

MatLab Software Package for Propagation Data Pre-Processing

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Abstract

Hydrometeors, gases and refractive index inhomogeneities cause the main propagation impairments on microwave terrestrial or satellite links. While the interactions of the wave are well known, a full statistical description of static and dynamic parameters of attenuation, depolarisation and scintillation require long term measurements and extensive data analysis due to climatic factors.

Following our participation on Olympus propagation campaign we prepared also for the already failed STENTOR campaign (STENTOR was destroyed on recently Ariane V launch) by developing a tool for pre-processing data analysis. The software tool is quite intuitive software developed in MatLab that allows an easy conversion of daily raw acquired data to attenuation and XPD time series.

Presentation is structured according the following mainlines:

- The requirements of the software tool ranging from data display, user interaction with the data and main facilities to be implemented are highlighted
- The software modules and procedures developed mainly:
 - Data loading and calibration
 - Inspection, classification and repairing
 - XPD and attenuation templates extraction using several approaches
 - Bias removal and data quality assessment
 - Data archiving oriented from several points of view: full data, events, etc
- Results and performance

Conclusions show that this software approach, using Matlab graphical facilities and a modern PC, is an excellent tool to perform data pre-processing tasks. These tasks were often made on a per event basis time-consuming sessions or with programs difficult to tailor to user needs or to debug and with a poor interface.