

Danmarks Nationalkomité for SCAR

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Campaign status Feb 20 – ICEGRAV-2011 project, Antarctica

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Dear friends and colleagues,

The Danish ICEGRAV-project is currently doing good progress in Antarctica, collecting basic gravity, magnetic and ice radar data from a DC3 platform in the Antarctic Peninsula and East Antarctica regions. I cc this brief status report, since you have all been more or less involved in the project on the science, logistics or funding side.

The ICEGRAV project is a close scientific collaboration between DTU, NGA, University of Texas, University of Bergen/NPI/Norway, IAA/Argentina and BAS/UK. The primary goal is to measure airborne gravity in hitherto unmapped areas, and eventually contribute to a coordinated Antarctic gravity grid compilation, for basic use in geodesy, geophysics, and satellite orbit determination, such as the current global gravity field model EGM08. The secondary goal is to provide basic radar, laser and magnetic data, as made possible by the rather large long-range DC3 aircraft.

The primary funding is provided by the National Geospatial-Intelligence Agency, USA, with supplemental funding from ESA (P-band radar) and NASA-IceBridge (UTexas participation).

The ICEGRAV field crew presently consist of R Forsberg and S Kristensen, DTU-Space, Denmark, A Gidskehaug, Norway, and ph.d. student J Greenbaum, University of Texas. The Basler DC3 is chartered through Ken Borek Aviation, Canada, and the transit costs and charter shared with UTexas. The ICEGRAV 2010/11 season has therefore been split in two: an October/November campaign, operating from Rothera and Marambio, trying to finish the Antarctic Peninsula lines (but again plagued by dismal weather), and a February 2011 campaign, finishing the Peninsula lines and starting new survey in East Antarctica (Dronning

Maud Land). Logistics support for the Feb 2011 campaign has been provided by Argentina (Ushuaia support, Marambio and Belgrano fuel), UK (Rothera and Halley support) and the Norwegian Polar Institute (Troll support).

The Feb 2011 flight setup include the following instruments:

LaCoste and Romberg gravimeter S-99 (Univ. of Bergen)

LaCoste and Romberg land gravimeter G-466 for base ties

Numerous GPS units on several aircraft antennas, Inertial navigation system

Geometrics 823 Cesium magnetometers (aircraft boom-mounted and base station)

DTU-ESA Polaris P-band ice sounding radar (with 2 m or 4 m belly-mounted antennas)

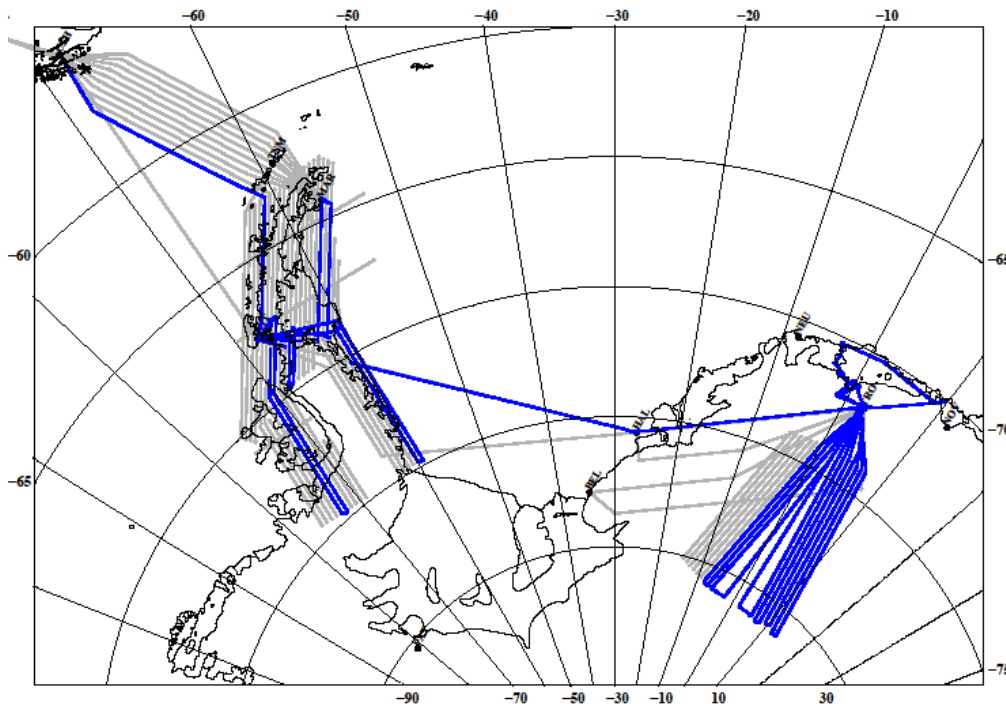
60 MHz ice radar, with wing-mounted antennas (UTexas, building on DTU heritage)

SigmaSpace scanning lidar (green) and Riegl infrared vertical-beam laser (UTexas)

All instruments have so far functioned with few or no problems. Weather-related aircraft height changes and excessive turbulence have given minor gaps in gravity data. P-band radar and 60 MHz radar seems to co-exist with minimal or no RFI, and ESA P-band test flights completed.

Weather delays in UTexas's positioning of the aircraft back to Ushuaia, and subsequent bad weather preventing transit flight over the Weddel Sea, have given us a large delay, but relatively good conditions at Troll is helping catching up in the East Antarctica program, and the last missing flight lines on the peninsula. Enclose a current coverage map and some pictures.

Rene Forsberg, DTU-Space, Troll, 20-2-12



Survey flights of the 3rd ICEGRAV campaign, February 2011 (shown in blue). Antarctic Peninsula is essentially finished (except for one flight track). East Antarctica remaining lines shown in grey.



DC3 aircraft at Rothera (left) and at Troll blue-ice runway (right).



Cabin instruments: UTex radar, gravimeter, IMU (left), Sigma Space lidar and P-band radar (right)



P-band large antenna installed for ESA test (left); southern Antarctic Peninsula (right)