

NDSF Sentry Update

NDSF NATIONAL
DEEP SUBMERGENCE
FACILITY



SENTRY 2023 OPERATIONS SUMMARY

STATS

35 DIVES
5 CRUISES
118 OP DAYS
508 h SURVEYING
1,417 Km COVERED

LOCATIONS

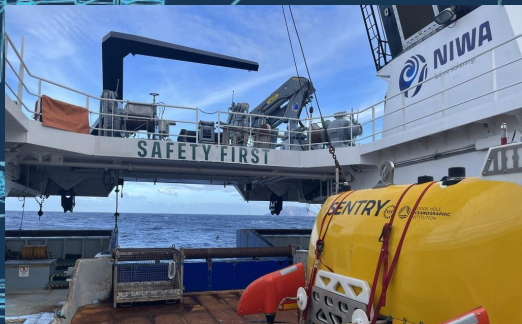
EPR - 9 North
Gulf of Mexico
White Island, NZ
Santa Barbara Basin
PNW - Axial

PI's

Dan Fornari (WHOI)
Craig Miller (GNS)
Tina Treude (UCLA)
Chris German (WHOI)
Battista/Menza (NOAA)

VESSELS

R/V Atlantis
R/V Tangaroa
NOAA Nancy Foster



SENTRY 2023 OPERATIONS HIGHLIGHTS

700 Total Dives!

NRDA Gulf Restoration Ops

Vessel integrations Nancy Foster & Tangaroa

Hydrothermal estuaries work, plume hunting

Loading by Barge Long Beach

Delayed Shipment from NZ

Maintenance Period at SIO

WHITE ISLAND



NANCY FOSTER



SANTA BARBARA BARGE

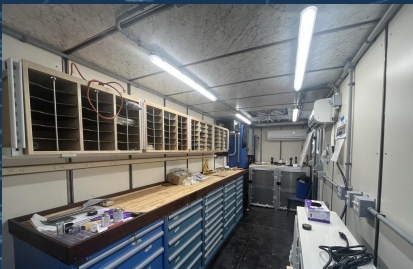


SAN DIEGO

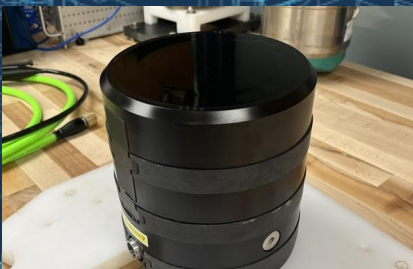
NDSE NATIONAL DEEP SUBMERGENCE FACILITY



ENGINEERING UPDATES



Replacement support van



Teledyne Tasman DVL



Harmonic Servo Pressure testing

ENGINEERING PROJECTS

Server Van replacement

Tasman/Nortek DVL

OS/Dist upgrade

Legacy hardware replacement (XRM/Servo)

Addresses PCAR Finding

MX upgrade/replacement

Electrical switches development

Chassis replacement

Phins C7 purchase

Misc Ship integrations

Processing/Storage upgrade

Constant Improvement of Cruise Planning

Addresses PCAR Finding



MX planner



New Chargers



Processing computer/NAS



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
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INITIATIVES AND DEVELOPMENT

- Continued use of MATE program for DEIJ development and early career development
- Supporting WHOI blue tech initiative with local student from Cape Cod community college for a semester



WAVEGLIDER PROGRESS TO-DATE

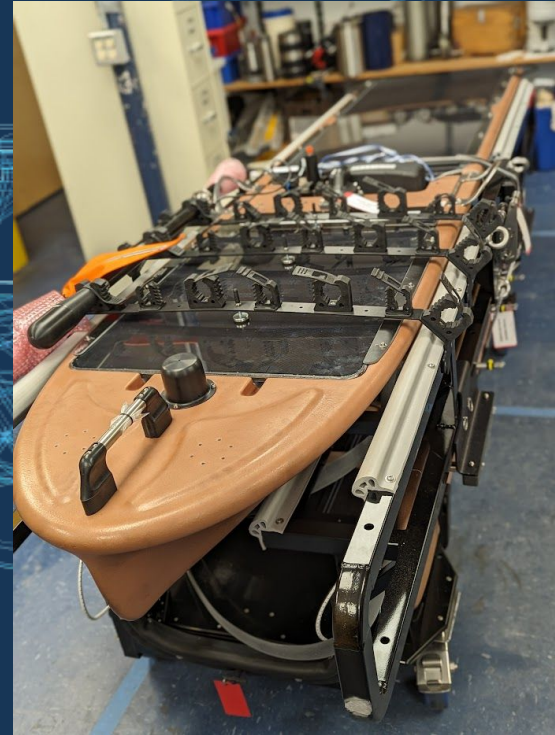
Waveglider is a Permanent Addition to the Facility

Utilization of Legacy Waveglider

WHOI Received New Waveglider

Completed initial checkouts of System

Completed WHOI Built Acomms Equipment



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NEW WAVEGLIDER UNPACKED AT WHOI

WAVEGLIDER NEXT STEPS

Integrate WHOI Acomms Modem

Local Sea Trials

Upgrade Topside Software for ease of use and to keep Parity with Sentry Software



NDSE NATIONAL DEEP SUBMERGENCE FACILITY



SCREEN DISPLAYING OLDER SOFTWARE TO BE UPDATED

NDSF Jason Update

NDSF NATIONAL
DEEP SUBMERGENCE
FACILITY



JASON OPS SUMMARY: JULY THROUGH SEPTEMBER 2023

STATS

68 Dives

4 Cruises

59 Days at sea

402 Hours in water

LOCATIONS

PNW

AXIAL

PI's

Mark Zumberge (SIO)

Julie Huber (WHOI)

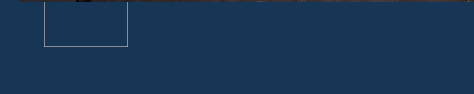
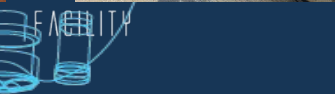
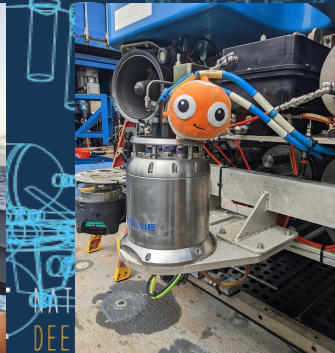
Beth Orcutt (Bigelow)

Deb Kelley (UW)

VESSELS

R/V Thomas G.

Thompson



JASON PERSONNEL UPDATE



Sarah Sergent

Officially joined our group this year as a Contractor after sailing with us in 2022 and 2023. DEEP SUBMERGENCE

UNOLS MATE Program

Two formal additions to the Jason Ops roster thanks to the opportunity provided by the MATE program.

Adam Ensminger

Joined our group as an Electrical Engineer after sailing with us in 2023.



JASON UPDATES

- First Maintenance Period in three years underway
- A new pre-cruise checklist is under development and will be sent to all PI's as soon as an approved cruise has been identified
- SOP is to conduct a minimum of two formal pre-cruise planning meetings with PI's at intervals identified in the pre-cruise planning doc circulated to all PI's (PCAR '23)
- We are adding SEALOG customization to pre-cruise planning (PCAR '23)
- Previously used equipment installation and testing procedures will be reviewed in the pre-cruise planning meetings (PCAR '23)
- Clearer definitions of map requirements and access to existing maps will be given in pre-cruise planning (PCAR '23)
- A standardized dive report that will be common across all NDSF vehicles is under development (PCAR '23)
- Chain of communication between PI's, Jason Team and Ship Crew will be reviewed as part of the pre-cruise planning moving forward (PCAR '23)

NDSF NATIONAL
DEEP SUBMERGENCE
FACILITY



WINTER MAINTENANCE

VEHICLE

- Floatation removed, serviced and mounting modified to address constraint issues
- Manipulators serviced and repaired (PCAR '23)
- Frame inspected with dye penetrant – no major issues identified
- PBOF and rubber molded cables inspected and repaired
- Lasers upgraded
- Failed serial, video and network connections repaired
- Leak detects added
- All sensors and equipment inventoried, tested, repaired and calibrated as required



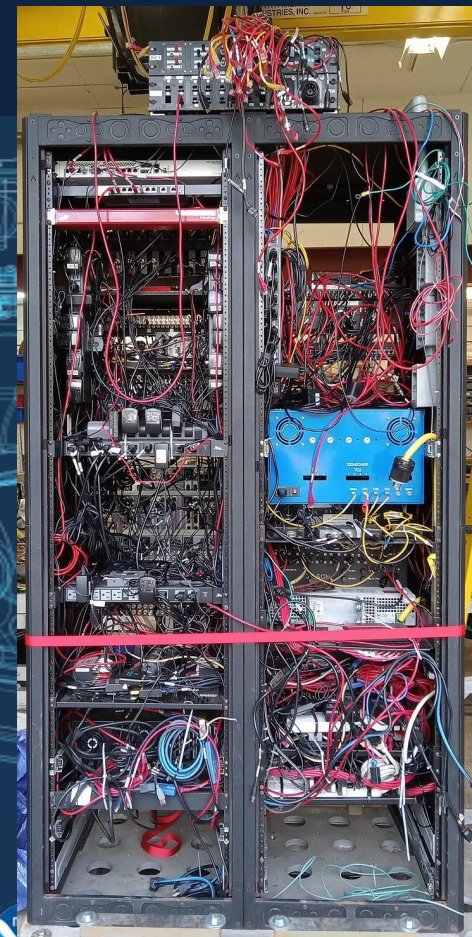
NOAA DEEP SUBMERGENCE
VEHICLE FACILITY



WINTER MAINTENANCE

Vans

- Rigging and Control Vans painted
- Control Vans serviced to extend life and seal bladder repaired
- Topside computers replaced and installed in COTS rack
- Telemetry, data and nav racks rewired and documentation updated
- Ground fault monitoring system and spares repaired and calibrated
- Air conditioners serviced



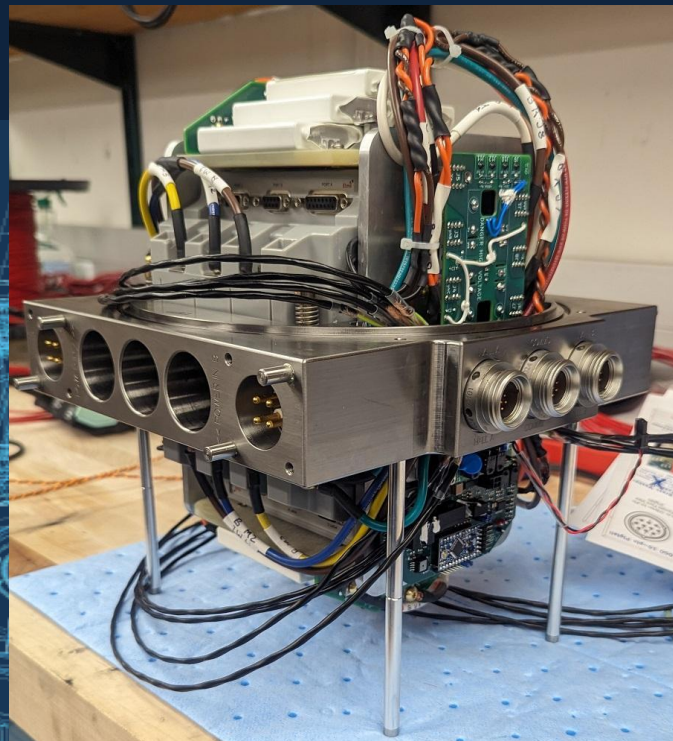
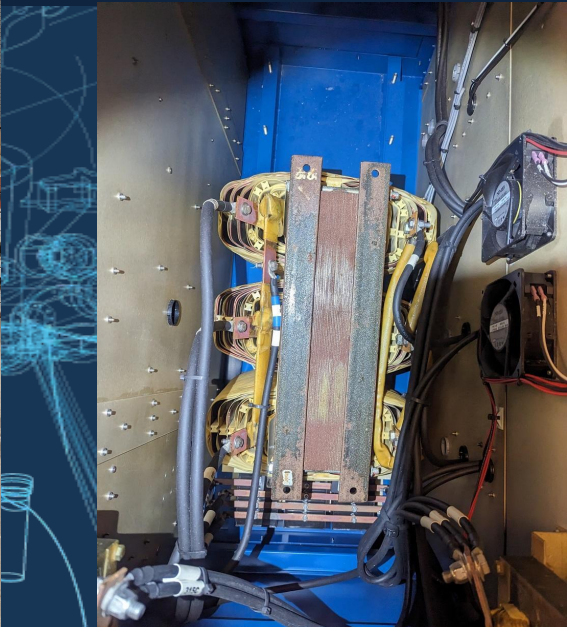
WINTER MAINTENANCE

LAUNCH AND RECOVERY SYSTEM (LARS)

- Winch level wind rebuilt (PCAR '23)
- Winch main motors and brevini gearboxes rebuilt
- Crane HPU rebuilt
- Spooling of new cable on drum
- Crane hardware and hydraulic fittings and hoses serviced and replaced as necessary



WINTER MAINTENANCE

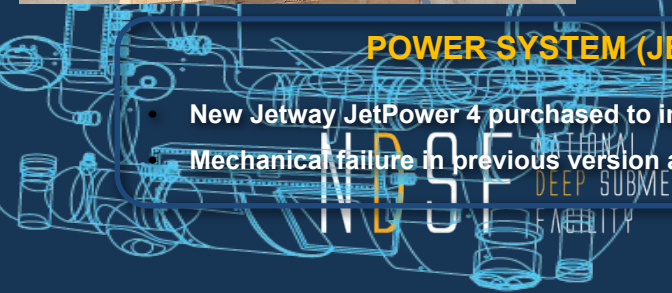


POWER SYSTEM (JETWAY)

- New Jetway JetPower 4 purchased to integrate into Control Vans
- Mechanical failure in previous version addressed (PCAR '23)

PROPULSION R&D UPDATE

- First Motor Pod in assembly process – will be used in field pending successful dock trials



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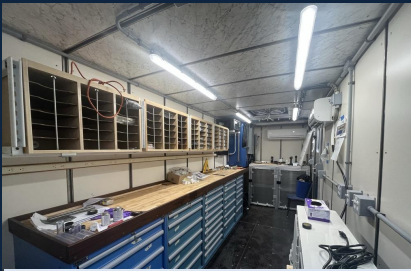


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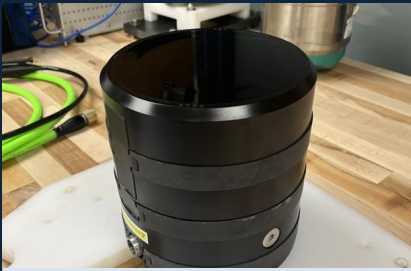


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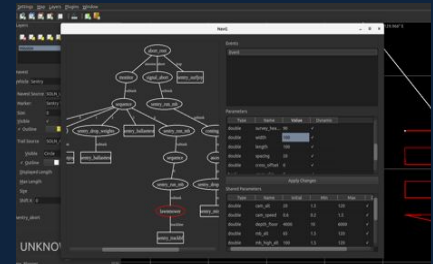
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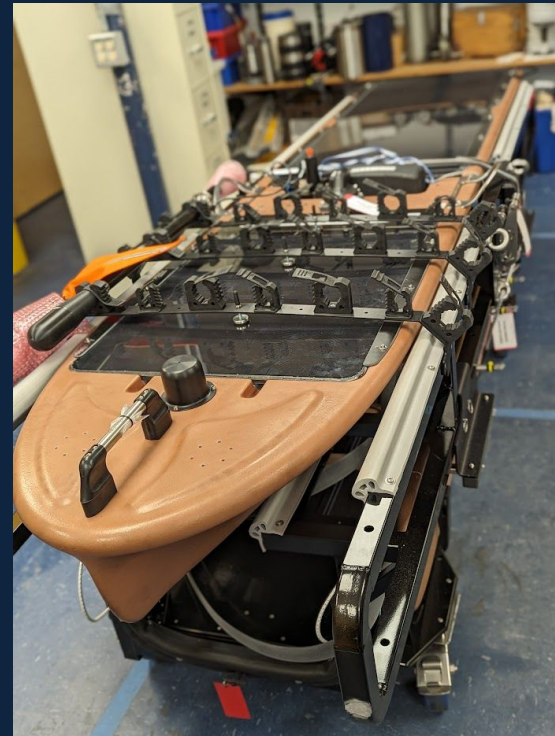
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NDSF Alvin Update

ALVIN OPERATIONS SUMMARY

6 Cruises completed in 2023/2024

- Fornari EPR
- Fornari Galapagos
- Treude
- Levin
- Lapham
- Arellano (Jan '24)

Total Dives in '23: 72

Average Time Submerged: 6 hours

Average Bottom Time: 4:45 hours

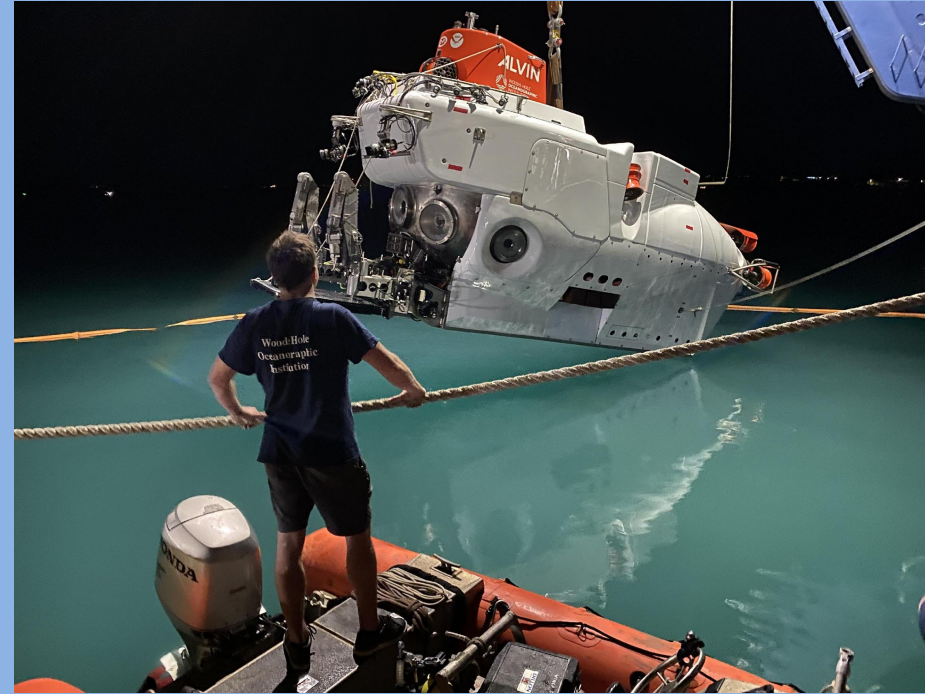
Max Depth: 3,444 m

Average Depth: 1,149m



ALVIN HIGHLIGHTS

- 145 dives since 6,500m Certification
- Procurement/integration of 'Alvin GoPro' still and 5K video cameras
- Alvin Data Engineer on every voyage
 - Reinforces PCAR finding
- Delivery of a new Alvin 6500m elevator
 - First deployment on Joye April '24
 - Reinforces PCAR finding
- Improved pre-cruise planning and use of Alvin planning checklist for users
 - Addresses Implodable volume PCAR finding
- Purchase of an Aandera (Xylem) Optode sensor
- Design/Assembly of configurable 6500m Heat-flow probe
- Design study of Li-Ion Batteries underway
 - Addresses PCAR finding
 - Parallel collaboration with NAVSEA



ALVIN Staff Update

New Hires in 2023/2024: 4

Open Job Listings: 2

Open Job Listings

- 1 Mechanical Engineer
- 1 Electrical Engineer

New Team Members

- **Kaitlyn Tradd** – Lead Mechanical Engineer
- **Kathryn Pietro** – Alvin Project Manager
- **Scott Nietfeld** – Electrical Engineer
- **Toshinobu Mikigawa** – Electrical Engineer



ALVIN Staff Update

NSF MATE Internships:

Emilia Topp-Johnson

Pursuing a Masters in Astrophysics – Columbia University

Noah Bourassa - Pursuing a Masters in Oceanography - U. Rhode Island

Total Alvin MATE Interns to date: 9
Excellent NSF program!
MATE Interns hired by ALOPS: 3

Cape Cod Community College Intern

Matthew Monteiro – pursuing a degree in robotics



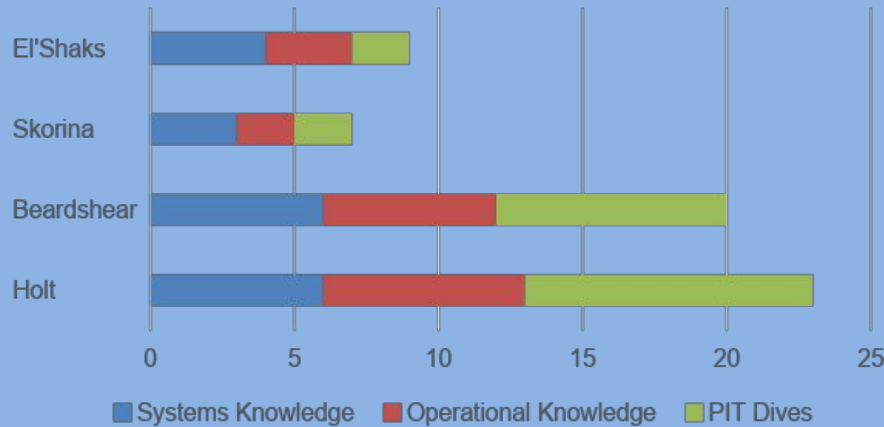
Noah and Emilia - Alvin weight party
February 14, 2024

ALVIN Operations Training

Pilot Training

- Primary PIT's Randy Holt & Kaitlyn Beardshear, on track to qualify in May 2024
- Other PIT's making progress to qualify early 2025
- 17 PIT dives scheduled for 2024

Pilot Candidate Progress



Nick O'Sadcia Qualified Pilot 2023!

Alvin Pilot #45



ALVIN Group Training

Professional Development

- Alvin introduced a Professional Development Program in 2023
- 15 team members have utilized this tool
- Feedback from group is positive

Udemy

- Using the online resource for further training and professional development
- Available online/offline for all Alvin Team
- Alvin trying to encourage and develop a culture of learning

Group Training

- Ops team completed STCW training in November
- Qualified 3 new MIL-STD-1330 Oxygen Instructors
- Plans for Ops Group systems training in late summer/early fall 2024

Professional Development



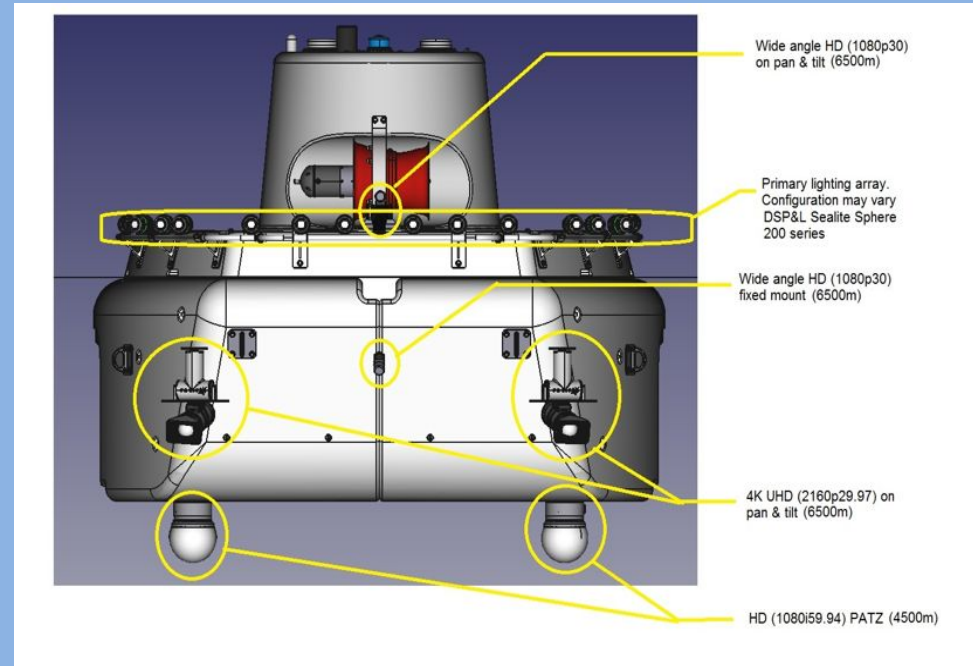
■ Engineering ■ Outreach ■ Operations ■ Misc.



Alvin Imaging & Cameras

- Completed work to stabilize the system and network
- System is generally stable with ongoing refinement of iPad interface
- Investigating candidate tactile controllers
 - Game controller w/joysticks

Reinforces PCAR findings
- Alvin now carries 2 GoPro cameras
 - Same as MISO video/still cams
 - 5K video – versatile mounting
 - HD still cam – brow mounting
 - Regular part of Alvin data package
 - Investigating 6,500m GoPro
 - For use on Levin 5,500m dives



Alvin PCAR Activities

Updates to elevator "burn-bottle" firmware

Enables topside awareness of release actions

Evaluation of basket air-weight load cases with safeties

Will result in clear load limits for science planning

Addresses PCAR finding

Design of new slurp rotary actuator underway

Reduce slurp hydraulic water intrusion issues

Addresses PCAR finding

Creation of Alvin user training/familiarization videos underway

Addresses PCAR finding

