Significant environmental benefits with the Single Sky

Environmental impacts of aviation are in conflict with the growing numbers of flights and use of the airspace. Aircraft cause in particular CO_2 and noise emissions but also contribute to NOx and particulate matter emissions. With the expected doubling of traffic in the next 10-20 years also the greenhouse gas emissions, where aviation currently contributes to about 3,5% of the total, will increase heavily. If we are unable to handle the effects of growing congestion in air and on airports, the impact might be even more than double. Continuous measures are required in all fronts to ensure that emission growth rate remains below transport growth rate.

The contribution of Air Traffic Management on environment is one element in a complex moving puzzle. With an optimised Air Traffic Management in Europe it is possible to reduce fuel consumption and emissions by about 10% per flight. The Single Sky policy - together with the SESAR technological programme – aims to harness all of that potential. One main obstacle to a greener airspace is the suboptimal flight profiles, in particular indirect flight routes of aircraft because of various reasons. One idea of optimised Air Traffic Management is to enable the most direct route possible. Every shortening of the routes reduces fuel burn and thereby means less CO_2 emissions and air pollutants (NOx). Especially with the operation of the Network Manager, routes can be shortened and the optimisation of arrival and departure procedures has the potential to produce even greater benefits.

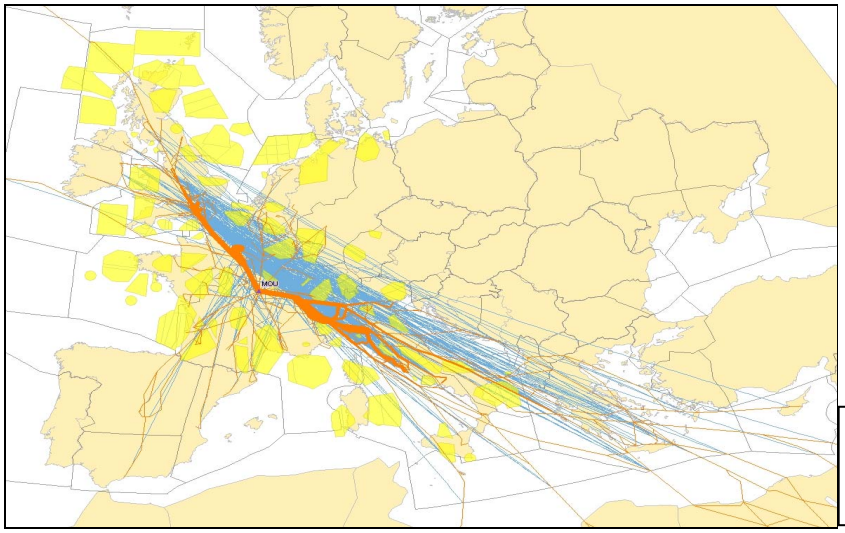
Cut unnecessary surplus length of flights

A core starting point is to reduce the current surplus length of flights in Europe. On average, aircraft today fly 42 km longer than would be the shortest distance between their departure and destination airports. Approximately 0.2% of the approximately 3.5% share of aviation of total CO_2 emissions in Europe is due to ANS-related inefficiencies. The average en-route route extension was 4.6% of the routes flown in 2011 and each 0.1% improvement in that extension reduces fuel burn by 30 000 tons, which translates to 92 000 tonnes of CO2 per year. Furthermore SES will approximately lead to a similar reduction which applies to CO_2 emissions regarding air pollutants (NOx) and particulate matter emissions. NOx emissions have also been increasing in the EU from 1,8% to 5,8% of the total EU27 emissions.

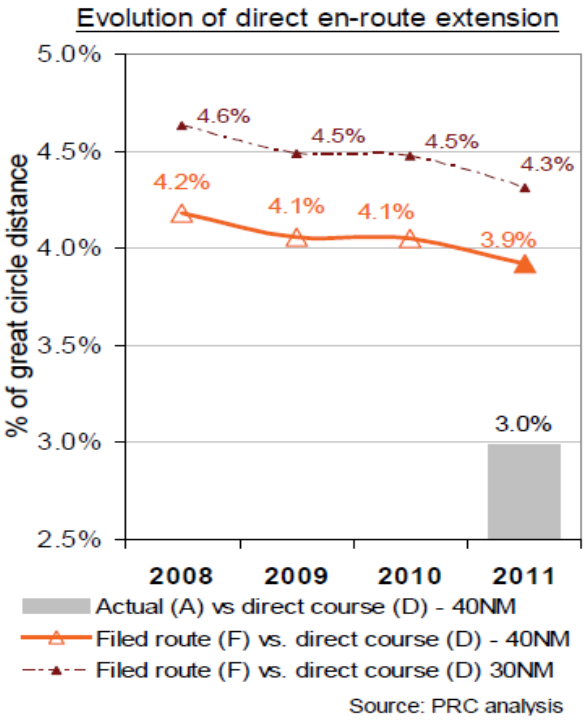
By shortening the flight routes and assuming an average fuel consumption of 2.9 litres per 100 km and per passenger for the new generation of aircraft we can expect savings of 1.5 litre fuel per passenger per flight and 5 million tons of CO_2 per year.

Two main elements of the Single Sky policy will contribute to this:

1. Defragmentation of European airspace with new possibilities for more direct routing: especially with strengthening of the Network Manager and the flexible use of airspace.
2. As predictability of flight operations is improved, the arrival time, instead of the departures time, will become the main reference for the future flight planning schemes and systems thus reducing or avoiding holdings.



Inefficient flight routes
(Blue=straight, Red=actual)



The Figure shows the development of the additional distance aircraft have to fly compared to the shortest possible route. This corresponds to each aircraft flying an average of 42 km longer than strictly necessary, which leads to unnecessary CO^2 emissions. The grey shading shows the difference between the optimum and actually flown route, whilst the dotted and solid lines represent the difference between the route planned by the operator and the shortest route. The references to 30/40 Nautical Miles refer to how far from the departure/destination airport the calculation starts or ends, underlining that much of the inefficiency exists close to the destination/departure airport.

Turn down the noise in air traffic

Health is impacted by the noise produced during take-off and landing. Currently 1.8 million European citizens are affected by aircraft noise above 55 Lden. Since for most of the EU airports the aircraft routing is the measure with the highest potential for noise exposure reduction[1], SES has a significant benefit potential regarding noise reduction. But noise in the immediate vicinity of airports is inversely proportional to greenhouse gas emissions, so a balance needs to be found between fuel-optimised climbs at maximum power settings and the resulting noise distribution.

The approach of the European Union for a greener airspace

The EU is pursuing two streams for a greener airspace which they complement each other and should therefore be followed simultaneously.

The first stream concerns Research and Development for 'greener' technology. High priority is given to "the greening of air transport" in the 7th Framework Programme for RTD. The flagship is the "Clean Sky" Joint Technology Initiative. By 2020 the aim is to reduce fuel consumption and CO_2 emissions by 50% per passenger kilometre, to reduce NOx emissions by 80% and to reduce unburnt hydrocarbons and CO_2 emissions by 50%.

The second stream is about modernized air traffic management systems. The Single European Sky (SES) legislation reforms the way air traffic management is organised in Europe. The SESAR initiative is the technological component of SES and one of the objectives is to reduce emissions by 10% per flight.

Other actions are also taken. For example the Commission has contracted studies regarding the use of renewable energy sources, in particular biofuels, in aviation.