



THE FINELY HONED BLADE

How the antenna that outperforms all others was created

A strong partnership makes 5G a reality

Few airborne telecommunication technologies are as mission-critical as the aircraft antenna. Antennas are the first and last point of contact with the aircraft itself, and their performance affects every other technology in the inflight connectivity (IFC) ecosystem.

The partnership between Gogo Business Aviation and FIRST RF is well-established having already produced the best wireless link available for the AVANCE L5 antennas. So when Gogo began developing its 5G solution, it turned to FIRST RF to design and build an all-new, multiband, multifunction antenna that uses phased arrays and beamforming to focus on 5G towers while avoiding typical sources of interference. The quality of the antenna determines how well the link to the ground network performs — and the Gogo 5G antenna must be able to fulfill substantial performance criteria with extraordinary reliability and durability.

“There’s no such thing as a boring aviation product. Many of the lessons we’ve learned putting hardware into the nastiest places on earth have been applied to this antenna.”

*Mike Sharkey,
President, FIRST RF*

The partners

Gogo Business Aviation is the industry leader in inflight connectivity and entertainment (IFEC) and the first company to embark on building a true 5G airborne broadband network in which the entire ecosystem meets 5G standards. With an existing infrastructure of 250+ towers, a track record of building and deploying three previous ATG networks to-date, and extensive vertical integration, Gogo is the only IFC company in North America positioned to make 5G a reality for business aviation.

FIRST RF is a leading designer and fabricator of advanced airborne antenna and radio frequency (RF) systems. The company has deep experience providing military-grade hardware for a variety of defense and aerospace clients around the globe. Organized into two complementary divisions, it effectively provides both applied R&D and manufacturing capabilities.



Integrated, from design to deployment

FIRST RF's main task was to provide a multifunction, belly-mounted blade antenna with 360-degree coverage. Minimizing antenna size was also a high priority. The design needed to accommodate complex multiband apertures, advanced beamforming technology, phased arrays, and other crucial features.

From the start, Gogo worked closely with FIRST RF to define a custom solution that would deliver on the high expectations of 5G performance, while being as small and rugged as possible. FIRST RF engineers were quick to identify the best type of aperture given size constraints and other factors, and they were able to quickly simulate performance characteristics. They also solved how to integrate legacy and future network technologies, crucial for overall 5G network performance.

With antenna performance established and validated, Gogo was able to finalize system specifications and priorities early in the collaboration.

5G, delivered

FIRST RF prides itself on always looking ahead, and its team identified several ways to exceed original specifications. Novel beamforming techniques, for example, allowed FIRST RF to get outstanding gain from a small antenna, increasing system throughput to more reliably meet the demands of the Gogo 5G network. The team also designed a highly aerodynamic blade shape to minimize drag, as well as a mechanical interface compatible with existing Gogo antenna mounts, which simplifies installation.

As a result, antenna prototypes met or exceeded expectations on key performance metrics, with zero defects and all timelines met. FIRST RF will continue to provide support and expertise throughout the integration process.

Gogo and FIRST RF both know that enabling a true 5G experience requires that all components within the network, including onboard equipment, are 5G-native. Where other IFC providers might claim to combine some 5G components on top of 4G networks, only Gogo will provide true 5G — enabled, in large part, by FIRST RF's small-but-mighty antenna.

Gogo 5G antenna in detail



Developed by Gogo and FIRST RF

Type 13-inch, blade-style, multiband phased array antenna

Standard RF/coaxial interfaces that align with existing Gogo dual directional antenna interfaces

Approximate dimensions 13" L x 8" H x 4" W

Antennas per aircraft 2

LEARN MORE

Contact us to learn about Gogo 5G, our development process, and what 5G means for you.

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