SpaceWeb

SpaceWeb is the evolutionary development of the X.Star family of VSAT networks, which use Ku-Band, C-Band and Extended C-Band communications satellite transponders to inter-connect remote user locations via a central hub in a "star" network architecture.
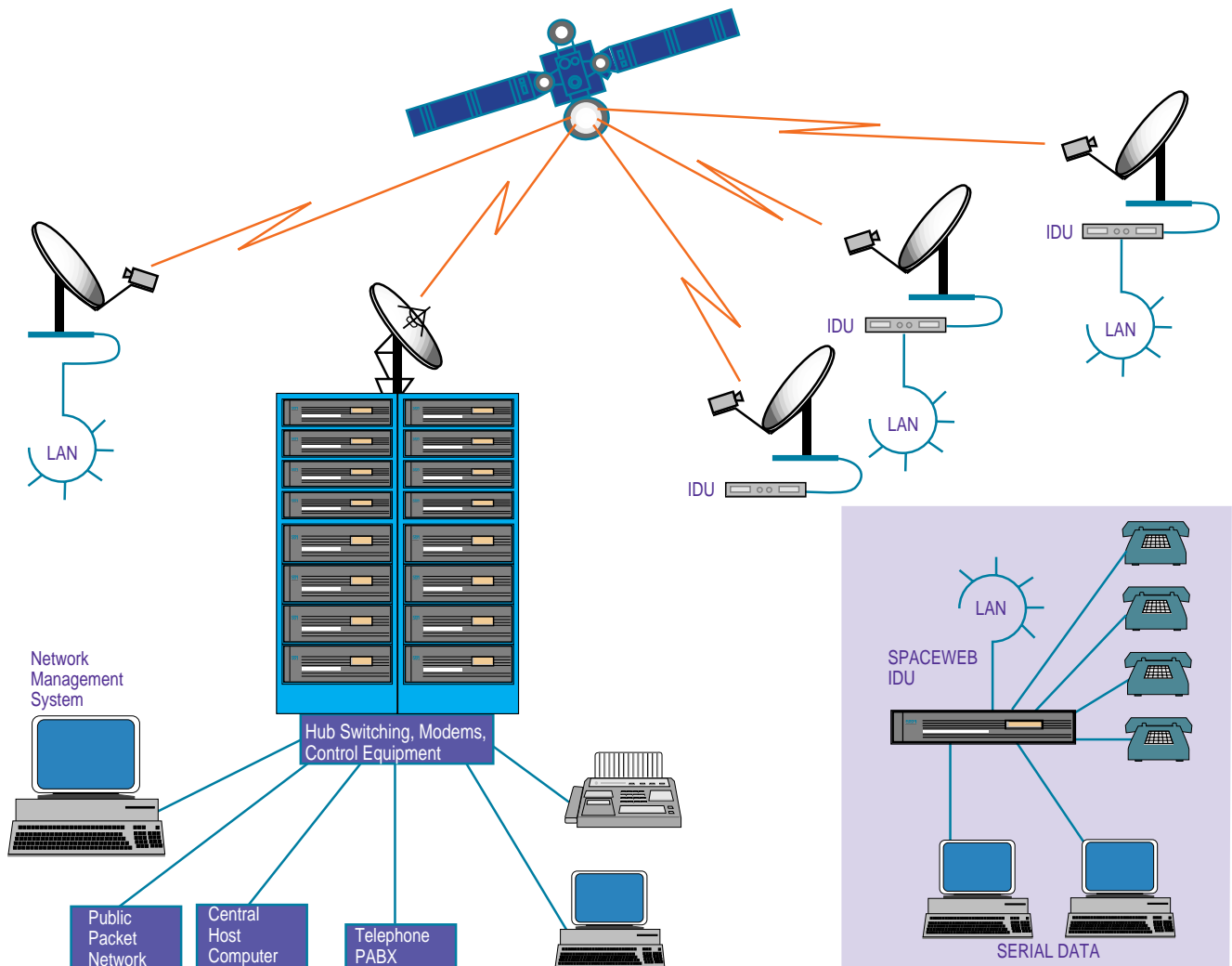
Introduction

SpaceWeb® is the evolution of the X.Star family of VSAT networks, using Ku-Band, C-Band and Extended C-Band satellite transponders to interconnect remote users via a central hub in a "star" network architecture.

SpaceWeb is designed for today's cost conscious network users who wish to use satellite communications to provide a low cost network solution for data, fax and voice applications.

At the SpaceWeb customer premises, is the SpaceWeb Micro Terminal (SMT), which communicates over satellite with the central hub facility. The hub's modular architecture is designed to provide attractive start up costs along with establishing a powerful and flexible platform for future growth.

For reliable end to end communications, SpaceWeb utilizes STM's well proven X.Star satellite communications protocol. X.Star has the power to emulate the industry's data protocols including X.25 SNA/SDLC, TCP/IP, Frame Relay, and more.

IDU

LAN

IDU

LAN

IDU

LAN

LAN

SPACEWEB
IDU

SERIAL DATA

Network
Management
System

Hub Switching, Modems,
Control Equipment

Public
Packet
Network

Central
Host
Computer

Telephone
PABX

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SpaceWeb Installation

Applications

SpaceWeb's small, low cost VSAT design can be used to implement or enhance a variety of modern applications. SpaceWeb has proven to be an economical and reliable solution for a number of applications including:

■ **Distance Learning** – With SpaceWeb, remote classrooms can now communicate with

The X.Star protocol has been in use around the world since 1988, providing error-free delivery of packets from source to destination in STM satellite networks. This protocol is also responsible for directing packet traffic using flow control, buffer management and when necessary, selective packet re-transmission.

teachers in far off locations, access the Internet and give students entry to electronic libraries, email, etc. Businesses can utilize SpaceWeb for remote training and corporate information seminars.

SpaceWeb Features

■ Efficient Field Proven Communications Protocol
■ TDM/TDMA Star Topology Network
■ Integrated, Low Cost Micro Terminal Configuration
■ TCP/IP, X.25, SDLC Spoofing, etc.
■ LAN, Data, Voice, Facsimile, and Distance Learning
■ Supports Several Thousand Micro Terminals
■ Powerful Network Management System

■ **Internet Access** – Remote users are able to access the world wide web at high speed entirely over satellite. This is an excellent system for corporate internet and intranets, as well as an ISP platform.

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■ **Enterprise Networks** – Businesses, both large and small, can enjoy seamless, low cost global connectivity to remote offices. Modern communications services such as Wide Area Networks (WAN) Internet and telephony can be provided to achieve greater efficiencies in business operations.

■ **Shared Hub Operations** – Both large and small shared hub networks can benefit from the SpaceWeb design. For large networks STM can design your own shared hub for flexible and personalized operations. For small networks existing shared hubs are available. This provides small networks with an inexpensive on-ramp to the information super highway.

■ **Even More**... A variety of applications can benefit from SpaceWeb's technology to enhance network and communications capabilities. Applications such as Banking & Financial Networks, Manufacturing & Distribution Networks, POS Networks, SCADA Systems and Lottery Systems – to name just a few – can rapidly increase efficiency and capability by utilizing the SpaceWeb technology.

System Design

SpaceWeb is a packetized system. It utilizes a common outbound Time Division Multiplexed (TDM) channel to broadcast packets to all of the remote VSAT's in the network. Each SpaceWeb terminal receives all of the broadcast packets and filters out packets not specifically addressed to it. The SpaceWeb remote VSAT, uses a Time Division Multiple Access (TDMA) channels to communicate to the central hub facility.

To reduce operating costs, the granularity and speed of both the TDM and the TDMA channels have been optimized to provide flexibility and modularity. The outbound TDM channels can operate at 64, 128, 256, 512 and 1024 Kbps. Therefore, attractive startup costs for satellite transponder space segment can be realized. Since the system supports multiple outbound TDM channels, network growth and expansion is not

compromised. Several thousand nodes can be supported in a single network. The inbound TDMA channels can operate at 32, 64, 128 or 192 Kbps. This also allows a small startup configuration at the hub in addition to low space segment costs.
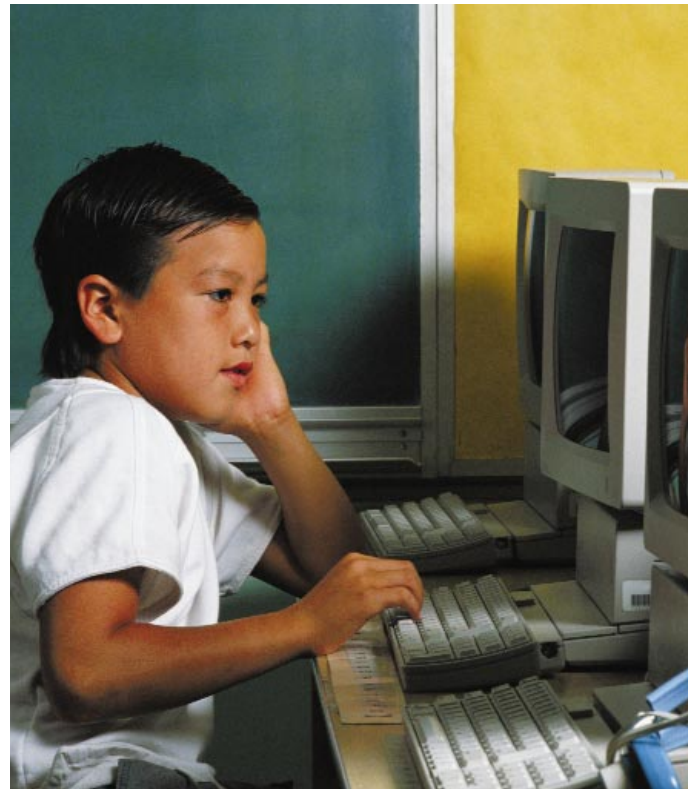
Central Hub

The nucleus of the SpaceWeb system is the central hub where all the packet traffic is concentrated and routed. Traffic can be directed to Enterprise Hosts, PABX systems, LAN servers etc., or to SpaceWeb terminals, providing complete connectivity from any system port to any other system port.

The central hub facility is typically comprised of three main components. These are:

Antenna: A high gain antenna subsystem operating at either Ku-band, C-band, or extended C-band frequencies.
RF: Microwave amplifiers, receivers and frequency converters, usually packaged into a redundant configuration for dish reliability.
Baseband: Performs modulation, Burst Demodulation, Packet Switching, Data Routing, Protocol Emulation, and interfacing with the user's equipment. The main components are:

■ Network Control unit (NCU)
■ Subnetwork Control Unit (SCU)
■ Master Clock Unit (MCU)

The modulator sends the TDM outbound carrier to the uplink equipment for transmission to the remote VSAT sites. The burst demodulators receive the TDMA signal from the remote VSAT. The NCU along with the SCU performs all the data processing functions at the hub. The MCU, which contains demodulators, recovers the outbound digital signal for the purpose of measuring the round-trip propagation delay from the hub to the satellite while providing clocking information to the hub. In addition, the NMS provides a comprehensive overview of the network and its operation.

Hub Equipment Layout

The central hub consists of one or more equipment racks, housing the Master Clock unit, Network Control Unit, power supplies, patch panels, modulators, burst demodulators and Local Control Processor (LCP) cards.

Base Band Equipment

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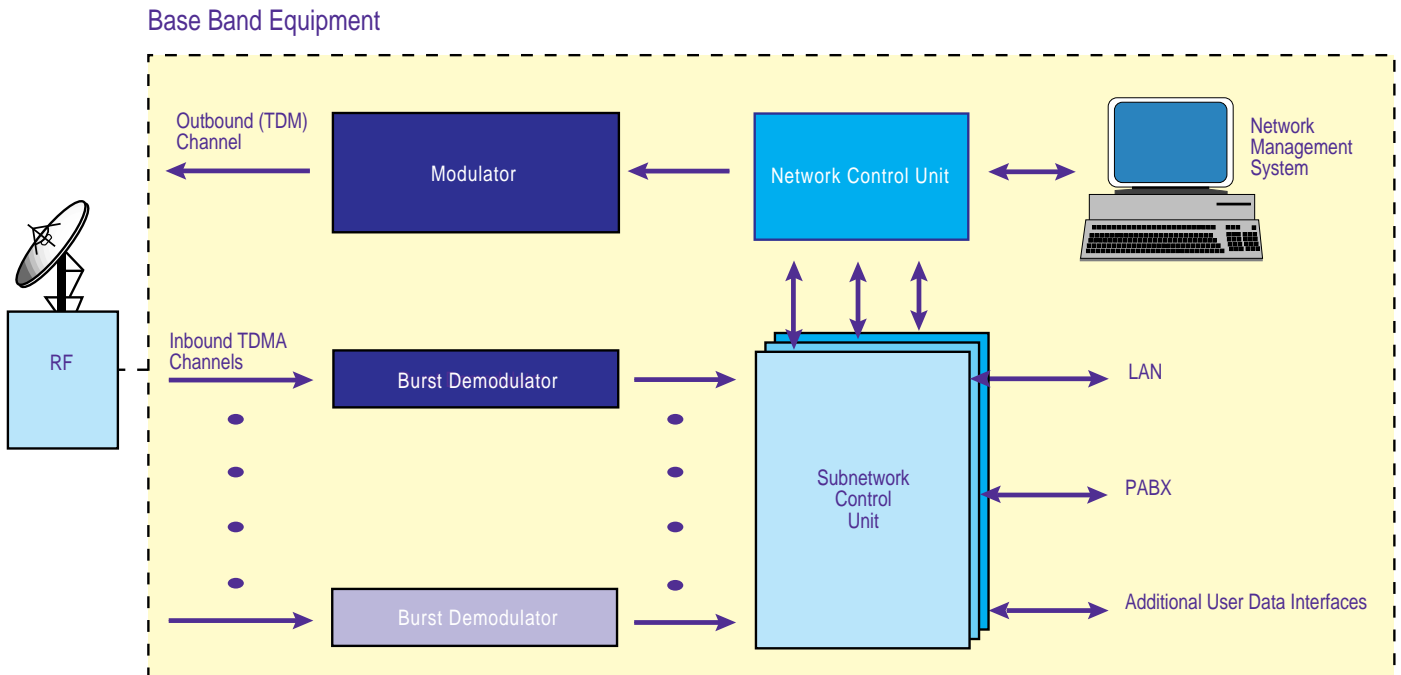
SpaceWeb Micro Terminal

The SpaceWeb Micro Terminal (SMT) is a low cost, multi-protocol device which communicates with the SpaceWeb central hub. Each SpaceWeb Micro Terminal supports direct ethernet connectivity and optional voice/fax, diagnostic and serial data ports for more diverse applications.
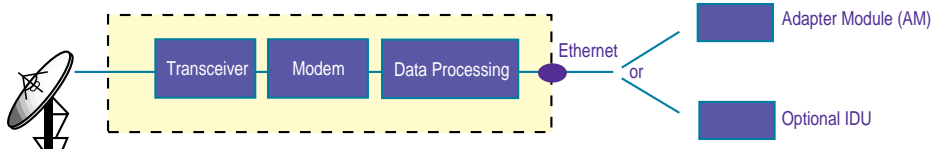
Outdoor Unit (ODU)

The basic SMT consists of:

- 1.2 - 2.4 m Antenna
- Integrated Outdoor Unit Assembly
- LAN Connection
- 1 Watt C-Band (Optional 5W booster amp available)
- 0.5 Watt Ku-Band (Optional 2W booster amp available)

Adapter Module (AM)

For AC power environments, the Basic SMT comes with an adapter module (AM) which provides:

- Ethernet User Port (RJ-45)
- A/C Power Adapter (110/220) to power the Outdoor Unit

Indoor Unit (IDU)

An IDU is also available for additional network applications:

- Ethernet User Port (RJ-45)
- RS-232/V.35 Data Ports
- Diagnostic Ports
- Voice/Fax Plug in modules
- A/C Power Adapter (110/220) to power the SMT

ODU

	Transceiver	Modem	Data Processing	Ethernet	

or

Adapter Module (AM)

Optional IDU

Network Management

The SpaceWeb Network Management System (SNMS), provides sophisticated monitoring and control of the entire system. The SNMS is essential to the operation of the network.

User port configurations, data rates, signaling and remote diagnostics are all controlled and monitored from the central SNMS system computer. The SNMS is typically installed at the central hub, but can be located elsewhere in the network, if desired.
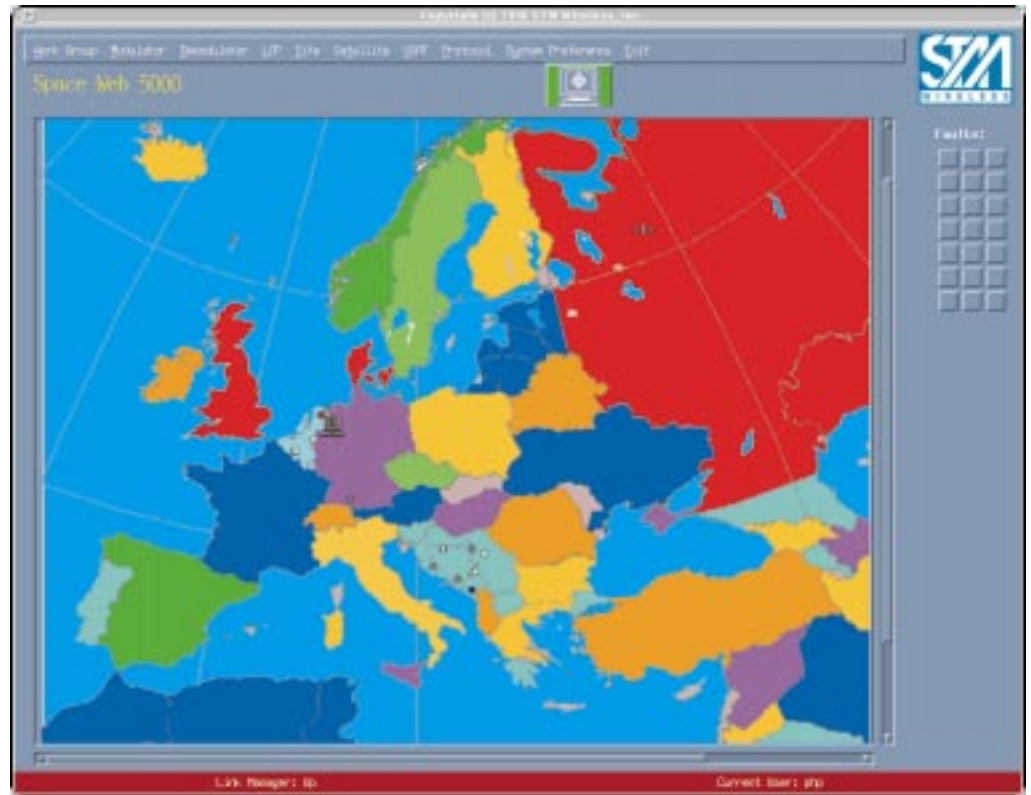
Designed as a three tiered architecture, each being in itself a discrete application, the SNMS is an extremely flexible system supporting different hardware platforms. It provides portability, can readily be scaled for small or larger hardware platforms, depending upon potential network size and is easy to maintain.

SNMS user friendly, operator interface allows centralized network management and control of the entire network through a single Graphical User Interface (GUI). When the SNMS is powered up, a customized color map showing the entire network is displayed as the main screen. This identifies the central hub and all of the remote terminal locations, displaying their status in real-time. The map screen provides entries to other SNMS functions via simple point and click mouse operations. These entries are shown as menus or selection buttons for ease of use. All messages and alarms generated by the system are displayed at the operator console in the English language and in color coded graphical format. All messages are time stamped and stored in the network's database for future retrieval. A hard copy is also available.

Information database gives the operator of the SNMS full control of virtually all of the system parameters, ranging from the customer name at each site, to the data rate of any port in the network. All of the configuration parameters required for the proper operation of the terminal are entered in the database configuration of the SNMS.

Remote management terminals can also be installed at remote sites to provide additional system control flexibility. Depending upon how the prime SNMS and the remote SNMS sites are configured, each site is capable of monitoring and controlling all, or just a part of, the network.

The Company

STM Wireless, Inc. is a leading manufacturer of satellite and wireless radio communication products using VSATs (Very Small Aperture Terminals) hubs, multiplexers, modems and other networking equipment. STM products are designed to support data, fax, voice and video networks requiring cost-effective connections between geographically dispersed locations. The company's proprietary equipment and software are employed by business, government agencies and telephone companies in Europe, the Americas, Africa and Asia. The company also provides full turnkey system integration services and shared hub services.