Future Design Challenges

To: **FAA-EASA Safety Conference**

Cologne, Germany 2019

By: **Rob Burke, Group Manager, Federal Aviation Administration, Training and Simulation Group**

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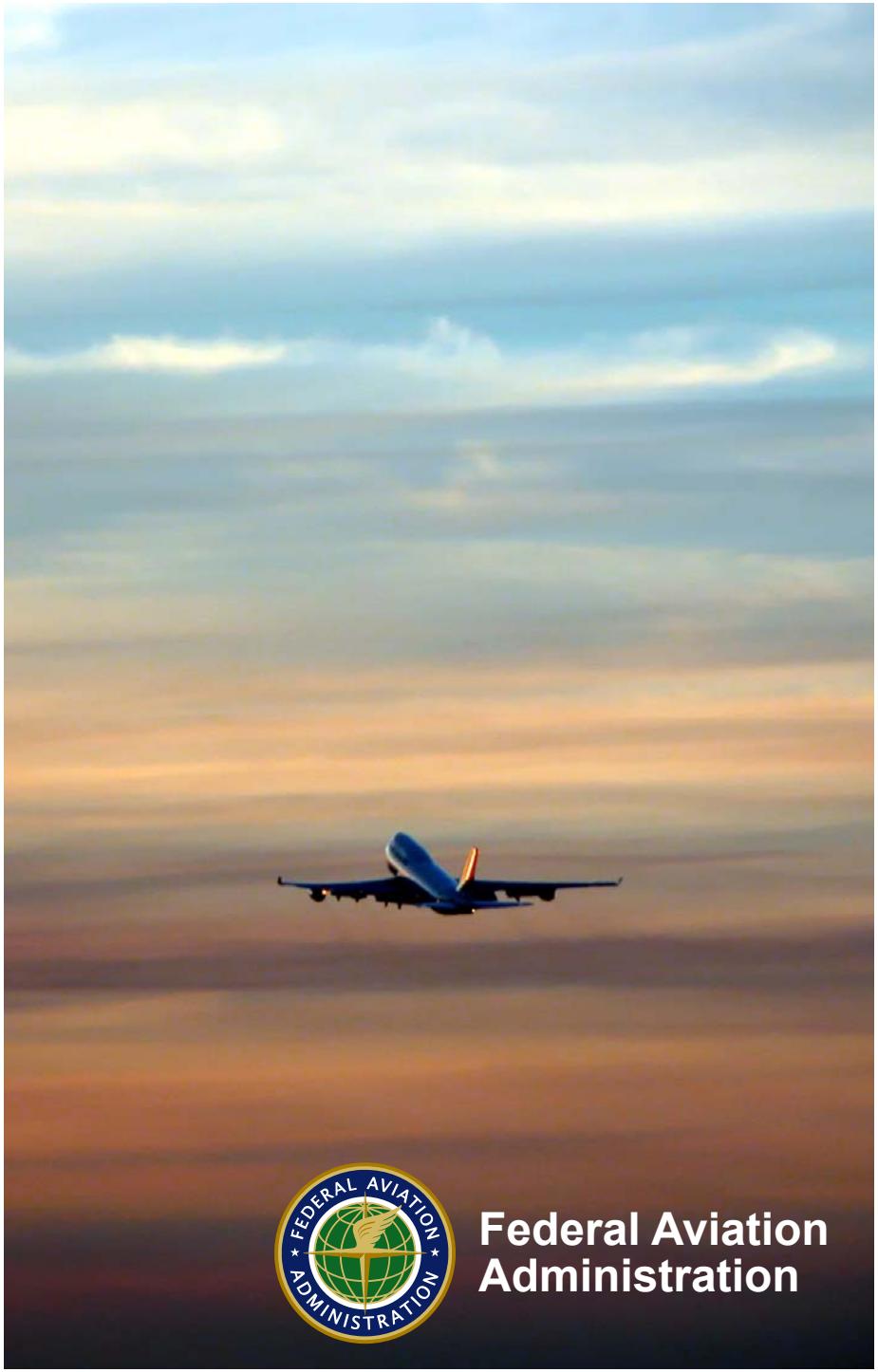

Overview

- **Provide a perspective of the challenges associated with increasing levels of autonomy in a transport flight deck.**

Air Carrier Training Aviation Rulemaking Committee (ACT ARC) Member Organizations

Aerospace Industries Association (AIA)	Delta Air Lines
Airline Dispatchers Federation (ADF)	FlightSafety International (FSI)
Airline Pilots Association (ALPA)	National Air Carrier Association (NACA)
Airlines for America (A4A)	National Air Disaster Alliance/Foundation (NADA/F)
Association of Flight Attendants (AFA)	National Air Transportation Association (NATA)
Association of Professional Flight Attendants (APFA)	National Business Aviation Association (NBAA)
CAE Inc.	Regional Airline Association (RAA)
Coalition of Airline Pilots Associations (CAPA)	Regional Air Cargo Carrier Association (RACCA)

Altitude Deviation Report

“…..both pilots were monitoring when the autopilot failed to capture the assigned altitude…..”

Altitude Deviation Report

“…..both pilots were monitoring when the autopilot failed to capture the assigned altitude…..”

Altitude Deviation Report

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SAFO 15011

U.S. Department
of Transportation
Federal Aviation
Administration

SAFO
Safety Alert for Operators

SAFO 15011
DATE: 11/17/15

Flight Standards Service
Washington, DC

http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo

A SAFO contains important safety information and may include recommended action. SAFO content should be especially valuable to air carriers in meeting their statutory duty to provide service with the highest possible degree of safety in the public interest. Besides the specific action recommended in a SAFO, an alternative action may be as effective in addressing the safety issue named in the SAFO.

Subject: Roles and Responsibilities for Pilot Flying (PF) and Pilot Monitoring (PM)

Purpose: This SAFO encourages operators to define roles and responsibilities for the PF and PM.

Discussion: Whether by inputs to autoflight systems or manually flying, controlling the flight path of the aircraft is the pilot's highest priority. In a two-pilot operation, one pilot is designated as PF and one pilot is designated as PM. Review of operators' manuals indicates that the roles and associated tasks of the PF and PM are not always clearly defined. Each operator should explicitly define the roles of the PF and PM to include:

1. At any point in time during the flight, one pilot is the PF and one pilot is the PM.
2. The PF is responsible for managing and the PM is responsible for monitoring the current and projected flight path and energy of the aircraft at all times.
3. The PF is always engaged in flying the aircraft (even when the aircraft is under autopilot control) and avoids tasks or activities that distract from that engagement. If the PF needs to engage in activities that would distract from aircraft control, the PF should transfer aircraft control to the other pilot, and then assume the PM role.
4. Transfer of PF and PM roles should be done positively with verbal assignment and verbal acceptance to include a short brief of aircraft state.
5. The PM supports the PF at all times, staying abreast of all air traffic control instructions and clearances and aircraft state.
6. The PM monitors the aircraft and system states, calls out any perceived or potential deviations from the intended flight path, and intervenes if necessary.

Operational policies and procedures should be reviewed or developed to ensure the division of duties and responsibilities between flightcrew members protects the ability of the PF to control the flight path. Assigning non-flight path-related tasks to the PF should generally be avoided. Operational data should be collected and used to revise definitions of PF and PM roles and responsibilities to ensure their effectiveness. Operators are encouraged to take an integrated approach in operations and training (initial/upgrade and recurrent) to emphasize the responsibilities and importance of PF and PM roles.

Recommended Action: Directors of Operations, Directors of Training, Training Center Managers, Check Pilots, Training Pilots, and flightcrews should be familiar with the content of this SAFO. They should work together to ensure the content of this SAFO is incorporated into operational policy and provided to pilots during ground training, and reinforced during flight training and checks.

Contact: Questions or comments regarding this SAFO should be directed to the Air Carrier Training Systems and Voluntary Safety Programs Branch, AFS-280, via phone at (202) 267-8166.

Distributed by: AFS-200 AFS-280

SAFO 15011

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14 CFR § 25.1302 Installed Systems and Equipment for Use by the Flight Crew

(c) Operationally-relevant behavior of the installed equipment must be:

(1) Predictable and unambiguous; and
(2) Designed to enable the flight crew to intervene in a manner appropriate to the task

Preamble – (c) (1) (2)

(1) Predictable and unambiguous, and

Means that a qualified flight crew can retain enough information about what the system will do under foreseeable circumstances as a result of a changing situation such that they can safely operate the systems. This behavior needs to be unambiguous because the pilot actions may have different effects on the airplane states or in circumstances.

(2) Designed to enable the flight crew to intervene in a manner appropriate to the task

Means that the design must be such that the flight crew will be able to take some action or alter an input to the system as appropriate to the task.

14 CFR §91.3 Responsibility and authority of the pilot in command.

(a) The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft.

Thank you

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