



## Wrap up and Conclusions

27<sup>th</sup> April 2017, Olomouc, Czech Republic

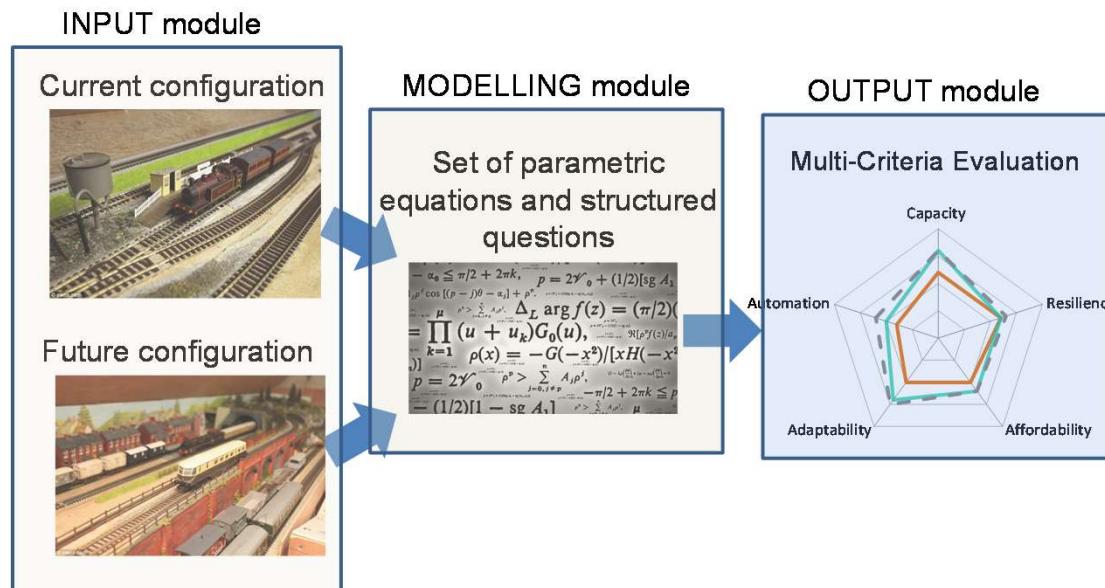
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SP3 Leader



# WP3.1 – Achievements and Conclusions



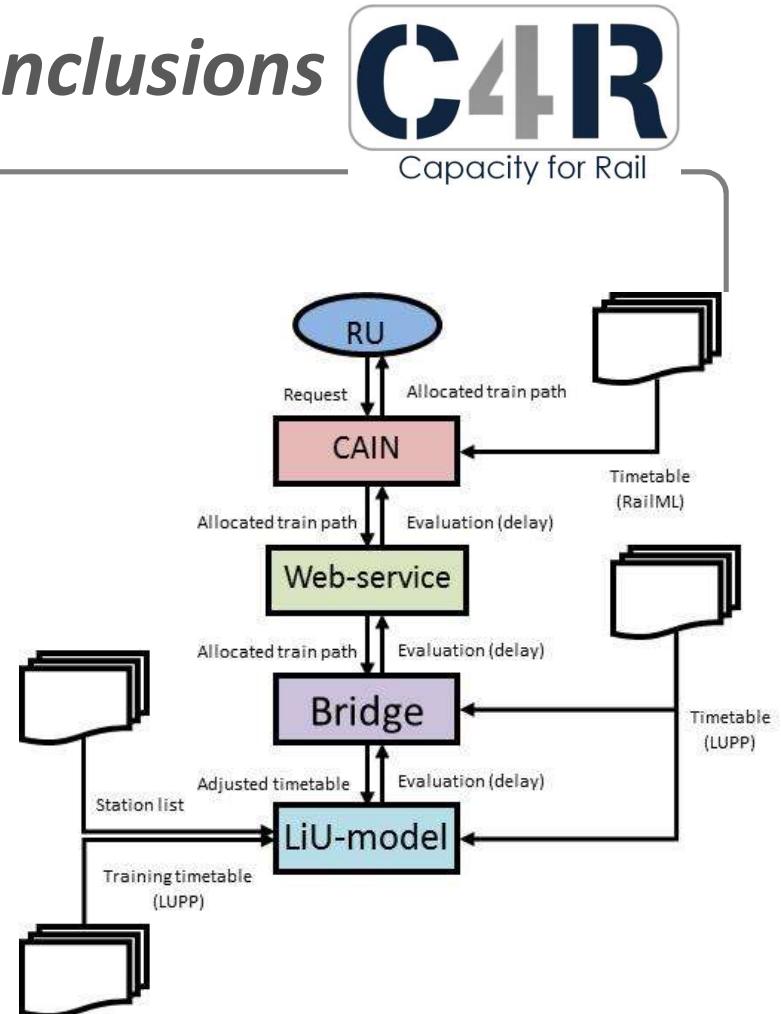
- An automatic tool to support strategic investment decisions on infrastructure enhancements, operational strategies and technology deployment
- Impacts are assessed considering a “whole-system” approach which looks at trade-offs among different capabilities.
- The use of such a tool is expected to bring significant savings to complex long term planning processes.



## WP3.2 – Achievements and Conclusions



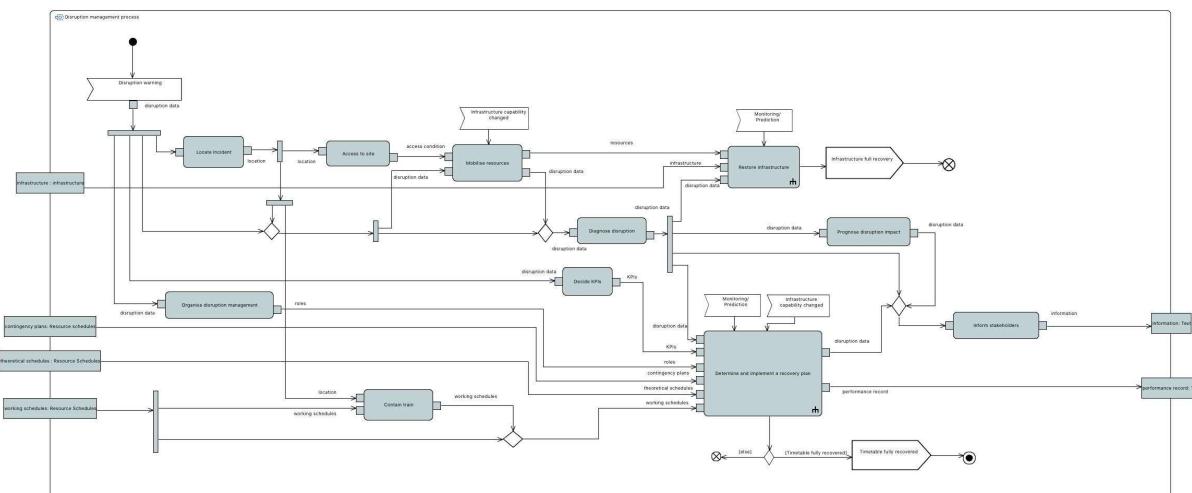
- Tactical and operational planning are integrated in a tool for the optimised scheduling of extra train paths in already existing timetables.
- Medium-term insertion of freight train paths and short-term insertion of extra pax trains (in case of large disruptions) is possible minimising delay propagation.
- The uptake in real-life operations would ease the insertion of extra train paths, mitigating delays which could lead to more revenues for IMs in the long term and more flexibility during emergencies.



## WP3.3 – Achievements and Conclusions



- SysML schematisation of current disruption management processes highlighted the need of automating communication/coordination and of using optimised decision support tools.
- A roadmap for increasing levels of automation in European Railways has been provided and validated, showing that automation is more effective when applied in groups and not incrementally.
- Real-life applications of an automated delay prediction tool (based on neural network) provides an example of how automation could improve quality of decisions to solve disruptions.



## WP3.4 – Achievements and Conclusions



- Recommendations on data extensions to be used in different operational contexts
- Requirements for exchanging and integrating data coming from different sources including customers and other modes of transport.
- A web-based data architecture based on ontologies has been designed to collect and semantically combine data from different sources and in different formats.
- The adoption of ontology-based data architecture definitely represents the way forward to enable automation of railway operation, advanced information systems and cross-mode data communication.



# *How to bring forward these innovation to the industry?*



IMs usually reluctant in adopting new systems if not already used and validated by another IM.

How to go out of this loop?

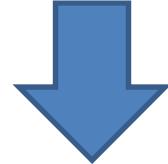
What's  
your  
opinion  
?

Would cooperation between two or more IMs for a shared deployment of new technologies (not R&D project) help?

# *Future directions of R&D in Europe?*



**EC H2020 funds  
for railway  
research**



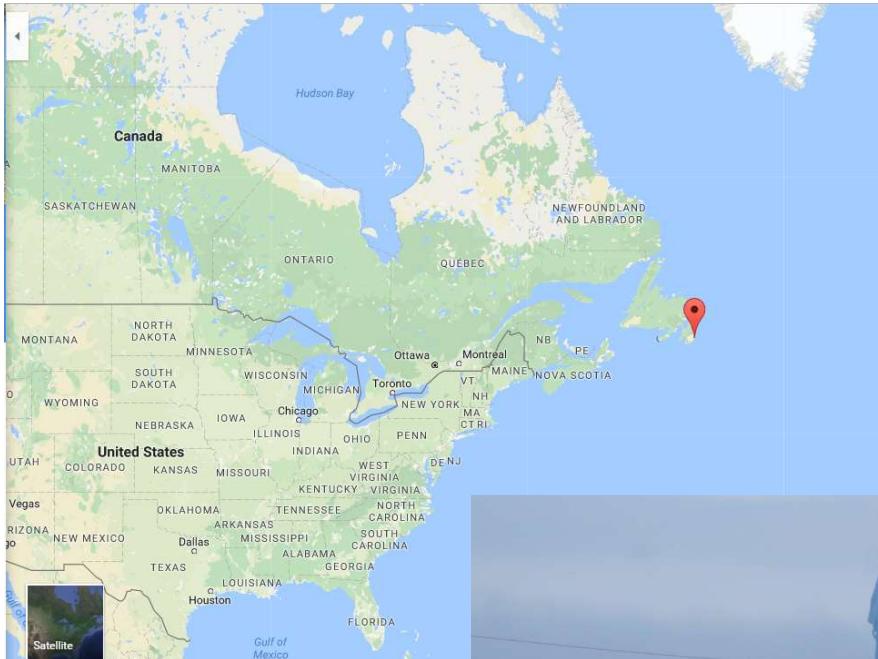
- ✓ Not really future thinking (conservative)
- ✓ Not flexible in the structure
- ✓ Tangible risk of disregarding outcomes of previous EU projects

How are we going to cut emissions by 60% without cutting down air traffic and make railways a substitute to aviation?

# *Future directions of R&D in Europe?*



19<sup>th</sup> April 2017, Newfoundland, Canada



How can we stop this deadly process if we don't think about alternatives to the airplane, which produces 30 times more CO<sub>2</sub> than a HS train?



# *Future directions of R&D in Europe?*

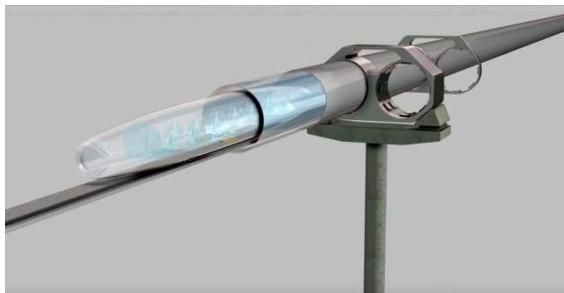


What about:



Optimised algorithms for  
automatic traffic control?

Maglev integration with  
conventional railways?



Possible studies on the  
hyperloop?

# Q&A

