

# Project Cornerstone

## Newsletter #7:

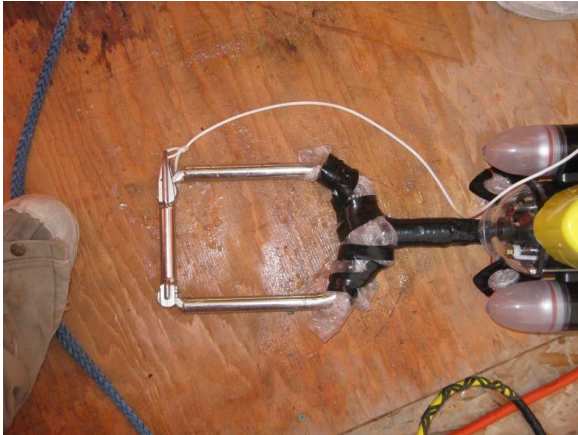
29 March, 2009 (Sunday)

Yesterday was a slow day, but today was very productive. In brief, today was good for the AUV camp; it was good for Garry's camp, but it was a bad day for skidoos.

The weather so far has been gorgeous. It has been moderately cold (minus 30, day after day), but it has been calm and clear – great working weather. We pray that it stays cold, for when it warms up the weather will turn foul – wind, fog and general misery. Speaking of fog, there is a constant water sky over Robeson Channel, just a few miles to the east of us. This indicates the presence of a lot of open water. The Radarsat pictures show all of Robeson as being black. In other words, Robeson Channel is either completely open or covered with very thin ice. The pictures show that the so-called ice bridge down by Kane Basin has not formed – yet again.

Another set of measurements – also associated with UNCLOS – is a series of gravity lines being run jointly by Canadians and Danes. Every day a DC3 goes out and measures gravity from near shore northward to near the pole. Then they come back along a different track. And the next day they do it all over again. The tracks are about 10 miles apart. They, too, must be pleased with the weather. Because gravity measurements require a very steady platform, the automatic pilot has to be a good one. The pilot (the human one) told me that they swapped out the old automatic pilot for a new one – just for these measurements.

The day at the AUV camp was very productive. Much of the day was devoted to practising with the little ROV (VideoRay) and with the Happy Hooker. A Happy Hooker is a device for threading a line through a loop, such as a lifting point on our AUV.



The upper picture shows the Hooker attached to the ROV (facing left). (Pay no attention to the blue rope; I'm sorry it got left in the pictures.) The lower leg of the Hooker gets pushed into a loop or a ring, and the cross member swings back, as shown in the second picture. Then the ROV backs away from the ring, the lower joint of the cross-link reconnects, and the upper joint breaks away. This leaves the rope, as represented by the white string threaded through the ring. Can you imagine the string being



pulled back through the ring? The ROV is then pulled back to the ice hole, and we are left with a string (or rope) threaded through the ring. When I first saw a Hooker work, it was done quickly – like sleight-of-hand – and I thought it was the nearest thing to magic.

When we get out to the tent every morning, the first thing that Ron, Peter and Darrell do is their pre-launch preparations. The procedure is quite time-consuming, and I'm still trying to learn the details. The picture (right) shows Peter adding oil to one of the pressure compensators.



After the AUV is made ready, it is lifted off its cradles, and the floor is removed (and stacked up at one end of the tent).

The next picture shows the ice that has formed overnight. In spite of the floor, which has some insulating properties, and in spite of the fact that two stoves are left on (low) overnight, one or two cm of ice forms. So the next thing we do is clear out the ice.



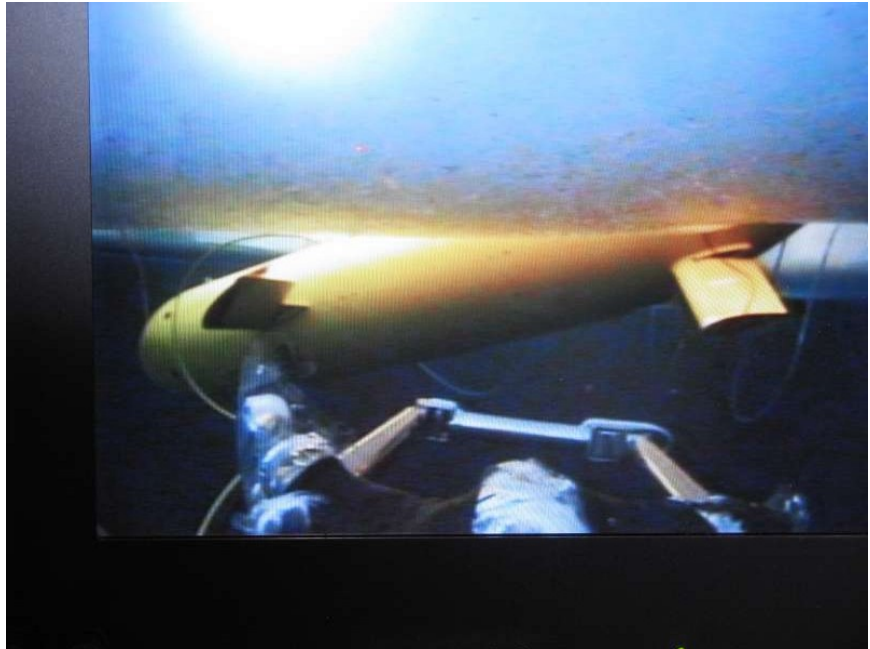
The picture on the right shows a colander and a shovel scooping wet ice into a little sled, which, when full, is pulled outside and dumped. After the hole is reasonably clear, a fan is set up to blow warm air over the water. This usually keeps the hole ice-free for the rest of the day.

Once the hole was ready, Ron, Peter and Darrell did a couple of variable ballast tests.

A little later Dan showed up to do the Happy Hooker trials. On the next page is a picture of the ROV screen. It shows what the ROV is looking at. It sees the Hooker attached to its front end and in the background it sees the AUV, which is hanging half below the hole. The AUV was lowered clear of the ice hole, and the ROV threaded line through one of the top lift points. Then Dan and the ROV, with the help of everyone there, did it several more times, working out a couple of small bugs in the process.

The next test involved the AUV being pulled off to the side under the ice. (Remember the 4-inch holes and the lines from these holes to the AUV? Well, we did it again.) After the vehicle was pulled off to the side, it was ballasted light so that it rested up against the bottom

of the ice. This is how it will rest next year when it comes back from a mission. In this configuration the little ROV can't get at the top lifting points, so a bottom eye has been fixed to the AUV. A rope will be strung to this bottom point, and weights will be run down the line to make the AUV sink a little, at which point the ROV will have access to the top lifting points. So, we practised hooking a line to the bottom eye. Dan was getting pretty good by this time, and he did a couple of hook-ups in short order. Again, we had proved a concept, and everyone was pleased.



Sometime during the afternoon, we had three visitors from the base, who had walked out to the camp. Not much happens on Sunday, and we were a novelty. So, we had a bit of a visit. I was going to say we had a short break, but I'm afraid we just kept right on working. No tea. No cookies. No nothing. Our mothers would have been ashamed at our inhospitality. From left to right we have Jenny Heroux, Tod Lund and Adrienne Glover. I do hope I have the spellings right.



While most of us were helping with the AUV and ROV test, Chris Kaminski and Alex Forrest were trying out their Wireless Fibre System (WFS). The idea is to have some way of telling the exact location of the vehicle once it has risen to the surface. The system involves two coils, one transmitter on the vehicle and the other the receiver on the surface. They found that the signal would go through several metres of water. However, they had trouble actually locating the transmitter once it had been pushed under the ice and off to the side. (Another job done by the little ROV.)

Garry's group also had a good day. They drilled a hole and put down the modem that is meant to simulate the AUV. This modem talked to the other eight modems to get all the ranges, and from this data it will calculate its location. They did the experiment with the modem at five different depths at the first hole. They then repeated the measurements at

two more holes. Thus they have fifteen locations for which they can compare calculated locations to actual (measured) locations. So far, they haven't looked at the data. Garry says that there were no hitches; everything went very well. They have one more day for this experiment before the plan says that they will move on to their other experiment, the Long-Range Acoustic Bearing System (LRAB). (See Newsletter 4.) Garry says that they are on schedule and that they will be done tomorrow.

I mentioned at the beginning that we had had skidoo problems today. On the way home from our camp we abandoned two skidoos. I was more-or-less responsible for both of them, so I now have some sort of unenviable record. Garry's group abandoned one also. The picture shows two rescued machines, and I recognize only one of them. It's a good thing we have a quite a few spares, or the work would go much slower. Dan Wile, where are you when we need you?



With regard to naming the two AUVs, I've received a couple of suggestions, but the names are not flooding in. You do realize of course, that we have no power to name these vessels, but we can suggest.

Best Wishes, Ron Verrall  
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