Assessing the coupling of ATM elements across the network

Novel tools to evaluate ATM systems coupling under future deployment scenarios - Domino

Project Partners

Eurocontrol

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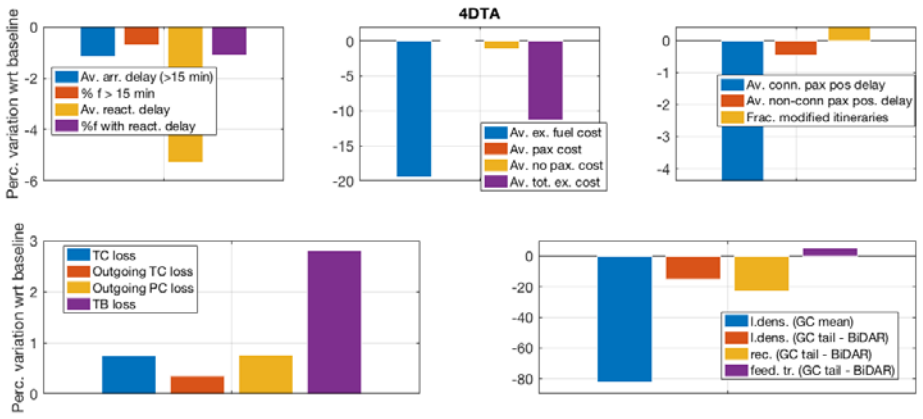

Benefits:

- **Trip centrality metrics for flights and passengers**
- **Extreme events causality metric**
- **Agent-based model capturing flights and passengers**
- **Flexible and expandable platform and methodology**

Airspace management brings together multiple stakeholders and systems including flights, passengers, arrival managers and the Network Manager. The system evolves as a result of SESAR initiatives and other technology and policy changes. Such changes, even when applied locally, often have an impact on other sub-systems due to the high level of coupling across elements of the system. Domino explored such issues through the development of a toolbox based on a full European, agent-based model of the ATM system, featuring flights and passenger itineraries, also developing network metrics focused on centrality and causality.

Domino models the current state of the system, and its behaviour under the implementation of three mechanisms: 4D trajectory adjustments, flight prioritisation and flight arrival coordination. The agent-based system allows Domino to represent the behaviour of different stakeholders and to capture the emergent characteristics of the system. The model considers a full day of operations, including flights (with delays) and passengers' itineraries (with connections), executed in an event-driven simulator environment.

The network metrics can be applied to the outcome of Domino's model, or to historical datasets, providing a set of tools ready to be used by ATM system analysts.

More Information: www.domino-eu.com

The systematic approach used in the development of Domino's model provides a flexible platform able to model new mechanisms, regulations or agents' behaviours in a seamless manner

The new metrics on passenger trip centrality and extreme event causality have proven to be insightful for capturing complex, indirect interactions

Enhanced PIs complement current Performance Framework and can better capture ATM performance

Key project outcomes include the development of an agent-based model and network metrics investigating three mechanisms