

Recent development and future trends in telecoms antenna for satellites

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Recent generations of telecommunication satellites have seen ever more challenging antenna requirements. An increase in complex shaped coverages per satellite has resulted in the need for more antennas and for multiple coverages per antenna, while the need for frequency re-use between coverages has resulted in demanding isolation requirements among antennas on the same satellite.

More stringent RF requirements are a challenge to feed designers and also to reflector manufacturers, with demands for increased aperture size while maintaining stringent surface accuracy performance.

European industry has an impressive heritage in complex active antennas for multi-beam payloads in L- and S-bands. We are now seeing the adoption of multi-beam Ka- and Ku-band payloads by an increasing number of operators. Current systems generally use a “single feed per beam” (SFB) approach, with beams distributed over several apertures. However passive multi-feed per beam (MFB) antennas are also available, based on low-loss multi-mode beamformers.

As beam sizes are reduced, larger apertures are required, leading to several interesting reflector developments, building on existing low-frequency unfurlable mesh reflectors and on heritage in folding reflector panels.

Meanwhile, true in-orbit multi-beam flexibility will require cost-effective active antennas, a research area being pursued in ESA with several interesting developments ongoing.

This presentation will survey recent trends and developments in the field of satellite communication antennas, with an emphasis on their application to commercial programmes



Biography - Silvia Raffaelli

Silvia Raffaelli was born in Italy. She received her Laurea degree (cum laude) in electronic engineering from the University of Florence, Italy, in 1995, and her Ph.D. in applied electromagnetics from Chalmers University of Technology, Gothenburg, Sweden, in 2001.

From 2002 to 2006, she was a Senior Research Engineer at the Antenna Research Center at Ericsson AB, Gothenburg, Sweden, working on advanced antennas for 4G base stations. She subsequently worked for two years at Antenova, Cambridge, as a Principal Engineer, working on terminal antennas for mobile communications. Since 2008, she has been working as a Principal Engineer at Astrium EADS, Stevenage, UK, designing satellite antennas. Her main research interests include electromagnetic theory and applications, particular conformal antennas, microstrip antennas, periodic structures and antennas for space applications.