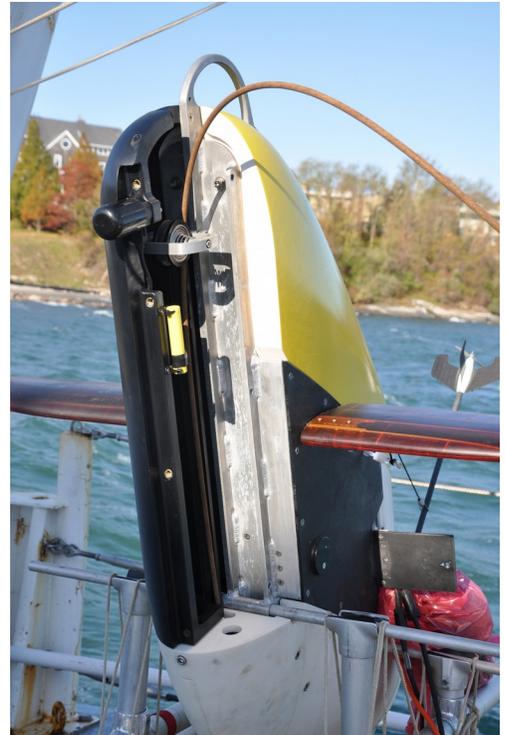




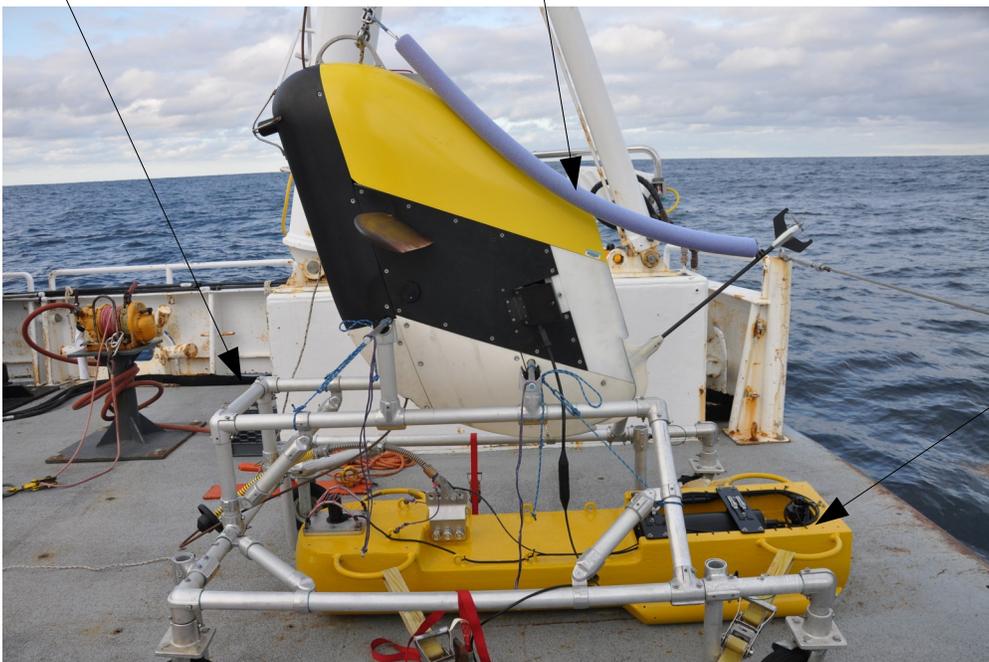
Wire flyer vehicle:

About 250 lbs,
Sits on a cart the whole time on deck,
until picked up for launch
and recovery. We take two
pieces off the front of the vehicle to
pass the .322 cable through it.



Pool noodle lets the tail go, when
it hits the water.

Cart



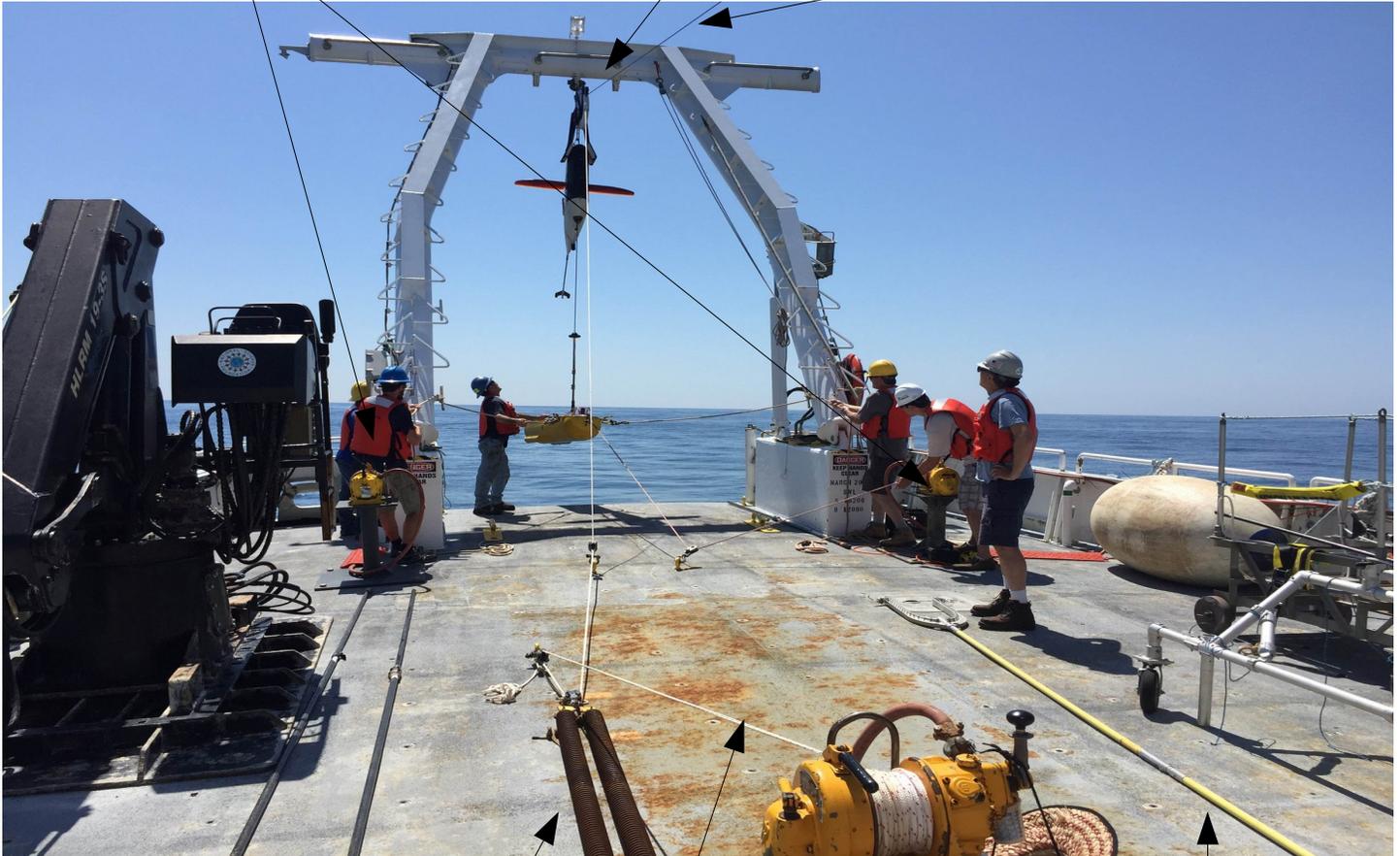
2000 lb clump

Has rings to grab with
hooks. Also has one
on the front, that was
added after this photo.

Custom sheave with “dog ears” to hold the Flyer during launch and recovery. The .322 runs over the main wheel, and a second lift line runs on other rollers above the main wheel.

Tuggers on the side to control the Clump (if needed).

.322 wire to winch



Springs (tugger end fixed to the deck)

Lift line runs from a tugger, down to the deck, back to some springs, up to the sheave, down to the vehicle. Here we use a couple deck eyes and blocks to fair lead everything. We have the springs and blocks.

The springs provide compliance so the vehicle can be held tight in the sheave as the A-frame moves. This is like “two blocking” it, but the springs keep the force in the line limited.

Stabilizer pole.

There is a safety line in the springs, and we usually paint marks on the deck for the minimum and maximum spring travel, to limit the tension in the line.



We need to place the lift line deck blocks to keep the line clear of the .322 lead to the winch. The lift line gets pulled off to the side while towing the Flyer.

.322 (running over big wheel)

Lift line (to deck)

Lift line (to vehicle)

We have a spinnaker shackle quick release to let the Flyer go at launch. You have to pull at an up angle, so there is little chance of false tripping when in the sheave.

This fork keeps the Flyer from twisting around the cable while being raised or lowered. Once up in the sheave you don't need to keep the fork there.

With the Flyer in the sheave the clump weight can be dealt with, without having to worry about what the Flyer is doing.



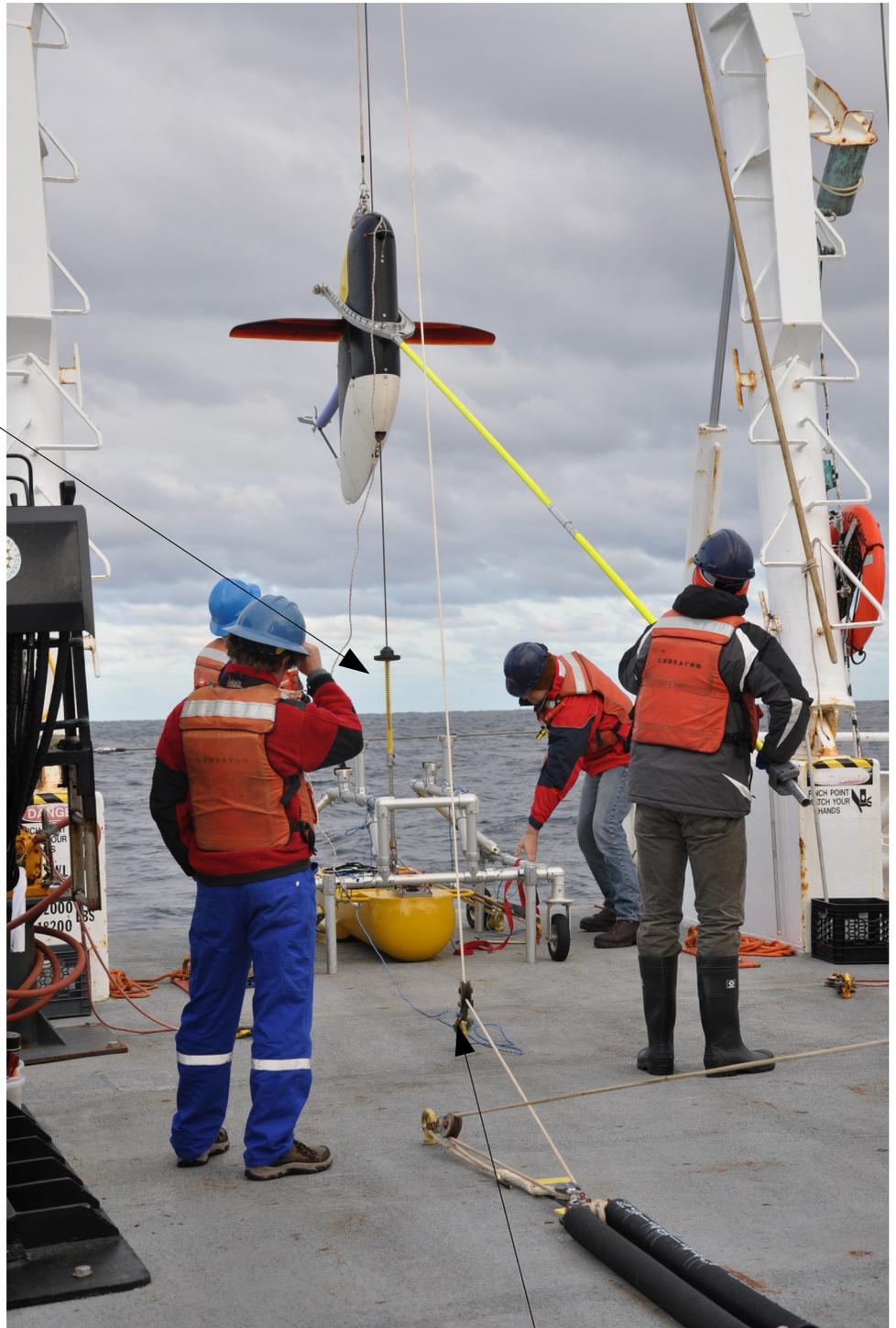
Tension marks.

The person working the tugger keeps the spring end between the marks as the A-frame goes in/out.

While the flyer is in the sheave and the A-Frame is moving small adjustments need to be made to keep the Flyer secure in the sheave ears.



Two people typically guide the Flyer on and off the cart. They have to pay attention to the spring bumper that is around the cable. It is there to soften the blow should the Flyer ever fly into the clump.

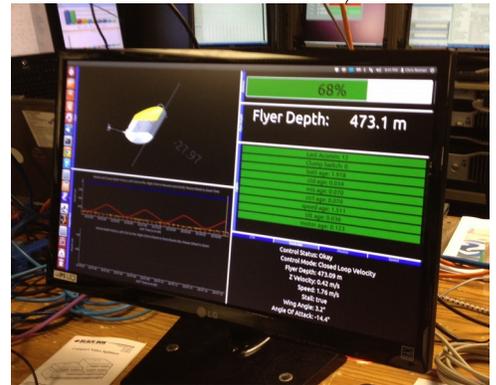
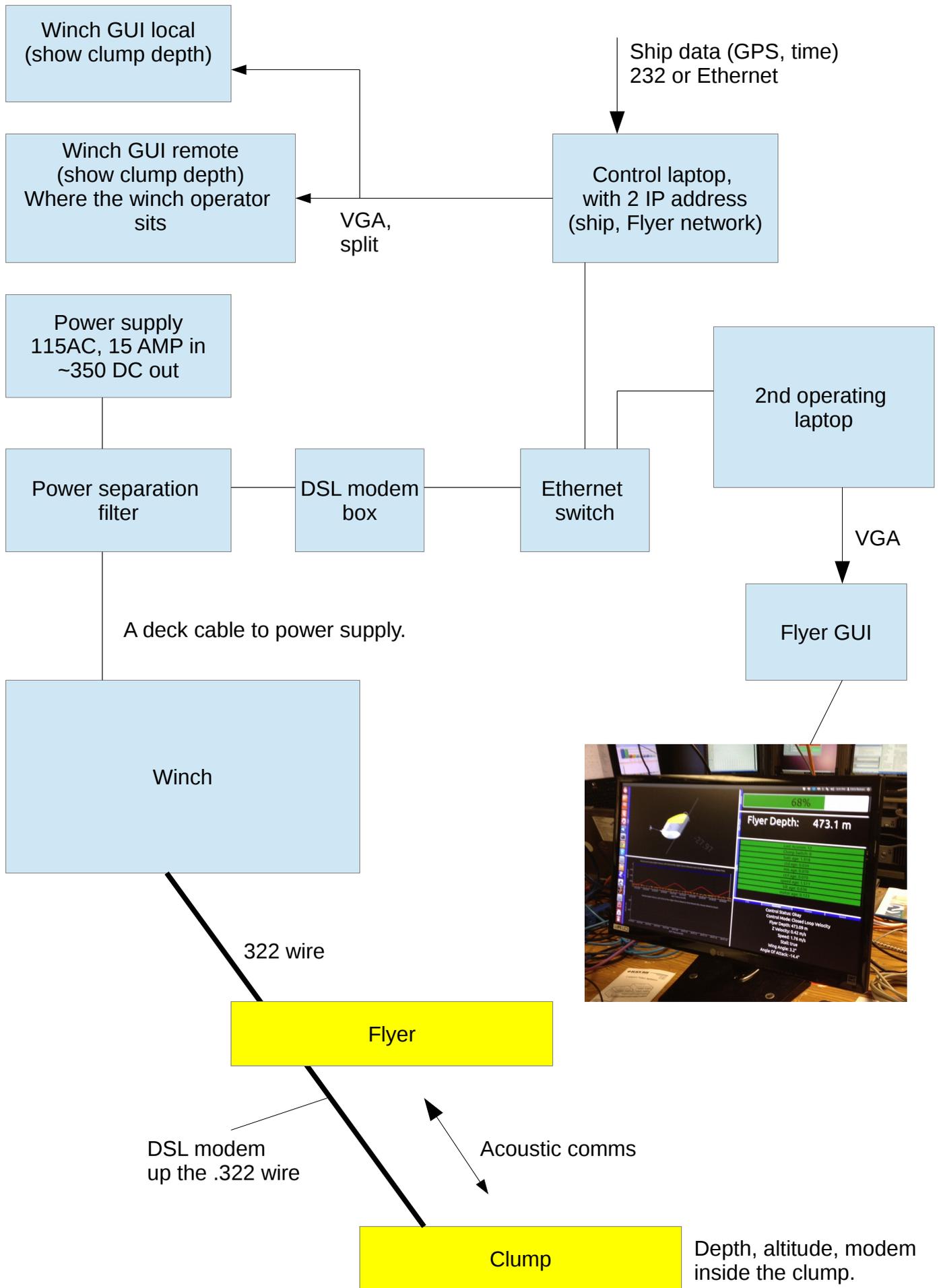


Fair lead block for the lift line.

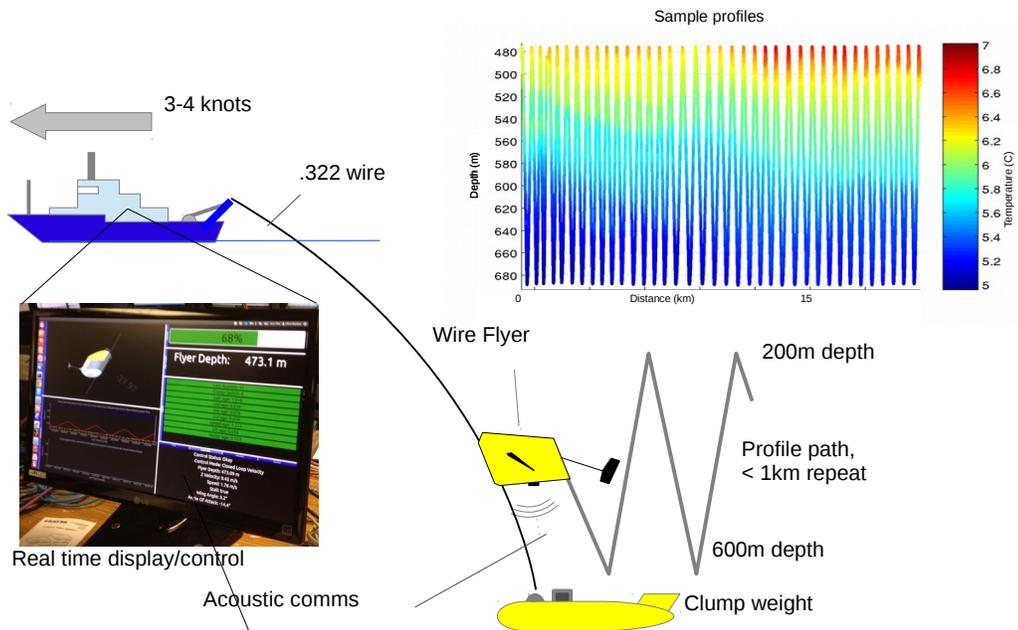
For launch and recovery we use the following people

- Winch operator
- A Frame operator
- Tugger lift line operator
- Pole stabilizer person
- Two people to deal with the Flyer and cart.

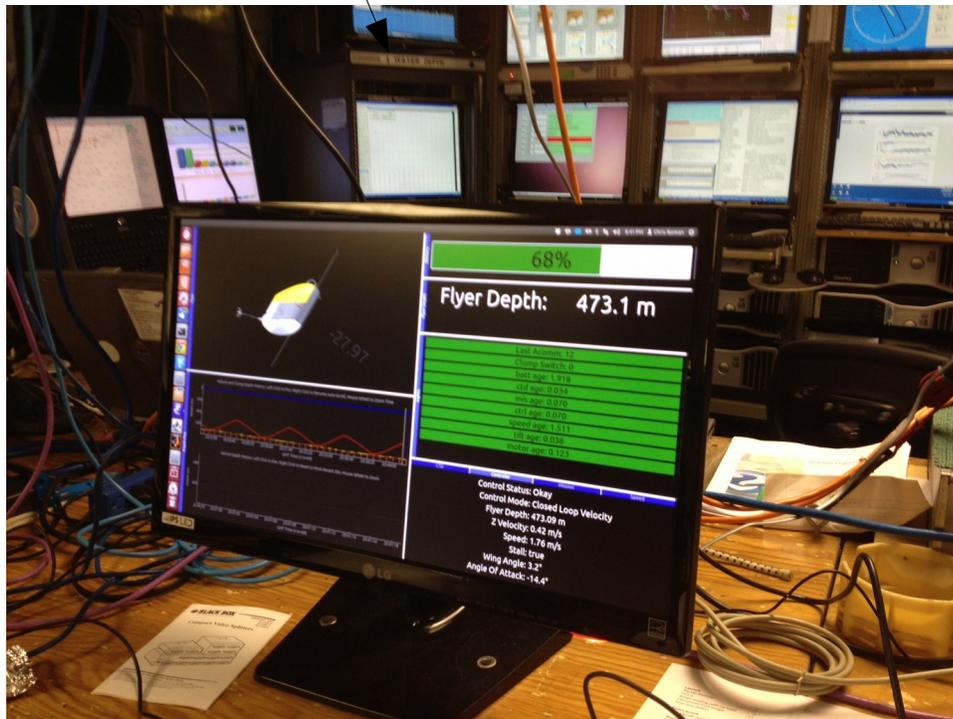
6 people total



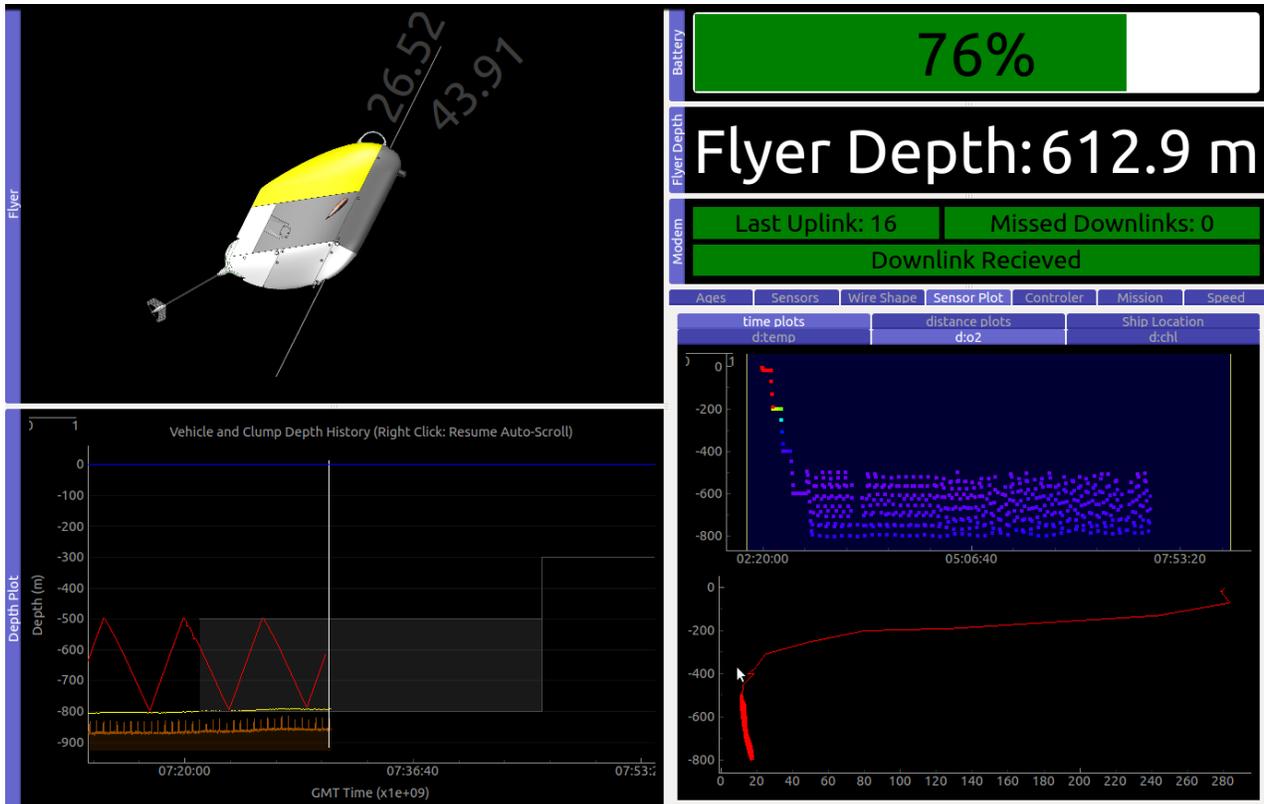
Modem communications



With the modem we can see what the Flyer is doing, and send it updated commands.



Flyer GUI – for Flyer pilot



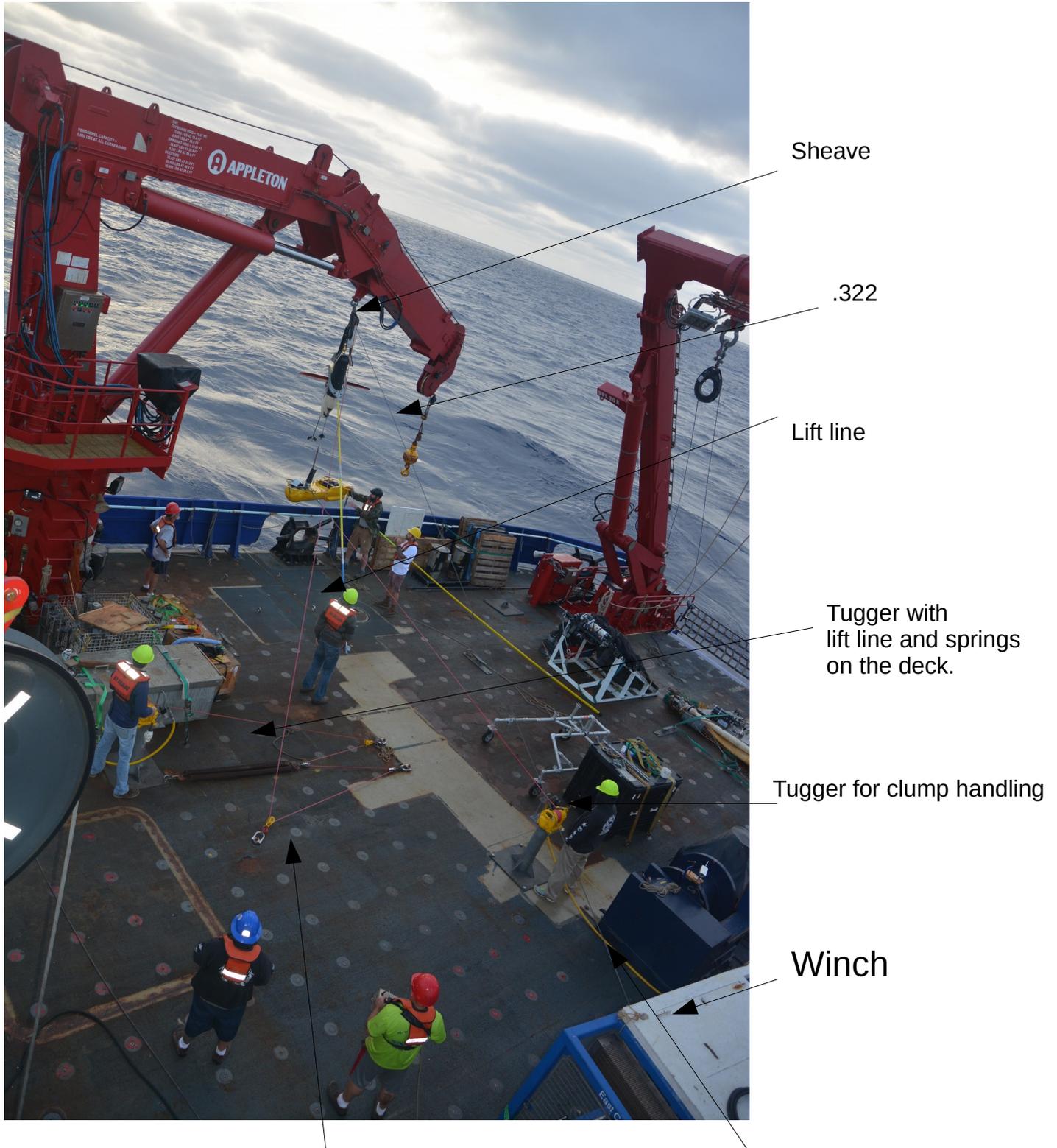
Clump GUI – for the winch operator



Side launch from a crane.

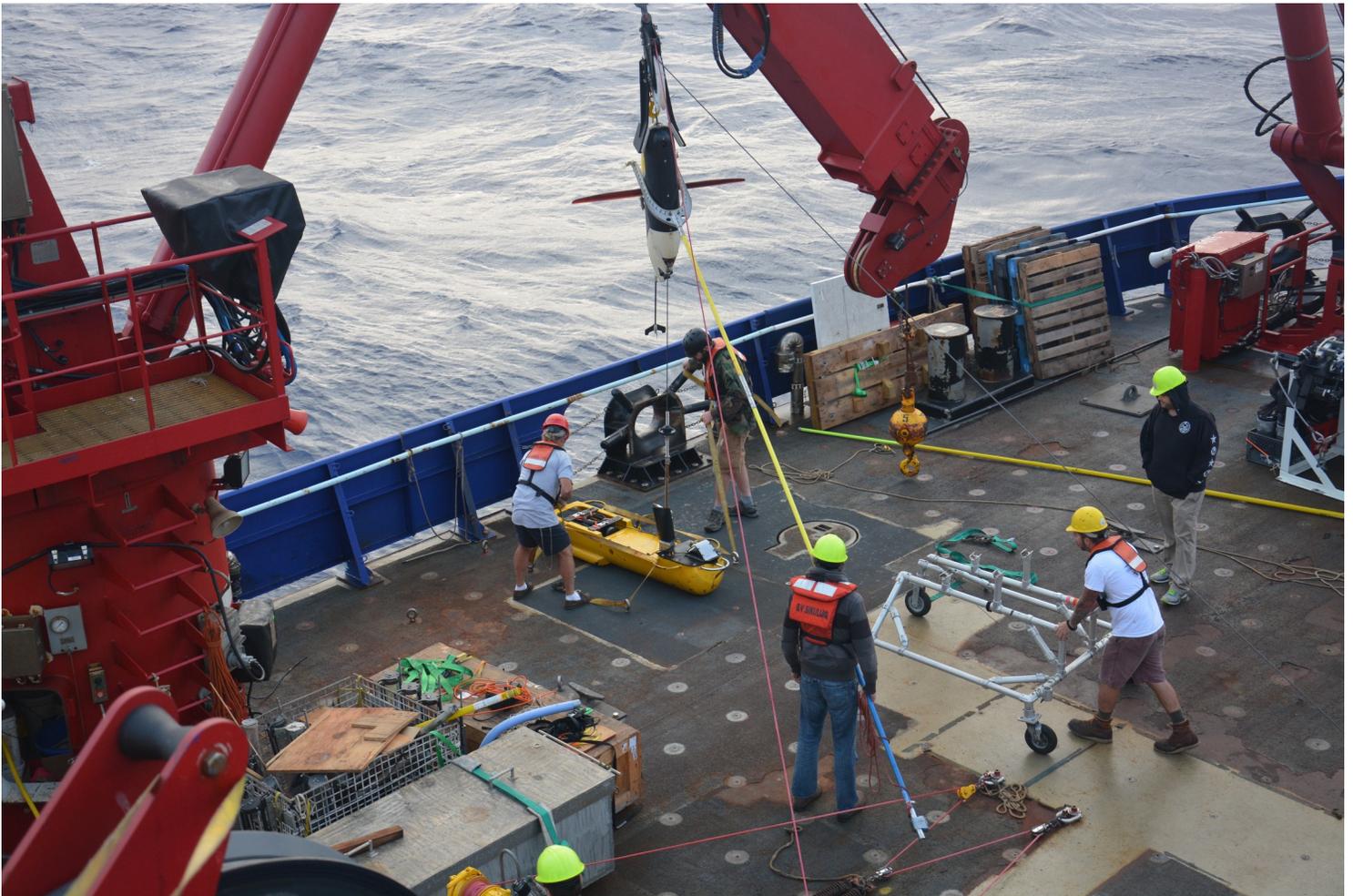
Basically the same as the A-frame except that the crane overboards the vehicle.

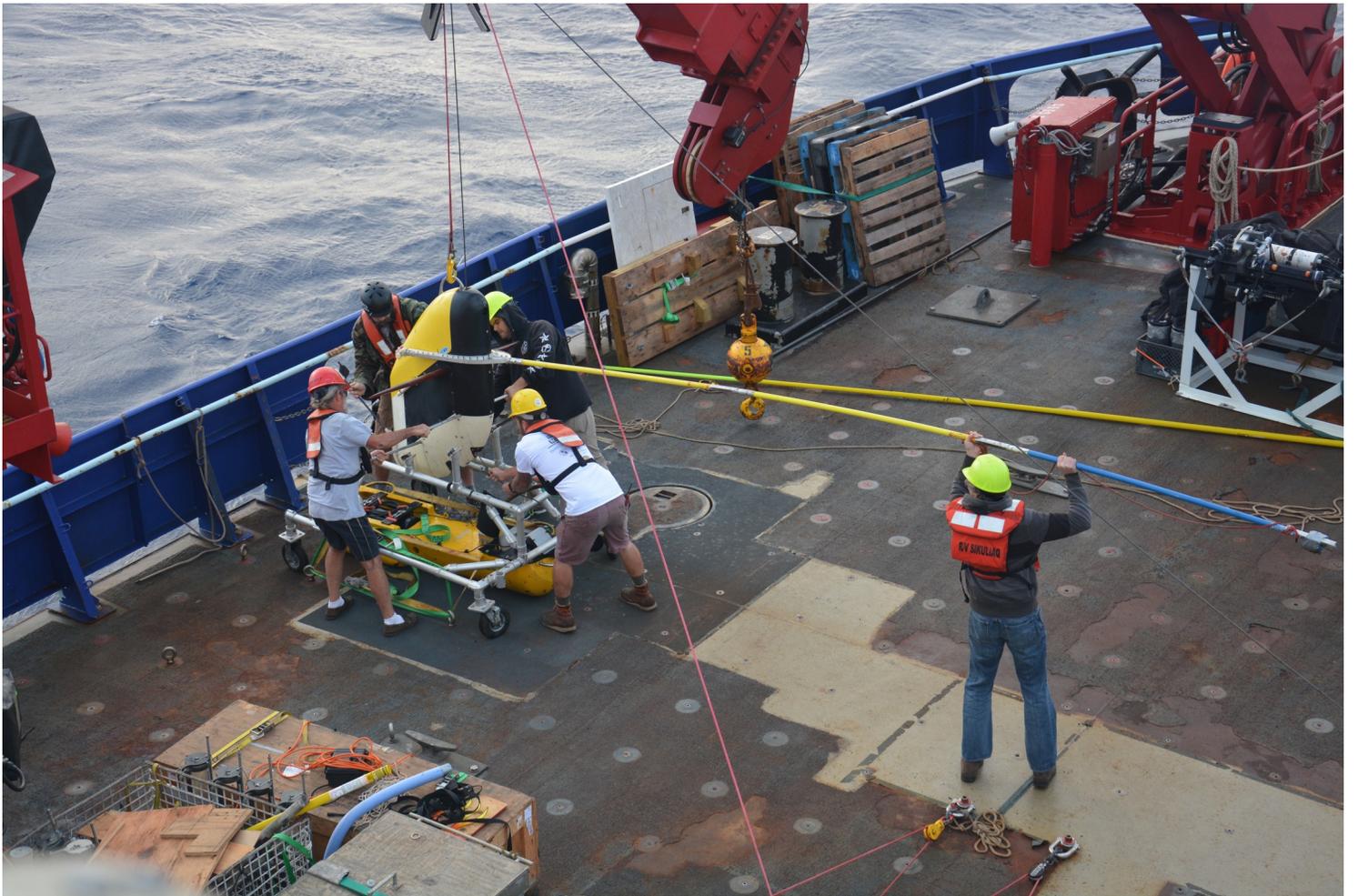
An issue with the side recovery can be getting the stabilizer fork on the Flyer when the vehicle is on the surface. The person needs to stand forward of the vehicle, but can have a hard time getting the vehicle to rotate and point toward the ship. The ship is typically going 1.5 knots during launch. Having some forward speed helps keep it from being pushed down by the person hooking the bail.

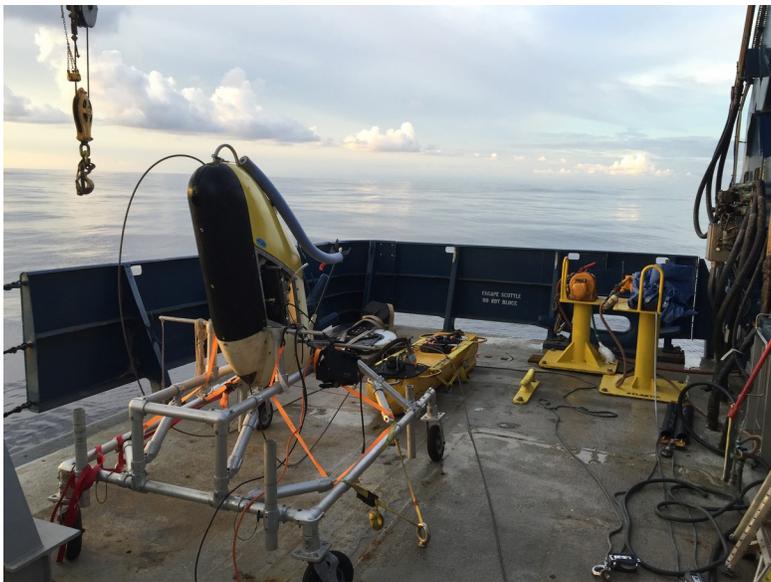


The point the lift line leaves the deck and needs to be forward (or aft) of the .322 lead between the winch and the sheave when the crane is out. This keeps the lift line from being fouled by the .322.

Clump lands on deck, Flyer is still in the sheave. Cart comes in and then the Flyer is lowered by the lift line tugger.

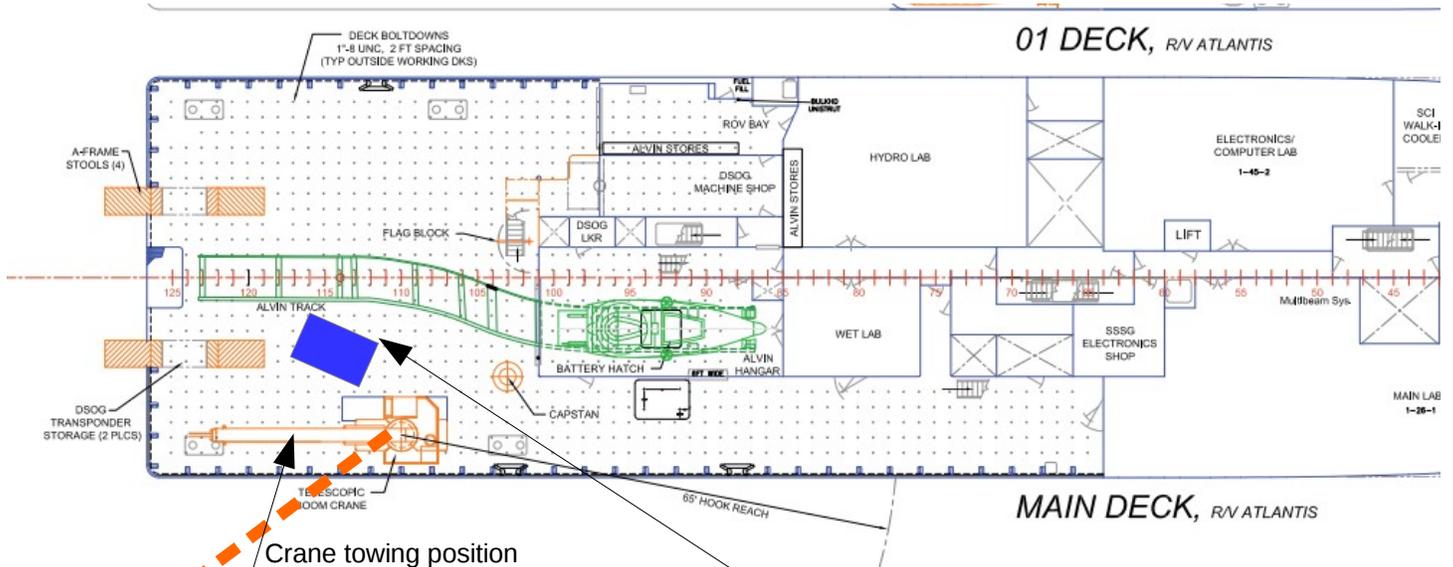




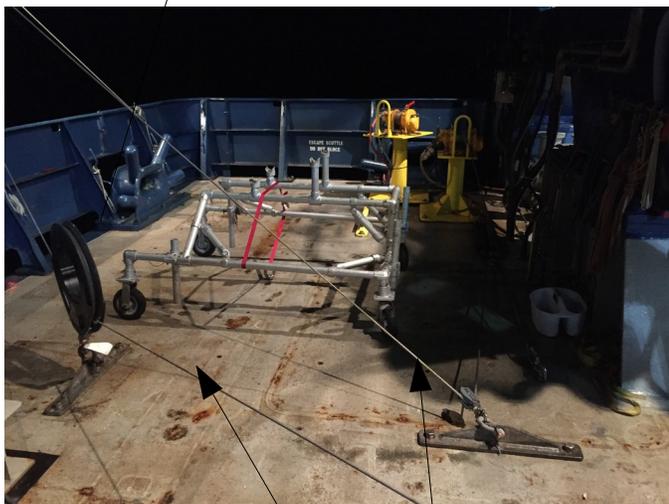


Compact install on Atlantis in the stbd quarter. Wire was led from the winch to a fair lead block and to the crane for towing. Crane sat in a boom crutch while towing in the outboard position.

One tugger helped steady the clump on recovery. The other was used for the lift line (led forward near the fair lead block).



Winch was rotated into towing position for Flyer dives. Stowed as shown for Alvin ops.



.322

Lift line