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Operational Suitability Report (OSR)

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Innovative Solutions & Support Flat Panel Display System with Integrated Dual FMS and Autothrottle

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RECORD OF REVISIONS

Revision Number	Sections	Date
Original	All	09/12/2017

CONTENTS

SECTION	PAGE
COVER PAGE.....	1
RECORD OF REVISIONS	2
CONTENTS.....	3
1. PURPOSE AND APPLICABILITY	4
2. DESCRIPTION.....	4
3. PROCEDURES FOR USE OF THE IS&S FPDS WITH AUTOTHROTTLE.....	8
4. SPECIFICATIONS FOR TRAINING AND CHECKING	8

1. PURPOSE AND APPLICABILITY

The purpose of this Operational Suitability Report (OSR) is to specify Federal Aviation Administration (FAA) training and checking recommendations of pilots operating the Innovative Solutions & Support (IS&S) Flat Panel Display System (FPDS) with Integrated Dual Flight Management System (FMS) and Autothrottle (referred to in the balance of this report as IS&S FPDS with autothrottle) installed in General Aviation aircraft. The evaluations were conducted by the Kansas City Aircraft Evaluation Group (MKC-AEG) in a Pilatus PC-12.

This report establishes the operational suitability of the IS&S FPDS with autothrottle installed in aircraft not requiring a pilot type rating or those aircraft not operating under a Special Federal Aviation Regulation (SFAR). This is the first autothrottle system for a single-engine airplane. Operational suitability for those aircraft requiring a type rating or that operate under an SFAR will require individual evaluations. This report does not approve the operational use of this equipment. Commercial operators must apply to their assigned operations authority for applicable operational use authorization.

The guidelines in this report apply to operations inspectors, principal operations inspectors (POI), and Training Center Program Managers (TCPM). This report also applies to Title 14 of the Code of Federal Regulations (14 CFR) part 135 air carrier check pilots and instructors, certificated flight instructors, Training Center Evaluators (TCE), and 14 CFR parts 61, 135, 141, and 142 training providers.

This report may be used in its entirety or in part to assist FAA offices in the determination of operational suitability, training, and checking when the IS&S FPDS with autothrottle is installed, similar to aircraft requiring a pilot type rating or aircraft operating under an SFAR.

2. DESCRIPTION

The IS&S FPDS with autothrottle replaces legacy avionics instrumentation to display the primary flight, navigation, and engine information on three large format displays. Additionally, it provides the user the interface to control and monitor many of the other aircraft systems, such as communication and navigation radios, transponder, weather radar, terrain, traffic, lightning detection, and flight director. It also provides an integrated flight management system, electronic charts, moving map, Sirius XM weather, electronic checklists, and autothrottle.

The FPDS consists of a left and right 10.4-inch primary flight display (PFD), 15.4-inch multifunction display (MFD), data concentrator unit, engine data concentrator unit, and autothrottle kit. There are additional supplemental components with the installation as well as third-party equipment that the FPDS interfaces with. The FPDS interfaces with the existing autopilot, Attitude Heading Reference System (AHRS), traffic, weather, and terrain equipment in the aircraft.

The PFDs are installed and provide a high-resolution display. The two PFDs function as the pilot and copilot's primary flight displays. They depict traditional electronic flight instruments (EFI),

including attitude indicator with full width horizon, airspeed indicator tape, altitude indicator tape, vertical speed indicator, flight mode annunciator, and horizontal situation indicator.

The primary and normal function of each high-resolution, full-color PFD is to provide attitude, heading, air data, navigation, alerting, radio altitude, autopilot flight mode and autothrottle mode annunciation, user interface, radio control, transponder 1, weather radar, TCAS 1, and synthetic vision information to the flightcrew. The user inputs on a PFD are synchronized with the other PFD. Each PFD includes an integrated flight management function to support flight planning and navigation functions.



Primary Flight Display

The MFD is installed in landscape format and provides a high-resolution display. The MFD located in the center of the panel is divided into four separate display tiles (engine instruments and fuel information; map, progress, active route or enhanced vision system; 2 mode page tiles (map, FMS, checklist, system, or audio)).

The primary function of the high-resolution, full-color MFD is to provide engine and fuel indications, mapping, Sirius XM weather, terrain awareness, flaps, radio audio control, user interface, display brightness control, source selection, Global Positioning Satellite (GPS) status, and enhanced vision information. The MFD may also be used for flight planning, Weight and Balance (W&B) control, and selection of display system settings. The FMS inputs are synchronized with the PFD FMS.



Multifunction Display

The autothrottle system provides automatic control of the engine power to maintain either a constant airspeed or constant engine torque (with temperature limit) when the aircraft is within the flight envelope and the engine parameters are within a normal operating range. The autothrottle is a bolt-on system to the existing throttle quadrant and interfaces directly with the left PFD.

The autothrottle control and protection logic is incorporated into the PFD and provides automatic control of the power control lever only during takeoff/go-around (TO/GA), climb, cruise, and descent phases of flight. The PFD 1 monitors the data used for the autothrottle function and prevents automatic throttle engagement until all of the parameters are valid and within range. The PFD 1 will also automatically disengage the autothrottle function under the conditions that are described in the AFMS.

The autothrottle function has two control modes that can be selected by the pilot via the PFD 1: torque control mode and airspeed control mode. The torque mode has the following submodes: TO/GA and climb. The airspeed mode has a turbulence submode. The following limit protections functions are provided by the autothrottle function and are always active: temperature (ITT) limit protection, overspeed and underspeed protection, and torque limit protection.

3. PROCEDURES FOR USE OF THE IS&S FPDS WITH AUTOTHROTTLE.

Operators must develop normal, supplemental, and emergency operating procedures from the AFMS and Pilot's Guide. These procedures must be included in the appropriate approved operator training course when required by 14 CFR.

4. SPECIFICATIONS FOR TRAINING AND CHECKING

Successful completion of IS&S FPDS with autothrottle training is necessary when required. IS&S FPDS with autothrottle training must be FAA-approved as required by 14 CFR.

The MKC-AEG Chair found the IS&S FPDS with autothrottle to be operationally acceptable and recommends a minimum of 2 hours of ground training for part 135 operators prior to use of this system. Training should emphasize the independence of the autopilot and autothrottle systems, TO/GA functions of the autothrottle system, and flight director and airspeed control interfaces. System training should be accomplished in a full flight simulator (FFS), flight training device (FTD), or on the actual systems installed on the aircraft. Pilot in-flight checking should not be required.