Sweden – leading efforts to reduce aviation emissions
Green flights from gate to gate with Green Connection

A green flight demonstration was arranged today at Oxford Aviation Academy – flights that are green all the way from take-off at Gothenburg Landvetter Airport to landing at Stockholm Arlanda Airport. Through modern technology and improved co-operation, it is estimated that approximately one hundred of these flights will be made between December 15th and May 31st. The new way of flying reduces carbon dioxide emissions by 100-165 kg per flight, and is being carried out under the Green Connection partnership.

With the latest GPS-based RNP-AR technology (Required Navigation Performance-Authorization Required), approach paths to the runway can be curved and shortened. High precision navigation technology enables a more energy efficient approach, which minimises fuel consumption and reduces emissions – particularly CO₂ emissions.

- LFV has been working for many years to make our air space more efficient – everything from shortening flight paths to improving flight timing. It is important to us to promote efficient flights with as little environmental impact as possible. The results of the Green Connection demonstrate what the aviation industry can achieve when all actors co-operate towards a common goal. Implemented on a large scale, this can mean a significant reduction of aircraft greenhouse gas emissions, says Thomas Allard, Director-General of LFV, the National Civil Aviation Administration.

With Green Connection, the industry is pulling no stops and is making entire flights more resource efficient. First up is the flight path between Sweden’s two largest airports. After taking off from Gothenburg’s Landvetter Airport, the plane is allowed to gain altitude as quickly as the aircraft type allows, up to cruising altitude. Once it reaches cruising altitude, the plane takes the shortest possible route at optimal speed to Stockholm Arlanda Airport. During the flight the aircraft constantly communicates its anticipated flight path in four dimensions (longitude, latitude, altitude and time). This information is analysed and compared against the actual flight path, enabling improvements to flight predictability.

The new arrival procedure into Stockholm Arlanda runway 26

The new design RNP AR arrival procedure into Stockholm Arlanda runway 26 which is:

- 11 NM shorter than the existing PRNAV STAR
- Lateral and vertical optimized
- Designed to avoid noise sensitive areas
- Flights arriving from west saves on average 164 kg of carbon dioxide.
- Flights arriving from southwest saves on average 100 kg of carbon dioxide.
This is a major step forward in the long journey SAS has taken towards making Swedish air space more efficient. It allows us to improve our punctuality, which is already at a world-class level, while reducing our emissions. Our goal is to reduce our emissions by 20 per cent by 2015 over 2005 levels, traffic growth included. Along with newer, more efficient aircraft, improved energy efficiency in daily operations and using a blend of renewable aviation fuel, the development in this area is extremely vital to the realization of our sustainability goal, says Rickard Gustafson, Group CEO of SAS.

"Green approaches" have been made at Stockholm Arlanda Airport since 2009, meaning that pilots glide with engines at idle from cruising altitude until the very last stage of the approach. A new RNP-AR approach procedure was introduced in 2010 for Arlanda’s runway 26, resulting in a much shorter route. As compared with ordinary green flights, the curved green approach shortens the flight path by over 20 kilometres.

Full utilisation of the latest navigation technology would shorten flight paths at Swedavia’s airports, in one year alone, by a distance corresponding to twenty-five around-the-world flights. This is a major contribution to fuel economy and reduced climate impact, and another step in offering world-class efficiency, says Torborg Chetkovich, Group CEO of Swedavia.

Green Connection is headed by LFV and implemented by a collaboration between Swedavia, SAS, GE Aviation and Rockwell Collins. The project is partially financed by SESAR (Single European Sky ATM Research) and is part of the AIRE (Atlantic interoperability Initiative to Reduce Emission) transatlantic collaboration. Its aim through 2020 is to increase European air space capacity, reduce aviation's environmental impact and reduce the cost of air traffic service by half – while maintaining current levels of air safety, at a minimum.

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