

**Trafikverket
Shift2rail och KAJT
EU
Spl ledningsgrupp
2014-04-01
Magnus Wahlborg**



TRAFIKVERKET

KAJT

KAJT – Branschprogram Kapacitet i järnvägstrafiken

- Forskning inom järnvägskapacitet och trafikstyrning
- Forskningsprogram 2013 – 2022, avtal 2 år, (4år + 4 år)
- Parter: Trafikverket, VTI, Uppsala universitet, Linköping universitet, SICS, KTH o Blekinge tekniska högskola
- Foi medel Trv 11,5 msek + externa parter 3,5 msek 2013
- Partnerföretag: Nivå 1 SJ och LKAB, nivå 2 Transrail

KAJT

Branschprogram Kapacitet i järnvägstrafiken – KAJT.

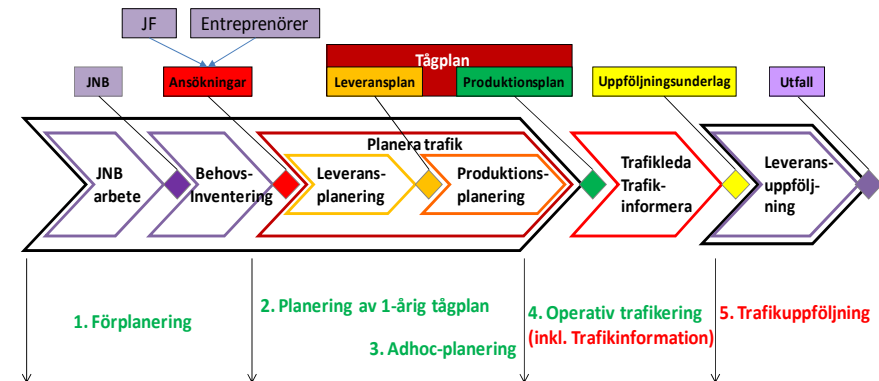
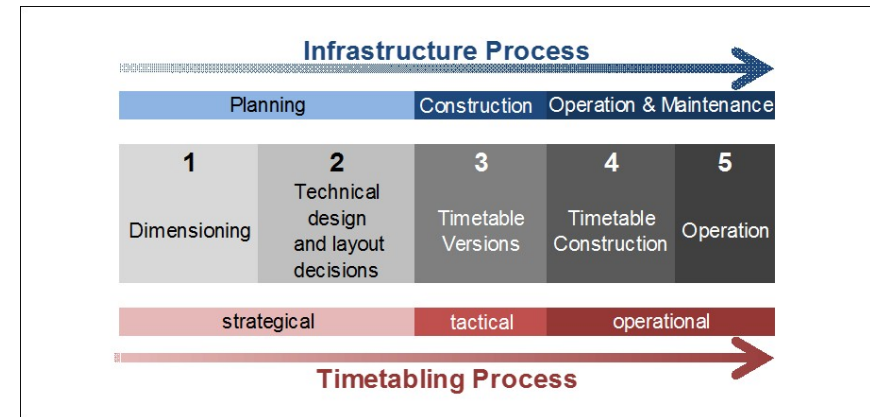
Kärnområde är att utveckla processer och innovationer inom området kapacitetsplanering och trafikstyrning från operativ drift till 40 år framåt i tiden.

Fokusområden:

- Trafikering och infrastruktur (TI)
- Taktisk trafikplanering (TT)
- Operativ trafikstyrning och tågkörning (OT)
- Underhåll och trafik (UT)

Foi program

- Behov av KAJT samverkan
- Behov att sammanföra och utveckla, Förplanering – tågplan – operativt – uppföljning (trafikprocessen)
- FUKS rapport grund för Foi program och Foi plan 2015 – 2017
- Shift2Rail – järnvägsforskning EU 2015 - 2021



KAJT EU projekt

KAJT EU projekt

- OnTime Optimal Networks for Train Integration Management across Europe
 - 201111 – 201410
 - 1 projekt
- Capacity4rail SP3 Operations for enhanced capacity
 - 201310 – 201709
 - 5 delprojekt
 - SP3 - Samma kärna och miljöer som OnTime

OnTime

EU projekt inom kapacitet och trafikstyrning

- del av 7:e rampgm, Errac har skrivit underlag
- Infrastrukturhållare Sverige, Tyskland, England, Italien och Frankrike

Projektansökan 2 december 2010

Projektstart 2011 november

Projektet är 3 år 2011 november – 2014 december

- EU finansierar 5,4 miljoner Euro
- Total budget 8,4 miljoner Euro

Projektdeltagare

England: Network Rail, univ Birmingham, univ Nottingham, Graffica (sme)

Sverige: Trafikverket, Uppsala universitet, Transrail (sme)

Italien: RFI, univ Bologna, Value team, Ansaldo

Frankrike: SNCF, RFF, Inrets

Tyskland: DB, TU Dresden

Holland: TU Delft, Erasmus univ

Schweiz: EPFL Lausanne, "Systransis" (sme)

Innovationer

1. Standardiserade definitioner och metoder
2. Förbättrade metoder för tidtabellsplanering
3. Algoritmer för automatisering och beslutsstöd till tågledare
4. Metoder, processer och algoritmer för beslutsstöd vid större störningar
5. Interoperabilitet för kommunikation och presentation av information
6. Information arkitektur och standardiserad tågledningsdata

Innovation	Current TRL	Planned TRL after ON- TIME
Innovation 1: Standardiserade definitioner och metoder	2	7
Innovation 2: Förbättrade metoder för tidtabellsplanering	3	6
Innovation 3: Algoritmer för automatisering och beslutsstöd till tågledare.	3	7

TRL – Technology Readiness Level (se Wikipedia)

Innovation	Current TRL	Planned TRL after ON-TIME
Innovation 4: Metoder, processer och algoritmer för beslutsstöd vid större störningar.	2	6
Innovation 5: Interoperabilitet för kommunikation och presentation av information.	3	6
Innovation 6: Information arkitektur och standardiserad tågledningsdata.	2	7

TRL – Technology Readiness Level (se Wikipedia)

Referensgrupp

- Externt seminarium i DLC Boden december 2012 OnTime – 60 deltagare
 - Bildade referensgrupp
- Deltagare referensgrupp:
 - Trafikverket, LKAB, Green Cargo, Jernbaneverket, Uppsala U, Transrail
- Referensgruppsmöten 2-3 gånger per år
 - Enbart via lync och telefon hittills

Resultat

- Processer, Metoder, system, best practice/state-of-art
 - Samverkan, Infrastrukturförhållare, akademiska, systemleverantörer, SME
- Simulatorer, beslutsstöd
- Demonstrator
 - Tågplanering (ad hoc planeringen)
 - Metoder mindre störningar
 - Metoder större störningar
 - Lokförarstöd
 - Standarder modeller
- Malmbanan simulator, CATO systemet

Capacity4Rail:

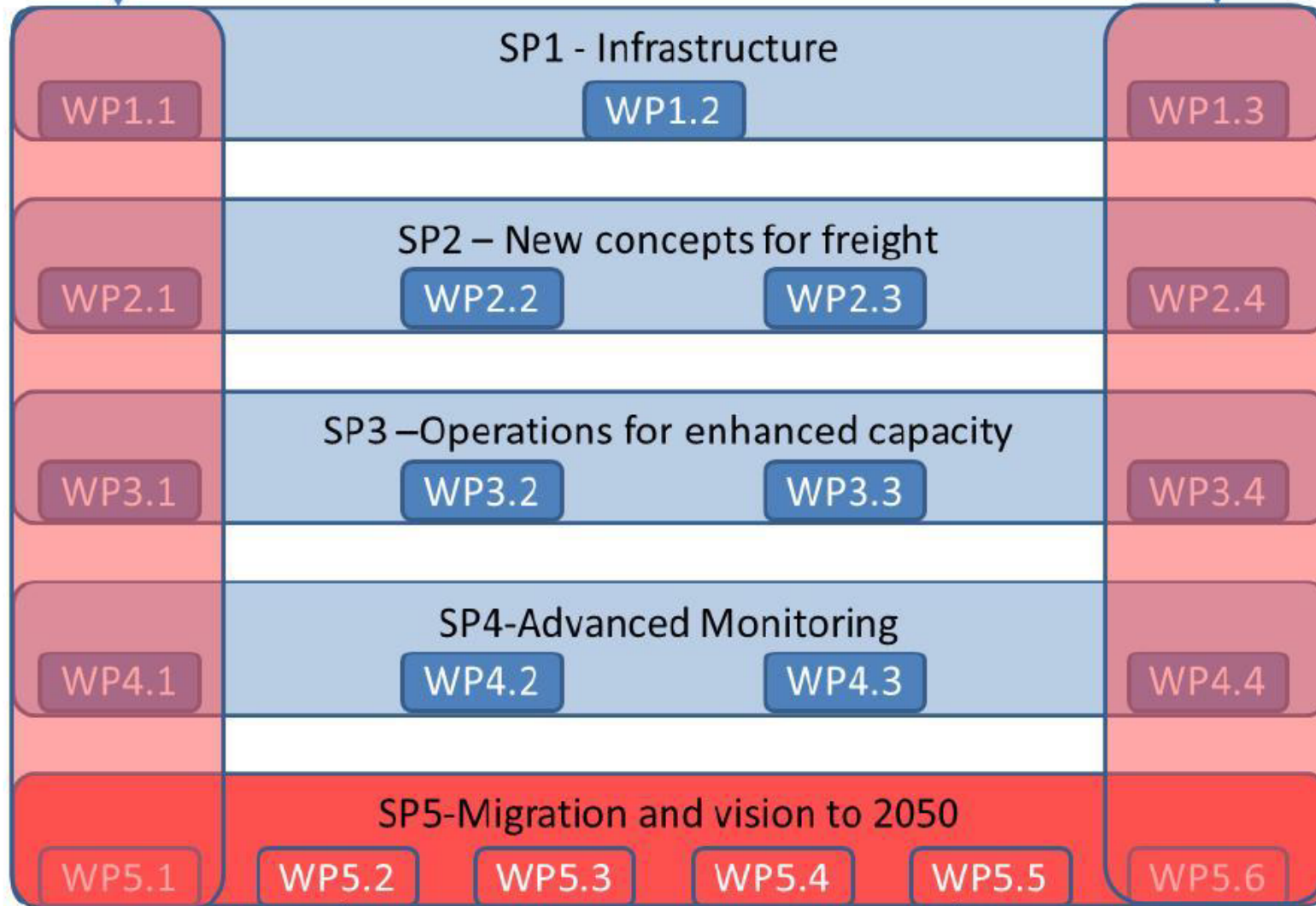
Increasing Capacity 4 Rail networks through enhanced infrastructure and optimised operations

- EU-projekt som pågår 20131001 – 20170930
- Koordineras av UIC
- 48 parter, varav 7 svenska, däribland:
 - Trafikverket
 - Uppsala Universitet
 - Kungliga Tekniska Högskolan
 - Linköpings universitet

State-of-the-art,
data evaluation
and customer
requirements

Results analysis,
recommendations

Project at a glance



Global scenarios leading to 2050

Projektdeltagare – SP3 Operations for enhanced capacity

England: Network Rail, univ Birmingham, NewRail, TRL

Sverige: Trafikverket, Linköpings universitet, KTH

Tyskland: DB, TU Dresden

Frankrike: Systra, IFFSTAR

Tjeckien: Oltis Group

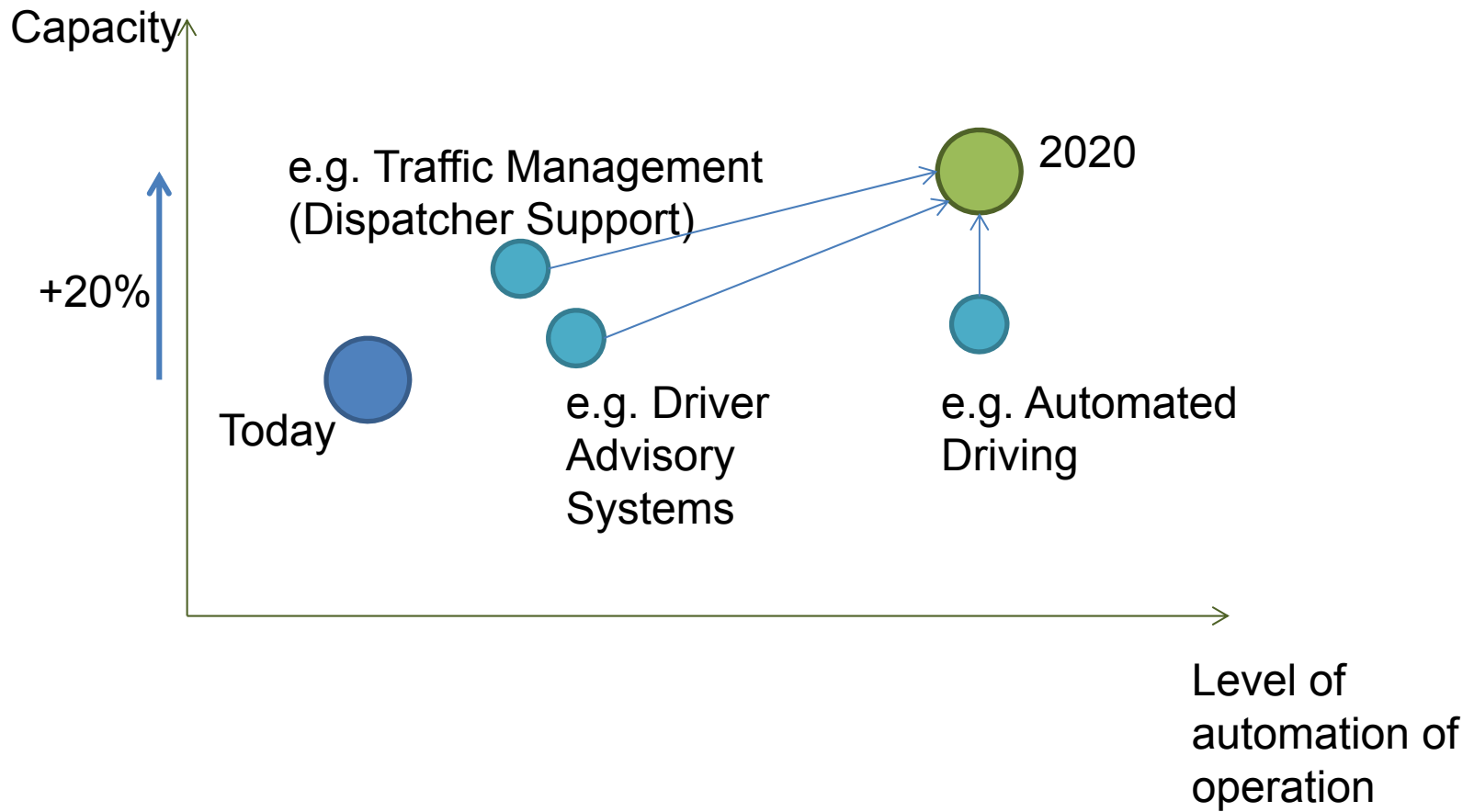
Italien: Ansaldo

Övriga referensgrupp: UIC, IK Polen

Ur målen:

- Utöka förståelsen av möjligheter och begränsningar när det gäller kapaciteten i det europeiska järnvägsnätet.
- Identifiera förutsättningarna för att möta kravet på kapacitet för person- och godstrafik på järnväg i framtiden 2030/2050.
- Modellering och simulering:
 - Nulägesanalys
 - Framtida behov
 - Lämpliga testscenarier för utvärderingar.
- Trafikstyrning och avvikelshantering
- Roadmap för automatiseringsstrategier
- System för datahantering

Capacity increase through automation of operation



Shift2Rail

Shift2Rail helhet

- Huvudbidragstagare för Järnvägsforskning inom EU 2015 och 6 – 8 år framåt
- Beslutande organ 8 st grundarna
 - UNIFE Järnvägsindustrin i Europa (Bombardier, Siemens, Alstom, Ansaldo STS, Caf, Thalys)
 - Trafikverket och NetworkRail
 - EU representant
- Därutöver associerade medlemmar
 - DB Tyskland, SNCF Frankrike, FS Italien, ADIF Spanien, Industri, universitet
- Mindre del öppna utlysningar



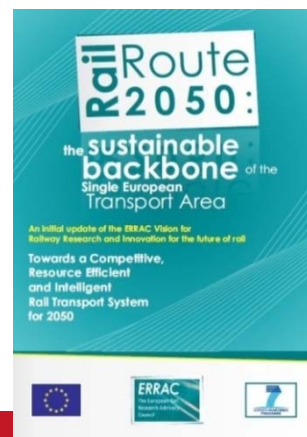
SHIFT²RAIL: visions enabler

Implementing Europe 2020 objectives
for a smart, sustainable and inclusive growth

Modal Shift
&
Attractiveness

Competitiveness

Growth & Jobs



SHIFT²RAIL objectives: More, Better, Cheaper!

- Enhance **CAPACITY** / user demand of the European rail system
 - SHIFT²RAIL research and innovation aims at an estimated overall increase of capacity up to 100%
 - SHIFT²RAIL research and innovation aims at increasing user demand
- Consolidate the **RELIABILITY** / quality of service of the European rail system
 - SHIFT²RAIL research and innovation aims at an estimated overall increase of reliability up to 50%
 - SHIFT²RAIL research and innovation aims at increasing user satisfaction
- Improve on **LIFE CYCLE COST** / competitiveness
 - SHIFT²RAIL research and innovation aims at an estimated overall reduction of LCC up to 50%
 - SHIFT²RAIL research and innovation will help the European manufacturing industry to, at least, keep its market share against increasing business competition in an increasing market

→ Impacting all segments of the rail market!



→ Making daily life easier for millions of European passengers and rail freight users!



From collaborative experience within FP6/FP7 to a much more ambitious instrument

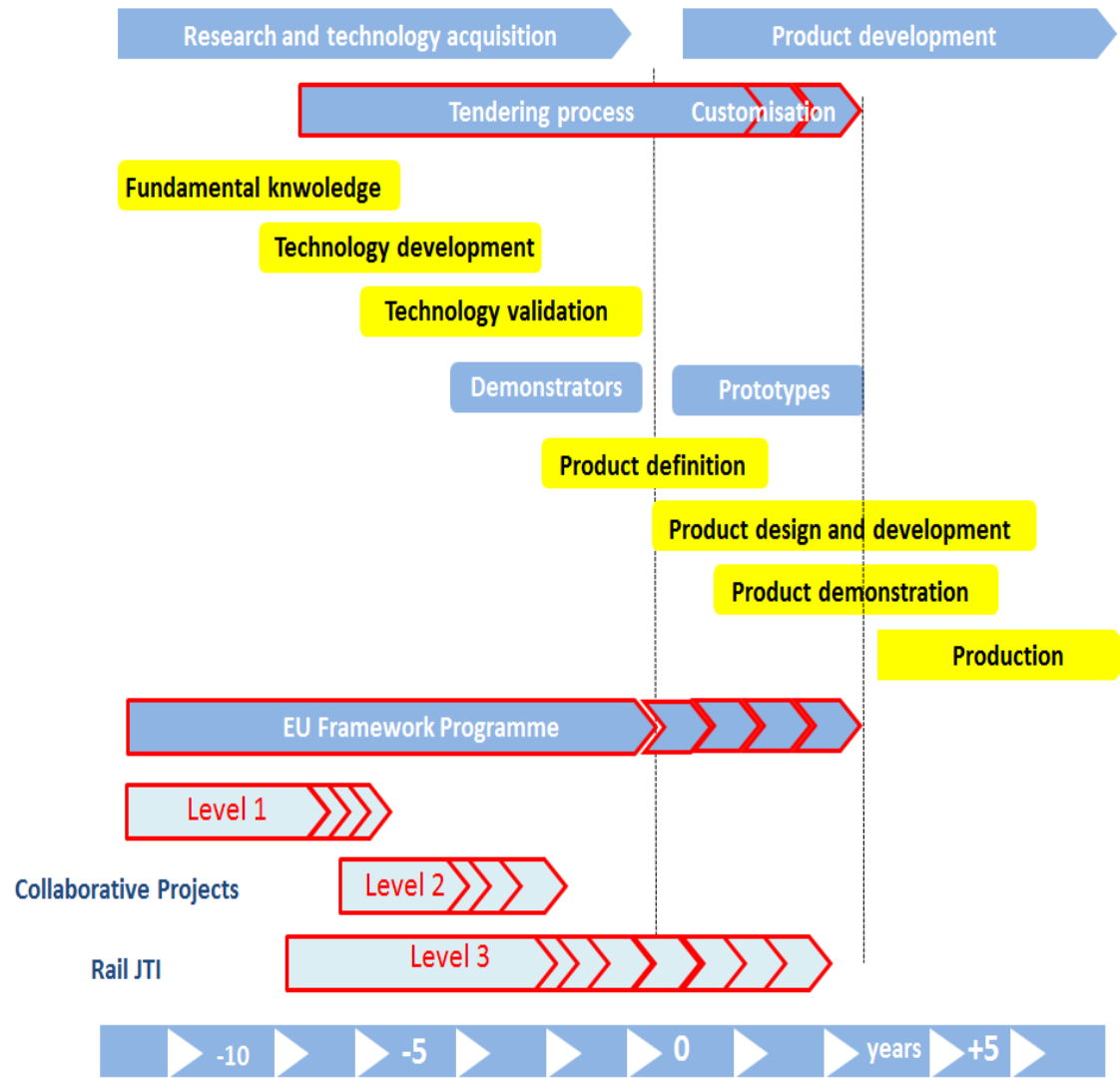
- The good results achieved in FP7 normal R&D collaborative projects need to be taken at a further step to significantly contribute to the Railway overall competitiveness
→ New collaborative R&D closer to the market needs is required in Horizon 2020 (from TRL 4 – limits of normal FP7 – to TRL 6/7)
- After more than 10 years of cooperation in EU R&D, the promoters of this initiative investigated an instrument that could provide a step-change for the European rail system
- Challenge:
How to allow a faster implementation of innovative technologies into final products on the market?



European Rail : A key economic sector for Europe

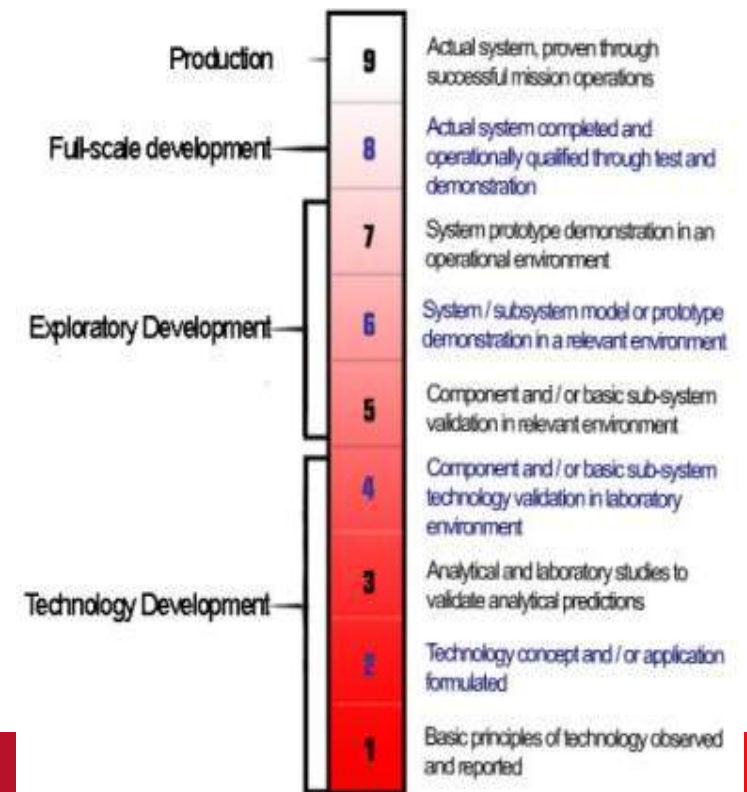
- A wide range of rail stakeholders
 - Rail manufacturers (rolling stock & system integrators, signalling, railway infrastructure, sub-systems)
 - Infrastructure managers
 - Operators (railway undertakings, light rail urban operators)
 - Specialised universities and research institutes
- Present in 25 EU Member States
- Job creating
 - 3 million families depend on rail employment in Europe

Getting closer to the market than under the usual EU Research Framework Programmes



Technology Readiness Level

R&D - Technology Readiness Mapping





SHIFT²RAIL research priorities

IP1 Energy & Mass Efficient Technologies for High Capacity Trains

Develop the future generation of trains that will be lighter, more energy efficient while being able to reduce today's travelling times, causing less track damage and less impact on the environment, thereby delivering a lower whole life cost.

IP5 Technologies for Sustainable & Attractive European Freight

Define all technological and process breakthroughs necessary to contribute to the realisation of one of the key goals from the White Paper: 30% of road traffic switching to rail and inland waterways by 2030 and 50% by 2050.



IP2 Advanced Control & Signaling Systems

Develop a new generation of signalling and control systems, building on current ERTMS, to enable intelligent traffic management with automatically driven trains and optimise capacity, reliability and minimise life costs.

IP3 Cost Efficient High Capacity Infrastructure

Deliver a new railway infrastructure system (including both infrastructure and energy subsystems) that provides a breakthrough which will radically improve capacity and performance and reduce costs.

IP4: IT Solutions for a Seamless Attractive Railway

Realise one of the key goals from the White Paper: "By 2020, establish the framework for a European multimodal transport information, management and payment system." through the development of open IT architecture framework.

System management working groups across research priorities focusing on:

Environment Management (Noise & Vibration, Energy, etc.), Integration Mobility Management, EMC/Interference Management, etc.

Our Focus



Trafikverket focus areas:

- **IP 1:** TD3 - Bodyshell, TD4 - Running Gear
- **IP 2:** TD1: Adaptable communications, **TD2: Railway network capacity increase**, TD3: Moving fluid block, TD4: Safe train positioning incl. satellite, TD6: 0 on-site testing, TD7: Engineering and operational rules, Formal methods for smart signalling system specs TD8: Virtually-coupled train sets, **TD9: Traffic Management**, TD11: Smart radio-connected all-in-all wayside objects, TD12: Cyber system security incl. Key Management
- **IP 3:** TD3.1 - S&C Medium Term, TD3.2 - S&C Long Term, TD3.3 - Track Medium Term Solutions, TD3.4 - Track Long Term Solutions, TD3.5 - Proactive Bridge and Tunnel Assessment and Repairing/Upgrading, TD3.6 - DRIMS - Dynamic Railway Information Management, System + Virtual Network, TD3.7-RIMMS - Railway Integrated Measuring and Monitoring System, TD3.8-System maintenance engineering and strategies, TD3.10-Integrated AC power supply system, TD3.11-Smart Metering for a Railway Distributed Energy Resource Management System (RDERMS)
- **IP 5:** TD1 - Freight Electrification, Brake and Telematics, TD2 - Access and Operation, TD3 - Right Wagon design, TD4 - The Novel Terminal, TD5 - New Freight Propulsion Concepts

Status



CONTENT

- Content suggested by initiator (i.e. Unife) group end of 2013.
- It is 1800 pages, 40 Tech Demos (programs) in 5 Innovation Packages
- This content is not formally not approved, and will not be
- Now a Master Plan (MP) is developed, 80 pages
- The MP is developed by the EC, upon suggestion from Unife Group

Status



The Master Plan :

- It will be proposed by the EC
- It will be approved by the Governing Board (GB), communicated to the EP and endorsed by the Council
- The MP is basis for content application by Founding Members (FM)
 - FM applies within their allocated budget, on project areas
- The MP identifies areas for applications to become Associate Member (AM)
 - AM applies as a entity for areas within the IPs

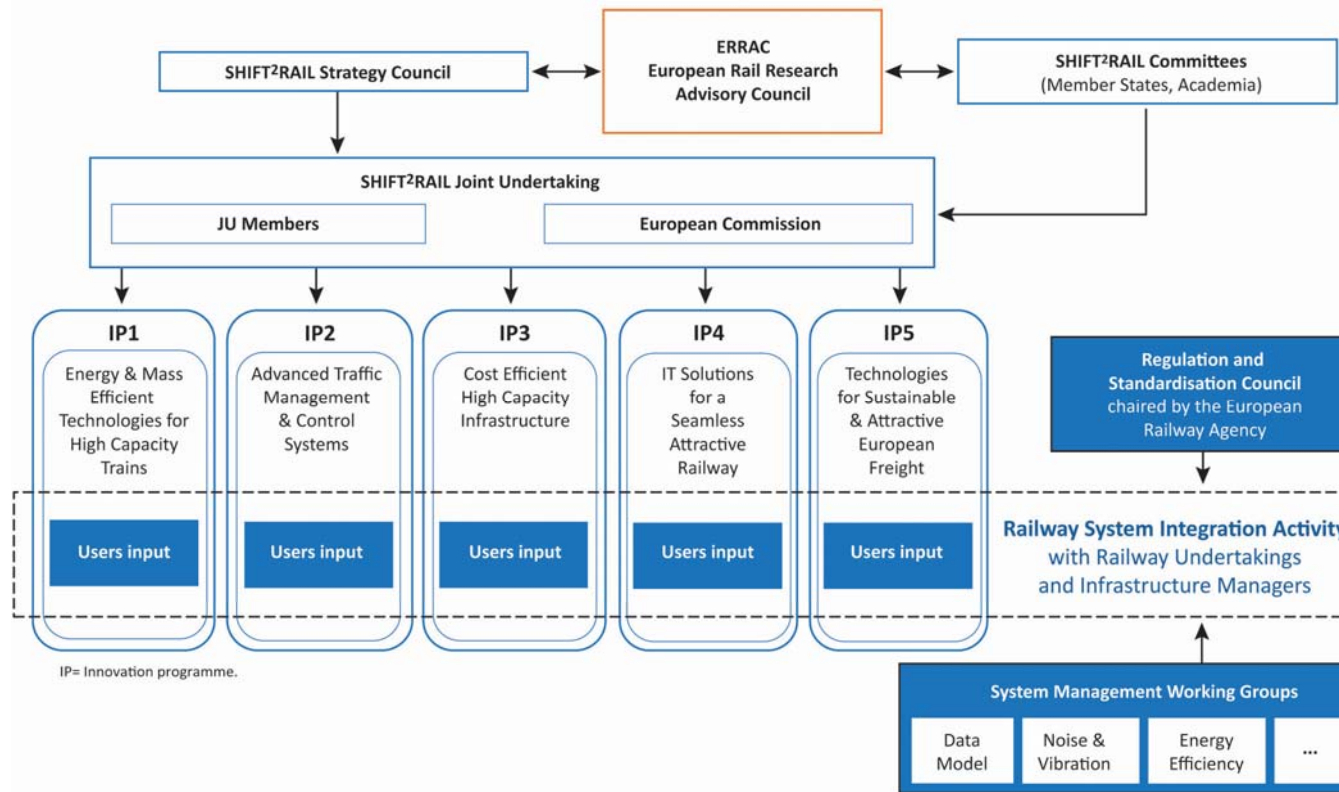


Status

Process:

- Council working group met last time 20th of February
- Coreper discussed S2R last Friday
- TTE Council will discuss/preliminary decide 14th of March
- EP will give its recommendations mid April
- TTE Council will decide in June
- EC will then set up S2R, with the first GB
- The call for AM will be launch within 3 months after the set-up
- S2R will be operational in the beginning of 2015, with a full GB
- A Scientific Committee and a State Representatives Group will be set up

Status



Results



KPIs:

- a 50% reduction of the life-cycle cost of railway transport, through a reduction of the costs of developing, building, maintaining, operating and renewing infrastructure and rolling stock, as well as through increased energy efficiency;
- a 100% increase in the capacity of the railway transport system to meet increased demand for passenger and freight railway services;
- a 50% increase in the reliability and punctuality of rail services; measured as 50 % reduction of unreliability and late arrivals
- Removal of remaining technical obstacles (close TSÍs)
- Reduce negative externalities (N&V, emissions, ...)

Sums



Project volume:

- Totally 800 M €, at least ...
- Founding Members (FM)
 - In total 380 M €
 - Thereof Trafikverket 40.7 M €
- Associate Member (AM)
 - In total 285 M €
 - At least 4.75 % within an IP
 - Alternative for RU 22.8 M€ in several IPs
- Open Calls
 - 135 M € (including first call 52 M €)

Central activities



- S2R shall:
 - Play a major role on rail-related R&I
 - Manage all rail-focused R&I actions co-funded by the EU
 - Set up the Open Calls
 - Liaise with stakeholders, including research org. and universities
- Founding Members (FM)
 - Provide quantitative and qualitative descriptions of the contribution (summer 2014)
 - Propose a annual work plan, activities and budget
 - Work with the overall S2R objectives



SHIFT²RAIL's preparation phase: the promoters

- Already 25 major rail stakeholders including Infrastructure Managers (NetworkRail & Trafikverket) committed to provide significant resources on the long-term to reach the S²R objectives

- Initial founders:



- New industrial partners are already actively collaborating in the IPs and have signed a MoU: **Acciona, Amadeus Rail, AZD, Indra, MerMec, Oltis, Selex and TataSteel**. Signature is pending/expected from Ardanuy, BAM Rail, Colas Rail, Comsa-Emte, ETF, Ineco, Neopul, Rhomberg Sersa, Systra, Strabag rail, Technosite, Wiebe.
- Leading European Railway Undertaking and Infrastructure Managers are already actively participating in the IPs and **ADIF, FS and SNCF** have already signed a MoU. DB and PKP signatures are pending/expected.

➤ **Additional stakeholders are joining!**

Central activities



Trafikverket shall:

- “Provide quantitative and qualitative descriptions of the contribution” (summer 2014)
 - Trafikverket will work with partners
 - The preparation must be done in cooperation with our partners
 - Our common challenges, aims and goals must be defined
 - Our key development areas must be clear
 - It will be the start-up of a new and closer cooperation
 - The cooperation shall be efficient, pragmatic and respectful

Central activities



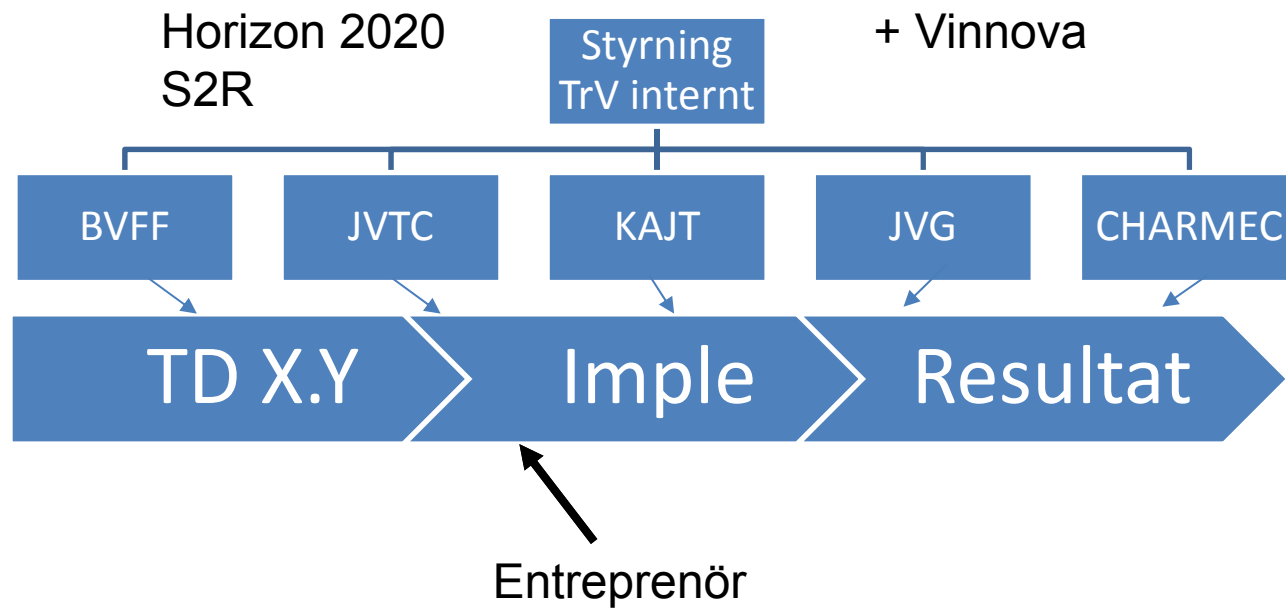
Trafikverket shall:

- “Propose a annual work plan, activities and budget”
 - The detailed project planning will be in the yearly project plans
 - The cooperation will be operational during the coming years
 - It should focus on project planning, execution and follow-up
 - Due to the volume of activities, cooperation at different levels is necessary

Shift2Rail Sverige och Trafikverket

Sammanfattning

- Trafikverket är 1 av 8 grundarmedlemmar, övriga är Network Rail och stora aktörer inom Järnvägsindustrin.
- TrV går in med 20M€ under perioden och får lika mycket från EU, vilket motsvarar totalt ca 60MSEK/år, en ökning jämfört med dagens järnvägsforskning (som är i storleksordningen 40 MSEK/år).
- Trafikverkets forskning de närmaste 6-8 åren kommer få S2R-stämpeln på sig och kanaliseras genom S2R (då får nämligen TrV 50% betalt av EU).
- Införande i Trafikverket
 - Portföljhantering
 - Trafikverket samordnare för Shift2rail Sverige
 - Möte med Järnvägscentra om Shift2rail – KAJT, Järnvägsgruppen KTH, JVTC Luleå, Charmec



Budget

- Övergripande 40 Mkr/år
- Fördelning per IP till TP
 - Arbete krävs

