

# Alpha Ridge Test of Appurtenance (ARTA)

## Newsletter #1

23 March 2008, Easter Sunday.

Yesterday, thirteen of us flew from Edmonton to Eureka, which is on Ellesmere Island, the most northerly island in Canada's Arctic Archipelago. Eureka is at latitude 80 degrees, longitude 86 degrees, essentially 2700 km straight north of Winnipeg. Some of us were from Halifax, some from Ottawa and two of us were from Victoria. We met in Edmonton, spent the night in a hotel near the airport, and early in the morning we headed off to the airport. The day did not begin well. The clerk at the First Air counter met us with the information that the flight would be delayed by two hours since they were having trouble finding a flight crew. Later, there was some concern about the weather at Eureka, and the flight was delayed again. We finally got underway a little before 13:00. The picture to the right is of Patrick Potter, whose expression shows the resignation we were all feeling.



The flight, itself, was very good. We were whisked north in a 737, which, in comparison to the propeller-driven Hercules that we used to take from Victoria, was much quieter and much faster. The lower noise level meant that it was possible to talk to your neighbour; we didn't have to spend the whole flight with ear-protectors jammed firmly in place. The 737 was configured so that about one third of its space carried passengers and the rest carried freight. The stewardesses were very nice, and they fed us well.

We stopped for fuel in Resolute Bay. The weather there was quite nice – no wind, temperature about 30 below and reasonable visibility. We stretched our legs (see the picture below), wandered about the airport building and marvelled at the enormous stuffed polar bear they have on display. It took about 45 minutes to refuel, and then we were off for the final one-hour leg to Eureka.



The weather in Eureka was not quite so nice. The temperature was not bad – again, about 32 below, but this time there was a stiff wind, and this makes all the difference. The visibility was not great, either – hence the delay in Edmonton. All the passengers were herded aboard a couple of vans and taken down to the Eureka weather station, where we are to stay. The two stewardesses came down, too, for a short tour and visit. The rest of the flight crew and a number of the locals stayed at the air-strip to unload all the freight.

The thirteen of us were given a safety briefing and a quick building tour by Eureka's Program Manager, Al Gaudet. We were assigned rooms, we had coffee, and we settled back to wait for our luggage.

That's when things got interesting. Dave Maloley came up from the airstrip to say that the 737 crew had forgotten to unload all our baggage. It was on its way back to Resolute. I guess that in the cold and the wind and the confusion of unloading all the 'big' freight, the personal baggage had been forgotten. Dave contacted the airline to ensure that the baggage was taken off the plane at Resolute; the last thing we wanted was for it all to go all the way back to Edmonton. The company has promised to send up the bags this morning by Twin Otter. So, I have been assured as I sit here typing, that I won't have to stay grubby too much longer.

The station here has a new building since I was last here in 1986 (the year Chernobyl blew up), and, as you can tell from the picture, they have many of the appropriate amenities.

**Background:**

The project that we are on is called the Alpha Ridge Test of Appurtenance. It is a follow-on to our project of 2006, which was called the Lomonosov



Ridge Test of Appurtenance. Both of them have to do with the United Nations Convention on the Law of the Sea (UNCLOS), which says that if a country wishes to exercise sovereign rights to its continental shelf beyond the 200 nautical mile limit, it must collect appropriate information and submit a claim to the United Nations. Once a country has signed this convention, it has ten years to collect the data and make the claim. Canada signed in November, 2003, and so it has until 2013 to complete the process. For more information, check the many sites on the web.



The map above, lifted off the web site: [http://jproc.ca/rrp/alert\\_nunavut\\_map3.gif](http://jproc.ca/rrp/alert_nunavut_map3.gif) shows the location of both Alert, where we worked in 2006, and Eureka, which is the headquarters for this year's project.

Our intent, in brief, is to run a seismic survey of the Alpha Ridge, which runs more-or-less north of the mouth of Nansen Sound, the inlet that lies between Axel Heiberg Island and Ellesmere Island. (See map.)

The idea is to make large impulsive noises in the water and record the sound after it has reflected from all the various layers in the earth's crust beneath. This will, hopefully, allow the scientists to determine whether or not the offshore bottom is part of Canada's continental shelf. If it is, then the appropriate arguments can be made to the UN.

The standard technique for making a loud impulsive sound is to detonate an explosive in the water. In our case, we plan to set off 800-lb charges at a depth of 100 m. To record the subsequent echos from the earth's crust, we will place geophones on the ice. We will put out as many as 120 'phones spaced about 1.5 km apart. With this set-up we expect to be able to 'see' right down to the mantle.

The procedure is first to put all the explosives in place. This involves lowering twenty 40-lb charges at ten or eleven locations over a distance of several hundred kilometres. Each site is marked with a GPS beacon that sends its location back south. This allows us to find the explosives several days later even if they have drifted away from their original site. This deployment job usually takes us a couple of days. After all the explosives are in place, the geophones and their recording packages are set out, and, once they are in place, the explosives are fired one after another. The geophone packages are then picked up and the data are recovered. The recording packages are refurbished (with batteries and memory cards) and the process begins again.

To help us with all this we have five helicopters and two Twin Otters. Actually, two of the helicopters are dedicated to the people who are carrying out bathymetry and gravity measurements. (It's going to be a busy year!)

Late in February the first group of workers came to Eureka to establish two icecamps. The first one (the Hydrographic Camp) is a large camp close to shore just north and east of the mouth of Nansen Sound. The other one (the Reflection Camp), which will be much smaller (only three people) will be set up a couple of hundred kilometres offshore. Right now it's at  $83^{\circ} 29' N$ ,  $93^{\circ} 11' W$ . No doubt it will drift.

We expect the Hydrographic Camp to stay put since it is only about 5 km from the shore, and it is on ice that is more-or-less trapped by the land. Setting up the camps has been very slow work because the temperature out on the ice has been down around 50 below, and there has been a wind. However, things are improving. We seem to have brought the good weather with us, for today it's only 30 below, there's no wind, and the visibility is wonderful.

Once we get some clothes, we can go to work.

Best wishes,

Ron Verrall