

Coastal & Global Scale Nodes (CGSN) Operational Status

May 13, 2020

Al Plueddemann, Derek Buffitt, Sheri White, Peter Brickley



CGSN Status: Pioneer

COVID-19 impacts in red

Operations: Moorings

- ISSM: MFN power conservation due to wind turbine damage.
- OSSM: MFN shutdown following electrical short in riser.
- CNSM: Initial MFN shutdown due to power controller (PSC) issues, now resolved and MFN functional.
- All CSM telemetry swapped over to commercial Iridium service.
- All profiler moorings have halted collection of data due to a vendor firmware issue. Remote intervention is not possible. Firmware solutions have been provided by vendor for next turn.
- Up to date on ingestion of available telemetered & recovered data.

Operations: Mobile Assets

- 4 of 5 planned gliders in the field, healthy and on track lines
- **Glider data gaps possible due to delays in refurb operations and delayed or canceled cruises.**
- **AUV cruises on hold due to COVID-19.**

Refurbishment

- All moorings completed refurbishment for Pioneer 14.
- **Integration and burn-in delayed due to COVID-19.**
- **Planned re-start of integration and burn-in: May 11, 2020.**

Cruise

- **Planning for limited Pioneer-14 cruise, 7-17 June.**
- **Ongoing risk assessment and cruise planning activities.**
- **Focus on Profiler Moorings only.**

Platform	Infrastructure %	Instruments %	Delivered XMIT %	Data Collected %
CP01CNSM	83%	80%	48%	84%
CP03ISSM	83%	87%	39%	87%
CP04OSSM	87%	86%	50%	91%
CP02PMCI	71%	14%	29%	29%
CP02PMCO	71%	14%	29%	29%
CP02PMUI	71%	14%	29%	29%
CP02PMUO	71%	14%	29%	29%
CP04OSPM	71%	14%	29%	29%
CP01ISPM	71%	14%	29%	29%
CPxxCNPM	71%	14%	29%	29%



CGSN Status: Irminger Sea

COVID-19 impacts in red

Operations: Moorings

- GSM: One wind turbine damaged; VELPT, plus IMM PHSENs and PCO2s have failed.
- HYPM, FLMA, FLMB fully operational.
- GSM telemetry swapped over to commercial Iridium service.
- Up to date on ingestion of available telemetered and recovered data

Operations: Mobile Assets

- 2 of 3 planned gliders in the field, includes Biological Carbon Pump (BCP: Nicholzen/Pavelsky) glider
- BCP Glider went adrift due to bladder issue, recovered May 7th.
- Glider 560 lost, experienced battery depletion, potentially due to faulty harness.
- **Glider data gaps possible due to delays in refurb operations and delayed or canceled cruises.**

Refurbishment

- All material and instrumentation available for Irminger 7
- **Integration delayed, planned start: May 18, 2020.**
- **Burn-in delayed, planned start: June 5, 2020.**

Cruise

- **Planning for Irminger 7 cruise, July 1 - Aug. 2, 2020.**
- **Ports revised to WHOI-WHOI**
- **Ongoing risk assessment to determine:**
 - **Re-start of mooring integration and burn-in**
 - **Recommendation on conducting the cruise**

Platform	Infrastructure %	Instruments %	Delivered XMIT %	Data Collected %
GI01SUMO	86%	61%	59%	66%



CGSN Status: Station Papa

COVID-19 impacts in red

Operations: Moorings

- All subsurface moorings in operation
- Upper WFP on HYPM failed to inductive comms failed; data will be recovered next turn.
- Up to date on ingestion of available telemetered and recovered data
- **Expect data gaps starting Sept/Oct 2020 from HYPM, and in mid to late 2021 from FLMs**

Operations: Mobile Assets

- 2 of 3 planned gliders in the field
- **Glider 537, 575 transiting to US West Coast along Line P for recovery.**
- **Glider data gaps due to delays in refurb operations and cruise cancelation.**

Refurbishment

- **Refurbishment halted due to COVID-19.**
- **Available instrumentation re-assigned to Irminger to mitigate vendor delays.**

Cruise

- **Recommendation to cancel 2020 Papa 8 cruise on RV Sikuliaq.** Considered highest risk to personnel and lowest risk to infrastructure.



CGSN Status: Southern Ocean

Operations

- Successfully completed final recovery of Southern Ocean surface mooring Jan 2020.
- No planned deployments going forward.
- Up to date on ingestion of available telemetered and recovered data.

Refurbishment

- Received approval for southern hemisphere sparing plan.
- Southern Ocean and Argentine Basin moorings and vehicles will be used to supplement Papa, Irminger and Coastal arrays.

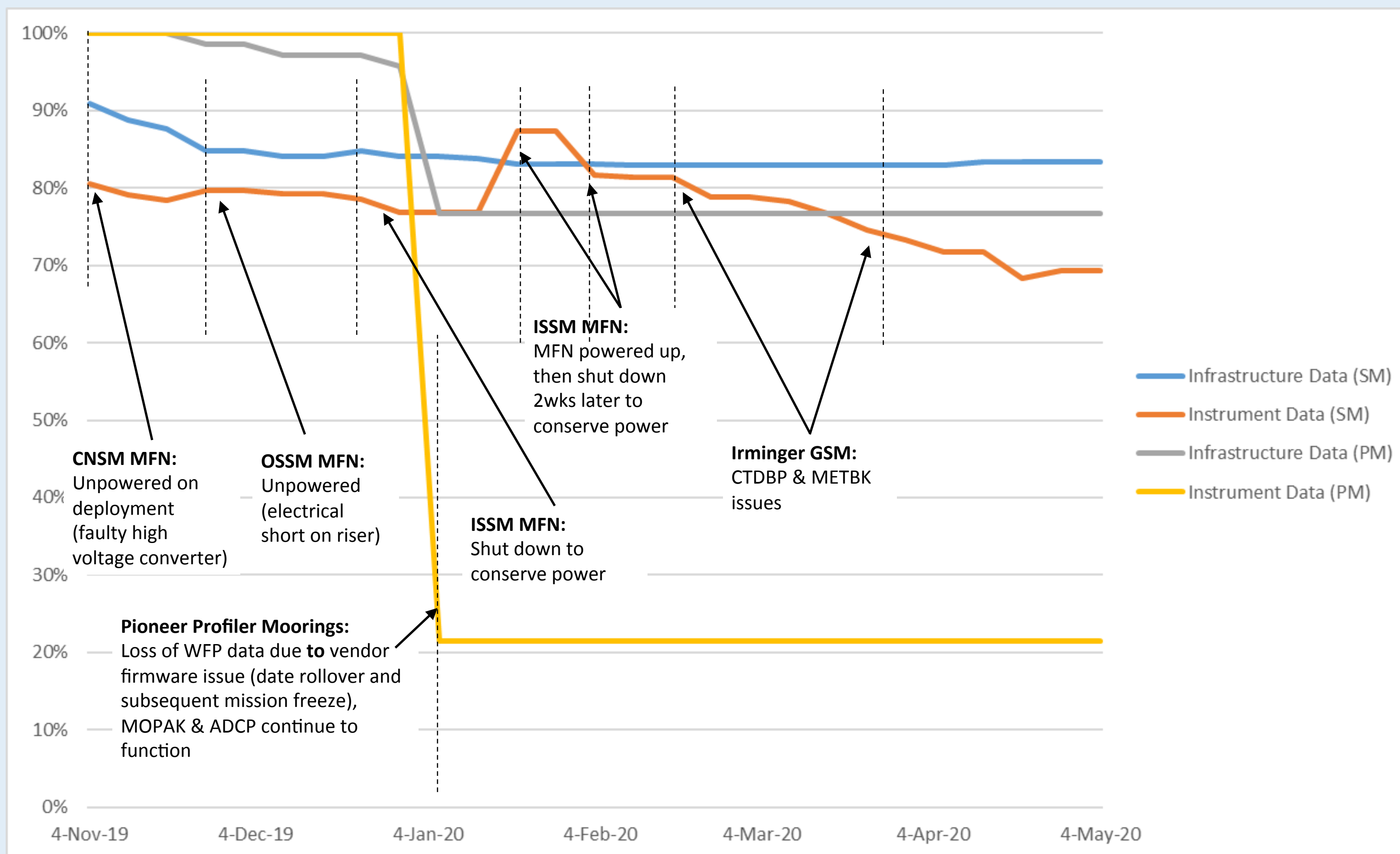
Cruise

- Southern Ocean 6 cruise, RRS Discovery Jan. 16 – Jan. 25, 2020.
- OOI operations were Surface mooring recovery only.
- Final shipments from Punta Arenas received in April 2020.





Infrastructure & Instrumentation: Last 6 Months



- Six-month surface (SM) & profiler mooring (PM) status
- Actively managing moorings based on regular data checks and weekly review of all operational data
- Implemented incident tracking document
- Includes:
 - Instrument assessment
 - Infrastructure health
 - Risks to infrastructure such as storm events
 - Actions and potential interventions



Technical Developments & Reviews

- **Stretch hose design and production:**
 - New stretch hose termination
 - Eliminate urethane potting, revise conductor bundle, decrease refurb costs
 - Alternate stretch hose manufacturer
 - Modern facility with ISO standards should increase build quality
 - Successfully completed test build of stretch hoses in April
- **Telemetry Service changes:**
 - Successfully swapped over from Fleet Broadband telemetry to commercial Iridium service for all deployed moorings April 1st
 - Commercial Iridium service will be replaced by DISA cards during next mooring turn.
 - **Inability to conduct Pioneer (possibly Irminger) CSM turn due to COVID-19 will result in increased cost.**



Technical Developments & Reviews

- **Ongoing power systems review and actions:**
 - Sourced higher reliability boards for Power System Controller (PSC)
- Obtained and tested higher efficiency solar panels for Pioneer and EA.
 - New panels generate more power in shaded conditions
 - Test panels were previously deployed on Pioneer and Endurance (one mooring each)
 - Planned full deployment on next Endurance cruise
- Investigation of increased battery capacity
 - Surface Moorings: Increase number of AGM (absorbent glass mat) lead acid batteries within existing well.
 - Reviewing well design, hydrogen risk and mitigations for surface moorings
 - Profiler Moorings: Engaging vendor on Lithium rechargeable batteries for buoys
 - Reviewing mechanical/electrical changes needed to accommodate



Technical Developments & Reviews

- **Ongoing Tech Refresh activities for Instruments:**
 - FDCHP: Ongoing evaluation and improvements
 - Recent deployments (Irminger in 2019, Fall Pioneer 2019) updated to correct on-board calculations so that the telemetered flux data are useable.
 - METBK: Implementing upgrade to new CPU board
 - Tested on Pioneer, being implemented for PRC modules
 - ZPLSC: New transducer
 - Should mitigate failures experienced in prior deployments
 - Phased implementation plan; initial purchases during PY2



Technical Developments & Reviews

- **Glider Review, Feb 2020:**

- Overview of glider operations & performance since 2017 review.
- Presented options for expanding glider fleet to meet data delivery expectations.
- Waiting on panel report and recommendations.

- **MFN Review, June 2020:**

- Currently preparing operations and performance review.
- To include mechanical and electrical design, failure modes, and overall performance.
- Will include recommendations for path forward.



Summary COVID-19 impacts

- **Cruise impacts:**

- Pioneer spring turn: reduced scope, profiler moorings only
- Irminger annual turn: planning underway for full turn, priority is surface mooring
- Papa annual turn: recommended cancelation

- **Data delivery impacts:**

- Pioneer CPMs offline April-June; Pioneer CSMs limited through the summer
- Pioneer Spring AUV missions canceled
- Papa HYPM and FLM data gaps expected (starting Sep/Oct 2020)
- Papa gliders diverted from Array in April 2020
- Pioneer, Irminger and Papa glider data gaps due to refurb delays and cruise delays

- **Financial impacts:**

- Re-allocating cruise-related budget to other activities/impacts through ECR process
- Additional costs for cruises not canceled: quarantine, cleaning, testing, transits
- Additional costs for non-DISA Iridium data telemetry
- Potential for additional vehicle recovery costs and/or lost vehicles



Community Engagement

- **Over 40 specific activities listed in Q1 and Q2 reports**
- **Ocean Sciences 2020:**
 - Talk in Sustained Observing session; contributions to other talks and posters
 - Assisted with OOI Booth and OOIFB Town Hall
- **Engagement with Researchers:**
 - Assisted researchers with data access and interpretation
 - Assisted researchers with proposal preparation
 - Engaged SME researchers in data evaluation (PC02A, ZPLSC, FDCHP, OPTAA)



Community Engagement

- **Data Distribution:**

- IOOS Glider DAC – active Pioneer gliders now available, will continue to populate
- NDBC – preparing for delivery of Pioneer surface buoy data
- Water sample analyses – ongoing effort to standardize protocols and reporting

- **Other Activities:**

- Talks on OOI program and tours of OOI facilities
- Facilitated ancillary activities on cruises (eliminated due to COVID-19)
- Reviewed and edited website and social media content
- Assisted WHOI with Burke Innovation Awards for OOI data analysis



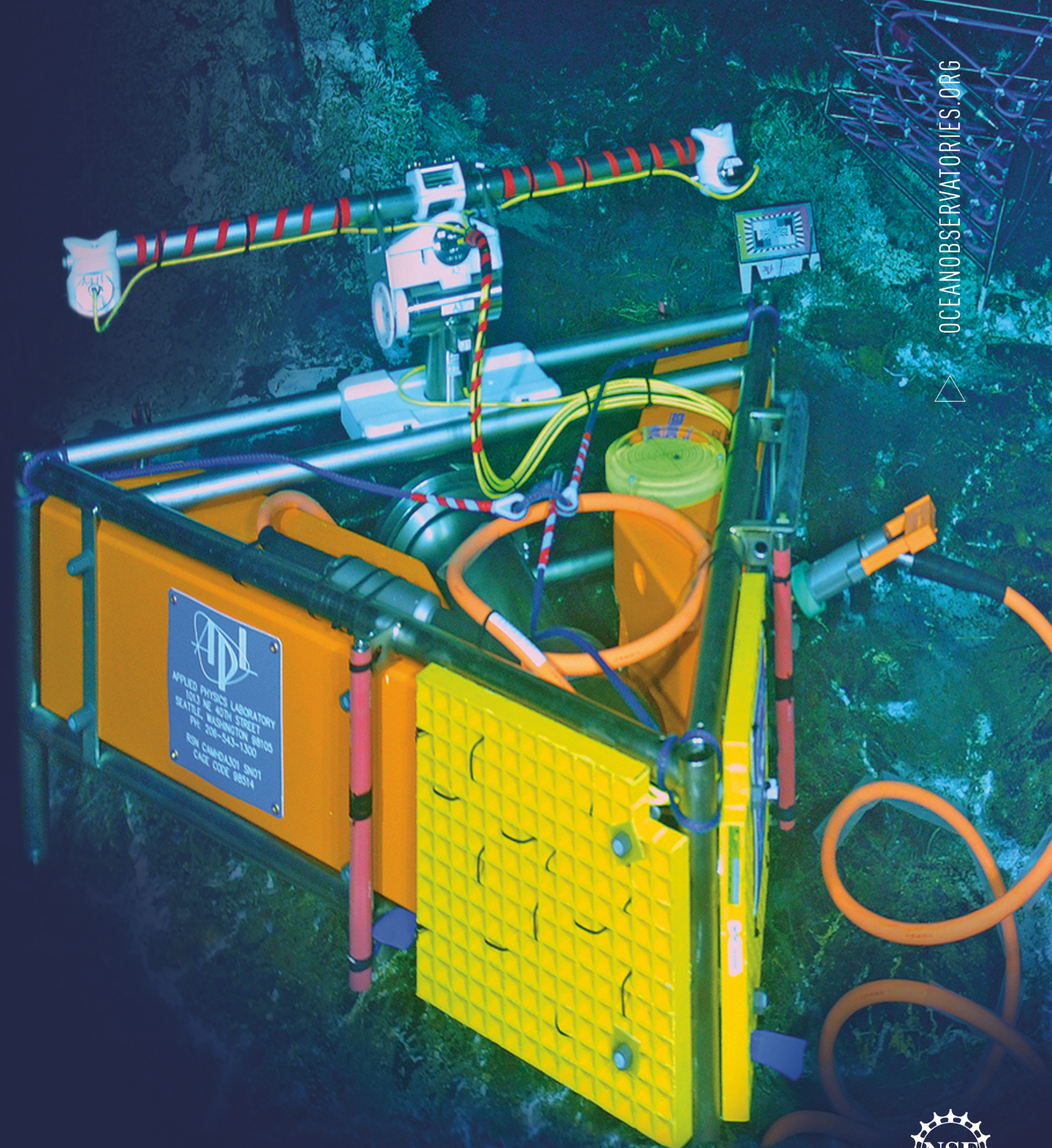
Community Engagement

- **Pioneer relocation assessment:**
 - Next formal step is NSF sponsored workshop in Spring 2021
 - CGSN working towards TDP to support the workshop, target Feb 2021
- **Science highlights:**
 - Recent publications from Pioneer and Southern Ocean highlighted in quarterly reports
 - Pioneer: Community responding to changes in storm tracks, marine heat waves, Gulf Stream ring population, salinity intrusions.
 - Irminger: Continuing engagement with OSNAP PIs, interest in surface flux time series and water column profiling provided by OOI.
 - Papa: Interest in the Pacific Warm Blob, subsurface profile data available from OOI in conjunction with surface forcing from NOAA buoy.



OCEAN
OBSERVATORIES
INITIATIVE

Questions?

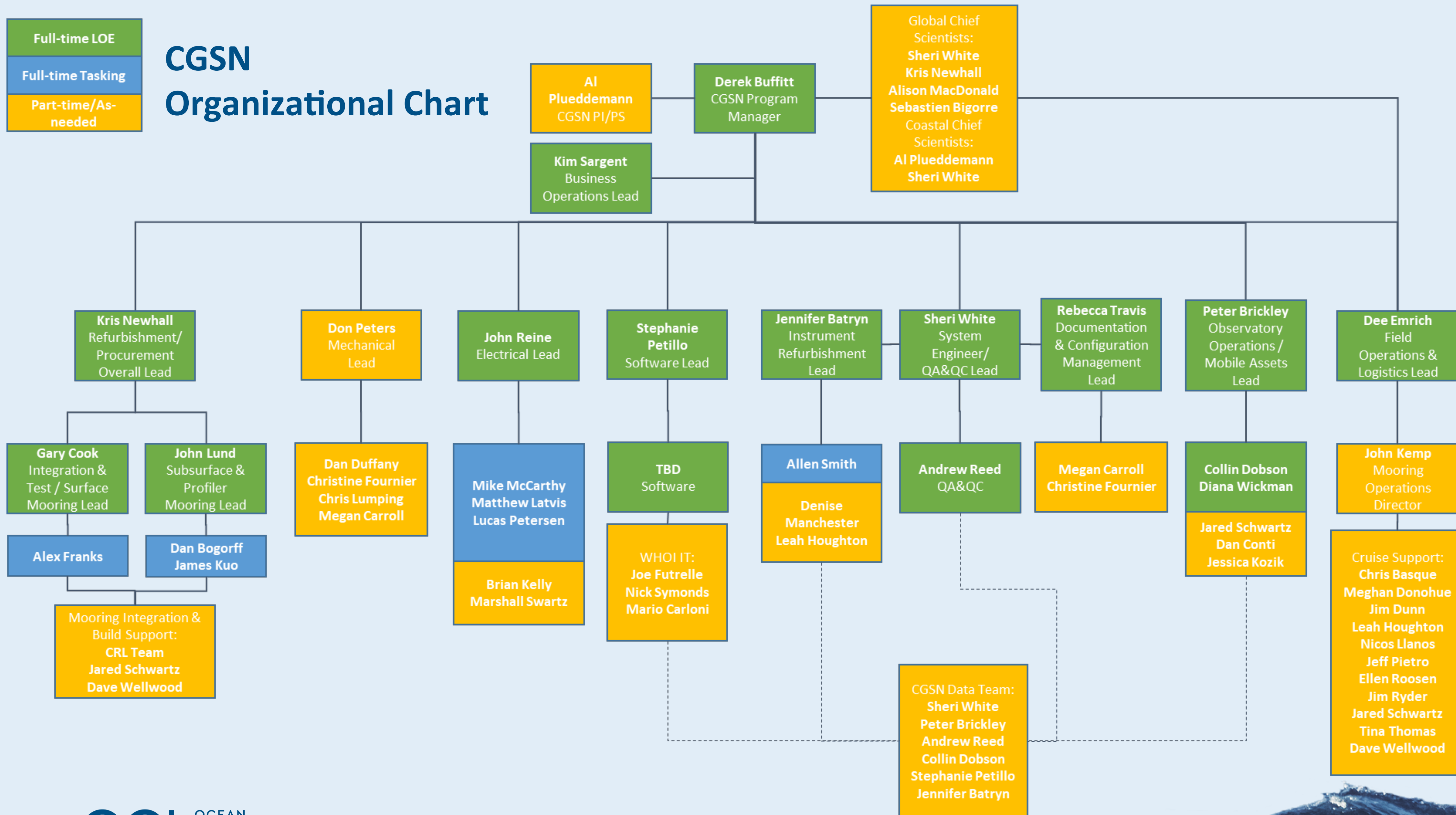


OCEANOBSERVATORIES.ORG



Backup/Extras





CGSN Operations

- **Refurb/Mechanical:** Kris Newhall
- **Electrical:** John Reine
- **Software:** Stephanie Petillo
- **Instruments:** Jennifer Batryn
- **System Engineering & Data Team Lead:** Sheri White
- **Data QA/QC:** Andrew Reed
- **Documentation/Config. Management:** Rebecca Travis
- **Platform Operations:** Peter Brickley
- **Logistics:** Dee Emrich

