Ballistic Radomes
Protecting Mission-Critical Communications

THE U.S. MILITARY UTILIZES ITS NETWORKS AS COMMUNICATIONS PLATFORMS TO MAINTAIN AN INFORMATION ADVANTAGE OVER ADVERSARIES. GIVEN THE RISKS INVOLVED IN COMBAT SITUATIONS, NETWORK AND COMMUNICATIONS SYSTEMS USED IN THEATER MUST BE MORE THAN MOBILE AND SECURE; THEY MUST ALSO BE PHYSICALLY PROTECTED FROM THE BATTLEFIELD ENVIRONMENT AS WELL AS FROM BALLISTIC ATTACKS.

Adversaries of the U.S. recognize that antennas are critical components of the military’s network architecture and satellite communications system—if the system is compromised, so is the mission. With antennas and other critical network infrastructure frequently on the command vehicles of mobile troop units, these elements must be protected so the network will continue to inform the mission.

LGS Innovations is one of the first companies to provide a radome solution with the following critical features:

» Ballistic Protection
» Radio Frequency (RF) Transparency
» Low Weight
» Affordable Cost

PHOTO COURTESY OF U.S. ARMY
Strength on the Battlefield
Meeting the Warfighter’s Need for Combat Communications

LGS Innovations Ballistic Radomes are suitable for a number of different Satellite Communications On-the-Move (SOTM) applications and have been designed to meet the warfighter’s need for a mobile satellite communication and terrestrial network able to move voice, video, and data across long distances for forces on the move in combat.

Satellite parabolic dish antennas mounted on command vehicles are typically covered with thin molded or thermoformed dust covers that provide little impact protection and are easily damaged in combat. To address these shortcomings, LGS Innovations develops its ballistic radomes using thermoplastic composite material with radio frequency (RF) transparency that increases both the functionality and the ruggedness of the radome. This capability opens up a variety of applications in the radar and communications areas, where the plastic polymer can provide impact and ballistic protection to a radar or communications transceiver with negligible impact on the network’s performance.

Even under extreme heat or cold, LGS Innovations ballistic radomes have excellent impact strength. The weatherable thermoplastic composite armor works well in harsh, battlefield environments; its hydrophobic coatings ensure that water won’t interfere with the communications. The affordable, low-weight material can also be formed into net shapes that do not require a supporting superstructure, allowing LGS innovations to design ballistic radomes that cover and protect a variety of antenna systems, including parabolic, beam, patch, and phased array antennas.

Parameter Value

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Size, RF Frequency, and Finish Color</td>
<td>As Required by System</td>
</tr>
<tr>
<td>Areal Density for NIJ0108.01 Level 1 Ballistic Protection</td>
<td>2.1 lb / FT²</td>
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<tr>
<td>Insertion Loss</td>
<td>&lt; 0.5 dB</td>
</tr>
<tr>
<td>Finish</td>
<td>Hydrophobic Coating</td>
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<tr>
<td>Environmental Resistance</td>
<td>Biological / Chemical Resistant</td>
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Example of design and fabrication capabilities of a ballistic radome for a satellite-communication-on-the-move antenna system. The ballistic radome replaces a non-ballistic dust cover without changes to the mounting interface.
Research & Development
From the LGS Innovations Government Communications Lab

The Government Communications Lab undertakes experimental and computational efforts aimed at understanding the mechanics of high-speed collisions and ballistic impact on multi-layered composite armor system for the purposes of optimization. Research and development efforts are directed to improve the plastic armor ballistic performance and provide lower weight, greater degrees of ballistic and blast protection, net-shape single armor parts, and lower RF loss.

As antenna requirements vary with each mission, LGS Innovations customizes the ballistic radomes design to meet mission requirements, including weight, protection levels, insertion loss, and operating frequency. LGS Innovations can provide affordable ballistic radome in a broad range of sizes, shapes, and finish colors so that the ballistic radome can be a drop-in replacement for an existing non-ballistic radome.

LGS Innovations leverages breakthroughs in thermoplastics composite material technology and fabrication processes from its Government Communications Labs and Bell Labs to produce armor products, components, and systems for U.S. deployed forces and homeland security missions. These solutions offer superior ballistic and blast resistance protection, and are smaller, lighter, smarter, multi-functional, environmentally friendly, compatible, more survivable, customizable, and affordable.

The LGS Ballistic Radome project is subject to International Traffic in Arms Regulations (ITAR) set forth by the U.S. Government.

ABOUT LGS INNOVATIONS

LGS Innovations LLC solves the most complex networking and communications challenges facing the U.S. Federal Government. Building on its Bell Labs heritage, LGS Innovations delivers groundbreaking research and advanced networking and communications solutions that provide an information advantage and contribute to the mission success of its customers. Solutions include Infrastructure & Installations; Video Teleconferencing and Surveillance; Tactical Communications; Wireless/Mobility; 4G/LTE; Enterprise, Optical and Data Networking; and research and development in Advanced Multimedia/RF, Cybersecurity, sensing technologies, and Photonics.