

Main thematic area: *Economics/Science/Technology*

Cost: £/££/£££

Fuel efficiency development and prediction

Background

Climate impact pressures are increasingly driving the need for a better picture of what the future may hold for aviation. Several demand scenarios exist (principally those of the UN International Panel on Climate Change), but these need second tier interpretation to account for technology, operational and market options for change. An understanding of the relative emissions efficiency gains from different areas of performance is crucial to industry and governmental decision making.

Aircraft efficiency (eg emissions / passenger km) depends upon engine and airframe issues such as structures, propulsion and aerodynamics as well as load factors, routing efficiencies, air traffic management, airline operational models (eg hub and spoke versus point to point) and economies of scale.

Study aims

This study will explore the extent to which technology and operational factors may contribute to improvements in overall fuel efficiency. It will unpack past performance on fuel efficiency by looking at inventories and historical data to determine the trends for each element of cumulative efficiency improvement. It will try to identify the drivers behind historical trends and examine if a detailed understanding of past performance can help to guide future developments. The work will engage various stakeholders both to obtain data and to inform study concepts.

Lead: Cranfield University
Duration: 12 months
Partners: MMU, Cambridge, Sheffield

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Integrated Fleet Assessment Tool

The study work will lead to the development of a proposal for a 'what if' model – the Integrated Fleet Assessment Tool. This would estimate the fuel efficiency of the fleet by linking available models and testing various assumptions on efficiency change.



Benefits

A better understanding of fuel efficiency improvement – how it has evolved and how it may to evolve – will help the aviation sector and government to prioritise resources and determine what further work is likely to be most productive. This study will enable conclusions to be drawn on whether 'business as usual' in terms of evolutionary change of technology and operations will be able to meet aviation's developing environmental commitments, or whether a more fundamental shift into revolutionary technological, operational and market developments is required.

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