



# BROADBAND AT SEA

Network Strategies for Enhancing Cruise Guest Quality of Experience (QoE)

## CRUISING INTO THE FUTURE TODAY

Cruising isn't what it used to be – it's bigger and better than ever. In 2018, 386 cruise ships with a total passenger capacity of 26.7 million generated an estimated \$40.0 billion in sales revenue for cruise line operators. High passenger growth projections for 2020 and beyond, coupled with stiff competition, are compelling cruise operators to build luxurious, more technologically advanced ocean- and river-going “smart ships”. These luxury vessels will increasingly depend on high

throughput, low-latency satellites and global IP-based network ecosystems and applications to deliver exciting guest experiences that bring new revenue streams and network operating efficiencies to cruise operators – and elevate the cruise guest Quality of Experience (QoE) to a whole new level.

Broadband-speed internet access on a cruise is ranked by cruise guests as a top five must-have vacation amenity. Cruise Industry News estimates that over 50% of cruise guests use a ship's WiFi-enabled internet services while onboard. Because cruise guests and crew members are so accustomed to having instant mobile broadband



access to content, entertainment and applications at home, work, or on the go, they simply expect the same availability and QoE onboard ships and in ports around the world.

More specifically, cruise guests expect cruise line operators' ships to be smart enough to enable them to:

- Communicate with family, friends and colleagues while at sea via text messages, email, and real-time face-to-face video applications such as Facetime or Skype;
- Live stream personal videos on social media platforms such as YouTube, Instagram, Facebook, Twitter, and Snapchat;
- Stream full-length HD movies from Netflix, Hulu, or Amazon Prime on demand at sea or in port;
- Participate in multi-player gaming, virtual and augmented reality experiences in real-time;
- Be entertained with an array of broadband-enabled, interactive, digitally-driven ship board activities.

With the right smart ship network strategy for existing and to-be-built fleets, operators can cruise into the future with new broadband-enabled services and revenue streams, higher guest satisfaction ratings, more repeat and referral customers, and improved operational efficiencies.

## MEET THE SMART SHIP

What exactly is a smart ship? At a basic level, a smart ship is an internet-enabled cruise vessel that leverages Software Defined Networks (SDN), embedded sensors, and technology to better serve customers in an optimally efficient way. While each cruise line operator will define what a smart ship is to them, smart ship amenities can range from providing mobile device connectivity, wayfinding portals around the ship, radio frequency ID chips with luggage tracking, Internet of Things (IoT) enabled sensors, pervasive WiFi, in-cabin technology, Bluetooth Low Energy tracking and more. Smart ship and customer experience-based systems are being deployed across all the major cruise operators. Royal Caribbean International, MSC, and the Carnival Ocean Medallion programs are some recent examples.

SES Networks' Signature Cruise Solution is enabling smart ship initiatives for several major cruise lines. Powered by our low-latency O3b Medium Earth Orbit (MEO) satellites for primary broadband connectivity, with Geostationary Earth Orbit (GEO) connectivity for network diversity and business continuity, our cruise offering delivers low-latency managed broadband with throughput up to 1Gbps available anywhere, whether at sea or in port. Additional revenue-generating services include a captive portal, private label applications and a mix of IP-based voice, video and data services – all delivered via an OPEX business model that eliminates the risk of deploying high-speed data services and elevates guests' QoE to a whole new level.



## SMART SHIP NETWORK STRATEGIES

Any good network strategy for a fleet of smart ships should enable reliable, affordable internet, mobile and WiFi connectivity at fibre speeds. CIOs and CEOs may choose to develop and manage custom network and IT solutions in-house or can alternatively contract with a managed services provider. If built in-house, devices, routers, servers, bandwidth, security, and applications are purchased in piece parts from multiple vendors. Mobile and kiosk applications must be programmed and beta tested after requirements have been identified. IT and legal staff will need to negotiate multiple internet peering, content, cloud service and network connectivity partner agreements – a drawn out process and time-consuming proposition. Once negotiations are complete, purchases are typically made using CAPEX funds. Maintenance and management of the solution then becomes an ongoing staff responsibility and expense.

A less complex, easier to manage network strategy is for smart ship builders and operators to contract with a single trusted managed network services provider. There's no complexity, build-out phase, multiple vendor contracts, or time spent managing and monitoring networks or programming apps. No staff or expertise are needed to maintain inflexible, non-scalable networks that are complex and costly to manage across a fleet. SES Networks' Signature Cruise customers simply:

1. Select standard guest services, packages and applications to be offered;
2. Choose one of three different ways to broadband-enable individual smart ships and/or a fleet; and
3. Indicate the initial amount of capacity needed for each ship in the fleet.

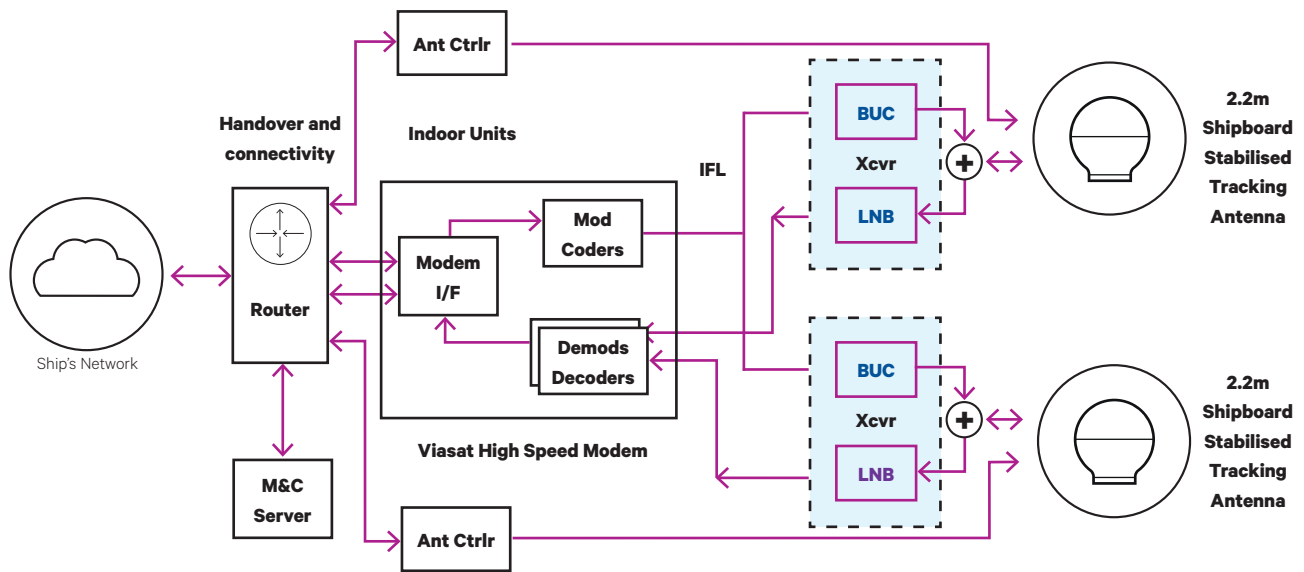
Purchase Options	Pros	Other Considerations
Pre-purchase capacity based on predictable demand and budget	<ul style="list-style-type: none"> <li>• Predictable budget</li> <li>• Scale up or down easily</li> <li>• Can accommodate unique operator needs</li> </ul>	<ul style="list-style-type: none"> <li>• Sets hard limits</li> <li>• Does not flex with demand</li> <li>• Challenging operations budget</li> </ul>
Pay for bandwidth used based on actual not estimated use ("network as a service")	<ul style="list-style-type: none"> <li>• Easily meet changing guest demand</li> <li>• Cost of goods sold reduces expense burden</li> <li>• Flexible to meet unique operator needs</li> </ul>	<ul style="list-style-type: none"> <li>• Need to pre-purchase for operations</li> <li>• Requires rigor and mature management</li> </ul>
Share revenue for add-on services purchased by guests	<ul style="list-style-type: none"> <li>• Vendor ownership</li> <li>• Lower cost of operations</li> <li>• Fewer headcount</li> </ul>	<ul style="list-style-type: none"> <li>• Limited flexibility</li> <li>• Revenue loss unless incremental</li> <li>• Gray areas impact accountability</li> </ul>

## FUTURE-PROOF SMART SHIPS WITH SES NETWORKS' SIGNATURE CRUISE SOLUTION

Providing broadband-enabled services at sea and in ports worldwide is a must for cruise ship operators that want to lead the market, generate new revenue, and elevate guests' overall QoE. SES Networks' Signature Cruise Solution enable innovative smart ship capabilities using a service-oriented architecture that dynamically scales and intelligently adapts network capacity in real-time to meet application-specific latency requirements, changing traffic loads, and network conditions. Our "network as a service" OPEX business model and network ecosystem creates new opportunities for cruise line operators:

- Monetise packages of revenue-enhancing, cost-reducing IP-based video, voice and data services enabled by managed MEO/GEO hybrid connectivity;
- Customise push advertising and unique applications available via a branded captive portal, mobile devices and ship kiosks;
- Combine beams to customise guest experiences;
- Have dedicated "follow-the-ship" (FTS) beams deliver 1Gbps to a single ship;
- Use zoned beams to serve multiple ships in an area with up to 1Gbps connectivity to a single ship; and
- Provide complete coverage with >500 high performance satellite beams covering 99% of the world.

# SES NETWORKS' SIGNATURE CRUISE ARCHITECTURE



Enhance the cruise guest experience with SES Networks' industry leading onboard digital entertainment and communications services delivered fleet-wide via low-latency MEO spot beam connections with data rates up to 1Gbps throughput capacity. Backup/failover capabilities are provided by Ku/C band GEO connectivity to guarantee up to 99.7% availability for integrated onboard data, voice, and video services with redundant shore-side connectivity to ISP and peering points.

## PER SHIP, ZONE OR FLEETWIDE CAPACITY

Cruise ship operators can scale dedicated, low-latency bandwidth per ship, regional area or fleet-wide as needed. Capacity is provided via steerable tracking beams, dual tracking antennas, and redundant gateways with seamless handovers in the event of blockages. With little upfront cost, and without the need for traditional VSAT hardware, cruise line operator investments and risks are reduced. SES Networks' Signature Cruise Solutions also include 24x7 network monitoring, remote hands, and real-time updating of route data.



# BROADBAND AT SEA

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