AEROSPACE OPERATIONS DIVISION



Airport Airside Operations



Can your airport cope with the predicted capacity demand?

Capacity at airports is seen as the primary limiting factor for overall ATM system capacity. According to SESAR, integrated airport operations and a growing level of co-ordination between the aerodrome community, ANSPs and airspace users, will help to better match capacity and demand and improve efficiency. NLR is specialised in defining and validating new concepts and procedures for airport airside operations that aim at fully exploiting airport capacity while maintaining the necessary safety levels, increasing punctuality, reducing cost and limiting the environmental impact in a multi-stakeholder approach. In addition, NLR can prototype and validate new tools required to realise the benefits.





NLR CARRIED OUT MANY RESEARCH ACTIVITIES FOR IMPROVE-MENT OF AIRSIDE OPERATIONS, KEY ELEMENTS ARE:

- Advanced Surface Movement Guidance and Control Systems (A-SMGCS) and
- Collaborative Decision Making (CDM).

Applying these holistic approaches is seen as the most promising path to achieving the paradigm shift towards performance-based airport operations, as required by SESAR. Our expertise in affiliated research areas like Airport Safety Assessment of Operational Procedures, Human Factors and ATM Validation is an important contributor to obtaining high-quality realistic and reliable results. It also helps determine possible consequences of introducing new approaches within the existing airport environment.



The concepts that NLR develops and tools that are researched include:

- Departure Manager (DMAN): NLR DMAN provides a scheduled runway sequence optimised for multiple stakeholders with a focus on Outbound Punctuality Sequencing (OPS).
- Electronic Flight Strips (EFS): NLR developed a flexible prototype HMI of an EFS based on Schiphol operations. Air traffic controllers use the EFS to administer their clearances. This information input can be further used to check consistency of operations and give warnings in case of conflicts.

- Route Planner (RP): This planning tool determines the optimum taxi route in terms of standard operations and efficiency. This information can be further used to check for conformance with the planned route.
- Controller Pilot Data Link Communication (TAXI-CPDLC): Information that is managed using RP and EFS can also be used for transmitting planned taxi routes and taxi clearances between air traffic control and aircraft using CPDLC. On the airborne side electronic moving maps will display the position of the aircraft on an airport map including other traffic, restricted areas, runway information, taxi information and clearances.
- Runway Incursion Alerting (RIA): NLR developed and tested different types of safety nets, such as the Schiphol RIA system, which was prototyped at NLR. Furthermore, the NARSIM-Tower validation platform was used for hardware-in-the-loop and human-in-the-loop testing of safety nets for taxi conflicts and restricted area intrusions.
- Virtual Block Control and Separation Bubbles: These are tools for safer operational procedures during low visibility conditions. So-called Virtual Stop Bars are used in combination with a Separation Bubble Algorithm to allow for safe execution of block control.

NLR EXPERIENCE AND EXPERTISE

NLR applied its research capabilities not only for Dutch customers (LVNL, Schiphol) but also for the European Commission, Eurocontrol and European Airports like Luxemburg and Malpensa.

NLR is in a position to offer its services for consultancy and expertise in Airport Airside Operations for the complete concept development and validation cycle from prototyping and feasibility testing to full-blown hardware and human-inthe-loop performance validation exercises. The results are custom-made validated procedures, system requirements and operational concepts that will provide our customers with the expected operational benefits.

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