## The STEAMR instrument

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Abstract—The envisaged limb viewing of STEAMR is based on a staring concept with 14 beams, polarised at  $\pm$  45 degrees, covering a nominal altitude range of 6-28 km at mid latitudes. The complete STEAMR instrument will be presented on system level, including antenna, optics, calibration system, focal plane array, 340 GHz front-ends and 12 GHz wide back-ends. Omnisys is now prime for the STEAMR instrument and is performing prototyping work for 4 complete radiometer channels of the 14 planned for the flight instrument in parallel to system studies towards ESA for the Premier satellite platform. Test results will be presented. Parts of the optics (IAP) and the calibration system is also being prototyped and the complete instrument development plan has now been addressed and presented.

The current optical design concept is based on a six-mirror system, including a Ritchey-Chretien telescope that routes the incoming beam to the focal plane unit and the optics is diffraction-limited by the 1.6 x 0.8 m aperture of the primary reflector.

The calibration system consist of a beam chopper and a reference selector and the references will be two absorptive loads at different temperatures, a nadir view (TBC) and CW source to test sideband conversion ratio and signal response of the complete receiver chain.

The receiver front-ends consists of subharmonic mixers with integrated LNA's with the LO pumped by an active x6 multiplier and x2 schottky doubler with a power consumption of < 800 mW per channel, including LO and IF LNA. These 14 front-ends are connected via an IF system to 14x2 6 GHz wide spectrometers in the back-end. 12 GHz bandwidth is being processed with 1024 channels per band with a resolution of <20 MHz after post processing. The spectrometers are based on the HIFAS ACS ASIC presented at ISSTT 2009. The complete instrument is estimated to consume 307 W and have a mass of 102.5 kg, including contingencies.

The instrument system design will also be briefly described in terms of accommodation issues on the platform, system integration and test plans as well as structural and thermal analyses results from the system study effort.

