Addition of GMRT (basemap of GeoMapApp) tileserver to Atlantis/Alvin and Jason systems



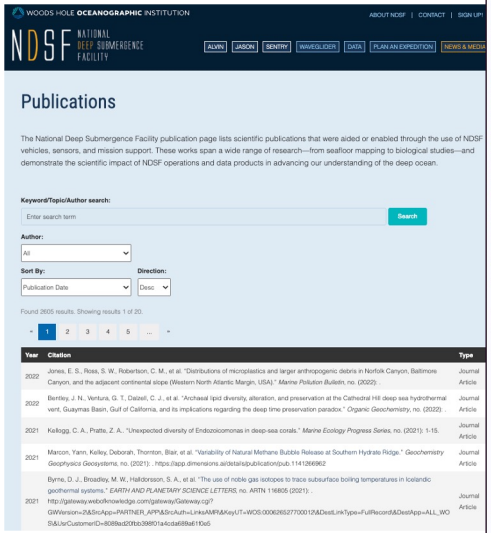
- Unauthorized users or cruise/dives under embargo now met with Access Denied message.

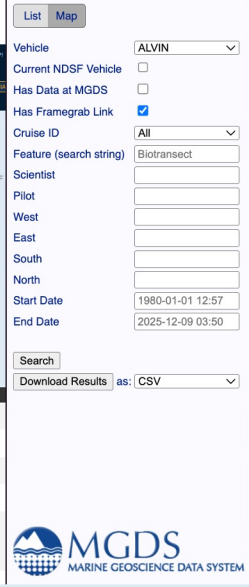


Facility Updates

- Mixed review of pre-cruise planning checklists **PCAR 2024, 2025**
- Vehicle Metadata Mapper Updates
  - Metadata is fully up to date
  - Toggles for framegrabs, MGDS data access, and current NDSF vehicles
- Vehicle Dive Stats
- Reviving the NDSF Bibliography

https://ndsf.whoi.edu





Vehicle Dive Stats

Select Time Range: Current Year *(Jan 1, 2025 → Dec 12, 2025)*

Alvin		Jason		Sentry	
Vehicle Type	HOV	Vehicle Type	ROV	Vehicle Type	AUV
Number of Expeditions	4	Number of Expeditions	3	Number of Expeditions	5
Number of Dives	43	Number of Dives	69	Number of Dives	40
Avg. Max Depth (meters)	-1977	Avg. Max Depth (meters)	-1175	Avg. Max Depth (meters)	-2643
Total Dive Time (hours)	299	Total Dive Time (hours)	414	Total Dive Time (hours)	592
Total Time on Bottom (hours)	190	Total Time on Bottom (hours)	302	Total Time on Bottom (hours)	491
Avg. Dive Time (hours)	7	Avg. Dive Time (hours)	6	Avg. Dive Time (hours)	15
Avg. Time on Bottom (hours)	4	Avg. Time on Bottom (hours)	4	Avg. Time on Bottom (hours)	12

Questions/Feedback

- Reach us at ndsf_info@whoi.edu