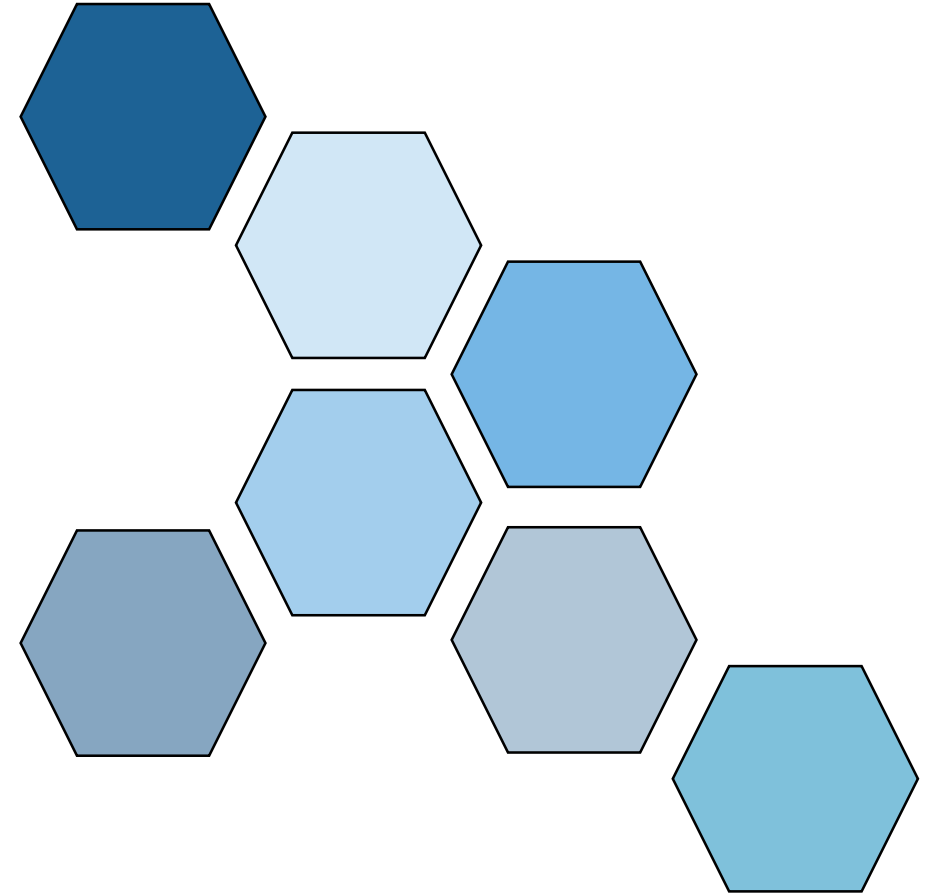


P-ONE Virtual Meeting

STRAW-b status update

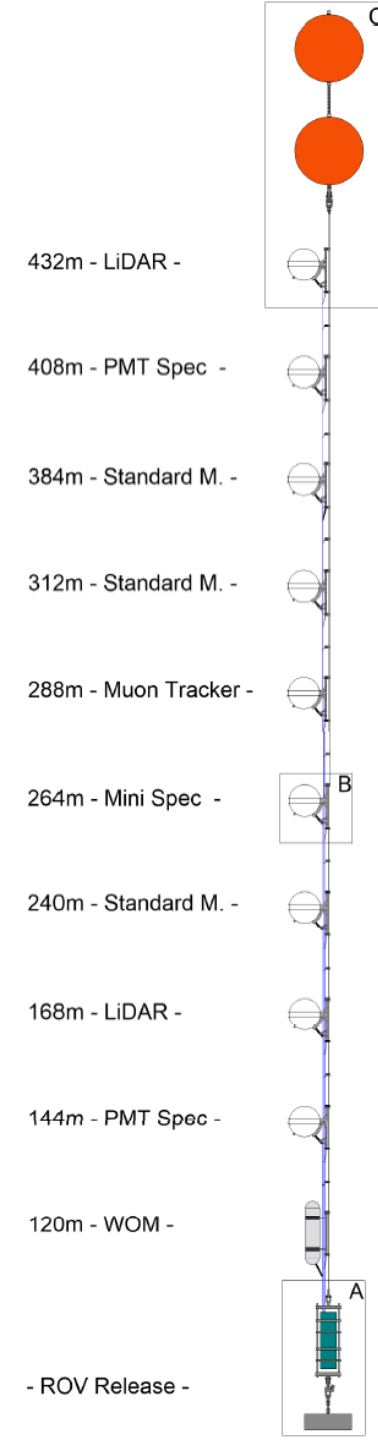
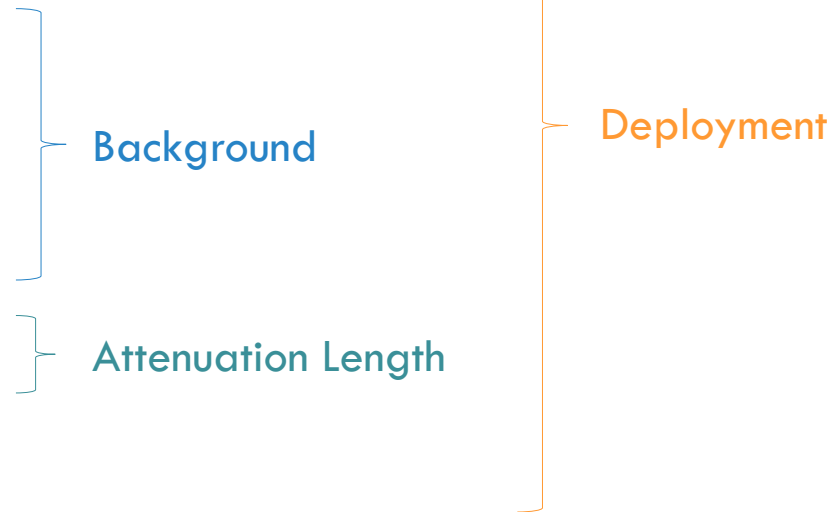
M. Böhmer, C. Fink, C. Fruck, R. Gernhäuser, A. Gärtner, C. Haack, F. Henningsen, K. Holzapfel, Na. Khera, Ni. Khera, K. Leismüller, L. Papp, I.C. Rea, E. Resconi, C. Spannfellner, M. Traxler, J. Michel, L. Winter, L. Ruohan, C. Bellenghi, D. Vivolo

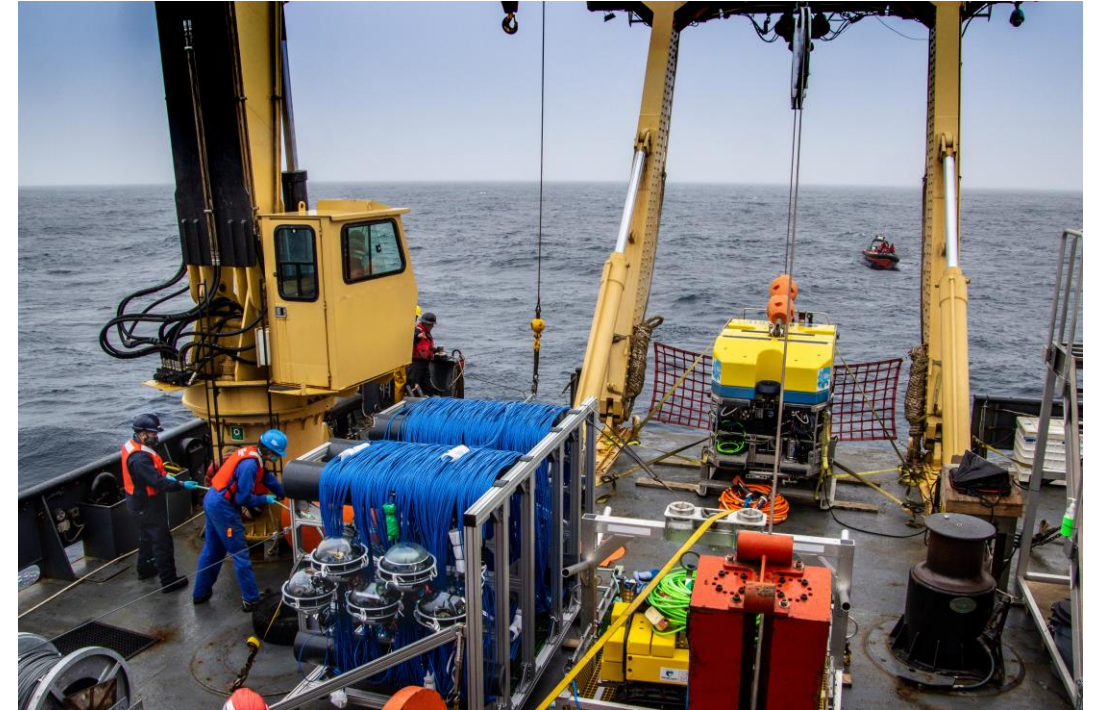
TUM – Experimental Physics with Cosmic Particles



STRAW-b – 2nd P-ONE pathfinder

- Mooring line with 10 modules in total
- 3 standard modules with p/T/H ping signal
- 7 specialized modules
 - 2x PMT spectrometer
 - Stand-alone spectrometer
 - Muon Tracker
 - LiDAR
 - WOM – external module





Timeline:

End of 2018 – Start of development/collecting first ideas

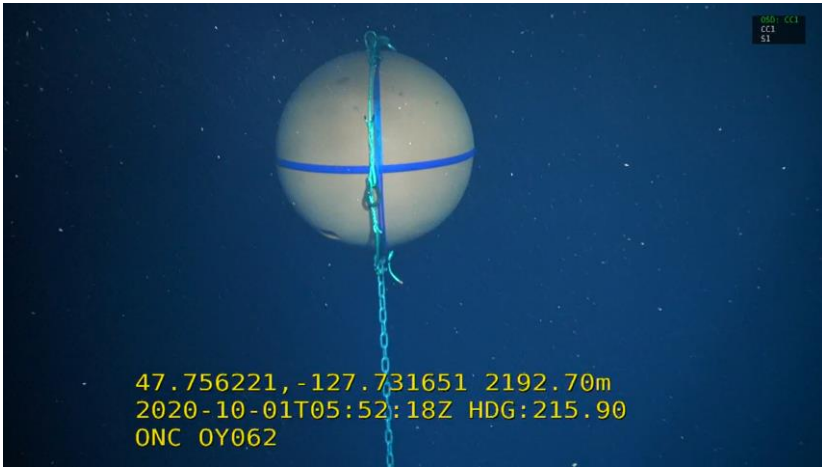
27/09/2020 – Deployment

01/10/2020 – Dive for inspection and connection

Now – Data commissioning for specialized modules

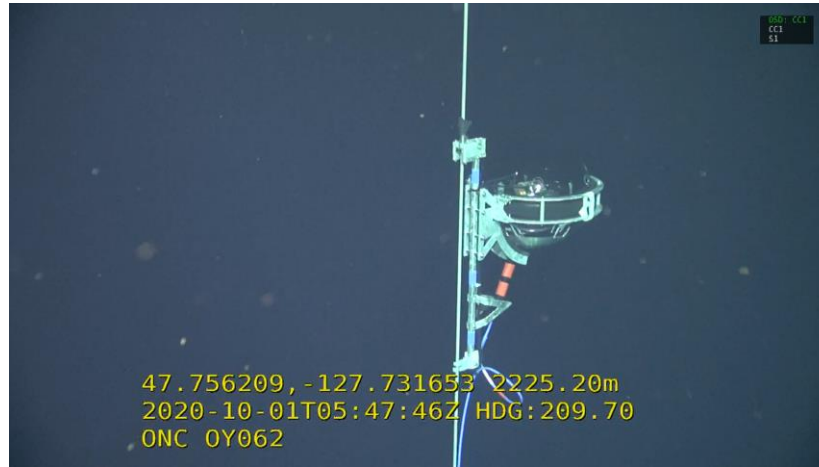
Images: Ocean Networks Canada

STRAW-b status



Floats

Depth: **2192m**; **2200m**

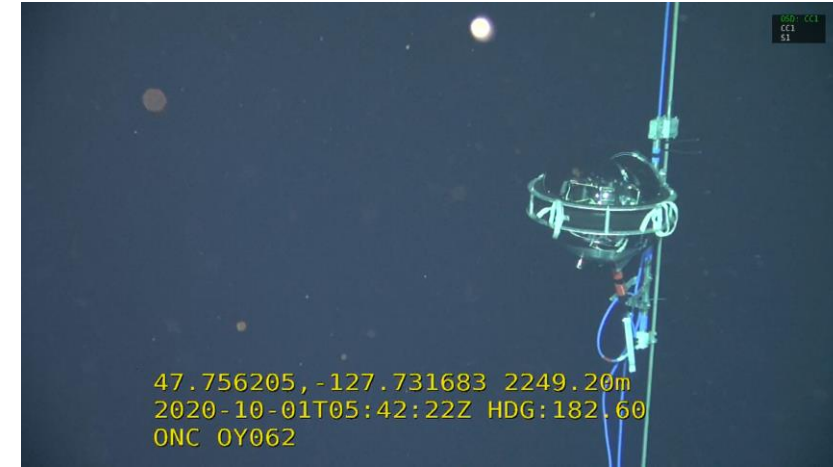


LiDAR 2

ONC IP: 10.136.117.160

Depth: **2226m** (432m VEOC)

Functional

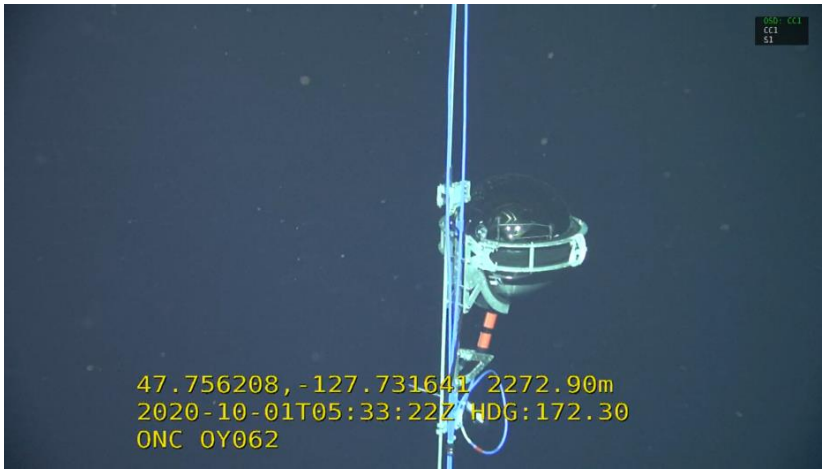


PMT spectrometer 2

ONC IP: 10.136.117.161

Depth: **2248m** (408m VEOC)

Functional

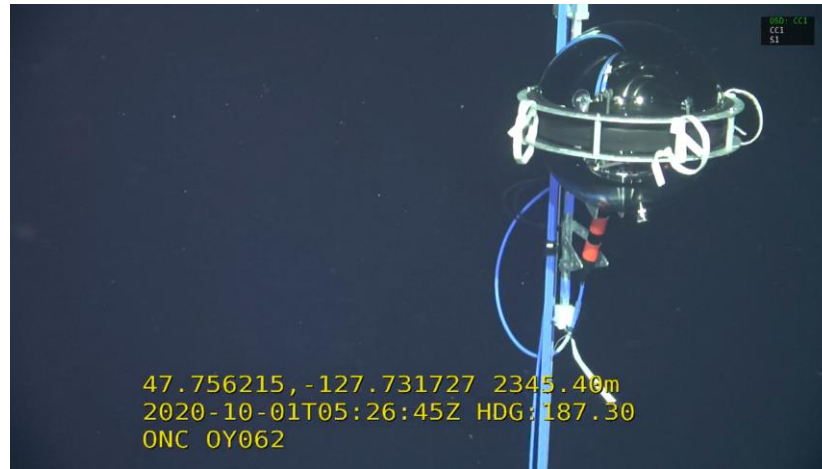


Standard module 3

ONC IP: 10.136.117.162

Depth: **2273m** (384m VEOC)

Overcurrent

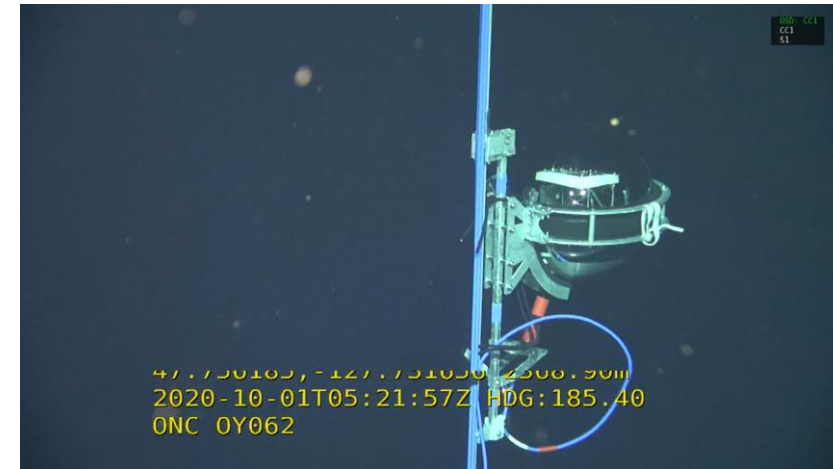


Standard module 4

ONC IP: 10.136.117.180

Depth: **2345m** (312m VEOC)

Functional

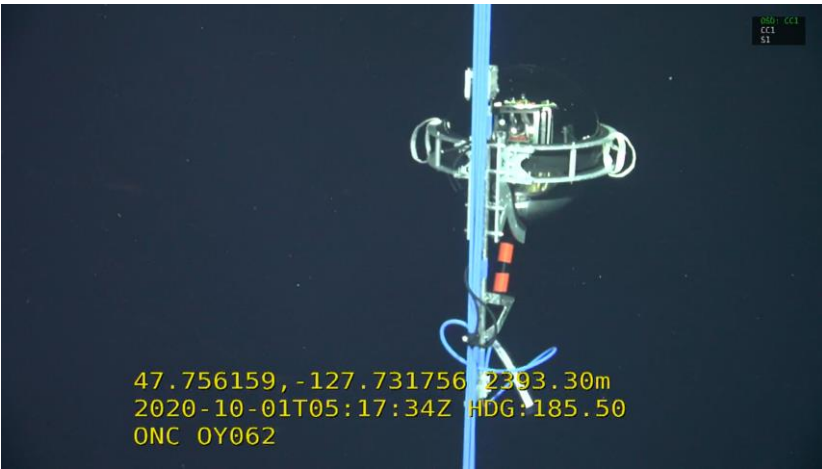


Muon tracker

ONC IP: 10.136.117.164

Depth: **2369m** (288m VEOC)

Functional

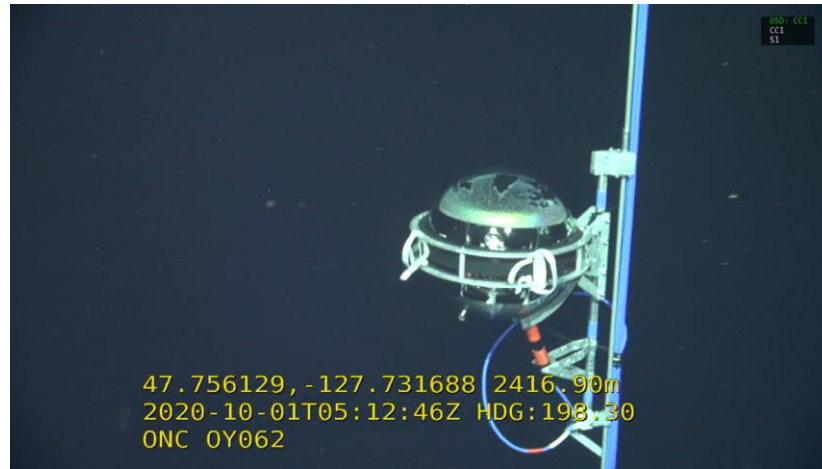


Mini spectrometer

ONC IP: 10.136.117.165

Depth: **2393m** (264m VEOC)

Functional

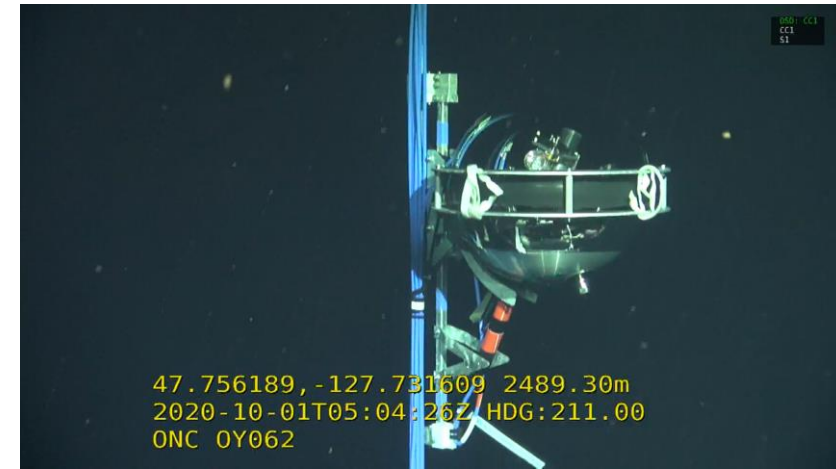


Standard module 1

ONC IP: 10.136.117.166

Depth: **2417m** (240m VEOC)

Functional

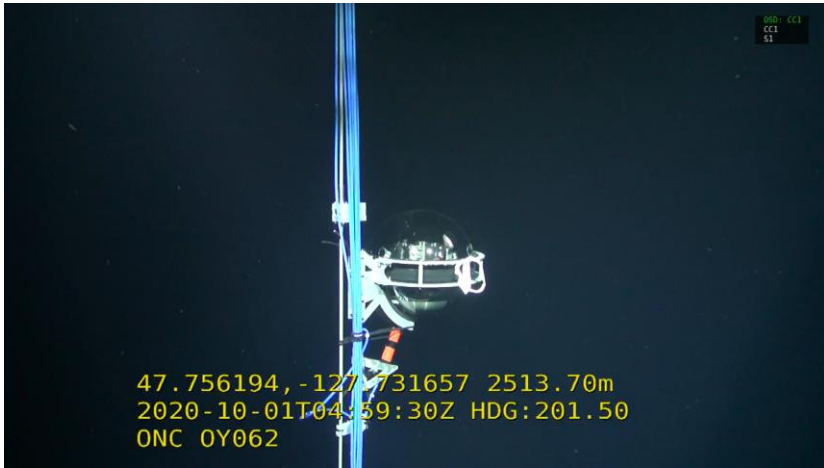


LiDAR 1

ONC IP: 10.136.117.167

Depth: **2489m** (168m VEOC)

Functional



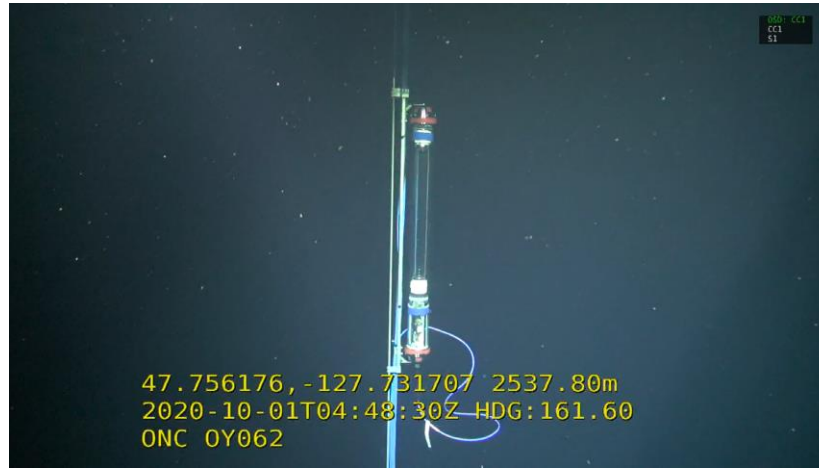
PMT spectrometer 1

ONC IP: 10.136.117.168

Depth: **2512m** (144m VEOC)

Functional

14.12.2020



WOM

ONC IP: 10.136.117.169

Depth: **2536m** (120m VEOC)

No communication
(since power outage)

P-ONE | C. Spannfellner | Technical University Munich



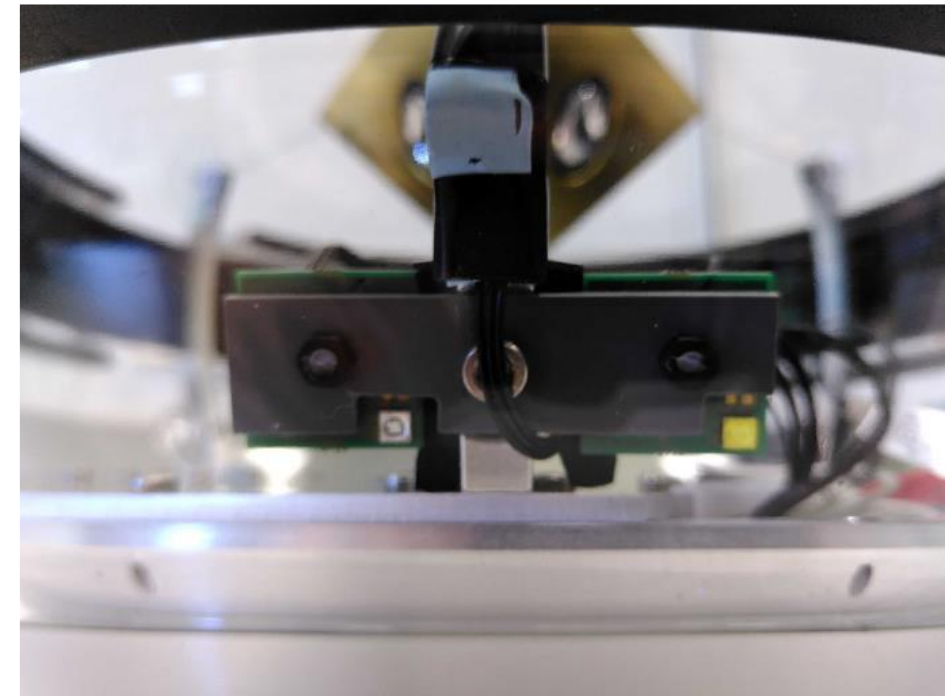
Mini Junction Box (MJB)

Depth: **2656m**

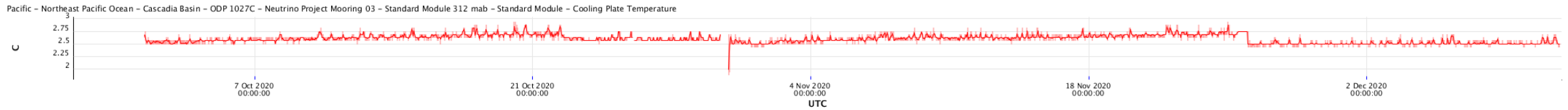
Standard modules

STRAW-b – standard modules

- Standard modules have base functionality (empty modules)
- SM take environmental data (p/T/H)
- Completely integrated in Oceans 2.0 plotting utility
 - Available at:
<https://data.oceannetworks.ca/PlottingUtility> [Pacific - Northeast Pacific – Cascadia Basin – ODP1027c – Neutrino 03]
- Standard module 3 failed right after deployment
 - Powering up is not possible – electrical short
 - Probably linked to broken connector at MJB



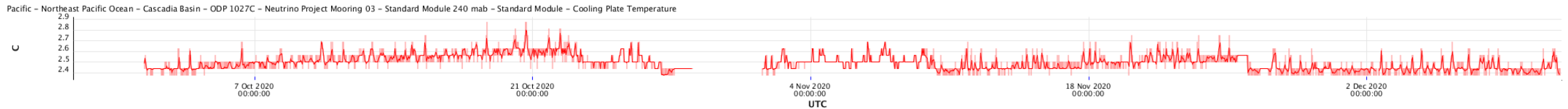
STRAW-b – standard modules subsea temperature (estimates)



[Technical University of Munich Standard Module SN004 – Cooling Plate Temperature \(66302\) – Clean – MinMax – Downsampled](#)

[Technical University of Munich Standard Module SN004 – Cooling Plate Temperature \(66302\) – Clean – Avg – Downsampled](#)

Standard module 004: Oceans 2.0 plotting utility



[Pacific – Northeast Pacific Ocean – Cascadia Basin – ODP 1027C – Neutrino Project Mooring 03 – Standard Module 240 mab – Standard Module – Cooling Plate Temperature \(66223\) – Clean – MinMax – Downsampled](#)

[Pacific – Northeast Pacific Ocean – Cascadia Basin – ODP 1027C – Neutrino Project Mooring 03 – Standard Module 240 mab – Standard Module – Cooling Plate Temperature \(66223\) – Clean – Avg – Downsampled](#)

Standard module 001: Oceans 2.0 plotting utility

NOTE: Data is not corrected. Verification/correction from lab data pending. Runtimes need to be considered.

- Pre-shipment an offset of 2°C was measured (in air)
- Long-term monitoring (few years) could potentially provide climate change data

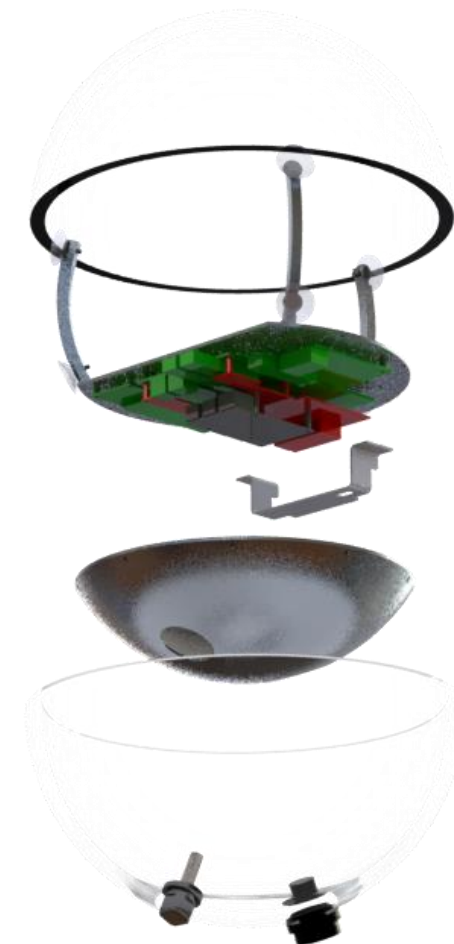
Up next: Status updates from specialized modules

Thank you for the attention!

Backup

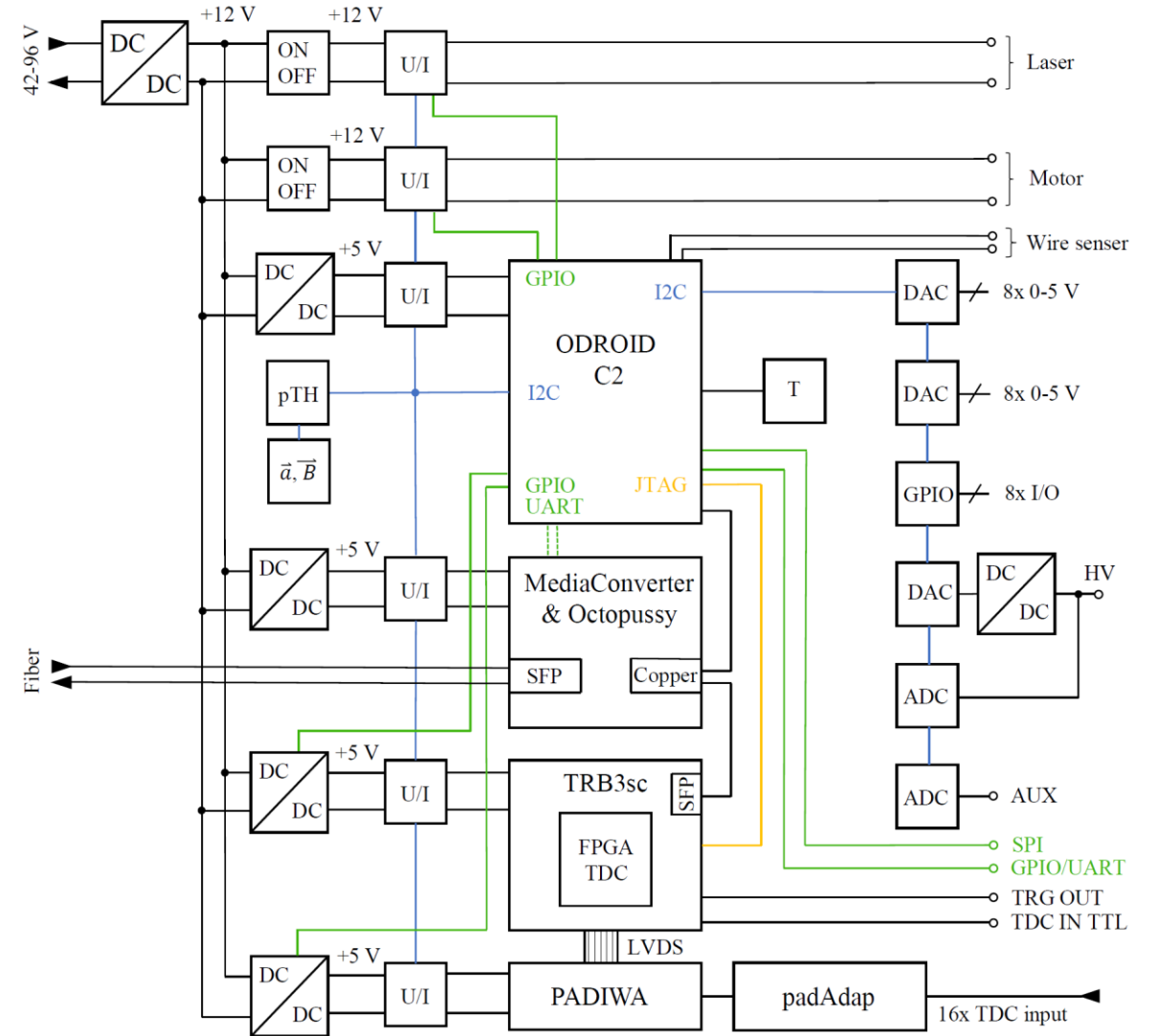
STRAW-b – standard modules

- Base for all modules
- Readout system based on TRB3sc
- Deliver p/T/H and \vec{a} , \vec{B} ping signals from positions
- Modular mechanical substructure



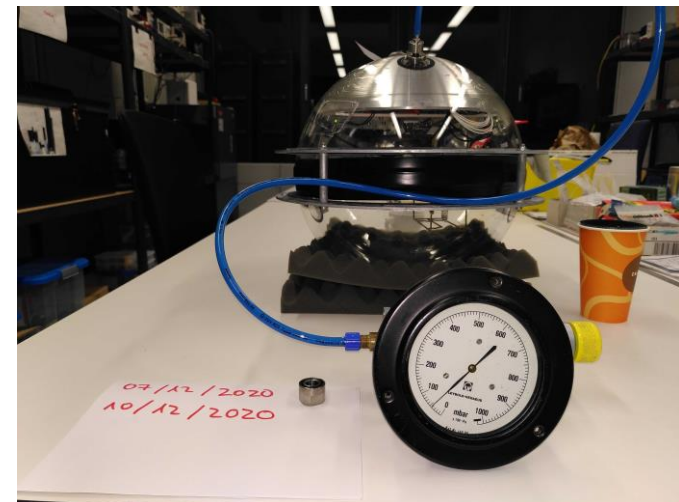
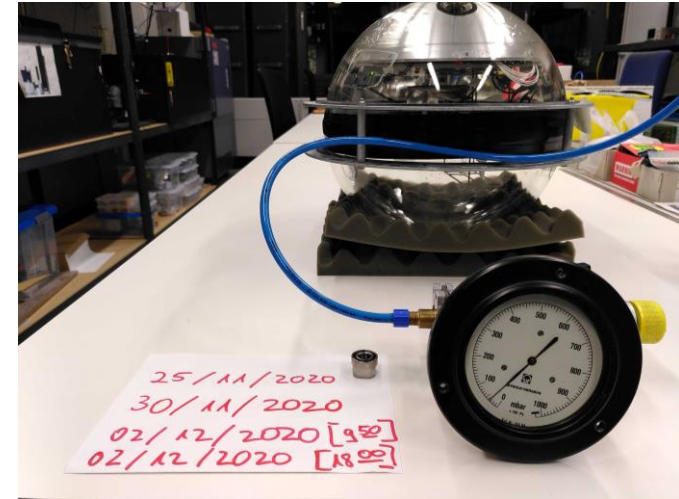
STRAW-b – readout electronics

- Photosensor signal is fed to PADIWA
 - Amplification and signal-shaping for TOT measurements
- TRB3sc (Trigger Readout Board)
 - Integrated readout system with FPGA and TDCs
 - Different thresholds adjustable for TOT measurement
- Communication via media converter and Odroid C2



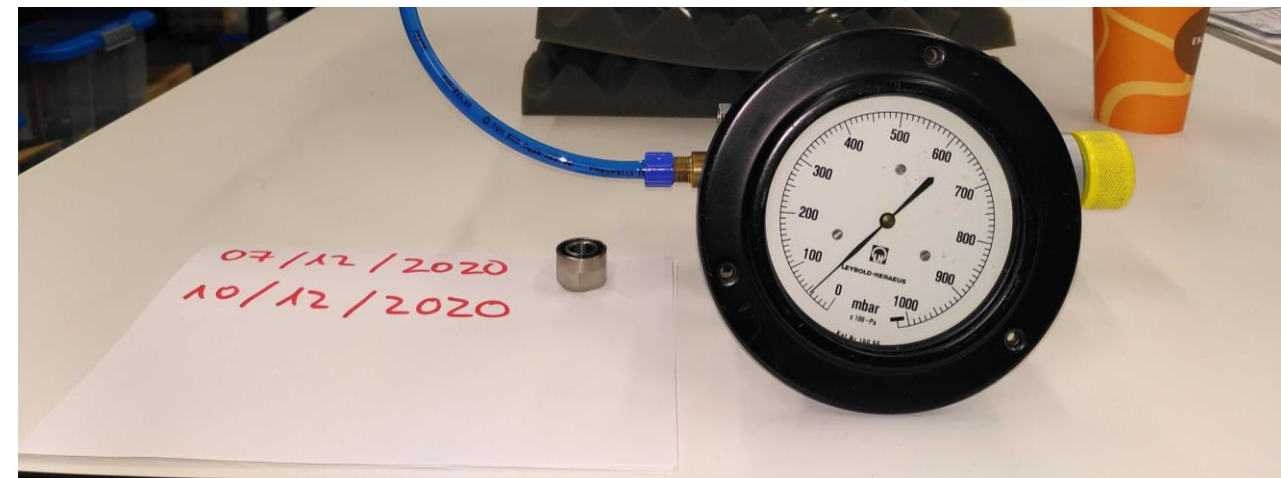
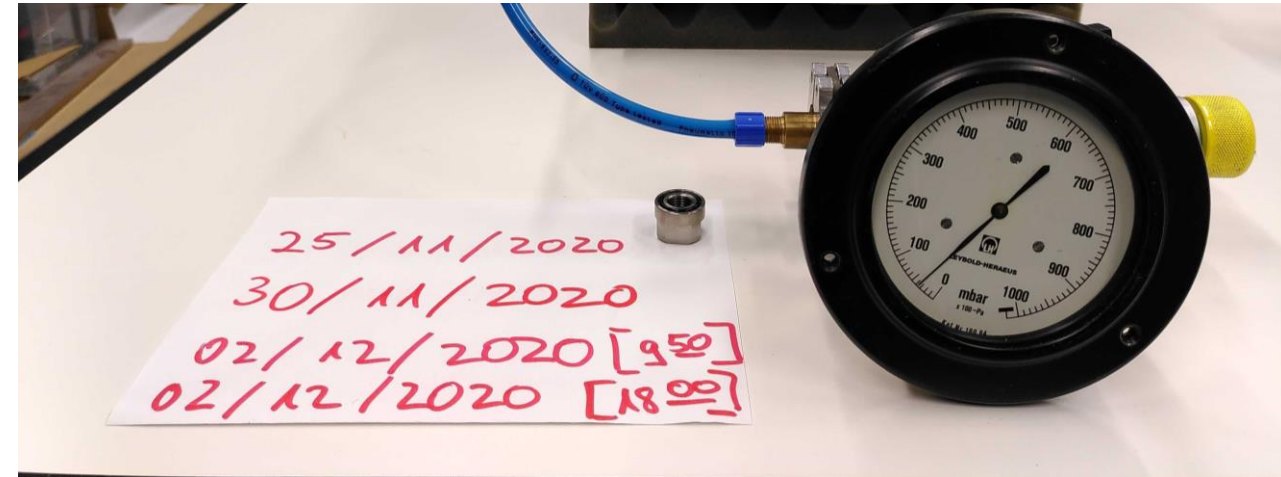
SM2 – conclusion & next steps

- Long term test shows no leak
- Failure origins most probably from penetrator
 - Vacuum port cannot be excluded – but tight if cap is closed correctly (must have happened several times)
 - Teroson can be excluded as fault location
 - Also loose contact of penetrator adapter as fault possible
- Long term monitoring with removed sealing compound
- Additional leakage search with coloured water (tank test)

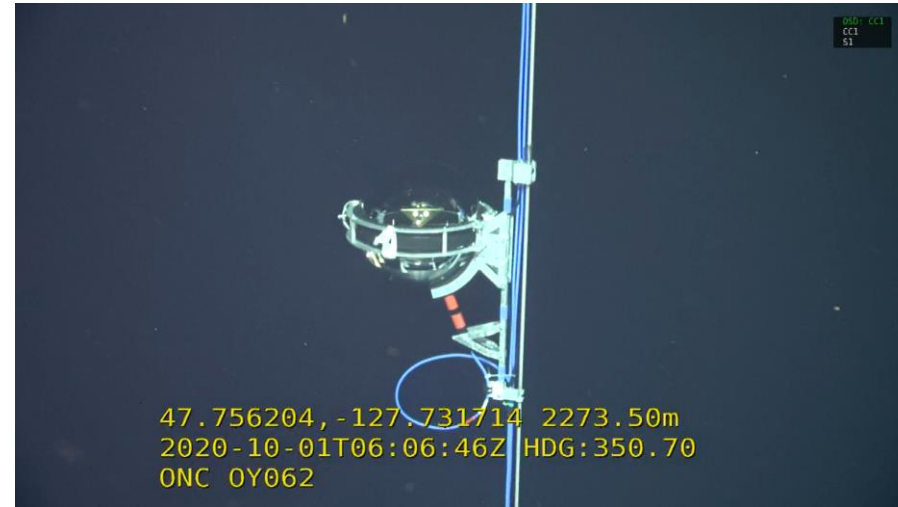
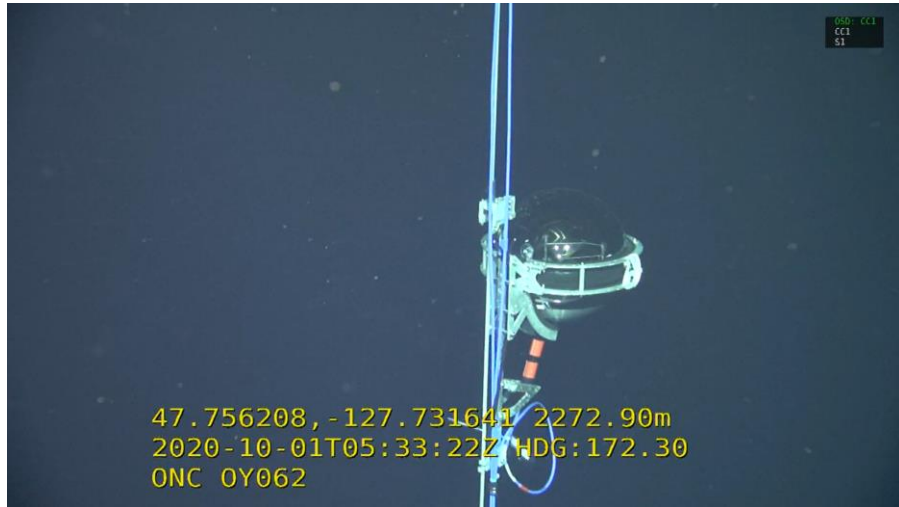


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 - Also loose contact of penetrator adapter as fault possible
- Long term monitoring with removed sealing compound
- Additional leakage search with coloured water (tank test)



SM3 – failure/timeline recap



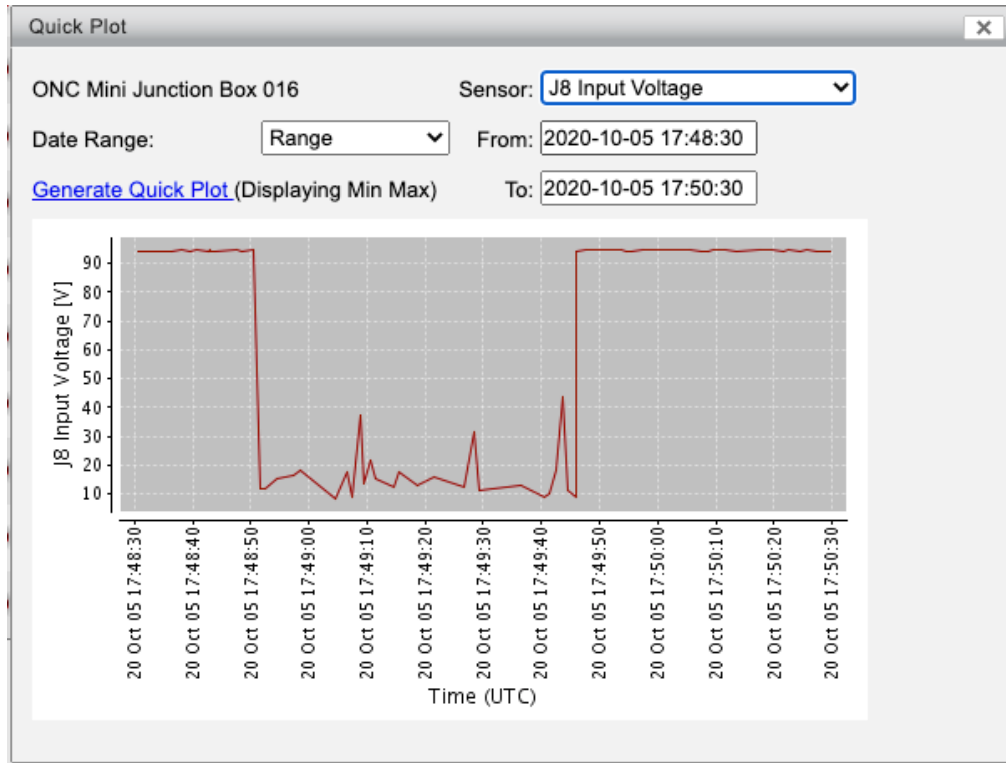
26/09 – Last connection prior to deployment – SM3 responds; p/T/H normal (354.46mbar/22.88°/30.31%)

27/09 – Deployment of STRAW-b

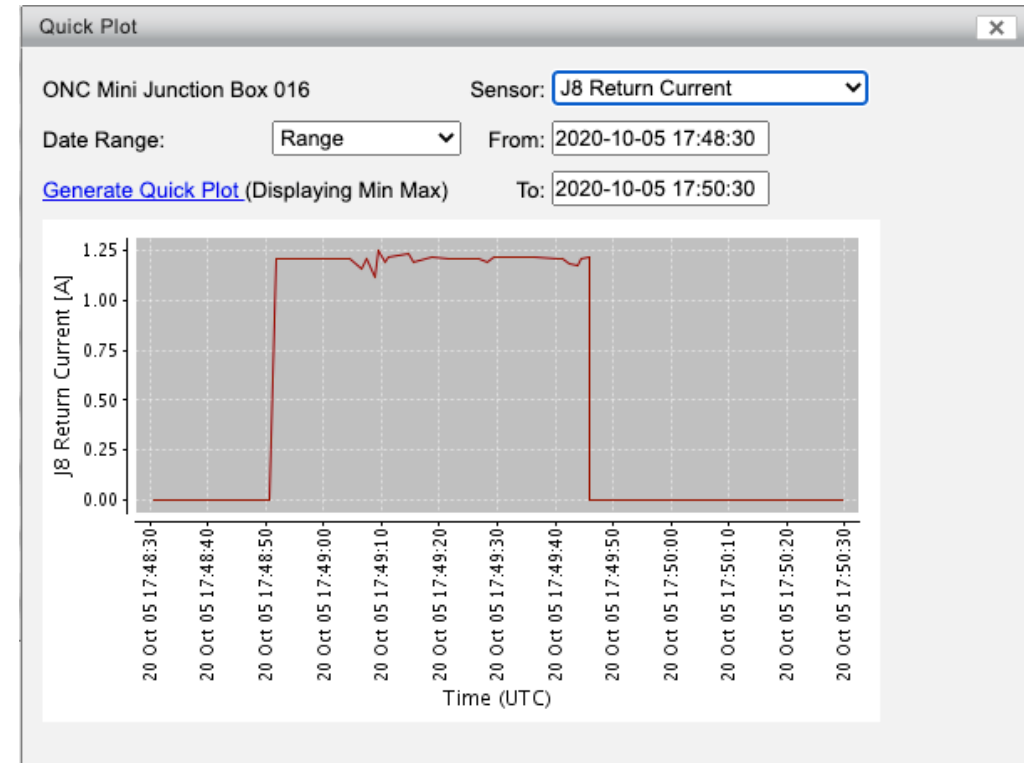
01/10 – Connection of STRAW-b to MJB – no connection to SM3 possible (high power consumption)

05/10 – 2nd connection attempt – powering up not possible (current spiking, voltage drops)

SM3 – power monitoring (provided by ONC)



- Voltage drop to 10-20V (peaking at 40V)



- Current peaks at 1.25A

SM3 – possible fault location

- Voltage drops to 12.5 to 15V (fluctuating)
- Current rises to 1.25A
- Corresponds to a resistance of around 10-12 Ohm
 - VEOC at the SM3 has a length of 384m (with 39.3 Ohm one way)
 - Short at the SM3 is unlikely (voltage would be around 96V)
 - Low resistance indicates that the failure originates from the connector at the MJB
 - Probably caused by water in the connector – could explain voltage fluctuation due to changing resistance

