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ASSEMBLY — 41ST SESSION

TECHNICAL COMMISSION

Agenda Item 33: Other issues to be considered by the Technical Commission

EXPANDING THE USE OF PERSONAL MOBILE DEVICES FOR FLIGHT OPERATIONS

(Presented by the United States)

EXECUTIVE SUMMARY

This information paper provides an update on the United States Federal Aviation Administration's (FAA) efforts to improve efficient access to flight information and trajectory based operations. This paper includes updates and descriptions of various research efforts underway that involve applications of mobile technologies to improve the safety and efficiency of surface operations and flight planning.

<i>Strategic Objectives:</i>	This working paper relates to the Safety and Air Navigation Capacity and Efficiency Strategic Objectives.
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<i>Financial implications:</i>	N/A
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<i>References:</i>	Doc 10039, <i>Manual on System Wide Information Management (SWIM)</i>
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1. INTRODUCTION

1.1 The use of personal mobile devices by pilots is commonplace in the aviation community. Almost every pilot uses a mobile device to plan their flight, file their flight plan, and conduct their flight. More sophisticated pilot apps provide flight planning features, maps, charts, and a host of other information valuable for flight operations. Concept exploration and research is being conducted into expanding the role of the pilot's personal mobile device prior to departure. This includes using commercial networks and service providers to exchange information safely and securely between the pilot and Air Navigation Services Provider (ANSP), which in this case is the United States FAA.

2. CONCEPT RESEARCH AND EXPLORATION

2.1 This paper provides examples of ongoing research into the use of personal mobile devices and enabling apps to conduct pre-departure information exchange. Although much of the focus of the research is on providing these services to the General Aviation (GA) community, the concepts could be extended to commercial operators, and other emerging operations, such as unmanned aircraft systems (UAS). An important component of the concepts being explored is that a service provider acts as the conduit to route information safely and securely between the pilot and ANSP. The presence of a service provider reduces the number of connections to the ANSP's resources and places the responsibility of pilot identity access and management upon the service provider and not the ANSP. A prototype of each of the capabilities listed below has been created to further explore the feasibility and application of the concepts.

2.2 Pre-departure instrument flight rules (IFR) clearance information exchange

2.2.1 At towered airports where pre-departure clearance or data comm departure clearance services are not available, instrument flight rules (IFR) clearances must be issued verbally. At airports without an operating tower, clearance delivery, negotiating IFR release, and IFR cancellation must be accomplished verbally. Verbal methods are time-consuming for pilots and air traffic control (ATC), subject to read-back errors and/or incorrect interpretations and can generate delay when ATC must tell aircraft to stand by while ATC performs higher-priority duties. Research is being conducted into how GA pilots can use a personal mobile device to receive IFR clearances, negotiate IFR release, and cancel IFR where other electronic services are not available.

2.3 Departure readiness information exchange

2.3.1 As the FAA develops more-efficient departure scheduling mechanisms, not all flight operators are able to electronically submit up-to-date departure readiness information. Furthermore, many towers' only means of receiving departure readiness information from pilots is verbally at call for taxi. While many scheduled commercial operators provide collaborative decision making (CDM) information, including departure readiness information to the FAA via established electronic means, most of the GA community does not have a means to electronically submit the same information. Research is being conducted on how a pilot can use their personal mobile device to electronically submit departure readiness information to the appropriate FAA system and receive informative data in return. Extensions of this concept could enable international carriers to participate in CDM information exchange using electronic flight bags.

2.4 **Departure demand information awareness**

2.4.1 Real-time departure demand data is not readily available to the GA community. Making this data available to GA pilots will provide greater situation awareness and allow them to plan more effectively at busier airports. Accurate “ready to taxi” times are critical for both flight operators and the FAA to understand and plan for the demand at busy airports, especially during times of high demand, such as special events or routinely busy periods. GA pilots often lack a reliable method to obtain traffic management constraints that apply to their flights. Research is being conducted on making real-time departure demand information at busier airports available electronically and accessible via mobile devices and on assessing the impact of enabling GA pilots to make more informed decisions around departure planning.

2.5 **Call-for-release (CFR) time coordination**

2.5.1 Today, call-for-release (CFR) coordination requires communication between a pilot and the tower and between the tower and overlying air route traffic control center (ARTCC) to obtain a CFR time – this process is verbal and time-consuming. Research has shown that difficulty assigning CFR times can lead to departure delays and unused capacity in the United States National Airspace System. A concept to streamline the assignment of CFR times at airports without existing or planned scheduling tools is being explored. The concept involves assigning CFR times based on ready-to-taxi times (provided by pilots via a mobile app) and airport transit times (configured by air traffic control tower controllers), bypassing the need for tower controllers to call the ARTCC traffic management coordinator for each CFR time that needs to be assigned. The assigned time is displayed to both pilot and controller, and the time is confirmed verbally when the pilot calls for taxi. Current research focuses on the operational feasibility of the concept.

2.6 **Taxi conformance monitoring**

2.6.1 A prototype of a surface taxi conformance monitoring system has been developed to help address runway incursions caused by lost, distracted, or confused pilots at Class D airports in the United States. This system consists of pilot and air traffic control tower applications which make use of portable electronic devices such as tablets or laptop computers. The two applications work together to help pilots navigate the airport surface and provide alerts to both pilots and controllers if a deviation from the assigned taxi route occurs. Laboratory simulations of this system have been conducted to mature and refine the concept.

3. **CONCLUSION**

3.1 This research aims to provide a model for incorporating transformational mobile device-based services for pilots and controllers into the United States National Airspace System. The capabilities being developed will have the potential for the following benefits:

- a) democratization of services across a broader range of operators and operator types;
- b) streamlining the clearance delivery and data exchange processes for both pilots and ATC, reducing delay and pilot/controller workload;

- c) reducing read-back errors and miscommunication by providing pilots with textual information;
- d) reducing radio frequency congestion;
- e) reducing delays related to scheduling IFR departures at airports by implementing more reliable and less time-consuming electronic data exchange methods; and
- f) reducing runway incursions.

3.2 The Assembly is invited to note the information provided in this paper.

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