

## **AUTOSUB-UNDER-ICE: COMBINED SCIENCE USE AND TECHNICAL DEVELOPMENT IN A POLAR PROGRAMME**

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The United Kingdom's Autosub-Under-Ice(AUI) programme (2000-2007) brought together scientists and technologists to build a special polar-capable autonomous underwater vehicle (AUV) and use it for scientific research on three dedicated cruises of the research icebreaker, J.C. Ross, in both the Arctic and Antarctic. The Autosub AUV was specifically funded to investigate the ice shelf cavities and under sea ice environment in both polar regions. We discuss the merits and challenges of the approach used whose ultimate aim was to use the vehicle simultaneously on a number of highly disparate programs; from mapping using swath bathymetry, water sampling and CTD while underway, measuring ocean currents using ADCP, and digital photography of the benthic life. Technical challenges included developing autonomous precision navigation, obstacle avoidance systems and a water sampler. Science advice and support proved vital in identifying difficult operating conditions and in building cruises to maximize Autosub and vessel utilization. A current challenge is to work internationally, at present highly encumbered because of the structure of national research programmes where suitable working vessels are in different nations than the UK. Developing international cooperation is therefore crucial to allow this new polar capability to be maximized for scientific gain.