Operational Suitability Report (OSR)

Revision: Original
Date: 06/24/2020

Innovative Solutions & Support (IS&S), Inc.
Integrated Standby Unit (ISU) with Autothrottle
With Engine-Out Mode and $V_{MCA}$ Protection for
Textron Models B200/B200C and B200GT/B200CGT

Approved by The Aircraft Evaluation Division (AED)
Flight Standardization Board (FSB)
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## RECORD OF REVISIONS

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<th>Revision Number</th>
<th>Sections</th>
<th>Date</th>
<th>Administrator</th>
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<tr>
<td>0 (Original)</td>
<td>All</td>
<td>06/24/2020</td>
<td>A. Lott</td>
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## HIGHLIGHTS OF CHANGE

0. Original Document; all Sections.
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1. **PURPOSE.**

1.1 This Operational Suitability Report (OSR) specifies training, checking, and differences requirements applicable to flightcrew members operating Textron Models B200/B200C and B200GT/B200CGT with Innovative Solutions & Support’s (IS&S) Integrated Standby Unit (ISU) with autothrottle package modified under Supplemental Type Certificate (STC) No. SA00400BO. This report provides guidance to Title 14 of the Code of Federal Regulations (14 CFR) parts 91, 135, 141, and 142 operators and other training providers.

1.2 The Aircraft Evaluation Division (AED), Small Aircraft Evaluation Group (AEG) conducted an evaluation of Textron Model B200/B200C and B200GT/B200CGT aircraft with the IS&S ISU with autothrottle package installed. This activity was conducted at the Wilmington Airport (KILG) in New Castle, DE on November 7, 2019. The aircraft utilized for this demonstration was N313BM (Serial No. BY-50), a B200GT. The aircraft has the IS&S ISU that hosts the autothrottle display with an “ENGINE-OUT” protection mode configured. The evaluation reviewed operating characteristics and techniques to propose training, checking, and differences requirements applicable to the Textron Models B200/B200C and B200GT/B200CGT aircraft with STC No. SA00400BO.

2. **APPLICABILITY.**

2.1 In accordance with 14 CFR, the provisions of this report apply to all operations of Textron Models B200/B200C and B200GT/B200CGT. This report is also applicable to all training and checking conducted in the aircraft. This report is effective until amended, superseded, or withdrawn by subsequent revision.

2.2 The guidelines in this report apply to Aviation Safety Inspectors (ASI) (Operations), Principal Operations Inspectors (POI), Training Center Program Managers (TCPM), Aircrew Program Managers (APM), part 135 air carrier check airmen and instructors, Airline Transport Pilots (ATP) instructing in air transportation service, Certificated Flight Instructors (CFI), Aircrew Program Designees (APD), and Training Center Evaluators (TCE).

3. **DESCRIPTION.**

3.1 The autothrottle system utilizes the IS&S ISU that hosts the autothrottle display per STC No. SA00400BO. As part of the system, IS&S installed an autothrottle annunciator placed just right of the primary flight display (PFD). There are autothrottle controls on the left and right power levers. The go-around (GA) button activates the autothrottle on the ground for takeoff or during a GA. The autothrottle disconnect is located on the right power lever. The autothrottle controls engine power by moving the engine’s power lever with a pair of motorized actuator assemblies within the center pedestal. This is easily overridden by the pilot with nominal pressure. The system has two configurations: autothrottle and autothrottle with “ENGINE-OUT” mode. The normal autothrottle configuration maintains selected torque or airspeed. The autothrottle logic requires gross weight to accurately compute airspeed and torque limitations. This weight is entered into
the ISU on first power up and is automatically maintained by reducing weight as fuel is burned. The autothrottle also offers advanced alerts and protections for temperature, torque, and unsafe airspeed. The pilot must control the propeller controls to maintain safe propeller speed for torque being set by the autothrottle. If an engine failure occurs while the autothrottle is engaged, the autothrottle without “ENGINE-OUT” mode configuration will automatically disconnect. If the autothrottle with “ENGINE-OUT” mode configuration is enabled and “TAKEOFF,” “CLIMB,” or “GO-AROUND” modes are active, the autothrottle will enter “ENGINE-OUT” protection mode upon failure of an engine. If an engine failure occurs in any other autothrottle mode, the autothrottle will disengage. The “ENGINE-OUT” mode is determined when the oil pressure drops below 60 pounds per square inch (PSI) or rotational speed of the low-pressure compressor in a dual-spool gas turbine engine (N1) falls below 40 percent. This “ENGINE-OUT” protection mode will target the maximum available torque on the operating engine. The pilot will be able to adjust the target torque setting on the ISU autothrottle as long as the airspeed is above minimum control speed (VMCA). If airspeed falls below VMCA, the autothrottle will reduce the torque as needed to avoid overpowering rudder authority. Below VMCA, the target torque value will be blacked out on the ISU and cannot be manually adjusted using the ISU autothrottle. The Rudder Boost and Autofeather must be operational and engaged in order for the autothrottle “ENGINE-OUT” mode to operate.

3.2 The autothrottle will automatically disengage if it detects activation of autopilot Flight Level Change (FLC) mode while the autothrottle is engaged in “AIRSPEED” mode. The pilot can disconnect the autothrottle with the Autothrottle Disconnect button on the right Power Control lever, or by turning off the autothrottle using the ISU Autothrottle Power Key on the ISU controller.

3.3 The IS&S ISU is installed as a functional replacement for the legacy Electronic Standby Instrument System (ESIS). Unless identified otherwise within the Airplane Flight Manual Supplement (AFMS), all existing procedures and descriptions in the Airplane Flight Manual (AFM) referencing “ESIS” apply to the ISU. This digital standby flight display is powered by a standby battery pack and can operate for at least 60 minutes in case of emergency. The autothrottle capabilities are not available during operations on battery backup.

4. **PROCEDURES FOR USE OF THE ISU AND AUTO Throttle WITH ENGINE-OUT AND VMCA PROTECTION.**

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

5. **OPERATIONAL SUITABILITY.**

The Small Aircraft AEG found the IS&S ISU autothrottle with engine-out and VMCA protection system to be operationally suitable for parts 91 and 135 operations.
6. SPECIFICATION FOR TRAINING AND CHECKING.

6.1 In conducting this evaluation, the Small Aircraft AEG utilized factors that are considered the most likely scenario for operators of the B200/B200C and B200GT/B200CGT. The evaluating pilot had previous experience in a flat panel (all-glass) aircraft, and the same flight management system (FMS). Differences training was provided by the IS&S AFMS and the Pilot Guide for the ISU and autothrottle with engine-out and VMCA protection.

6.2 The pilot should already be familiar with the aircraft and other installed systems and equipment in the aircraft. Training should emphasize:

   a) The independence of the autopilot and autothrottle systems;
   b) Takeoff and GA functions of the autothrottle system;
   c) Incorporation of the ISU in the pilot’s scan;
   d) Autothrottle annunciations;
   e) Flight guidance panel and airspeed control interfaces;
   f) The use of the autothrottle with engine-out mode; and
   g) The methods of disconnecting and engaging the autothrottle.

**NOTE:** System training should be accomplished in a full flight simulator (FFS), flight training device (FTD), or on the actual systems installed on the aircraft.

6.3 Based on the evaluation, the Small Aircraft AEG recommends that differences training with autothrottle installed as Level D training on the following:

   a) The independence of the autopilot and autothrottle systems;
   b) Takeoff and GA functions of the autothrottle system;
   c) Incorporation of the ISU in the pilot’s scan;
   d) Autothrottle annunciations;
   e) Flight guidance panel and airspeed control interfaces;
   f) The use of the autothrottle with engine-out mode; and
   g) The methods of disconnecting and engaging the autothrottle.
## Training Differences Legend

<table>
<thead>
<tr>
<th>Differences Level</th>
<th>Type</th>
<th>Training Method Examples</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>Self-Instruction</td>
<td>• Operating manual revision (handout (HO))&lt;br&gt;• Flight crew operating bulletin (HO)</td>
<td>• Crew has already demonstrated understanding on base aircraft (e.g., updated version of engine).&lt;br&gt;• Minor or no procedural changes required.&lt;br&gt;• No safety impact if information is not reviewed or is forgotten (e.g., different engine vibration damping mount).&lt;br&gt;• Once called to attention of crew, the difference is self-evident.</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Aided Instruction</td>
<td>• Audiovisual presentation (AV)&lt;br&gt;• Tutorial computer-based instruction (TCBI)&lt;br&gt;• Stand-up instruction (SU)</td>
<td>• Systems are functionally similar.&lt;br&gt;• Crew understanding required.&lt;br&gt;• Issues need emphasis.&lt;br&gt;• Standard methods of presentation required.</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Systems Devices</td>
<td>• Interactive (full-task) computer-based instruction (ICBI)&lt;br&gt;• Cockpit Procedures Trainers (CPT)&lt;br&gt;• Part task trainers (PTT)&lt;br&gt;• Level 4 or 5 flight training device (FTD 4-5)</td>
<td>• Training can only be accomplished through systems training devices.&lt;br&gt;• Training objectives focus on mastering individual systems, procedures, or tasks versus highly integrated flight operations or &quot;real-time&quot; operations.&lt;br&gt;• Training devices are required to assure attainment or retention of crew skills to accomplish more complex tasks usually related to aircraft systems.</td>
</tr>
<tr>
<td><strong>D</strong></td>
<td>Maneuvers Devices</td>
<td>• Level 6 or 7 flight training device (FTD 6-7)&lt;br&gt;• Level A or B full flight simulator (FFS A-B)</td>
<td>• Training can only be accomplished in flight maneuver devices in a real-time environment.&lt;br&gt;• Training requires mastery of interrelated skills versus individual skills.&lt;br&gt;• Motion, visual, control-loading, and specific environmental conditions may be required.</td>
</tr>
<tr>
<td><strong>E</strong></td>
<td>Level C/D FFS or Aircraft</td>
<td>• Level C or D full flight simulator (FFS C-D)&lt;br&gt;• Aircraft (ACFT)</td>
<td>• Motion, visual, control-loading, audio, and specific environmental conditions are required.&lt;br&gt;• Significant full-task differences that require a high-fidelity environment.&lt;br&gt;• Usually correlates with significant differences in handling qualities.</td>
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6.4 Based on the evaluation, the Small Aircraft AEG recommends that differences checking with autothrottle installed as Level D checking.

### Checking Differences Legend

<table>
<thead>
<tr>
<th>Differences Level</th>
<th>Checking Method Examples</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>B</td>
<td>• Oral or written exam</td>
<td>Individual systems or related groups of systems.</td>
</tr>
<tr>
<td></td>
<td>• Tutorial computer-based instruction (TCBI) self-test</td>
<td></td>
</tr>
</tbody>
</table>
| C                 | • Interactive (full-task) computer-based instruction (ICBI)  
                   | • Cockpit Procedures Trainers (CPT)   
                   | • Part task trainers (PTT)   
                   | • Level 4 or 5 flight training device (FTD 4-5) | • Checking can only be accomplished using systems devices.  
                   | |
|                   | • Checking objectives focus on mastering individual systems, procedures, or tasks. |
| D                 | • Level 6 or 7 flight training device (FTD 6-7)   
                   | • Level A or B full flight simulator (FFS A-B) | • Checking can only be accomplished in flight maneuver devices in a real-time environment.  
                   | | • Checking requires mastery of interrelated skills versus individual skills.  
                   | | • Motion, visual, control-loading, and specific environmental conditions may be required. |
| E                 | • Level C or D full flight simulator (FFS C-D)   
                   | • Aircraft (ACFT) | Significant full-task differences that require a high-fidelity environment. |

6.5 Models B200/B200C and B200GT/B200CGT crewmembers not having previous B200/B200C and B200GT/B200CGT experience or not having proficiency with the installed FMS would require a higher level of training and checking. POIs may contact the Small Aircraft AEG for technical assistance in evaluating training and checking for individual operators that have unique issues not addressed in this report or with any other questions or concerns.