



*Doreet Oren, Director of Product Marketing and Corporate Communications* ●●●

Gilat provides thousands of enterprises, service providers and operators with efficient and reliable satellite-based connectivity solutions. Addressing the needs of residential broadband access, cellular backhaul, enterprise communications, in-flight connectivity, rail and maritime mobility, defense and public safety applications, Gilat's products and solutions are in use in more than 90 countries worldwide. As an end-to-end solution provider, Gilat offers complete integrated solutions which include satellite capacity, managed services, remote network operation, call center support, and field operations. Working in close partnership with leading satellite operators, major service providers and tier-1 MNOs, Gilat has extensive expertise in providing a range of end-to-end turnkey solutions.

## Making waves in mobile and mobility

Gilat Satellite Networks is a leading provider of satellite broadband solutions, founded in 1987 in Israel. The company delivers ground segment equipment and provides end-to-end services across the globe, utilising high throughput satellites (HTS). Amy Saunders spoke with Doreet Oren, Director of Product Marketing and Corporate Communications at Gilat, to find out more about the company's current activities, market presence, and outlook in the years to come.

**Question: Can you provide an overview of Gilat's development throughout the years, from its founding to where it stands today?**

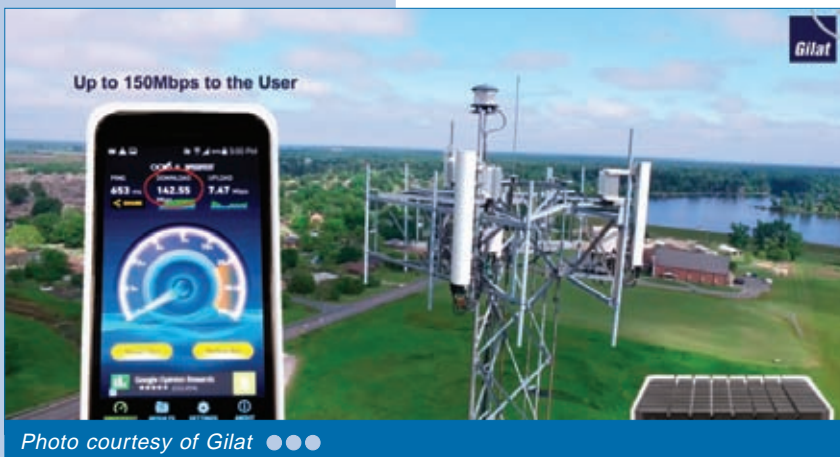
**Doreet Oren:** This year, Gilat is celebrating three decades of activity as a global company with an outstanding story of innovation, growth and success. As a pioneer in satellite communications, Gilat has led the industry with innovative and cutting-edge technology, enabling affordable connectivity in the most remote regions of the globe. Gilat is committed to bridging the digital divide, bringing connectivity to all, in support of a safer and better world. Gilat's comprehensive solutions support multiple broadband applications with a full portfolio of products to address a wide variety of market needs. Today, our strategic focus and leadership is on in-flight connectivity (IFC) and cellular backhaul.

Back in the 1990s, Gilat led rural telephony over satellite commun-

ications. Today, we continue to be active at the forefront of satcom technology, with innovative solutions enabling mobile and fixed broadband. Seven years ago, Gilat acquired two leading technology companies to enhance our portfolio, Raysat and Wavestream. Both acquisitions contribute significantly to our IFC strategic direction. The technology from Raysat, the leader in low profile two-way communication antenna solutions, serves as the foundation of our IFC antennas. And, our subsidiary Wavestream, the leader in high power Solid State Power Amplifiers (SSPA), is the de-facto industry standard for transceiver reliability and performance. Our widely deployed Wavestream transceivers meet the requirements of Boeing, Airbus and other major aircraft manufacturers and integrators.

In recent years, we have expanded from being an equipment vendor to offering complete integrated end-to-end solutions, which include complete network installation, operation and maintenance, as well as managed services. Gilat has extended its offering to additional geographies including North America and Japan and is providing solutions in the metro-edge, as well as in rural regions. Gilat has extensive expertise in providing a range of turnkey solutions best meeting our partners' business needs, while meeting the most stringent service level requirements.

Leveraging our strong partnerships with the world's leading satellite operators, we are taking advantage of the collaboration occurring throughout



*Photo courtesy of Gilat* ●●●



the satellite ecosystem. We combine innovative business models with optimized platforms to deliver field-proven solutions. Today, we both design and manufacture cutting-edge ground segment equipment, and deliver comprehensive end-to-end solutions, powered by our innovative technology.

**Question: In May 2017, Gilat's inflight connectivity solution demonstrated unprecedented throughput of more than 100Mbps in Gogo's live airborne event. What can you tell us about this project?**

**Doreet Oren:** Last May, Gogo hosted a large, high visibility industry event on their Boeing 737 test plane, the 'Jimmy Ray.' After the event, analysts and media applauded Gogo's 2Ku IFC system powered by Gilat's onboard VSAT modem.

In the test flight, Gilat's onboard modem demonstrated over 100Mbps performance, which was acknowledged as the highest throughput ever achieved onboard a commercial aircraft, as well as demonstrating continuous service with excellent user experience. In addition, this test flight also successfully demonstrated interoperability capabilities of Gilat's aero modem with the aircraft's communication (IFEC) avionic system.

In August, Gilat's airborne modem went into commercial operation, significantly upgrading Gogo's 2Ku IFC service. The major improvement in end-user throughput on Gogo's commercial flights was highlighted in Gogo's second quarter earnings call, which stated that the modem delivers 16 times more throughput than their previous solution, and that: "The network features faster and more sophisticated processing that enables much shorter hand-offs from one satellite to the next, further improving our service availability."

In November, the project reached another milestone as over 150 airplanes are now flying with Gilat's airborne modem. Gogo's installed base continues to ramp up quickly, and is expected to reach approximately 2000 aircraft.

Gilat is engaged with Gogo in deploying one of the largest IFC satellite networks, spanning multiple locations around the globe with support for the highest number of satellites. Leveraging our global reach, local experts and

service provider partners, Gilat is installing its sophisticated ground segment VSAT network in North America, LATAM, Europe, Asia and Australia to build out this network.

**Question: What can you tell us about Gilat's involvement in the IFC antenna market?**

**Doreet Oren:** In addition to the airborne IFC modem, we are also very involved in the IFC antenna market. Gilat has been a long-time leader in on-the-move antennas for many years and is very familiar with the challenges of tracking antennas. To meet the requirement for high-throughput connectivity aboard commercial airplanes, Gilat offers innovative IFC terminals.

Satellite coverage is a key challenge for IFC and other on-the-move applications. As passengers expect outstanding IFC service in both domestic and transcontinental flights, airlines must ensure uninterrupted connectivity along air routes that span geographies that are not served by a single satellite frequency band.

Gilat has risen to this challenge with our dual-band Ku/Ka antenna, which can operate in either band during the flight. The transparent switching between frequency bands during flight without requiring any disassembly or component replacement provides the flexibility to dynamically choose between different satellite technologies based on weather, network load or geolocation.

In addition, we are currently well into the development of a next generation airborne antenna consisting of electronically steered array/phased-array antenna (ESA/PAA) with no moving parts. A major advantage of this design is meeting the airlines' size and weight requirements and supporting the

IFC capabilities without affecting aircraft performance or manoeuvrability. Since there are no protruding parts, this innovative technology also minimizes aerodynamic drag, while reducing fuel consumption and CO<sub>2</sub> emissions.

In parallel to our own R&D effort, Airbus selected Gilat and 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. The project is being funded by the Clean Sky 2 research program, aimed at developing technologies that enable more efficient and greener air transport.

We see the next generation ESA/PAA direction as being particularly relevant in light of the emergence of LEO and MEO constellations. The fast electronically steerable beam capabilities of ESA/PAA better accommodate the need for intensive and robust multi-beams and satellite tracking that are required in the lower and medium orbit constellations.

**Question: IFC is hot right now for satellite communication; how does Gilat differentiate itself?**

**Doreet Oren:** Gilat is unique in its ability to offer IFC service providers a full product portfolio for in-flight Internet connectivity for commercial airlines. The offering includes Gilat's aero satellite tracking antenna, the power amplifier transceiver, and the modem manager (MODMAN). We offer both a complete IFC terminal as well as the individual components.

Our architecture permits an open design enabling our antennas and modems to work with equipment from different vendors. The antenna is agnostic to the underlying VSAT/modem technology and allows for easy integration with any baseband, and



Gilat Satellite Networks facilities ●●●

alternatively, the airborne modem easily integrates with any antenna. This interoperability enables IFC providers to mix-and-match according to their specific needs, to build their own best of breed solution, and to avoid vendor lock-in.

In this way, IFC providers can manage their services independent of the satellite operator and equipment vendors, and choose the best solution as needed based on performance and cost. Gilat's flexible technology and satellite-agnostic architecture enables service providers to optimize satellite bandwidth costs.

In addition, Gilat's VSAT solution is based on X-Architecture, a distributed cloud based design easily scalable to large networks. The architecture has been flexibly designed allowing for high density, thus saving rack space and power.

Gilat's solution is based on a single platform that supports both fixed and mobility applications. Dynamic resource allocation among applications such as IFC, broadband, enterprise, and cellular-backhauling reduces satellite capacity OPEX by offering efficient bandwidth management. Mobility applications can benefit from data sharing while transitioning between coverage regions.

Operational benefits are provided via Gilat's leading TotalNMS, which includes a comprehensive set of mapping tools delivering mobility services to a configurable geographic service area, with automatic beam switching. Global bandwidth management is supported by Gilat's innovative cloud quality of service (QoS), enabling service providers to provision and manage bandwidth across multiple teleports, satellites and user beams from a central NMS.

**Question: We're hearing a lot about cellular backhaul right now – how is Gilat meeting market demands in the field? What is your competitive advantage?**

**Doreet Oren:** Gilat has had tremendous success in the area of satellite backhauling for LTE cellular networks, evidenced by project wins with Tier-1 Mobile Network Operators (MNOs) worldwide, such as Sprint and T-Mobile in the United States, Globe in the Philippines, Optus in Australia, EE in the

UK, SoftBank in Japan, and others. In fact, Gilat is leading this market with both innovative technology as well as expertise in integrating into the MNO's core networks.

When it comes to satellite backhaul, I would like to emphasize the need to provide a true LTE user experience. This task is particularly challenging in LTE networks due to the high throughput required. This requires the VSAT platform to be capable of overcoming the inherent satellite delay. To this end, Gilat developed a patented acceleration technology with SoftBank that mitigates the latency effects, thus enabling delivery of a maximum user experience to end-users over satellite. This patent enables true LTE speed, by accelerating traffic inside the LTE GTP tunnel. The implementation of the acceleration, which is embedded in Gilat's Capricorn VSAT, enables achieving 150Mbps of TCP traffic to a single handheld device.

We see significant advantage in having the acceleration integrated into the VSAT. Having a single card for both the VSAT functionality and the acceleration obviously reduces costs, as well as providing accountability with a single point of contact for all software and hardware issues. In addition, complexity is reduced by using a single NMS, while the QoS is maintained with end-to-end bandwidth management. On top of this, an integrated solution enables maximum traffic efficiency during any link condition by eliminating sync delay between cards, which is critical to avoid packet loss during fade conditions.

**Question: Small cells appear to be great a solution in rural areas. What is Gilat's approach?**

**Doreet Oren:** In this context, Gilat sees a major advantage in an integrated small cell over satellite solution. This approach, in a sense, redefines the business case for remote cellular connectivity. Here we are working with a technology partner to provide a full optimized solution that includes the Software Defined Radio (SDR) small cell and our Capricorn VSAT. Gilat's CellEdge SDR solution works concurrently in 3G and 4G networks, allowing flexibility and an easy migration path.

The integration and optimization of the small cell with our cellular backhaul

solution, provides an enhanced user experience with high throughput and reduced bandwidth costs. CellEdge delivers the same speed and quality as terrestrial backhaul solutions. The solution uses the open standard interface luh (for 3G) and S1 (for LTE), enabling satellite bandwidth optimization for high efficiency and data rates.

At the same time, CellEdge helps operators to reduce capital expenditure (CAPEX) through low-cost equipment and low installation costs, while substantially lessening operational costs (OPEX) by enabling the use of inexpensive solar power. The integrated solution enables operators to overcome high rollout costs, lack of terrestrial backhaul and power infrastructure, low consumer uptake and low ARPU. Gilat offers a full turnkey solution including the power solution, which is typically solar, as well as the tower, civil works and fence. Optus has successfully implemented this integrated solution as an extension to their network to South Australia and the Northern territory. Mobile coverage is now provided to local residents and travellers in numerous previously unserved areas in the Australian outback.

Gilat's CellEdge solution has given Optus a highly efficient way to introduce mobile and broadband services in challenging and potentially expensive locations. Optus can use Gilat's VSAT technology and its own existing satellite network for backhaul rather than having to set up microwave or fibre connections. Furthermore, the compact small cell enables quick and easy deployment on almost any existing structure, as opposed to building a large and costly mobile base station.

**Question: It appears you've had an outstanding year in 2017. What can we expect from Gilat in 2018?**

**Doreet Oren:** Thank you, yes indeed. Gilat is committed to continuous innovation in our strategic areas of cellular satellite backhauling and IFC as we deliver cutting-edge solutions for the benefit for our partners. We intend to continue to focus on larger long-term deals and to address and prepare for new and emerging trends in the marketplace. We are hard at work to make sure that next year is even stronger.