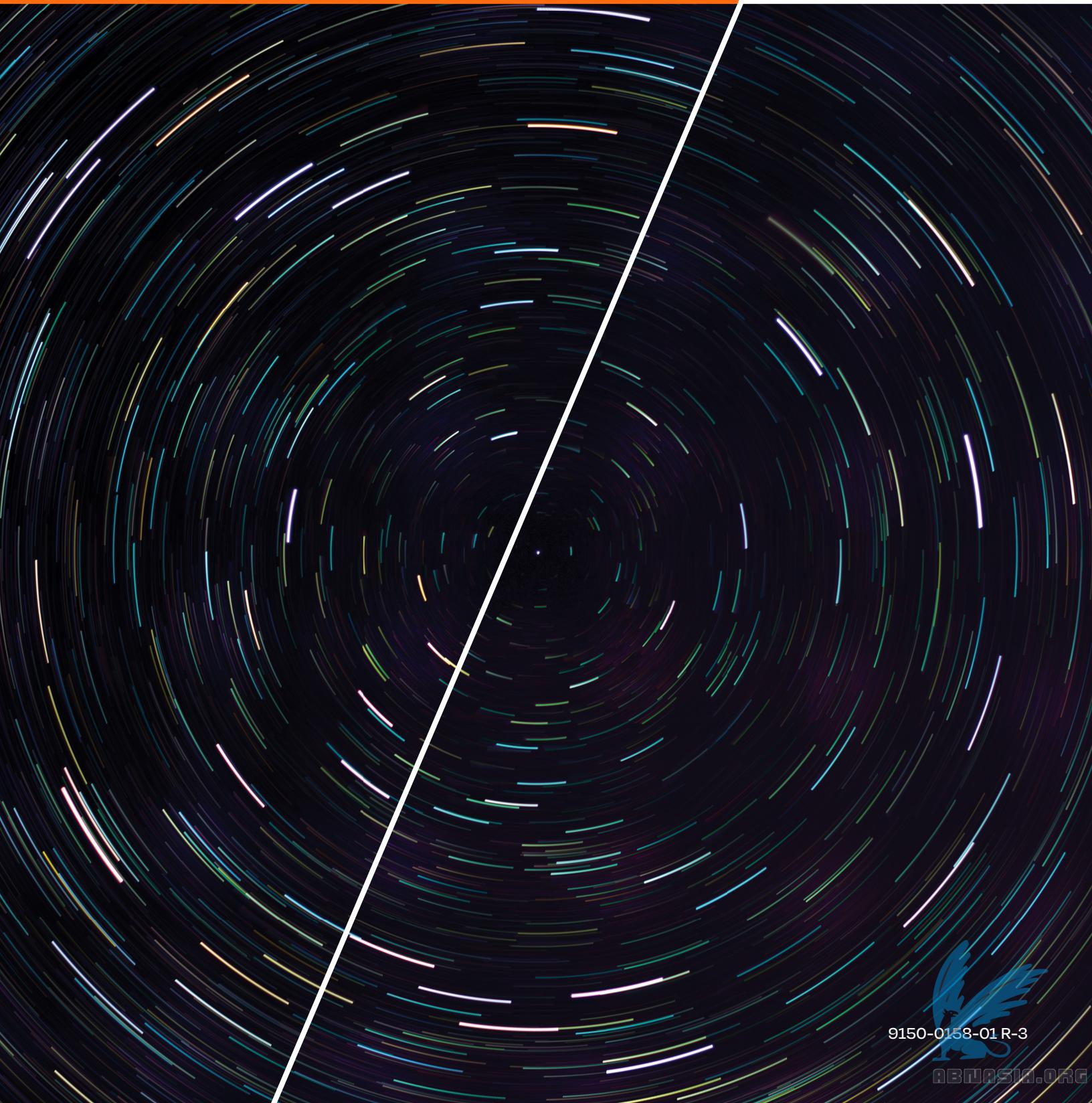


Affordable IoT beyond the network's edge

*IoT connectivity and applications for transportation, energy, construction,
agriculture, forestry, maritime and government*

Globalstar 



9150-0158-01 R-3

ABN ASIA.ORG

Turning IoT expectations into measurable value.

The global market for industrial IoT (IIoT) was sized at over \$263 billion in 2021 and is expected to swell to \$1.1 trillion by 2028. That's a clear sign that companies expect high value from this digital transformation of their operations. The big question is how to turn expectation into reality.

Big digital transformation projects have a poor record. A 2020 study by Boston Consulting Group found that a staggering 70% of them fall short of goals. Effective turnkey solutions are in short supply. Integrating them into existing management platforms can be hard. And the information technology skills needed to do it are in short supply. And when you deploy IIoT for fixed and mobile operations beyond the network's edge, the risk rises even higher.

Keeping it simple

The key to success is avoiding oversized projects that stress the entire organization. The odds improve when companies deploy IoT applications that meet real needs affordably, reliably and now. If they align with industry standards, companies have the option of integrating them into comprehensive solutions in the future. And they will be doing it with applications that have already proven their value in the real world.

Industrial IoT: what's the value?

Asset Tracking

- Protection against loss based on location data and geofencing
- Fast identification of unexpected activity signaling potential problems
- Better customer service based on up-to-date location information
- Reduced downtime and improved coordination of operations
- Better business performance from more efficient use of assets
- Improved supervision of remote workers

Sensor Data

- Near-real-time data on critical performance factors from mobile and fixed assets –
 - Engine performance
 - Fluid levels
 - Tire inflation
 - Pipeline pressure
 - Concrete curing
 - Environmental conditions
 - Soil conditions and wildfire danger
 - Analytics and data visualization to inform decision-making, reduce costs and boost performance

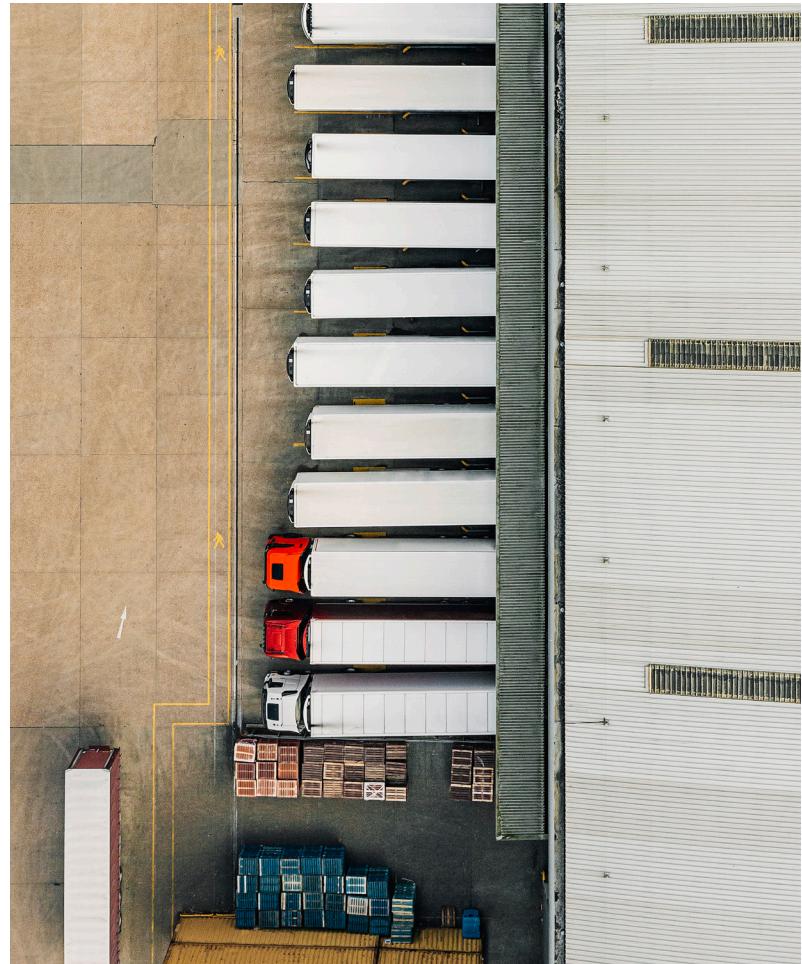
Real-world IoT applications

Remote Trailer Monitoring

More than 16 million trucks drive American roads each day, including nearly 4 million Class 8 big rigs. There is an average of 2 to 3 trailers for every tractor, and those trailers are a source of profit, but also cost and risk for logistics companies. Companies waste hours manually checking their yards for available trailers, tracking down trailers detained by customers and managing theft risks. An asset tracking and IoT solution for trailers using Globalstar technology and the Globalstar Satellite Network can make a major difference to profit, cost and risk. With trailers pinging their location, manual yard checks become obsolete and customers can be charged accurately for the trailers they detain. Trailer thieves find themselves leaving a digital trail as geofencing technology triggers alerts to a trailer going where it is not expected. Sensors can report utilization to predict when maintenance is needed and monitor conditions from temperature and open doors to the presence of cargo. In addition to greater productivity, lower risk, and higher revenues, avoiding purchase or rental of additional trailers can add save literally millions each year.

Managing Construction Assets

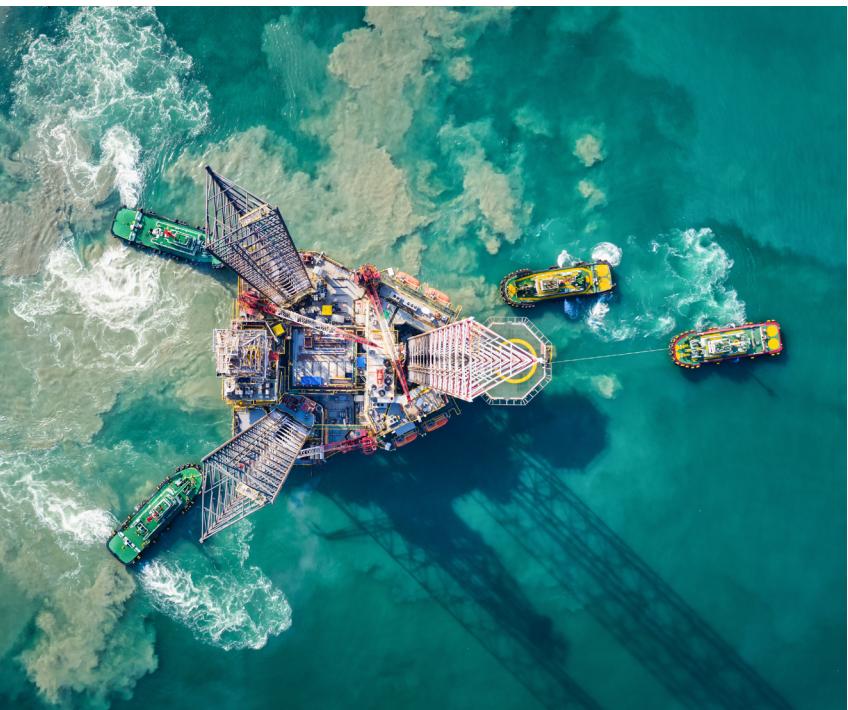
Many construction companies and equipment vendors still rely on phone calls and written logs to track equipment transported to and from job sites as well as its actual use. Satellite asset tracking with Globalstar lets companies check the location and status of equipment in near real-time, export data into their applications and accurately track data for billing the time each piece of equipment is used on a project. Onboard power and movement sensors can gather and report engine runtime accumulation and validate equipment operation to enable more cost-effective maintenance and greater uptime. Gains in productivity, additional revenue, maintenance costs, and uptime can be transformative.





Drill Rig Tank Monitoring

Fluid-filled tanks are basic equipment at every oil or gas drill site, holding everything from fuel and water to drilling fluids. Monitoring and maintaining the level in those tanks has long been a manual task that requires a worker to check exterior gauges and log the results. But remote monitoring is becoming increasingly common. Globalstar's IoT solutions enable fast product development of new monitoring systems for fluid levels. Data on tank levels including GPS coordinates allows drilling companies and their vendors to see all tanks, establish automatic alerts to low level and even automate dispatch of supply trucks to refill the tanks. Data processing on edge devices allows them to limit data transmission when tanks require no action and condense measurement data into short messages, saving on transmission costs. Drilling companies save thousands of unnecessary hours and ensure that fluids are always available to support uninterrupted operation.



Coordinating Support Vessels

Offshore energy platforms are served by fleets of support vessels delivering supplies, material and people, supporting construction, towing platforms and operating remote-controlled underwater vehicles. While many fleet operators still rely on pen-and-paper for tracking their assets, Globalstar's IoT solutions can generate accurate tracking data on vessel location and provide flexible geofencing around platforms, docks, and maintenance facilities to send alerts to key vessel movements. Displayed on the SPOT My Globalstar advanced mapping application, the data reduces idle time for vessels and quickly lets fleet managers identify the most efficient way to route vessels to platforms, which can make the difference between profit and loss.



Realm Enablement Suite

Transmit Smart Data from edge to endpoint

Realm Enablement Suite is an edge-to-endpoint, AI-enabling solution for IoT, built on innovative edge hardware, Globalstar's reliable network, and the Realm Cloud. The suite consists of high-performance devices and modules that use an Edge Application Platform to enable the automation of remote processes and deliver smart data to the endpoint. In addition, Realm Cloud offers a robust mobile device management (MDM) platform for device configurations, subscriptions, data analytics, and dashboard visualizations. As a result, the Realm Enablement Suite delivers value by slashing the time and cost of solutions while providing more efficient use of assets and data for enterprises.

Realm technology stack

/ REALM EDGE SOLUTIONS

- **Devices and Modules:** Low-cost, high-performance devices and modules equipped to interface with industry-standard sensors and providing the processing power to host AI applications and process Smart Data for cost-effective transmission.
- **Edge Application Platform:** Powering development of custom applications to run at the edge. Managing device configuration and uploads.

/ ULTRA-RELIABLE NETWORK

- Delivering data from the edge securely, reliably and affordably over the Globalstar Satellite Network.

/ REALM CLOUD

- Providing everything you need to manage devices, configurations, subscriptions and data translation, with a rich array of features to help you create IoT applications and integrations.
-

Realm edge solutions

Devices and modules

*Transmit smart
data **from the edge***



Integrity 150 is a next-generation, solar-powered data transmitter and asset tracker that interfaces with industry-standard sensors over Bluetooth and delivers Smart Data from the edge. Users can quickly program AI-enabled applications and computing solutions using the Edge Application Platform to process location and sensor data at the edge for low-cost Smart Data transmission. In addition, it delivers zero-maintenance ownership with the longest-lasting battery (10+ years) and shelf life available. With its low-power design built for the world's most challenging environments, the Integrity 150 reliably delivers secure data and location reporting with unprecedented payload options.

*Slash **hundreds of hours** of
development time*



The **ST150M** satellite modem module can be quickly and effectively integrated into technology to develop unlimited applications for a range of markets. Like the Integrity 150, the modem leverages industry leading BLE5, Nordic C, and comprehensive unified APIs, empowering rapid development and customization of firmware for more advanced smart data applications and enabling AI at the edge. In addition, the ST150M provides both wired and BLE access to the fully programmable 24 I/Os for interface with sensors and actuators. The **ST150 Dev Kit** includes ST150M module on a dev board with satellite and GPS patch antennas, all mounted on an Arduino Shield, to develop and test technology designs before committing them to hardware.

Automate processes at the edge

The onboard processing capacity of Realm edge devices make it possible to fully automate remote processes to save money, increase productivity, improve margins and enhance safety. The module contains 24 configurable Input/Outputs (I/Os) that interface with sensors and actuators. This combination of custom software and powerful hardware can not only detect change but take immediate and high-value action in response, such as –

Preventing pipeline or process equipment failure

If a sensor detects a problematic rise or fall in pressure, edge devices can trigger local audible and visible alerts, open or close valves and remotely shut down pumps as needed.



Avoiding toxic releases

When sensors detect dangerously high water in a tailing or wastewater pond, edge devices can turn on a pump to lower the level, trigger alarms and trigger more complex actions.



Managing irrigation remotely

If soil moisture sensors in irrigation equipment detect low moisture, edge devices can turn on irrigation pumps and save the need for a visit to the site.



Stopping catastrophic engine breakdowns

Stopping catastrophic engine breakdowns. When sensors monitoring key engine factors detect a dangerous change, such as a sudden drop in oil pressure, edge devices can trigger alarms and, after a pause for human interaction, switch off the engine.



The same software developed for the edge device can automatically dispatch smart messages over the Globalstar Satellite Network to alert managers to the issues and supply data to management systems. Eight of the devices' 24 I/Os can be configured as analog, which allows them to measure and report changes per connected analog sensor.

Edge application platform

Quickly program AI applications for processing smart data. The low-code Edge Application Platform is the key to unlocking the unlimited capabilities of these rugged, reliable devices in the field and slashing hundreds of hours of development time for new products. The standards-based architecture means that new features and platform upgrades can reliably access the same hardware interfaces, APIs, and applications as previous versions with no specialized coding.

The Platform provides access to the firmware and base applications that run the devices and an extensive and growing library of applications to interface with sensors measuring temperature, humidity, magnetic fields, angular position, motion, proximity, and other metrics. No more writing custom code to control every aspect of hardware operation. Also included are hardware interfaces allowing full driver/hardware abstraction and APIs that give your custom applications access to device capabilities. The GitHub application library invites developers to share new and updated apps with the Realm customer base.

Edge application platform layers

Application Layer / The base applications that run the Integrity 150 and ST150M, as well as Bluetooth services, are open to developers for integration with their software, including theft alert, messaging, tracking, SOS and BLE.

Unified API Layer / Application program interfaces (APIs) enable your custom applications to immediately access the full capabilities of devices, including sensor support, without additional coding.

Library Layer / An extensive and growing library of applications can be uploaded to devices in their current form or modified to interface with sensors measuring temperature, humidity, magnetic fields, angular position, motion, proximity, and other metrics. We invite all integrators to share their successful modifications or new applications with other Realm integrators in the GitHub project library.

Hardware Application Layer / Hardware interfaces allow full driver/hardware abstraction within Realm devices to simplify and speed development.

Ultra-reliable network

Your data is transmitted reliably and securely over the Globalstar Satellite Network for delivery to your designated endpoint. It may be Realm Cloud, servers on your premises or one of many third-party IoT platforms on the market.



Realm Cloud

Realm Cloud provides everything you need to manage devices, configurations and subscriptions, as well as translate and manage data, analytics and dashboard visualizations. Featuring a microservice and API-based architecture, with DevOps automation, Realm Cloud is a multi-tenant environment with an elastic infrastructure that grows with you. It delivers a rich array of features: analytics, a rules engine, advanced GIS, data management, edge-device management, complex event processing, security, and compliance. Your team can focus on creating IoT applications and integrations, while leveraging our platform features for all the rest.

Realm Cloud features

Enhanced device and data management, security and analytics



Performance management



Device configurator and data decoding



Device and data management via web + Mapping capabilities



Alerts & notifications management with rules-based engine



Device level details including location and associated sensor data



Account and company management



Asset tracking solutions

*Low power, long life and equipped to **perform***



SMARTONE SOLAR

SmartOne Solar is the only solar asset tracker certified as Intrinsically Safe with ATEX Zone 0 and HERO (Hazard of Electromagnetic Radiation to Ordinance) certifications for hazardous environments. Virtually maintenance-free with up to 10 years of usable service for tracking and monitoring, it's easy to install - requiring no harnesses, external power, or external antennas. In addition, the SmartOne Solar features a wide range of reporting capabilities with inputs available to monitor critical functions from engine run time to tank level and alarms.



GSATSOLAR

GSATSolar is a rugged, low-cost, ultra small, solar-powered device ideal for off-grid tracking of assets and remote IoT operations. The terminal is compact, easy to use and install, and is built for tough outdoor use.



SMARTONE C

SmartOne C is the market's most affordable and feature-rich tracker for locating fixed and mobile assets and transmitting sensor data. Line or battery-powered, it is a small, easy-to-mount unit that is ideal for sending GPS coordinates at long intervals and configurable for various frequency rates.



SPOT TRACE

SPOT Trace is a small, discrete tracker that tracks mobile assets by providing location pings as often as every 2.5 minutes for display on a customizable user dashboard. This easy-to-use turnkey device offers simplified tracking at the lowest cost.



DIGITAL MAPPING

Digital mapping that turns GPS location and data from the field into actionable visual intelligence. It provides high visibility of all in-field resources, geofencing that can trigger alerts to atypical changes, and advanced reporting capabilities.



Remote and lone worker safety solutions



SPOT X 2-WAY SATELLITE MESSENGER

SPOT X GPS Messengers connect to your smart phone via Bluetooth wireless technology through the SPOT X app to access your contacts and communicate easily with colleagues.



SPOT GEN4 SATELLITE GPS MESSENGER

SPOT Gen4 GPS Messengers provide an inexpensive, reliable way to report locations, use pre-set messaging for check-in and have access to an SOS button to signal the need for emergency assistance.



DIGITAL MAPPING

Digital mapping that simplifies location tracking to keep remote and lone workers safe and productive.

Low-cost Satellite Modem Modules



ST100

ST100 Satellite Modem Module gives developers a low-cost option for adding instant satellite communications capabilities to any OEM product for any market. Ultra-light in weight and compact, the ST100 can be used in a variety of simple tracking applications.



STX3

STX3 Low-Power Satellite Modem Module offers affordable pricing, low power consumption and compact build. The smallest surface-mountable satellite modem from Globalstar, the STX is ideal for delivering remote sensing, tracking and monitoring data.



Smart Data for IoT in the world's most challenging places

For more than 15 years, Globalstar has offered customers and partners easy to use, low-cost, high-performance tracking and connectivity solutions that work beyond the reach of electric power and terrestrial telecom. We carry that commitment into products and services for the Industrial Internet of Things: providing just the smart data you need to solve today's problem and protecting your ability to seize tomorrow's opportunities.

Why Globalstar?

Globalstar helps people connect, communicate, and transmit data in smarter ways.

As a telecom infrastructure provider, we offer reliable satellite and terrestrial connectivity that's simple, fast, secure, and affordable. With our low-earth orbit (LEO) satellite network providing coverage to more than 200 countries, we connect and protect assets, transmit key operational data, and save lives – from any location – for consumers, businesses, and government agencies around the globe.

Globalstar's terrestrial spectrum, Band 53/n53, offers carriers, cable companies, and system integrators a versatile, fully licensed channel with a growing ecosystem to improve customer wireless connectivity, while Globalstar's XCOMP technology offers significant capacity gains in dense wireless deployments.

In addition to SPOT GPS messengers that connect people in remote environments, Globalstar offers next-generation IoT hardware and software products that efficiently track and monitor assets, process smart data at the edge with AI-enabled applications and manage analytics with cloud-based telematics solutions – all of which drive safety, productivity, and profitability.

We transform smart ideas into smarter solutions.

*To learn more about how
Globalstar can benefit
your business, contact us at
salesinfo@globalstar.com.*



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/ Commercial IoT

A dark, abstract background composed of numerous glowing fiber optic cables radiating from the center, creating a sense of depth and connectivity.

Connect smarter

globalstar.com

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