

POSTER

Advanced SAS2 Spaceborne Analyzer System

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The SAS2 (Signal Analyzer and Sampler) wave analyzer system has been developed at BL-Electronics Kft. for spaceborne VLF wave measurement. The instrument has several versions depending on the applications. Some units used on small satellites are low power, low speed while others eg. used for onboard wavefront analysis on the ISS are higher power, high speed (2 Msps/ch) data samplers. The SAS2-K2 is a VLF analyzer developed for the Compass-2 satellite.

The SAS2-K2 has two input channels: one electric antenna (two electrical spheres with ~2.5m base distance in differential mode) and one search-coil for magnetic measurement. The input signals passing through the preamplifier and signal conditioner enter into 16bit A/D converters for data sampling. The input bandwidth depends on the sampling clock and so from the internal FIR filter of the sigma-delta ADC. Programmable analogue bandwidth can be 2.5/5/10/20 kHz.

The internal data processing unit is based on an ADSP-2181 DSP from Analog Devices. The core of onboard software is a dedicated real-time operating system. The main modules are: measurement control, telemetry interface, command decoder, event detection and onboard time.

The event detection software is a very important part of the system. The onboard telemetry system can download only a limited amount of data to the Earth. Real-time VLF sampling results a vast amount of data. Most of the time the measured data contains mainly background noise or not interesting signals that can be processed by low speed integral measurements.

Using the onboard processing capacity of the DSP and appropriate algorithms we can find the relevant data in the incoming data stream and send mainly valuable information to the telemetry downlink. Thus we can cover the whole orbit with integral measurement and still there is enough TM capacity left for the high detail transient measurements.