Ground Control

SCADASat
Secure, scalable satellite connectivity

The data challenges for SCADA and utilities

The data requirements of SCADA and utility industries can be demanding. The industry as a whole is a target for cyber attacks, sites are often out of reach of terrestrial data connectivity, and extreme weather can disrupt data transfer and reliability.

Cyber security

Cyber-attacks are on the rise around the world. Between 2020 and 2021,IBM reported a 10% increase in data breach costs to customers, from $3.86 million to $4.24 million per incident. Utility powerhouses have been targets for this activity which can cost businesses tens of millions. The remote nature of these sites also make them more susceptible to data breaches and compromised security.

Remote sites

Most power, energy, critical infrastructure and oil and gas providers have approximately 10-20% of remote sites that are 'off grid'. By nature of their location, cellular, fiber and terrestrial networks do not cover the site nor site operations and sometimes the only connectivity is via lone workers attending site for maintenance and routine purposes.

Weather and climate conditions

Remote utility sites can be subjected to the harshest of conditions. The United Nations Office for Disaster Risk Reduction reports that over the last 20 years, there has been a "staggering rise" in the number of extreme weather events. Floods, fires, storms and earthquakes, all risk the stability, reliability and telemetry data delivery of sites that are reliant on cellular and fiber connectivity.

SCADASat Based Solution

SCADASat is the optimum satellite based solution for SCADA and utility data transfer and retrieval from even the most remote locations across the globe.

SCADASat provides a highly secure, private satellite network operating a direct communication channel between a process control centre and remote locations. Completely independent of any public infrastructure, it's highly secure and reliability is assured.

Specifically engineered to support mission critical narrowband applications such as SCADA, Telemetry, M2M and IoT, the ruggedized and utility hardened hardware is designed to provide years of robust and reliable operation even in adverse weather conditions - unlike cellular and fiber.

The platform is highly scalable and suits the needs of both small and medium-sized networks, is compatible with both IP and legacy serial devices and operates independently from terrestrial communications systems, both complementing and offering an alternative solution to terrestrial networks, ensuring transmission at all times.

Robust and reliable communications

AES 256 end-to-end security

Keeps you in control

Flexibility to support legacy systems

Affordable satellite connectivity

Designed specifically for SCADA and telemetry

Always on connectivity

Complete security
SCADASat complies with IEC 61850 standards and AES-256 encryption and authentication. Furthermore, it's completely isolated from the Internet or any other network, riding over a dedicated space-segment of one or more satellites for redundant fail-over reliability, in multiple topologies. Cyber security features include: VLAN (Virtual LAN) support, file system encryption, secure Linux login to avoid unauthorized access, and SW/FW upgrade over-satellite authentication.

Compliance and certification
SCADASat complies with IEC-61850 - the global standard for utility and industrial communication and automation. Through rigorous testing, Ground Control solutions are certified in the Worldwide Industrial Telemetry Standards (WITS) DNP3 protocol which sets the global standard for the utility industry telemetry control and monitoring requirements, and in particular, the interoperability between equipment from different manufacturers.
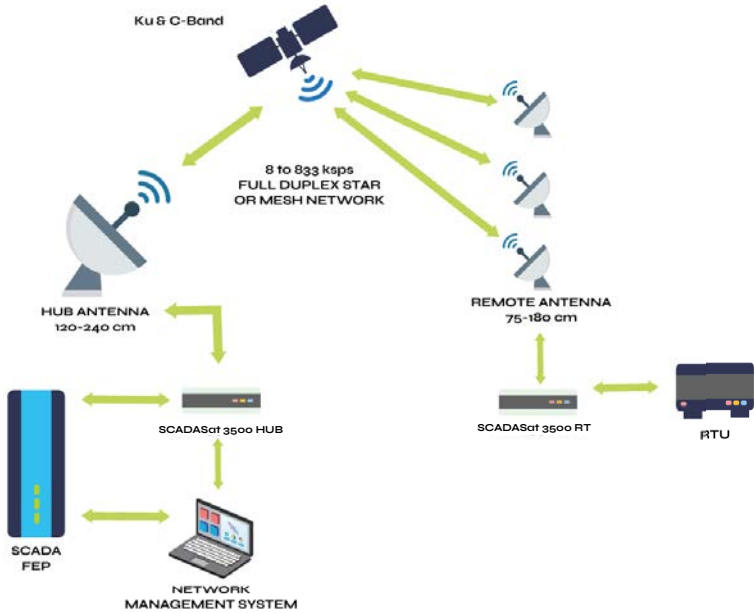
Save costs but stay secure
Onsite maintenance of traditional connectivity devices can take several hours to service – with on-site visits taking place on average once per week. Even then, there is no guarantee of the issues being resolved without further callbacks. By comparison, SCADASat is an extremely reliable, always-on solution, and relays data in real-time, ensuring prompt and guaranteed service.

The SCADASat HUB is the lowest cost VSAT HUB on the market. By efficiently using the satellite spectrum, and tailoring satellite bandwidth to the actual application needs, annual communication costs are reduced to a minimum. This makes SCADASat the ideal primary as a backup for existing terrestrial communications.

How SCADASat works

Ku & C-Band

8 to 833 ksps
FULL DUPLEX STAR
OR MESH NETWORK

HUB ANTENNA
120-240 cm

REMOTE ANTENNA
75-180 cm

SCADASat 3500 HUB

SCADASat 3500 RT

RTU

SCADA FEP

NETWORK
MANAGEMENT SYSTEM

POINT to POINT
Stand alone, two sites communicating to one another.

STAR
Star topology is a bespoke design where all data returns to a central HUB whereby the HUB provides network signalling and data transmission over the outbound TDM carrier.

The transmission is continuously received by all remotes. The remotes will transmit on the inbound TDMA carrier according to a user-configured slot allocation scheme. The outbound and inbound carriers can be sized independently to meet exact throughput requirements.

For most SCADA and telemetry networks, the inbound traffic is larger than the outbound traffic. However, when network traffic exceeds the capacity of the single outbound and inbound carrier, additional carriers can be added easily.

MESH
MESH is a multi point to point network with remote sites, directly connected with a centralized HUB for management and control.

The SCADASat mesh feature (TDD) is implemented with a single TDMA carrier, where the hub is designated as the master. The master provides timing and bandwidth (slot) allocations to the connected remotes in the network. Network configuration and bandwidth allocations are highly flexible and can be dynamically changed.

Mesh connectivity also enables remote-to-remote connectivity via a single "hop". Single hop connectivity is a highly desired capability for several utility distribution use-cases where latency is critical. The reliability of SCADASat''s mesh network implementation is further enhanced by an optional "hot" stand-by master. It enables uninterrupted operation in case of a master outage.

SCADASat key features

- Ultimate in security – a closed "private" satellite network
- Satellite bandwidth efficient – fixed low communication cost
- Network management tools designed for SCADA and M2M
- Data rates supported from 8ksps to 832ksps
- Modular and scalable to meet network requirements
- Integrates with existing TCP-IP and Serial SCADA M2M devices
- Application protocol independent suitable for DNP3, WITS & legacy protocols
- Provides a fully routed IP Infrastructure supporting Peer to Peer connections
- Enhanced security – 256 AES encryption (option)
- Cyber secure feature set: VLAN (Virtual LAN) support, file system encryption, secure Linux login to avoid unauthorised access, SW/FW upgrade over-satellite authentication
- Easily upgrade from existing private wire / LTE network
- Own and control your own network and satellite segment

SCADASat serves multiple markets

Power
Transmission
Distribution networks
Hydro-power generation
Renewables (wind and solar farms)

Energy
Fresh water supply networks
Waste-water treatment facilities
River, dam, and reservoir level control

Critical Infrastructure
Structure monitoring
Critical infrastructure protection
Security/CCTV and access controls

Oil and Gas
Oil and gas pipelines
Platforms
Emergency shutdown valves

Technical specification

- Topology: Star (FDD) and Mesh (TDD)
- Data transmission speeds: 8ksps to 832ksps
- Frequency range: L-band 950-2150MHz
- Power supply: BUC +24V, 3A max; LNB 18V, 0.5A max
- Serial interfaces: RS232, 422 or 485, 1 x USB-C; 2 x DB9 for hub and 19" remote; 1 x RJ45 for desktop remote with 2 serial ports
- Network interfaces: 2 x RJ45 10/100Mbps Ethernet
- Dimensions (LxWxH): Hub and 19" remote – 177mm x 482.6mm x 44mm / Desktop remote – 177m x 133mm x 44mm
- Operating temperature: 0° to +50°C
- Power supply: Hub and 19" remote – 24 to 48VDC / Desktop remote – 24VDC from 100-240VAC/50-60Hz power adapter
- QoS: DSCP – DiffServ (differentiated services) based IP prioritization
- VoIP: Extended and verified multi-simultaneous IP voice-calls over satellite (including RT-to-RT calls)
- Roll-off factor: The 3500 is extended to support roll-off down to 0.1 (previously 0.3), which allows for more effective use of space segment
- BoD: Extended to configure max/min throughput, as well as dynamic adaption to actual throughput.

Supported protocols
TCP, UDP, RIP, ICMP, ROHC, GRE, Static Routes, ACL, IPv4
Circuit switched
Leased line, dial-up and multidrop (grouping)
SCADA
RP570, ADPL 180, Comli, Sinaut S1, Modbus RTU/IP/ASCI, DNP-3.0, WITS, Serck Proteus
IEC-60870-101 and 104, IEC-61850 etc.

Ground Control

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About Ground Control

Ground Control uses satellite and cellular technology to connect people and things – specializing in connecting hard-to-reach people and things.

Ground Control designs and builds its own hardware covering the entire spectrum of connectivity requirements, with manufacturing facilities in the United States, and in the UK. From first responders to remote field workers, wind farms to well sites, whether collecting IoT data, tracking positions, accessing the internet, or making video calls, 'we've got you covered'.

Ground Control's long-term partnerships with airtime providers such as Inmarsat and Iridium mean that it has access to the most competitive and comprehensive airtime plans and takes full advantage of service evolutions in ways that make customers' challenges easier to solve.