

SkyEdge IV System

Secure, Mission-Ready Multi-Orbit Ground Segment Platform

Software-Defined Multiverse Ground Segment Platform

SkyEdge IV is Gilat's software-defined ground segment platform. The SkyEdge IV architecture supports capabilities often required in defense and government satcom networks, including multi-orbit operation, resilient capacity management, secure access, mobility support, redundancy, and centralized network control.

As defense operations increasingly span multiple domains and satellite environments, SkyEdge IV provides a unified ground segment platform that can support fixed infrastructure, mobile forces, and changing mission demands. The platform helps users, including those operating in government and security environments, deploy and operate satellite networks with availability, protection, redundancy, diversity, and embedded cybersecurity as operational conditions, locations, and space assets evolve.

Architecture Relevant to Defense Network Requirements

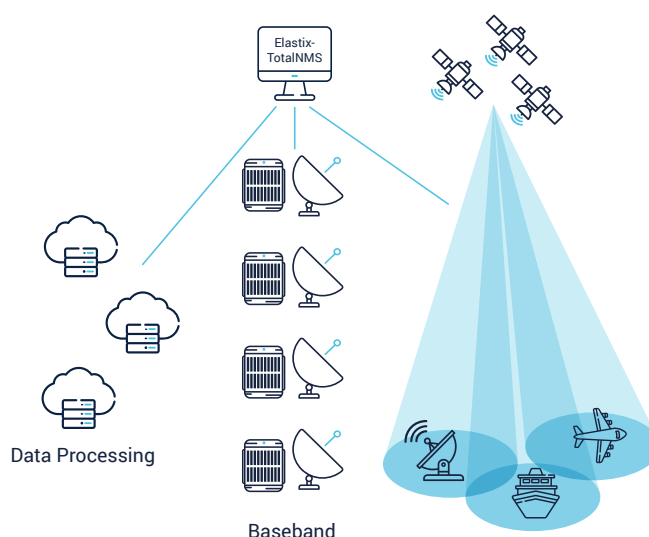
At its core, SkyEdge IV is a software-defined and virtualized ground segment platform. Its architecture supports organizations that require availability, security, and operational flexibility across a broad range of operational environments and mission scenarios, including government and security users.

SkyEdge IV supports fixed sites alongside mobile and deployable forces, spanning land, sea, and airborne platforms. A single platform operates natively across GEO and NGSO systems, allowing defense networks to leverage different orbital assets as part of a unified and resilient operational environment. Virtualized hub components can be deployed centrally, geographically distributed, or configured with built-in redundancy to ensure continuity of operations.

The compact, high-density footprint enables deployment in permanent facilities, deployable shelters, or centralized locations, while centralized command and control ensures consistent policy enforcement, visibility, and operational oversight across hubs and remote terminals.

Benefits

- Applicable to networks requiring resilient satellite connectivity, including government and defense-related applications
- Virtualized, software-defined architecture, enabling flexible deployment and evolution
- Supports next-generation VHTS and NGSO constellations across multi-orbit environments
- High availability and resiliency through redundancy and geographic diversity
- Flexible, scalable, high-density architecture, supporting any network size with minimal footprint
- Security architecture designed in accordance with NIST cybersecurity and Zero Trust principles
- Efficient capacity management dynamically prioritizing mission-critical traffic
- Rich feature set for fixed and mobile applications across land, sea, and airborne platforms



Resilient Capacity Management for Mission Continuity

Networks operating under constantly changing conditions require communications infrastructure that can adapt in real time. Missions shift, forces move, priorities change, and connectivity must adapt in real time. SkyEdge IV supports dynamic steering of capacity and processing resources to where they are needed most, without requiring the network to be engineered for peak demand everywhere.

This capability is especially relevant in a multiverse operational environment, where capacity may be drawn from different orbits, beams, or frequency bands depending on availability and mission context. Resources are allocated based on operational priorities, ensuring that critical users and applications retain service even as overall network conditions change.

By avoiding static bandwidth allocation and over-provisioning, SkyEdge IV enables efficient use of constrained or leased space segment resources while maintaining predictable performance for prioritized terminals. Communications remain operational under beam edges, interference, adverse weather, and other stress scenarios commonly encountered in defense operations.

Advanced Waveform and Air Interface Technology

Reliable defense communications depend heavily on the robustness and adaptability of the air interface. SkyEdge IV incorporates advanced waveform technologies that help improve availability, efficiency, and operational resilience under degraded conditions and challenging spectrum environments.

The system combines DVB-S2X forward links with advanced adaptive coding and modulation and Gilat's Elastix Access Scheme, which intelligently blends elastic SCPC and MF-TDMA. This allows multiple terminals and mission applications to share the same bandwidth pool while still delivering guaranteed service levels per terminal.

SkyEdge IV supports multi-band operation across C, Ku, Ka, and Q/V bands, allowing defense networks to operate seamlessly across different frequency environments.

Wide dynamic range operation and multi-dimensional adaptivity across power, symbol rate, modulation, coding, and spreading factors enable the network to continuously optimize performance as link conditions evolve. Interference mitigation mechanisms further improve service continuity in constrained spectrum environments.

The result is a versatile and resilient air interface that can support use cases ranging from small tactical terminals to high-capacity fixed nodes, while maintaining predictable performance across multi-orbit and multi-band satellite environments.

Secure-by-Design Platform

SkyEdge IV incorporates security as a foundational element of the platform, helping defense and government operators protect communications across distributed, multi-orbit satellite networks.

The platform combines secure access, encrypted communications, authenticated terminals, and hardened system architecture to reduce operational risk and support mission continuity. All air-interface traffic, including user, management, and control traffic, can be protected using TRANSEC mechanisms with hardware-based AES-256 encryption. Secure boot, digitally signed software, and platform hardening help prevent unauthorized access and software tampering, while X.509 terminal authentication and IPsec support strengthen network access security.

Centralized management enables consistent policy enforcement, controlled user permissions, secure HTTPS-based administration, and rapid operational response across geographically distributed hubs and terminals. Combined with redundancy, diversity, and resilient network architecture, SkyEdge IV helps maintain secure and available communications in contested, degraded, and operationally demanding environments.

Support for Mobility and Fixed Network Operations

Defense and government communications may need to span highly mobile tactical units and fixed installations without fragmentation or operational gaps. SkyEdge IV can support this range of operational modes on a single platform.

Seamless beam and satellite switching enables continuous connectivity for mobile terminals as they move across coverage areas, orbits, and beams. The system interfaces with on-the-move, on-the-pause, and fixed antennas and supports land, sea, and airborne platforms with varying terminal sizes and mission profiles.

By operating across multiple satellite environments, SkyEdge IV supports a true operational multiverse, ensuring service continuity even as underlying space assets or coverage conditions change.

L2 and L3 Networking Services with Mission-Aware QoS

SkyEdge IV supports both Layer 2 and Layer 3 services over a unified platform, enabling flexible integration with defense IP networks and legacy infrastructures.

Mission-aware, bi-directional Quality of Service ensures that critical communications receive the necessary priority and resources, even when multiple applications and terminals share the same bandwidth pool. Traffic can be prioritized by application type, terminal, or operational role, ensuring deterministic behavior for high-priority services.

This approach allows voice, video, data, and command-and-control applications to coexist on the same network without compromising mission-critical performance.

Wide Range of Modems for Fixed, Mobile, and Deployable Networks

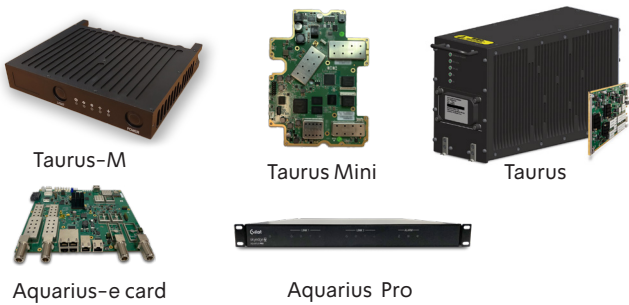
SkyEdge IV supports a wide range of modems for fixed, mobile, and deployable network applications. The modem portfolio can accommodate fixed infrastructure, deployable units, and mobile forces while maintaining consistent performance across shared and constrained bandwidth environments.

Supported modems range from small tactical terminals to high-capacity nodes and are available in both integrated terminal configurations and modular form factors. The portfolio supports MF-TDMA and SCPC operation, enabling flexibility in how bandwidth is allocated and shared across users and applications.

SkyEdge IV-supported modems include:

- Taurus-M
- Taurus Mini
- Taurus
- Aquarius-e (card)
- Aquarius Pro

This breadth of modem options allows a single SkyEdge IV ground segment platform to support land, sea, and air operations, from mobile tactical teams to high-throughput fixed sites, while maintaining a consistent operational and security framework.



High Availability and Operational Resilience

Operational continuity is critical in defense environments. SkyEdge IV supports continuous operation through redundancy, diversity, and resilient system architecture suitable for operational deployments requiring high availability.

The platform supports 1:N redundancy with automatic failover across hub components, along with geographic and gateway diversity to mitigate weather events, fades, outages, or site failures. Unmanned and remotely operated gateway facilities can be supported to reduce on-site personnel requirements.

Disaster recovery configurations enable backup hubs and network operations centers to be deployed when enhanced availability is required, ensuring communications remain operational even during major disruptions.

Centralized Command and Control

SkyEdge IV provides centralized command and control of hubs and terminals, enabling defense operators to manage distributed satellite networks with clarity and precision.

The system supports real-time situational awareness of network status, rapid fault detection and recovery, and centralized enforcement of operational policies. Secure access mechanisms ensure that only authorized personnel can view and control the system.

This centralized operational model supports efficient oversight of complex, distributed networks spanning multiple orbits, platforms, and mission environments.

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 – 256APSK $\frac{3}{4}$
(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:

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