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EXECUTIVE COMMITTEE

Agenda Item 17: Enhancement of ICAO Standards

ADDRESSING THE FUTURE CHALLENGES OF THE OPERATION OF POWERED LIFT CATEGORY/TILTROTOR CLASS AIRCRAFT IN INTERNATIONAL AIR NAVIGATION

(Presented by the United States)

INFORMATION PAPER

SUMMARY

By the end of the decade, a new technology that allows an aircraft to fly as an airplane or a rotorcraft and transition between these two modes while in flight will be operating in the United States. To ensure the viability of international powered lift/tiltrotor operations, some ICAO standards may need to be reviewed. The U.S. believes that it has a responsibility as an ICAO Contracting State to treat powered lift as a separate category. Other States prefer to consider powered lift aircraft as rotorcraft and to await future demand before embarking on changes to the Standards and Recommended Practices (SARPs). To date, there has not been a comprehensive tasking of the review of the various ICAO annexes that may be impacted by this technology in order to guide the operational decision process of future States of Registry.

This paper highlights the need for a proactive, cohesive review of the impacts of powered lift aircraft technology on international aviation standards

1. INTRODUCTION

1.1 The first flight of the Bell-Agusta BA609 tiltrotor aircraft was in March 2003. This new technology allows an aircraft to fly as an airplane or a rotorcraft and transition between these two modes while in flight. The helicopter companies producing this aircraft anticipate certification and operation by the end of the decade. Other companies are also researching applications of various powered lift concepts such as tilt-wing aircraft, vectored exhaust, and other combinations.

1.2 Vertical/Short Take Off Land (V/STOL) and Vertical Take Off Landing (VTOL) aircraft are classified by the technology that produces their vertical lift capability. All of the different technologies that produce V/STOL and VTOL capabilities are classified as Powered Lift. The tiltrotor technology is comprised of conventional aircraft fuselage with wing-mounted outboard nacelles that contain the engines, transmissions, and prop-rotor discs. The nacelles are capable of rotating from horizontal (like an airplane) to vertical (like a rotorcraft) while in flight.

1.3 The tiltrotor aircraft has twice the range of a conventional rotorcraft and matches the speed and range of existing turboprop aircraft. This new technology aircraft will provide performance, range, utility, and operational flexibility that could function independent of conventional airports and could reduce airport congestion. The powered lift's versatility has the possibility of changing the norms of international air navigation.

2. DISCUSSION

2.1 Powered lift aircraft technology has the potential to realize significant benefits to international aviation. It may address airport runway and airspace congestion issues because of its unique operational capabilities. Worldwide, a small percentage of airports account for the great majority of enplanements. The powered lift aircraft's ability to operate from smaller, short field airports, yet perform like a turboprop, will enhance aviation transportation.

2.2 FAA has been reviewing the U.S. standards to ensure the viability of powered lift aircraft operations. Some ICAO standards similarly need to be reviewed to ensure the viability of international operations. Some areas for consideration are summarized below:

2.2.1. Airworthiness Certification:

The United States has been working diligently to both certify the civil tiltrotor and incorporate powered lift aircraft into its air transportation infrastructure. The U.S. will treat powered lift aircraft as a separate category of aircraft. The FAA has developed proposed certification standards for a particular powered lift aircraft, the Bell Agusta BA609, by consolidating appropriate proven national airworthiness codes – from both rotorcraft and transport category airplanes – as well as developing new standards for those unique aspects of this tiltrotor design. This process will allow modification of the proposed standards as the aircraft is under development, and it is intended that the certification standards will be finalized prior to final certification. Globally, no review of ICAO Annex 8 design standards for powered lift aircraft has been initiated.

2.2.2 Airman Certification:

The one area where ICAO has begun significant work related to powered lift aircraft is in flight crew licensing. The ICAO Flight Crew Licensing and Training Panel (FCLTP), following the definition of aircraft in Annex 1, is considering whether to recommend the establishment of a separate aircraft category or to treat the BA609 as a separate type of aircraft, either helicopter or airplane. Proposed revisions to Annex 1, however, have not yet been adopted.

2.2.2.1 The U.S. believes that powered lift aircraft must be a separate aircraft category under ICAO Annexes 1, 6 and 8. Under these ICAO Annexes the handling and flight characteristics of aeroplanes and helicopters are mutually incompatible. Powered lift aircraft combine the handling and flight characteristics of aeroplanes and helicopters. ICAO Annex 1 further requires that a type rating may only be added to a license if the added aircraft type does not differ in its flight or handling characteristics from the aircraft on the basic license.

Licensing for an aircraft that combines the flight and handling characteristics of both rotorcraft and aeroplanes cannot be accommodated by adding a type rating to a helicopter or aeroplane license under ICAO Annex 1. Thus, the only means to meet the requirements of Article 37 of the Convention on International Civil Aviation and to meet ICAO Annexes 1 and 8 is to establish a separate aircraft category for powered lift aircraft.

2.2.2.2 In 1997, the U.S. completed and published a major change to 14 CFR part 61, *Certification: Pilots, Flight Instructors, and Ground Instructors*, which incorporates the training and experience requirements for powered lift pilots. This change addresses the training requirements for an individual seeking an add-on category rating to either an airplane or rotorcraft license. Additionally, it addresses the requirements for ab initio powered-lift training. The U.S. has drafted the practical test standards to be used by examiners when conducting pilot certification and aircraft type rating practical examinations. The practical test standards will be finalized upon completion of the initial powered lift aircraft certification.

2.2.3 Operations and Maintenance:

The ICAO Helicopter Tiltrotor Study Group is considering the need for separate annex 6 requirements for powered lift. The U.S. plans to propose national operational and maintenance requirements that will draw from existing codes, 14 CFR Parts 1, 43, 91, 119, and 135.

In addition, the ICAO Obstacle Clearance Panel should be tasked to review or establish new instrument procedures for all phases of flight.

2.2.4 Air Traffic:

The unique operational capabilities of the powered lift aircraft may have ramifications for aircraft separation standards and approach and departure standards.

2.2.5 Environment:

In the environmental area, work has already been completed. At the fifth meeting of ICAO's Committee on Aviation Environmental Protection (CAEP 5), the committee recommended and the council adopted tiltrotor aircraft guidelines for noise certification. These guidelines were adopted in Annex 16, Volume 1, Attachment F, Amendment 7 on 21 March 2002.

2.2.6 Airports.

The operational capabilities of the powered lift aircraft will require additional standards for landing and takeoff facilities.

3. CONCLUSIONS

3.1 Rarely, has ICAO faced the challenge of the development of a new technology that may impact so many existing SARPs. The global community should be prepared to welcome technology that could operate safely and alleviate infrastructure concerns. The powered lift aircraft can reduce runway and airport occupancy congestion. In the U.S., these types of delays are an estimated $9.4 billion annual cost to the economy, growing to $13.8 billion by 2007. The worldwide costs to international navigation are unknown, but significant.

3.2 The powered lift aircraft will increase airspace system capacity through simultaneous, non-interfering operations by fixed-wing and vertical flight aircraft.

3.3 Given the time required for the development and implementation of ICAO standards, activity needs to begin before the 36th General Assembly. It would be prudent for the Council to initiate a top-down, coordinated effort to change or create SARPs that would facilitate operation of powered lift/tiltrotor category aircraft in international air navigation.

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