

Challenges and perspectives for Space Antenna Testing

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Over the last 35 years ESA supported major evolutions in antenna measurement techniques to answer needs for all the development phases from initial breadboarding, material RF characterisation, to accurate antenna characterisation and satellite testing. Recently, the evolution from single beam to multiple beam telecom antennas and the multi frequency/wide band operation call for new approaches to reduce the testing time significantly.

In other applications, missions at the lower range of the frequency spectrum involve the testing of very large antennas, exceeding the quiet zone dimensions of most space antenna testing facilities. A complicating factor is the complex 0g devices for large reflector and array antennas, immobilizing the spacecraft during testing. This has resulted in a push, at several places, for the transition from far field (CATR) testing to near field testing, although for the latter, several system parameter tests or end-to-end tests are not fully matured and standardized.

Besides these new challenges, there are the everlasting quests for higher accuracy and higher (sub-mm wave) frequencies. But there are also new developments, offering perspectives to conquer these challenges, like the strengthened interactions between the modelling and the testing domains as one of the ways forward.

This paper will perform a review of key challenges for space antenna testing and highlight new techniques, recently implemented or under developments for some of them.



Biography - Maurice H. Paquay

Maurice H. Paquay graduated in 1987 at the Technical University of Eindhoven, The Netherlands. He started his career at the TNO Physics and Electronics Laboratory in The Hague (NL) where his first task was the development of a dual polarized patch antenna array for the airborne active SAR system called PHARUS. Following the system development, he rolled into the Near Field Antenna Measurement activities. After serving nearly 10 years with TNO, he moved over to Hollandse

Signaal Apparaten (currently Thales) where he became the project manager of the POLARIS project, a polarimetric FMCW radar, but after 2 years the opportunity opened up for the position of Antenna Measurement Engineer at ESA-ESTEC (Noordwijk NL). Currently he is lab responsible for the Compact Antenna Test Range and Compact Payload Test Range at ESA-ESTEC, with a mission to extend the frequency range of the antenna test facilities from 400 MHz to 325 GHz by implementing Near Field and Quasi-Optical techniques.