Plenary session 2:
Transport research into implementation
Plenary session 2: Transport research into implementation

• Carlo Borghini, Executive Director, Shift2Rail
• Georg Trausmuth, Head of Corporate Research, Frequentis
• Eric Nantier, Director Operations Control Process, Lufthansa Group
• Olaf Dlugi, Chairman of the Industry Consultation Body
• Tanja Grobotek, CANSO Europe Director

Moderated by Peter Hotham, Deputy Director, SESAR JU
Transport Research into implementation
S2R OBJECTIVES

+50%
INCREASE RELIABILITY & PUNCTUALITY BY 50%

x2
DOUBLE RAILWAY CAPACITY

HALVE LIFE-CYCLE COSTS OF RAILWAY TRANSPORTS

CONTRIBUTE TO REDUCTION OF NEGATIVE EXTERNALITIES, SUCH AS NOISE, VIBRATIONS, EMISSIONS & OTHER ENVIRONMENTAL IMPACTS

CONTRIBUTE TO THE ACHIEVEMENT OF THE SINGLE EUROPEAN RAILWAY AREA

S2R PROGRAMME, ABOUT €1BLN and A NEW APPROACH TO R&I IN RAILWAY

working together & driving innovation
AN OPEN and ACTIVE ORGANISATION

28 MEMBERS
343 PARTICIPANTS INVOLVED FROM 27 COUNTRIES
92 SMEs
84 RESEARCH CENTRES AND UNIVERSITIES

Values as at 1 Sept 2016 in Million EUR

*incl. at least 120M€ of additional activities

2015 - € 52 M
SHIFT2RAIL INITIATIVE
LIGHTHOUSE PROJECTS

2016 - € 168 M
27 PROJECTS

2017 - € 112 M
17 PROJECTS

2018 - € 158 M
18 TOPICS & 4 TENDERS

8 Founding Members
19 Associated Members
Open Calls

Data extracted from CORDA database in April, 2018
USER FIRST
...opening up new Capabilities coming from emerging technologies or concepts!
From a piecemeal to a System Architecture Approach

- **Innovation**: evolutionary, by steps or disruptive

- **Time to market**: moving from R&I to deployment => system approach to decrease fragmentation

- “Do not reinvent the wheel”: Open System Interface (or interconnection) model

- **Innovation Skills and Competences**: still the same needs in the Digital Railway?

THE FUTURE RAIL SYSTEM: TRAINS MAXIMIZING THE SYSTEM PERFORMANCE BY A COMBINATION OF DISTRIBUTED INTELLIGENCE AND SUPERVISION

- **Enablers**: digital technologies, automation, artificial intelligence, data, cloud and supercomputing, **connectivity**, satellite, but also **new regulatory concepts and framework**, traction, braking systems, etc....

- **Deployment**: from zero on site testing through integrated testing to revenue services testing, large real time demos, transition models
S2R R&I results and process leading to standards and regulation

Shift2Rail internal process

S2R R&I results

input

S2R CCA WA 3.2

Develop

Maintain

S2R Rolling Innovation Plan

Bring its input into the regulatory framework and standardization plan

R&I to reg / stds formal process

Stakeholders e.g. ERRAC

RASCOP Platform (chaired by EC)

European Commission

- Advisory task proposing guidelines for R&D leading to technical standards for interoperability and safety, after stakeholders consultation
- Recommendation for TSI
- Requests for TSI
- Request for standards
- mandate

CEN/CLC/ETSI

ISO / IEC / ITU

JPC-R, Others, SSO

Shift2Rail internal process

Assisting the S2R projects/TDs:
- Overview of standardisation activities, ongoing and planned
- Monitoring of progress
- Assistance in the timely development of appropriate standards
- Close cooperation with relevant partners and organisations

S2R

Detailed Guidance

ERA

- FEED INTO

Detailed Guidance

S2R

S2R R&I results and process leading to standards and regulation

S2R R&I results and process leading to standards and regulation
Towards Horizon Europe and a potential Shift2Rail 2
S2R Europe 2030  Research and Innovation beyond 2020

**FUNDAMENTAL RESEARCH**
- TRL: 0 -> 2
- Rail
- « Blue Sky »
- ad-hoc governance open to all
- Funding type: Horizon Europe rules

**APPLIED RESEARCH**
- TRL: 3 -> 7
- R&I
- PPP membership with third parties
- Flat rate on entity accounting rules

**DEPLOYMENT COORDINATION**
- S2R solutions with S2R JU supervision
- open to all
- Funding type: CEF/EIB/etc.

START-UPS BLUE-SKY APPS

**START-UPS BLUE-SKY APPS**
Programme Content: Operations -> Systems -> Innovation Capabilities

**RAILWAY**

**CUSTOMER CENTRIC**
- 6. Services Timed to the Second
- 2. MAAS
- 3. Logistic on Demand
- 10. Stations, Smart City Mobility

**SUSTAINABLE**
- 1. ATO
- 4. More Value from Data
- 5. Optimum use of Energy
- 8. Guaranteed Assets Health and availability
- 9. Intelligent Trains
- 7. Low Cost Railway
- 11. Environmental and Social Sustainability
- 12. Rapid and reliable R&D delivery

**DIGITAL**

**Other technologies/Processes**

- Relation with Air Transport
- Concessions (?)
- Energy Efficient
- Cost Efficient
Programme Content: towards an Integrated Rail System

- **2018**
  - InnoTrans 2018
  - System Architecture
  - Integration
  - I2M+
  - Mobility at the core of rail

- **2030**
  - ATO GOA3
  - Virtual Coupling
  - CBM
  - Energy Efficiency
  - Noise reduction
  - IP4 completed
  - Hybrid Locos
  - Long Freight Trains

- **2040**
  - Integrated Rail System

- **2050**
  - Integrated Mobility and Transport Systems
# Founding Members

- ALSTOM
- Ansaldo STS (A Hitachi Group Company)
- BOMBARDIER
- CAF
- Network Rail
- SIEMENS
- THALES
- Trafikverket

# Associated Members

<table>
<thead>
<tr>
<th>Virtual Vehicle Austria consortium+ (VVAe+)</th>
<th>European Rail Operating community Consortium (EUROC)</th>
<th>Swi'Tracken consortium</th>
<th>Smart DeMain (SDM) consortium</th>
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<tr>
<td>Amadeus</td>
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<td>AERFITEC</td>
<td>Competitive Freight Wagon</td>
<td>Smart Rail Control</td>
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</table>

*Shift2Rail*
Transport Research into Implementation

Georg Trausmuth
Director Corporate Research
Highly reliable communication and information solutions for a safer world
70 years of innovation in safety-critical applications
Drivers of Innovation
Timeline of selected examples (Research to Implementation)

- Idea
- Initial Research
- Extended Features
- Launching Customer
- Standardisation
Timeline of selected examples (Research to Implementation)

SWIM (Research) → Prototypes & Demonstrators → SWIM (Standardisation) → Prototypes & Demonstrators → SWIM (Implementation) → Remote Tower (R) → Prototypes & Demonstrators → Remote Tower (S) → Remote Tower (I) → Drones (R) → Drones (S) → Drones (I) → 2005 → 2010 → 2015 → 2020+
System Wide Information Management (SWIM) - MosaiX
Seamless, interoperable data exchange between all stakeholders

AVIATION INTEGRATION PLATFORM

VCS3020X
smart STRIPS
smart VISION
Air Situation Display

Data Integrator
Met Office
ATC
Worldwide stakeholders

STAKEHOLDERS
Aviation and non-aviation

MosaiX SWIM*

Flight info
Aeronautical info
Surveillance
Weather info

AVIATION EXCHANGE MODELS and legacy protocols

*) System-Wide Information Management
Remote tower – much more than visualization
Trusted and proven technical and operational expertise

SOLUTION COMPONENTS – functional view

- Communication: Voice Communication System VCS3020X
- Information & control: smartTOOLS, ATIS / VOLMET, MET / NAV, LICOS / TEC
- Flight data handling: smartSTRIPS, Messenger
- Surveillance: Air Situation Display, PTZ-MAP, Tracker
- Visualisation: smartVISION

SOLUTION COMPONENTS – location view

Control centre
- ICWP

Network
- vitalsphere

Airport site
- Control, Comms, Sensors

EXTENSIONS
- System management
- Recording

SERVICES
- Implementation
  - Specification, installation, configuration, test and acceptance, PM
- Operations
  - CONOPS, transition, safety & regulation, training, OPS PM
- Technical
  - Security, NW support, maintenance
Drones: Challenges from different perspectives

- Approval of a flight plan
- Flight areas
- Geofencing
- Information mgmt.
- Interoperability multiple UTM Landscape

Unawareness:
- Largely unknown
- Undocumented
- Not standardised

Flights planning mgmt.
Situational awareness
ATC rules & regulations
Instructions and clearances
Information needs

Drone operator
ANSP
Conclusion

- Extended Footprint
- Timelines
- Resources
- Technological Improvements
- Market Harmonization
Transport Research into Implementation

05.12.2018
Eric Nantier, Director
Operations Control Process Development & Management, Lufthansa Group
Operations Research & Air Traffic Management, SWISS
What is Innovation?

“The **process** of translating an **idea** or **invention** into a good or service that creates **value** or for which customers will pay.

To be called an innovation, an idea must be replicable at an **economical cost** and must satisfy a specific **need**. **Innovation** involves deliberate application of **information**, **imagination** and **initiative** in deriving greater or different **values** from resources, and includes all processes by which new ideas are generated and converted into useful products. In **business**, innovation often results when ideas are applied by the **company in order** to further satisfy the needs and expectations of the customers. “

Source: [http://www.businessdictionary.com/definition/innovation.html](http://www.businessdictionary.com/definition/innovation.html)
The Lufthansa Group Approach

Research
- Close cooperation with many universities in Austria, Germany, Great Britain, France, Switzerland and the Netherlands
- Internship program at SWISS
- Support of students with their Bachelor and Master thesis
- Close cooperation with DLR (German Aerospace Center), Eurocontrol and ANSPs

Innovation
- Participation in SESAR Research activities, e.g. Vista and SESAR2020
- Execution of Very Large Scale Demonstration with many flight trials and simulation

Implementation
- Integration and Participation in SESAR Deployment Manager together with airline partners and suppliers
Examples of Implemented Research Projects

Large Scale Demonstrations

iStream – integrated SESAR TRials for Enhanced Arrival Management

AAL- Augmented Approaches to Land

FROT:

First Rotation hours

Optimisation Trial

FLUGHAFEN ZURICH

skyguide

EUROCONTROL

SWISS
Thank you
Transport research into implementation

Olaf Dlugi
ICB Chairman
5th December 2018
CURIOSITY
EXPLORATORY R&D
APPLICATION ORIENTED R&D
INDUSTRIAL R&D
HAS TO BE TARGETED
PREREQUISITES for R&D

SES GOVERNED

NETWORK CENTRIC

PERFORMANCE ORIENTED
FOR AIRSPACE USERS

FOR DRONE OPERATORS

FOR THE END USER
A MUST FOR R&D

OUTPUT BASED

OPERATIONAL DRIVEN

TECHNOLOGY AS AN ENABLER
LESSONS LEARNED

PRIORITISE
R&D HOW?

COMPREHENSIVE

COORDINATED

UPDATED RESEARCH ROADMAP
CHALLENGES

AUTOMATION

RESISTANCE TO CHANGE

INTELLECTUAL PROPERTY RIGHTS
MUST BE TARGETED
DEPLOYMENT HOW?

SYNCHRONISED
HARMONIZED
STANDARDIZED
AIR & GND
DEPLOYMENT WHAT?

OUTPUT BASED TARGETS

NOT TECHNOLOGY DRIVEN

PRIORITISED
DEPLOYMENT SUPPORT

FUNDING

INCENTIVISATION
DEPLOYMENT TARGET

SEAMLESS EUROPEAN NETWORK
LESSONS LEARNED

PROGRAMME MANAGEMENT
FURTHER CONSIDERATIONS

GLOBAL PERSPECTIVE

AFFORDABLE G/A SOLUTIONS

MILITARY NEEDS
CHALLENGES

OPERATIONAL REALITY

INSTITUTIONAL SET-UP

ENFORCEMENT

ROLE OF THE HUMAN
I am convinced that the necessary trust in the future of SES deployment can be enhanced by concentrating on some short term solutions to build capacity while taking the necessary steps for the mid to longer term solutions.
WHO WE ARE

Global Membership
89 Full Members (ANSPs)
representing
85% of the world traffic

89 Associated members
- companies that supply the technology,
products, services and solutions to ATM industry
European Membership
34 Full Members (ANSPs)
representing 90+% of the
European traffic
CHALLENGES
CHALLENGES

- Commitment
- Digitalization/Automation
- Virtualisation
- Human dimension
Resistance to change comes from a number of sources....
SOLUTIONS

- Incentive framework
- Mature solutions
- Human Dimension
Demonstrate a tangible benefit to network performance
Transition plan so SESAR solutions are feasible
Addressing the Human Dimension is a must
- Reward good performance for the Network
- Funding for the Network
- Industry cooperation for the Network
CANSO is the single voice of 34 European ANSPs and is committed to working closely with all stakeholders in European ATM.
Many thanks!
Panel discussion: Transport research into implementation

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