

F-16 Wideband Radome



Superior RF performance over the broader AESA radar band

Greater operating frequency space

Maximizes detection and SAR mapping performance across the AESA radar band

Fully leverage investment in AESA radar system

General Dynamics Mission Systems has designed and developed a new wideband radome to optimize the performance of the Active Electronically Scanned Array (AESA) radars utilized for F-16 aircraft upgrade programs. The existing F-16 Full-Scale Development through Block 50/52 nose radomes are narrow band radomes of a monolithic wall construction. These radomes perform well over the narrow bandwidth of the legacy Mechanically Scanned Array (MSA) radars, but are not capable of supporting full bandwidth operations of AESA radars.

Realizing the maximum performance across the full bandwidth of the AESA radars requires a wideband radome.

Our F-16 wideband radome is designed to achieve wideband performance using a multi-layer sandwich construction instead of the solid laminate construction of the heritage nose radome. A multi-layer construction has many tuning options and provides the same excellent reflection and transmission performance that a solid laminate wall achieves, but over a much broader operating bandwidth and range of incidence angles.

The General Dynamics wideband radome is compatible with advanced AESA radars including the Northrop Grumman's AN/APG-83 Scalable Agile Beam Radar (SABR). Prototype radomes have been produced and tested. Full qualification is underway.

F-16 Wideband Radome

Relevant Experience

- General Dynamics is the designer and the only original equipment manufacturer (OEM) for the F-16 nose radome
- General Dynamics has designed and produced wideband nose radomes for the following platforms: F-16 Blk 60, F/A-18E/F, EA-18G, F-15E, and F-35 A/B/C

Configuration

General Dynamics' F-16 wideband radome is designed around the F-16 Blocks 20-52 and preserves:

- Existing Outer Mold Line (OML) shape
- Existing aircraft mounting interfaces
- Existing air data system

Performance

Utilization of the new wideband radome rather than the existing narrowband radome will provide:

- Superior RF performance over the broader AESA radar band
- Greater operating frequency space
- Maximizes detection and SAR mapping performance across the AESA radar band
- Fully leverage investment in AESA radar system

Characteristic	Current (Solid)	Wideband (Multi-Layer)	Impact / Comment
Interface	—	—	Maintains existing aircraft mounting interfaces, air data system and OML.
Lightning Protection	—	★	Reduces RF interference, more robust and easier to maintain.
Transmission	—	★★	Maximizes detection performance across the AESA radar band.
Reflection	—	★★	Minimizes interference. Maximizes SAR mapping performance across the AESA radar band. Maximizes detection performance across the AESA radar band.
BDE Repeatability	—	—	Maintains comparable post-compensation tracking error performance.

★ IMPROVEMENT

★★ SIGNIFICANT IMPROVEMENT

General Dynamics' F-16 wideband radomes provide superior performance while preserving all air data and attachment interfaces of the current F-16 radome.

Radome Retrofit Alternative

Integration of an AESA radar with the existing F-16 radome will have an impact on the AESA radar's performance. If the performance degradation is acceptable, the existing radomes must be modified to eliminate mechanical interferences and maintain aircraft signature performance.

GENERAL DYNAMICS

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