Indigenous Radomes for Airborne and Weather Applications

Airborne Nose Radome- for fire control radar of Jaguar Maritime Fighter Aircraft fleet (IAF)

CSIR-NAL indigenously designed, developed and fabricated a composite nose radome for the Fire Control Radar of Jaguar Maritime Aircraft for HAL, Bangalore, end user being IAF. Manufacturing technology for productionizing the Airborne Nose Radome for the Indian Air Force Jaguar Maritime Fighter Aircraft fleet has been developed and transferred to HAL. The ToT document was officially handed over to HAL by Director, NAL on 16th April 2010.

Features:

The monolithic Nose Radome was fabricated using high performance GFRP. It is a variable thickness, nose thick and base thin design radome. An in-house developed closed mould resin injection technology has been used in fabrication of the radome. The composite radome is protected with anti-static / anti rain erosion paint subjected to qualification tests, viz., EM, lightning protection, static loading, vibration and rain erosion tests in presence of CRI. The radome has successfully met the stringent airworthiness qualification standards.

Jaguar Nose Radome

Jaguar

Industry Partnership:

Technology License and General Terms Agreement for Manufacturing of Composite Radome for Jaguar Aircraft, Hindustan Aeronautics Limited Bangalore, (Date: 10th February 2010, License Fee: Rs. 1.18 crore).

Cost Economics :

Unit cost: Rs.11 Lakhs at ToT stage. Further cost reduction expected with HAL taking up production of 50-60 nos. Saving of precious foreign exchange of nearly 200% vis-à-vis the imported Israel radome.

Ground based Radomes – for protection of DWR Radars of Indian Metrological Department

The huge out-door radomes protect the steerable antenna from the harsh, all-weather conditions, while permitting the electromagnetic waves to pass through without any interference or significant loss. Radomes were designed and developed by CSIR NAL for the India Meteorological Department and Indian Space Research Organisation.

Amongst the recent achievements, CSIR-NAL has successfully designed and installed 12.88m diameter composite spherical Doppler Weather Radome (DWR) protecting the weather radar belonging to BEL/ ISRO at IMD campus Cherrapunji within a record time. During the year 2015 CSIR-NAL has successfully completed the installation of DWR Mark II Radome at Gopalpur seashore, near Chandipur, Odhisa in May 2015 and at Kochi, Kerala in December 2015. With the successful completion of these two installations, the DWR Mark II Radome indigenization program, that has a significant role in weather monitoring activities of IMD, has successfully met the objectives and culminated with dissemination of the technology to industry.

The 12.88m dia. DWR Radome installed at Cherrapunji, Meghalaya.

DWR Radome at Gopalpur, Odisha.

DWR Radome at Kochi, Kerala.

Features

The Ground Based Weather Radome is a spherical radome of diameter 12.88m. It has 66 polygonal panels fabricated using PolyUrethane (PU) Foam core glass epoxy sandwich composite. A cost-effective wet layup and Room Temp. vacuum bag moulding process has been adopted. The Radome is designed to withstand 250 km/h wind speed with gusts upto 300 km/h.

Industry Partnership

Agreement for licensing of DWR radome manufacturing technology, BEL Ghaziabd,(Date: 30-May-2011, License Fee: Rs. 2.00 crore)

Cost Economics

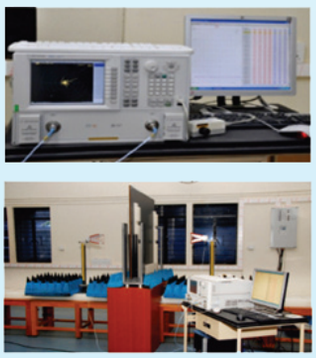
Unit cost: Rs.116 lakhs approx. at ToT stage. Further cost reduction expected with production of 30-40 Nos. by BEL. Saving of foreign exchange of minimum of 30% vis-à-vis imported US radomes and also allows deployment in strategic locations.

Electromagentic Design & Analysis for Radomes

The Computational Electromagnetics Laboratory (CEM Lab.) was founded in 1993 at the CSIR-National Aerospace Laboratories (CSIR-NAL) to initiate the activities in the area of computational electromagnetics for aerospace applications.

- Integrated antenna-radome analysis capability
- FSS-based radome designs
- Monolithic/ sandwich (including honeycomb) designs
- Variable thickness radome (VTR) design
- Hybrid-VTR design for missile radomes
- Multi-sector optimization radome design
- Ground-based and airborne radomes (for aircraft, missiles, etc.)
- High-temperature, high performance radomes
- Stealth radomes
- Radome EM performance enhancement
- Broadbanding techniques
- In-house EM material characterization of candidate radome materials

Adaptive antenna control unit



FSS Measurement System

Electromagnetics Laboratory

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