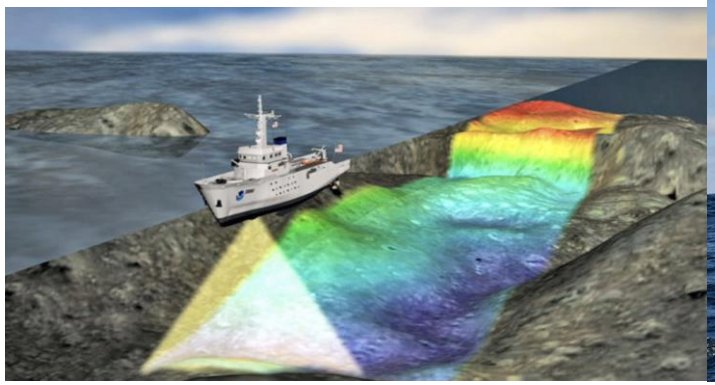
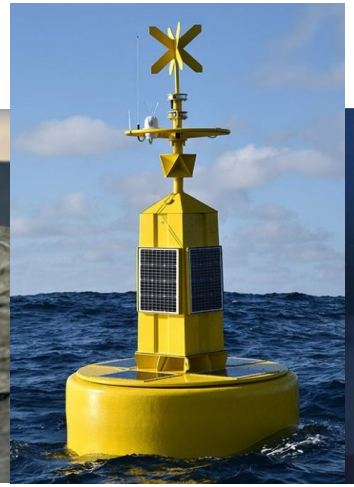
AML Oceanographic

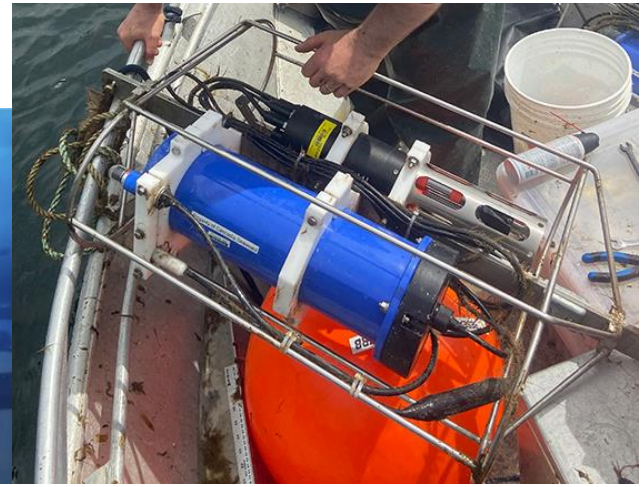
50 Years of ocean sensing solutions

Located on both the west and east coast in Canada, AML provides ocean sensing solutions around the globe

We help our customers remove the unpredictability - economic and technical - from their survey operations.

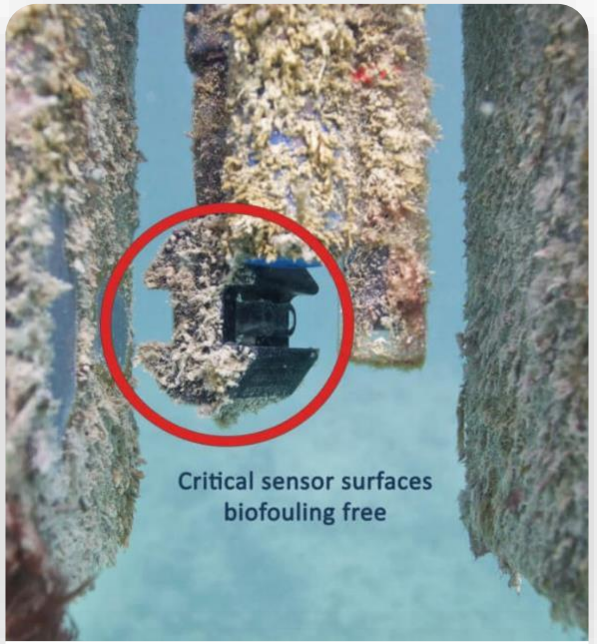






OUR SOLUTIONS

Instrumentation



Biofouling Control

Underway Profiling

Instrumentation

Field-swappable sensor-heads

Largest array of end-cap mounted sensors

Environmentally friendly biofouling control

Wireless charging for USVs

Fastest delivery in the market

Speedy SVPs

Standard hydrographic products
shipped within 5 business days

Maximum profiler depth 500m | Maximum quantity 5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AML.oceanographic.com


Canada

UV BIOFOULING CONTROL

“After 15 months and still going, at our worst bio-fouling site, the sensors remain clean and operating fine. We are all absolutely amazed. ”

Scott Mclean Director – Ocean Networks Canada Innovation Centre (ONC)

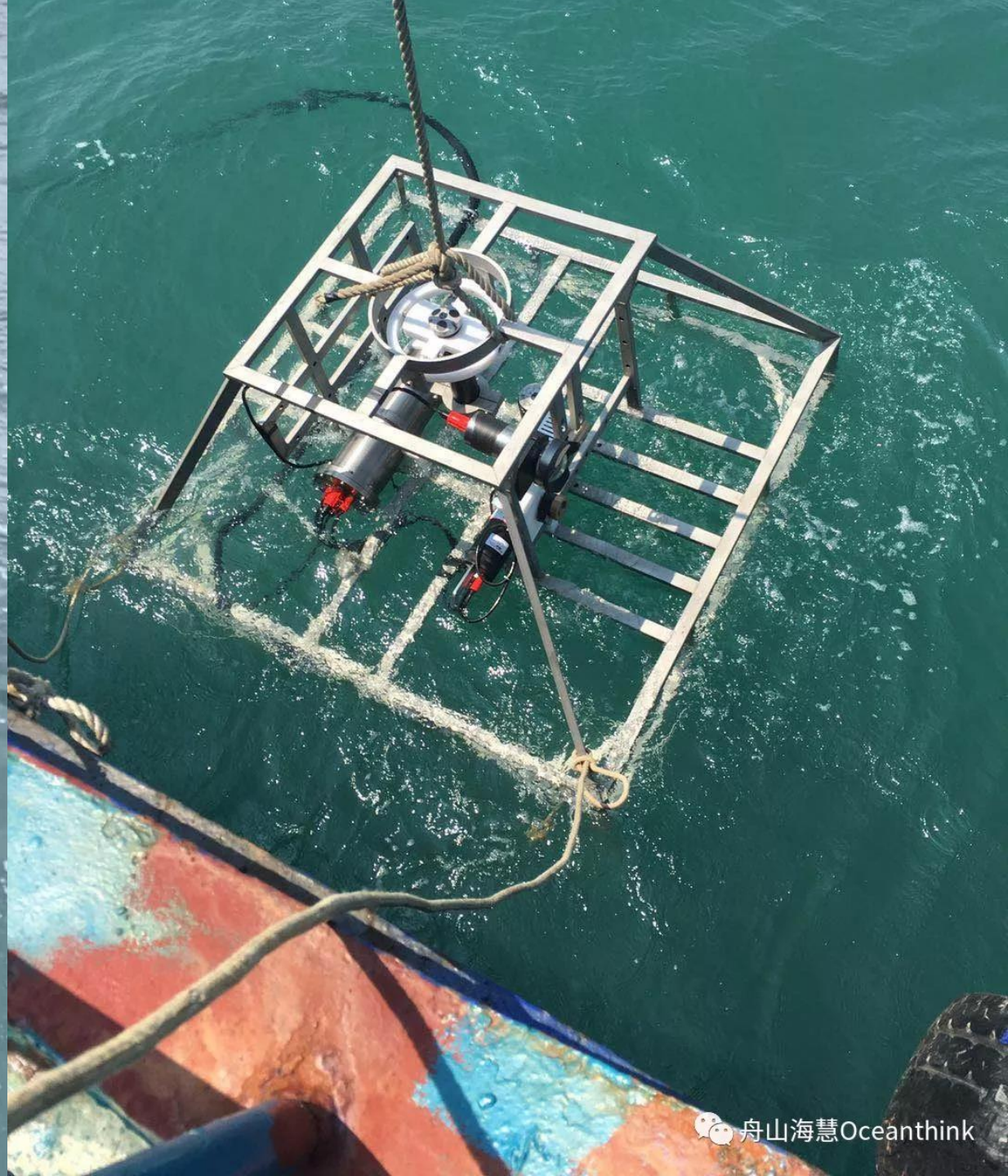
"Six weeks into our test, the unprotected oxygen sensor was clearly fouled while the UV protected sensor is still producing reasonable data."

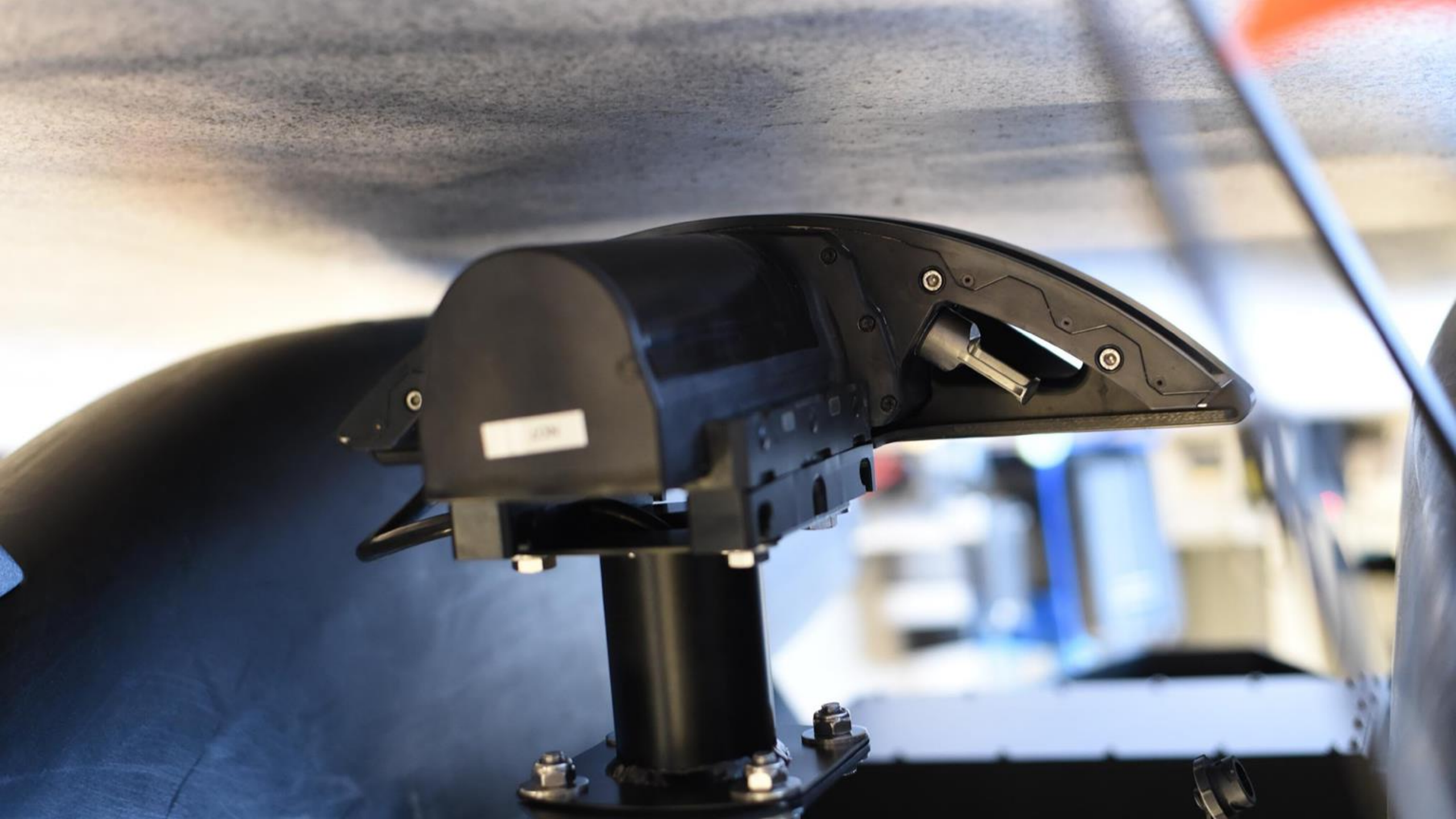
Jonathan Fram. Assistant Professor – Oregon State University (OSU)

13°


PADI


SEABER





Instrumentation Developments
Wireless Charging and Communications

- No connector connections required
- Interchangeable transmitters and instruments
- Long term missions now only limited by total power on board, not instrument
- Now on AML 3
- Integrated solution does require engineering application note on request

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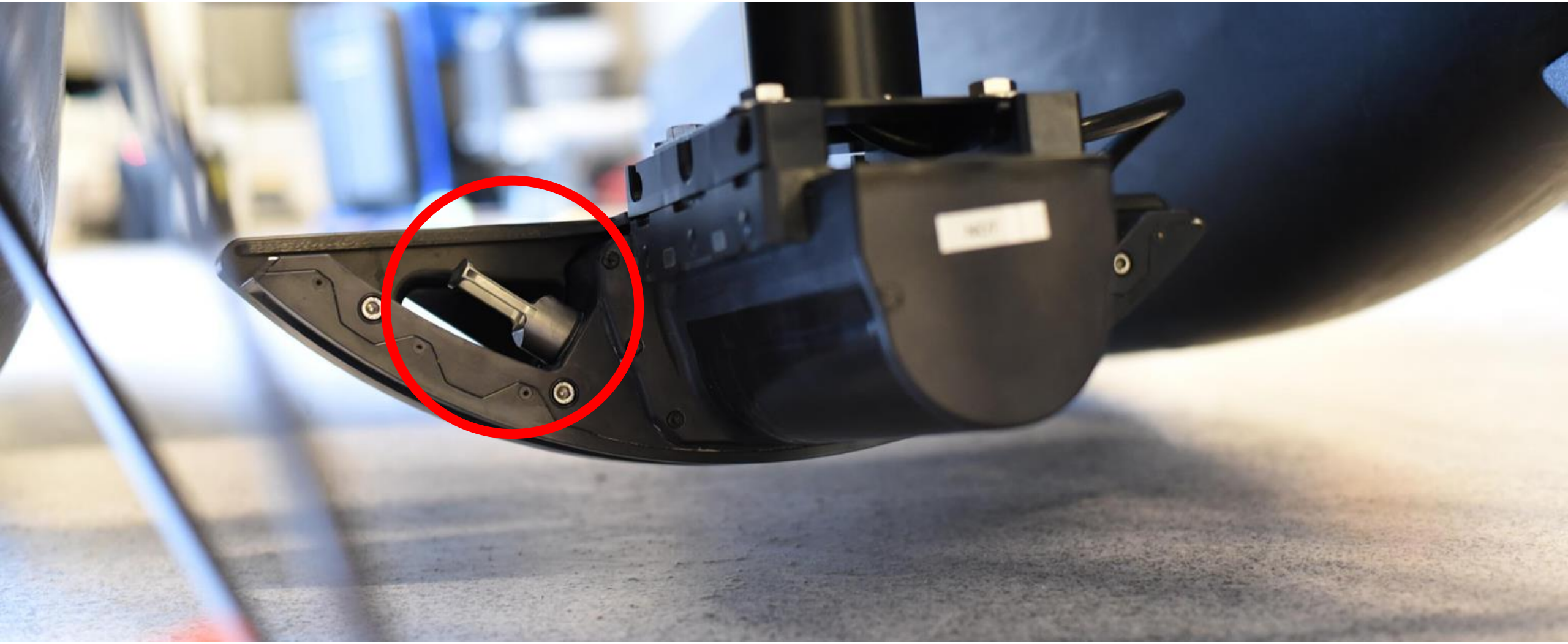
Application Note:
Wireless Charging Capability on
AML-3 WCR

The Importance of Sound Speed in Multibeam Survey

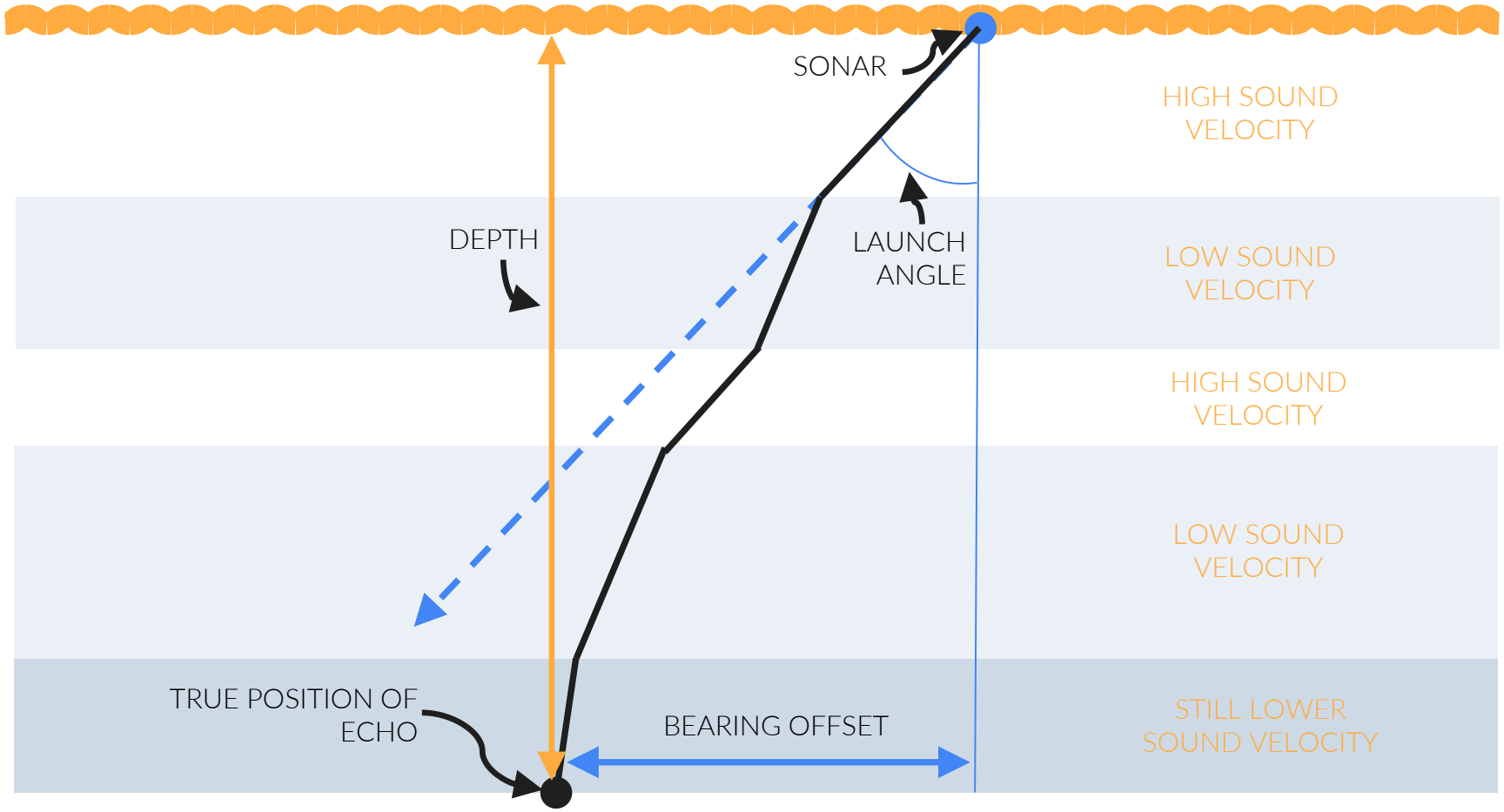
Where is sound velocity measurement used in multibeam systems?

(1) At the multibeam head for the purposes of beam steering



Where is sound velocity measurement used in multibeam systems?

(2) Within the water column itself to correct for both refraction and range errors.



How often should I be taking a profile?

Ideally:

CONTINUOUSLY

!

(Or as often as possible)

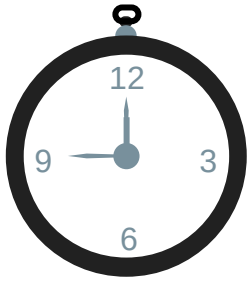
Realistically:

Periodically

According to conditions

How often should I be taking a profile?

General Guidelines

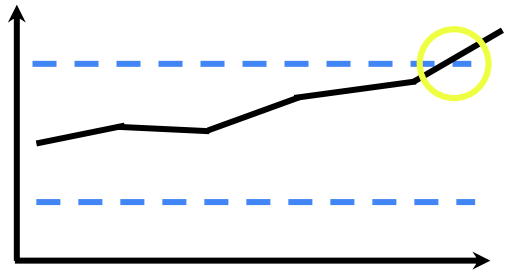


Temporal Based

Once per hour, give or take.

Spatial Based

Once every *x* km.



Sea Surface SV Changes

Once the sea surface SV changes by more than some fixed amount (~1 m/s)

Profile Frequency Before and After Local Solar Noon

Sound speed structure changes significantly

- An hour before
- Two hours after

Local Solar Noon

NOAA recommends increasing SV profile collection during this period… Double your casts during this period.

Credit to H. Stewart, J. Croucher, J. Tixier, and J. Spurlock (Fugro) for the presentation at CHC 2024. Credit to NOAA for the Local Solar Noon calculator tools.

Optimizing SVP Acquisition Frequency for Surface Vessels Equipped with MBES and Underway Profilers

important takeaways:

1. IN GENERAL, 1 hour before to 2 hours after local solar noon is good enough. There's no need to make field crews chase minutes.
2. The time of local noon only varies by ~20 minutes over the year. Calculating the time of LSN at the spring equinox is good enough, and you can set an alarm at the start of the MSHW in the acquisition station at the beginning of the survey.
3. You need to go more than about 20 nautical miles in longitude before you start to see > 5 minutes of difference in the time of local solar noon – so pick a point in the middle of your survey area and call it good.
4. The main solar heating window opens when the barometer begins to fall….so you can add this to your survey planning. Even if you don't have water temperature data, you can look at the afternoon pressure drop and use that as a proxy.
5. Don't do your patch test or USBL calibrations during the main solar heating window!!!

Credit to H. Stewart, J. Croucher, J. Tixier, and J. Spurlock (Fugro) for the presentation at CHC 2024. Credit to NOAA for the Local Solar Noon calculator tools.

Underway Profiling Systems

60 years of combined expertise in the domain

Real time obstacle avoidance

180+ systems delivered

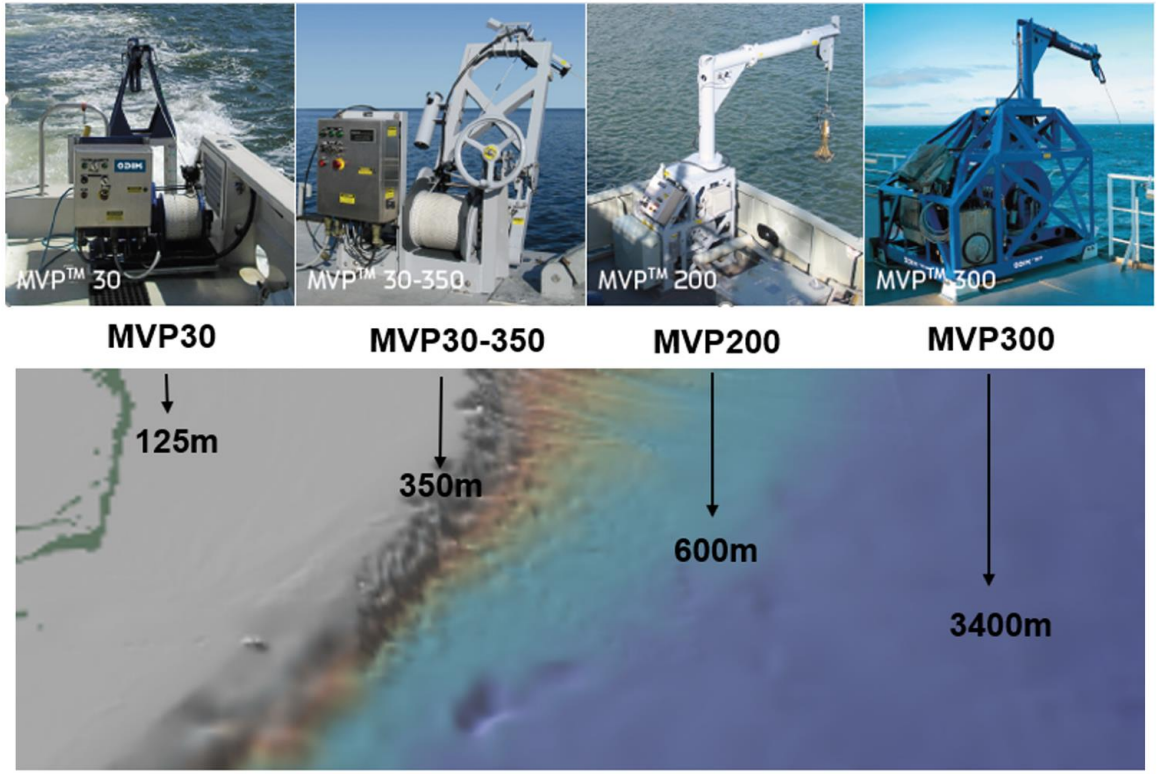
TYPICAL SURVEY CHALLENGES

Survey Trade-Offs

Performance Predictability

Managing XBTs

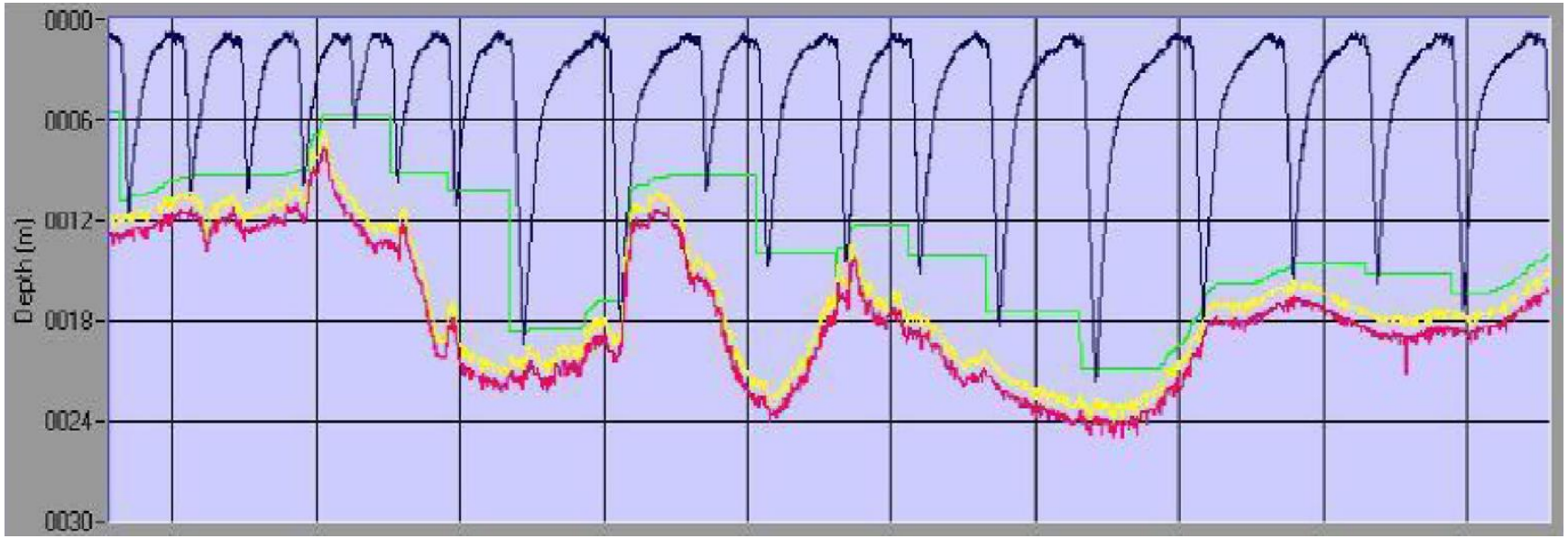
Moving Vessel Profiler



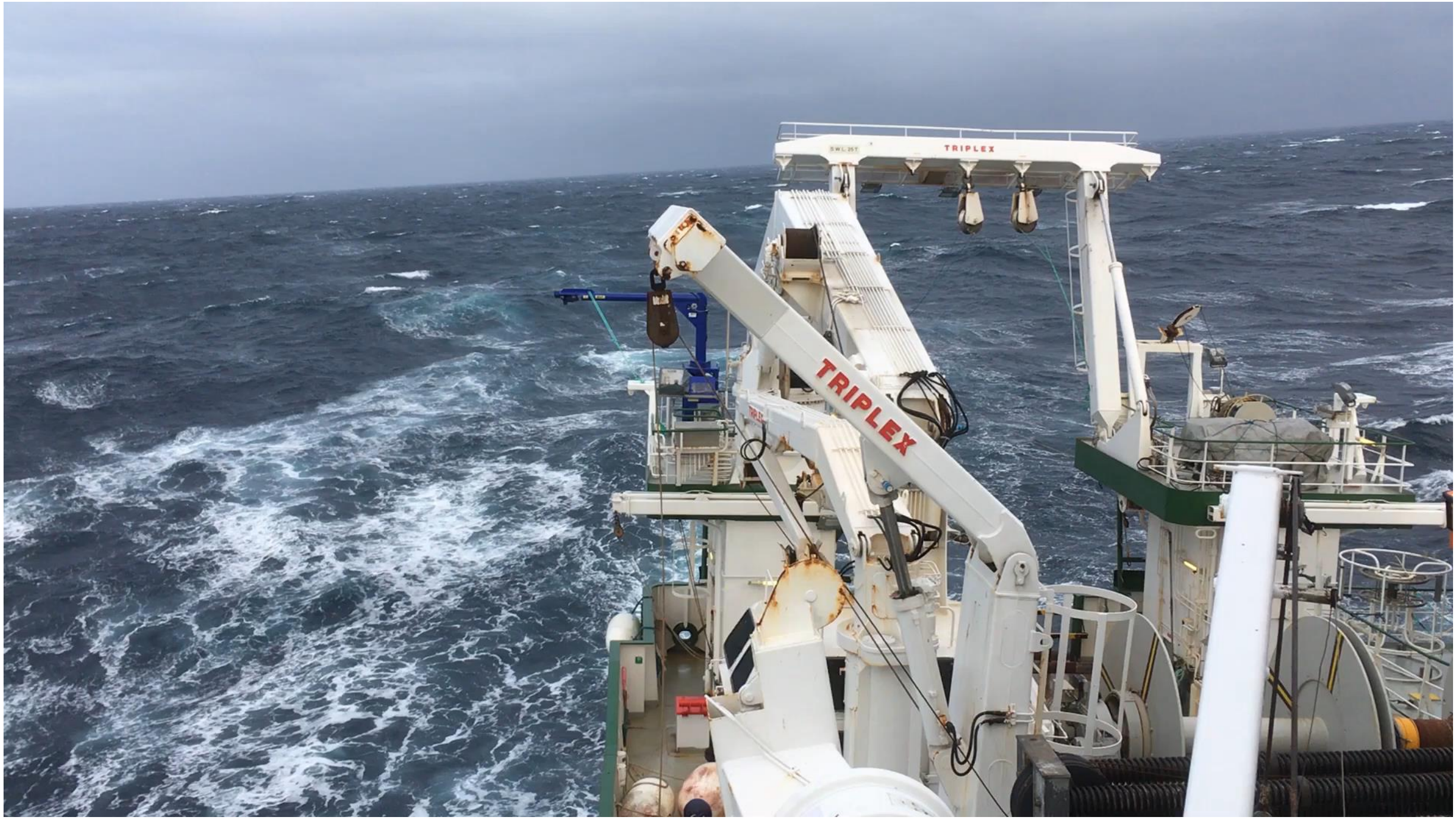
	MVP30		MVP30-350		MVP200		MVP300	
Speed	Depth Obtained	Cycle Time	Depth Obtained	Cycle Time	Depth Obtained	Cycle Time	Depth Obtained	Cycle Time
0 knots	125 m	2.6 min	350 m	8.5 min	600 m	12.9 min	3400 m	70 min
1 knots	105 m	2.5 min	280 m	7.8 min	520 m	9.9 min	2683 m	61 min
2 knots	90 m	2.3 min	245 m	7.5 min	457 m	8.4 min	2200 m	57 min
3 knots	80 m	2.2 min	228 m	7.3 min	406 m	7.4 min	1900 m	55 min
4 knots	73 m	2.1 min	200 m	7.0 min	368 m	6.9 min	1650 m	53 min
5 knots	66 m	2.1 min	175 m	6.7 min	335 m	6.5 min	1450 m	50 min
6 knots	60 m	2.0 min	155 m	6.4 min	310 m	6.4 min	1250 m	46 min
7 knots	56 m	1.9 min	140 m	5.8 min	285 m	6.0 min	950 m	37 min
8 knots	51 m	1.8 min	121 m	5.1 min	265 m	5.9 min	740 m	29 min
9 knots	47 m	1.7 min	90 m	4.2 min	250 m	5.8 min	580 m	23 min
10 knots	42 m	1.7 min	70 m	3.3 min	235 m	5.8 min	460 m	19 min
11 knots	35 m	1.6 min	55 m	2.5 min	223 m	5.7 min	370 m	16 min
12 knots	30 m	1.6 min	30 m	2.2 min	200 m	5.6 min	300 m	13 min

Collect vertical water column data continuously in real-time while without stopping

MVP : Automated Seabed Avoidance



Example: Safety block when profiling to 1m altitude. When MVP calculates there is a risk of seabed collision it will automatically put a restriction on deployment depth. Only when safe to do so it will allow full deployment to programmed depth or altitude.



Courtesy of INFOMAR and John Hughes Clarke, UNH.

MVP Savings Calculator

Survey Duration (days)

60

Mean Survey Depth (m)

200

Number of Required Casts per Day

6

Time to Stop Vessel to Take Static Profile (min)

20

Time to Take Static Profile (min)

20

Time to Re-deploy and Resume Operations (min)

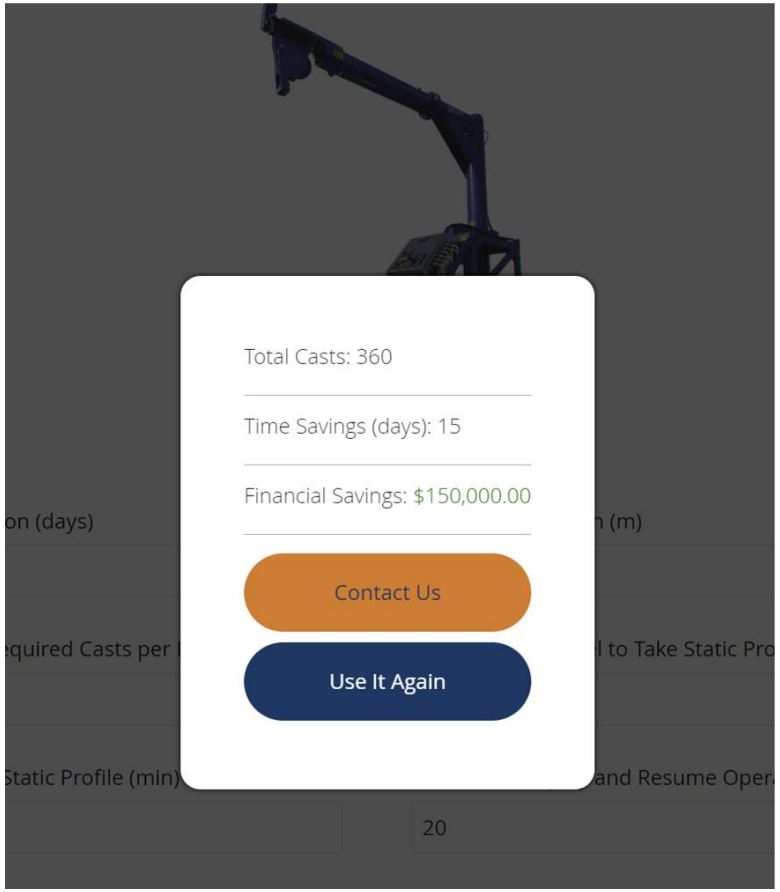
20

Daily Survey OpEx (USD)

10000

Calculate Savings

https://amloceanographic.com/mvp-calculator-upgrade

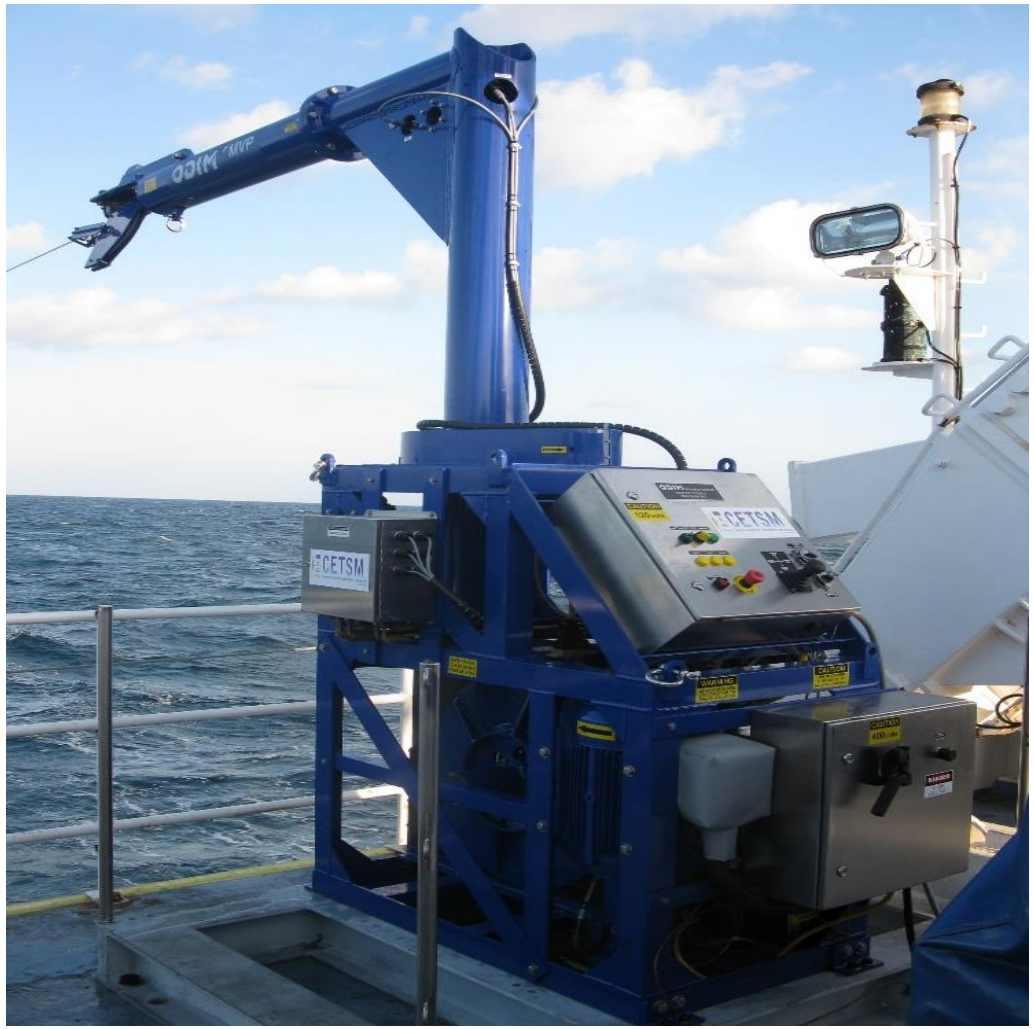


MVP Sensors

- Sensor capability increasing (e.g. SeaBird SUNA Nitrate on large fish)
- Move to both science and mapping where water column data is of value
- Small system expanded sensor payloads

Systems: MVP30 / 30-350

MVP200



MVP300


TAURUS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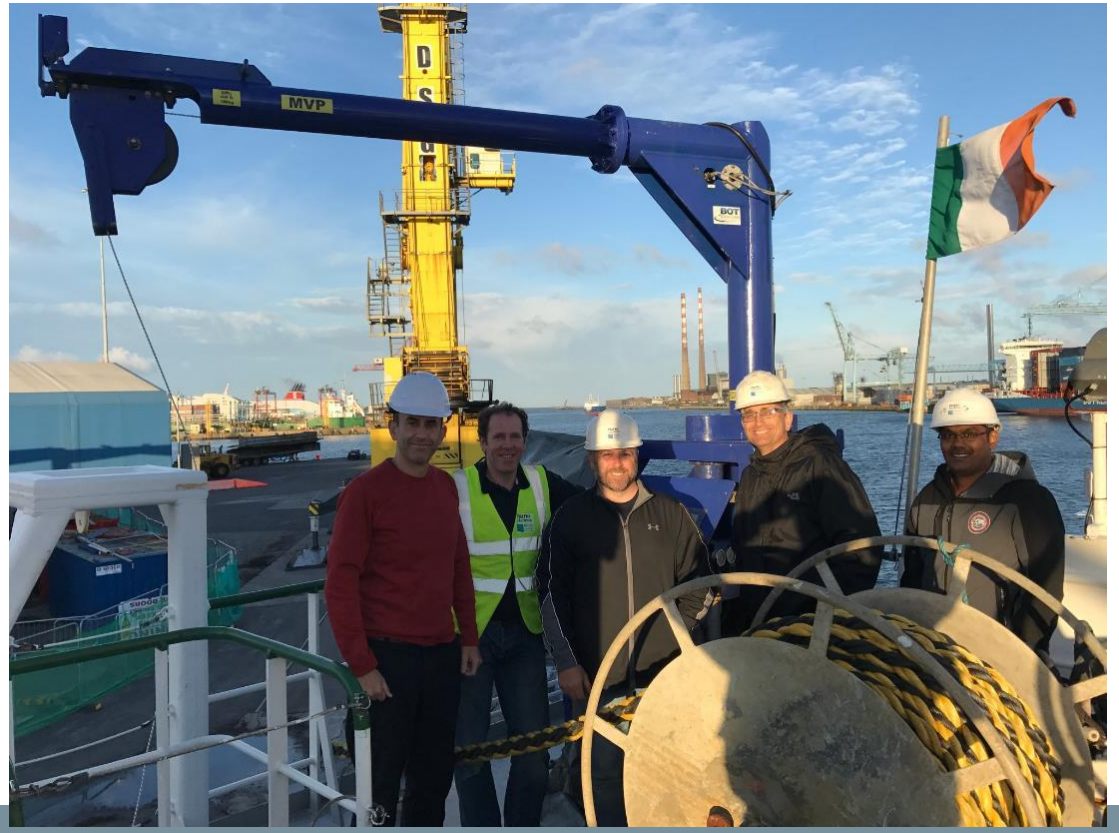

Questions?

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