

Eutelsat S.A.



Mobile two-way broadband for trains in Europe

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Interacting with your world



- ▶ Europe's leading satellite operator
 - ▶ Top three global provider of Fixed Satellite Services (FSS)
 - ▶ International workforce comprising 480 technical, commercial experts from 27 countries
- ▶ Europe's largest fleet
 - ▶ 17 satellites with full coverage of Europe
 - ▶ 6 further satellites with privileged access to Europe from Africa, Asia, Americas





- ▶ Commercial high-speed trains offers multiple benefits :
 - ▶ significant numbers of high-yield passengers
 - ▶ multi-hours journeys
 - ▶ need for both business and entertainment
 - ▶ very limited competition from terrestrial solutions
- ▶ End-user look forward for continuous connectivity everywhere
- ▶ Solutions shall be the same whichever the context if possible
- ▶ Mobile broadband market is mature: We must act today



- ▶ Pre-commercial trial in UK of two way satellite service
 - ▶ Service Provider Qinetiq Rail
 - ▶ Hub/Noc in Italy
 - ▶ Broadband access service
 - ▶ Viasat hub/modem
 - ▶ Ray Sat antenna (12,5 cm)
 - ▶ Forward link 3.5Mbps / Return link 256Kbps



Mowgly project 1/2



- ▶ **MOWGLY = MO**bile **W**ideband **G**lobal **L**ink **s**Ystem
- ▶ 12.5 M€ R & D project funded by the European Commission
- ▶ Duration: 24 months (from 01/ 2005)
- ▶ Targets : Aviation, Rail and Maritime platforms for broadband communications
- ▶ Objective: extension of DVB-S2 and DVB-RCS standards to mobile environment
- ▶ Eutelsat responsible for the economic and usage analysis, mission requirements and business plan analysis, system architecture and service provision





- ▶ First train trials in September 2006
 - ▶ On a RENFE commercial high speed train with a test coach
 - ▶ Onboard Network solution with WiFi connectivity/authentication portal
 - ▶ Large panel of end-user services: web access, VPN, SMS, email, live TV and radio
 - ▶ Low profile dual-reflector antenna (30cm)
 - ▶ Standard DVB-RCS modem
- ▶ Next trials in January





- ▶ East TGV connectivity study and demonstration
 - ▶ OCEA consortium pre-selected (Orange, Cap Gemini, Eutelsat, Alstom)
 - ▶ Viasat hub/modem
 - ▶ Tes/Orbit antenna (40cm)
 - ▶ WiFi / satellite solution
 - ▶ Demonstration in December



Two way Train System Overview

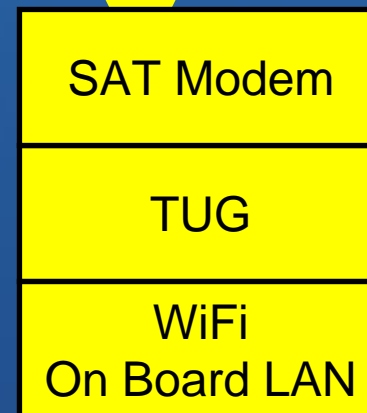


- ▶ Complete two-way broadband system/service for trains using Ku-band satellites and low profile antennas
- ▶ True broadband experience
 - ▶ Satellite Forward channel data rates up to 30 Mbps data rates
 - ▶ Satellite Return channel data rates at 512 kbps per train
 - ▶ Hybrid multipath IP routing using satellite and terrestrial networks

Broadband for trains with ADSL-like performance!



- ▶ On board equipment suite
 - ▶ Low profile on-board antenna
 - ▶ Antenna control unit (ACU)
 - ▶ SAT Modem
 - ▶ TUG (Train Universal Gateway)
 - ▶ WiFi On Board LAN



Key technologies: Antenna development



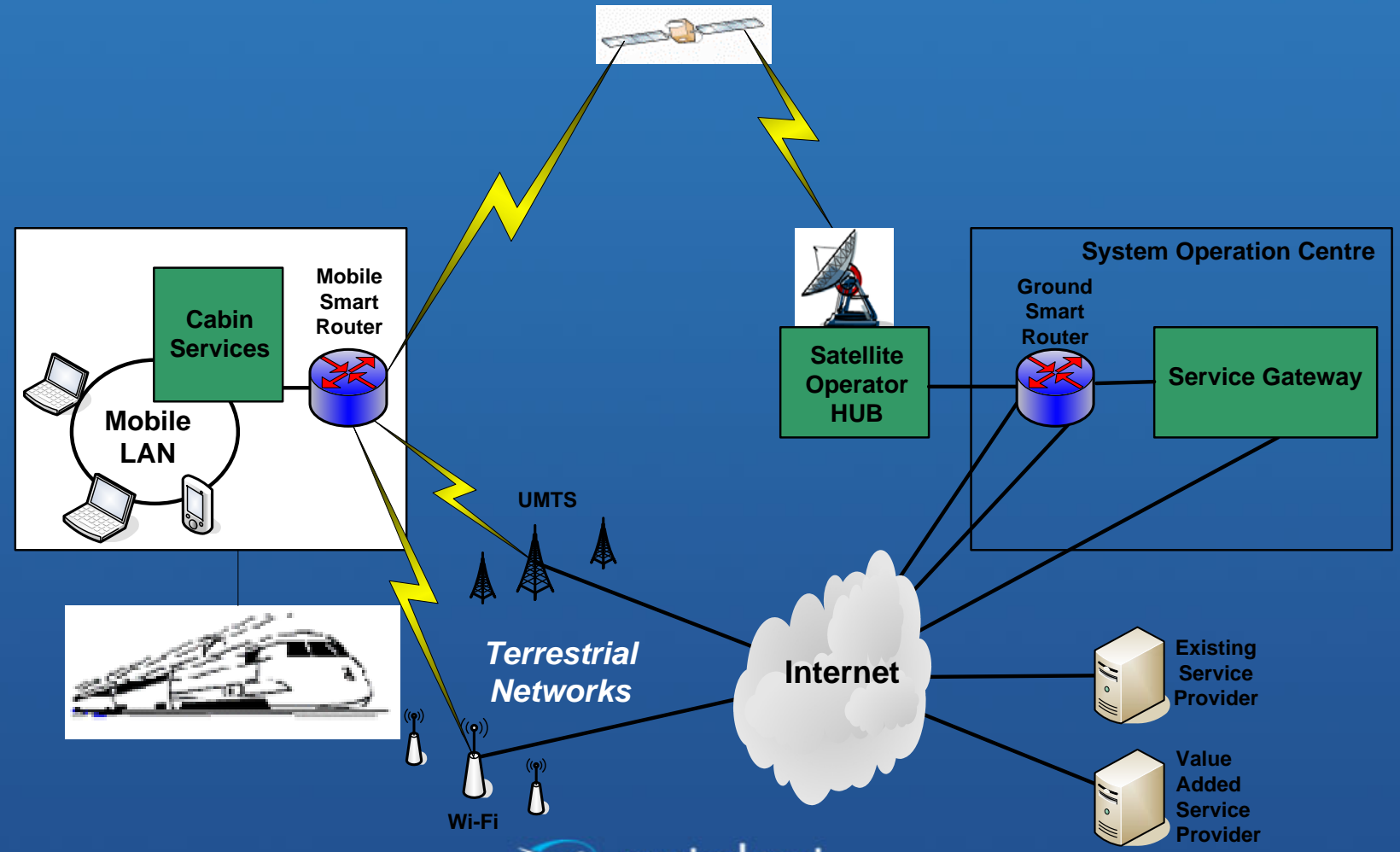
The TES antenna (patent pending)
used already in UK (Qinetiq/Virgin)
and Spain (Mowgly/RENFE)





Key technologies: The MBI/RCF* Train Universal Gateway (TUG)

OVERALL PHYSICAL ARCHITECTURE



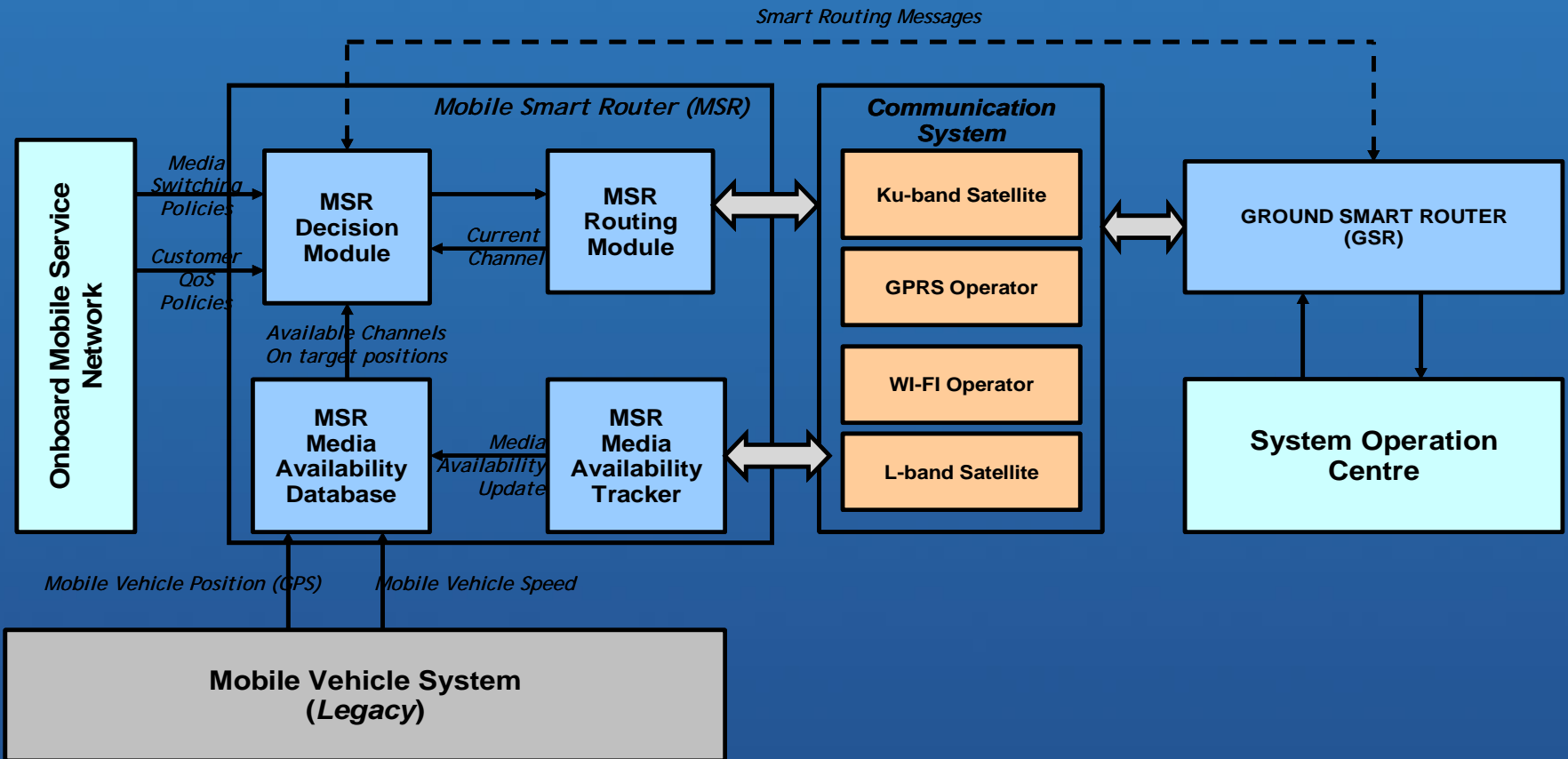
* <http://www.rockwellcollins.fr>
<http://www.mbigroup.it>





Key technologies: The MBI/RCF Train Universal Gateway (TUG)

LOGICAL DECOMPOSITION – BASELINE APPROACH





- ▶ Platform providing onboard services
 - ▶ Onboard Network solution with WiFi connectivity/authentication web portal
 - ▶ Authentication, authorization and accounting capabilities
 - ▶ Web services (Web browsing & Web mailing)
 - ▶ VPN access services (Corporate mailing & Corporate intranet ...)
 - ▶ Voice over IP services (Skype™, specific devices)
 - ▶ Live TV & Live Radio (direct conversion or customized contents)
 - ▶ Intranet (News, weather info., airport info., dynamic contents)
 - ▶ Web portal services (SMS & MMS edition/sending, Web mail editor)
 - ▶ Security services (Telemedicine, Cabin surveillance, real-time link)



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