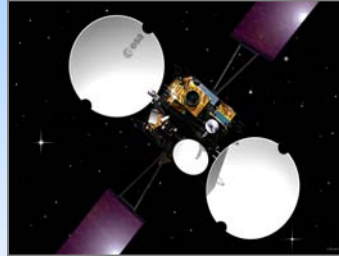


Highly Stable CFRP Antenna Reflectors



The request for lighter antenna reflectors is still ongoing. But the lighter they get, the severe are a) the problems of structural integrity during launch and b) the shape stability of the reflector due to the periodically changing thermal environment in space. Especially reflectors for high transmission frequencies need an excellent in-flight stability in order to minimize sidelobe or pointing errors.

HPS GmbH has put huge effort in the design & configuration of such reflectors, in the development of integrated reflector engineering tools, in the characterization of the newest materials available and in advanced manufacturing processes. Among the used materials are new core materials like carbon foam and carbon honeycomb. For the face sheets investigations have been done in high-modulus pitch based carbon fibers as well as nanotube based composites. Several coatings have been identified for different applications, also in order to avoid MLI or sunshields.

Now, together with its mother company INVENT, HPS is able to provide high performance and – even more important – cost effective antenna reflectors for 1-75 GHz and in diameters between 0.5 m and 2.5 m.

Example Specification A (0.6 m Ku-Band)

- diameter: 0.6 m, F/D: 1.5
- mass: 570 g (excl. interface, dish only)

Example Specification B (1.2 m Q/V-Band)

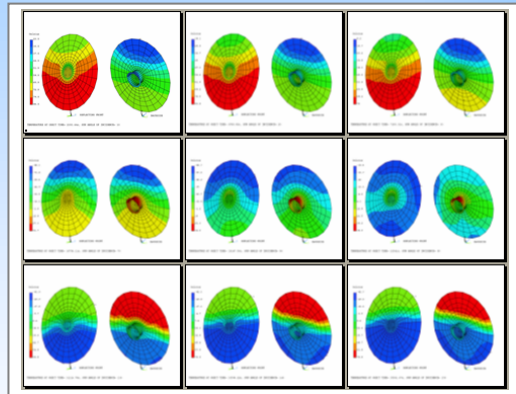
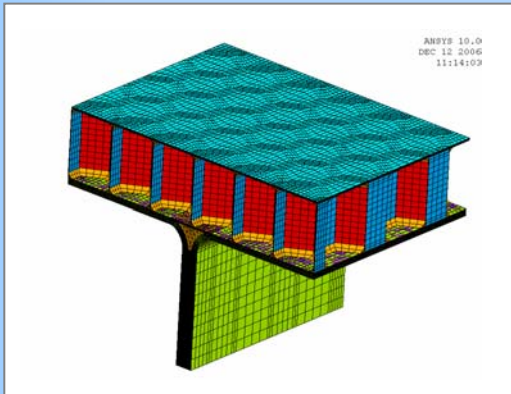
- diameter: 1.2 m, F/D: 1.5
- mass: 2.6 kg (incl. interface)
- reflection loss < 0.1 dB
- depolarisation: < -40 dB
- amplitude variation: < 0.02 dB
- phase variation: < 2°
- transmission coefficient: < -40 dB
- pointing error: < 0.1°
- maximum deflection in orbit: 30 µm RMS
- first eigenfrequency: >50 Hz
- temperature range: -150° to +150°

Example Specification C (2.4 m Ka-Band)

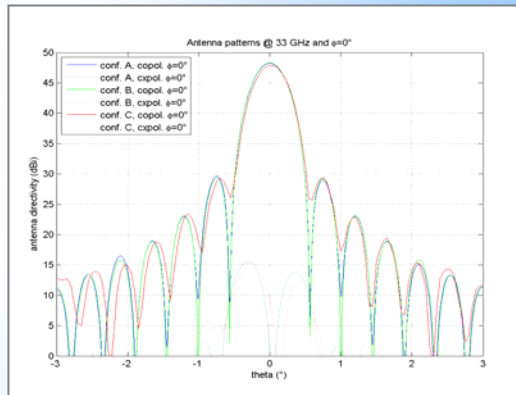
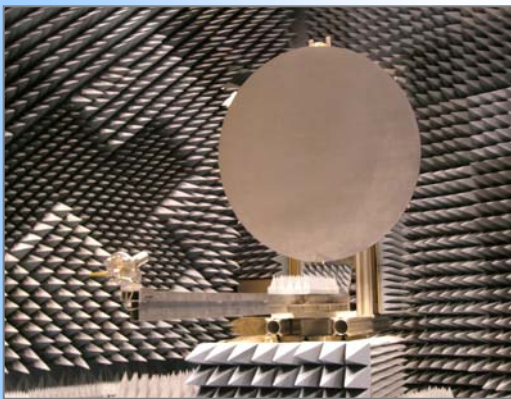
- diameter: 2.4 m (around 4.5 m²)
- mass: 11 kg (incl. interface)



Detailed Structural & Thermal In-orbit Analysis



RF-Tests in a Compact Range and RF-Performance Correlation



Thermal-Vacuum Cycles, -Distortion Tests and RMS In-orbit Prediction

