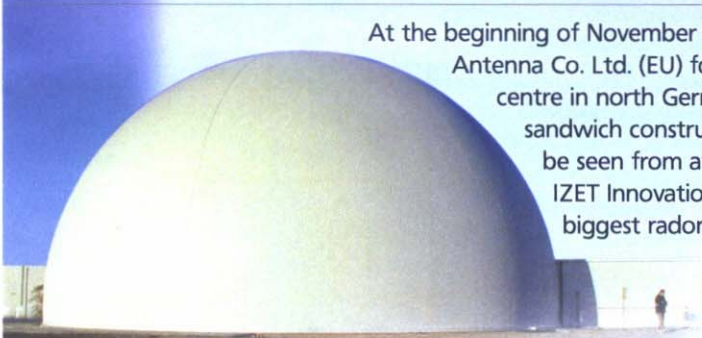


HAHLBROCK HIGH-LIGHTS

Hemispherical Radome for Nippon Antenna R&D Center Best dielectrics due to seamless fibreglass sandwich construction



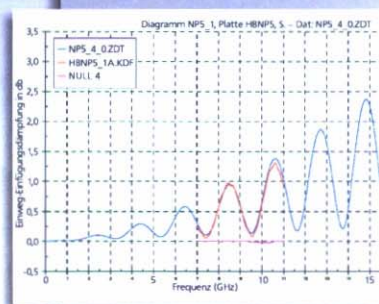
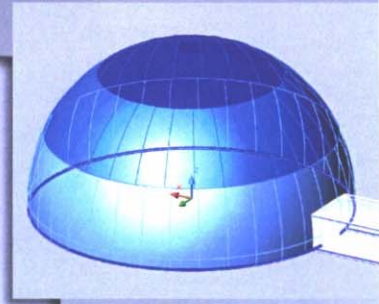
At the beginning of November 2004 Japanese aerial maker Nippon Antenna Co. Ltd. (EU) formally opened its European test centre in north Germany. The new radome of fibreglass sandwich construction that protects the test unit can be seen from afar, rising above the grounds of the IZET Innovation Centre in Itzehoe. One of the biggest radomes of its type, with an external diameter of 26.14 m (86 ft), the R&D Center of Nippon Antenna will test the complex aerial systems of modern vehicles in future.

The primary consideration for the selection of the radome material was the use of a form of construction completely without any metal components and allowed a constant material thickness throughout. For that reason the generally used form of construction whereby individual segments are bolted together at flanged edges with a solid laminated structure was rejected. The segments are glued seamlessly to one another with a groove and tongue connection and joined on both sides with identical covering fibreglass laminated components.

Hahlbrock - Faserverstärkte Kunststoffe realized the extremely precise spherical geometry with the aid of computer-assisted manufacturing of all production facilities and moulds. The radome segments themselves that are around 6.35 m (21 ft) in length were machined on 5-axis CNC machines and could be inserted into one another on the site with a high degree of precision and without the need for any subsequent reworking.



The sandwich material with very thin fibreglass covering layers with a thickness of less than 1 mm (0.04 inch) was initially dimensioned regarding its suitability for the desired frequency range. Subsequently the one-way insertion loss and the reflection loss in an aerial section were checked. The first tests of the measuring unit showed that the dielectric properties of the final radome even exceeded the results of the simulation.



Details of the radome

Structure:	Hemisphere
Diameter:	26.14 m (86 ft)
Height from base to pole:	14.07 m (46 ft)
Surface:	1,150 m ² (12,380 sq ft) without entrance tunnel
Division:	86 segments with polar cap (orange peel geometry)
Material:	fibreglass sandwich with foamed PVC core
Assembly:	Segments butt-joined seamlessly by gluing
Sustained wind load:	154 km/h (1.14 KN/m ²)
Optimized frequency range:	50 MHz to 6 GHz

