

EARTH OBSERVATION SYMPOSIUM (B1)
Future Earth Observation Systems (2)

Author: Mr. Guennadi Kroupnik
Canadian Space Agency, Canada, guennadi.kroupnik@asc-csa.gc.ca

Mr. Ziad Ali
Canadian Space Agency, Canada, ziad.ali@asc-csa.gc.ca

Dr. Allan Hollinger
Canadian Space Agency, Canada, allan.hollinger@asc-csa.gc.ca

Mr. Martin Hebert
Canadian Space Agency, Canada, martin.hebert@asc-csa.gc.ca

POLAR COMMUNICATIONS AND WEATHER (PCW) MISSION

Abstract

Global climate change and ever growing worldwide interest in the vast natural resources and shorter air and marine routes in the Arctic represent new challenges and opportunities for Canada and the world. To profit from the opportunities and to overcome the challenges, we need better weather prediction, climate and environment monitoring, as well as, broadband communications capabilities in the Arctic.

Currently in operation and planned new generation of GEO and polar orbiting LEO satellites do not provide adequate solutions for the Arctic, in terms of coverage, spatial and temporal resolution.

The Canadian Space Agency, in partnership with Environment Canada, the Department of National Defence and other Government Departments, has defined the needs for and evaluated the merits of a Polar Communications and Weather (PCW) satellite mission. The studies demonstrated that a constellation of two satellites in a Highly Elliptic (Molniya-type) Orbit (HEO) will improve weather forecasting, and environmental and climate change monitoring, as well as, provide continuous broadband communications capabilities throughout all of the Arctic.

The objective of this paper is to provide technical description of the planned “core” PCW mission, as it is defined by the end of Phase A. PCW would be a world-first constellation of satellites in HEO, where each of the satellites is equipped with meteorological, communications, and space weather payloads. PCW system would fill the gaps in communications coverage of the North and provide unique highly temporal (refreshed every 15 minutes) and high (on meteorological scale) special resolution (500 m in VNIR, and 2km in IR) operational meteorological, and climate and environment monitoring data over the entire Arctic. The data will be complementary to one provided over the mid-latitudes by GEO satellites, thus creating conditions for a truly global coverage.

The paper will, also, address system-level trades-offs, and describe technical challenges related to the design of the bus, meteorological, communications, and space weather payloads. It will present a concept of operations and provide a programmatic overview, including opportunities for an “enhanced” PCW mission via international collaboration.

The authors certify that the paper has not been presented at a previous meeting and that financing and attendance of an author at the IAC to present the paper is assured.