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GOMX-4A/B: A FORMATION FLYING PRECURSOR MISSION FOR CONTINUOUS ARCTIC
SURVEILLANCE USING NANO-SATELLITES

Abstract

The Arctic region is well known for its uninhabitable environment, where settlements are sparse and near the coast with little common infrastructure between settlements. In case of emergency (i.e. a ship grounding) merely finding shelter for the stranded is a challenge. As very little is known about the amount of ship traffic in the region currently, a first step is to gain knowledge about the amount of ship traffic in the region. Typically, ships are continuously monitored by base stations situated along the coastline. However, due to vast distances and poor infrastructure, it is not possible to deploy ship monitoring stations along the Arctic coastline (i.e. Greenland). One alternative is to monitor the area by satellite. Aircraft in the region are also of interest, and can also be monitored by satellite much more easily than by dedicated ground stations. GomSpace ApS, a privately held Danish company is working together with the Danish Ministry of Defense and the European Space Agency on a precursor mission to demonstrate the feasibility of a formation flying nano-satellite constellation providing continuous coverage of all ships and planes over the Arctic region by monitoring the AIS and ADS-B signals. The precursor mission is currently scheduled for launch in 2017. The precursor mission will demonstrate all essential technologies needed for this future constellation, which includes: payloads for detecting signals from ships and airplanes, payloads for performing inter-satellite link at S-band, and orbit control via cold-gas thrusters. The satellites will be developed around the standard GomSpace 6U satellite bus platform. In this paper the background for the mission is detailed, the performance analysis on the different payloads is presented, and mission operations concepts are presented.