



KONGSBERG

KSAT^{lite}

A FLEXIBLE AND COST OPTIMIZED
GROUND STATION NETWORK
FOR SMALL SATELLITE PROGRAMS

Utilizing the highly reliable, rugged and well maintained infrastructure from our large antenna global network, providing 24/7 operations

Innovative, cost efficient satellite programs now have access to an equally innovative, flexible and cost optimized ground station service – **KSAT^{lite}** – developed for the rapidly emerging smallsat market. Offering significantly reduced service prices, **KSAT^{lite}** retains the market leading characteristics of the KSAT ground station network:

- Unequalled geographical locations for polar orbits, enabling 26 out of 28 possible passes per 24 hours from only two ground stations; Arctic Svalbard station and Antarctic Troll station.
- Mid-latitude sites for low-inclination orbits and extremely low latency polar orbit downloads
- Optical fiber data backhaul from all sites, except Antarctica (Troll) which uses a high-capacity GEO satellite link
- Highly automated operations through the KSAT Tromsø Network Operations Center (TNOC)

Attractive pricing while maintaining high quality: **KSAT^{lite}** antennas are deployed at existing KSAT sites, reusing the infrastructure and operational concept. Customer interfaces, centralized through the Tromsø TNOC, are handled by friendly and efficient staff, facilitating the excellent customer relation which has become our trademark.






WORLD CLASS – THROUGH PEOPLE, TECHNOLOGY AND DEDICATION

KSAT ^{lite} is a ground station network based on small and cost-effective antennas, coupled with flexible options and procedures in terms of customer interfaces, equipment selection, monitoring, priority allocation, availability and pass selection. At the same time, **KSAT ^{lite}** preserves the major advantages of the successful KSAT large antenna network: pole-to-pole geographical locations, high quality, dependability and volume efficiency.

Antennas/Backends

KSAT ^{lite} supports multiple frequency combinations to meet specific satellite program needs. The baseline is 3.7m antennas located around the world, supporting X- and S-band downlink and S-band uplink. **KSAT ^{lite}** also offers VHF/UHF capabilities, Ka-band compliancy is being added within 2015.

KSAT ^{lite}	 Baseline 3.7	 UHF/VHF	 Ka-band
Receive	X-band S-band	UHF VHF	Ka-band -
Transmit	S-band	UHF	-
Backend	KSAT Standard BYOD	KSAT Standard BYOD	KSAT Standard BYOD

When designing the **KSAT ^{lite}** backend, decades of experience with providing ground station services to the traditional space industry have taught us the importance of flexibility. **KSAT ^{lite}** gives our clients the freedom to choose – use a fully integrated KSAT Standard, with several custom configs and setups available or “Bring Your Own Device” – BYOD. The choice is yours!

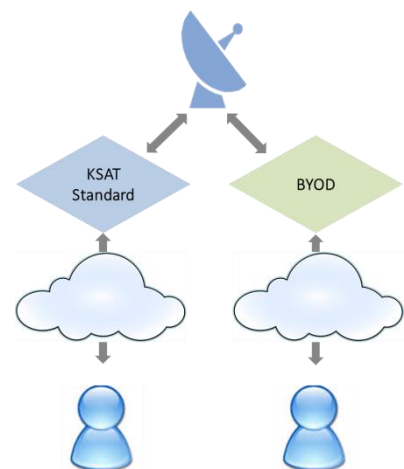
Customer Interfaces

KSAT Standard

We will both operate the antenna and provide secured channels prior to AOS. These channels may be used both to send commands to the satellite, and to receive command responses/ telemetry and payload data. The provided channels will remain open until after LOS. We support a wide variety of modulations and protocols.

BYOD

We operate the antenna and host your equipment at the KSAT ^{lite} sites, allowing you to use your preferred backend equipment and to setup and control the necessary channels.



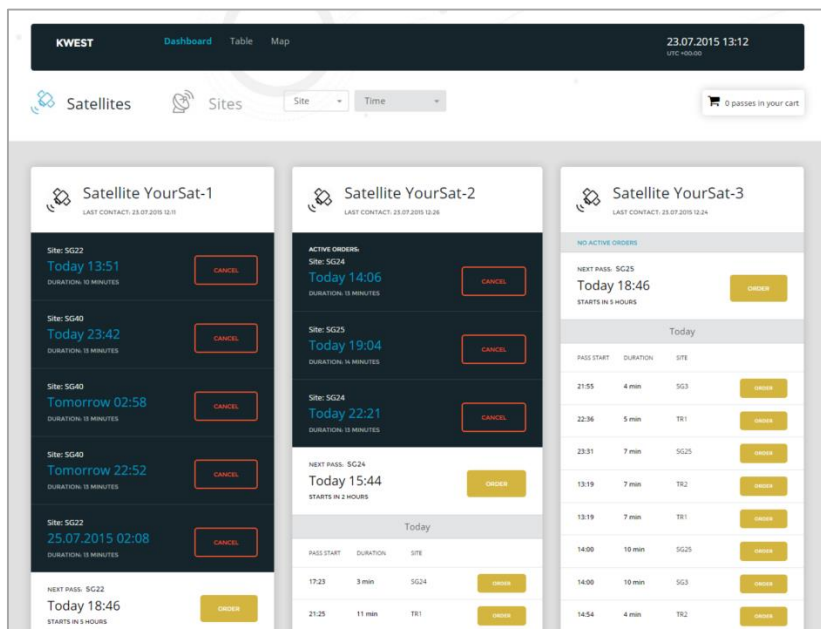
KSAT can, through the 24/7 operations center, monitor all systems and alert customers as needed. KSAT can also provide a real-time system monitoring interface to the customers.

Scheduling

As part of **KSAT ^{lite}** an interactive, web-based scheduling application is provided, enabling:

- Real-time access to the KSAT antenna network scheduling system
- Full visibility into passes fitting mission needs
- Visual representation of both available and scheduled passes
- Interactive scheduling and cancellations
- Both mission, site and time based views
- Multi-satellite and multi-site support

The **KSAT ^{lite}** scheduler allows customers to interface directly with the antenna scheduling system, selecting passes from a clear presentation of opportunities corresponding to the satellites’ TLEs and requiring no further action from that point on. The system allows for late changes or scheduling of additional passes just hours before the event.



KSAT ^{lite} Scheduler Mission based view - showing available and scheduled passes for each satellite across available sites.

Service Levels

To match the operational concept of as many small satellite owners as possible, **KSAT ^{lite}** provides two different service levels, one for the most demanding users requiring a high level of availability (Maxi) and one for users with less stringent support needs (Flexi). It is possible to choose a combination of the two price plans.

Maxi	Flexi
Customer commits to average number of daily passes	Flexible scheduling based on availability
KSAT guarantees antenna capacity	Low financial commitment
Scheduling Scheme Priority	Possibility to move passes within same week
Possible to top up with Flexi passes	Scheduling up to 3h before pass available

About KSAT

Kongsberg Satellite Services AS (KSAT) is a commercial Norwegian company, uniquely positioned to provide ground station and earth observation services for polar orbiting satellites. KSAT's network consists of over 70 antennas optimally positioned for access to polar and lower inclination orbits at the interconnected polar ground stations; Tromsø (69°N), Svalbard (78°N), Antarctic TrollSat (72°S), Inuvik (68°N) and Fairbanks (65°N) as well as integrated mid-latitude stations in South Africa, Dubai, Singapore, Mauritius, and Argentina.

KSAT's advantages lie not only in our global network of ground stations, but also in our state-of-the-art and unique operations concept. The Tromsø Network Operations Centre (TNOC) functions as the core operations center integrating the entire KSAT global Ground Station Network through remotely monitoring and controlling the ground stations. TNOC is the one-stop point of contact for the KSAT global Ground Station Network 24/7, 365 days a year. A highly reliable communications infrastructure is coordinated and implemented as an integral part of the KSAT operations. TNOC handles the pass scheduling, reporting, management and interfacing with the KSAT operations team and the customer. A second Operations Centre is located at SvalSat, providing a full, geographically independent redundancy for the TNOC.

KSAT's customers include commercial entities, governments, national space agencies and international organizations worldwide. KSAT has a significant customer base in the United States, including government agencies, commercial satellite operators and other space entities.

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