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SPACEBORNE ANTENNA TECHNOLOGY FOR K- AND Q/V-BAND

Abstract

HPS GmbH, Germany, started to develop its own spaceborne antenna technology in 2003 with the project STAN. Since then, several reflector antennas have been successfully manufactured, assembled and tested. In this paper the new technologies and outstanding performances of four of the most recent antenna products for K- and Q/V-band will be presented: - ARA: K-band Antenna Reflector Assembly for the ESA mission "EUCLID". All the scientific data acquired from the on-board instruments will be transmitted to the ground stations on Earth through the ARA. HPS GmbH is responsible for the detailed design, analysis, manufacturing, integration, and testing of all the three models of ARA (STM, EQM, and FM). The first model, already fully flight representative, has been delivered in 2017 and successfully tested by the end of 2017. The EQM will be delivered in spring 2018. - HIDAN: 2.4 m side-deployable Q/V-band reflector. HIDAN is a project funded by ESA in the frame of the ARTES program with the aim to identify and validate a reflector antenna technology compliant with the stringent requirements for a large Q/V-band reflector. HPS Germany is prime contractor and responsible for the RF, mechanical and thermal design, as well as manufacturing, assembly and verification of the EQM model of the reflector. The final test campaign will take place March 2018 - H2KAR: 1.1 m side-deployable Ka-band reflector for the German telecom-mission "Heinrich Hertz". H2KAR is co-funded by the German Space Agency DLR fostering innovative technologies. The reflector will illuminate a service area located in Northern Germany and in parts of the North Sea and the Baltic Sea. HPS Germany is responsible for the RF, mechanical and thermal design, as well as manufacturing, assembly and verification of the EQM- and PFM-model ("In-Orbit Verification model") of the reflector. In addition, HPS Germany also supplies the antenna subsystem including two-axis pointing mechanism, hold-down and release mechanisms and antenna feed for the H2SAT North Beam Antenna ("H2NBA"). - FLANT: Q/V-band feeder link antenna with a Gregorian offset geometry (main reflector diameter 1.2 m). The purpose of FLANT (ESA ARTES) is to investigate one of the main subsystems of the next-generation high-capacity satellite architectures, which make use of Q/V-band for the feeder link, while the user link remains in Ka band. HPS Germany has

developed the antenna capable of serving up to 10 ground stations distributed over Europe. The EM model has been successfully manufactured, assembled and tested in 2015.