Product Brochure

Elastix-Architecture

New Dimensions in Ground Segment Satellite Network Architecture

The satellite communication industry is going through a massive transformation; multi-orbit constellations are being launched with new types of satellites that enable higher throughput and flexible coverage using software-defined capabilities in space.

These new satellite capabilities require the ground segment to evolve and expand to enable next generation applications such as 5G and IoT, alongside classic solutions such as In-Flight Connectivity and Maritime. The next generation ground segment must be elastic, agile and have an open architecture that provides the best solutions to the needs of future satellite networks at maximum efficiency (CapEx and OpEx) throughout the network's lifecycle.

SkyEdge IV's Elastix-Architecture is an evolution of the X-Architecture, taking Gilat's extensive experience in designing, implementing and deploying satellite communication ground stations and expanding it to the new Elastix Era.

Elasticity in satellite communication is more crucial than it's ever been before. Having the ability to adapt, expand and deploy network resources in real-time is no longer a future promise but an absolute necessity to maximize the capabilities of next generation satellite technology. More specifically, in the Elastix Era, space and ground segment satellite communication providers are developing solutions that work in harmony, being dynamic, programmable, streamlined, efficient and scalable.

Gilat's Elastix-Architecture is built around 4 basic dimensions that are key to next generation satellite communication:

Cloud-Based Ecosystem

Multi-Orbit Satellite Constellations

Software-Defined Satellites

Elastix-Access

Cloud-Based Ecosystem

The first key dimension of the Elastix-Architecture is the cloud-based ecosystem.

The rising power of elastic cloud computing helps businesses improve their internal processes. They get better results, improve operational efficiency and ultimately increase the bottom line.

Cloud infrastructure optimizes the hardware needs of data centers, providing enormous elasticity; organizations don't need to buy and maintain the latest hardware devices or maintain their own data centers when scaling up or down their operations. The common infrastructure management tasks such as scaling, scheduling, patching and provisioning are handled by cloud providers; therefore, businesses can focus their time and effort on the business logic specific to their applications or processes.

Cloud solutions correctly select and assign the right resources to a workload or application in order to achieve optimal efficiency. The resources are scalable and elastic in near real-time and are metered by use. Systems will be primarily software, demand-based with efficient and dynamic network scalability. Resources will be used only as needed to meet surges in demand as they arise.

In the next generation of satellite communication systems, cloud elasticity will be the way things are done. Virtualization and the ability to work seamlessly in a cloud environment will support a cloud infrastructure and flexible data-throughput, thereby providing significant improvements to the economies of scale.

Furthermore, one of the greatest benefits of the cloud is its flexible business model; the ability to pay based on what you use, is of course most relevant for the Elastix Era.

Gilat joins the game with our Elastix-Architecture, which leverages cloud technologies. This will enable satellite operators to have a ground segment that can be easily integrated into the common computing infrastructure. In turn, operators will have the ability to scale up/down based on real-time network needs and thus increase their operational efficiency and reduce operational costs.

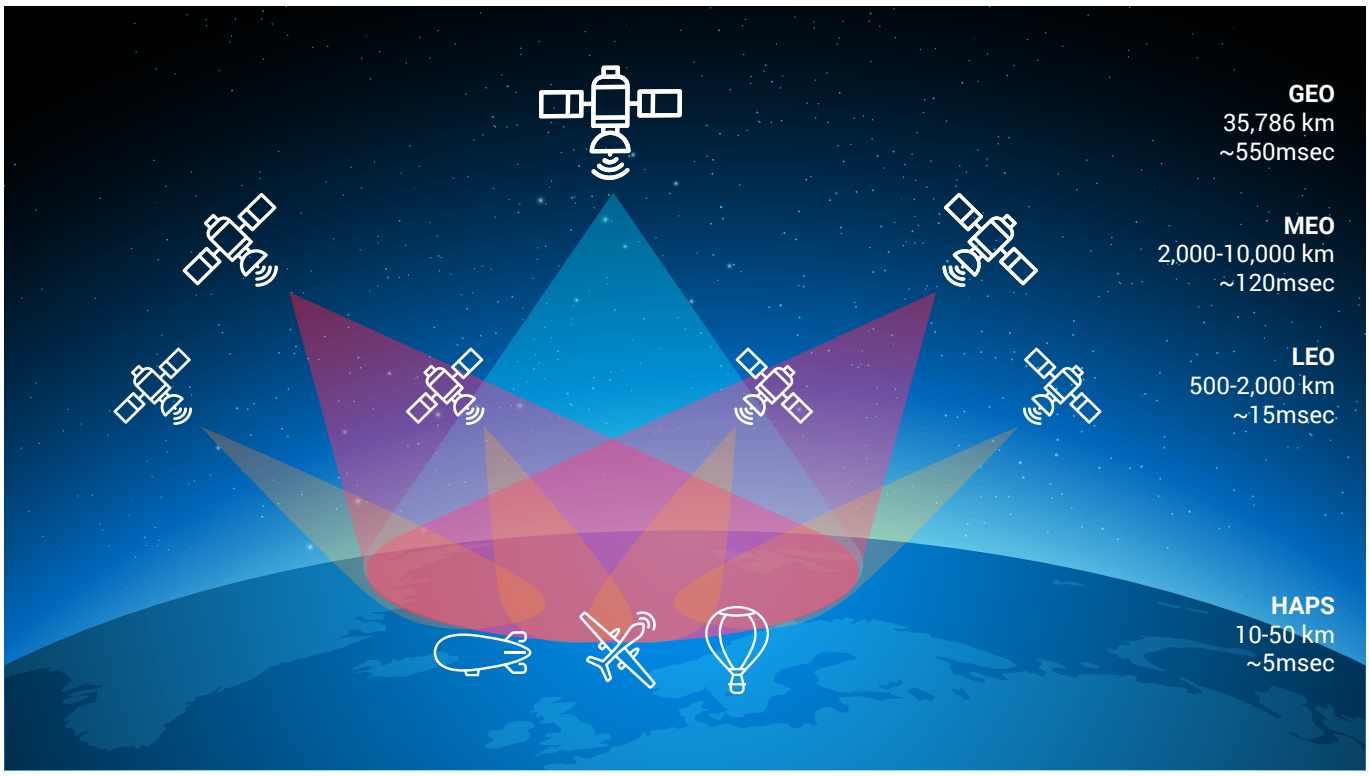
Multi-Orbit Satellite Constellations

Another key dimension of the Elastix-Architecture is the expansion from GEO satellites to Very High Throughput Satellites (VHTS) and Non-GEO Stationary (NGSO) constellations. The increase in orders of magnitude of bandwidth using VHTS and the introduction of low latency orbits opens satellite communication to unprecedented opportunities that include ubiquitous 5G coverage, high throughput applications such as demanded on cruise ships and airplanes, as well as opportunities for delay-sensitive applications.

The Elastix-Architecture addresses the multi-orbit operation of any satellite constellation, medium earth orbit (MEO) or low earth orbit (LEO), including seamless handovers between orbits, implementing 'make before break' for an uninterrupted and transparent user experience.

GEO, MEO and LEO constellations will continue to live in harmony as complementary technologies, each with their own advantages. It is important to enable multi-orbit, per application and per region configuration with varied service options and to deliver orbit redundancy. The elastic multi-orbit operation must allow users to continue to enjoy uninterrupted service that is completely oblivious to the orbit switch.

Constellations Are Becoming a Reality



Software-Defined Satellites

The next major dimension of the Elastix-Architecture is the innovation of Software-Defined Satellites (SDS) that influence and shape next generation satellite communication. SDS have the elastic capabilities to modify beams, bandwidth, power and connectivity as needed. The smart satellites of the Elastix-Architecture allow for programmable Software-Defined Networks (SDN) that support on-the-fly changes to optimally address dynamic network changes.

To accommodate SDN, the ground segment plays a major role in providing complimentary elasticity to enable the required dynamics from such networks in several ways:

First, scalability will be enabled with any beam structure and at any demand allocation. This gives a great advantage for network scaling not limited by beam coverage, bandwidth and peak throughput. Scalability enables a ground infrastructure that is better optimized to reduce costs with smaller footprint, while capacity is added only as network utilization increases. This includes 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 accommodating ongoing, changing demands.

Furthermore, the Elastix-Architecture also 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. The inefficient "design to peak usage" will no longer be relevant. Allocation of resources is elastic at the point where demand meets accurate supply.

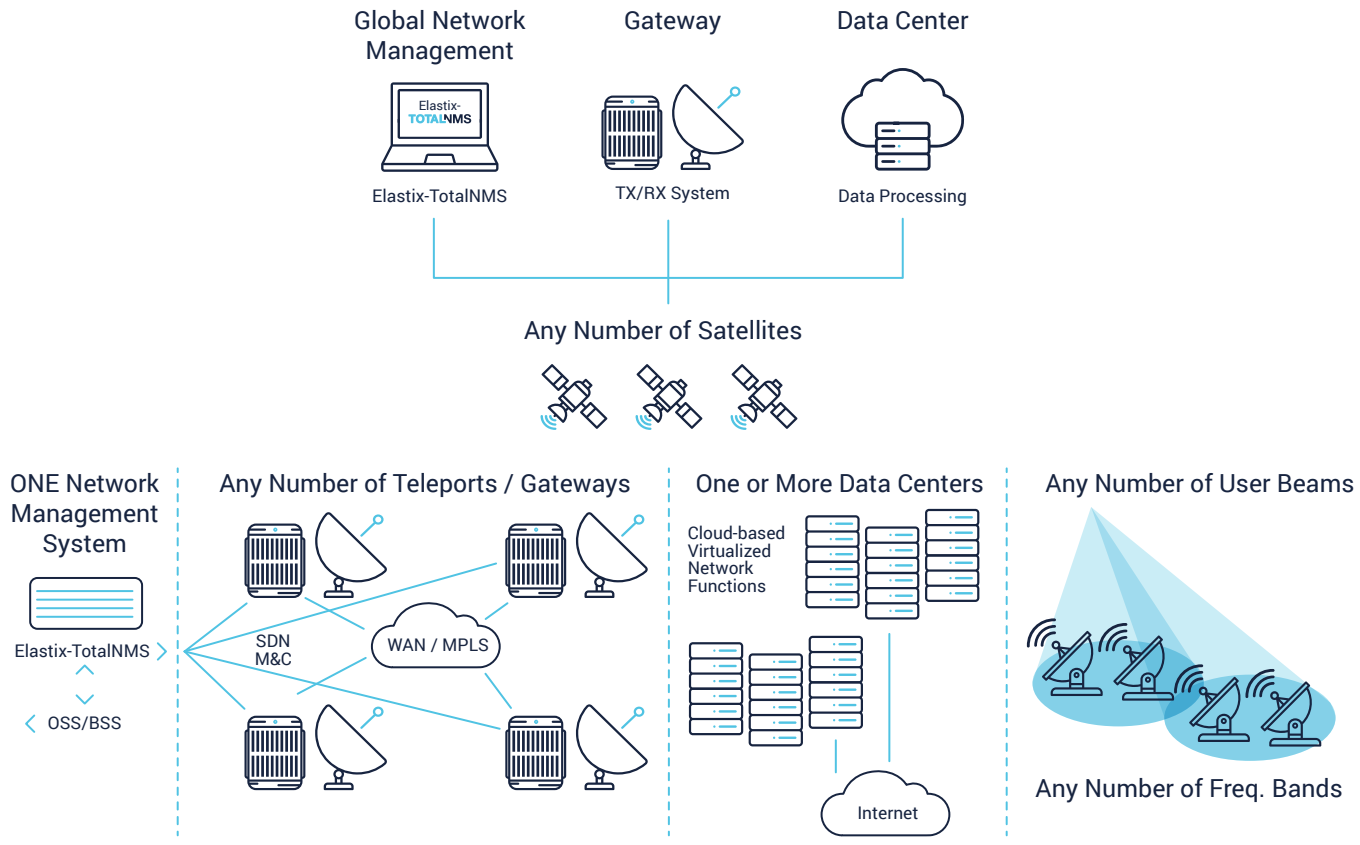
Elastix-Access

The forth dimension of the Elastix-Architecture is the highly efficient Elastix-Access. The Elastix-Access is able to answer a variety of needs that include high-throughput applications including cellular backhaul and mobility, all the way to very low throughput for applications such as IoT.

Furthermore, the Elastix-Access addresses dynamic changes in the satellite network caused by physical conditions or changing needs. Network utilization must be optimized in the Elastix Era more than ever before with speeds that are moving from Kbps to Gbps on a single terminal, with fast and dynamic adaption to change with maximum efficiency.

The Elastix-Architecture has a single technology that can answer the varying needs of multiple applications and dynamic changes. The actual required bandwidth must be identified, adjusted and controlled to provide the best quality of service with maximum cost savings. The availability of the satellite link must be maintained for best service availability, with continuous power adjustments, to most efficiently and dynamically reduce modulation codes to maintain service quality.

Elastix-Architecture



Gilat's Elastix-Architecture is designed to enable customers to promote next generation core technologies like 5G and cloud and will enable satellite operators to expand their business into new markets.

A distributed architecture with software-defined based orchestration, as implemented in the Elastix-Architecture, is the ideal solution for maximizing throughput over software-defined satellites with a scalable sophisticated infrastructure.

The Elastix-Architecture allows for simplified management and orchestration by the Elastix-TotalNMS centralized management system. Gilat's network management system is built utilizing its proven expertise in satellite network monitoring, control and configuration management.

The Elastix-Architecture is based on the four dimensions that enable Gilat to extend its core capabilities into the next challenges of satellite communications. The advanced architecture provides enhanced support for applications like cellular backhauling, emergency response, satcom on the move, oil & gas and others. The Elastix-Architecture provides a boost for higher performance, better efficiency, dynamic use of multiple satellite orbits, all enabling service providers around the world to take their business to the next level.