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Operational Suitability Report (OSR)

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Innovative Solutions & Support Integrated Standby Unit with Autothrottle

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RECORD OF REVISIONS

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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 Integrated Standby Unit (ISU) with Autothrottle (A/T) (referred to in the balance of this report as ISU A/T) installed in General Aviation aircraft. The evaluation was conducted by the Small Aircraft Evaluation Group in a Pilatus PC-12.

This report establishes the operational suitability of the ISU A/T 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 amendment to the Supplemental Type Certificate (STC) for the Innovative Solutions & Support A/T 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 ISU A/T is installed, similar to aircraft requiring a pilot type rating or aircraft operating under an SFAR.

2. DESCRIPTION

The ISU provides a second (standby) source and display of pitch, roll, airspeed, altitude, and vertical speed in case of primary flight display (PFD) failure. It is also a standby magnetic heading indicator that provides an alternate display of magnetic heading with a directional gyro heading source backup. The ISU is independent of the PFD system and is located on the pilot's instrument panel to the left of the PFDs. The ISU contains electronic inertial sensors and pressure sensors used to compute and display pitch, roll, magnetic heading, slip/skid, altitude, airspeed, maximum allowable airspeed, Vspeeds, and vertical speed. Electrical power is supplied from the battery or the other emergency power bus depending on configuration.

The ISU A/T is designed to display the following information: attitude, heading (360-degree horizontal situation indicator perspective), airspeed, mach, altitude, vertical speed, roll and bank indication, unusual attitude chevrons, A/T control functions, adjustable settings, menu, and localizer and glideslope deviation scales.



System A/T functionality provides the pilot with the capability to automatically control the required engine power (N_g) by automatically controlling the flight operating range position of the power control lever (PCL) for a selected value of torque (TRQ) or indicated airspeed (SPD). Control of the PCL by the ISU A/T is only performed in the flight operating range (forward of the idle detent position). The ISU A/T can provide automatic control only during takeoff/go-around (TOGA), climb, cruise, and descent phases of flight. The pilot can manually override the control of the PCL and disengage the A/T at any time.

A/T ON/OFF

The lower line select key is used to engage and disengage the A/T. When “A/T ON” is displayed, pressing the key will engage the A/T at the current selected mode and setpoint and begin automatic throttle movement. When “A/T OFF” is displayed, pressing the key will disengage the A/T and discontinue A/T movement. When engaged, the A/T mode in the top left of the horizontal situation indicator (HSI) will turn green, the light emitting diode (LED) on the left side of the ISU will light up green, and the bottom of the HSI will display the target

TRQ/speed and any annunciations related to the A/T, including active protection modes, a calibration required message, or a failure message if any A/T parameter has failed.



A/T On/Off Key

A/T DISENGAGEMENT

The A/T OFF key will disengage the A/T if active, but the ISU will also automatically disengage the A/T under the following conditions:

1. A/T power is turned off.
2. Indicated Airspeed (IAS) Hold mode is activated.
3. The throttle lever is manually moved by the pilot.
4. The A/T disconnect switch has been pressed.
5. An A/T parameter is missing or failed.

When an automatic disconnect occurs, the LED on the ISU will blink twice and light up yellow, an audible alert will sound, and the “ACK DISCONNECT” message will appear at the bottom of the HSI. Pressing the encoder (labeled ACK) will cause the message to disappear and turn off the yellow LED light until another disconnect occurs.



Autothrottle Disconnect

3. PROCEDURES FOR USE OF THE ISU A/T

Operators must develop normal, supplemental, and emergency operating procedures from the Airplane Flight Manual Supplement (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 ISU A/T training is necessary when required. ISU A/T training must be FAA-approved as required by 14 CFR.

The Small Aircraft Evaluation Group Chair found the ISU A/T to be operationally acceptable and recommends a minimum of 2 hours of ground training for part 135 operators prior to use of this system. This training time assumes the pilot is already familiar with the aircraft and other installed systems and equipment in the aircraft. Training should emphasize the independence of the autopilot and A/T systems, TOGA functions of the A/T system, incorporation of the ISU in the pilot's scan, A/T annunciations, and flight director (FD) 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.