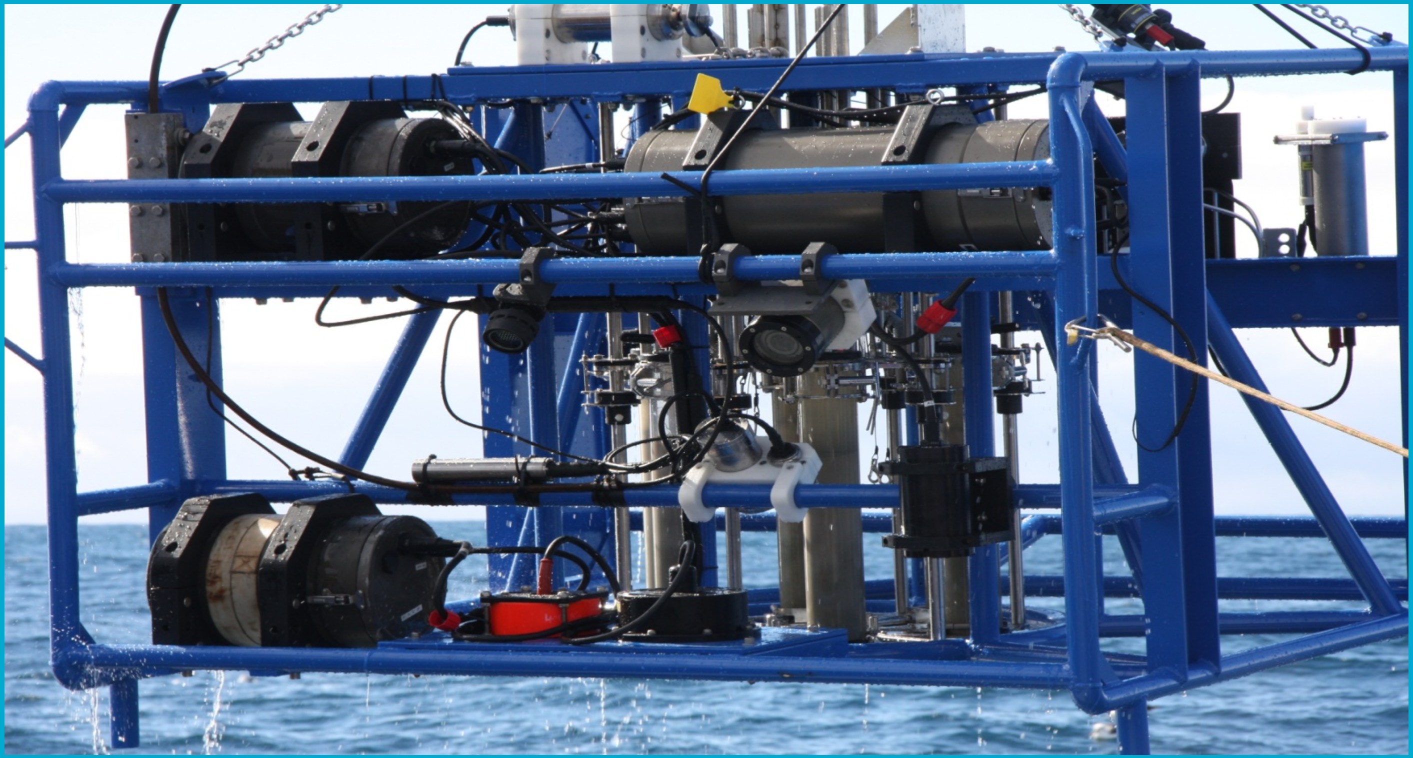

Integrated Coring Platform (ICP)

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Introduction .... Why?

- Our Scientists are involved in providing baseline studies in oil exploration in the Great Australian Bight, Australia. The brief was to develop a system which could collect sediment samples, study the hydrochemistry of the water column through measurements of hydrocarbons, and gain an understanding of micronekton through acoustic methods - typically using Simrad GPT's.

- Ship time is expensive so a 'highly desirable' for our design was to combine all of these sampling techniques into a single platform. Significant time saving could be achieved by avoiding multiple deployments.

- Confirmation that the corer has captured sediment samples was also a high priority.

Some Basics...

- The platform had to sample to 3000m. Our canisters are aluminium, bored from a solid billet. Its a big job.

- Due to depth limitations of the echo sounder transducers we had to remove them at sites over 1500m. We added a 6000m altimeter to give us altitude at the deeper sites.

- We have a month to build it

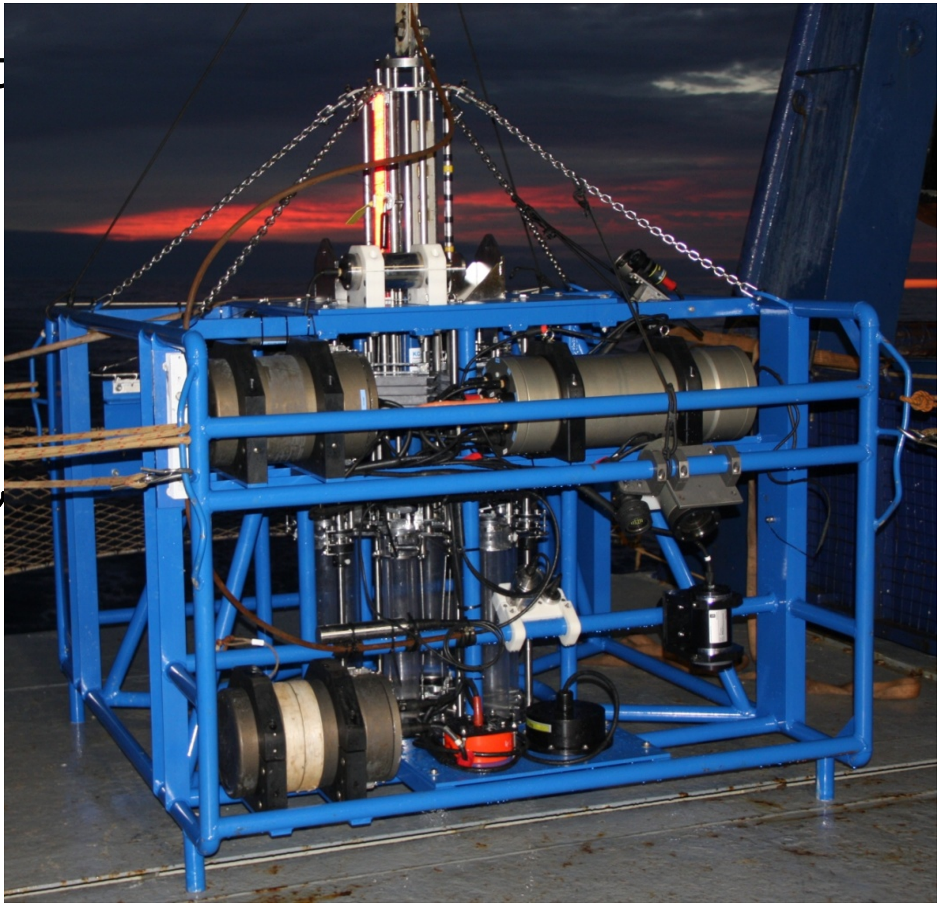
- The Instrumented Coring Platform integrated a KC (Denmark) multi corer, Simrad EK60 echo-sounders, and a SBE25plus CTD (incorporating a suite of hydrocarbon sensors). Water samples were captured using Niskin bottles.

- The ICP is controlled via a 3 km fiber optic cable. This allows real-time monitoring, control and capture through a GUI written using Labview. The underwater unit has a PIC controller which manages device switching, pitch/roll sensing and combining instrument data into a single string which is sent with the video to the surface via the fiber.

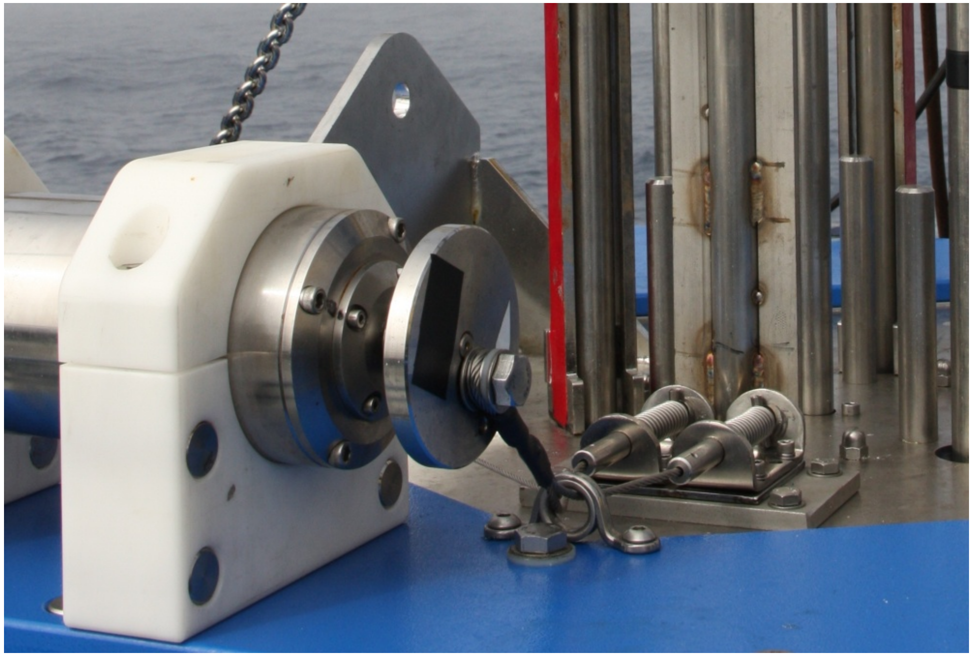
- There are 3 video cameras which are used to survey the seabed, view and confirm that a sediment sample has been captured and monitoring of the cable.

- The ICP starts with a KC multicorer. It's commercially available and uses a 800kg weight to push 6 polycarbonate tubes into the seabed.

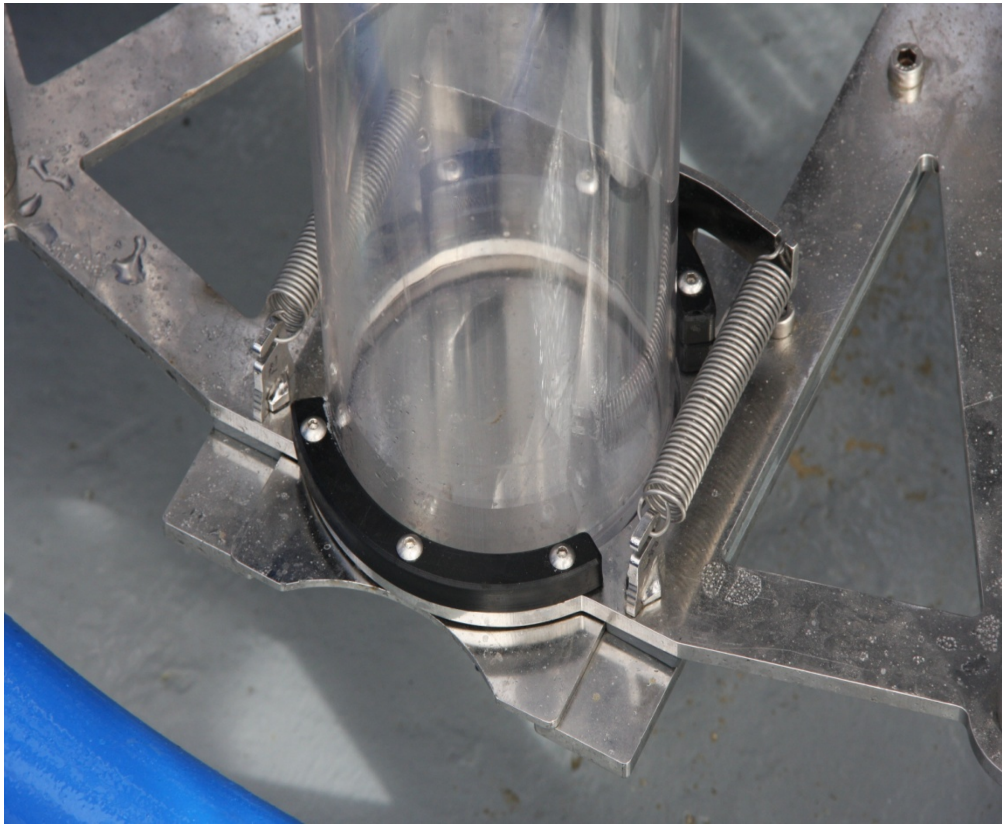
- During our trials we found that when the ICP hit the water, the impact caused the ICP to 'bounce' and this caused the corer to misfire.



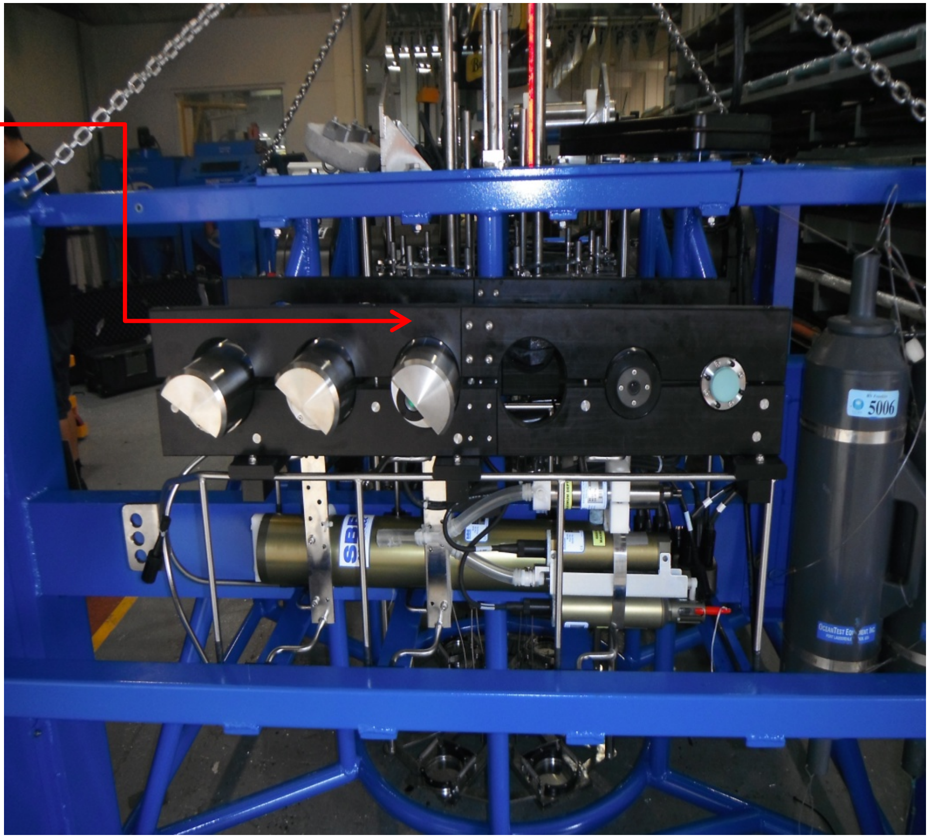
- We added a motorised lockout which prevents the central column from moving. To arm the corer the pins are retracted.



- We added some guides to the base of the poly carb tubes to prevent them ‘jumping’ out and locking the corer open.

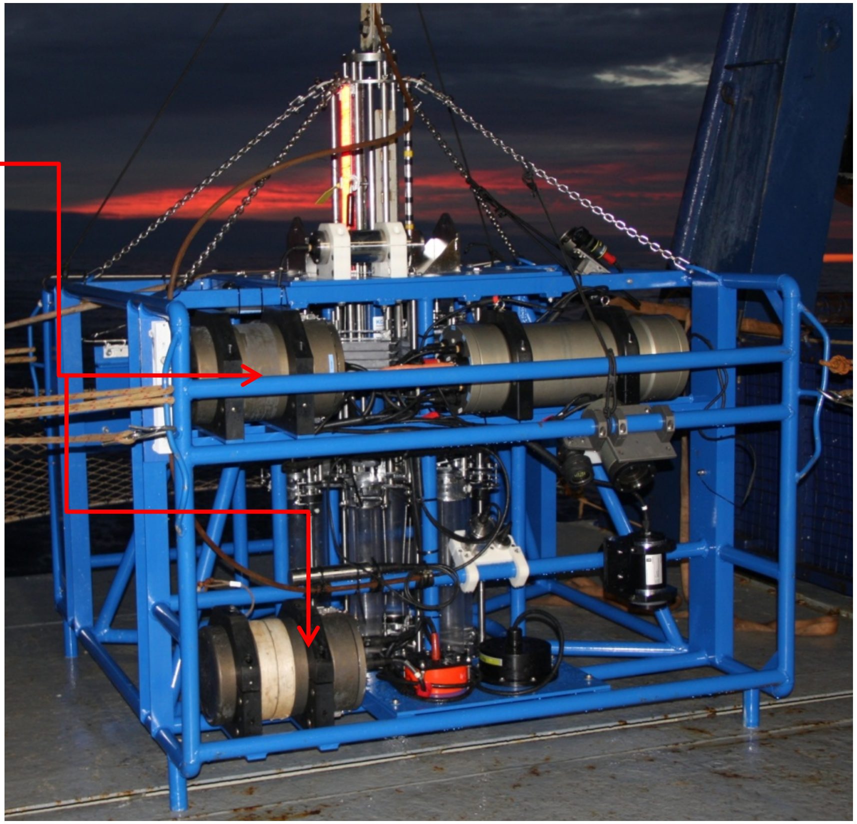


- 5 hydrocarbon sensors and CTD functions via a SBE 25 plus

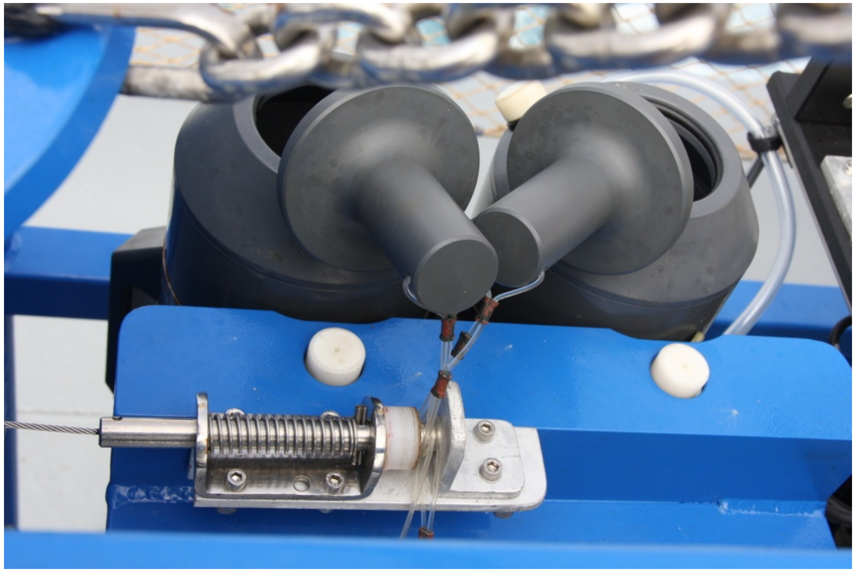


Acoustics....

- 2 Simrad EK60 GPTs with modified backplanes allowing us to fit them into a small canister.
- We used 38 and 120 kHz to study micro-nekton, plankton and other midwater creatures

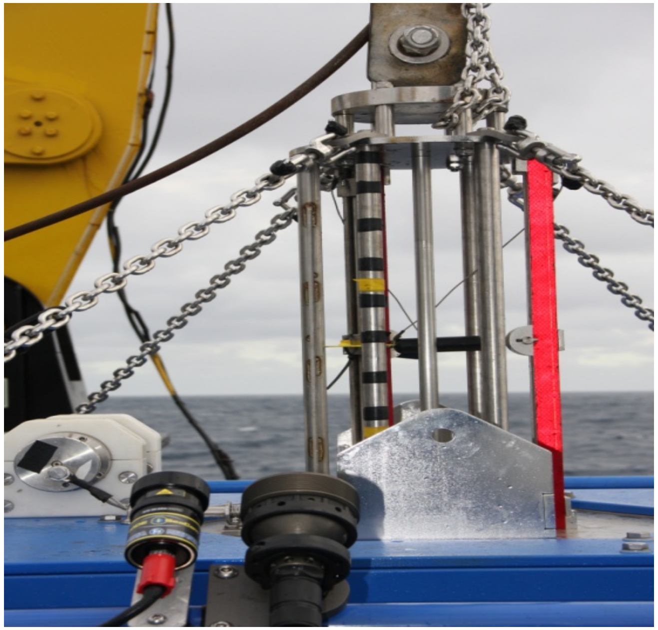


- We added two 10 L Niskin bottles which are released when the corer is armed. The hydrochemists used this to calibrate their instruments.



- We added three video cameras. We can monitor the corer, or look sideways and survey the seabed.

- We had concerns that the cable might bunch after contact with the seabed. The third camera allows us to monitor this.

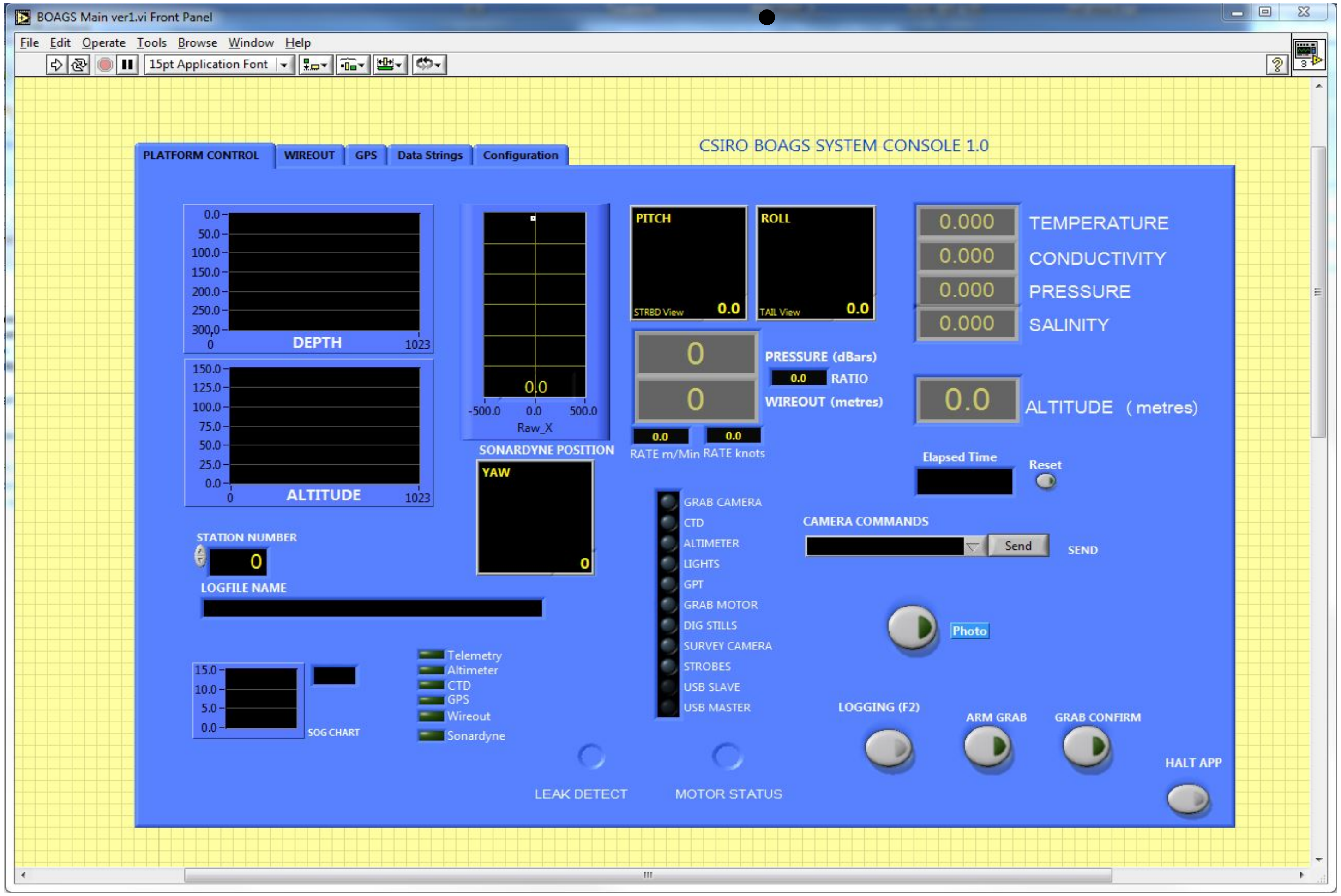


- The ICP is operated in an control room. The pilot watches the telemetry and video in real time, whilst controlling the winch remotely via a joystick.

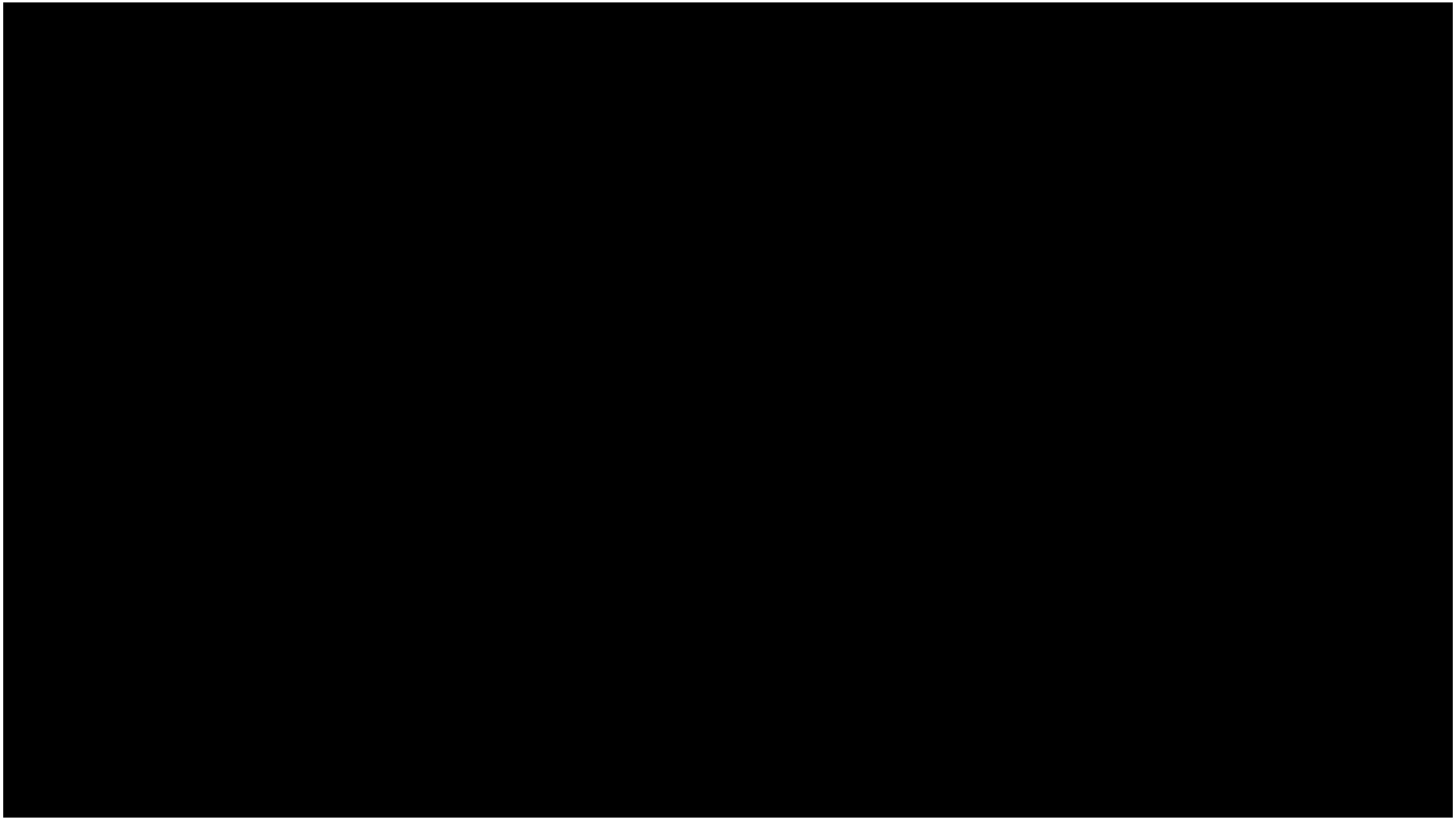
- The Labview Screen GUI is on the left. The video screen is on the right. We also monitor the winch in case there is an issue with spooling.

The control room...

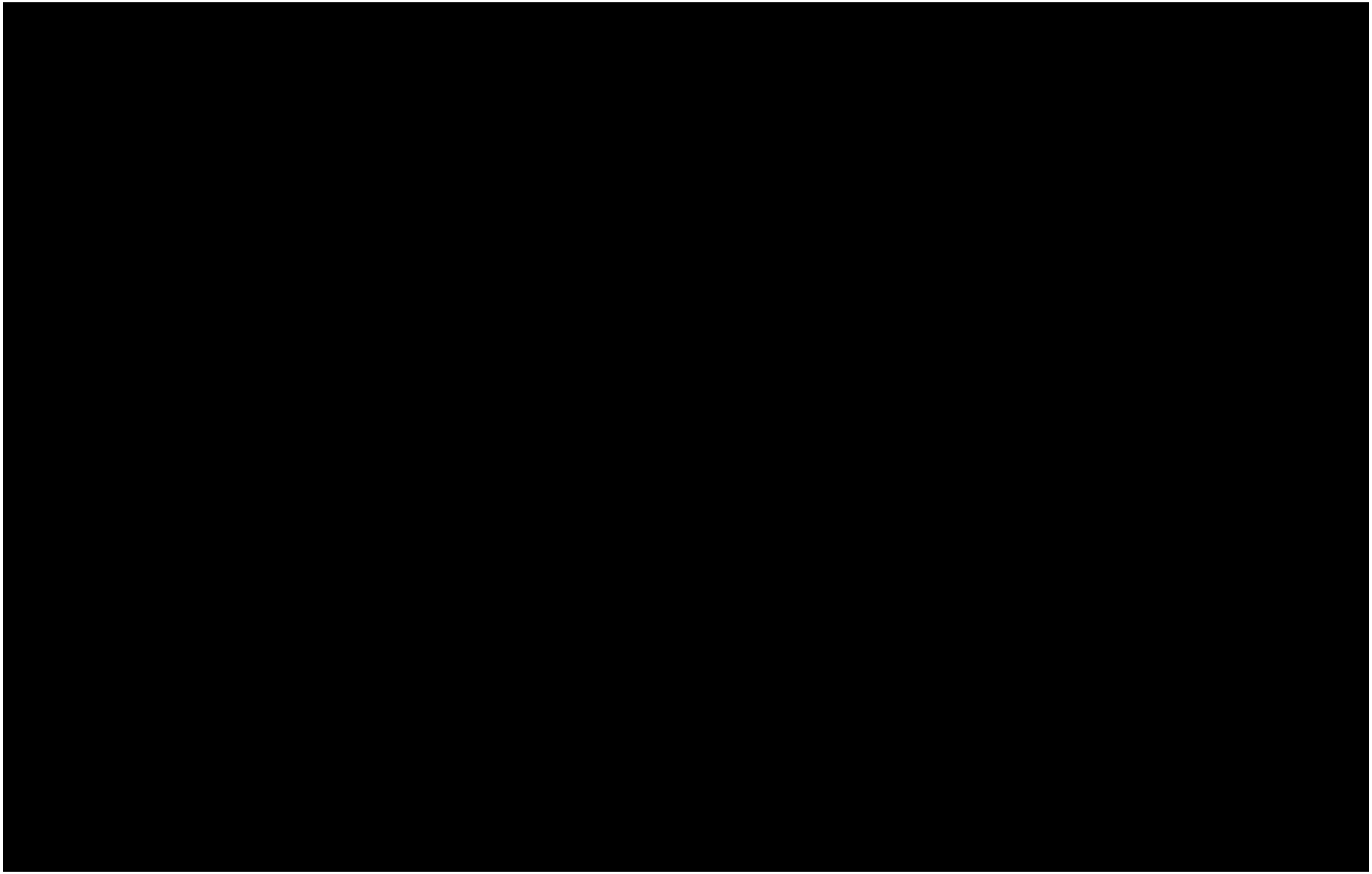
The Control GUI



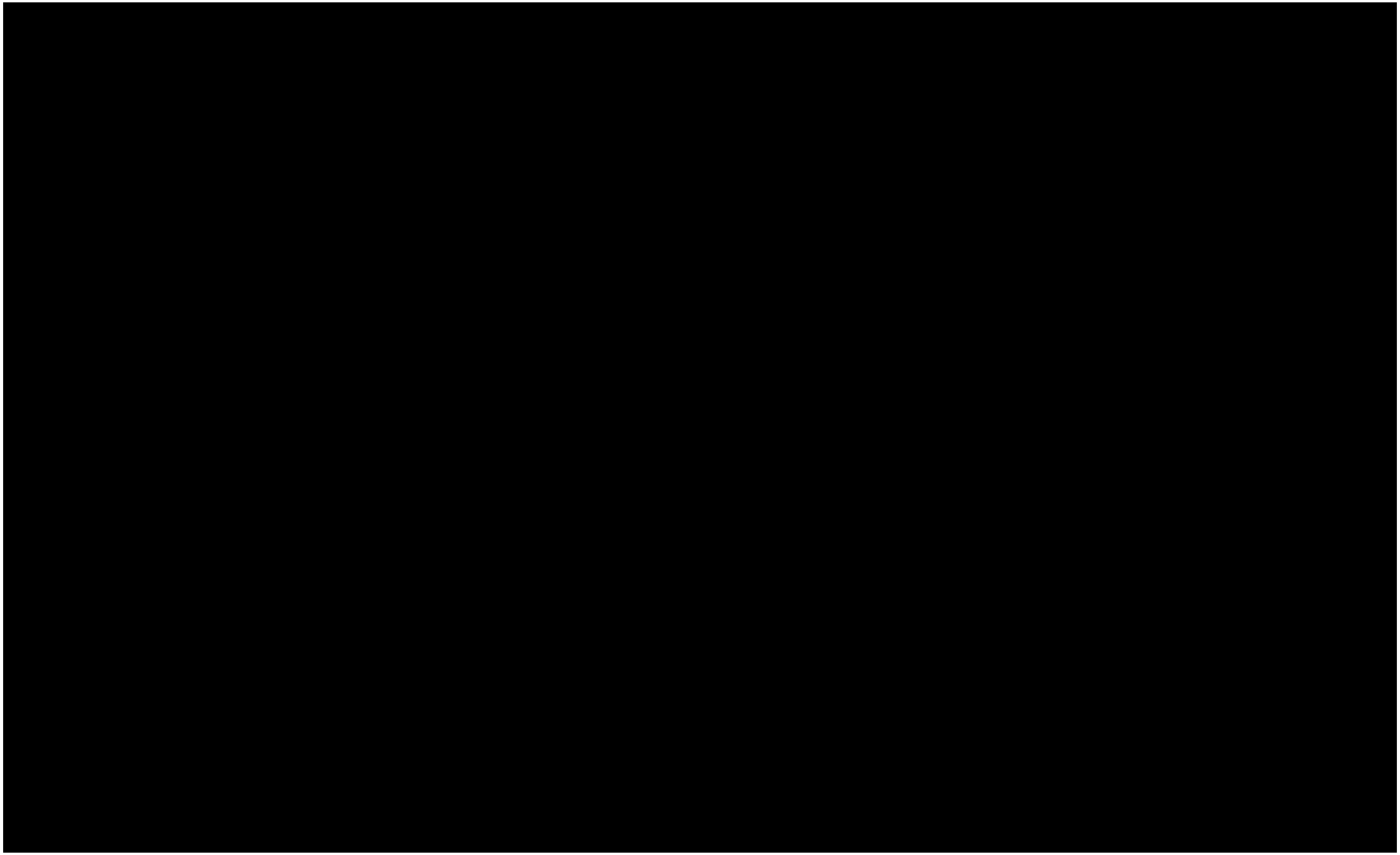
We had a few misfires. This occurred after the corer was armed.



This is a good sample. The tubes are fully embedded



There was some minor bleeding of samples. Recovering fine silt was a problem



The Future...

- Due to time and budget constraints we'd change the Fiber Optic multiplexor so we could view all cameras simultaneously, rather than switch between them.

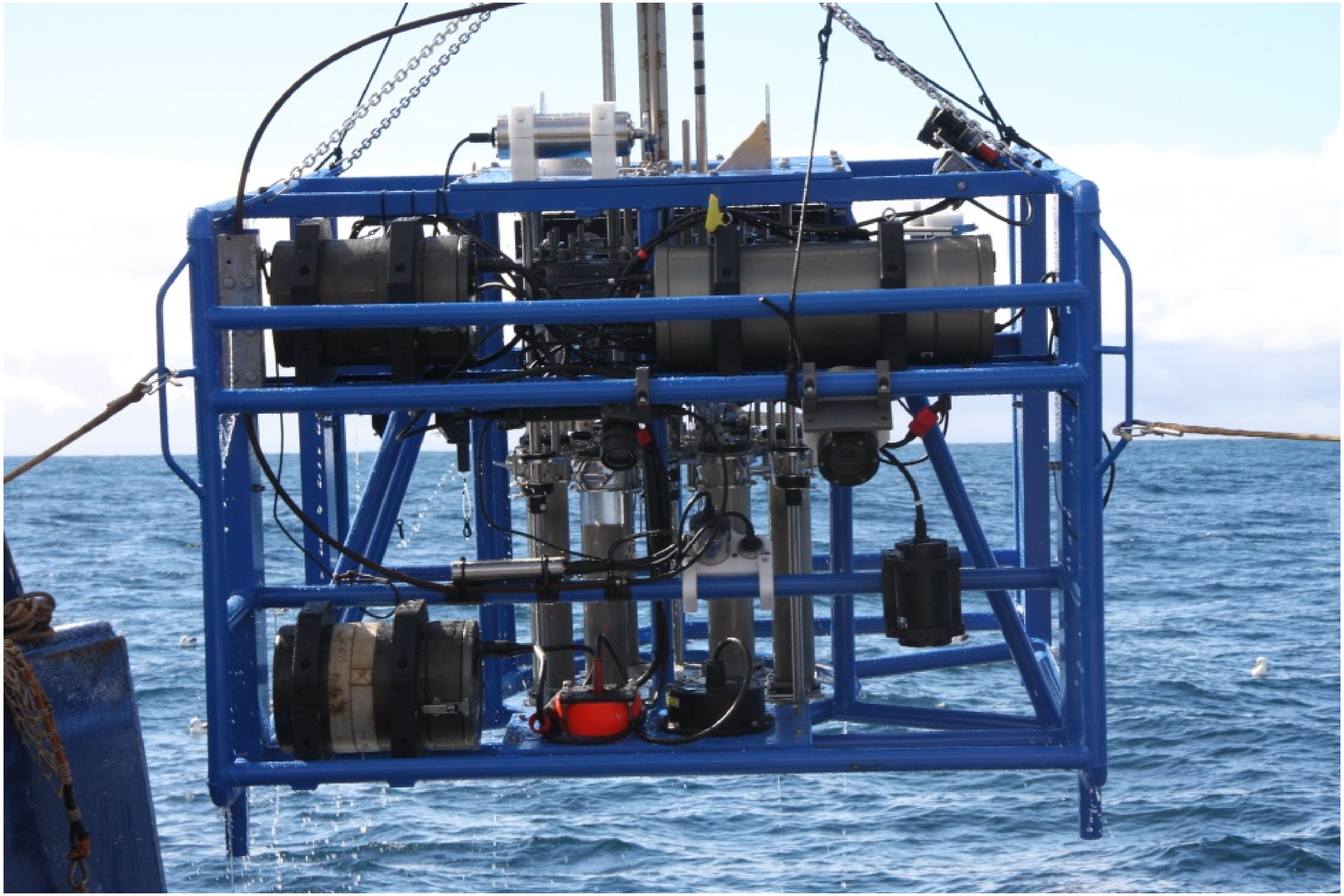
- The 'bleed' from the poly carbonate tubes needs further work.

- Ability to re-arm the corer at depth would be nice

- More lights to improve survey camera images.

- More RS232 Channels for more sensors

Questions????



Thank You

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