Arctic Low-budget Hydrography Update

An article from the June 2006 issue of Hydrointernationaldescribed our plans for utilising a hovercraft to deploy autonomous drifting echosounding Seafloor Sounding in Polar and Remote Regions (SSPARR) buoys in the Arctic Ocean. TheR/H Sabvabaaâ€“ a Griffon 2000TD hovercraft built specifically for polar marine geophysical research â€“ is now a reality and awaiting transfer to Svalbard and the high Arctic.<P>

Ordered in October 2006 from Griffon Hovercraft Ltd, the R/H Sabvabaa (an Inuit word meaning ‘flows swiftly over it’) successfully passed its sea trials in Southampton just one year later. The craft and our proposed research programme can be viewed at our website (8 1). Intended to be based at the UNIS University in Longyearbyen, Svalbard, during the polar winters and used primarily in that quarter of the Arctic Ocean inaccessible to ice-breakers, the craft has a number of unique features. It hosts a complete navigational suite of GPS, radar, FLIR thermal imaging, and marine, aircraft and Iridium communications with fixed base stations as well as portable transceivers. Well insulated for Arctic operations, it sleeps four people and will operate with a crew of just two scientists.

The hovercraft is powered by a 440-hp Deutz water-cooled engine. This also runs a hydraulic pump that can power a 6kVA generator set, an ice drill (21cm diameter, 4m long), and an air compressor with 190-bar capability. Electrical power is supplied by an alternator to a large science battery bank, supplemented by a solar panel producing one-third kilowatt. The craft attained speeds over 38 knots with a 2,200-kg payload. Maximum hover height is 73cm. Long-range tanks on the side decks give a maximum range of 2,000km.

For science underway, an electromagnetic probe forward of the bow continuously measures ice thickness. In open leads, either a sled-mounted Knudsen CHIRP or a 12/200-kHz echosounder can be towed. Continuous seismic profiling is done using a 40-in^3 airgun and 30-m streamer. A lightweight corer and winch is under development. The hovercraft will also be used to deploy and recover four autonomous drifting seismic reflection buoys. Built by Christian Michelsen Research AS (CMR) in Bergen, they feature a solar-powered sparker, hydrophone, GPS and Iridium link. At average drift speeds, about 100 shots a day will be SMSed by Iridium to Bergen. CMR is also using the same components to produce a prototype of the SSPARR buoy discussed in 2006, which may be mass-produced and similarly deployed by hovercraft.

Although polar ice cover is rapidly shrinking, the ice of the Lincoln Sea north of Ellesmere Island and Greenland remains significantly thicker, around 4m. I did my doctoral thesis there, using data over the Alpha Ridge from the American drifting station Fletcher’s Ice Island (T-3). Recent study of un-analysed seismic data from the 1971–1974 T-3 drift suggests that this was the site of an asteroid impact several million years ago. The evidence is the disturbed nature of the uppermost 500m of the generally uniform sediment cover over an area of 200 by 600km. Study of this area and its numerous grabens presents the possibility of determining the origin of the larger Amerasia Basin. Scientific targets are the origin of this enigmatic Himalayan-sized ridge, corroborating the asteroid impact and finding sites for deep scientific drilling by the future scientific drillship *Aurora Borealis*, when the ice permits.