

SMALL SATELLITE MISSIONS SYMPOSIUM (B4)
Small Space Science Missions (2)

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AAUSAT3: A CUBESAT FOR AIS SPACE RECEIVER

Abstract

Purpose:Next generation monitoring of ship traffic will partly be based on LEO satellites. Traditionally, receiving and monitoring of Automatic Identification System (AIS) messages from ships has been done using buoys and ground stations. However, this is impractical around Greenland and at open seas, due to the large area to cover. In the latest years, reception of AIS signals in space has had an increased interest due to the limitations in traditional ground based receiving methods. AAUSAT3 is a pico-class satellite complying with the CubeSat standard. The satellite is managed, build and developed by students as part of their education. The main purpose of the satellite is to evaluate the possibility of receiving AIS in space. AAUSAT3 contributes to the maritime community and future AIS-satellite developers by giving non-commercial data and statistics which so far has been a challenge to obtain.

Methodology:AAUSAT3 is a distributed platform with different architectures responsible of different subsystems. The satellite is equipped with an Electronic Power Supply, a UHF radio, an Attitude Determination and Control System, and two AIS receivers. The AIS receivers are based on two different detection and demodulation methods. The internal communication uses the connection oriented CubeSat Space Protocol on an internal CAN-bus.

Results:A prototype of AAUSAT3 was tested on a high altitude balloon flight in October 2009 as part of the REXUS/BEXUS programme. The test was a success and the satellite performed as expected. The Electronic Power Supply, the UHF radio and the two AIS receivers were tested and they all performed well on the high altitude balloon flight. The two AIS receivers collected and stored AIS messages which has been used to define a methodology for testing the performance of AIS satellites.

Conclusion:The balloon flight showed a very high quality and reliability of AAUSAT3. The communication link, powersupply, AIS subsystems, and ground segment were fully functional during the entire flight and all mission objectives were fulfilled. Currently, AAUSAT3 is planned to be launched in the first half of 2011.