AGA 4: Space Surveillance and Remote Sensing

Zeit: Donnerstag 9:00–10:30 Raum: HSZ-04

Hauptvortrag AGA 4.1 Do 9:00 HSZ-04

Optical Tracking and Characterization of Space Objects — •Thomas Schildknecht — Astronomical Institute University of Bern, Switzerland

Near-Earth space becomes increasingly populated with artificial space objects. A multitude of operational Earth observation, communication, research, and military spacecraft share this space with a large number of abandoned rocket upper stages, defunct spacecraft and fragmentation debris - so-called space debris. Knowing the orbits of all these objects becomes indispensable to 'manage the traffic' and prevent accidental collisions. Traditionally the task of building and maintaining orbit catalogues was left to military entities. Only limited and degraded information from these catalogues is publicly available, and more importantly, information on military spacecraft is intentionally withhold. Furthermore most of the small-size space debris is not contained in these catalogues.

The proliferation of space debris and the increased probability of collisions and interference raise concerns about the long-term sustainability of space activities. During recent years space agencies and civilian research organizations increased their efforts to build space object catalogues and to investigate the space debris population. This paper will describe optical techniques to detect, track and characterize space objects including small-size debris and illustrate them with examples from the long-standing observation programs of the Astronomical Institute of the University of Bern (AIUB) devoted to the search of space debris and the surveillance of the geostationary ring.

AGA 4.2 Do 10:00 HSZ-04

Remote sensing and geoinformation technologies in support of nuclear non-proliferation and arms control verification regimes — •Irmgard Niemeyer — Forschungszentrum Jülich GmbH, Institut für Energie- und Klimaforschung, IEK-6: Nukleare Entsorgung und Reaktorsicherheit

A number of international agreements and export control regimes have been concluded in order to reduce the risk and proliferation of weapons of mass destruction. In order to provide confidence that Member States are complying with the agreed commitments, most of the treaties and agreements include verification provisions. Different types of verification measures exist, e.g. cooperative measures; national technical means ; technical monitoring or measurement devices placed at or near sites; on-site inspections; intelligence information; open-source information, such as commercial internet data and satellite imagery.

The study reviews the technical progress in the field of satellite imaging sensors and explores the recent advances in satellite imagery processing and geoinformation technologies as to the extraction of significant observables and signatures. Moreover, it discusses how satellite data and geoinformation technologies could be used complementary for confirming information gathered from other systems or sources. The study also aims at presenting the legal and political aspects and the cost benefits of using imagery from both national and commercial satellites in the verification procedure. The study concludes that satellite imagery and geoinformation technologies are expected to enhance the verification efficiency and effectiveness.