

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Advanced Systems (3)

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ANTARCTIC BROADBAND: FAST INTERNET FOR THE BOTTOM OF THE EARTH

Abstract

High-bandwidth communications is the largest sector of the commercial satellite industry. While micro- and nanosatellites have yet to service this market, it is expected that such spacecraft will play an increasing role in the communications industry, with likely initial applications in niches that cannot be readily or easily addressed by traditional service providers. Polar communications are one such niche. Communication needs at the poles are increasing rapidly, and traditional space and terrestrial communication solutions will not be able to meet these needs in the near-future. Inherent orbital limitations exist for geostationary communication satellites, while environmental issues limit what can practically be accomplished with terrestrial infrastructure.

The Antarctic Broadband program has developed miniaturized communications technology specifically designed to meet the data transfer requirements of users in the Antarctic. Funded under the Australia Space Research Program, the project consortium, comprised of industry and research organizations, has developed a number of innovative solutions to meet the challenge of transferring data from polar regions to anywhere on Earth at very high speed. The first spacecraft expected to be launched by this program—a nanosatellite demonstrator—will be able to provide end-to-end data links at speeds in excess of 15 Mbps between small Earth stations, which may be fixed or mobile. Alternatively, if configured as a telemetry transmitter, the nanosatellite payload can achieve downlink speeds between 60 and 120 Mbps at 1 Watt RF output power.

This paper discusses the Antarctic Broadband program, including the key technologies which have been developed to facilitate high-speed polar communications; an initial risk-reduction nanosatellite demonstration mission; and the envisioned operational broadband system.