

The Big Beam Boom

SES White Paper June 2015

Although we are becoming more accustomed to higher levels of data connectivity, a huge area remains drastically underconnected: the airspace and the oceans. Crisscrossed and cruised by thousands of aircraft and ships every day, these unconnected areas have remained largely uncharted territory for high quality video and data communications until now. It's all about to change. Aeronautical and Maritime connectivity is about to make its quantum leap into the 21st century.

Demand in the skies: Aeronautical

Denser traffic, longer queues and rush hours of people and baggage to board more flights; stacked planes circling above airports already being enlarged and extended, passenger numbers rising substantially every year, massive investments in mega-airports and record orders for new airplanes; a fierce price war and cut-throat competition on services between operators: the air traffic sector is sprouting ever higher and ever faster. Next year, 3.6 billion passengers are expected to fly across countries, continents or oceans. And that number increases every year – by around six percent alone in 2014 and 2015¹. Boeing and Airbus are both forecasting demand for at least 2,200 new aircraft annually over the next 20 years.

Air travel is now a ubiquitous commodity. To remain competitive, airlines are differentiating themselves through

price, security or enhanced premium services. One such service feature is becoming pre-eminent: the connected aircraft, enabled for Wireless In-Flight Entertainment (wiFE), an expansion of on-board connectivity that allows audio and video streaming to passengers' handhelds and tablets.

The global aeronautical satellite communications market is forecast to grow from 47,500 units in 2014 to 95,500 in-service units and generate 3.2 billion US dollars in retail revenues by the end of 2024 with North America forecasted to generate most revenue with more than 11,500 units to be added by 2024².

The trend in passenger connectivity is pointing to a wider satellite services uptake and more bandwidth to meet pent-up demand.



WORLD AERO ROUTES

1 NSR - Aeronautical Satcom Markets 3rd Edition 2 NSR - Aeronautical Satcom Markets 3rd Edition (Includes L-band MSS)

AERONAUTICAL SATCOM IN-SERVICE UNITS BY AIRFRAME³



Global beam and market boom

This boom is having unprecedented effects. Satellite operators are putting in place high-performing beams to cover the global flight routes, corridors and geographies. Manufacturers are developing sophisticated yet consumer-friendly on-board technologies and systems. Airlines are configuring their planes for in-flight connectivity and entertainment and equipping even smaller airplanes on regional routes. Rights owners are reviewing their portfolios to exploit profitable new leisure and entertainment opportunities. Last but not least, aeronautical service providers are competing energetically for market share, with Gogo, Panasonic, OnAir, Global Eagle Entertainment, ViaSat and others jostling for leadership of these exciting new markets.

Personalised entertainment and connectivity choices all depend on the decisions that an airline makes and on the price-value efficiency and customer retention factor that it wants to achieve. The business case concerns the relationship between at least three factors that are all increasing fast: seats, users and bandwidth per user.





The increasing numbers of passengers will very soon be demanding much more capacity per passenger. They will switch from basic applications such as email and web browsing to more elaborate services such as video streaming, text messaging, voice over IP and even video conferencing. TV-like services and broadcasting could increase this demand still further.



AN EXAMPLE OF GLOBAL SATELLITE SPOT BEAM COVERAGE

High capacity satellite systems provide the optimally scalable solution for such a wide range of bandwidth-intensive applications anywhere in the world: a combination and concentration of regional and global beams for broadcast/ multicast applications serving low-density traffic zones, and narrow spot beams for high-capacity broadband communications serving dense traffic zones.

The satellite industry is now investing in high capacity satellite systems that offer the lowest cost per bit, enabling service operators and airlines the leeway to offer customers a broad and attractive range of service packages to fit their

Enhancing the maritime travel experience

The fact that access to high-performance connectivity for high-flying objects is now available on moving sites other than land is one of the most significant elements in the quickly emerging satellite mobility communication market. The quantum leap for airborne craft can also be witnessed in new and better options for maritime connectivity.

The number of maritime vessels in service grew by almost 25 per cent between 2012 and 2013 and revenues increased by more than 15 per cent. Surpassing a rate of increase of 20,000 vessels is seen as a tipping point for the industry and the new target is now an increase to around 50,000 vessels over the next few years⁴.

Bandwidth demand also continues to rise. This is particularly evident in the high end segments including rigs, cruise lines, ferries, mega yachts and OSVs (Off Shore Vessels). Operators of large vessels, cargos, cruise ships and super yachts are increasingly demanding high-powered and individualized connectivity solutions.

The key sectors within this market are merchant maritime, cruise ships, fishing and offshore platforms. The market is

different needs, from free and low-price services to more expensive premium packages

SES will be investing some 1 billion Euros in three new Ku-band high throughput satellites in the coming years, and has integrated an airline traffic demand analysis tool into its satellite design software to optimise the satellite configurations and bandwidth allocations specifically for the aeronautical sector. This will generate the best possible performance at the most efficient price according to airline load, passenger consumption behaviour and flight path. The overall aim is a globally consistent service with unbeatable efficiency.

buoyant, with Airbus D&S, Harris CapRock, KVH, Inmarsat and others competing strongly for market share.

The enabler of this growth is the satellite. The global maritime broadband satellite communication market is expected to reach 50,000 units in service – with almost half of them in merchant shipping – and to generate 2.8 billion US dollars of revenue at the retail level globally by 2024, making it one of the fastest-growing segments of the global satellite services industry.

MAIN MARITIME SERVICE PROVIDERS REVENUES MARKET SHARE, 2014³





GLOBAL MARITIME IN-SERVICE UNITS FSS & HTS³

4 Source: The Comsys Maritime VSAT Report, 4th edition



The most spectacular example of this market growth can be found in the satellite operator O3b's breakthrough beamed coverage that exclusively follows the Royal Caribbean's newest, biggest, and most aptly named cruise ship "Quantum of the Seas", with a tonnage of nearly 170,000 GT, a length of 350m, 18 decks, and a maximum passenger occupancy of nearly 5,000. The Quantum of the Seas, the first of the Royal Caribbean's Quantum class of ships, also represents a quantum leap in mobile communications.

SES is not only investing in its geostationary (GEO) fleet, but also in Medium Earth Orbit (MEO) spacecraft, through its stake in the O3b venture, operating a dozen satellites at a distance of 8000 kilometres from the Earth. This allows low-latency, fibre-like connectivity with steerable beams which can follow a moving site such as a ship.

Billed as the world's first smart ship, Quantum of the Seas offers high performance broadband delivered over O3b and more bandwidth than all other cruise ships in the world combined. Such high-speed connectivity will give passengers as rich an experience as in their own home. The connectivity is possible through O3b providing one gigabit per second (1 Gbps) of low latency capacity via a satellite beam that is constantly tracking the ship. The end result is a completely new, ubiquitously connected travel experience.



COVERAGE MAP OF O3B NETWORKS

Conclusion

Everyone wants more, better, cheaper data, and everyone wants to be connected always, not just on land in the home and office but when we travel on land or in flight or on the sea.

The global market for data mobility and flexibility is like a flywheel, accelerated by exceptional demand for maritime and aeronautical connectivity. Airplanes and ships need more and better satellite communications for voice, data and broadband services. Meeting the demand from markets – aeronautical and maritime – is vital. The unique approach of SES is to combine GEO and MEO capacity, to deliver comprehensive mobile coverage for lower cost per bit, massive throughput and low latency fibre-like services to meet all the varying demands for the data requirements of the next generation, including the "open access" model, allowing customers to bring their own device and choose their own connectivity model. In this way the satellite industry is responding to the challenge to use insight, creativity and imagination to ensure that these demands can be met competitively, creatively and effectively.



SES'S UNIQUE GEO-MEO OFFERING

Aeronautical and Maritime connectivity is about to make its quantum leap into the 21st century.

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Published in June 2015.

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