

## THz Interferometers in Geosynchronous Orbit, - status and results

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**Abstract**—This paper presents the development of a demonstrator for the Geostationary Atmospheric Sounder (GAS) instrument and test results. GAS utilizes synthetic aperture radiometry to obtain desired spatial (30 km) and temporal (nowcasting) resolution for measurement of atmospheric temperature and humidity profiles under all weather conditions. These parameters are decisively important to meteorological and climate models at all time scales. The instrument development project includes on-ground demonstration of both the imaging performance and the mechanical concept. This activity was concluded in October 2010 with a final presentation at ESTEC and all test results agreed with predictions and verified that such an instrument could be developed and meet the end user requirements. The design and implementation of the demonstrator will be presented with some system level test results. Ruag Space AB has been the prime for the demonstration phase and responsible for the post processing, analyses and demonstrator system level tests. Omnisys has been responsible for the electronics, i.e. front-ends, cross correlator back-end, LO system etc.

The plan for the next phase is still uncertain on the European side, but there is an ongoing development at JPL for a similar instrument, GEOSTAR. Omnisys are now working together with this team and are concentrating on the cross correlator part. A full custom ASIC in 65 nm CMOS has been developed and is currently being tested. The first test results are very encouraging with clock speeds ( $> 2.5$  GHz) and power consumption ( $< 0.13$  mW/ch/GHz) as expected. Full performance predictions will be disclosed at the conference. Full custom samplers are also being developed with a planned tape-out in mid 2011. Expected performance of these devices will be presented together with a preliminary design of a full cross correlate system.

