

25th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Small Earth Observation Missions (4)

Author: Mr. Jon Harr

Norwegian Space Agency (NOSA), Norway, jon.harr@spacecentre.no

Mr. Tyler Jones

Norwegian Space Agency (NOSA), Norway, tyler.jones@spacecentre.no

Mr. Knut Svenes

Norwegian Defence Research Establishment, Norway, knut.svenes@ffi.no

Mr. Andreas Nordmo Skauen

Norwegian Defence Research Establishment, Norway, Andreas-Nordmo.Skaugen@ffi.no

Mr. Tore Smestad

Norwegian Defence Research Establishment, Norway, tore.smestad@ffi.no

Mr. Ivar Spydevold

Statsat AS, Norway, ivar.spydevold@statsat.no

Mr. Eirik Voje Blindheim

Statsat AS, Norway, eirik.blindheim@statsat.no

Mr. Alexander Beattie

Space Flight Laboratory, University of Toronto, Canada, abeattie@utias-sfl.net

Ms. Laura Bradbury

UTIAS Space Flight Laboratory, Canada, lbradbury@utias-sfl.net

Mr. Brad Cotten

University of Toronto Institute for Aerospace Studies, Canada, bcotten@utias-sfl.net

Dr. Robert E. Zee

University of Toronto, Canada, rzee@utias-sfl.net

Mr. Frode Storesund

Kongsberg Seatex AS, Norway, frode.storesund@kongsberg.com

Mr. Torkild Eriksen

Norwegian Defence Research Establishment, Norway, toe@ffi.no

Mr. Bo N. Andersen

Norwegian Space Agency (NOSA), Norway, bo.andersen@spacecentre.no

Mr. Daniel Kekez

UTIAS Space Flight Laboratory, Canada, dkekez@utias-sfl.net

MICROSATELLITES FOR MARITIME SURVEILLANCE, AN UPDATE ON THE NORWEGIAN
SMALLSAT PROGRAM**Abstract**

The first Norwegian microsatellite AISSat-1 was launched in 2010. It weighed less than 6 kg and carried the first-generation space AIS receiver developed by Kongsberg Seatex. The satellite was developed as a cooperation between the Norwegian Defence Research Establishment (FFI), the Norwegian Space Centre (NSC) and the Norwegian Coastal Administration (NCA).

Highly successful both from a technology demonstration and mission point of view, AISSat-1 was followed by AISSat-2 in 2014, forming Norway's first operational satellite constellation. Both satellites

were built by the Space Flight Laboratory (SFL) at the University of Toronto Institute for Aerospace Studies (UTIAS). In spite of 3-year nominal lifetime, both satellites still operate and deliver AIS data to Norwegian governmental users at every orbit over the Vardø and Svalbard ground stations.

In order to assure continuity of AIS data delivery, Norway launched 2 new AIS satellites in July 2017, thereby doubling the constellation which now is composed of 4 satellites. NorSat-1 and -2 are also built by SFL, and are bigger than their predecessors with a mass of 16 kg each. Both are equipped with the latest 4th generation AIS receiver from Kongsberg Seatex, in addition to auxiliary technological and scientific payloads.

During their first year of operations, AIS performance of NorSat-1 and 2 has largely exceeded expectations, with an increase of 60

The next satellite in the NorSat series, NorSat-3, is currently under development. It will, in addition to the standard AIS receiver, carry an experimental Navigational Radar Detector (NRD). By acquiring signals from the ships' compulsory navigation radar, the NRD will provide an even more complete picture of the traffic in the Norwegian waters. The NRD receiver and processing unit on NorSat-3 will be built by Kongsberg Seatex, based on prototypes from FFI. FFI develops the NRD antenna and the software for processing signals from the antenna to the user systems.

The article will focus on giving a general overview of the Norwegian smallsat program, lessons learned and in-orbit performance of the newcomers NorSat-1 and -2, and status on the development of NorSat-3.