

The new ViaSat® *LinkStar<sup>™</sup><sub>S2A</sub>* system is a two-way, bandwidth-on-demand broadband VSAT system designed with network speed and efficiency in mind. *LinkStar<sub>S2A</sub>* now brings you higher efficiency and data rates surpassing many other TDMA systems. *LinkStar<sub>S2A</sub>* combines broadband access and a high-speed return channel to satisfy your bandwidth-intensive applications using IP data over any fixed satellite.

Since its introduction, the *LinkStar<sub>S2A</sub>* VSAT system has been built on a foundation of open standard DVB technology including a DVB-S or DVB-S2 forward link. The new and innovative *LinkStar<sub>S2A</sub>* DVB-S2 technology includes advanced Low Density Parity Check (LDPC) coding for ultra-low Eb/No performance near Shannon's theoretical limit. That, combined with 8PSK and 16APSK modulation, provides bandwidth reductions of up to 30% below traditional values. Our newly available Adaptive Coding & Modulation (ACM) technology provides rain fade mitigation and reduces the satellite bandwidth requirement for downstream traffic by up to 63%. Dynamic Link Adaptation (DLA) provides rain fade mitigation on the return link while reducing satellite bandwidth by nearly 20%.

The *LinkStar<sub>S2A</sub>* system offers satellite link speeds up to 126 Mbps on the downstream and up to 4.2 Mbps on the upstream channels to the hub. With this high upstream channel capacity, remote sites can be server locations, content providers, multimedia sources, video teleconferencing participants, and corporate headquarters.



**LINKSTAR<sup>™</sup><sub>S2A</sub> AT-A-GLANCE**

**NEW**

- DVB-S2 Adaptive Coding & Modulation
  - HTTP Acceleration & Bandwidth Reduction
  - Data Encryption
- 
- Flexible, Scalable Architecture
  - Multiple Inbound Access Schemes Supporting a Wide Range of Applications
  - Multimedia, Broadband Connections
  - Advanced IP Routing Capability
  - Standards-Based Platform
  - Powerful Network Management System
  - Automatic Rain Fade Compensation
  - Combined Hybrid Star/Mesh Networks



## FEATURES

**EFFICIENCY** With turbo coding and optimized spectral shaping, you can use your satellite bandwidth more efficiently on the return channels and provide your customers with a superior user experience. Maximize your resources through higher efficiency and cost savings.

### **AUTOMATIC RAIN FADE COMPENSATION**

**NEW Adaptive Coding & Modulation (ACM)** for the downstream reduces satellite bandwidth requirements by up to 63%. (Optional)

**NEW Dynamic Link Adaptation (DLA)** reduces upstream satellite bandwidth requirements almost 20%. (Optional)

**Dynamic Uplink Power Control** automatically boosts signal level during fading conditions, ensuring your network will stay connected.

**ACCELERATION AND COMPRESSION** improves link efficiency and enhances user experience

**NEW HTTP Acceleration & Bandwidth Reduction with AcceleNet** boosts the speed of your customers' web surfing experience while reducing your operating costs for satellite bandwidth. (Optional)

**TCP Acceleration** boosts the speed of your TCP traffic enhancing your end users' experience.

**IP Header Compression** significantly reduces the bandwidth required for VoIP traffic by eliminating extraneous and redundant protocol information.

**QUALITY OF SERVICE (QoS)** based on DiffServ offers six queues at the scheduler level on each remote terminal. You get a finer prioritization of user traffic based on profiles defined using the IP QoS feature.

### **MULTIPLE INBOUND ACCESS SCHEMES TO SUPPORT A WIDE RANGE OF APPLICATIONS**

give you the ability to meet or exceed your customers' expectations.

**Bandwidth on Demand (BoD)** dynamically increases bandwidth as it is needed, for as long as it is needed. Ideal for multi-user Intranet and Internet applications as well as large file transfers.

**Committed Information Rate (CIR)** provides near-instantaneous accessibility of all available bandwidth. Ideal for guaranteed Quality of Service (QoS) applications. Combined with the *LinkStar<sub>S2A</sub>* system's application-triggered CIR feature, this is the right choice for VoIP and video conferencing services.

**Application-Triggered BoD/CIR** allows dynamic assignment of BoD/CIR resources, maximizing resources and matching customer-specific application requirements. (Optional)

**CIR Reallocation** offers CIR when the user needs it. Once the needs are satisfied bandwidth becomes available to the entire network. This allows operators to fully utilize bandwidth resources.

**Slotted ALOHA** grants immediate network access to low-bandwidth applications. This powerful feature minimizes latency and is particularly suited for transactional applications such as lotteries, point-of-sale (POS) and automated teller machines (ATMs).

**DHCP Relay and VLAN Tagging** enable service providers to offer VPN services to multiple customers through this optional feature. The *LinkStar<sub>S2A</sub>* system enables end-to-end VLAN separation of customer traffic, reuse of private addresses, and automatic IP address assignment to devices at remote sites.

**Frequency Hopping** allows your network to be more efficient through load balancing across return channels.

## POWERFUL NETWORK MANAGEMENT SYSTEM

**(NMS)** Our Web-Based NMS gives you configuration control and network management using GUI and a standard browser. The Network Control Center (NCC) provides additional management through traffic statistics, call detail records and an SNMP interface. Other features include:

- **Virtual Network Operator (VNO)** (optional)
- **Virtual Service Provider (VSP)** (optional)
- **User Groups** (logically group remote terminals)
- **Online Context-Sensitive Help**

## FLEXIBLE, SCALABLE ARCHITECTURE

With each **Regional NCC (RNCC)** managing up to 8,000 sites and a single NCC controlling up to 10 RNCCs, you can grow your network to a total of up to **80,000 nodes**.

Compact **C-SERIES HUBS** are available for smaller, scalable, cost-effective networks allowing for system growth.

**MULTI-SATELLITE/MULTI-TRANSPONDER** You can choose to operate in C, Ku, and Ka band, utilizing a unique region for each requirement.

**REDUNDANCY** Ensure your critical communications through both local and/or geographic redundancy for the hub.

## STANDARDS-BASED PLATFORM

**DVB-Based Architecture** enables service providers and satellite operators worldwide to build open-standard networks for IP data, Internet access, video streaming, telemedicine, VoIP and distance learning. For operators who require standardization on the return channel, the *LinkStar<sub>S2A</sub>* network offers an optional DVB-RCS compliant version with a simple, cost effective over-the-air software download.

**MULTIMEDIA, BROADBAND CONNECTIONS** provide up to 126 Mbps on the downstream and up to 4.2 Mbps per upstream carrier.

## SECURITY

**Encryption** is available for the downstream traffic, up stream traffic, and network control channel.

**Network Locking** controls migration of terminals across networks. (Optional)

**IPSec** is transparently delivered by the *LinkStar<sub>S2A</sub>* system.

**NEW Data Encryption** using AES-128 is now available. (Optional)

**Control Plane Security** encrypts network management messages for highly secure communications. (Optional)

**ADVANCED IP ROUTING CAPABILITY** Unicast and Multicast, RIP, IGMP, UDP, TCP are all supported by the *LinkStar<sub>S2A</sub>* system.

**INPUT POWER OPTIONS** include a choice of AC and DC power. Intelligent power conservation is ideal for solar applications.

**MARITIME/MOBILE OPERATION** allows installation on moving platforms such as ships and vehicles.

**HYBRID STAR/MESH NETWORKS** provide flexibility for a multitude of applications in one integrated network. Sharing a common DVB-S2 outlink, the *LinkStar<sub>S2A</sub>* system is interoperable with ViaSat's LinkWayS2 mesh VSAT system.



**LinkStar<sub>S2A</sub>**

**INTEROPERABLE  
NETWORK ARCHITECTURE**



**LinkWay<sub>S2</sub>**

**SPECIFICATIONS**

**LinkStar<sub>S2A</sub> Satellite IP Terminal**

Burst Rates (ksym/s)	156	312	625	1250	2500
Bit Rates (rate 2/3 FEC, kbits/s)	208	416	833	1667	3333
Bit Rates (rate 6/7 FEC, kbits/s)	267	535	1071	2142	4285
Channel Spacing (kHz)	200	400	800	1600	3200

**RETURN/UPSTREAM CHANNEL (remote to hub)**

**Format** MF-TDMA

**Transmit IF Frequency** 950 to 1525 MHz

**Turbo Coding** DVB-RCS compliant

**Modulation** QPSK

**DOWNSTREAM CHANNEL (hub to remote)**

**Format**

DVB-S2 ACM, MPE/MPEG-2, DVB-S<sup>1</sup>

**Symbol Rates**

**DVB-S<sup>1</sup>** 2.5 to 10/36 Msps<sup>2</sup>; 1 to 36, 42 Msps optional

**DVB-S2** 2.5 to 10/36 Msps<sup>2</sup>

**Data Rates**

**DVB-S<sup>1</sup>** 2.5 to 10/20/45/58 Mbps<sup>2</sup>; to 1.1 Msps optional

**DVB-S2** 2.5 to 10/20/45/94/126 Mbps<sup>2</sup>

**FEC and Modulation**

**DVB-S<sup>1</sup>** R/S (204, 188) and Convolutional QPSK @ 1/2, 2/3, 3/4, 5/6, 7/8

**DVB-S2** LDPC

QPSK @ 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10

8PSK @ 3/5, 2/3, 3/4, 5/6, 8/9, 9/10

16APSK @ 2/3, 3/4, 4/5, 5/6, 8/9, 9/10

**BER** Quasi-error-free per DVB standards EN 300421 (DVB-S) and EN 302307 (DVB-S2)

**Receive IF Frequency** 950 to 1750 MHz

**PHYSICAL INTERFACES**

**L-band Transmit and Receive** (2) Type-F, 75 ohm

**Network** (1) 10/100BaseT Ethernet (RJ-45)

**Console** (1) RS-232 (DB-9)

**RF Antenna Diameters** 0.96, 1.2, 1.8, 2.4 M

**ODU Power**

1, 2, 3 and 4 watt Ku-band, 2 and 5 watt C-band

**ODU Operating Temperature** -40°C to 55°C

**LNB** DRO (standard), High stability PLL (optional), Universal LNB compatible

**RETURN CHANNEL SATELLITE TERMINAL (RCST)**

**MECHANICAL/ENVIRONMENTAL**

**Dimensions** 1U high, 13" W, 8" D

**Power** 100 to 240 VAC, universal 50/60 Hz +24 VDC

**Temperature**

-5° to 50°C operating; -40° to 70°C storage

**Humidity**

95% relative humidity non-condensing at 0° to 50°C operating; 95% relative humidity non-condensing at 65°C storage

**NETWORK MANAGEMENT AND CONTROL**

**Network Management System (NMS)**

Java Web-based, standard PC

**Network Control Center (NCC)**

SUN Solaris Workstation; SNMP agent

**SYSTEM PERFORMANCE**

**TCP/IP** 10 Mbps throughput to the LAN

Up to 50 Mbps with ViaSat xPEP

**UDP/IP** 20 Mbps throughput to the LAN

Up to 62 Mbps with IP Express Forwarding

**Scalability**

500 nodes with C Series Hub;

8,000 nodes with single Hub/NCC;

80,000 nodes with multiple Hubs/NCC

**Protocols**

TCP/IP, UDP/IP, IGMP, RIP 1&2, IP QoS support

**COMPLIANCE**

**Safety** UL/cUL 60950-1<sup>3</sup>; CE-R&TTE (EN60950-1)

**EMI/EMC**

FCC part 15 Class B; ICES-003 Class B; AS/NZS3548 Class B;

AS/NZS 4053; CE-R&TTE (EN 301489-12)

**RF Spectrum**

CE-R&TTE (EN 301 428); ANATEL

RoHS Compliant

<sup>1</sup>Optional

<sup>2</sup>Hub configuration dependent

<sup>3</sup>NRTL Certified

**ViaSat, Inc.**

**Tel:** +1.678.924.2880

**Fax:** +1.678.924.2480

**Email:** vsatsales@viasat.com

**www.viasat.com/vsat**



**Atlanta** 1725 Breckinridge Plaza, Duluth, GA 30096, Tel: +1.678.924.2400, Fax: +1.678.924.2480

**Beijing** Lucky Tower Block B, Suite 1112, No. 3 Dong San Huan Bei Lu, Beijing 100027, China, Tel: +86.10.6461.5761, Fax: +86.10.6461.5754

**New Delhi** 601 New Delhi 611-A, JMD Pacific Square, Sector 15, Part 2, NH #8 Gurgaon 122001 Haryana India Tel: +91.124.402.5200, Fax: +91.124.402.5252

**Rome** Piazza del Popolo 18, 00187 Rome, Italy, Tel: +39.0636712432, Fax: +39.0636712400

**San Diego** 6155 El Camino Real, Carlsbad, CA 92009, Tel: +1.760.476.2200, Fax: +1.760.929.3941

**Sydney** Unit 4/22 Narabang Way, Belrose, NSW 2085, Australia, Tel: +61.2.9986.3888, Fax: +61.2.9986.3899