

Offering Wi-Fi and Multimedia Services in a Commercial High Speed Train Landscape: NTV 2013

EU SatComm Innovation Awards

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2. The Challenge

Milestones

21Net & HISPASAT have developed techniques and applications for mobile satellite services in more than two decades.

2004-2005 Integration of dedicated communication channels in high-speed trains (RENFE-AVE)

2006 Integration of DVB-RCS in high speed trains (TGV).

Q1- 2007 THALYS Project Award ("ThalysNet").

Q4-2007: First stage commercialization. (3 trains)

May-2008: Commercialization of the whole fleet (26 trains).

2. The Challenge

Milestones

2009: 21NET Contract with NTV for 25 Alstom AGV trains, factory equipped. Internet and TV solutions (IPTV + video on demand).

2009: 21NET Trial in Indian Shatadgi Express. June 2011 awarded the contract to provide communication in 100 trains.

July 2011: reached the figure of 1,300,000 users who have used our service ThalysNet.

May-2012: Beginning of the commercial deployment in NTV

March 2013: Service fully deployed with 26 trains and advanced IP Services (Free WiFi, TV, VoD...)



2. The Challenge

NTV, Italy

- 25 High Speed Alstom AGV trains
- Europe's most modern train: Telematics a key feature
- Target 10 million passenger journeys per year
- "italo live" Service started May 2012



1. The Challenge

Key Elements

- Optimization of satellite bandwidth: DVB-RCS
- Mobile Access Router (MAR) + Aggregation
 - MAR: automatic switching to UMTS or Wi-Fi links when satellite link unavailable.(e.g. train in covered station) without interruption of user's internet session.
 - Aggregation (more bandwidth): simultaneous use of concurrent channels (2 cellular connections or cellular + satellite).
- Quality of Service
 - Solution to share bandwidth amongst users (Business/Economy) and to prioritize certain types of traffic

2. The Solution

The product

- **Broadband Internet allows passengers to be productive:**
 - Send & receive emails with attachments
 - Use VoIP services such as Skype
 - Browse the web & chat online
 - Access corporate intranet via VPN
- **Multimedia services allow passengers to experience:**
 - Video on demand
 - TV and music
 - Games
- **Voice & data communications provide productivity benefits for train operators and staff**

2. The Solution

Why Satellite??

- Speed over 3G networks.
- CAPEX and OPEX allowing commercial viability.
- Fast implementation and deployment of the system.
- Homogeneity and scalability of the network.
- Configuration flexibility.
- Quality guaranteed for large numbers of users.

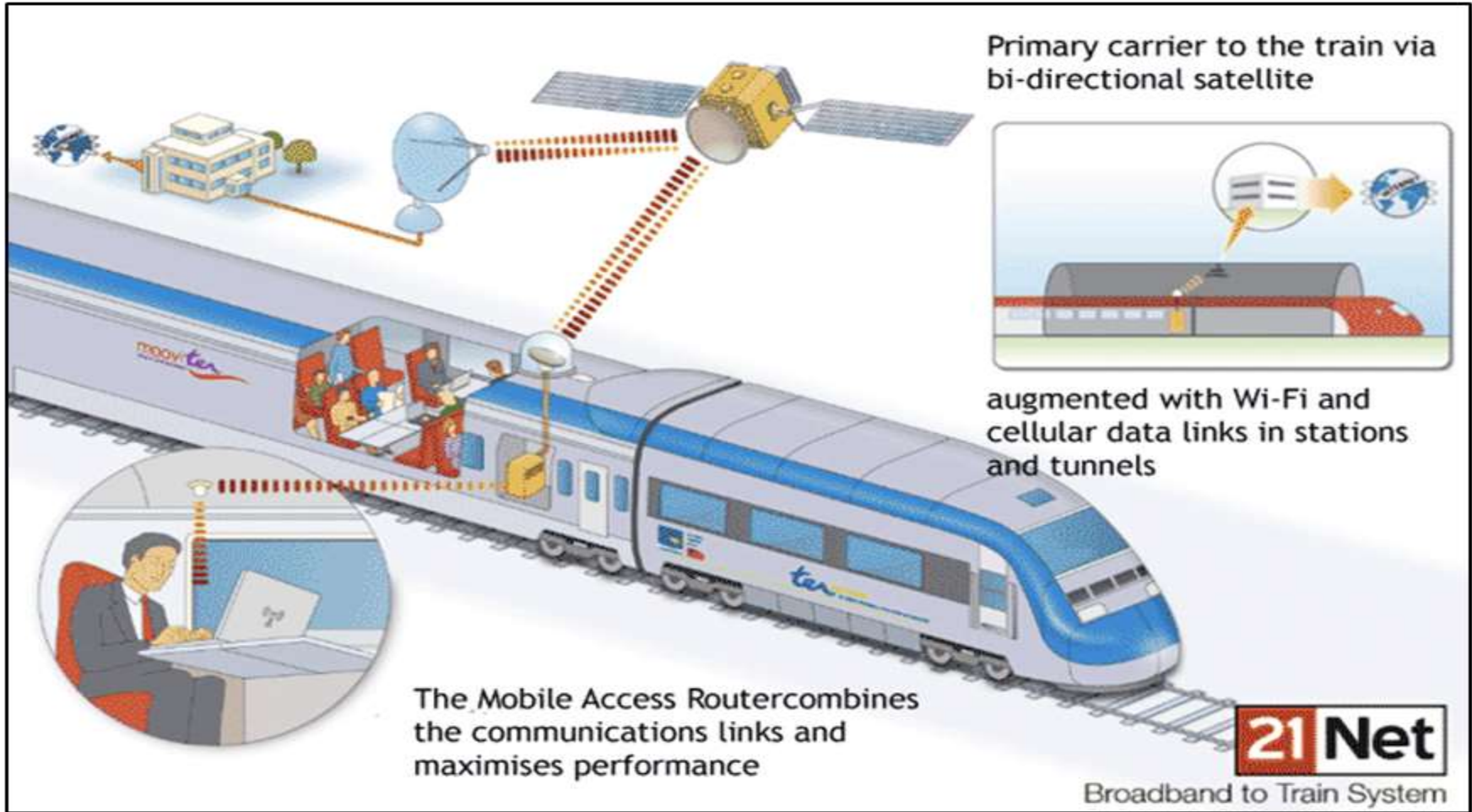


Technology Comparison Chart

PARAMETER	3G	SATELLITE
<i>Maximum download speed</i>	<i>14 Mbps</i>	<i>64 Mbps</i>
<i>Maximum upload speed</i>	<i>5,8 Mbps</i>	<i>8 Mbps</i>
<i>Independence from the rest of 3G users</i>	<i>No</i>	<i>Yes</i>
<i>Constant CIR</i>	<i>No</i>	<i>Yes</i>
<i>Specific QoS for trains</i>	<i>No</i>	<i>Yes</i>
<i>Facility capacity expansion</i>	<i>No</i>	<i>Yes</i>
<i>Interruption of services due to a massive number of users</i>	<i>Yes</i>	<i>No</i>
<i>Independence of the route</i>	<i>No</i>	<i>Yes</i>
<i>TV services</i>	<i>No</i>	<i>Yes</i>

2. The Solution

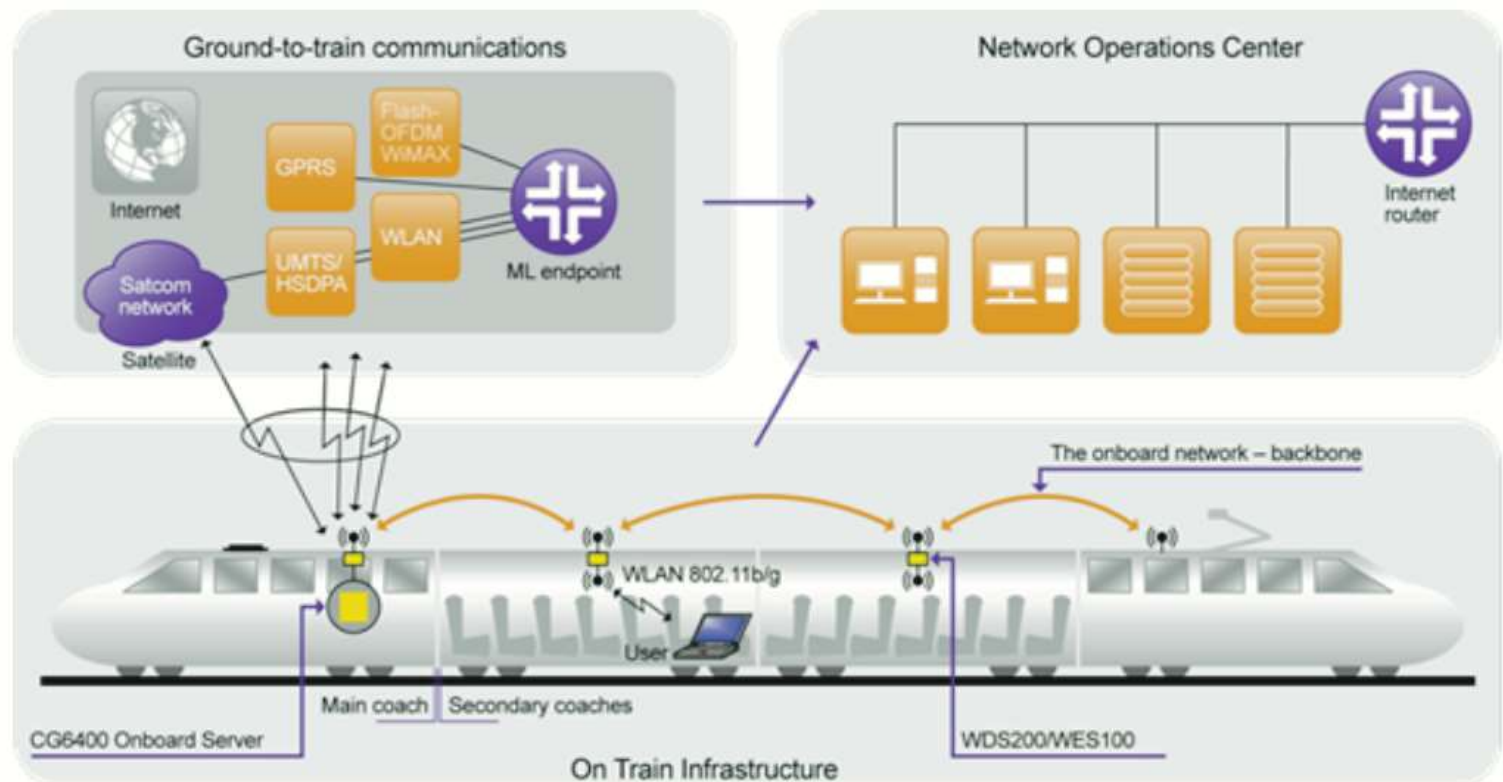
Architecture



2. The Solution

Architecture

- Modular system with open architecture and standard interfaces/protocols to meet potential expansion of passenger services.
- Base technology: Satellite (95% coverage). It is complemented by other technologies in dark areas.
- 3 main blocks: the railway infrastructure, train-ground communications and operations center.

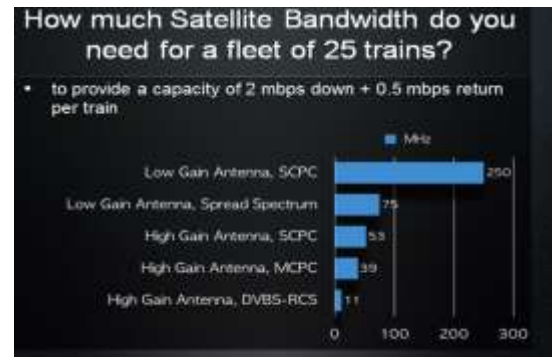


2. The Solution

Antenna integration



Rooftop section designed and built by 21Net tightly integrated into design of Alstom AGV train



2. The Solution

Antenna integration

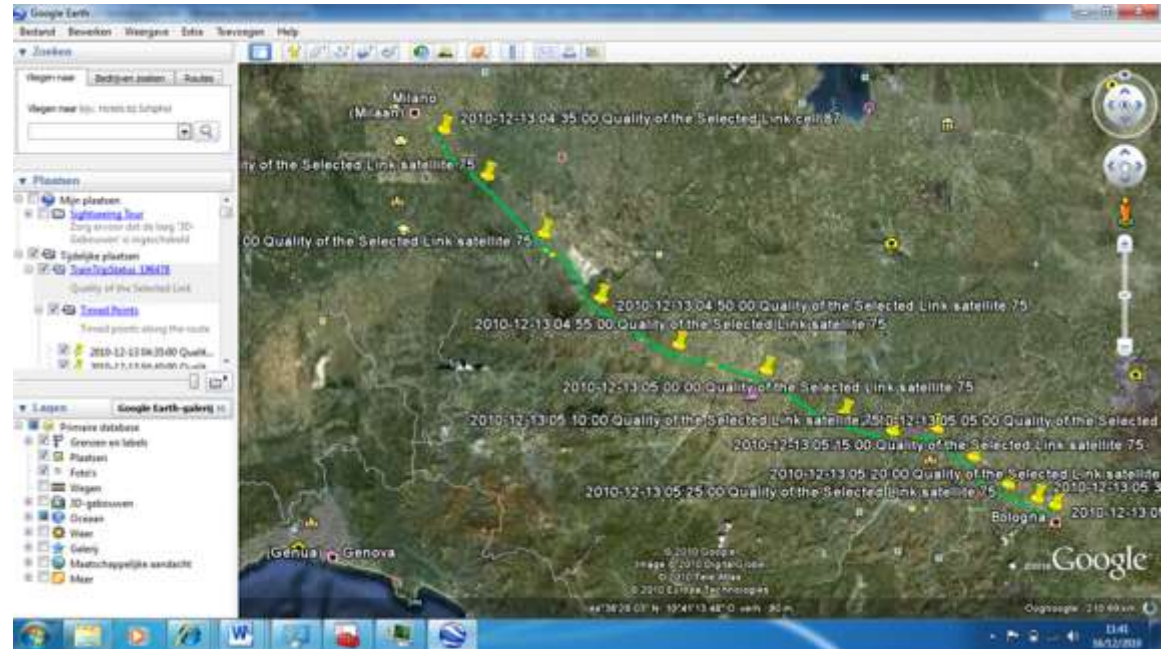


Satellite Antenna
Integrated into roof

2. The Solution

N.O.C.

Tools



Remote & real time monitoring of operational status:
NOC provides failure alarms and performance status reports of all the network elements (availability, signal strength, bandwidth, etc.)

2. The Solution

N.O.C.

Tools



- The tools provide a real dynamic allocation of bandwidth per train, per fleet, per user or per time frame.
- Monitorization is running 24/7 with implementation of alarms and pasive maintenance.



3. The Service

Cinema Car



- Full length movies, and trailers, in special Cinema Car
- 8 overhead high resolution screens
- Every seat equipped with headphone jack, volume and channel selector
- Supports multiple languages



3. The Service

IPTV



- Dynamic Multi / Unicast technology over shared satellite link means IPTV plays continuously as train travels at 300 km/hr despite obstructions, bridges and tunnels*
- Available in laptops, tablets&SmartPhones
- Very popular on board



3. The Service

BROWSING



- A shared WiFi connection is deployed with a fiber backbone distribution all along the train.
- Users can navigate with no restriction.

4. The Future

4.1 Indian Rail



- The world's Largest Railway company - 1.6 million employees, 8,000 trains!
- Successful trial in January 2009 on Mumbai - Ahmedabad Shatabdi Express
- First contract for Internet on Board 3 Rajdhani trains between Delhi and Calcutta



Titular capítulo nuevo

1. Titular de la página

1.1 Subtitular

Titular diagrama

- Mauris ipsum. Nulla metus metus
- Integer euismod lacus luctus magna
- Mauris ipsum. Nulla metus metus
- Integer euismod lacus luctus magna
- Mauris ipsum. Nulla metus metus

Titular diagrama

Quisque volutpat condimentum velit:

- Mauris
- Nulla
- Ipsum
- Metus

1. Titular de la página

1.1 Subtitular

- Suspendisse potenti. Nunc feugiat mi a tellus consequat imperdiet. Vestibulum sapien. Proin quam. Etiam ultrices. Suspendisse in justo eu magna luctus suscipit. Sed lectus. Integer euismod lacus luctus magna.

- Quisque cursus, metus vitae pharetra auctor, sem massa mattis sem, at interdum magna augue eget diam. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Morbi lacinia molestie dui. Praesent blandit dolor.

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luctus suscipit. Sed lectus.**

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sapien. Proin quam. Etialtrices.**



