


inmarsat

5G
Rail

ENABLING THE CONNECTED WORLD

ANSALDO STS

KEY BENEFITS OF BGAN

1. Performance: standard IP at a rate of up to 448kbps with a low latency from 800 milliseconds.
2. Reliability: operates over the Inmarsat L-band global satellite and ground network, with 99.9% availability.
3. Easy to integrate: simple for field teams to set up, integrate and maintain without technical expertise or training.
4. Cost effective: low-cost terminal, low data rate plans with no reconnection fees.
5. Enhanced support: free firmware upgrade over-the-air.
6. Easy to manage solution: remote terminal management, debugging and configuration options.

Ansaldo STS
A Hitachi Group Company



Inmarsat satellite connectivity supports evolution of ERTMS train signalling system on European railways

ABOUT ANSALDO STS

Ansaldo STS is a Hitachi Group company listed on the Milan Stock Exchange, which specialises in railway signalling and integrated transport systems for mass transit, passenger and freight rail operations. The company designs, manufactures, installs and commissions signalling components, systems and integrated mobility solutions for the management and control of new and upgraded railway, transit and freight lines worldwide. It also acts as a lead contractor and turnkey provider on major transportation projects worldwide.

Since 2011 Ansaldo STS has been a front runner in leading ambitious and innovative satellite-based projects, for example leading the European initiative to integrate satellite technologies into the European Railways Train Management System (ERTMS).

THE CHALLENGE

Safety and efficiency are two of the highest priorities on any railway network. The ERTMS manages the railway traffic on high speed, national lines in Europe, a task which is critical to guaranteeing the safe and efficient transit of passengers and freight across the continent. However, half of the European rail network is made up of

smaller, regional networks which are critical to local economies. In some cases, the signalling on these regional networks is still operated manually, due in part to a lack of reliable connectivity infrastructure. This infrastructure needs to be upgraded to make these regional networks interoperable and as safe as possible. 28,00

Francesco Rispoli, Manager of Satellite Technology at Ansaldo STS, explains the importance of overcoming these barriers: "Train operators in Europe are evaluating plans to upgrade their regional and local railway system primarily to make the infrastructure more efficient, but also to improve the safety where the lines are still manually operated, and in some cases

lacking the automatic override capabilities that protect against inevitable cases of human error. However, there is a significant cost implicated in the deployment of telecommunications infrastructure, such as GSM-R, along these railway lines.

According to a recent study by the transport economics experts, ESA 3InSat team of Bocconi University, 28,000km of European railway lines could benefit from a more efficient ERTMS solution which utilises satellite technology".

THE SOLUTION

Ansaldo STS and RFI, the state-owned company that manages the Italian railway infrastructure, formed the ERSAT initiative in 2012, backed by the European GNSS Agency (GSA) and European Space Agency (ESA). The goal was to combine the ERTMS features with satellite positioning and IPbased communications, utilising satellite connectivity, and resulting in an interoperable system at a lower cost than installing a GSM-R terrestrial communications network. Operating on a 50km stretch of rail line on the island of Sardinia between Cagliari and San Gavino, the ERSAT initiative selected Inmarsat's satellite-based communications network to deliver the required connectivity to trains on the railway line as the first stage of this process. Inmarsat's BGAN, which provides a reliable, IP-based real-time connectivity service with 99.9% uptime, was selected to provide connectivity to the trains, in conjunction with Vodafone's M2M Global Cellular Network. Inmarsat supplied a BGAN terminal for the ERSAT initiative that could withstand the harsh environment of the railway network and deliver the required connectivity to the train. The BGAN terminal and satellite communication network enables the control room, to communicate and monitor the location of the train, giving it the authorisation to proceed through junctions.

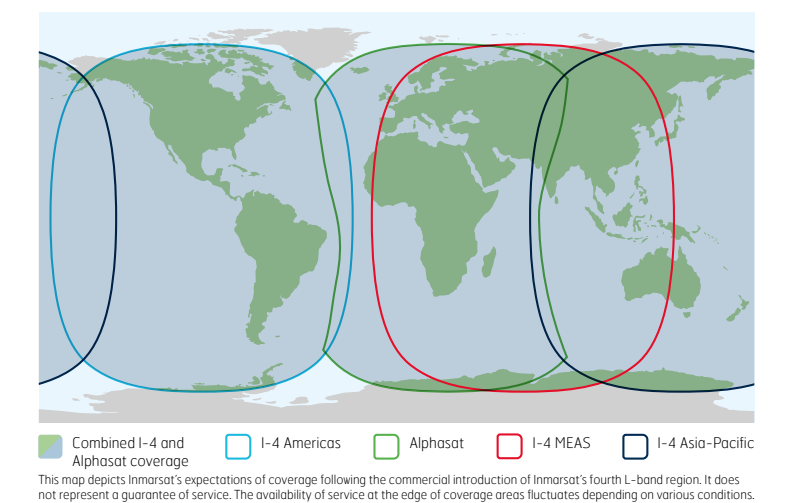
THE RESULTS

Francesco commented: "Satellite technology, combined with cellular networks, is the most effective, lowest cost option to extend the ERTMS to local rail networks, as initiated by the ESA 3InSat project. Inmarsat's BGAN terminal was installed on an operational train on March 2014, and in the period up to the beginning of 2017, that train travelled roughly 150,000km. The terminal, however, showed no-ill effects and was successfully operated and tested for 10,000km between the stations of Cagliari, San Gavino, and Olbia, during this time, in what was the first largescale roll-out test in Europe."

Francesco further commented: "Through close collaboration with the rail operator, we have been able to verify the technology in real operational conditions, therefore attaining confidence and a convincing business case for satellite technology as a means to extend the ERTMS to regional railway lines. This has now enabled us to move on to the next stage of the validation and certification process with a new pilot line under the guidance of RFI and involving the Italian Railways Safety Agency. The main goal of this stage is to demonstrate that this solution satisfies all the requirements needed, without impacting on the safety levels of the ERTMS. The expectation is that

the new pilot line will contribute to the standardisation process with the ERTMS stakeholders and enable us to begin rolling out the solution across Europe." "The train management systems and rail networks of the future will require increasing bandwidth, more resilience, rugged terminals and a global footprint. Rapidly deployable solutions and longterm telecom services are key for backup services to existing terrestrial networks and to increase the throughput for enhancing transport capacity. The ultimate goal of the ERTMS is to limit the need of dedicated telecom networks. Autonomous driving technology is just one example of the incoming technologies that train operators are looking to, and Inmarsat's satellite connectivity in Sardinia is expected to open the way for future large-scale adoption of satellite communications world-wide," Francesco concluded.

INMARSAT I-4 NETWORK COVERAGE



HOW TO BUY

Quisque facilis vehicula venenatis etiam et arcu sit amet lacus mattis.

C Joe Bloggs

E XXXXXXX@inmarsat.com

W inmarsat.com/XXXXXX

While the information in this document has been prepared in good faith, no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability (howsoever arising) is or will be accepted by the Inmarsat group or any of its officers, employees or agents in relation to the adequacy, accuracy, completeness, reasonableness or fitness for purpose of the information in this document. All and any such responsibility and liability is expressly disclaimed and excluded to the maximum extent permitted by applicable law. Coverage as shown on maps is subject to change at any time. INMARSAT is a trademark owned by the International Mobile Satellite Organization, licensed to Inmarsat Global Limited. The Inmarsat LOGO and all other Inmarsat trademarks in this document are owned by Inmarsat Global Limited. © Inmarsat Global Limited. All rights reserved.