

Sea Operations for Ocean Observatories

**Installation and Maintenance of Cable
Observatories: Right tools for the right job**

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A UNIVERSITY OF VICTORIA INITIATIVE

Presentation Overview

The operation and maintenance of cabled ocean observatories is both challenging and resource intensive. Operations teams must continually strive to find the balance between efficiency and effectiveness.

Points for discussion:

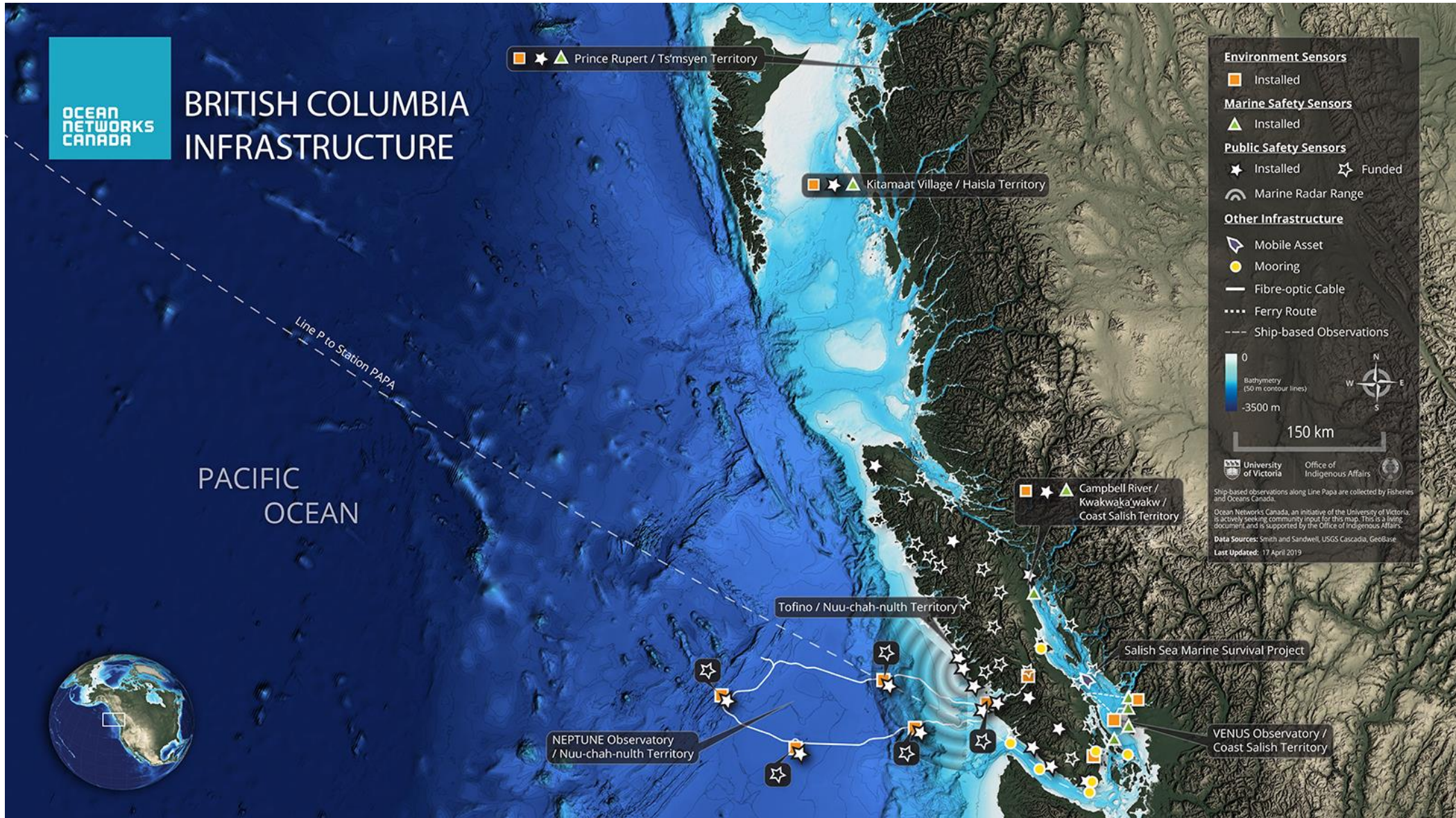
- Ocean Networks Canada (ONC)
- O&M Philosophy
- Tools
- Plans and processes
- Questions

A large school of fish, likely salmon, swimming in deep blue water. The fish are densely packed and moving in various directions, creating a dynamic and textured scene. The lighting is soft, highlighting the silvery scales of the fish against the dark background.

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Ocean Networks Canada

Who we are



Who we are





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O&M Philosophy

O&M Philosophy

- “The customer is king” but may not have the best solution
 - Understand what the user is trying to do
 - Communicate constraints and present options
 - Work to the best possible solution
 - Talk early, talk often
- Standardize where ever possible
 - Common connectors/cables
 - Platforms
 - Do not reinvent the wheel. Shamelessly copy good ideas
- Time is money
 - Design for deployment, recovery maintainability from the start
 - Balance between capital cost and life-cycle costs

O&M Philosophy

- Time spent in testing is never wasted
 - A \$10K instrument is a \$100K instrument when deployed offshore at 2300m
 - Test and document at every level
 - Test and prove end to end data flow and control
 - Technical metadata is just as important as science metadata
- Process, process, process
 - Instrument workflows critical
 - Clear roles and responsibilities between teams
 - Capture post expedition lessons learned

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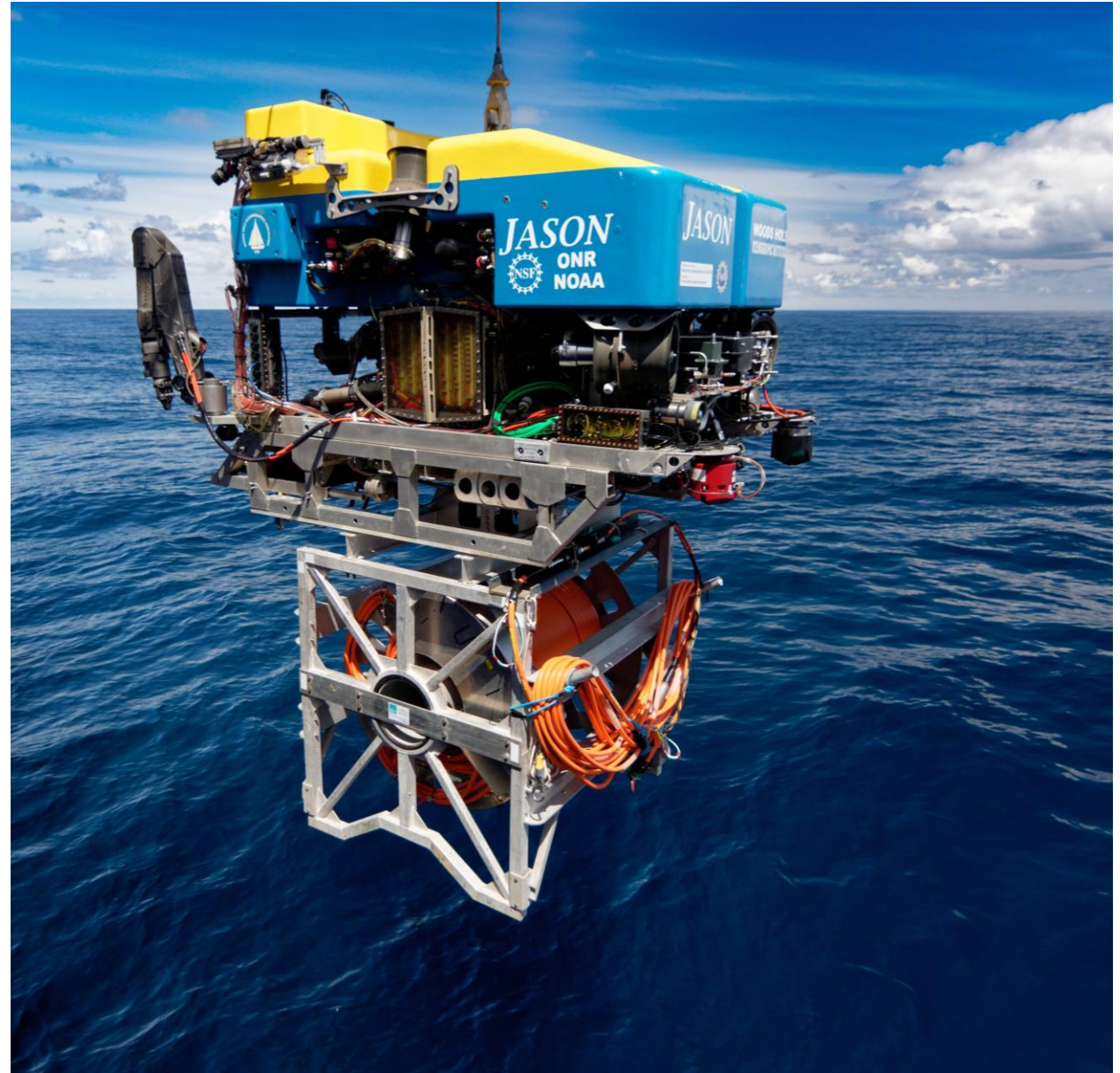
The Right Tools

The right tools

ROVs support broken down into two classes

- Heavy lift: 1800 – 3600 KG through frame lift capability
- Limited lift: 25 – 50 KG lift using vehicle thrusters

ONC has 7 pre-qualified ROV suppliers which simplifies the contracting of ROV services. ROV supplier selected based on planned activities (heavy lift, two-wire ops,), support ship availability, cost



The right tools

ONC/ University of Victoria does not own suitable ROV support vessels

We use a range of vessels:

- Canadian Coast Guard Research ships
- US UNOLS vessels
- Commercial cable ships
- Others – Ocean Exploration Trust

Vessel selection based on planned activities.

Flexibility is key



The right tools

Standardized platforms ensure that deck and ROV interface issues can be managed across different vessels

If a custom design is needed, then we incorporate the required interfaces – latch points, connector banks

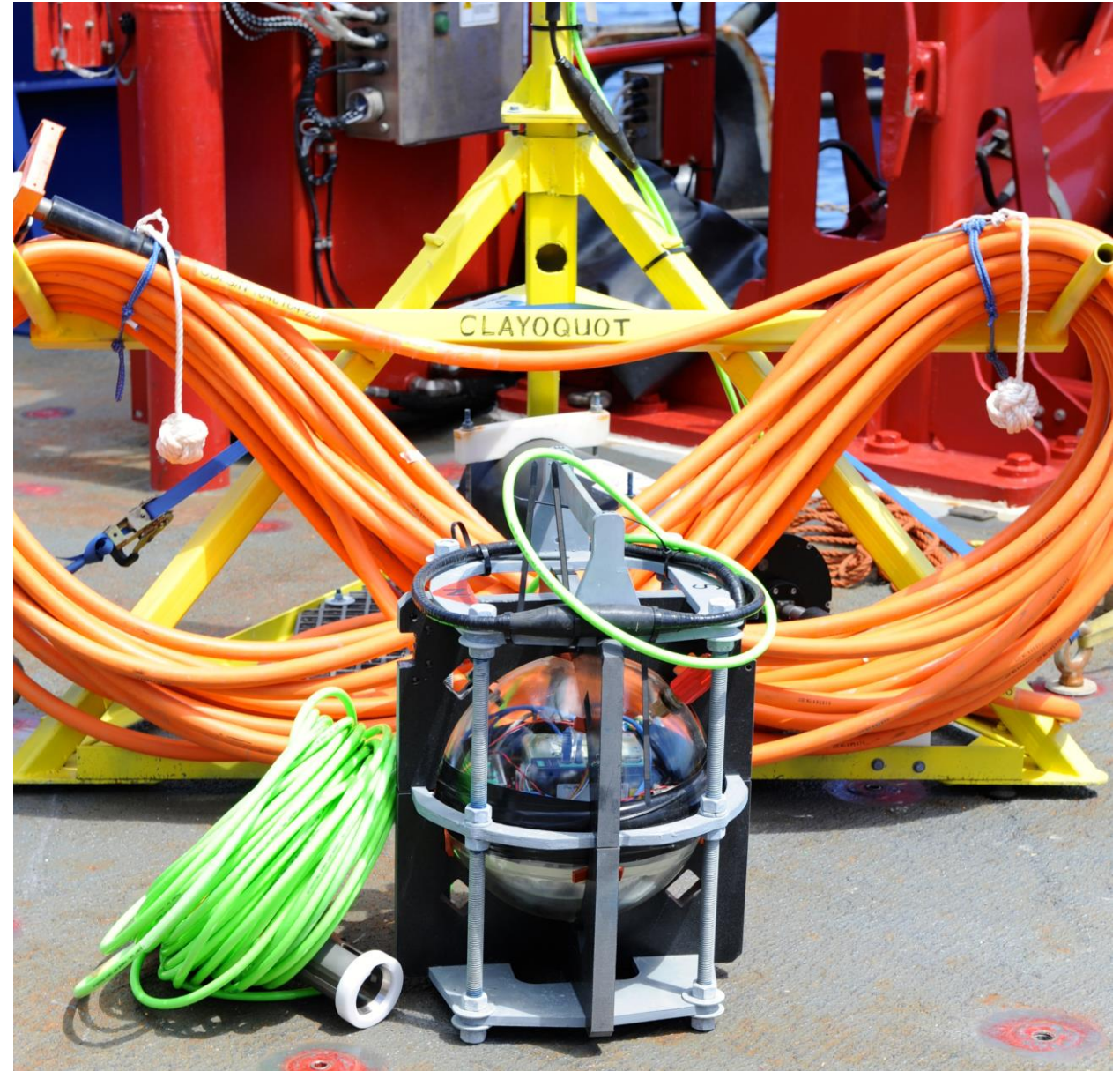


The right tools

Choose your cables and connectors wisely!

Once you have a design that works, impose it on instrument providers/science users

Reduce cable management issues on the seafloor whenever possible: ONC now moving to double ended wet mateable connectors. Significant time saving in all environments but especially vent fields



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Plans and Processes

Plans and processes

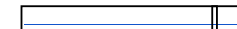
Annual planning cycle starts in Sep:

- Science and maintenance tasks collected
- Selection of ROV and vessel needs.
Contracting as required
- Design/procurement/build activities
scheduled
- High level cruise plan developed for
inclusion in Annual Operating Plan
- Detailed Dive plan development

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representative Kirk Decker (John Dorocicz's replacement)



Plans and processes

Instrument testing:

- Initial bench test
 - Electrical parameters
 - Firmware
 - Bench data collection
- Data Acquisition Framework testing
 - Software driver
 - Single instrument testing in tank
 - Tank data collection



Plans and processes

Instrument testing (con't):

- System integration
 - All instruments on platform
 - Power and comms from junction box
 - Tank data collection



Plans and processes

Instrument Workflows

- Part of Ocean 2.0
- Track all steps required for instrument deployment/recovery
- Linked to JIRA

Ocean Networks Canada Device Details

Oceans 2.0

Logged in as **Adrian Round** | Profile | Help | Logout

A maintenance expedition is underway from Sept 10-24. Data interruptions from Salish Sea and NE Pacific sites can be

Data Preview | Data Search | Plotting Utility | SeaTube | Digital Fishers | Cameras | More | Admin

Request Support | Report a Problem

Device Id: **23065** Device Name: **RDI Workhorse Long Ranger ADCP 75 kHz (17431)**

General | Sensor | Ip | Electrical Rating | Data Rating | Nameplate | Port | Physical Characteristics | Device Action | Event | Site | Procurement | Additional Attributes | Workflow | SeaScript | Parser Definition

NEPTUNE 2019-08 Cable Innovator: Serial Device Installation (Process Group)

Acquisition Complete: 7/7

Task	Area of Responsibility	Status	Comment	JIRA	Last Modified (UTC)	Modified By
Device - create	Data Stewardship	Complete			24-Jul-2019 01:29:29	Reyna Jenkyns
Instrument Documentation - collect	Data Stewardship	Complete		NEPDATA-11688	24-Jul-2019 15:53:50	Mitchell Wolf
Instrument Documentation - publish	Data Stewardship	Complete		NEPDATA-11688	24-Jul-2019 15:53:50	Mitchell Wolf
Device Actions - update	Data Stewardship	Complete		NEPDATA-11688	24-Jul-2019 15:53:50	Mitchell Wolf
Instrument Point People - assign	Data Stewardship	Complete			24-Jul-2019 01:29:29	Reyna Jenkyns
Bench Test - complete	Marine Operations	Complete		EN-2888	24-Jul-2019 01:29:41	Reyna Jenkyns
Depth Rating - assign	Data Stewardship	Complete	3000m from Configuration Summary file, but updated to 2000m due to pressure sensor rating	NEPDATA-11688	25-Jul-2019 21:29:19	Reyna Jenkyns

[Edit](#)

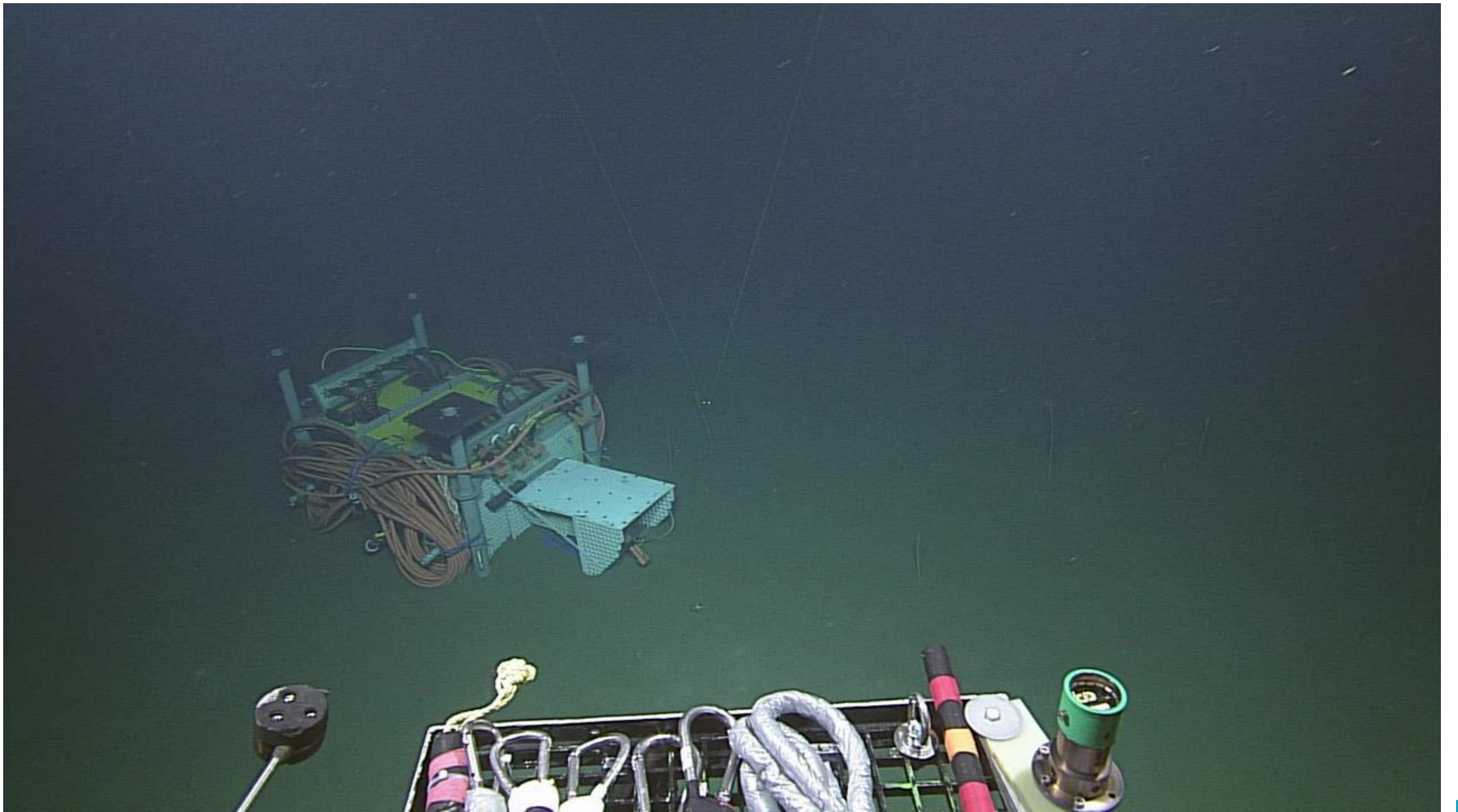
Serial Device Development Complete: 12/12

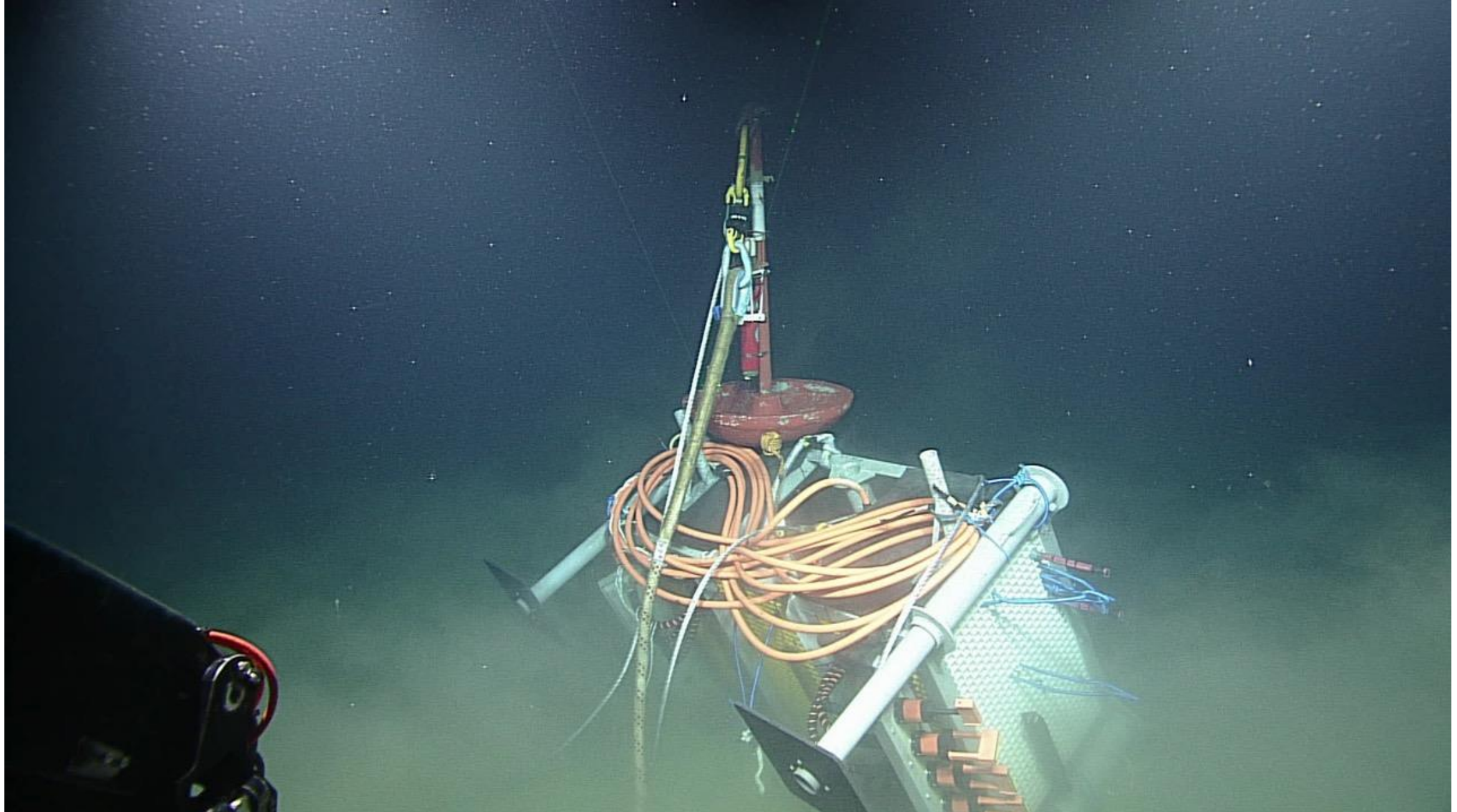
Task	Area of Responsibility	Status	Comment	JIRA	Last Modified (UTC)	Modified By
Data Products - develop	Data Team	Complete			24-Jul-2019 01:34:21	Reyna Jenkyns
PostProcess Job - enable	Data Stewardship	Complete	job 95 is enabled	NEPDATA-11689	26-Jul-2019 00:30:10	Reyna Jenkyns
Site - prepare	Data Stewardship	Complete	Barkley Upper Slope, mounted on platform so shares site with JB. UpperSlope_IP_2019-09 exists		24-Jul-2019 15:54:48	Mitchell Wolf
FTP job - configure	Data Stewardship	Not Required			24-Jul-2019 01:34:21	Reyna Jenkyns
Sensors - create	Data Stewardship	Complete			24-Jul-2019 01:34:21	Reyna Jenkyns

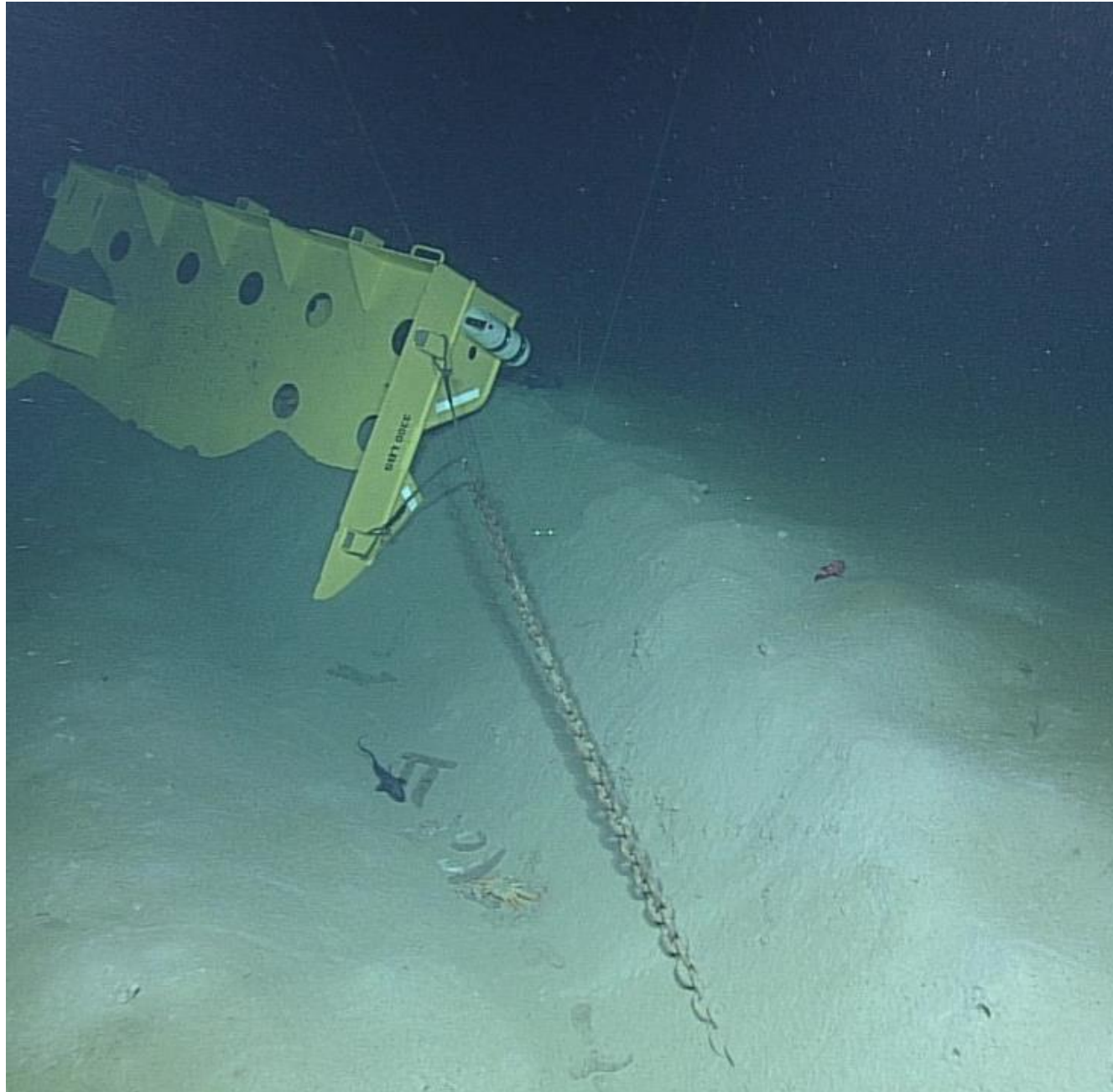
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Murphy lives subsea!







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Questions