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Scientific research tools as an aid to Antarctic logistics

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Logistics have always been a vital part of polar exploration and research. The more efficient those logistics can be made, the greater the likelihood that research programmes will be delivered on time, safely and to maximum scientific effectiveness. Over the last decade, the potential for symbiosis between logistics and some of the scientific research methods themselves, has increased remarkably; suites of scientific tools can help to optimise logistic efforts, thereby enhancing the effectiveness of further scientific activity.

We present one recent example of input to logistics from scientific activities, in support of the NERC iSTAR Programme, a major ice sheet research effort in West Antarctica. We used data output from a number of research tools, spanning a range of techniques and international agencies, to support the deployment of a tractor-traverse system into a remote area of mainland Antarctica. The tractor system was deployed from RRS Ernest Shackleton onto the Abbot Ice Shelf then driven inland to the research area in Pine Island Glacier

Data from NASA ICEBRIDGE were used to determine the ice-front freeboard and surface gradients for the traverse route off the ice shelf and onwards into the continent. Quickbird high resolution satellite imagery provided clear images of route track and some insight into snow surface roughness. Polarview satellite data gave sea ice information in the Amundsen Sea, both the previous multi-annual historical characteristics and for real-time information during deployment. Likewise meteorological data contributed historical and information and was used during deployment. Finally, during the tractors' inland journey, ground-based high frequency radar was used to determine a safe, crevasse-free route.