

# Tracking Ships From ISS

## Norwegian Monitoring Equipment at Place in the Space Station

It is not necessary to launch one's own satellites to track ships from space. The International Space Station is a stable platform for such tracking and for testing future systems.

The Norwegian Defence Research Institute (FFI) has on behalf of ESA been chosen to lead a project to develop a system for global monitoring of shipping traffic.

The first monitoring unit, NORAIS, developed and built at FFI, was a part of the cargo when the Japanese H-2 Transfer Vehicle docked with the International Space Station some weeks ago. Thus,, the first part of the space-based ship tracking experiment with the Columbus Automatic Identification System (COLAIS) is in place.

The Norwegian Automatic Identification System (NORAIS) is an improvement and advancement of AIS, the short range coastal traffic system used by ship and vessel traffic services around the world. NORAIS is built for Columbus, the European space laboratory on the International Space Station. In November a specially constructed antenna was brought to the ISS and fitted on the outside of Columbus. From then on, the testing of NORAIS will start. Unfortunately, the orbit for ISS will not bring the instrument over all oceans under Norwegian jurisdiction, but the Norwegian technology will be tested in large scale from the platform in space. The NORAIS-receiver has a viewing range of more than 4000 kilometres covering the ocean areas between 70 degrees north and 70 degrees south several times per day. This means that COLAIS in the future could extend the range of ship-tracking services to also include trans-ocean traffic.



*The NORAIS Instrument before Packing for ISS. Photo courtesy: FFI.*

### Global Sea Monitoring

The goal is to take part in the development of space based AIS and global sea monitoring. The ISS has free vision over vast sea areas. Therefore the NORAIS can keep track of a much larger quantity of signals than the base stations on Earth. Researchers and engineers will use the signals to improve on the methods used to separate the signals from each other. This way, ship traffic in a large area or from a long distance can be monitored.

The instrument is developed by Kongsberg Seatex and the Norwegian Defence Research Establishment (FFI) in cooperation with other partners. Operations will be carried out by FFI through the Norwegian control unit for experiments at the ISS, N-USOC in Trondheim, Norway. N-USOC will collect data from the instrument and send it to FFI every hour.

NORAIS was built in a year. The fast development phase was partly due to the construction of its twin, made for use in the dedicated AISSat-1 satellite. AISSat-1 will perform similar measurements as NORAIS, but the data will be downloaded in real time under different conditions.

### Global Vessel Tracking

NORAIS is an advancement of the current short range coastal traffic system. The primary goals of the experiment are to receive and decode Automatic Identification System (AIS) messages globally, as well as to aid in the development of an operational system. The NORAIS receiver is financed under the European Space Agency's General Support Technology Programme (GSTP).

FFI is the principal investigator for the COLAIS experiment that consists of two AIS receivers procured by ESA through GSTP. In addition to the NORAIS receiver, the LUXAIS receiver from the co-investigator in Luxembourg will be operated on a 50-50 time share basis. When operating an AIS receiver in space, the main challenge is the interference between messages from ships transmitting at the same time.