Flight Standardization Board (FSB) Report

Revision: 14
Date: 07/05/2017

Manufacturer

Boeing

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1. RECORD OF REVISIONS

<table>
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2. INTRODUCTION

Aircraft Evaluation Groups (AEGs) are responsible for working with aircraft manufacturers and modifiers, during the development and FAA certification of new and modified aircraft to determine: 1) the pilot type rating, 2) flightcrew member training, checking, and currency requirements, and 3) operational suitability.

This report lists those determinations for use by: 1) FAA employees who approve training programs, 2) FAA employees and designees who certify airmen, and 3) aircraft operators and training providers, to assist them in developing their flightcrew member training, checking and currency.

3. HIGHLIGHTS OF CHANGE

The purpose of this revision is to add the B-737-8. This report is a new format and has been completely modified from the previous revision. Major modifications include the deletion of currency training levels depicted in the Master Differences Requirements table, renaming of Operator Differences Tables to Differences Tables, and deleting regulatory repetitive information.

4. BACKGROUND

The Seattle AEG formed a Flight Standardization Board (FSB) that evaluated the Boeing 737-8 as defined in FAA Type Certificate Data Sheet (TCDS) # A16WE. The evaluation was conducted during August 2016 using the methods described in FAA Advisory Circular (AC) 120-53B, Guidance for Conducting and Use of Flight Standardization Board Evaluations. All previous evaluations of the B-737 series aircraft evaluated at the time of certification are included in this report.

5. ACRONYMS

AC   Advisory Circular  
ACARS  Aircraft Communication Addressing and Reporting System  
AD   Airworthiness Directive  
ADV   Advanced  
AEG   Aircraft Evaluation Group  
AFCS   Automatic Flight Control System  
AFM   Airplane Flight Manual  
AEW&C   Airborne Early Warning and Command  
AP   Autopilot  
APU   Auxiliary Power Unit  
AT   Auto Throttles  
ATC   Air Traffic Control  
CATI/II/III Category I/II/III ILS Instrument Approach
CBT  Computer Based Training
CDS  Common Display System
CDU  Control Display Unit
CHDO Certificate Holding District Office
CMO  Certificate Management Office
DR   Difference Requirements
DU   Display Unit
EADI  Electronic Attitude Director Indicator
EHSI  Electronic Horizontal Situation Indicator
EDFCS Enhanced Digital Flight Control System
EGPWS Enhanced Ground Proximity Warning System
ER   Extended Range
ETOPS Extended Range Operations
FAA  Federal Aviation Administration
FAS  Final Approach Segment
FD   Flight Director
FFS  Full Flight Simulator
FMCS Flight Management Computer System
FMS  Flight Management System
FSB  Flight Standardization Board
FSTD Flight Simulation Training Device
GBAS Ground Based Augmentation System
GLS  Global Positioning System Landing System
GNSSLS Global Navigation Satellite Systems Landing System
HUD  Head Up Guidance Display
IAW  In Accordance With
ICAO International Civil Aviation Organization
IGW  Increased Gross Weight
ILS  Instrument Landing System
IRS  Inertial Reference System
LAAS Local Area Augmentation System
LOFT Line Oriented Flight Training
LOS  Line Operational Simulation
MDS  MAX Display System
MCP  Mode Control Panel
MMEL Master Minimum Equipment List
MDR Master Differences Requirements
NAV  Navigation
ND   Navigation Display
NDB  Non-Directional Beacon
NSP  National Simulator Program
OE   Operating Experience
OEM  Original Equipment Manufacturer
PC   Proficiency Check
PDCS Performance Data Computer System
PF   Pilot Flying
6. DEFINITIONS
These definitions are for the purposes of this report only.

6.1 **Base Aircraft.** An aircraft identified for use as a reference to compare differences with another aircraft.

6.2 **Current.** A crewmember meets all requirements to operate the aircraft under the applicable operating Part.

6.3 **Differences Tables.** Describe the differences between a pair of related aircraft, and the minimum levels operators must use to conduct differences training and checking of crewmembers. Difference levels range from A to E.

6.4 **Master Differences Requirements (MDR).** Specifies the highest training and checking difference levels between a pair of related aircraft derived from the Differences Tables.

6.5 **Mixed Fleet Flying –** The operation of a base aircraft and one or more related aircraft for which credit may be taken for training, checking, and currency events.

6.6 **Operational Evaluation.** An AEG determination of pilot type rating, minimum crewmember training, checking and currency requirements, and unique or special airman certification requirements (e.g., specific flight characteristics, no-flap landing).
6.7 **Operational Suitability.** An AEG determination that an aircraft or system may be used in the National Airspace System (NAS) and meets the applicable operational regulations (e.g., 14 CFR Parts 91, 121, 125, 135).

6.8 **Qualified.** A crewmember holds the appropriate airman certificate and ratings as required by the applicable operating Part.

6.9 **Related Aircraft.** Any two or more aircraft of the same make with either the same or different type certificates that have been demonstrated and determined by the Administrator to have commonality.

6.10 **Seat Dependent Tasks.** Maneuvers or procedures using controls that are accessible or operable from only one flightcrew member seat.

6.11 **Special Emphasis Area.** A training requirement unique to the aircraft, based on a system, procedure, or maneuver, which requires additional highlighting during training. It may also require additional training time, specialized training devices or training equipment.

6.12 **Specific Flight Characteristics.** A maneuver or procedure with unique handling or performance characteristics that the FSB has determined must be checked.

7. **PILOT TYPE RATING**

7.1 **Type Rating.** The Boeing 737 type rating designation is B-737. The Navy P-8 and the AEW&C were not evaluated by the FSB and no type rating determination was made.

7.2 **Common Type Ratings.** Not applicable.

7.3 **Military Equivalent Designations.** Military aircraft that qualify for the B-737 can be found on the faa.gov website under Licenses and Certificates, Airmen Certification, Online Services, Aircraft Type Rating Designators. This webpage is kept up to date and can be found at [http://www.faa.gov/licenses_certificates/airmen_certification/](http://www.faa.gov/licenses_certificates/airmen_certification/).

8. **RELATED AIRCRAFT**

8.1 **Related Aircraft on same TCDS.** The B737-100, -200, -200C, -300, -400, -500, -600, -700, -800, -800SFP, -900, -900ER, -700 IGW, and -8 are related aircraft. As used in this report, series groups are identified as:

   • B737-100/-200
   • B737-300/-400/-500
   • B737-600/-700/-800/-900
   • B737-8

8.2 **Related Aircraft on different TCDS.** Not applicable
9. PILOT TRAINING

9.1 Airman Experience
The provisions of this section apply to all 737 training programs, and assume the training will be
given to airmen with previous experience. Examples of applicable previous experience may
include any of the following: experience in Part 121 or 125 air carrier operations, former
military, commuter, or corporate pilots with turbine powered aircraft experience, etc. For airmen
not having such experience (e.g. recent “ab initio” program graduates), additional requirements
may be necessary as determined by the POI, TCPM, FSB, and AFS-200.

9.2 Special Emphasis Areas
Pilots must receive special emphasis on the following areas during ground training:

- Alternate Go Around Flaps: For B-737-700/-800/-800SFP/-900/-900ER/-8 aircraft
certified to conduct Flaps 30° approaches using Flaps 5° during go around. The use of
Flaps 5° for go-around creates a substantial increase in approach climb weights in hot
and/or high environments. The Flaps 30° approach speeds for Flaps 5° go-around
operations require minor-model specific speed additives to the standard Flaps 30° $V_{REF}$
speeds in order to maintain the performance requirements of §25.121(d). Alternate Go-
Around Flaps operations require a separate AFM Appendix, and a supplementary
procedure defining flightcrew actions. Operators are encouraged to develop an approach
review and briefing card for use by flightcrews when conducting any Alternate Go-
Around Flaps operation. Ground training for flightcrews current in the B-737-700/-800/
800SFP/-900/-900ER/-8 aircraft is established at Level B. Training may be administered
via CBT, stand up lectures or video and should include performance requirements, speed
additive use and effect on maneuver margins, alternate go-around procedures, flightcrew
callouts, and engine failure procedures. This item must be included in initial, upgrade,
transition, differences, and recurrent training.

- Automatic Landings: Due to the differences among B-737 AP autoland systems ground
training is required during a pre-flight briefing prior to flight training. This item must be
included in initial, upgrade, transition, differences and recurrent training.

- When an EDFCS that supports Fail Operational Autoland operations with a Fail Passive
Rollout system is used, ground training is required during a pre-flight briefing prior to
flight training. This item must be included in initial, upgrade, transition, differences and
recurrent training.

- B-737-8 Flight Control system. The Elevator Jam Landing Assist system and the
Landing Attitude Modifier (LAM) ground training must address the system functions and
associated flight spoiler deployments. This item must be included in initial, upgrade,
transition, differences and recurrent training.

- Head Up Guidance Display (HUD). Training must address appropriate ground training
elements for both HUD and non-HUD operations as specified in Appendix 5. This item
must be included in initial, upgrade, transition, differences and recurrent training.
Pilots must receive special emphasis on, and perform the following areas during flight training:

- **Alternate Go Around Flaps** for B-737-700/-800/-800SFP/-900/-900ER/-8 aircraft certified to conduct Flaps 30° approaches using Flaps 5° during go around. The use of Flaps 5° for go-around creates a substantial increase in approach climb weights in hot and/or high environments. The Flaps 30° approach speeds for Flaps 5° go-around operations require minor-model specific speed additives to the standard Flaps 30° $V_{REF}$ speeds in order to maintain the performance requirements of §25.121(d). Alternate Go-Around Flaps operations require a separate AFM Appendix, and a supplementary procedure defining flightcrew actions. Operators are encouraged to develop an approach review and briefing card for use by flightcrews when conducting any Alternate Go-Around Flaps operation. For flightcrews current in B-737-700/-800/-800SFP/-900/-900ER/-8 aircraft, flight training is established at Level D. This item must be included in initial, upgrade, transition, differences and recurrent training. Training should include the following:
  i. A two engine flaps 30° approach to a flaps 5° go-around;
  ii. A two engine flaps 30° approach to an engine failure during a flaps 5° go-around; and
  iii. A two engine flaps 30° approach in icing conditions to an engine failure during a flaps 5° go-around

- **Automatic Landings.** Due to the differences among B-737 AP autoland systems, flight training must occur with the appropriate AP autoland systems (e.g. Fail Operational vs. Fail Passive). This training can occur in either a FFS or airplane. Flight training must ensure appropriate AFM limitations are addressed and complied with. This item must be included in initial, upgrade, transition, differences and recurrent training.

- **When an EDFCS that supports Fail Operational Autoland operations with a Fail Passive Rollout system is used, flight training can occur in either a FFS or airplane and should address both single and dual channel AP approaches. This item must be included in initial, upgrade, transition, differences and recurrent training.**

- **B-737-8 Flight Control System.** Elevator Jam Landing Assist and Landing Attitude Modifier (LAM) affect flight spoiler deployments. This item must be included in initial, upgrade, transition, and recurrent training.

- **Head Up Guidance Display (HUD).** Training must address appropriate flight training elements for both HUD and non-HUD operations as specified in Appendix 5. This item must be included in initial, upgrade, transition, differences and recurrent training.

### 9.3 Specific Flight Characteristics
There are no specific flight characteristics.

### 9.4 Seat Dependent Tasks
Pilots must receive initial, transition, upgrade, and recurrent training in these seat dependent tasks:

- **Head Up Guidance Display (left seat)**
b) Nosewheel steering (Left seat when a tiller is not installed on the right side)

9.5 Regulatory Training Requirements Which Are Not Applicable to the B-737 series. Part 121, Appendix E

- Tuck and Mach buffet training: B-737-300 through -500, and -600 through -900ER, and -8 series of airplanes do not exhibit any Mach Tuck tendency and therefore no training is required for this flight maneuver. Demonstration of the aircraft’s overspeed protection capabilities is an acceptable substitute.
- Fuel Jettisoning: The B-737 Series does not have fuel jettisoning capability.
- Turns with and without spoilers. Not required due to aircraft design.

9.6 Flight Simulation Training Devices (FSTD). Special device or simulator characteristics are described for training, checking, and re-establishing currency as follows:

- Enhanced Flight Visual System (EFVS) must be trained in a level C or higher FFS in both day and night conditions.

9.7 Training Equipment

There are no specific systems or procedures that are unique to the Boeing 737 that require specific training equipment.

9.8 Differences Training Between Related Aircraft

Pilots must receive differences training between the B-737-100 through B-737-8 aircraft when mixed fleet flying as specified in Appendix 2.

9.8.1 PFD/ND differences.

PFD/ND differences require a minimum of 12 hours in an interactive CBT, 6 programmed hours in a level 6 FTD, and supervised line flying as described in Appendix 4. Pilots must be trained in accordance with Appendix 2. ND is an expansion of MAP and the CBT need only demonstrate the differences in display selections and capabilities (e.g. Center Map). The following elements should be included in the training program:

- FMA DIFFERENCES
- AFDS STATUS ANNUNCIATOR
- VERTICAL SPEED DISPLAY
- AIRSPEED BUGS AND FLAP MANEUVERING SPEEDS
- COMPASS ROSE
- PITCH LIMIT INDICATOR
- AIRSPEED TREND VECTOR
- MINIMUM AND MAXIMUM SPEEDS
- LANDING ALTITUDE REFERENCE BAR
- ALTIMETER SETTING
- LOC AND GS DEVIATION
- SELECTED ALTITUDE INDICATION (BUG)
- GROUND SPEED DISPLAY
- RADIO ALTITUDE DISPLAY
- TCAS RESOLUTION ADVISORIES
- TIME CRITICAL WARNINGS
9.8.2 Blended, Split Scimitar, Advanced Technology Winglet. Operators engaged in mixed fleet flying B-737 series aircraft with and without winglets must address differences at the A/A/A level including:
- Physical/dimensional differences, with emphasis on lower strake clearance considerations during ground operations
- Takeoff crosswind guidelines
- Landing crosswind guidelines
- Ground contact angles for normal landings

9.8.3 Roll Control Advisory System (RCAS)
RCAS is optional equipment on the B-737-NG and B-737-8. The Flight Standardization Board found Level B training to be sufficient for initial, transition, and upgrade training in that series aircraft.

9.8.4 Runway Situational Awareness Tools (RSAT) System
RSAT is optional equipment on the B-737-NG and B-737-8. The Flight Standardization Board found Level B training to be sufficient for initial, transition, and upgrade training in that series aircraft.

9.8.5 Rockwell Collins HGS-6000 Head-Up Guidance System with HCP Interface
The HGS-6000 is optional equipment on the B-737-NG and B-737-8. The Flight Standardization Board found Level A differences training to be sufficient for pilots already qualified on the Rockwell Collins HGS-4000 Head-Up Guidance System.

9.8.6 Training for Integrated Standby Flying Display may be satisfied with Level A training for all B-737 aircraft. No flight training required.

9.8.7 Universal Avionics Flat Panel Display/FMS installations (STC ST03355AT/ST03356AT) into -300 series or IS&S Flat Panel Display installation (ST03125NY) into the -400 series. The Flight Standardization Board found that Level D differences training to be sufficient.

9.8.8 Universal Avionics Flight Management System installations (STC ST03362AT) into -200 series. The Flight Standardization Board found that Level C differences training to be sufficient.

9.8.9 Ground training for the B-737-800 to the B-737-8 must include the following special emphasis areas:
a) Flight Control system to address the Elevator Jam Landing Assist system
b) Landing Attitude Modifier (LAM) to address the two LAM system functions and associated flight spoiler deployments
a) Gear handle operation to address standard operating procedures
b) Flightcrew alerting

10. PILOT CHECKING

10.1 Landing from a No Flap or Non Standard Flap Approach.
The probability of flap extension failure on the B-737 is extremely remote due to system design. Therefore, demonstration of a partial flap approach and landing, using full slats and flaps less than 15°, during pilot certification or a §§ 61.58 proficiency check, 121.441 proficiency check, or 125.287 competency check is required. Refer to Order 8900.1, Volume 5 when the test or check is conducted in an aircraft versus a FFS.

10.2 Specific Flight Characteristics
There are no specific flight characteristics.

10.3 Seat Dependent Tasks
During initial, transition, and upgrade checking, pilots must be checked in these seat dependent tasks:
  a) Head Up Guidance Display (left seat)
  b) Nosewheel steering (left seat, right seat when installed)

10.4 Other Checking Items
Precision approach using HUD and EFVS. When HUD use is approved, checking must include suitable demonstration of HUD use for modes and phases of flight authorized. HUD vs. FD and Raw Data. When HUD is installed, PC maneuvers, LOFT, LOS or other demonstrations may be completed using HUD at the check pilot’s/inspector’s discretion. However, periodic assessment of non-HUD skills should be demonstrated, and at any time a check pilot/inspector may at their discretion request that authorized maneuvers be performed without use of HUD (e.g. if manual CAT I FD operations are authorized, the airman being checked may be requested to perform the maneuver without HUD).

10.5 Flight Simulation Training Devices (FSTD)
Enhanced Flight Visual System (EFVS) must be checked in minimum of a level C FFS in both day and night conditions.

10.6 Equipment
There are no specific systems or procedures that are unique to the B-737 series aircraft that require specific equipment.

10.7 Differences Checking Between Related Aircraft

  10.7.1 Alternating PC for B-737-100/200, B-737-300/400/500, B-737-600/700/800/900, and B-737-8 Series Groups.
  For mixed-fleet-flying between series groups, PC should alternate, but are not required to alternate, each six months for PICs, and annually for other flightcrew members. When such alternating checks are accomplished, the differences checking of other series within the series group being checked (e.g. either B-737-100/200, B-737-300/400/500 and/or B-737-600/700/800/900 and/or B-737-8) may be satisfied by ground training, written questionnaire, oral
review, or other method approved by the POI or TCPM. However, such simplified programs may not be approved if they result in progressive loss of knowledge or skills related to particular differences over successive recurrent periods.

10.7.2 FMS Demonstration of Competency. FMS Checks. Checking for differences related to a series having FMS must include a demonstration of competency covering both an oral/written exam and demonstration of proficiency with both normal and non-normal procedures. FMS proficiency should be demonstrated with “hands-on” operation, and address each applicable FMS mode or function. Specific items and flight phases to be checked may include initialization, takeoff, departure, cruise, arrival, precision and non-precision approach, missed approach, holding, diversion to an alternate or route re-clearance, and pertinent non-normal scenarios. Scenarios used should include routes, airports, ATC situations, and other factors, which are representative of, or present equivalent complexity to those anticipated for that operator. FMS competency may be demonstrated in conjunction with other checking.

11. PILOT CURRENCY
There are no additional currency requirements for the B-737 other than those already specified in parts 61, 121, 125, and 135.

11.1 Differences Currency between Related Aircraft
Not Applicable.

12. OPERATIONAL SUITABILITY
The B-737 series aircraft is operationally suitable for operations under parts 91, 121, 125, and 135. The FSB determined operational compliance by conducting an evaluation of aircraft serial number YT945 on 08/16/2016. The list of operating rules evaluated is on file at the Seattle AEG.

13. MISCELLANEOUS
13.1 ETOPS.
- B-737-200/-300/-400/-500 aircraft are approved for 120-minute ETOPS operations.
- B-737-600/-700/-800/-900 aircraft are approved for 180-minute ETOPS operations.

13.2 Forward Observer Seat
The B-737 series aircraft forward center observer seat has been evaluated and determined to meet the requirements of §§ 121.581(a), 125.317(b), 135.75(b) and Advisory Circular (AC) 120-83.

13.3 Landing Minima Categories
All operators should reference 14 CFR §97.3 and use an approach category appropriate to the speed of V_{REF}. Air carriers may be further restricted by their operations specifications for circling approaches. Approach Category for B-737 series aircraft is as follows:
<table>
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<th>Aircraft</th>
<th>Category</th>
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<tr>
<td>B-737-100/200/200ADV</td>
<td>C</td>
</tr>
<tr>
<td>B-737-300/400/500</td>
<td>C</td>
</tr>
<tr>
<td>B-737-600/700</td>
<td>C</td>
</tr>
<tr>
<td>B-737-800/900/900ER</td>
<td>C or D</td>
</tr>
<tr>
<td>B-737-8</td>
<td>C or D</td>
</tr>
</tbody>
</table>

Due to the numerous maximum landing weight options among the B-737-600 through -900ER series group and the B-737-8, determining an aircraft approach category may be done using the certificated maximum flap setting of 40° and the particular airplane’s AFM maximum certificated landing weight.

13.4 Normal Landing Flaps
The B-737 normal “final landing flap setting” per § 91.126(c) are Flaps 15°, 30°, and 40°. Flaps 15° is primarily used for non-normal situations (e.g. engine out approach) or atypical operations (e.g. high altitude airport operations).
# APPENDIX 1 DIFFERENCES LEGENDS

## Training Differences Legend

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

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<th>Checking Method Examples</th>
<th>Conditions</th>
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<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 self-test (TCBI)</td>
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<tr>
<td>C</td>
<td>• Interactive (full-task) computer based instruction (ICBI)</td>
<td>• Checking can only be accomplished using systems devices.</td>
</tr>
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<td>• Cockpit procedures trainers (CPT)</td>
<td>• Checking objectives focus on mastering individual systems, procedures, or tasks.</td>
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<td>• Part task trainers (PTT)</td>
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<td></td>
<td>• Level 4 or 5 flight training device (FTD 4-5)</td>
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</tr>
<tr>
<td>D</td>
<td>• Level 6 or 7 flight training device (FTD 6-7)</td>
<td>• Checking can only be accomplished in flight maneuver devices in a real-time environment.</td>
</tr>
<tr>
<td></td>
<td>• Level A or B full flight simulator (FFS A-B)</td>
<td>• Checking requires mastery of interrelated skills versus individual skills.</td>
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<td>• Motion, visual, control loading, and specific environmental conditions may be required.</td>
</tr>
<tr>
<td>E</td>
<td>• Level C or D full flight simulator (FFS C-D)</td>
<td>• Significant full task differences that require a high fidelity environment.</td>
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<td>• Aircraft (ACFT)</td>
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### APPENDIX 2 MASTER DIFFERENCES REQUIREMENTS (MDR) TABLE

These are the minimum levels of training and checking required, derived from the highest level in the Differences Tables in Appendix 3. Differences levels are arranged as training/checking.

<table>
<thead>
<tr>
<th>Related Aircraft ↓</th>
<th>Base Aircraft →</th>
<th>B-737 BASIC B-737-100/200 (SP77)</th>
<th>B-737-200 ADV</th>
<th>B-737-300,400,500 (NON-EFIS)</th>
<th>B-737-300,400,500 (EFIS)</th>
<th>B-737-600,700,800, 900, -900ER</th>
<th>B-737-8</th>
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<tr>
<td>B-737 BASIC B-737-100/200 (SP77)</td>
<td>A/A NAV - B/B PMS - C/B</td>
<td>B/A NAV - B/B PMS - C/B</td>
<td>C*/C*</td>
<td>C*/C*</td>
<td>D/D</td>
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<td>B/A PDCS - C/B NAV - B/B AFCS - C/B PMS - C/B</td>
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<td>C*/C*</td>
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<td>C/B</td>
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C* - Level C training or checking which requires use of a Level 5 FSTD or higher.

(1) Limited FMS pertains to 737-300/400/500 airplanes which retain partial FMS functions.

(2) C level training requirement may be satisfied by interactive CBT.
(3) The B-737-8 was not evaluated to aircraft B-737-100, -200, 200ADV, -300, -400, and -500. Differences from B-737-800 to B-737-8 have been evaluated. Operator Difference Requirements (ODR) tables must be developed when transitioning from the B-737 600/700/900/900ER to the B-737-8 to identify any additional training requirements.
APPENDIX 3 DIFFERENCE TABLES

This Design Differences table, from the Boeing 737-800 to the Boeing 737-8, was proposed by The Boeing Company and validated by the FSB on 08/16/2016. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

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<td>AUX DISPLAY-Added Information Displayed</td>
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<td>31- FLIGHT INSTRUMENT DISPLAYS</td>
<td>MAINT LIGHT (replaces PSEU light)</td>
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<tr>
<td>72, 73,77,78,80 POWER PLANT</td>
<td>EEC SYSTEM Addition of Icing Idle speed</td>
<td>No</td>
<td>No</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>72, 73,77,78,80 POWER PLANT</td>
<td>INDICATORS Revised Display Format</td>
<td>No</td>
<td>No</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>72, 73,77,78,80 POWER PLANT</td>
<td>INDICATORS Compact engine display removed</td>
<td>No</td>
<td>No</td>
<td>A</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>72, 73,77,78,80 POWER PLANT</td>
<td>INDICATORS Added THRUST alert</td>
<td>No</td>
<td>No</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>72, 73,77,78,80 POWER PLANT</td>
<td>INDICATORS Added MOTORING indication for bowed rotor logic</td>
<td>No</td>
<td>No</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>72, 73,77,78,80 POWER PLANT</td>
<td>THRUST REVERSER SYSTEM Added REVERSER COMMAND and REVERSER AIR/GND alerts</td>
<td>No</td>
<td>Yes</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>72, 73,77,78,80 POWER PLANT</td>
<td>THRUST REVERSER SYSTEM Replaced REVERSER alert with REVERSER LIMITED</td>
<td>No</td>
<td>Yes</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>
This Maneuver Differences table, from the Boeing 737-800 to the Boeing 737-8, was proposed by The Boeing Company and validated by the FSB on 08/16/2016. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

<table>
<thead>
<tr>
<th>FROM BASE AIRCRAFT: B-737-800</th>
<th>MANEUVER</th>
<th>REMARKS</th>
<th>FLT CHAR</th>
<th>PROC CHNG</th>
<th>TRAINING</th>
<th>CHECKING</th>
</tr>
</thead>
<tbody>
<tr>
<td>TO RELATED AIRCRAFT: B-737-8</td>
<td>PREFLIGHT INSPECTION</td>
<td>Optional installation of two-position tailskid</td>
<td>No</td>
<td>Yes</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>CLIMB</td>
<td>After take-off checklist – Landing gear handle</td>
<td>No</td>
<td>Yes</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>NON-NORMAL</td>
<td>Read and do Checklist changes due to annunciation and system changes listed in DESIGN difference tables.</td>
<td>No</td>
<td>Yes</td>
<td>B</td>
<td>B</td>
</tr>
</tbody>
</table>
Operating Experience for flying multiple series may be accomplished in any B737 series. Additional SLF must be accomplished IAW the table below for those flightcrews flying the series listed. When differences training relates to qualification for FMS, SLF must also include use of FMS. Such FMS required SLF pertinent to each flightcrew member must be obtained while serving in a flightcrew position and include FMS operation. However, LOFT involving FMS operation in an appropriately configured Level C or Level D FFS may be substituted. When differences training relates to qualification for PFD/ND, SLF must also include use of PFD/ND. Such PFD/ND required SLF pertinent to each flightcrew member must be obtained while serving in a flightcrew position and includes PFD/ND operation. For flightcrew members with previous EFIS experience, a 4 hour LOFT session involving PFD/ND operation in an appropriately configured FSTD (minimum of a level 5 FTD), may be substituted for 2 SLF legs as specified below.

### SUPERVISED LINE FLYING

<table>
<thead>
<tr>
<th>Related Aircraft ↓</th>
<th>Base Aircraft →</th>
<th>B-737-100/-200</th>
<th>B-737-300/-400/-500 EFIS</th>
<th>B-737-600/-700/-800/-900/-900ER</th>
<th>B-737-8</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-737-100/-200</td>
<td></td>
<td>X</td>
<td>2/5</td>
<td>2/5</td>
<td>Not Evaluated</td>
</tr>
<tr>
<td>B-737-300/-400/-500</td>
<td></td>
<td>2/5</td>
<td>X</td>
<td>2/5</td>
<td>Not Evaluated</td>
</tr>
<tr>
<td>B-737-300/-400/-500EFIS</td>
<td></td>
<td>2/5</td>
<td>2/5</td>
<td>X</td>
<td>Not Evaluated</td>
</tr>
<tr>
<td>B-737-600/-700/-800/-900/-900ER</td>
<td></td>
<td>2/5</td>
<td>2/5</td>
<td>2*</td>
<td>Not Evaluated</td>
</tr>
<tr>
<td>B-737-8</td>
<td></td>
<td>Not Evaluated</td>
<td>Not Evaluated</td>
<td>Not Evaluated</td>
<td>X</td>
</tr>
</tbody>
</table>

1) * Legs of LOFT in a level 5 FTD or higher may be substituted.
2) SLF must be accomplished by a flight instructor or check pilot.
3) 2/5 = minimum of 5 hours of SLF which includes 2 flight segments.
APPENDIX 5 HEAD UP GUIDANCE TRAINING

The HUD pilot training requirements consists of those related to initial and recurrent ground and flight training. Unless covered concurrently during an initial or transition type rating course, a prerequisite to beginning this course of training is prior training, qualification and currency in the B-737 airplane. It should be noted that the program focuses principally upon training events flown in the left seat by the pilot-in-command (PIC). Nevertheless, SIC indoctrination and training is also essential.

HUD General
1.1. INITIAL GROUND TRAINING: For all operators, the initial ground training program should include the following elements:
1.1.1. Classroom instruction covering HUD operational concepts, crew duties and responsibilities and operational procedures including preflight, normal and non-normal pilot activities. For operators wishing credit for low visibility operations predicated on use of the HUD, information should be provided on the operational characteristics, capabilities, and limitations of the ground facilities (surface movement guidance control system) and airborne CAT III system. Airline policies and procedures concerning low visibility operations should include a reporting process, MEL issues, operation following a missed approach, OE and currency requirements.
1.1.2. Classroom instruction (or CBT) on the HUD symbology set and its inter-relationship with airplane aerodynamics, inertial factors and environmental conditions.
1.1.3. A HUD pilot training manual or equivalent material in the Operations Manual which explains all modes of operation, the use of various HUD controls, clear descriptions of HUD symbology including limit conditions and failures, and incorporating a crew procedures guide clearly delineating pilot-flying (PF) and pilot monitoring (PM) duties, responsibilities and procedural call-outs and responses during all phases of flight during which HUD operations are anticipated. Emphasis on the availability and limitations of visual cues encountered on approach both before and after DH. This would include:
   1.1.3.1. Procedures for unexpected deterioration of conditions to less than minimum RVR encountered during approach, flare and rollout
   1.1.3.2. Demonstration of expected visual references with weather at minimum conditions
   1.1.3.3. Expected sequence of visual cues during an approach in which visibility is at or above landing minima.
1.1.4. A video tape demonstrating all modes of operation complete with sound. For operators wishing credit for low visibility operations predicated on use of the HUD, this should include narrative descriptions and several low weather approach demonstrations with procedural call-outs and responses. All critical procedural call-out possibilities should be covered.
1.1.5. If the HUD is used as a CAT II/CAT III landing system, emphasis on the need for rigorous crew discipline, coordination and adherence to procedural guidelines as is required for other CAT II/CAT III landing systems.

1.2. INITIAL FLIGHT TRAINING: Unless integrated with initial or transition type rating training, flight training dedicated to HUD familiarization and proficiency is in addition to other required elements. When a FFS is used, only a FAA approved B-737 FFS with both a visual and the Head Up Guidance System installed may be used. For FFS training, all required approaches should be flown from no closer than the final approach.
fix (FAF) for instrument approaches and from no closer than approximately 1000 feet AGL (3 - 4 NM) to the runway threshold for visual approaches.

1.2.1. Flight training should include at least the following:
   1.2.1.1. Air work - Air work should include:
   • Straight and level flight, accelerations and decelerations
   • Normal and steep turns, climbs and descents
   • Stall prevention and recovery and unusual attitudes
   • Vectors to intercept and track selected VOR courses

   **NOTE:** Emphasis should be placed on HUD unique symbology, i.e., flight path, flight path acceleration, airspeed error tape, AOA limit bracket, and excessive pitch chevrons. When this training is complete, the trainee should have a thorough understanding of the relationship between aircraft flight path parameters and the HUD symbology.

   1.2.1.2. Visual Approaches (VMC mode)
   • Perform one approach showing deviations above and below glideslope for symbology/runway relationship
   • Straight-in landings, no wind, repeat with 10 kt cross wind and at night
   • Circling approaches and landing with 10 kt crosswind, if applicable.

   **NOTE:** It is desirable to fly half of these approaches at different airports that have dissimilar approach and runway lighting systems. Special emphasis should be placed on optimizing circling approach techniques and procedures. Approaches with the aircraft in a non-normal flap configuration should be included.
1.2.2. Instrument Approaches:
   1.2.2.1. For all operators.
   • Perform a CAT I approach to 200 foot DH, 2400 RVR, wind calm
   • Demonstrate failures and incorrect settings on approach, i.e., mis-set runway elevation, airspeed, selected course, etc.
   • Illustrate unique characteristics of symbology in wind shear conditions, i.e., erratic wind speed and direction, flight path, flight path acceleration and speed error, etc.
   • Non-precision approach, VOR approach, 600-2, 15 knot crosswind

   1.2.2.2. For operators wishing credit for low visibility operations predicated on use of the HUD.
   • Perform a CAT II approach to 100 foot DH, 1200 RVR, 5 - 10 kts crosswind
   • Perform a CAT IIIa ILS approach and landing starting on a 30 degree intercept to the ILS, below glideslope, weather clear and calm
   • CAT IIIa ILS with 700 RVR, wind calm - another ILS with a 10 knot crosswind
   • CAT IIIa ILS with 0/0 weather. After touchdown, raise weather to demonstrate position on runway
   • CAT IIIa ILS with various reasons for a missed approach (system downgrade, “APCH WARN”, etc.)
   • CAT IIIa ILS with various RVRs and crosswinds, include light turbulence

NOTE: Several of the instrument approaches should include a variety of ground and airborne system failures requiring pilot recognition and appropriate procedural actions. Demonstrate system/component failures could include flap asymmetry problems, engine out operations, HGS sensor failures, etc. Demonstration how HUD failure modes can reduce precision and increase pilot workload unless PF/PM duties and responsibilities are clearly delineated and understood.

1.2.3. Takeoff: For operators wishing credit for low visibility takeoff operations predicated on use of the HUD.
   • Normal takeoff, clear and calm, repeated with gusty winds
   • Takeoff, 600 foot RVR, 5 knot crosswind
   • Takeoff, 300 foot RVR, 5 knot crosswind, engine failure prior to V1
   • Takeoff, 300 foot RVR, 5 knot crosswind, engine failure after V1
   • Takeoff with HGS failure, 300 foot RVR

1.2.4. For airline operators: within 60 days subsequent to completion of HUD training, pilots must have completed their Operating Experience (OE) for HUD CAT II/IIIa operations. All previously qualified (in aircraft) pilots should be certified upon satisfactory completion of the HUD ground and flight training programs.

1.2.5. All initial, upgrade and transition PICs must be observed by a check pilot during their OE. This requirement should include three HUD assisted takeoffs: one visual approach and three instrument approaches in conditions not less than RVR 1800. SICs should be observed to perform Category II/IIIa PM duties upon satisfactory completion of the HUD training program.
1.2.6. For all operators: prior to utilizing the HUD in IMC conditions below RVR 1800, each PIC must accomplish at least twenty-five manually flown HUD approaches to Category II/IIIa minima in VMC conditions. Each approach must terminate in a manually controlled HUD assisted landing or HUD assisted go-around. In addition, each PIC must accomplish at least twenty-five HUD assisted takeoffs in VMC conditions prior to using the HUD mode in IMC conditions. Upon completion of this requirement the HUD qualified pilot would then be observed to conduct HUD approaches to company authorized minima as set forth in their Operations Specifications.

1.3. **RECURSERY REQUIREMENTS:** For operators wishing credit for low visibility operations on use of the HUD, during the six-month recurrent training and PC, the following low visibility operations should be performed in addition to regular requirements:

- Approach and landing, 700 foot RVR, 10 knot crosswind
- Approach, 700 foot RVR, 10 knot crosswind, light turbulence with missed approach
- Takeoff, 300 foot RVR, 10 knot crosswind
- Takeoff, 300 foot RVR, engine failure either before or after V1
- Selected ground training subjects should be reviewed annually

2. **HGS 4000 EFVS Training:** Installed on Boeing Business Jet (BBJ) Aircraft—Not for Landing Credit

   2.1. Initial Ground School Required (4 hours)

   **NOTE:** Completing the HGS 4000 EFVS Computer Based Training (CBT) completes the basic ground school. CBT learning material will be summarized during the Familiarization Flight briefing.

   - General
   - IR theory
   - EFVS System Architecture
   - EVS HUD Display Symbology
   - EVS HUD Display Format
   - EVS Videos of Flight Scenarios
   - Runway markings and lighting
   - EVS Operating Procedures & Limitations
   - Part 91.175 (C)(2)
   - Noise and "blooming"
   - Roman Candle effect – Rain
   - Burlap effect
   - Burn In – How to eliminate
   - NUUC
   - Weather Conditions (fog & visual reference)
   - Flightcrew Qualification & Training
   - Transition from EVS imagery to non-EVS, visual conditions.
   - Crew briefings and callouts
   - Duties of pilot flying and pilot monitoring
• Crew coordination

2.2. Familiarization Flight Training Events - Required Familiarization Flight (left Seat) 2 hours

2.2.1. EFVS equipment:
- System use, checks and tests
- Displays, modes, annunciations
- Design eye position
- Use of on/off switch and "clear" mode

2.2.2. Transition from EVS imagery to non-EVS, visual conditions and runway acquisition.

2.2.3. Crew briefings and callouts

2.2.4. Instrument failures and warning systems

2.2.5. Various daylight and night takeoffs and landings including the following:
- VMC takeoff and landing
- Precision approach and landing (Any one of these)
  - ILS, GLS, WAAS/LPV
- Precision approach and missed approach (Any one of these)
  - ILS, GLS, WAAS/LPV
- Non-precision approach and landing. (LOC only to MDA)
- RNP Approach and landing – if applicable