

4D flights to make air travel even more predictable

Brussels, 19 March 2014. Air travel will become even more predictable in the future thanks to the work undertaken within the SESAR Programme to develop and validate initial 4D (i4D) trajectory management – connecting aircraft and ground systems to optimise the aircraft trajectory in three dimensions plus time¹. Prepared by SESAR members (Airbus, Eurocontrol, Honeywell, Indra, NORACON² and Thales), a flight trial going from Toulouse to Copenhagen and then Stockholm, successfully validated the sharing of trajectory information³ between both ground and airborne operations, and the capability of the aircraft to comply with time constraints in the en-route and approach phases of the flight. The flight trial further confirmed that i4D offers important safety and environmental gains, as well as increased flight predictability and overall network efficiency.

“Through this i4D flight trial, SESAR members are showing that the Programme’s research and development can bring about immediate and positive impact to Europe’s Air Traffic Management (ATM) system. This wouldn’t have been possible without the operational support and validation by pilots and air traffic controllers, who are making 4D trajectory management a reality. Thanks to their hard work, passengers will experience an enhanced travel experience, which is an important goal of the SESAR Programme,” says Claude Chêne, Executive Director of the SESAR Joint Undertaking.

Moving towards deployment

The core characteristic of i4D is to ensure that trajectories are always synchronised between air and ground. While a previous flight trial in 2012 demonstrated the feasibility of i4D, this second flight demonstrates the maturity and the robustness of the concept within a real traffic situation. Enabled by further refined airborne and ground systems and procedures, as well as enhanced Human Machine Interfaces (HMI), the latest flight trial builds on the results of an extensive validation process made up of a significant amount of real-time simulations involving pilots and air traffic controllers. This flight is an important step in the i4D validation roadmap, since it proves that the technology, systems and procedures are ready for large-scale demonstrations and therefore one step closer to deployment.

Flight trial

Throughout today’s flight, the aircraft’s trajectory information containing current and predicted positions were exchanged with the concerned air navigation service providers and airports. The Airbus A320 test aircraft flew from Toulouse in France through the Eurocontrol Maastricht Upper Area Control Centre (MUAC) airspace to meet a time constraint at a metering point close to Copenhagen airport. The flight then continued into Nordic Unified Air Traffic Control (NUAC) airspace to demonstrate an optimised descent to Copenhagen, after which it climbed to a cruise

¹ Dimensions 1 & 2: Latitude & longitude – the grid reference giving the aircraft’s position on the map; Dimension 3: Altitude – the height of the aircraft above ground or sea level, depending on the reference for the particular phase or flight. Dimension 4: Time – the aircraft position and altitude is defined for specific moments in time for the whole flight.

² NORACON is a consortium of nine partners: Austro Control and the North European ANS Providers (NEAP), Avinor (Norway), EANS (Estonia), Finavia (Finland), IAA (Ireland), ISAVIA (Iceland), LFV and Swedavia (Sweden) and Naviar (DK). LFV and Naviar will participate in the I-4D flight trial.

³ Extended Projected Profile (EPP) - information from the aircraft system describing the projected airborne trajectory.

level and then descended into Swedish airspace to a second metering point before landing at Arlanda Airport. After a change to another Flight Management System (FMS), the aircraft departed from Stockholm towards Copenhagen to meet two further time constraints before climbing towards MUAC airspace and returning to Toulouse.

Results

This latest flight trial shows further that the sharing of trajectory information between the air and ground can enable a safer and more efficient handling and certainty of flight profiles. Controllers can clearly see on their screens expected ground and airborne trajectories, which allows them to resolve discrepancies where necessary and anticipate the flight path with greater precision. On the airborne side, the aircraft can better manage their speed profile, which leads to fuel savings and an environmentally-optimised flight profile. The sharing of trajectory also means that aircraft sequences can be better managed and delivered into Terminal Manoeuvring Areas (TMAs) with greater efficiency.



The SESAR Programme is the technological and operational dimension of the Single European Sky (SES) initiative to meet future capacity and air safety needs. The aim of the SESAR Joint Undertaking (SJU) is to modernise European Air Traffic Management by coordinating and concentrating all relevant research and development efforts in the European Union. The SJU is a public body founded by the European Union and Eurocontrol, is directly responsible for long term and innovative research, and has formed a public-private partnership with the following fifteen members: AENA, Airbus, Alenia Aermacchi, DFS, DSNA, ENAV, Frequentis, Honeywell, Indra, NATMIG, NATS (En Route) Limited, NORACON, SEAC, Selex ES and Thales for conducting industrial research and validation.

[Watch our i4D video to see the concept in action](#)

Or visit www.sesarju.eu

-[Triona Keaveney](#), Chief Communications Officer, SESAR Joint Undertaking

Tel: +32 2 507 80 12

-[Martin Fendt](#), Press Manager, [Airbus](#)

Tel: +33 6 17 72 05 81

-[Antonio Tovar](#), Communication & Media Relations, [Indra](#)

Tel : +34 91 480 97 01

-[Mireille Roman](#), Communications MUAC/DIR, [Eurocontrol](#)

Tel: +31 6 558 61 279

- [Anne-Lovise Linge](#) & [Yvonne Matsson](#), [NORACON](#)

Tel: +46 70 819 26 75 or +46 40 635 56 47

-Stephane Marche, ATM Chief Architect, [Honeywell Aerospace](#)

Tel: +33 5 34 56 15 87

[Giaime Porcu](#), [Thales Group](#)

+33 1 57 77 92 18