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INFORMATION PAPER

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Agenda Item 9: Environment

9.3 ICAO International Aviation and Environmental Seminar, State Action Plan Seminar and Volcanic Ash Seminar

CLIMATE CHANGE ADAPTATION OF CIVIL AVIATION

(Presented by France)

EXECUTIVE SUMMARY

The French Government adopted in July 2011 a comprehensive climate change adaptation action plan covering all the expected impacts of climate change (water resources, health, infrastructures, forestry, etc.) and including in particular adaptation of civil aviation infrastructures.

In the field of civil aviation, the action plan identified a 4 point work program: (i) review and adaptation of airport building and maintenance techniques, (ii) inclusion of climate change consequences in long-term traffic demand forecasts, (iii) definition of a methodology for infrastructures vulnerability assessment and (iv) systematic vulnerability study.

A methodology for assessing airports' climate change vulnerability was established and is tested on Nice, Paris – Orly and Marseille airports. The methodology could be used in order to estimate the actual vulnerability of every airport.

Strategic Objectives:	• Environmental Protection

1. Introduction

1.1 Fight against climate change is based on two pillars: (i) mitigation actions to reduce greenhouse gases (GHG) emissions in order the limit their concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system and (ii) adaptation of societies' activities in order to cope with climate change impacts which can not be avoided due to the climate system inertia.

1.2 France is active in both mitigation and adaptation activities. In the field of civil aviation, France is mobilized in each topic of the basket of measures to reduce GHG emissions (aircraft energy efficiency, ATM improvements, alternative fuel development and market based measures), at the national level, European ones and in the framework of the ICAO Committee on Aviation Environmental Protection (CAEP).

1.3 About adaptation, French Minister for Ecology, Sustainable Development and Energy officially presented on July 2011 the first National Climate Change Adaptation Action Plan[1], which results of a one year consultation and preparation process between all stake holders, in continental France and overseas regions. The action plan contains about 230 measures which represent globally approximately 1 billion euros funding. They are structured around 20 topics[2] amongst which "Infrastructures and transport systems". This theme presents work programs for air, rail, river, road and sea transport systems.

2. Adaptation of civil aviation

2.1 The whole Climate Change Adaptation Action Plan is built on two French regional climate models which are based on B2 and A2 emissions scenarios published in the Fourth Assessment Report by the Intergovernmental Panel on climate change (IPCC).

2.2 About civil aviation, the action plan identified 4 measures: (i) review and adaptation of airport building and maintenance techniques, (ii) inclusion of climate change consequences in long term traffic demand forecasts, (iii) definition of a methodology for infrastructures vulnerability assessment and (iv) systematic vulnerability study.

2.3 About building and maintenance techniques, the French Civil Aviation Administration ("DGAC" in French) is analyzing if standards in term of bearing capacity, length and drainage of aviation runways should be reviewed owing to climate change impacts. In the case an update should be needed, DGAC would work for modification of official standards at ICAO, European or national level.

2.4 Concerning climate change consequences in traffic forecasts, the best way to address this issue is probably at the ICAO level, in the framework of the Forecast and Economic Study Group (FESG) of CAEP, with other concerned authorities as *inter alias* the World Tourism Organization (WTO).

3. Methodology for airport vulnerability assessment

3.1 The methodology for airport vulnerability assessment takes into account all the aspects of the climate change potential impact as described in existing documentation, in particular:

- Effect of warming on air conditioning demand of airport terminals;
- Effect of potential sea level elevation on coastal or low-lying airports;
- Potential effect of temperature elevation on takeoff operational constraints;
- Influence on traffic capacity of extreme weather events changes in frequency or intensity;
- General impacts on infrastructure maintenance;
- *etc.*

1: This document is available on the Department's website at the following URL address: http://www.developpement-durable.gouv.fr/-Plan-national-d-adaptation-2011-.html.

2: The 20 adaptation topics are: Health, Water resources, Biodiversity, Natural hazards, Agriculture, Forestry, Fisheries aquaculture, Energy and industry, Infrastructures and transport systems, Urban planning and buildings, Tourism, Public information, Education and training, Research, Funding and insurance, Coastal areas, Mountain areas, European and international actions, Governance and Cross-cutting issues.

3.2 On the basic of the list of possible effects, an analysis methodology with several indicators of vulnerability was defined by the French Technical Centre for Civil Aviation ("STAC" in French). This methodology allows the assessment degree of criticality of aerodromes regarding climate change, taking into consideration their geographic and physical characteristics but also the quantity and type of traffic (short, medium or long-haul) that they support.

3.3 The methodology also considers the importance of the airfield in the local transport network. Indeed the airport's degree of criticality decreases if switching possibilities of its traffic to another airport or another transport mode (rail or road) exist.

4. Vulnerability assessment of every French airports

4.1 The assessment methodology was first applied, on an experimental basis, to Nice airport (French Mediterranean coast) and is presently applied to Paris – Orly and Marseille airport. Then, the method could be used in order to estimate the actual vulnerability of each French aerodrome supporting public air traffic, in continental and overseas France, i.e. globally more than 550 airfields amongst which a few of them in the Carribean region.

4.2 For a majority of them, the assessment should probably be fast and simple. But for a few of aerodromes (for example coastal ones and airports with important traffic), the study may be more complex and detailed. In such cases different scenarios of vulnerability may be analyzed and specific monitoring actions may be envisaged. For some airfields available climate change or sea level elevation scenarios might not be precise enough in order to conclude the study.

4.3 At the European level a Working Group has been established by Eurocontrol on the issue of airport vulnerability assessment taking into consideration the French methodology.

4.4 More information of this project is available in the STAC website (www.stac.aviation-civile.gouv.fr – search with the key word *"Vulclim"*).

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