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BigRAID: Rapid Access Drilling for Large Diameter Boreholes

Content

The British Antarctic Survey (BAS) Big Rapid Access Isotope Drill (BigRAID) is a new branch of the BAS RAID, which can drill a 285mm diameter borehole to a depth of 100m in less than 10 hours whilst collecting ice. Rather than an ice core, ice chippings are collected for analyses such as water isotope analysis. This is at a lower depth resolution than is possible with cores. The dry borehole is available for instrumentation, and its large diameter opens the door for a wider range of down-borehole instrumentation than was previously possible. It can be run by a single operator.

BigRAID was initially designed to drill pilot holes for the BAS scalable hot water drilling system, however there are many potential uses. Its first use was at Summit in 2021, where it drilled 9 boreholes averaging 95m in depth. These boreholes formed the first three operational stations within the array of the Radio Neutrino Observatory in Greenland (RNO-G). Following upgrades undertaken by BAS, it is being deployed again at Summit in May 2022 to continue drilling boreholes for RNO-G – it aims to drill 30 boreholes, each to 100m, in one season.

Current development work will soon allow the drill to be capable of fully automatic operation, allowing a single operator to remotely monitor and control multiple BigRAID drills on a single site.

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