ASAT System

Industry Leading Multiservice and Multi-WaveformVSAT Platform

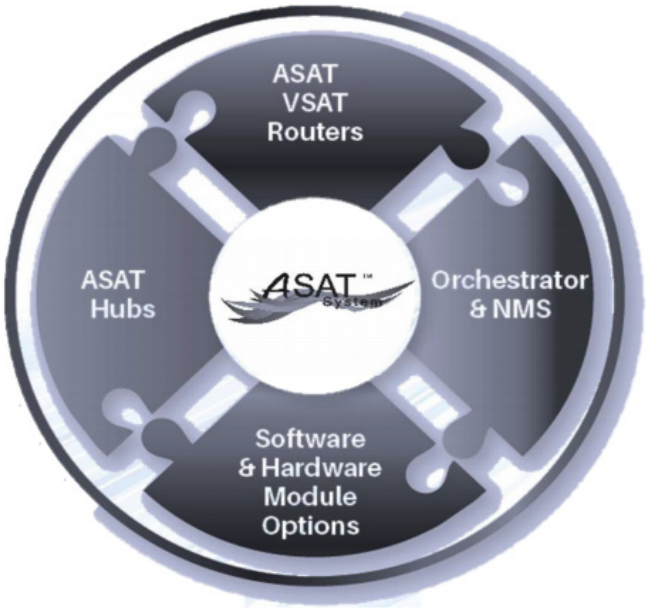
SpaceBridge understand the challenges of running complex SATCOM operations, especially providing links of highly varied speeds and SLAs. We've designed ASAT™ System to as a multiservice solution to ease these pains. ASAT™ System manages entry-level links such as consumer satellite terminals alongside high-end trunking and SOTM terminals, allowing both common management as well as complete bandwidth sharing that provides operators with optimal network-wide bandwidth utilization.

Features and Benefits

- High spectral efficiency supporting DVB-S2X Forward Link and wide range of Return Link MODCODs.
- Extensible to support hundreds of thousands terminals. Virtual Network Operation (VNO)
- 3D BoD™ bandwidth-on-demand Return Link technology encompassing MF-TDMA and SCPC - all within a single shared dynamic bandwidth pool.
- WaveSwitch™ 3D BoD™ capacity assignment (SLA, real time demand and on-the-fly waveform optimization) delivers optimum efficiency and network-utilizationand provides true multiservice and multi-application operation.
- Embedded PEP and QoS.

Multi-Application Platform

- Consumer Internet
- Small office / home office (SOHO), small/medium enterprise (SME) and remote branch office connectivity.
- Industrial IoT and M2M applications.
- Enterprise networks.
- Trunk and cellular backhaul.
- Mobile maritime, land and airborne applications.
- Tactical military, defense and homeland security (HLS) applications



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Future Proof

The ASAT™ VSAT System has been developed to satisfy the most demanding operators' needs. Built with flexibility and scalability in mind allowing operators running multi-service applications

Flexible to Perfectly Meet Operators' Markets & Applications

Driven by demand for broadband consumer, IIoT/M2M, enterprise, trunk and backhaul and mobile services for always higher throughputs with optimum efficiency, the SpaceBridge ASAT™ system was designed as a scalable multi-service platform configurable to support tens to hundreds of thousands broadband terminals. ASAT™ System supports both High-Throughput-Satellite (HTS) and wide-beam satellites.

Why Choose the ASAT™ System

Unlike single waveform platforms, ASAT™ combines the power of different waveforms for maximum adaptation to dynamic application requirements.

ASAT™ dynamically allocates BW from a single shared BW pool for highest efficiency. Platforms that partition waveform to separate pools suffer from reduced efficiency and require additional management efforts.

In contrast to other platforms, ASAT™ 3D BoD™ and WaveSwitch™ provide multi-dimensional on-demand capacity assignment (SLA, demand and on-the-fly waveform optimization) delivering optimum efficiency and network-utilization.

Performance to Rely On

Faster Forward Link and Return Link channels combined with unique 3D BoD™ and WaveSwitch™ adaptive waveform technologies ensure all applications are served seamlessly.

- Higher Forward Link efficiency with DVB-S2X at 5% roll-off.
- Wideband forward link for high-capacity satellite services.
- High Return Link spectral efficiency with 8PSK and 16APSK modulations.
- Rich protocol support - ASAT™ System fully supports voice, multimedia and video conferencing applications, multicast services from both Forward Link and Return Links including VSAT-to-VSAT as well as Layer 2 transport. ASAT™ System provides fully integrated Protocol Enhancing Proxy (PEP), Quality of Service (QoS) and Adaptive Coding and Modulation (ACM) at both Forward Link and Return Link – a complete stack of optimization improving user experience, minimizes satellite space segment and allows for true multi-service satellite operation.

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3D BoD™ and WaveSwitch™ - On-the-Fly Waveform and Access Method Switching Technology

Is your VSAT platform really efficient? As VSAT platforms support ever higher efficiency modulations-coding the industry is getting closer to reaching the absolute maximum efficiency - the Shannon capacity limit. On the other hand, network utilization seem to be lagging behind. Satellite service providers must make hard decisions between spectrum-efficient SCPC and high network utilization with bandwidth agility provided by MFTDMA. Even platforms that offer multi-waveforms require the selection of a single waveform at link provisioning, forcing you to make a choice.

With the ASAT™ System there is no need for service providers to compromise. Traditional BW managers are able to take into account only user SLA profile and the terminal real-time demand. ASAT™ System 3D BoD™ is an intelligent multi-dimensional bandwidth on demand radio resource BW manager / scheduler automatically taking into account SLA, real-time terminal demand as well as terminal traffic density, to allocate optimum waveform and seamlessly switch terminals between waveforms for optimal service and space-segment utilization:

- MF-TDMA – lean reservation based high network-utilization multi-frequency time-division multiple-access.
- Bandwidth-on-demand, dynamic SCPC – best spectral efficiency provided for those terminals of high and sustainable traffic density – while required.

ASAT™ system 3D BoD™ and WaveSwitch™ manages terminals' traffic across these waveforms in real-time, managing the entire Return Link as a single shared resource - eliminating any bandwidth fragmentation and utilization losses that typically traded off for meeting peak capacity demands.

Powered By WaveSwitch™

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System High-Level Specification

Architecture	
Topologies	Multi-gateway Multi-satellite / multi-beam support
Forward Link	
Technology	TDM Forward link
Channel Rate	Up to 500Mhz Forward Link carriers per cluster
Waveform	DVB-S2 / S2X ACM, GSE encapsulation, QSPK up to 256APSK LDPC/ BCH, annex M (Time Slicing) up to 32 TSNs.
Channel Spacing	5%, 10%, 20%, 25%, or 35% channel spacing (roll off factor).
Forward Link Capacity	Up to 2.5Gbps per carrier
Return Link	
Technology	3D BoD™ Return Link multi-waveform technology. • MF-TDMA - lean reservation based high-network-utilization, RLE encapsulation • SCPC - bandwidth-on-demand, high spectral-efficient dynamic DVB-S2X Return Links - for terminals of high and sustainable traffic density. • Terminal built-in Uplink Power Control (ULPC) and network-wide Power ACM™ provides QoS-drive ACM support and Return Link BW assignment. • Up to 500MHz Return Link BW capacity per cluster. • MF-TDMA mesh overlay option with supported VSAT modem models (wide-beam satellite coverage).
MF-TDMA Channel Rate	64Ksps and up to 8Msps.
MF-TDMA Waveform	BPSK, QPSK, 8PSK, 16APSK.
MF-TDMA Channel Spacing	5%, 10%, 15%, 20%, 25% channel spacing (roll-off factor).
MF-TDMA Channel Capacity	Up to 25Mbps per MF-TDMA Return Link channel.
SCPC RTN Channel Rate	500Ksps up to 25Msps.
SCPC RTN Waveform	DVB-S2X QPSK up to 64APSK.
SCPC RTN Channel Spacing	5%, 10%, 20%, 25%, or 35% channel spacing (roll off factor).
SCPC RTN Channel Capacity	Up to 100Mbps each SCPC Return Link.

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Applications, PEP and QoS	
Connectivity	• Wireline transparent Layer 2 connectivity (supported models only). • VLAN and VRF (Virtual Routing and Forwarding) (Supported models only). • Layer-3 NAT and DHCP server / DHCP relay. RIP routing protocol. • VRRP support. (Protocol and feature set is model dependant). • Full multicast support from hub and from behind remote.
Application Optimization	TCP/IP, HTTP acceleration. Cellular backhaul acceleration (supported satellite modem models only).
QoS	Built-in embedded QoS support integrated with Forward and Return Link ACM mechanisms.
Multimedia Support	• VoIP, video-over-IP and video conferencing support. • Multimedia QoS support and bandwidth assurance for VoIP QoE.
Security	IPSec VPN tunnel strong encryption (availability in certain models and limited by export control regulations).
Operations and Management	
Deployment	• Baseband RF modulation and demodulation separated from network processing and management - for flexibility and large-scale deployment supporting remote unmanned teleports. • RF Gateway diversity and distant data center, network over fiber • RF-over-fiber support.. • Flexible and scalable growth capability. • Hub / teleport geographical capabilities. • Remote-terminal full redundancy configuration options for mission-critical links.
Management System	• Graphical role-based multi-service web-application NMS (Network Management System). • VNO support.
Business Integration	• Integration with customers OSS and BSS systems using SOAP and REST API NBI. • Traffic accounting NBI to external billing systems.