



Casper Jensen, Senior Vice President, Head of Cobham SATCOM ●●●

Cobham SATCOM provides dependable communications and internet access anywhere under the most demanding conditions.

Its satellite and radio communication terminals perform in the most challenging and remote environments on land, at sea and in the air.

The company designs and manufactures these high performance products under the AVIATOR, EXPLORER, SAILOR and Sea Tel brands providing customers with outstanding performance, value and support through our global sales and service network.

Delivering value to the end-user

Cobham SATCOM was created in 2012 under Cobham plc following the acquisition of Thrane & Thrane, and today provides dependable communications and Internet access anywhere in the world, with terminals operating on land, at sea, or in the air. Its AVIATOR, EXPLORER, SAILOR and Sea Tel brand products are well-known throughout the industry for their reliance and outstanding performance. Here, Amy Saunders speaks with Casper Jensen, Senior Vice President, Head of Cobham SATCOM, to find out more about the company's latest achievements, market presence, and expectations for the future.

Question: Can you provide an overview of Cobham SATCOM's development, from its founding to where it stands today?

Casper Jensen: Cobham plc has since 2001 purchased four independent companies developing and manufacturing satellite communications equipment for various sectors. The most recent, Thrane & Thrane, was acquired in 2012, and subsequently all four satcom units were merged into one business unit called Cobham SATCOM.

We have developed our maritime portfolio significantly, to include an extensive range of class-leading satcom systems with focus on L-band MSS and VSAT on all frequencies, in addition to GMDSS solutions and other communication systems for maritime users in all sectors. We have along the way become well established as a

satcom antenna manufacturer in the aviation sector and for users on land. Our first system for an aircraft was launched in 1992 - the Aero-C system consisting of a 2 MCU SDU, combined HPA/LNA and the Sensor Systems LGA - and our AVIATOR product portfolio is now well established as a technology-leader for the Inmarsat SwiftBroadband service. On land, we manufacture antennas for Inmarsat BGAN and all VSAT services under the EXPLORER brand.

Question: What can you tell us about Cobham SATCOM's market presence, in terms of end user applications and geographic uptake?

Casper Jensen: Our reach is global across all our business units, land, sea and air. AVIATOR products are used on business jets and commercial airliners, but we also have an offering for UAV segments. EXPLORER BGAN and VSAT terminals are used in a wide range of industries, with core markets being broadcasting, emergency responders, NGOs and aid agencies, and defence.

In the maritime market, our SAILOR and Sea Tel antennas are used on ships of all types and size, from tankers and container vessels through to offshore support vessels, oil platforms and workboats. You will also find many luxury vessels, yachts and motorboats with SAILOR antennas on board.

Question: Where do you see the most opportunity for growth going forwards?



United Airlines have installed Cobham's AVIATOR 300D system for participation in the evaluation of SB-S ●●●



Casper Jensen: While we have established ourselves as a key player in our core verticals, there are still some very interesting growth areas going forward. Inmarsat's SwiftBroadband-Safety for aircraft is especially important, as it will allow our AVIATOR SwiftBroadband technology to become an integral part of cockpit connectivity in commercial aircraft. We are already working with major aircraft manufacturers such as Airbus to make this happen.

In the maritime arena, we see strong potential for medium sized VSAT and new small VSAT antennas. Over the last 18 months we have introduced several new 60 cm SAILOR VSAT antennas. Initially, these were to leverage new Ka-band high throughput satellite (HTS) services. The spot beam configuration of HTS has made smaller antennas more viable for global services, as it reduces the challenge of signal drop-off towards the edge of the footprint. Maritime customers benefit particularly from applying smaller antennas as installation costs can be significantly reduced, while more vessels can choose VSAT when they may not have had the space for a one metre antenna.

The North American and European maritime satcom market is very mature, having led the way in adoption of VSAT. We are now seeing APAC, South East Asia and South America starting to catch-up though, as they see the financial and performance benefits of moving away from legacy L-band solutions to fixed monthly price, global Ku or Ka-band VSAT.

The land mobile market is very steady, and growth is mostly driven by new services and technology. As an example, we are expecting a strong uptake on the new EXPLORER 8100, a brand new stabilised, auto-acquire, drive-away antenna system. For use on Ka-band networks such as Eutelsat KA-SAT and Inmarsat Global Xpress, the system is ideal for news gathering vehicles, where it can offer unparalleled comms-on-the-pause performance and unmatched pointing accuracy, ensuring high-quality connectivity that is available even when other antennas would have lost their connection to the satellite. This is achieved by unique Dynamic Pointing Correction technology, which can adjust in milliseconds to compensate for the vehicle it is installed on rocking on its

suspension. The result is that broadcasters can transmit live, high definition multimedia without interruption from anywhere in the world and in almost any weather conditions.

Question: Inflight connectivity is becoming increasingly ubiquitous throughout airlines the world over. What trends do you see regarding the implementation of this technology, and how can airlines ensure they deliver a market-leading service?

Casper Jensen: We expect to see a major drive for standardisation of the equipment, because current cost levels of associated equipment make switching between service providers exorbitantly expensive. Cobham is monitoring developments on this front closely, along with technological developments of the various subsystems that makes up a Ku/Ka band cabin connectivity solution, and is preparing for a market entry at that stage.

There is also a growing demand from airlines for wireless connectivity in the cockpit for tasks such as air traffic control, aircraft operation and cabin crew operations and to support a host of applications from enabling on-line use of modern EFBs (Electronic Flight Bag) to accessing real-time weather reports, flight planning and chart information.

We have addressed this requirement for continuous secure data exchange between the airlines' ground operations and their aircraft and met the trend for smaller, lighter, less expensive systems that are still feature rich. The answer was the development of a

superior next generation solution, designed to resist cyber threats for the next 20 years – the Cobham SATCOM AVIATOR S Series, an ARINC 781 compliant compact and lightweight satcom system. It enables Inmarsat's new SwiftBroadband-Safety (SB-S) IP data service which includes the encapsulation of ACARS messages (CPDLC and ADS-C) as well as safety voice, secure and plain IP data.

The Cobham SATCOM system features the most advanced security architecture and domain segregation measures available in a two LRU solution with a two MCU sized Compact Satellite Data Unit (CSDU - the radio) and HELGA (an antenna, high power amplifier and diplexer, all in one enclosure), linked through a standard low cost coaxial cable. Suitable for all single-aisle and wide-bodied aircraft, AVIATOR S is smaller and lighter and has a lower cost of ownership than any other Inmarsat system, including airtime costs. The total system weight is less than 6kg (13.2lbs) in the AVIATOR 200S configuration.

The advantages of IP-based data communications have been verified through evaluations of the ACARS over IP over SBB on a fleet of Hawaiian Airlines aircraft during the past 12 months. As part of these evaluations, it has also recently been announced that the Cobham and Inmarsat solution has enabled in-air connected EFBs for the first time.

Major airframers have selected the new Cobham SATCOM systems, with Cobham providing its AVIATOR 200S and 700S for the Airbus A320 and A330 fleets, while it was also recently



Cobham SATCOM - EXPLORER 8120 vehicle mounted ●●●

announced that the 200S will be certified on the Airbus A350 XWB. In addition, Cobham is in discussion with Boeing about establishing TSA's for AVIATOR S on new airframes. Further supporting Cobham's development of technologies to meet the future needs of the aviation community, United Airlines have installed Cobham's AVIATOR 300D system for participation in the evaluation of SB-S, while Hawaiian Airlines has selected AVIATOR 350D and SB-S for its new Airbus A321neo fleet.

AVIATOR S will enter the qualification phase later this year and be certified for flight through an EASA TSO by mid-2018.

Question: We've seen a fair amount of notable consolidation in the maritime communications sector lately. What is your assessment of this trend, and its impact on Cobham SATCOM?

Casper Jensen: Indeed, there has been some consolidation, and while that means fewer service providers in general, we feel that it can have a positive effect on the market. Fewer but larger players committed to meeting the communication needs of maritime users could result in more investment in new services, or tangible efforts to offer more

value to the customers. Competition in maritime satcom services is high, which can only benefit the end-user.

Regardless of how many service providers there are in the market, we remain committed to them as partners. Our goal is to continue developing new and innovative solutions based on our insight into the user-needs in all our verticals. Our aim is to enable highly reliable communication services with class-leading antenna technology that not only delivers performance, but leads the field in lifetime costs. OPEX is key for satcom service partners, and by producing equipment that is easy and low-cost to maintain, and that lasts regardless of how tough the environment is, we can help our partners to be more profitable, and in turn provide value to the end-user.

Question: We're seeing a lot of change in the satcom industry right now, with new satellite and antenna technology and standards all evolving. Which are the biggest trends you're observing right now, and how will Cobham SATCOM respond?

Casper Jensen: LEO and MEO constellations using cutting-edge CubeSat and SmallSat spacecraft are really starting to take shape and

opening up for new technologies and services. Cobham is dedicated to being part of this movement, and have our Sea Tel tracking antennas suited for this segment lowering the total cost of ownership of an LEO or MEO network, by significantly reducing power consumption, in addition to delivering tangible savings on deployment and maintenance. Uniquely, our solution is delivered as a complete, integrated system including radome, antenna controller, feeds and customer specific RF (BUC and LNB) in addition to a built-in auto-tracking feature, improving link performance and contributing to higher throughput and availability of service for the end-user.

We also see, that regardless of vertical, industries and organisations are looking to optimise their processes and workflows through digitisation. Our commitment is to help them achieve this by providing antennas solutions that increase the availability of connectivity for remote working environments, such as ships, aircraft or vehicles working in the field. Whether this is through SAILOR and Sea Tel antennas enabling engine monitoring for better fuel efficiency on a ship or enabling the so-called 'Electronic Flight Bag' used by pilots, availability of service is key. This makes it vital for satellite service providers to choose equipment that is proven to offer the radio performance and long-term durability required for delivering reliable connectivity and voice comms.

Question: In May 2017, Cobham SATCOM delivered its 50,000th SAILOR FleetBroadband terminal. How has the SAILOR FleetBroadband range grown since its inception in 2007, and what expectations do you have for it in the future?

Casper Jensen: SAILOR Fleet Broadband has become the best-selling Inmarsat FleetBroadband by far in the ten years since its launch. The portfolio now consists of SAILOR 500, 250 and 150 FleetBroadband, to match the service levels offered by Inmarsat. We also have the SAILOR Fleet One terminal which is based on the same technology platform. Our Fleet Broadband terminals have evolved in line with Inmarsat's developments and in general we have been first with bringing these to market, including



Cobham SATCOM - EXPLORER 710, ultra-portable BGAN terminal ●●●

Multi-Voice and 505 Emergency Calling.

While the Ka-band Global Xpress is the new generation service from Inmarsat, FleetBroadband continues to be relevant as an integral part of it. So, despite being over 10 years old now, we still see a significant market for SAILOR FleetBroadband, and hope to be hitting 60,000 terminals shipped soon!

Question: What do you think Cobham SATCOM's biggest achievements have been in the last year, and where is there room for improvement going forwards?

Casper Jensen: Our technology development continues apace and I am proud of the new products we have realised across all of our market verticals this year. But our work is also about enabling our partners to offer value to the end-user and to this end, we are not only focused on technology. One key area we are focused on is ensuring that we can deliver on our customers terms and on their deadlines. Consider the aviation market; a new commercial aircraft takes years to design and manufacture. Satcom is just one component of thousands, so any delivery issues can have huge ramifications. Likewise, the mobile nature of ships means that they can be literally anywhere, so organising the logistics to install an antenna at a port of call can be challenging. We have to work very closely with our partners to ship the equipment to be exactly where it's needed and when its needed. If a ship has to wait in port it could cost tens of thousands of dollars extra. If it moves without a new antenna because of a missed delivery it could be without the services it needs and indeed may not be meeting international regulations. So, our commitment continues to be to meet our customers timelines, and while we have always been focused on this area, going forwards our partners and their end-users will see us become an even stronger force within the logistics chain.

Question: What do you expect Cobham SATCOM to achieve in the rest of 2017 and 2018?

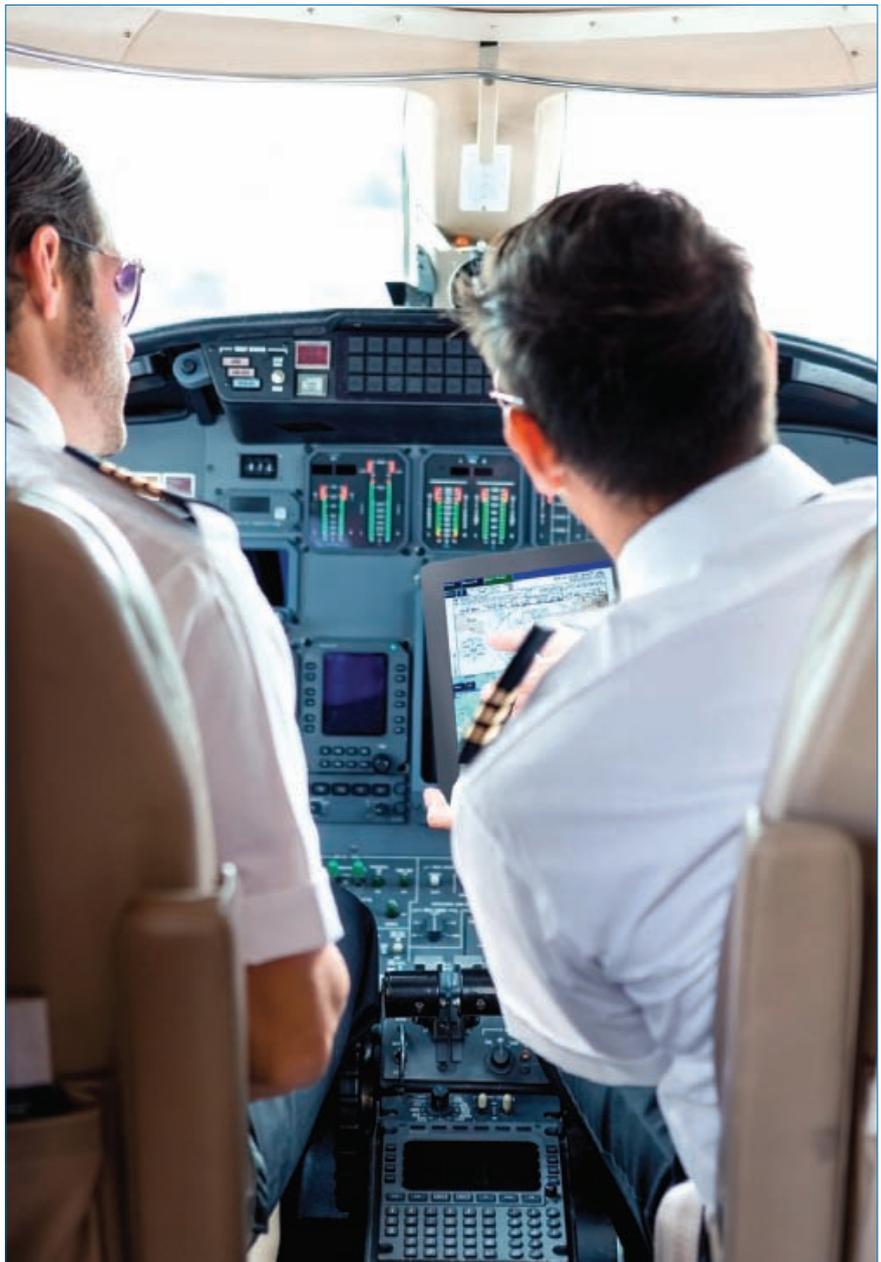
Casper Jensen: There are a few things we're looking forward to 'completing.' Our first antenna for operation on the new Iridium NEXT network for Iridium

Certus services, SAILOR 4300 will be ready and shipping by the end of the year. This will ensure that maritime users will have access to a class-leading antenna solution for when the service comes online early in 2018.

EXPLORER 8100 is already available for Eutelsat Ka-Sat and the GX version will be ready for shipping before the end of the year, giving broadcast end-users the opportunity to significantly improve the quality of connectivity on their news gathering vehicles using Inmarsat Global Xpress services, with the benefits of our unique

Dynamic Pointing Correction technology.

Going into 2018, we will conclude the development and qualification of the AVIATOR 200S for Inmarsat's SwiftBroadband-Safety service and have our first Air Transport certification flight. While most aircraft won't be getting access to the service until 2019, next year will be critical to ensure that our advanced terminal, which has been in the making for over five years, is ready to help revolutionise cockpit communication on commercial aircraft in the years to come.



Cobham SATCOM (aero) - cockpit - Cobham SATCOM are meeting the growing demand from airlines for wireless connectivity in the cockpit ●●●