

## Four channel alphasat Ka- and Q- band receiver station In Ljubljana

Project: European Space Agency (ESA); Ka/Q-band Propagation Measurements and Modelling – Slovenian Contribution to the Alphasat TDP#5 Scientific Mission (SatProSi-Alpha)

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In the project four channel beacon receiver has been set-up at Jozef Stefan premises. The receiver is capable of measuring co polar and cross-polar signals at Ka-band (19.701 GHz) and Q-band (39.402 GHz).

### Beacon receiver design:

- *RF front-end* - consists of an offset dish antenna with a custom designed 4 port feed and 4 low-noise-converter channels at two bands (19.7 GHz and 39.4 GHz) and two polarisations (co-polar and cross-polar);

- *digital receiver* - 4 output signals are led to an SDR receiver, the indoor unit consists of 4 USRP N200 connected via LAN to a PC running the GNU radio application, application for data storage, an SSH server for remote access and an application for applying potential changes to the tracking system control;

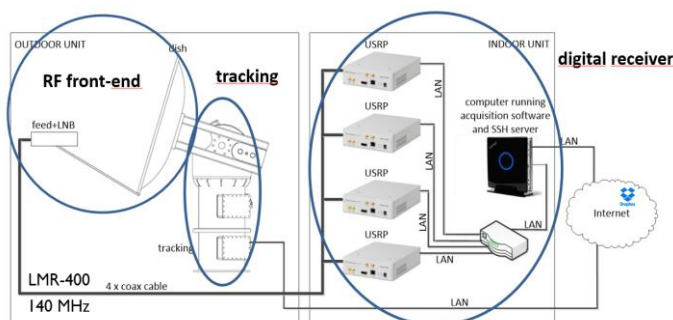


Fig. 1: Beacon system overview

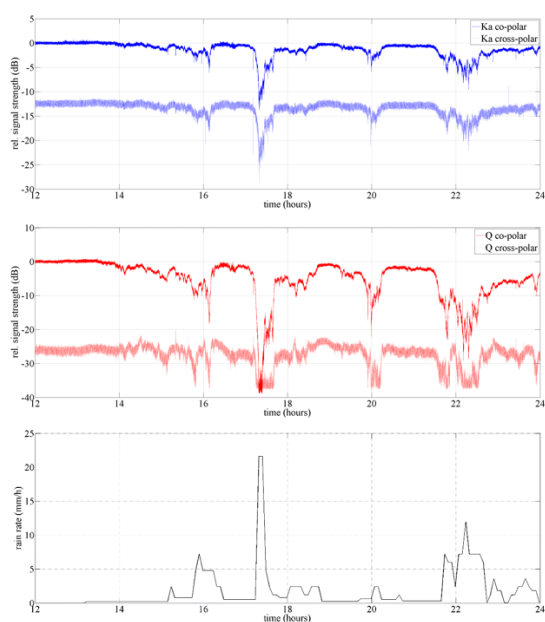


Fig 3: Measurements example – Ka-band, Q-band, rain rate

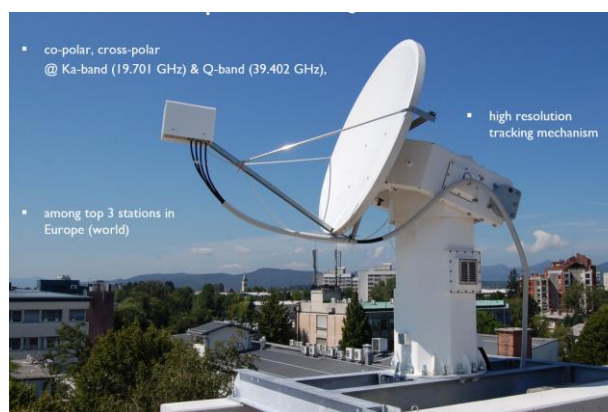


Fig 2: Four channel Alphasat Ka and Q-band receiver station

Signal measurements with the parallel rain intensity measurements by the co-located rain gauge are stored in daily files. The example shows light rain started around 15:00 h, while a stronger peak caused follows - 13 dB/38 dB attenuation at Ka/Q band.