

Topics (T)
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ARCTICSAT: MAKING SPACE FOR ARCTIC CLIMATE CHANGE RESEARCH

Abstract

With Canada's Arctic regions experiencing the effects of climate change faster than the rest of the country, northern Inuit and Indigenous communities require assistance. Traditional travel and hunting routes are being disrupted by unsafe ice conditions as multi-year ice melts, creating a need for community-driven remote sensing. This paper introduces a novel CubeSat mission to help address this need. The ArcticSat Mission will be a community co-developed 3U CubeSat equipped with a high-frequency microwave radiometer capable of detecting ice/water interfaces from a polar orbit and operated by community members from Chesterfield Inlet, Nunavut and Churchill, Manitoba in Canada. Equipped with timely data on ice and snow conditions (including ponds of fresh water during the melt season), communities will be able to assess safe travel corridors and monitor how the surrounding environment is changing on a weekly, monthly, seasonal, and annual basis – and how it may change in the future. Most importantly, ArcticSat will be designed, built, and operated in cooperation with northern community members, sharing the data freely over the SIKU Indigenous Knowledge Social Network, making it one of the most accessible sources of space data for northern Canadian communities. The ArcticSat project will build capacity in Canada by training and inspiring over 50 personnel from elementary school, high school, University, and communities in the fields of satellite remote sensing, climate change science, and space systems. ArcticSat team members will collaborate with industry (Magellan Aerospace and Precision ADM), the research community (the University of Manitoba's Centre for Earth Observation Science (CEOS), the Space Technology and Advanced Research Laboratory (STARLab), the University of Calgary, and York University), the amateur radio community, and northern community elders as they embark on a truly transdisciplinary project aimed at empowering Canadians with modern, low-cost, and accessible satellite remote sensing technology for the purposes of climate change research. The ArcticSat Mission will extend Canada's expertise in satellite remote sensing into the CubeSat realm, thereby making critical climate change research data more accessible to Inuit and Indigenous communities.