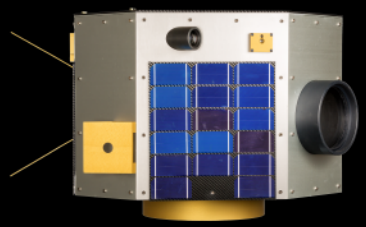
Slovenian Microsatellite for Earth Observation



Ground Station in Pomjan near Koper

Laboratory for Testing of Satellite Technologies

Web and Mobile Applications

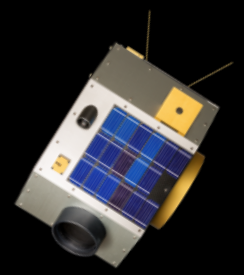
Remote Sensing Applications

SPACE-SI has developed a complete and fully automatic image processing chain that brings raw satellite data to map-ready images for web and mobile applications. For the efficient utilisation of the geo-located data, a crowd-sourced dissemination platform called *Geopedia* has been set up and thousands of data sets with several million data entries have been collected over the past few years. SPACE-SI has already applied these systems to several real-life situations including:

- change detection in urban and rural areas,
- determination of heat islands in cities,
- insolation modelling,
- continuous drought mapping,
- natural disasters mapping (e.g. floods, landslides, fires),
- mapping of agricultural areas (crop state, prediction, needs),
- invasive plants mapping (e.g. Japanese knotweed),
- estimation of plant stress to support detection of plant diseases,
- advanced maritime surveillance, and
- crowd sourcing – Earth observation, modelling, mobile data input and output.

SPACE·SI

SLOVENIAN CENTRE OF EXCELLENCE FOR SPACE SCIENCES AND TECHNOLOGIES



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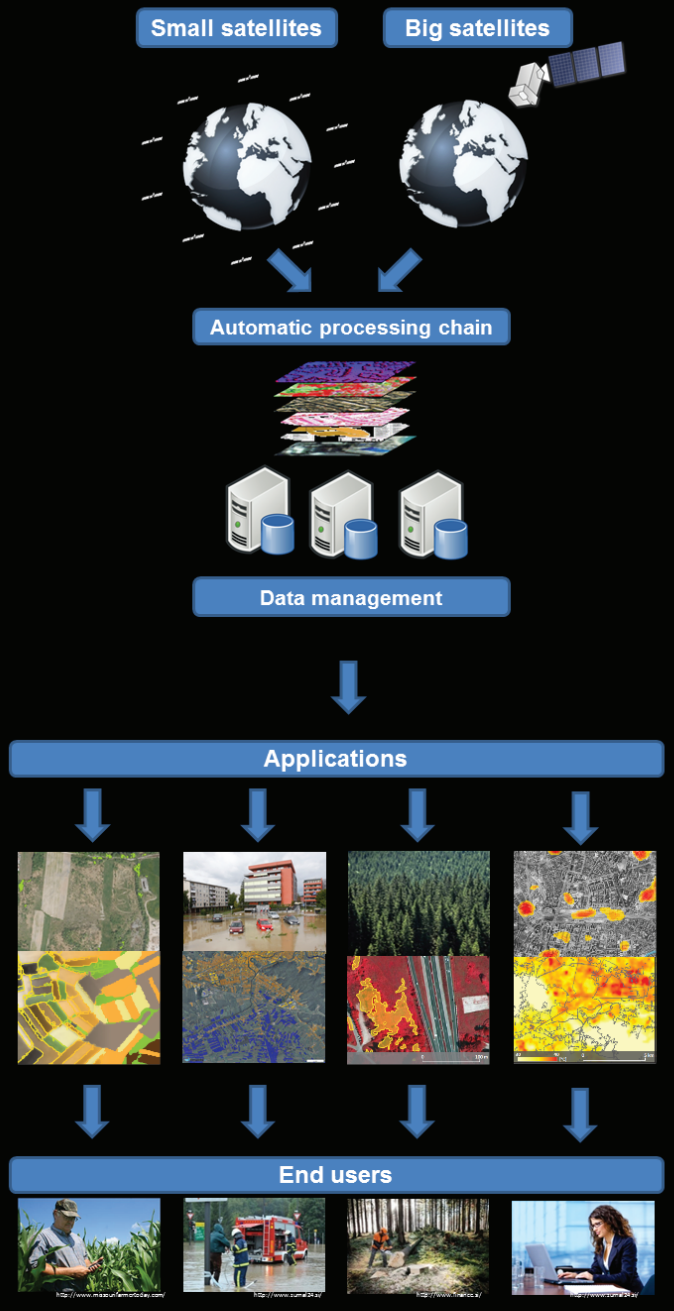
CENTRE OF EXCELLENCE SPACE-SI

The Slovenian Centre of Excellence for Space Sciences and Technologies SPACE-SI has been established by a consortium of academic institutions, high-tech SMEs and large industrial and insurance companies in order to benefit from the advantages of small satellite technologies and applications in Earth observation, meteorology and astrophysics.

The RTD activities of SPACE-SI are focused on high resolution interactive remote sensing and formation flying missions. These goals are supported by the development of an advanced RTD infrastructure that includes ground control infrastructure and satellite integration facilities as well as a multidisciplinary laboratory for testing of satellite systems and components in simulated space environments. The data sources from small satellites have been combined with data from large space programs such as Copernicus to enable frequent and cost-effective remote sensing applications in ecology, agriculture, forestry, land cover mapping, urbanism and maritime, as well as for monitoring climate changes, natural disasters and use of natural resources.

Slovenian Microsatellite

SPACE-SI has developed a low cost - high precision interactive remote sensing mission for acquiring multispectral images and real time HD video. The mission is based on a very advanced microsatellite for Earth monitoring and observation that has been developed in collaboration with the SFL from Toronto. The satellite carries two optical instruments. The primary instrument is capable of imaging at a GSD of 2.8 m in four spectral bands. Secondary instrument produces images at a GSD of 40 m GSD in a much wider field of view. Both instruments are capable of recording high definition video at 25 frames per second. The satellite is equipped with a 50 Mbps X-band downlink.



There is hardly any socio-economic or environmental challenge in which the space-borne earth observation data is not very helpful.

Ground Control Station

SPACE-SI possesses the largest professional ground station with satellite auto-tracking capability in Slovenia. It consists of two dislocated spacecraft tracking antennas (1.8 m and 5.2 m) which provide support for space missions in UHF, S-band and X-band frequency ranges. They can independently or synchronously track the same satellite. The ground station can track spacecrafts flying in Low Earth Orbit (LEO) down to 400 km. The larger antenna is X-band receive only and is equipped with conscan tracking technology and will be upgraded with high accuracy monopulse tracking capability. Smaller antenna has RX/TX capability on S-band. For UHF RX/TX capability a cross-Yagi antenna array is used.

Laboratory Infrastructure

SPACE-SI infrastructure includes following facilities for testing and integration of satellite technologies:

- Clean room ISO class 8 for integration of satellites and subsystems;
- Thermal vacuum chamber with minimum pressure 10^{-8} bar, usable test area of 0.85 m diameter by 1 m long, and temperature range from –60 °C to +80 °C;
- Nanoindenter Agilent G200 instrument for nano-mechanical testing of advanced materials in the micro to nano range of loads and displacements;
- Computer clusters and appropriate software for satellite mission analysis, processing of remote sensing data, coupled physical and chemical modelling of the atmosphere for predicting meteorological and pollution parameters well as multi-physics and multi-scale numerical modelling and optimisation of satellite components and subsystems.