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Adapting European airports to a changing climate

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Abstract

Airports are often classed as nationally critical infrastructure as they facilitate both mobility and economic growth. However, due to their fixed infrastructure and vulnerability to disruptive weather, they are particularly at risk from the potential consequences of climate change, with impacts such as sea level rise, higher temperatures and greater weather extremes creating both an operational and business risk. Therefore, to protect vital infrastructure and ensure future service continuity for airport operations, it is necessary to develop resilience to such risks.

This paper expands on previous analysis from EUROCONTROL, the European Organisation for the Safety of Air Navigation, to further clarify what the expected impacts for airports might be. In particular it highlights the need for action in areas which are expected to experience both high growth in demand and significant climate change impacts. It also presents an analysis of the outcomes of a stakeholder consultation which identifies lack of awareness, information and guidance as key barriers preventing aviation organisations from taking climate adaptation. It then introduces work carried out by EUROCONTROL in collaboration with aviation sector organisations to develop awareness of those risks so as to promote action to develop resilience.

Following this, it identifies some key questions to ask when initiating a climate change risk assessment at an airport and provides examples of organisations which have already carried out risk assessments. Finally, the paper presents the outcomes of a recent workshop on Adapting Aviation to a Changing Climate which identified four key priorities for action to develop climate change resilience. It highlights identifying knowledge gaps, raising awareness and promoting collaboration as key steps in building climate change resilience for the European and global aviation sector.

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Keywords: Climate change; resilience; adaptation; extreme weather; sea level rise; climate risk assessment; barriers to adaptation

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1. Introduction

There has been broad scientific consensus for several years that climate change will cause impacts such as higher temperatures, sea-level rise and greater weather extremes (IPCC, 2013). However, there is now growing realization that this will require all sectors of society to take action to adapt and develop resilience to such impacts (IPCC, 2014). Within the aviation sector, there may be risks for both en-route traffic and airport operations, and airport and ANSP infrastructure (EUROCONTROL, 2013, IPCC, 2014[b]).

For en-route traffic this will potentially cause loss of capacity, increased turbulence, route extensions and delay (EUROCONTROL, 2013[a]; Burbidge, 2015; Williams and Joshi, 2013). However, due to their fixed infrastructure and vulnerability to disruptive weather, airports are particularly at risk from the potential consequences of climate change, with impacts such as sea level rise, higher temperatures and greater weather extremes creating both an operational and business risk (Burbidge, 2014[a], ACRP, 2014). Airports are often classed as nationally critical infrastructure as they facilitate both mobility and economic growth. Therefore, to protect vital infrastructure and ensure future service continuity for airport operations, it is necessary to develop resilience to such risks.

This paper expands on previous analysis from EUROCONTROL, the European Organisation for the Safety of Air Navigation, to further clarify what the expected impacts for airports might be. In particular it highlights the need for action in areas which are expected to experience both high growth in demand and significant climate change impacts. The paper then introduces work done by EUROCONTROL in collaboration with aviation sector organisations to develop awareness of those risks so as to promote action to develop resilience.

Following this, it identifies some key questions to ask when initiating a climate change risk assessment and provides case study examples from organisations which have already carried out risk assessments. Finally, the paper presents the outcomes of a recent workshop on Adapting Aviation to a Changing Climate, organised by EUROCONTROL and Manchester Metropolitan University, which identified four key priorities for action to develop climate change resilience for the European and global aviation sector.

2. Key impacts for airports

The general climate impacts which we can expect within Europe are reasonably well-established, although they will vary according to climate zone, and there remains less certainty as to how they will involve at the local scale (EEA, 2012). This translates into a range of potential risks for airports which will also vary according to geographical location and scale of operations. Several papers and reports have already set-out in detail the key impacts which airports may experience from a changing climate (c.f. Burbidge, 2014[a]; EUROCONTROL, 2013[a]; ACRP, 2012). Therefore this section will provide a brief overview of the main potential risks to consider (figure1).

2.1. Changes in precipitation

Heavy precipitation events can require increased separation distances between aircraft; this impacts airport throughput. Snowfall in new areas implies that a much greater geographical area needs to be prepared for heavy winter weather.

Current aerodrome surface drainage capacity may be insufficient to deal with more frequent and intense precipitation events, leading to increased risk of runway and taxiway flooding. Underground infrastructure such as electrical equipment and ground transport access may also be at risk of inundation (Eurocontrol, 2013[a])