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THE EUROPEAN RAIL INDUSTRY

UNIFE vision about the future communication system for ETCS and the Railway signalling system

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11th of September 2013

AGENDA

- GSM-R background
- ERTMS market requirements
- The role of the telecom sub-system in the current and future signalling system
- Current and future R&D programs addressing the Railway telecom sub-system
- Conclusions

GSM-R – background and requirements

- **Main GSM-R functions**
  - Voice radio between driver and dispatcher
  - Data communication for ETCS level 2 and 3 between trackside and train
- **GSM-R requirements for ETCS data communication**
  - Performance of ETCS level 2 and 3 is fully dependent on the radio com performance
    - Continuous communication between mobile and trackside (max time for disconnection)
    - Quality of service (bit error rate, delays)
- **GSM-R drawbacks**
  - Long call procedure
  - Sub-optimal use of available bandwidth – limits the number of trains to be controlled in station areas
  - Obsolete technology (end of life expected in 2025)

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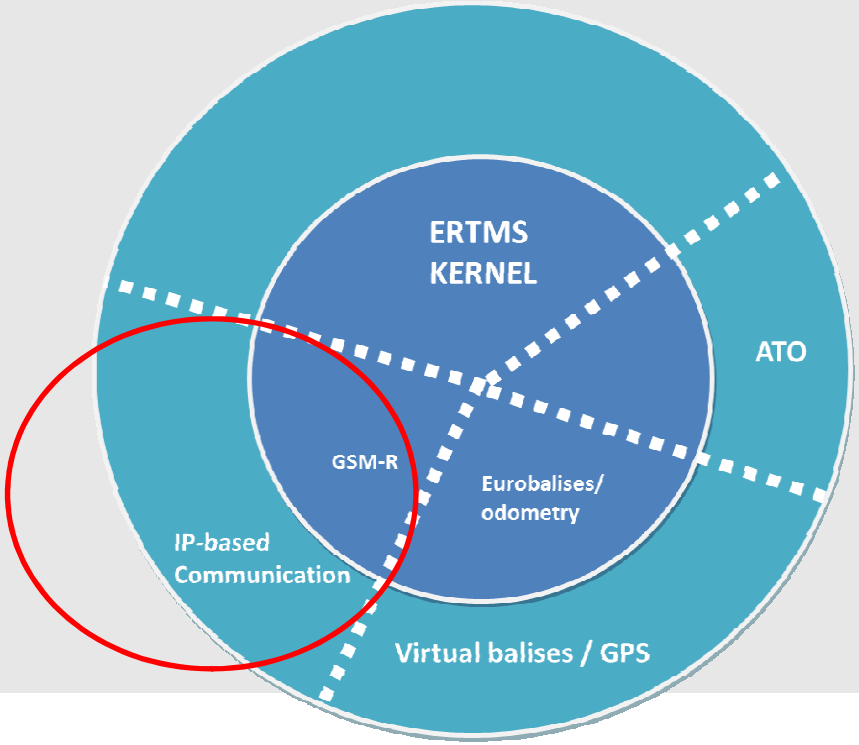
ERTMS market requirements

- **In Europe, GSM-R obsolescence expected in 2025**
  - Roadmap for future European standard to be prepared
  - Backward compatibility is key to preserve investments made by Railways and Suppliers

- **Outside Europe**



- Some customers cannot use GSM-R to deploy ETCS Level 2 and are currently looking for alternatives
- Projects are already developed with ETCS and other communication standard, like Tetra
- A "**bearer independent**" ETCS is a priority for customers as highlighted by the UNIFE "Global ERTMS" market (in 2011)
- Modern telecom standards are all "IP-based". In the future, ERTMS shall be based on **IP communication principles**, while offering **"backwards" compatibility**
- The above requirements are included in the **2012 ERTMS MOU (clauses 69 to 74)**

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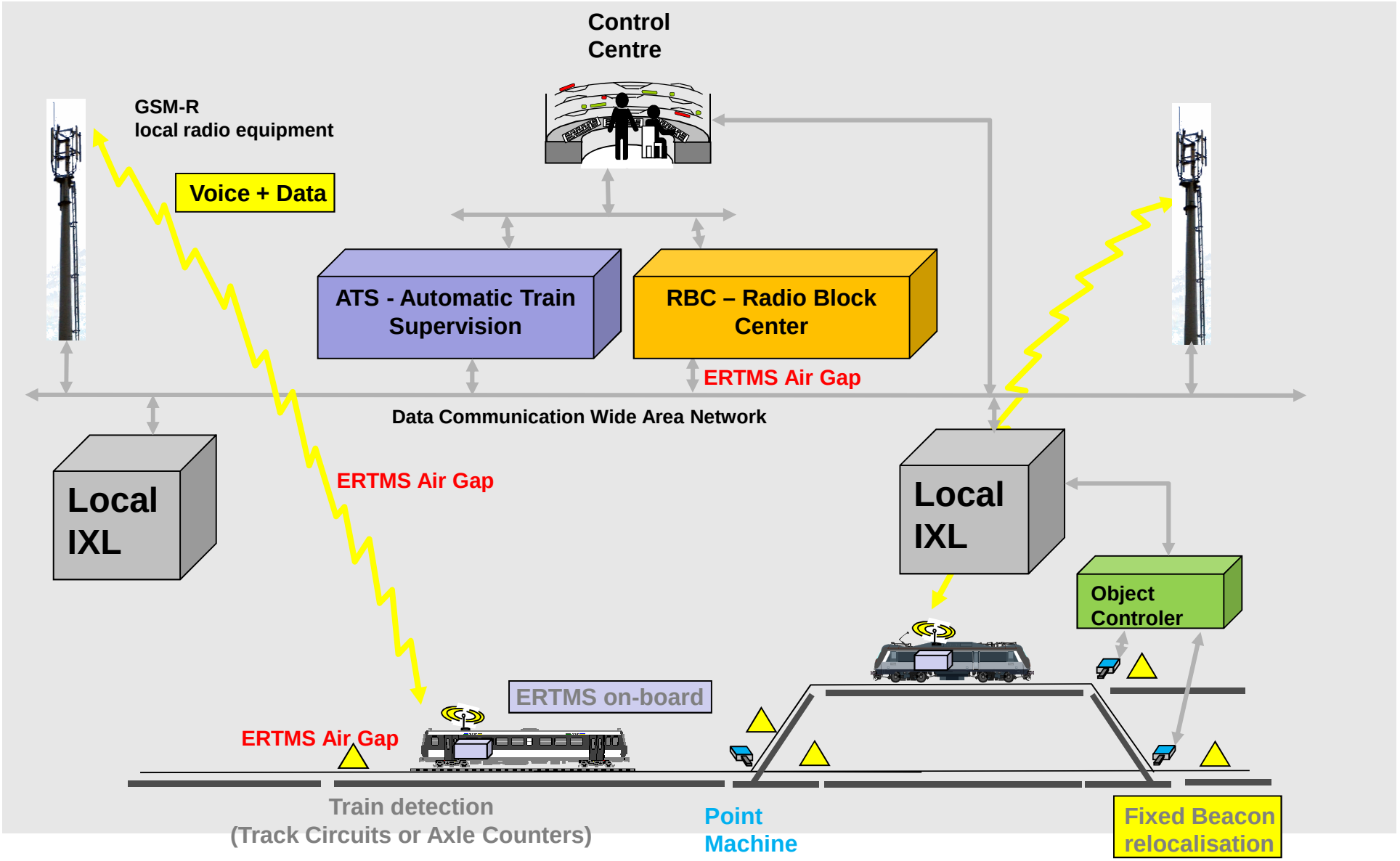
Current ERTMS L2 based signalling System

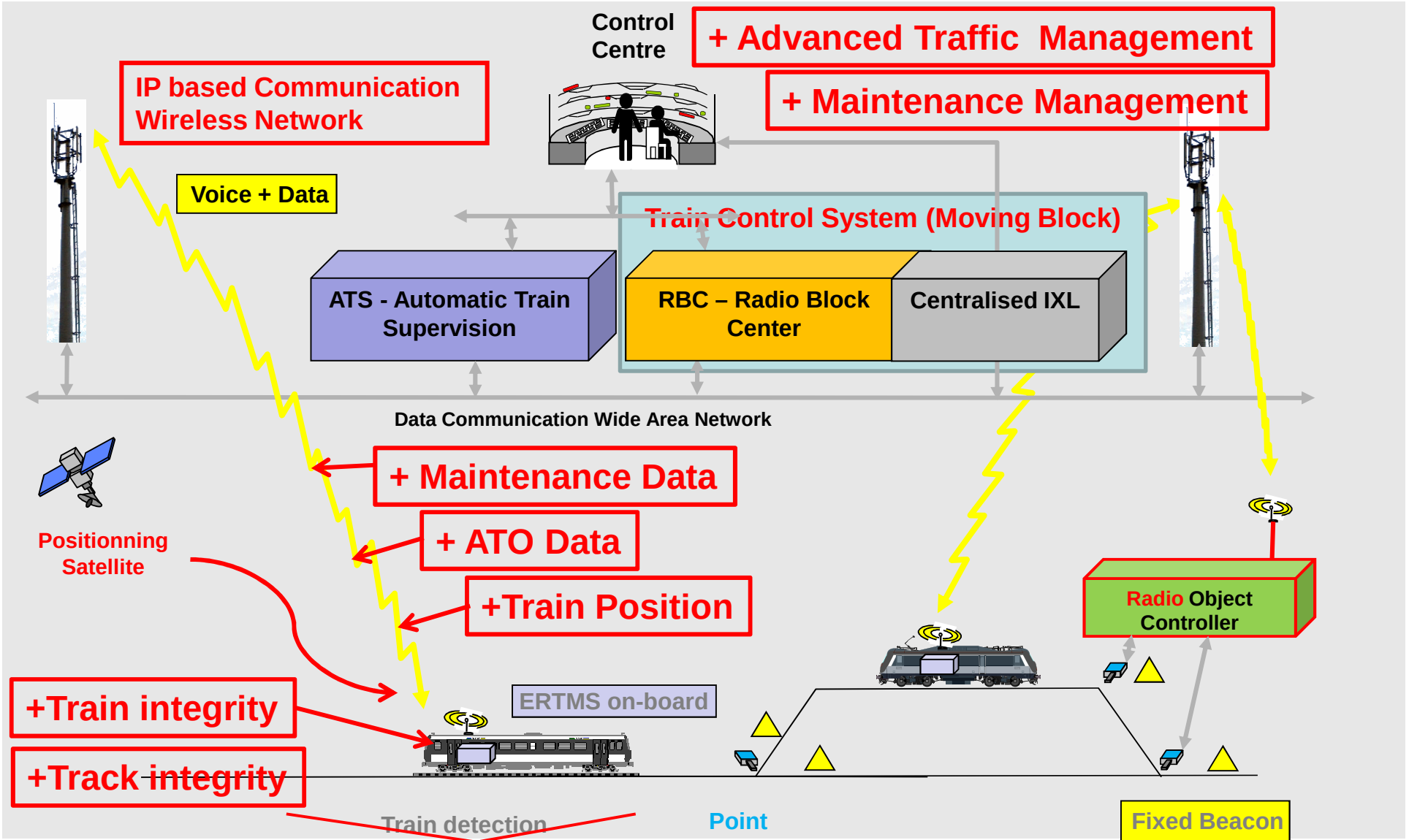


“Control-Command” System Approach and Vision (as proposed in the Shift2Rail innovation program)

- **Vision = what do we want to achieve and how?**
  - Management of a set of intelligent mobiles (trains, passengers, freight, workers…) on a “dumb” infrastructure thanks to an intelligent Integrated Mobility Management (IM^2) system offering/maintaining:
    - the highest capacity
    - the lowest costs (all costs: LCC)
    - the highest reliability
    - the highest safety (a reminder!)

  - **Meaning:**
    - **Highly performant/resilient/secure communications**
    - Automation together with new operation principles
    - No track-side elements any more (or nearly, apart from point elements) = no track circuits, no axle counters, no balises... and much less cables (and much less stolen/failing equipment), meaning track access charges dramatically reduced; rail becoming more performant
    - The train holds the intelligence and has an ensured operating performance
    - Traffic management = basically, which passenger/freight goes where and when? An area where rail is/must keep to be smarter than road
    - Less energy consumption + an ever greener transport
    - Rail is 100% available, maintenance being always achieved before the failure happens
    - Rail is 100% weather/climatic change resilient
    - A higher security

Future Signalling System for Mainlines based on ERTMS level 3



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Current and future R&D programmes addressing Railways communications

FP7 - NGTC

WP6: IP based Radio Communication

Sept. 2013 - Aug. 2015

Shift²Rail IP2

Advanced Traffic Management and Control System

- TD1: Adaptable communications for railways
- TD11: Smart radio-connected wayside objects

TEN-T MAP 2011

Activity 9: ETCS over GPRS

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Conclusions

- Performances of ETCS are fully dependent upon the quality and availability of the telecom network
- Independency between ETCS and the telecom network is mandatory to cope with worldwide market needs and different industrial cycles
- Trainborne and trackside ETCS equipment must move to IP based technology
- Many initiatives are popping up across the Sector. Coordination between the stakeholders is key to strengthen the European Standards
- Shift2Rail Sector initiative with EC and ERA support is an opportunity to gather all actors and prepare the future standards.

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