

Endurance Array (EA) Data QA/QC Activities

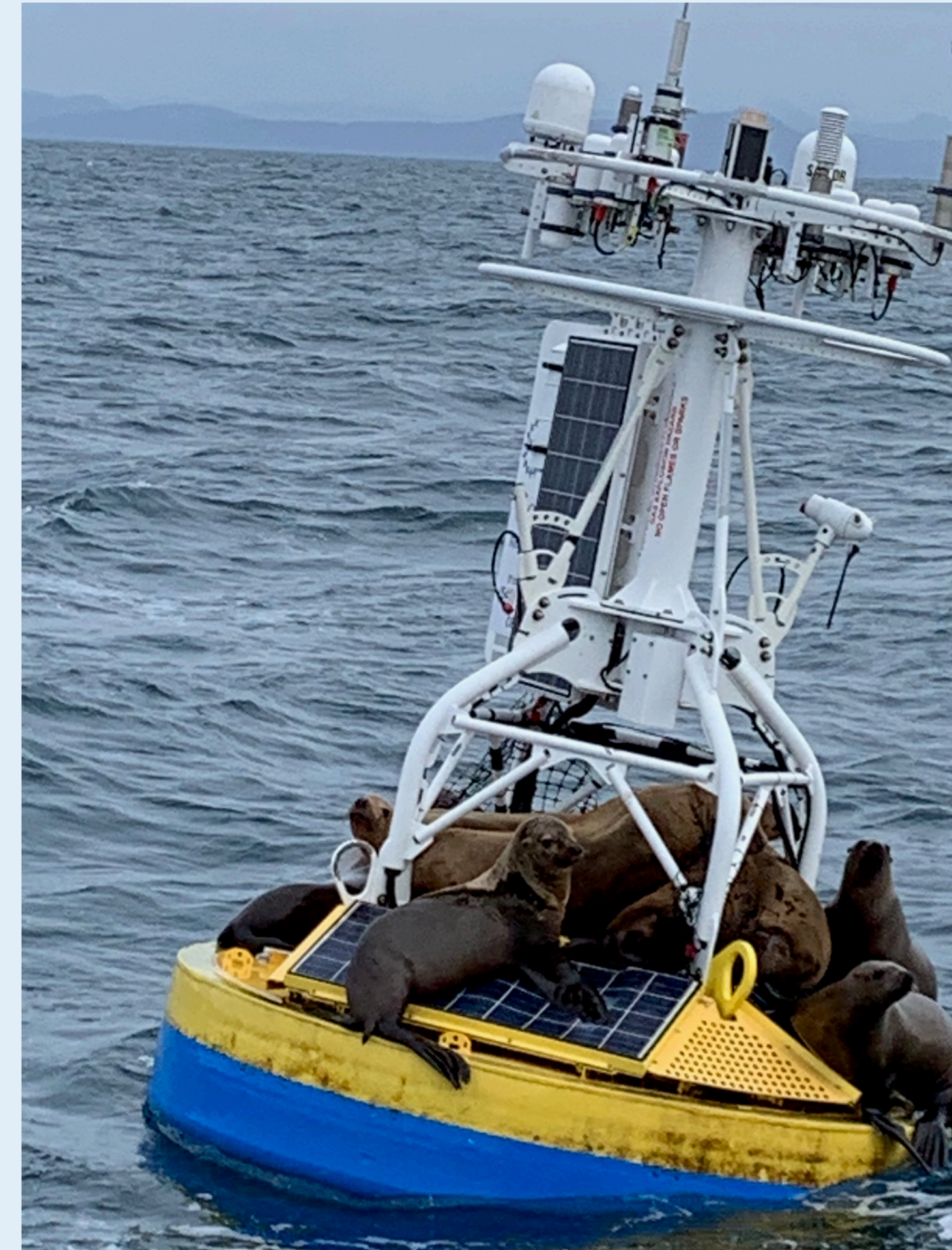
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EA Data Team

- Christopher Wingard – *Mooring and profiler data transfers, ingestion, QA/QC, annotations, and asset management*
- Craig Risien – *QA/QC, in-depth assessments, and communications*
- Russell Desiderio – *asset management, QA/QC, and in-depth assessments*
- Stuart Pearce – *Glider data transfers, ingestion, QA/QC, annotations, and asset management*
- *And a host of others!*





EA Data Team Responsibilities

- Asset/Metadata Management
 - Entering required metadata (calibration coefficients, deployment info) into OOI Net
 - Organizing, cataloging and posting shipboard and water sampling data
- Data Ingestion/Availability
 - Ingesting/re-ingesting data into OOI Net
 - Ensuring data flow from platform to shore to science users
 - Supporting transfer of data to IOOS Glider DAC, GOA-ON, NANOOS & NDBC
- Data QC
 - Monitoring deployed assets and reporting status
 - Identifying/resolving issues with instruments/data
 - Assist in development of automated data QC (QARTOD) and conduct HITL (Human In The Loop) data QC
 - Annotating data in OOI Net for instrument/data issues, metadata changes
- Supporting program (working groups, enhancements) and users (Help Desk)



EA Asset Management

- Critical Metadata Review
 - Completed end of 2019. All data impacting changes noted in OOI Metadata Widget
 - Transitioning to reviewing Metadata information available in the OOI Preload database (units, standard names, descriptions)
- Updating/Adding Asset Management Information
 - Continuing 2-person review of all updates, now formalizing and tracking through GitHub pull request review process
 - 258 files updated/added via 30 commits covering last quarter of 2019 through present
 - Need to align documentation and Standard Operating Procedures (SOPs) with other MIOs
- Roundabout
 - Currently only asset inventory, but calibration coefficient framework is in development
 - Entered all EA surface mooring instruments. Working through CSPP instruments and non-instrument assets (e.g. cables, beacons, releases).
 - Creating configuration/build templates (map to deploy CSV files in GitHub)
 - Actively working with WHOI on requirements, goals, testing and development



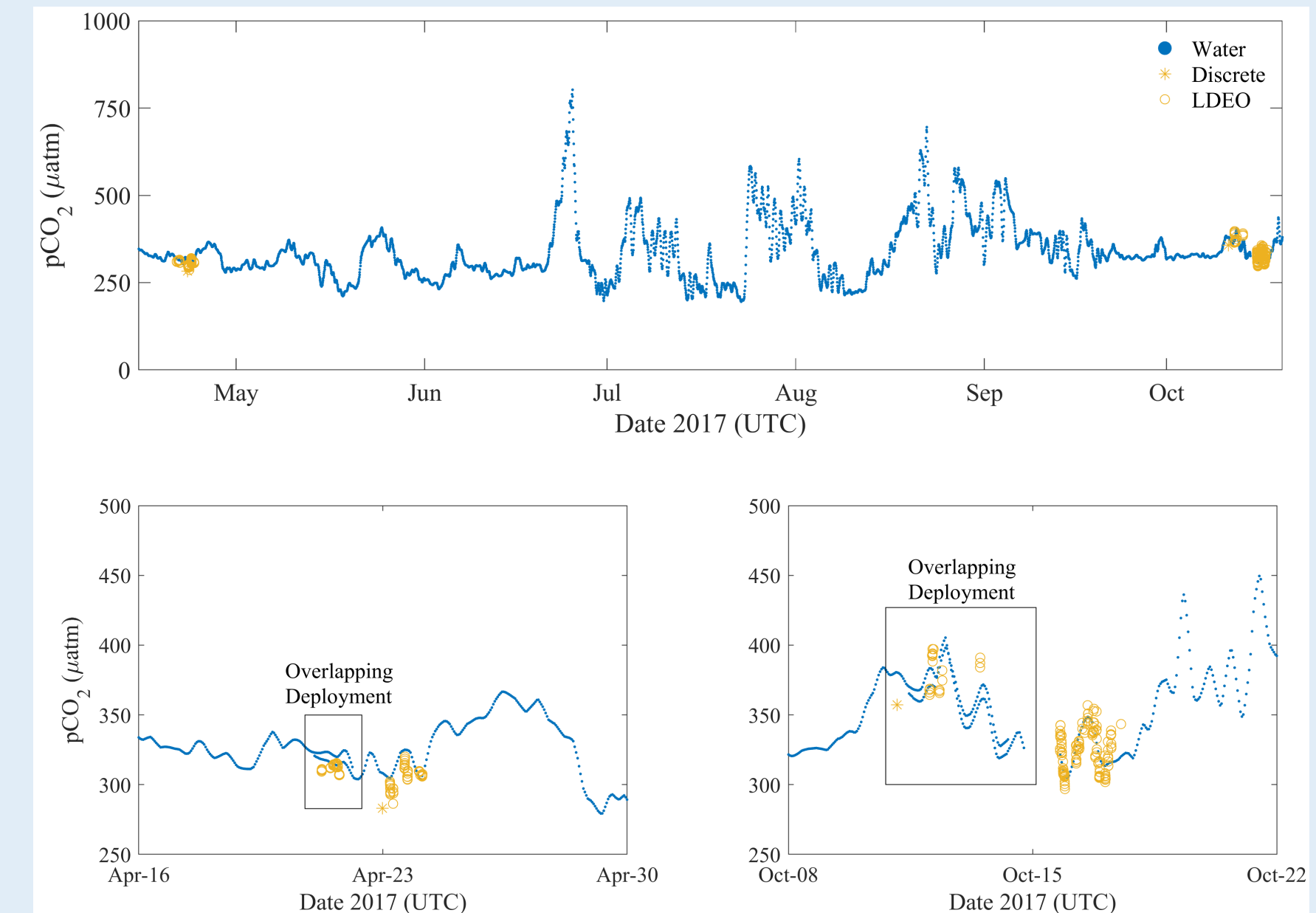
EA Data Ingestions/Availability

- Data Ingestions
 - Ingests are current and active for all deployed and recently recovered systems
 - Working on cleaning up ingest process and scripts, and developing a tracking spreadsheet to facilitate notifying internal team members of status and steps needed to complete prior to initiating ingests
 - Completed full purge and re-ingest of all EA glider data to address bug in latitude/longitude assignments
 - Completed purge of obsolete streams and ingest of updated streams for glider ADCP and CSPP FLORT data
- Data Availability
 - Daily, operational reviews of OOI Net and OMS++ with formal weekly assessments
 - *Converted surface moorings to use Iridium RUDICS for data transfers. Impacts ability to transfer some infrastructure datasets, but science instruments are unaffected.*
 - All historical, full resolution EA glider data now available via the IOOS Glider DAC. Code developed and operational to transfer decimated, real-time data moving forward



EA Data QC

- Daily, operational reviews of OOINet and OMS++ with formal weekly assessments
- Created process to download all OOI PHSEN data and assess data quality based on a gap analysis and utilizing QARTOD gross range test on pH, pure water blanks, and point-to-point variability
 - Framework for tech refresh assessments
 - Deep-dive HITL assessment outstanding
- Downloaded EA PCO2A data and conducted deep-dive HITL assessment. Updated/added 73 annotations to mark gaps or data as suspect/fail. Cross-comparisons with discrete samples, alternate sources of $p\text{CO}_2$ data and overlapping deployments
- Downloaded all EA METBK data, performed HITL quality control and cross-comparison with other mooring met data.



Focused view (upper panel) of the Spring 2017 deployment (#5) of CE02SHSM showing the observed offsets between the surface water $p\text{CO}_2$ measurements (●) and the discrete samples (*) and LDEO V2018 (○). Detailed views in the lower two panels, provide a better picture of the observed offsets during the periods of over-lapping deployments; between deployments 4 and 5 (lower left) and deployments 5 and 6 (lower right). Prior to using the OOI PCO2A data, users are strongly encouraged to conduct such cross-comparisons. The independent measurements obtained by the separate systems, and the close agreement between them, provide measures of confidence in the accuracy and applicability of the data.



EA Annotations/Communications

- Annotations
 - Developed from weekly reviews of mooring and instrumentation status
 - 146 operational annotations updated/created, with 73 created from the PCO2A review
- Ocean Sciences 2020
 - Presented in-depth reviews of the data from the PCO2A and METBK sensors during poster sessions. PCO2A review [posted to OOI website](#) and social media on 2020-05-11.
 - Annotations from METBK review will be added to database
- Community tools developed to assist with data downloads and analysis ([published to GitHub](#))
 - Developed set of Matlab functions to access data from OOI Net. Announced on OOI website April 3, 2020
 - Python and R tools are under development. Will be completed shortly and announced on OOI website. Outside users are testing/vetting R code
 - [Matlab toolbox](#) to work with coastal and global profiler data sets
- Assisted NANOOS (Northwest Association of Networked Ocean Observing Systems) in adding data from the Newport Hydrographic Line to the [NVS Glider App](#)



EA Accomplishments

- Attended OOI Data Team Workshop at WHOI in January 2020
- Completed Critical Metadata Review and added all data affecting issues to OOI Metadata Widget
- Created initial framework with feedback from all MIOs for assessing instrument performance from standpoint of data quality and tech refresh (PHSEN). Will use framework to create standard set of procedures and protocols for instrument reviews
- Completed submission of historical, full-resolution glider data to IOOS Glider DAC. Developed code to submit real-time, decimated data to the DAC moving forward. Coordinating with WHOI to assist in their efforts
- Completed in-depth review of all EA PCO2A data and developed set of HITL QC flags and protocol for assessment of the quality and scientific applicability of data. Summary posted to OOI website
- Successfully updated Asset Management and completed ingestions for Endurance 12 and multiple glider deployments and recoveries
- *Continued populating shipboard water sampling spreadsheets and posting to Alfresco*



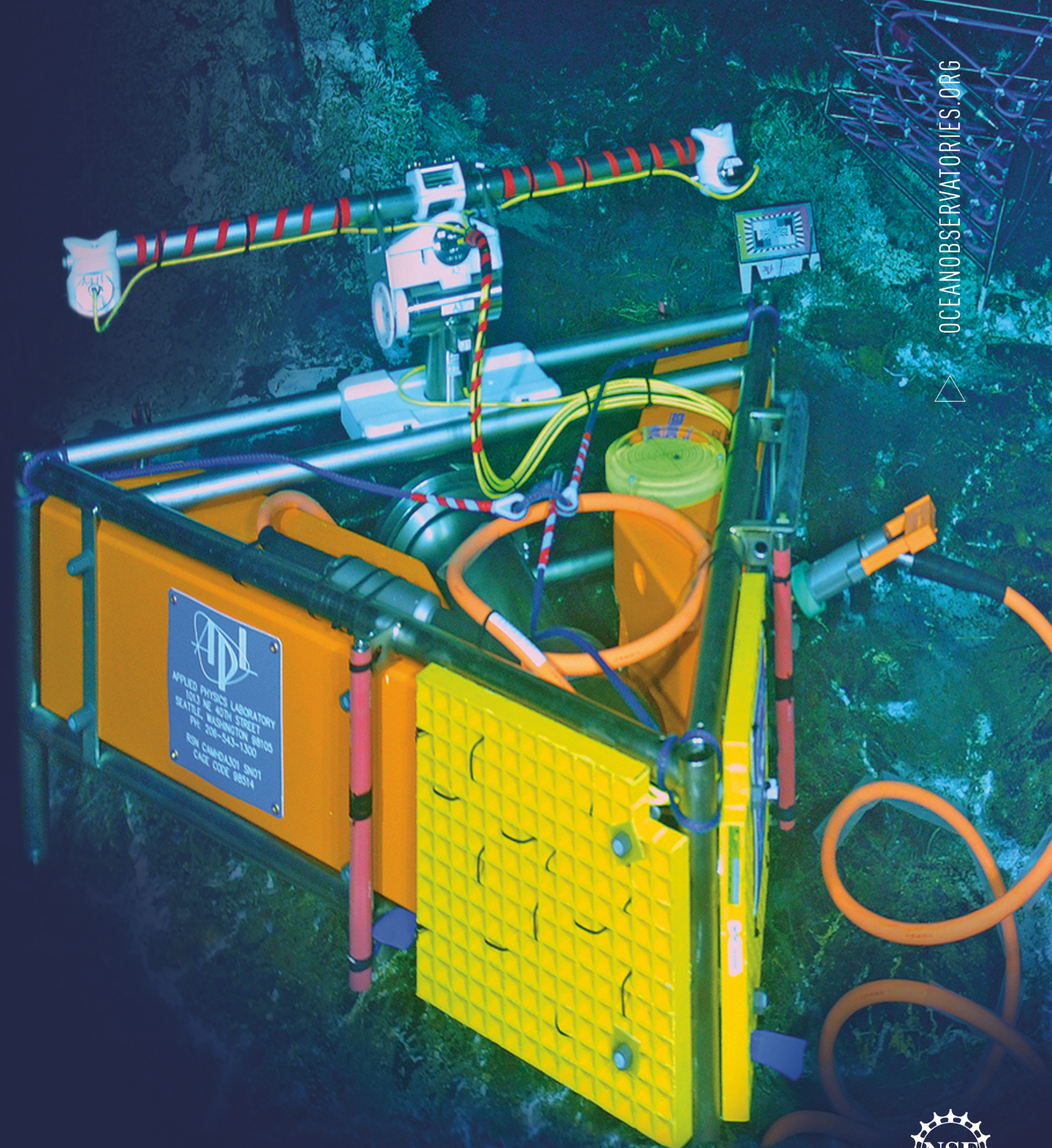
EA Path Forward

- Continue to support Roundabout development, adding remaining assets and finalizing build templates
- Work to develop SOPs, automated tools and documentation built around use of Roundabout
- Continue to support development of OMS++ system to improve mooring status and data quality monitoring (finalizing dataset parsers, processors and algorithms)
- Continue to develop and implement automated processes to review data and metadata ([Community Tools](#)), and support implementation of first QARTOD tests
- Continue to review metadata in the OOI Preload Database to support more consistent use of units, standard names, and descriptions
- Support and expand upon data analysis tools, processes and reporting frameworks for tech refresh efforts as well HITL QC
- Complete in-depth reviews of METBK (draft annotations) and PHSEN (HITL QC and annotations)
- Assist and coordinate in review and assessment of ZPLSC data



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Questions?



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