THE IRIS PROGRAMME BRINGS EUROPE ONE STEP CLOSER TO SAFER AND MORE EFFICIENT AIR TRAVEL

## The Iris satellite datalink solution enters implementation phase

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The modernisation of European airspace has taken another giant leap forward as Iris – Inmarsat and the European Space Agency's (ESA) air traffic management (ATM) programme – has entered its implementation phase. This takes us one step closer to Iris commercial service and fulfilling the SESAR objective of modernising ATM over Europe. Iris delivers an extensive list of benefits across the aviation industry, such as increased operational efficiency, major fuel savings, enhanced security, and decreased CO_2 emissions.

Some of the major advancements toward Iris commercial implementation include:
- Completion of system design, testing, and inclusion of European ATC communications standards for ATN/OSI and increased security resilience
- Successful trials to assure performance and compliance with SESAR and data link requirements
- Agreements with multiple OEMs to develop and certify commercial avionics to support Iris
- Establishment of partnerships with ATM stakeholders (ANSPs, OEMs, SESAR organizations, EASA)
- Requirements developed for the transition to future capabilities (ATN/IPS, Future ATS services-ATN B3)
- Agreement reached with a major European airline to begin flight trials in 2020 using Iris technology
- Agreement reached with European Satellite Services Provider (ESSP) to identify potential markets and business opportunities for Iris's commercial service.

Inmarsat has also signed agreements with major European ANSPs to help develop
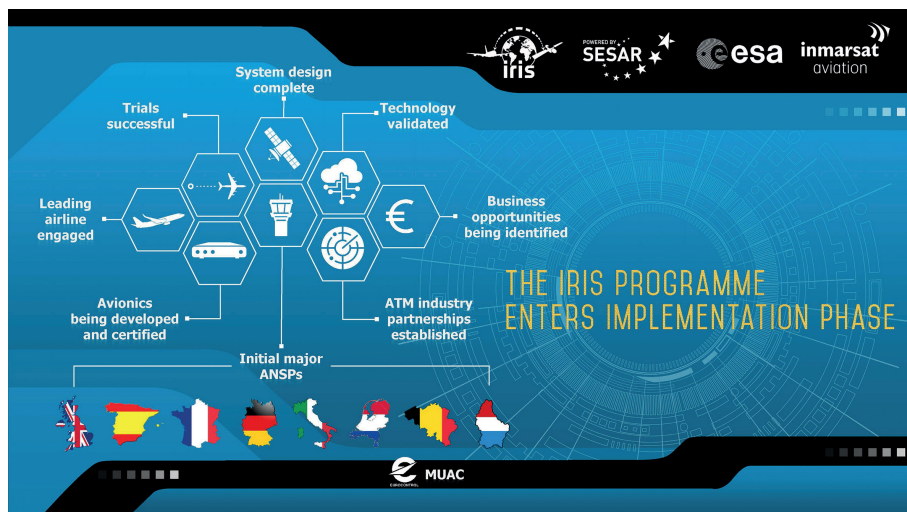
Above Major milestones in the Iris programme

Right: The project has entered the implementation stage with the broad support of industry

**Opposite page:** The Iris programme enables secure broadband internet connectivity for aircraft

standards for Air Traffic Control. These include DFS, ENAIRE, ENAV, EUROCONTROL MUAC, and NATS. All these mark significant milestones to demonstrate operational readiness, benefits, and to transition towards commercial service.

With commercial service scheduled to begin in early 2021, here is a little more about how this vital enabling tool for aviation delivers safer, greener, and more efficient air travel.

A solution for congested skies
With the International Air Transport Association (IATA) forecasting that air traffic will double by 2035, there is a fear that congestion of the ground-based radio frequencies currently used for air traffic control will lead to increased flight times,
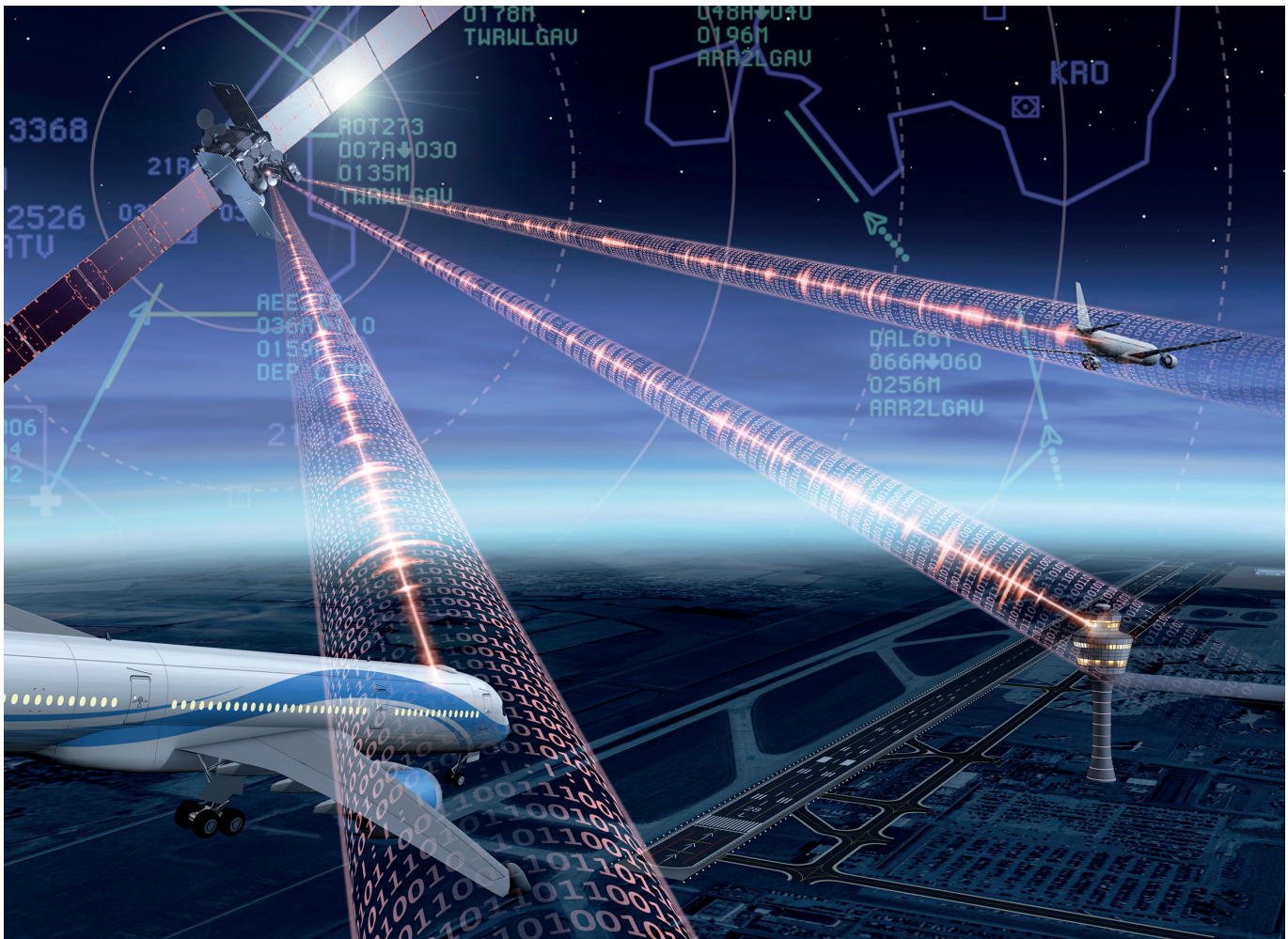
travel disruption, and negative economic and environmental consequences. The Iris programme will alleviate pressure on these ground-based radio frequencies by introducing a safe, secure satellite-based air traffic management data link between aircraft and air traffic control.

Inmarsat and ESA and more than 30 partners have been researching and planning Iris for the past five years. They designed the Iris system, conducted flight trials to validate performance and economic viability, and ensured compliance with the Single European Sky ATM Research (SESAR) masterplan and data link requirements. Requirements for transitioning to future capabilities have also been established and commercial avionics are now being developed and certified by multiple companies to support the technology.

Inmarsat's digital operations platform
Iris is powered by Inmarsat's award-winning SB-S digital aircraft operations platform, using its robust and reliable L-band satellite

constellation, which has underpinned global safety services for 40 years.

SB-S delivers secure, real-time operational and safety connectivity solutions that drive costs down and assure safety. In bringing digital transformation to the aviation industry, SB-S unlocks millions of dollars in savings for airlines through connected applications like graphic weather, long haul flight optimisation, in air flight briefs and virtual crew rooms.

The benefits of digital transformation
The Iris programme delivers powerful benefits to airlines and Air Navigation Service Providers (ANSPs) across Europe by enabling high bandwidth, highly-secure and cost-effective satellite-based data link communications.

### Fuel savings and increased flight efficiency with 4D trajectory
This allows aircraft to be pinpointed in four dimensions (4D), which include latitude, longitude, altitude and time. With 4D

trajectory operations, aircraft can automatically adapt their speed and trajectory in flight to arrive at a given point in space at a time pre-agreed with Air Traffic Control. As the trajectory of each aircraft is defined in detail in advance, with local conditions and other airspace users taken into account, the overall predictability and efficiency of air traffic will be enhanced. This precise flight tracking and more efficient air traffic management reduces delays and saves fuel.

Enhanced security through VPN
Iris is the future of real-time, secure air traffic management. The transition to high-speed broadband ushers in an era of greater connectivity and more devices with the potential to connect. Iris protects aircraft communications from cyber threats with security gateways. These gateways provide a VPN barrier between the ground and each aircraft that assures mutual authentication and integrity of data exchange. They also securely connect the flight management

The Connected Aircraft at the Heart of Digital Transformation
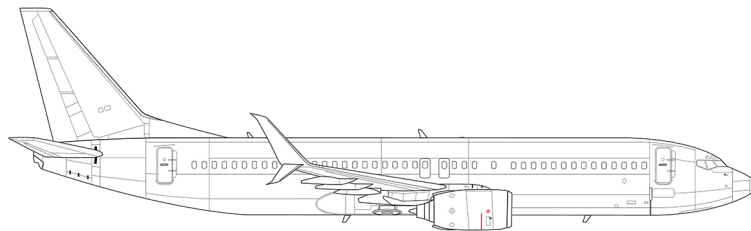
**CONNECTED
OPERATIONS SERVICES**

**MAINTENANCE OPERATIONS
CONTROL SERVICES**

**AIRLINE OPERATIONS
CONTROL SERVICES**

**AIR TRAFFIC
CONTROL SERVICES**

systems on-board the aircraft to the corresponding systems used by air traffic controllers on the ground.

Environmental benefits from decreased CO2 emissions

At present, inefficiencies in European airspace add an average of 42km to the distance of an average flight. More efficient flight paths enabled by Iris and SESAR will reduce fuel burn and CO_2 emissions, and lessen the need for vectoring and holding patterns. This is an increasingly important consideration for both passengers concerned about carbon footprints and airlines bound by ever-stricter environmental regulations across the EU.

Happier passengers from shorter trips and fewer delays

While Iris is designed to deliver game-changing operational benefits to airlines, it has some surprising implications for the passenger experience, too. Iris means a much lower risk of disruption and a faster, more comfortable journey. Popular destinations tend to stack inbound aircraft on a first come, first served basis, and this is notorious for delaying flights.

With the significantly advanced trajectory management Iris makes possible, however, ATC can instead sequence aircraft well ahead of their approach to make best use of runway capacity, and better cope with overloads caused by spikes in air traffic or

bad weather. As far as passengers are concerned, the less time wasted circling the skies in a holding pattern, the better.

The sky's the limit: the future of airline operational cost savings revealed

Airlines are set to see significant savings from satellite communications initiatives, such as Iris. The London School of Economics recently released the second chapter of Sky High Economics, a report studying the benefits of operational connectivity in the aviation industry. The report concludes that the connected aircraft, together with global satellite communications and the technology of the Internet of Things, can bring about efficiencies and enhancements in four key categories for aviation. These categories include: connected operations, maintenance operations control, airline operations control, and air traffic control.

Within these categories there are numerous benefits that can be realised. These include: reduced fuel consumption and emissions, maintenance and flight optimisation, better fleet utilisation and airspace capacity and improvements to the safety of aircraft and passengers. According to the report, all these operational benefits combined could yield savings for the global airline industry of up to US$7.5 billion annually based on existing connected aircraft numbers, rising to almost US$15 billion annually by 2035.

Iris ushers in a new standard for cybersecurity in aviation

With IP connectivity comes great responsibility, and Inmarsat takes cybersecurity very seriously. As a leader in cybersecurity, Inmarsat works closely with regulators and other stakeholders to collaborate on standards for cybersecurity and to help prepare for the future needs of aviation customers. An example of this is Inmarsat's corporate-level ISO 27001 certification, which demonstrates that its internal networks, policies and standards comply with the highest cybersecurity standards. The company has adopted industry best practices and certification for information security and has developed the most sophisticated and secure networks for data link and voice using VPN and KPI infrastructures.

Looking ahead to 2021

Iris commercial flight trials will begin in 2020 after an agreement was reached with a leading European airline and this will be followed by the rollout of full commercial service in 2021, upon completion of initial operating capabilities, commercial trials, and European Aviation Safety Agency (EASA) certification.

Iris is well on its way to provide one of the key elements of ATM digitalization: a vital data link service, enabling more efficient, cost-effective air traffic management. The programme is a pivotal initiative for modernizing European airspace and delivering powerful benefits for air navigation services providers and airlines alike. ❖