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IN-FLIGHT CONNECTIVITY

A Soaring IFC Landscape for Airlines and Service Providers

Is In-Flight Connectivity Ready to Take Off?

INTERVIEW

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FOCUS ASIA

Asia - Big Road Ahead for IFC

2017
NEWSLETTER

CONTENTS

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Is In-Flight Connectivity Ready to Take Off?

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Demand for in-flight connectivity (IFC) continues to rise worldwide, as confirmed in a 2017 Inmarsat survey of more than 9,000 passengers in 18 countries. The survey highlights the following two points:

a. IFC is now seen as a necessity and not a luxury
b. High quality IFC drives an airlines ticket sales

The emphasis is on high quality IC service. We see clearly that merely offering in-flight connectivity is not enough to ensure success. The true test of an IFC service is meeting passengers' expectations for the same online experience at 30,000 feet that they are accustomed to on the ground.

While IFC services have been available for a number of years, they've struggled to provide consistently high throughput levels and often are overpriced. The result, according to Euroconsult's report in 2016, is that only 6.2 percent of passengers are taking advantage of in-flight connectivity.

Broadband above the clouds (Source: Shutterstock)

The good news for airline passengers is that their wait for reliable, high-performance IFC services appears to be over. The Q3 announcement of Gogo's new commercial 2Ku service, as well as other market developments in China and elsewhere, suggest that technologies have now matured to the point where they can deliver high-performance IFC services, along with major improvements in bandwidth utilization.

Let's take a closer look at some of the innovative satellite technologies developed over the past few years that have enabled the launch of viable, high-performance IFC services.

High Throughput Satellites (HTS) Have Solved the Bandwidth Problem

One key market driver for IFC services has been the ever-increasing demand for high-performance broadband communications. Whether at home, at work or on the move, people expect to be connected round-the-clock. In scenarios where fiber and cellular connectivity are not an option (e.g., on a plane), satellite-based communication is often the only feasible way to ensure reliable broadband connectivity.

In the past, the cost of satellite bandwidth capacity often rendered satellite-based communications prohibitively expensive for providers of broadband services. In the case of IFC, where broadband connectivity needs to be delivered to hundreds of passengers simultaneously, bandwidth capacity is crucial. Moreover, in order to provide an outstanding user experience to each and every passenger, IFC services need to manage and share this bandwidth among connected passengers.

Today, improvements in satellite technology, particularly the emergence of high throughput satellites (HTS), have changed the rules of the game. HTS is estimated to provide hundreds of percent improvement in throughput over traditional wide beam satellites. The result has been a steep drop in bandwidth costs.

HTS enables the global coverage, high capacity and performance that IFC service providers require for a wide variety of broadband applications. Low-cost HTS bandwidth capacity is now being used to enable a wide variety of in-flight applications – from entertainment and passenger connectivity to internal aircraft systems, weather monitoring and more.

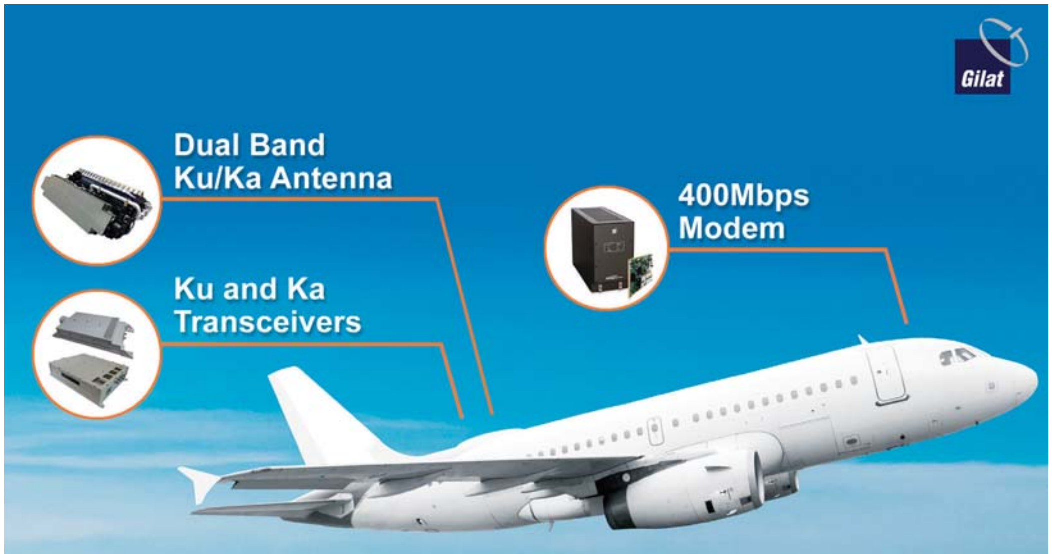
Upgrading Satcom Equipment for IFC Applications

While HTS has taken care of the bandwidth problem, a major technological task remained which is the need for new types of sophisticated equipment to deliver this satellite capacity to end users. In-flight connectivity and other mobility services require sophisticated airborne modems and antennas, as well as management systems on the ground to ensure constant satellite coverage along a route under any conditions.

The required components for a successful IFC deployment are described below:

High Throughput In-Flight Modem

In many respects, modem performance is the key to enabling continuous, high-throughput internet connectivity to hundreds of passengers during the course of a flight. Gogo, for instance, attributes the success of its new 2Ku service to its next generation in-flight modem, which is capable of delivering more than 16 times the throughput of its previous modem.



IFC Technology (Source: Gilat)

Gilat aero modem live-test performance (Source: Gogo)

Some of today's advanced airborne modems are able to deliver aggregate data rates of up to 400Mbps. These modems optimize the performance and efficiency of IFC services, while supporting seamless connectivity throughout the flight across multiple beams. Advanced QoS features guarantee a superior user experience for broadband applications, as well as traffic optimization for hundreds of passengers.

In-flight modems need to support satellite communication needs for both HTS and wide beam satellites on a global network. They manage the entire in-flight SATCOM system, providing broadband satellite backhauling for in-flight internet connectivity and other in-flight services such as cellular connectivity, entertainment, and live TV, as required to deliver a high-quality end-user experience.

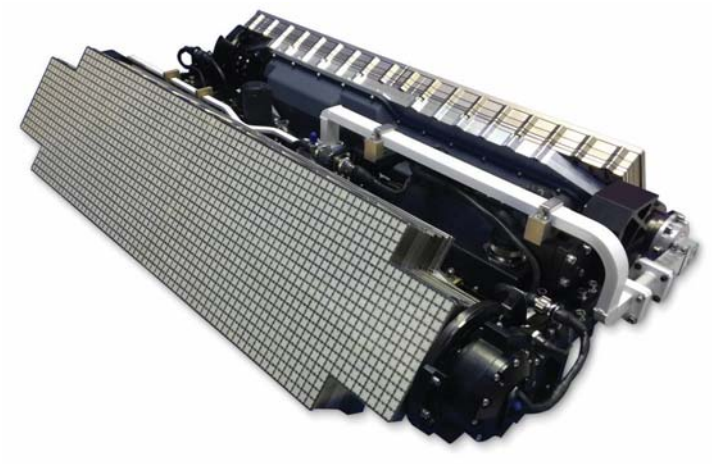
High-Capacity, Dual-Band Antenna

IFC is being deployed worldwide – from North America to Europe and the Far East – on both domestic and transcontinental flights. This means that airlines need to ensure uninterrupted connectivity along air routes that span geographies that are not served by a single satellite frequency band.

To meet this challenge, airlines are taking advantage of high capacity dual Ku/Ka band antennas that can operate in either band during flight, as well as transparently switching between frequency bands during flight without requiring any disassembly or component replacement. This provides the flexibility to dynamically choose between different satellite technologies based on price, weather or geo-location. Today's high-capacity antennas utilize advanced technologies, such as high-efficiency waveguide panel technology, to maximize throughput. Another key benefit of dual-band antennas is fuel efficiency. Using one antenna rather than separate antennas for Ku and Ka bands substantially reduces weight and drag, which translates into reduced fuel costs.

Distributed and Sophisticated Ground Segment Infrastructure

To support airlines' demands for global coverage, IFC service providers are building out distributed networks of satellite hubs to support reliable connectivity throughout domestic and long-haul international flights. The ground segment infrastructure is responsible for ensuring seamless beam switching and satellite hand-offs, Gilat Ku/Ka Aero Antenna (Source: Gilat)



Gilat Aero Modem (Source: Gilat)

which is critical for continued service availability. This functionality is particularly challenging when working with HTS, which use narrow spot beams that provide greater capacity and high data rates over smaller surface areas than traditional wide-beam satellites. Sophisticated real-time processing is necessary to accommodate the frequent switchover between beams, satellites and gateway as the plane travels, without disrupting user application sessions.

In addition to automatic beam switching, the ground segment also handles global bandwidth management of multiple gateways and data centers across the globe. QoS features enable service providers to provision and manage bandwidth across multiple teleports, satellites and user beams from a central management system.

Open Architecture

Baseband architectures that adhere to an open design are able to work with antennas and modems from different vendors. This type of interoperability enables IFC providers to mix-and-match according to their specific needs and avoid vendor lock.

Open architectures also give IFC providers the freedom to build their own best of breed solution. The antenna should be agnostic to the underlying VSAT/modem technology and allow for easy integration with any baseband, and alternatively, the airborne modem should easily integrate with any antenna. This allows IFC providers to manage their services independent of the satellite operator, and the equipment vendors and to choose the best solution for a given location as needed based on performance and cost.

What's Next for IFC Services and Technologies?

IFC is a mushrooming market that is expected to grow from $700 million in 2015 to nearly $5.4 billion by 2025 (Euroconsult). As data speeds and passenger consumption continue to increase, service providers will need to constantly upgrade and adapt their service to new requirements. These improvements will be driven first and foremost by technology.

Following the success of the next generation aero modem, efforts are already underway to create the next generation airborne antenna for IFC applications. To meet airlines' size and weight constraints, the design requirement is for a flat electronically-steered array/phased-array antenna (ESA/PAA) with no moving parts.

Airbus, for example, is working with a number of partners to develop an ESA/PAA antenna based on an array of flat panels that are embedded into the wing structure of the airframe. A major advantage of this design is that it supports IFC capabilities without affecting aircraft performance or maneuverability. Since there are no protruding parts, this innovative technology also minimizes aerodynamic drag, while reducing fuel consumption and CO^2 emissions. The project is being funded by the Clean Sky 2 research program aimed at developing technologies that enable more efficient and greener air transport.

Sidebar

Spotlight: Gogo's Commercially-Deployed Next-Generation 2Ku Service

Gogo, the leading global provider of broadband connectivity products and services for aviation, partners with 16 commercial airlines and has IFC installations on more than 2,900 commercial and 7,000 business aircraft worldwide. To enable continuous, high-throughput internet connectivity, broadband and streaming services to hundreds of passengers during flight, the company decided to upgrade its popular 2Ku service with a next generation modem and satellite baseband system from Gilat Satellite Networks.

Following live flight testing which demonstrated 100+ Mbps data rates per passenger, Gogo announced the use of this new modem in commercial airline service on July 31, 2017. With full support for HTS and wide beam satellites, this modem has enabled Gogo to significantly upgrade the performance and efficiency of its 2Ku service while maintaining full interoperability with existing avionic IFE systems. According to Gogo's announcement, the new modem is capable of delivering more than 16 times the throughput of its existing modem, and can easily support the increased capacity of next generation HTS as they come online.


Gogo Test Plane (Source: Gogo)

Gogo has already commenced deployed its next generation modem on airlines such as Aero Mexico, Air Canada, and Delta. Through 2017-2018, Gogo expects to continue to deploy its service on over 1,800 aircrafts across more than 13 airlines worldwide.

Doreet Oren has been with Gilat since 2012 and has been responsible for defining product positioning, messaging and go-to-market strategies. In over 20 years of industry experience, Oren held management positions in R&D, Product Management and Product Marketing for international telecom and flash-storage companies. Oren received a BSc in Computer Science from George Washington University.