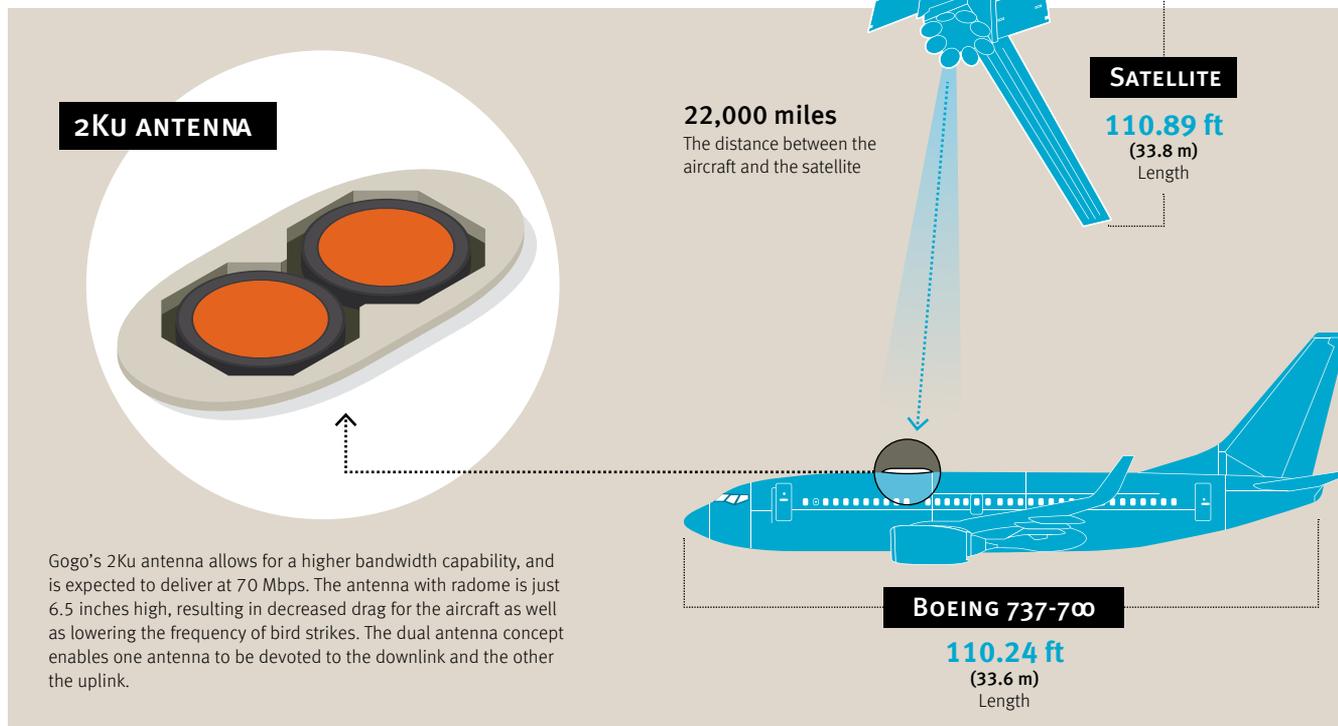


Advanced Antennae



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The concept for our worldwide geostationary satellite system was first popularized by the late Sir Arthur C. Clarke in 1945. Clarke, a legendary science-fiction writer and futurist, is famously known for saying, "Any sufficiently advanced technology is indistinguishable from magic."

BY HOWARD SLUTSKEN

Without any doubt, the ability to receive data and television signals via satellite is magical. A string of satellites circle Earth in a 22,000-mile-high geostationary orbit over the equator, zipping along in tandem with our planet's rotation so they appear to be parked over one spot above earth. That's why the satellite dishes you see on balconies and in backyards don't have to move.

Now consider the passenger in seat 27C, who absolutely needs to check e-mails and Facebook while on a transoceanic flight.

How does the moving aircraft connect, via satellite, to that other magical technology, the Internet? There's a lot of tech involved, and one of the key components is the antenna.

NASA demonstrated in-flight connectivity (IFC) over 20 years ago. Now, small, advanced and steerable antennae or new phased-array flat-panel antennae are mounted in low-profile and low-drag housings on top of aircraft fuselages. There's a wide range of designs and technologies from many manufacturers, including Honeywell, Gogo, Panasonic and Cobham. Some dishes steer mechanically, and some "steer" electronically. Some designs use

multiple dishes in the same housing and some use multiple channels to increase the data throughput. There are systems designed for connecting with established L-, S- and Ku-band satellites, and those using the new Ka-band "birds." The solutions are varied, as are the needs of airline customers, depending on routes, aircraft, and content requirements.

Connectivity has become a "must," and IFC technology and antenna systems will need to keep pace as demand for bandwidth and content grows. Maybe we'll even see antennae integrated into the full length of a plane's fuselage. It's too bad Sir Arthur isn't around; he'd likely have some great ideas! ■

FAA/EASA BIRD STRIKE STANDARDS

Airplanes and birds don't play well together. So, along with other international regulators, the US Federal Aviation Administration (FAA) and the European Aviation Standards Agency (EASA) have developed standards for aircraft design and construction to ensure safe aircraft operation in the event of a bird strike.

IFC antenna housings are mounted on the exterior of the airframe, which falls under the "Design and Construction" standard. That standard requires that the aircraft can successfully complete its flight after the impact of a 4-pound bird, while the plane flies at its cruising speed at sea level, or at 85 percent of cruise speed while at an altitude of 8,000 feet. Collateral damage from any impact, such as the loss or release of any parts, is also addressed.