Product Brochure

SkyEdge IV System for Military & Government

Mission-Critical Communications over Multi-Orbit, Software-Defined Platforms

Software-Defined Platform for Software Defined Satellites

SkyEdge IV is Gilat's next generation multi-service platform built with our new, advanced Elastix-Architecture. Our new platform is designed to provide the best ground segment solution for the Elastix Era of multi-orbit Software-Defined Satellites (SDS) placed in multi-orbit (GEO and NGSO), providing very high capacity over thousands of concentrated beams focused on specific needs.

SkyEdge IV provides military grade security based on TRANSEC & FIPS standards for multiple applications including communication on the pause, on the move, unmanned systems, manpacks and armored fighting vehicles.

SkyEdge IV is a highly elastic platform that enables, together with SDS, the creation of programmable Software-Defined Networks (SDN) that support on-the-fly changes to optimally address dynamic network changes.

The Elastix-Architecture is a cloud-based distributed architecture, enabling the ability to split between transmission function located in the gateway and data processing SW-based functions which can be flexibly deployed on cloud servers located anywhere in the network.

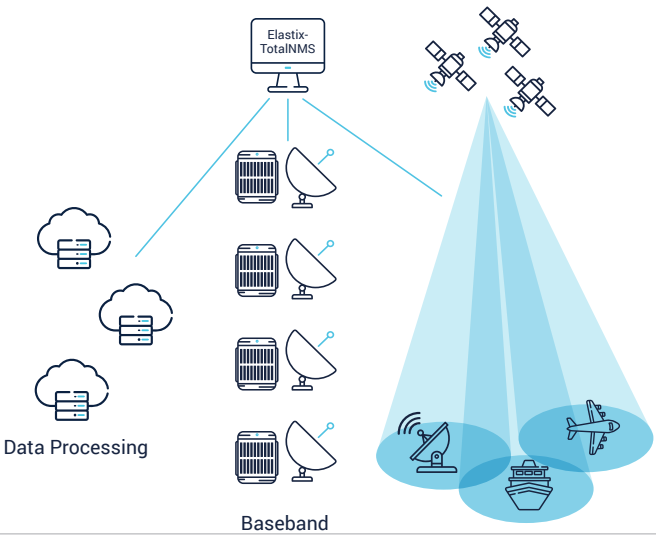
Rich Feature Set to Support the Military and Government Market

SkyEdge IV delivers innovative transmission technologies with exceptional performance and space segment efficiencies. Wideband DVB-S2X carriers in the forward direction and adaptive transmission in the return direction combining elastic SCPC and TDMA over shared bandwidth, enable high on-the-move service availability and maximum bandwidth efficiency at any condition – beam peak, beam edge, fade and different traffic demands. This is achieved by adaptive power control, changes to the carrier symbol rate, ModCod and spread-spectrum factor per VSAT on a per time-slot basis.

The SkyEdge IV system employs advanced features and capabilities that help you deliver services while simplifying your network operations.

Benefits

- Secure communications - FIPS 140-3 Level 3, TRANSEC end-to-end solutions for C4I systems based on robust VSAT applications
- Generic Modem Interface (GMI) API enabling secure sovereign services over NGSO
- Supports next generation VHTS and NGSO constellations
- Software-defined ground segment maximizing the value of software-defined satellites
- Accelerated FWD speed of up to 1.5Gbps
- Streamlined lifecycle management & orchestration via open platform interfaces
- Leverages cloud technologies maximizing operational efficiency and network agility
- Flexible scalable architecture with unprecedented density to support any network size and operational model with minimum footprint
- Wide range of ruggedized, lightweight, fast-to-deploy VSATs optimized for specific markets such as: SOTM, SOTP, UAV, AFV, Manpack
- Superior satellite resource optimization on military networks
- Supports RTN Spread Spectrum for increased resilience to interference and for low SNR links



- **Rich L2 and L3 services** – SkyEdge IV enables support over a single platform with both L2 MEF based and L3 services providing operators the maximum flexibility with the best networking services.
- **Robust Bi-Directional QoS** – Embedded in the platform, SkyEdge IV QoS supports various rates per site, DiffServ, flow and application priority, and VoIP call admission control to ensure voice and video quality.
- **Multi-Tiered Acceleration** – Enables fast web surfing and application response time using TCP acceleration, DNS caching, compression, and IP header compression.
- **Enhanced System Security** – Provides secure transmission over the satellite link by utilizing high-performance, HW-based AES-256 encryption. The system also employs X.509 terminal authentication.
- **Military Grade Mobility** – Enable beam and satellite switching, on-the-move antenna and BUC communication interfaces, and a comprehensive network management system for mobility terminals and routing capabilities.

Major Benefits of SkyEdge IV Elastix Architecture

- **Efficient Scalability** – SkyEdge IV's Elastix-Architecture enables the platform to efficiently scale based on aggregated capacity of the network regardless of specific beam coverage, bandwidth and or peak throughput. Scaling based on aggregated capacity provides unprecedented cost reduction with the smallest footprint possible, while capacity is added only as network utilization increases. This ensures accommodation of day-one operation over a large coverage area, scaling up with increased bandwidth, an increase in users and expanded geographic coverage, as well as support during the network maturity phase and accommodation of ongoing, changing demands.
- **Dynamic Capacity Steering based on Demand** – SkyEdge IV's Elastix-Architecture allows dynamic capacity steering of resources between beams to answer real-time changes in terminals throughput demand over specific geographic locations. No longer will it be required to allocate the maximum needed carrier size and compute power ahead of time. SkyEdge IV allows seamless dynamic carrier reprogramming in perfect coordination with the satellite to accommodate real time changes in user demand.

Single Platform for Multi-Orbit Operation

SkyEdge IV's single platform for multi-orbit operation enables deployment on GEO Very High Throughput Satellites (VHTS) as well as Non-GEO Stationary (NGSO) constellations and operates a single and unified multi-orbit network.

SkyEdge IV provides a complete set of capabilities on both the platform side and modem side, enabling seamless operation over both NGSO constellations and GEO VHTS. SkyEdge IV introduces a new set of capabilities on all layers and dimensions including modem installation, service provisioning, interfaces to tracking antennas, interface to the constellation resource manager, smart modem logon, satellite and beam seamless switchovers, and much more.

Multi-orbit support enables satellite operators to manage their multi-orbit constellations as a single network, maintaining seamless, uninterrupted service for users. This occurs while maximizing the benefits of each constellation per application and per region configuration with varied service options and delivering orbit redundancy.

High Performance Diversified Modems

SkyEdge IV provides a wide modem portfolio to answer any need from simple broadband modems to ultra-high processing capacity modems achieving throughputs of up to 1.5Gbps download and 750Mbps uploads and high packets per second processing of up to 600Kpps.

Gilat's compact tactical modems enable government agents and defense personnel to accomplish their critical missions, offering rapid connectivity for data, video and voice, even under the harshest conditions. SkyEdge IV Aquarius family military- grade VSATs offers secure, highly reliable broadband C4I satellite communications for the net-centric battlefield, helping to ensure information superiority for troops on the ground. Aquarius e-M with its board form factor easily integrates into a variety of solutions such as manpack, flyaway and UAS terminals. Taurus-M supports On-the-Move and stationary Military & Government operations on both SkyEdge II-c and SkyEdge IV platforms.

Aquarius e-M board

Aquarius Pro-M

(Taurus-M (SkyEdge II-c backward compatible

Unified and Centralized Elastix TotalNMS

SkyEdge IV includes an advanced total network management system, Elastix-TotalNMS, enabling full configuration, control and monitoring of all hub elements and remote terminals, regardless of their physical location.

Elastix-TotalNMS is backwards compatible and can manage both SkyEdge IV and SkyEdge II-c.

Elastix-TotalNMS includes the following key attributes:

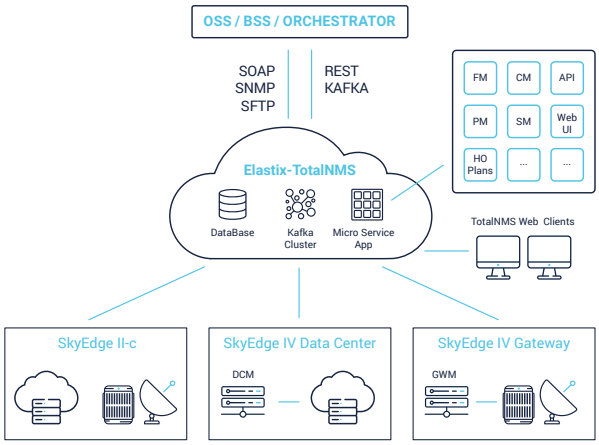
- **Network Dashboard** – a comprehensive set of network indicators providing real time and trending information on network throughput, utilization, and alarms
- **One-Click Management** – an intuitive GUI, with easy-to-use configuration tools and advanced diagnostic capabilities, providing effortless provisioning and troubleshooting for networks of any size
- **Customized User Administration** – flexible and highly granular mechanism, enabling user permission settings according to individual job function
- **Rich Northbound Interface** – comprehensive API to the operator's operational and business environment, enabling simple service orchestration and full platform orchestration from external network orchestration systems

Highly Scalable High Availability Design

SkyEdge IV features a scalable distributed network architecture enabling efficient and robust ground segment deployment over any number of satellite gateway locations, data centers and network operations centers. The advanced high-density chassis architecture minimizes rack space and power.

SkyEdge IV makes it easy to expand capacity as demand grows and extend services with minimal investment.

Gilat's centralized management system and redundant hub baseband Elastix-Architecture for SkyEdge IV facilitates support for unmanned gateway operations.



Elastix-TotalNMS – Cloud based network management and orchestration

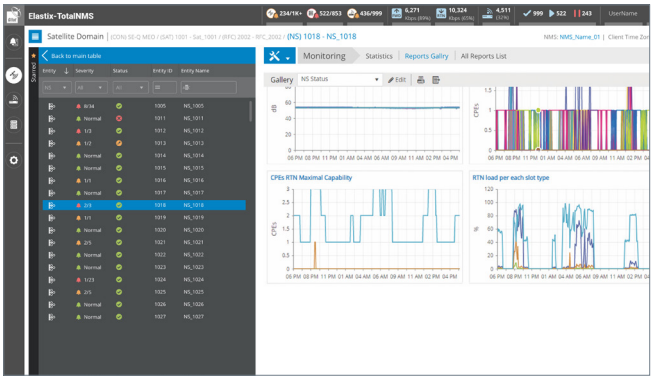
High-Availability System – 1:N redundancy and automatic failover of all hub components ensure very high system uptime. Integrated redundant 100Gb packet switching architecture and an advanced backplane design connecting all hub components guarantee high system reliability

- **Unattended Hub Operations** – remote visibility, management and control of all hub elements enable centralized management, thereby drastically reducing OPEX while enabling remote expert analysis of system behaviour
- **High Density Hubs Reduces Rack Space and Power** – compact chassis architecture for transmit modules, receive modules and servers provide high throughput performance while minimizing rack space and power
- **Smart GW Diversity Solutions for Fade Mitigation** – capable of seamlessly reprogramming network and switch from failed GW to different active gateways in N+K or N+O diversity modes
- **Disaster Recovery** – when enhanced availability service is required, a backup baseband hub, data center or NOC may be installed at a disaster recovery facility

The SkyEdge IV Hub System is designed to provide maximum service time while simplifying your network operations. The hub system is comprised of an advanced high-density multi-beam hub.

The X4-Chassis is coupled with a complete network management system. The main advantages of the chassis are:

- **Hot Swappable Modules** – eliminates network downtime
- **Backplane Design and Redundant LAN Switches** – eliminates external LAN wiring complexity
- **Software-Defined RF Matrix** – simplifies network operations and improves unattended hub operations
- **Remote Management** – remote control of all components simplifies support and shortens time for trouble resolution



Elastix-TotalNMS - Big data and analytics-based service assurance

Technical Specifications

General

Topology:
Star, distributed hub architecture (multiple GWs, NOC)
Multi orbit operation NGSO/GEO

Forward Channel

Standard: DVB-S2X ACM
Carrier rate: 5-500Msps
Roll-off: 0.05, 0.10, 0.2
MODCODs:
BPSK-S 1/5 – 256APSK¾ (seamless MODCOD switching)
SNR range: -9dB to +21dB
FEC: LDPC, BCH

Return Channel

Elastix-Access:
eSCPC (elastic SCPC) with TDMA overlay
Carriers rate:
0.1Msps (GEO) 1Msps (NGSO) – 250Msps
Roll-off: 0.05, 0.10, 0.2
Modulation: BPSK, QPSK, 16QAM
SNR range: -15dB to +15dB
FEC: XDC

Features

IP:
IPv4/IPv6, TCP, UDP, ICMP, DHCP, NAT/PAT, DNS Caching, cRTP, IGMPv2/v3, SIP, DiffServ, VLANs, RIPv2, Static Routes, BGP Transparent PEP: Integrated TCP Acceleration, IP header compression, Cellular GTP data acceleration
QoS:
Integrated, DiffServ, Multi-Level CIR/ MIR (User, Group)

MEF Based Layer 2 Services

E-Line Access, E-Line Transit Based on MEF 51.1
Frame Size: 9KB
Interface types: UNI/ENNI (untagged, 802.1q, 802.1ad)
Frame mapping to OVC:
UNI Interface - based on CE Tags, priority tag and untagged
ENNI Interface - Based on S-VLAN tag
Usage Services:
Integrated quota-based service definition system, Per ISP/VNO, forward & return quota, free usage time zones, quota reset, usage top-ups
Security:
TRANSEC, FIPS-140, AES-256 bit encryption, ACL Firewall, X.509 Terminal Authentication, VSAT IP-SEC client

Management

System:
Single centralized Elastix TotalNMS
Framework:
ITU / IETF standards-based
GUI Interface:
Web-based over HTTPS
Access Control:
Per User permission management
Northbound Interface:
REST, KAFKA, SOAP over HTTPS, SNMPv2c
IDU Antenna Interface:
Gilat's Antenna ICD, OpenAMIP v2, OpenBMIP

Interfaces

RF:
Tx 950-2450MHz, Rx 950-2450MHz; QMA/N-type, 50 ohms
LAN: 1 / 10 / 100 GbE Optic

Environmental and Mechanical

Certifications:
RoHS, CE, ETSI EN 300 386 V1.4.1:2008-04, ETSI EN 301 489-1 V1.8.1:2008-04, ETSI EN 301 489-12 V2.2.2:2008-09, AS/ NZS CISPR 22:2006, FCC CFR 47 Part 15 Subpart B, Industry Canada ICES-003:04
Power:
Universal AC 110 - 240V 50-60 Hz
Operating Conditions:
10° to +25° C, up to 90% relative humidity

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