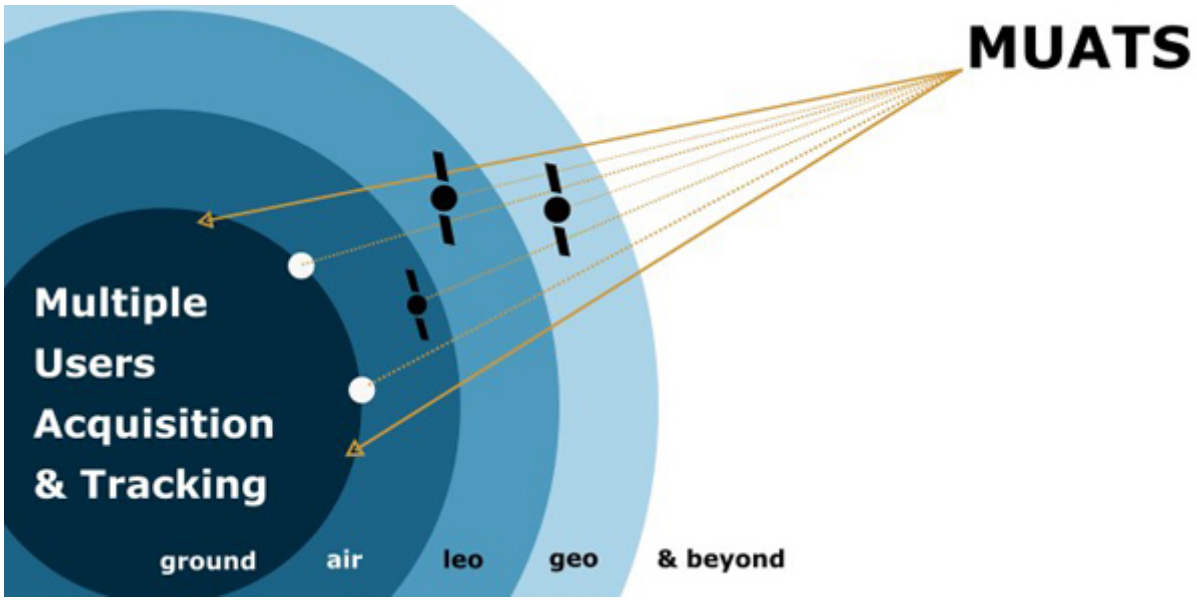
Multi User Acquisition and Tracking Sensor

Multi User Acquisition and Tracking Sensor (MUATS) for optical communication

In the frame of ESA's ARTES 4.0 Programme Line for Optical Communication (ScyLight), Jena-Optronik realized an innovative concept study for a Multi-User Acquisition and Tracking Sensor (MUATS) which allows to detect optical communication terminals in space.



The innovation: A Multi-User Tracking Terminal Sensor for laser communication

Optical communication terminals (OCT) employ laser beams to transfer data. This is for example the case in the European Data Relais System (EDRS) where data is transferred via optical communication from low-Earth orbit (LEO) satellites to geostationary satellites (GEO orbit), which then forward the data to ground stations on Earth via radiofrequency (RF) signal.

Although state-of-the-art OCTs are able to acquire and track potential communication

counterparts, they have only a limited field of view and therefore can set up a connection with only one partner at a time. Switching to the next terminal requires a certain preplanning and position knowledge of this partner.

MUATS addresses this drawback: Equipped with a wide field of view, it provides precise angular position information of multiple OCTs. This additional information enables an OCT to establish communication links rapidly between different terminals.

The MUATS concept

MUATS is able to track simultaneously up to 20 OCTs on the ground or in space. Jena-Optronik has developed the MUATS concept and demonstrator in the frame of ESA's ARTES 4.0 programme. MUATS is a single box design which accommodates

- two identical, radiation-hard refractive telescope optics
- two InGaAs detectors with dedicated electronics
- FPGA (Field Programmable Gate Arrays), power supply and SpaceWire customer interface

The concept envisages that all necessary hardware is housed in one enclosure to enable autonomous operation and a simple redundancy concept.

The next step: From multi-user tracking to autonomous space networks and constellations

Jena-Optronik currently develops an autonomous optical terminal detection sensor (AUTO-TDS) for autonomously operating networks.

AUTO-TDS will be able to identify multiple optical terminals simultaneously, which want to establish a link to the optical terminal on board of the satellite where AUTO-TDS is located.

Source: http://www.jena-optronik.com