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Air traffic control about to let pilots plan their own routes – but don't worry

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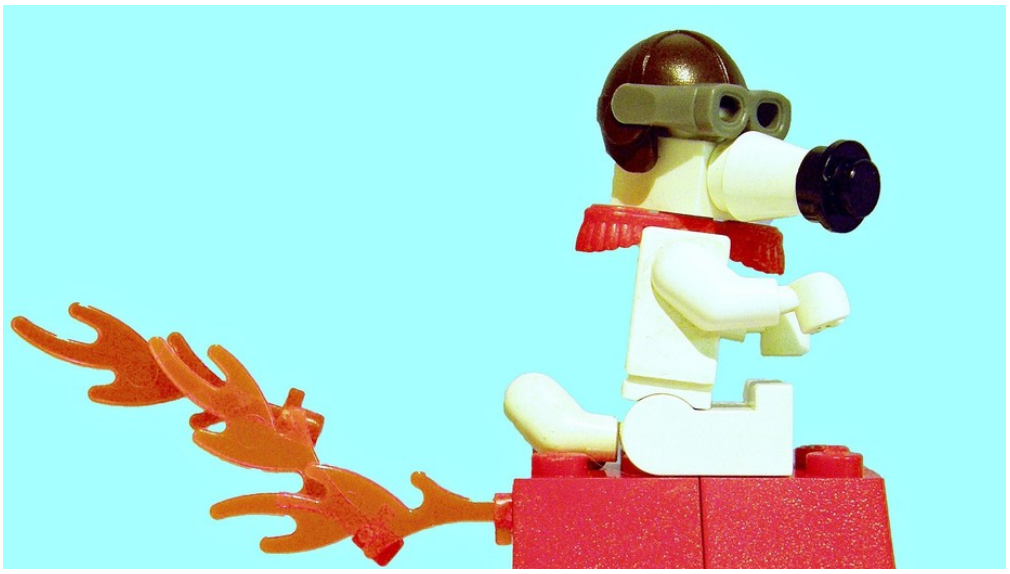

Just keep bearing left chaps. Alan, CC BY-SA

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A major change is coming to our skies. From next March, pilots will be able to determine their own routes and plan to fly direct from point to point.

Currently, flights must plan to follow explicitly defined corridors. These are rather like roads in the sky, up to 10 miles wide. Under the new scheme, flights will still be subject to air traffic control from Prestwick Centre in the West of Scotland, but pilots will be considerably more free to plan the specific route that they take.

The move by the UK's main air-traffic control agency, NATS, to switch to what is known as "route free airspace" will initially apply to an area between Skye and the Isle of Man that carries about 450 planes each day.

The rationale

Route-free airspace will allow aircraft to take shorter and more direct routes. This is expected to bring multiple benefits including better flight efficiency, greater cost-effectiveness, reduced engine running time, reduced fuel consumption and resulting environmental gains.

How it will work in practice is that the pilot or his airline will determine the best flight path using dedicated software and then submit a flight plan and route before take-off or before entering UK airspace. This can be done online or via several other methods including radio.

Route-free airspace has been made possible by technologies such as Automatic Dependent Surveillance-Broadcast (ADS-B). This makes use of satellite positioning to allow aircraft to broadcast their precise location every few seconds so that pilots of other aircraft are able to plan their routes accordingly.

This means that aircraft can make better use of available space and fly closer together. It removes the need for the tightly restricted routes that are used at present. ADS-B is being fitted to an increasing number of aircraft. It is mandatory in Australia. It will become mandatory for most aircraft in Europe from 2017, and from 2020 in the USA.

The idea of pilots planning routes without central coordination might raise safety concerns, but in practice, aircraft will still remain under the supervision of air-traffic control. Our fixed routes were indeed originally designed to maintain safety, but they employ decades-old systems that are based on radar and no longer necessary.

Becoming radar-undant? Jirsak

You might also think that fixed routes could lead to greater delays as aircraft manoeuvre around each other, but as routes will be actively monitored and predicted up to 25 minutes ahead of time, such issues are actually reduced. Neither will the routes result in a noise nuisance for people on the ground, since route-free airspace only applies to airspace above 25,000 feet (4.8 miles).

The bigger picture

NATS plans to extend the trial to the rest of Scotland and parts of the North Sea from 2017 and has a long-term strategy to establish all upper airspace in the UK as route-free (making this work in much of England and Wales will admittedly take rather more planning because the airspace is already very congested). This is being promoted as part of the Single European Sky initiative, which aims to modernise Europe's air traffic control system. It has the target of a 10% reduction in the effect of aircraft on the environment by 2020, against a background of increasing passenger traffic.

The pan-European air-traffic coordination agency Eurocontrol estimates that while the number of flights will have increased by 50% between 2012 and 2035, deploying route-free airspace over central Europe at night and weekends will reduce flight distance by the equivalent of 1.16m km per year. Route-free airspace has already been implemented in Sweden, Portugal and Ireland. It is planned or partially implemented in the rest of Scandinavia, Italy and central and eastern Europe. It also forms part of the Federal Aviation Authority's NextGen programme in the United States.

The health warning

However, despite the obvious benefits from going route-free, some argue that rising air-traffic volumes is not something that we will be able to support indefinitely. The biggest potential barriers are

probably infrastructure on the ground (especially airports themselves, which consume large areas of land) and rising costs of jet fuel.

Particularly around major cities, airspace is already crowded. While improvements to planning and control could make better use of the space, there is only so much to be done before no further aircraft can fit in the sky with a safe separation distance. And though the answer would presumably be to improve road infrastructure and high-speed rail instead, this has its own issues and controversies.

Optimyze This! Senohrabek

And we can't just rely on route-free airspace to deal with the environmental issues around aircraft. Eurocontrol's central forecast is that by 2035, total emissions might have fallen slightly despite the expected rise in air traffic, but that assumes that fuel efficiency keeps improving. This is by no means certain.

Air-traffic control therefore needs to focus on other ways of improving pollution, such as optimising taxi routes at airports and flight sequencing. This stems from the fact that short flights are more polluting than long-distance ones because of the impact of take-off and landing compared to the distance travelled. Indeed, it is interesting to note that in contrast with the liberalisation of air routes, there is a possible move towards more centralised control of taxi routes as automated systems for optimising routes are considered.

For the same reason, it is important that new technologies in computational search and mathematical modelling are fully explored and investigated in the context of ensuring that our air-traffic systems and resources are being used as efficiently as possible. So long as we see these moves towards making large amounts of airspace route free as just one contribution to a wider

environmentally-focused modernisation of the aviation industry, we should ultimately reach the right destination.

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