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Flight Standardization Board Report

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Manufacturer
The Boeing Company

Type Certificate Data Sheet (TCDS)	TCDS Identifier	Marketing Name	Pilot Type Rating
A16WE	737-100 737-200 737-200C	Boeing 737	B-737
A16WE	737-300 737-400 737-500	Boeing 737 Classic (CL)	B-737
A16WE	737-600 737-700 737-700C 737-800 737-900 737-900ER	Boeing 737 Next Generation (NG), Boeing 737-800BCF, Boeing Business Jet (BBJ 1, BBJ 2, BBJ 3)	B-737
A16WE	737-8 737-9	Boeing 737 MAX, BBJ MAX 8	B-737

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1. RECORD OF REVISIONS

Revision Number	Section(s)	Date
14	All	07/05/2017
15	3, 4, 8–13, Appendices 2–6	01/02/2018
16	3, 4, 5, 8, 9, 10, 12, 13, Appendix 3	10/17/2018
17	3, 4, 5, 8, 9, 10, 11, Appendices 2, 3, 7	11/16/2020

2. INTRODUCTION

Aircraft Evaluation Groups (AEG) are responsible for working with aircraft manufacturers and modifiers, during the development and Federal Aviation Administration (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 training requirements for Maneuvering Characteristics Augmentation System (MCAS), Autopilot Flight Director System (AFDS) enhancements, and additional Special Emphasis Training. Appendices 2 and 3 reflect applicable table updates from the Boeing 737-800 to the Boeing 737-8 and from the Boeing 737-8 to the Boeing 737-800. Appendix 7 was added to delineate ground and flight training necessary to operate the 737 MAX modified with Flight Control Computer (FCC) software version P12.1.2.

NOTE: See Section 8 for specifics of aircraft nomenclature used within this report.

4. BACKGROUND

The Transport Aircraft Seattle AEG formed a Flight Standardization Board (FSB) that evaluated the 737-8 aircraft as defined in FAA Type Certificate Data Sheet (TCDS) No. A16WE. The evaluation was conducted during August 2016 using the methods described in the current edition of FAA Advisory Circular (AC) 120-53, Guidance for Conducting and Use of Flight Standardization Board Evaluations.

In July and August of 2016, the FSB conducted a T2 and T3 to evaluate the 737-800 to the 737-8 differences training course. In March of 2017, the FSB conducted a T5 for the initial

737-8 type rating course. In September of 2017, the FSB conducted a T3 to evaluate the 737-8 to the 737-800 differences training course. These courses were found to be operationally suitable.

In September 2017, the FSB conducted a T1 to evaluate the 737-8 to the 737-9 aircraft. The 737-9, as well as the associated Airplane Flight Manual (AFM) change, were found to be operationally suitable.

In February 2018, the FSB conducted an analysis of the changes introduced for the 737-800 Boeing Converted Freighter (BCF). The analysis identified that the 737-800BCF is functionally equivalent to the 737-800. The 737-800BCF is incorporated into the Next Generation (NG) family aircraft in the Master Differences Requirements (MDR) Table. The 737-800BCF, as well as the associated AFM change, was found to be operationally suitable.

In April 2018, the FSB conducted flight evaluations of the Rockwell Collins right seat Head-Up Display (HUD) installation. The FSB found the right seat HUD and the use of dual HUD operations to be operationally suitable. The Flight Standardization Board Report (FSBR) has been revised to add the optional equipment training requirements where necessary.

In April 2018, the FSB conducted an analysis of the changes introduced for the Boeing Business Jet (BBJ) MAX 8. The analysis identified that the BBJ MAX 8 is functionally equivalent to the BBJ 2 aircraft. The BBJ MAX 8 is incorporated into the MAX family aircraft in Appendix 2, Master Differences Requirements (MDR) Table. The BBJ MAX 8, as well as the associated AFM change, was found to be operationally suitable.

In March 2019, the FSB conducted a T2 handling qualities evaluation of revised FCC P11.1 software between the 737-800 and the 737-8. The FSB evaluation determined that the handling qualities between the 737-800 and the 737-8 validated the original T2 evaluation results conducted in August 2016. Subsequently in March 2019, the FSB conducted an additional T1 functional equivalence evaluation with the new FCC software version P12.1. This evaluation determined functional equivalence between FCC software versions P11.1 and P12.1 with regards to airplane handling qualities and pilot training.

In September 2020, the FSB conducted Operational Evaluations of the updated 737-8 FCC software version P12.1.2, revised non-normal checklists (NNC), and all proposed pilot training in support of 737-8 and 737-9 design changes. The FSB determined the updated FCC software version P12.1.2 is operationally suitable. Boeing 737 MAX Special Training for Flightcrews is specified in Appendix 7 of this FSBR.

5. ACRONYMS

- 14 CFR Title 14 of the Code of Federal Regulations
- AC Advisory Circular
- ACS Airman Certification Standards
- ACFT Aircraft

- ADV Advanced
- AEG Aircraft Evaluation Group
- AEW&C Airborne Early Warning and Control
- AFDS Autopilot Flight Director System
- AFM Airplane Flight Manual
- AGL Above Ground Level
- ANCDU Alternate Navigation Control Display Unit
- ANS Alternate Navigation System
- AOA Angle of Attack
- AP Autopilot
- APU Auxiliary Power Unit
- ATC Air Traffic Control
- ATP Airline Transport Pilot
- AV Audiovisual Presentation
- BBJ Boeing Business Jet
- BCF Boeing Converted Freighter
- CAT Category
- CBT Computer-Based Training
- CDS Common Display System
- CDU Control Display Unit
- CPT Cockpit Procedures Trainer
- DH Decision Height
- DU Display Unit
- EDFCS Enhanced Digital Flight Control System
- EDS Emergency Descent Speedbrakes
- EEC Electronic Engine Control
- EFIS Electronic Flight Instrument System
- EFVS Enhanced Flight Vision System
- EGT Exhaust Gas Temperature
- ER Extended Range
- ETOPS Extended Operations
- EVS Enhanced Vision System
- FAA Federal Aviation Administration
- FAF Final Approach Fix
- FANS Future Air Navigation System
- FCC Flight Control Computer
- FD Flight Director
- FFS Full Flight Simulator
- FMA Flight Mode Annunciator
- FMC Flight Management Computer
- FMS Flight Management System
- FSB Flight Standardization Board
- FSBR Flight Standardization Board Report
- FSTD Flight Simulation Training Device

- FTD Flight Training Device
- GLS Global Positioning System Landing System
- GS Glideslope
- HGS Head-Up Guidance System
- HUD Head-Up Display
- ICBI Interactive Computer-Based Instruction
- ILS Instrument Landing System
- IMC Instrument Meteorological Conditions
- IR Infrared
- IS&S Innovative Solutions & Support
- ISFD Integrated Standby Flight Display
- LAM Landing Attitude Modifier
- LCD Liquid Crystal Display
- LOC Localizer
- LOFT Line-Oriented Flight Training
- LOS Line-Operational Simulation
- LPV Lateral Approach Procedures with Vertical Guidance
- MCAS Maneuvering Characteristics Augmentation System
- MDA Minimum Descent Altitude
- MDR Master Differences Requirements
- MDS MAX Display System
- MEL Minimum Equipment List
- MFD Multifunction Display
- MFF Mixed Fleet Flying
- MLW Maximum Landing Weight
- MTOW Maximum Takeoff Weight
- MTW Maximum Taxi Weight
- MZFW Maximum Zero Fuel Weight
- N_1 Rotational Speed of the Low-Pressure Compressor in a Dual-Spool Gas Turbine Engine
- NAS National Airspace System
- NAV Navigation
- ND Navigation Display
- NG Next Generation
- NM Nautical Mile
- NNC Non-Normal Checklist
- NPA Nonprecision Approach
- NUCC Non-Uniformity Correction Calibration
- OE Operating Experience
- OpSpecs Operations Specifications
- PC Proficiency Check
- PF Pilot Flying
- PFD Primary Flight Display
- PIC Pilot in Command

- PM Pilot Monitoring
- PMS Performance Management System
- POI Principal Operations Inspector
- PSEU Proximity Switch Electronic Unit
- PTT Part Task Trainer
- RCAS Roll Command Alerting System
- RNP Required Navigation Performance
- RSAT Runway Situational Awareness Tools
- RVR Runway Visual Range
- SELCAL Selective Calling
- SFP Short Field Performance
- SIC Second in Command
- SLF Supervised Line Flying
- SMGCS Surface Movement Guidance and Control System
- STC Supplemental Type Certificate
- SU Stand-Up Instruction
- TC Type Certificate
- TCAS Traffic Alert and Collision Avoidance System
- TCBI Tutorial Computer-Based Instruction
- TCDS Type Certificate Data Sheet
- TCPM Training Center Program Manager
- TO/GA Takeoff/Go-Around
- UTC Coordinated Universal Time
- V_1 Takeoff Decision Speed
- VOR Very High Frequency Omni-Directional Range
- V_{REF} Reference Landing Speed
- VSD Vertical Situation Display
- WXR Weather Radar

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 flightcrew members. Differences levels range from A to E.

6.4 Master Differences Requirements (MDR). Specifies the minimum levels of training and checking required between a pair of related aircraft, derived from the highest level in the Differences Tables.

6.5 Mixed Fleet Flying (MFF). 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. The AEG process to determine pilot type rating, minimum flightcrew member training, checking and currency requirements, and unique or special airman certification requirements (e.g., specific flight characteristics, no-flap landing).

6.7 Operational Suitability. The AEG determination that an aircraft or system may be used in the National Airspace System (NAS) and meets the applicable operational regulations (e.g., Title 14 of the Code of the Federal Regulations (14 CFR) parts 91, 121, 133, and 135).

6.8 Qualified. A flightcrew member 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 (TC) 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 flight simulation training devices (FSTD), or training equipment.

6.12 Specific Flight Characteristic. 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 Airborne Early Warning and Control (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 type rating can be found at www.faa.gov website under “Licenses & Certificates,” “Airmen Certification,” “Online Services,” “Aircraft Type Rating Designators.” This webpage is kept up-to-date and can be found at https://www.faa.gov/licenses_certificates/airmen_certification/.

8. RELATED AIRCRAFT

8.1 Related Aircraft on Same TCDS. The 737-100, -200, -200C, -300, -400, -500, -600, -700, -700C, -800, -800BCF, -900, -900 Extended Range (ER), -8, and -9 are related aircraft. Series aircraft groups are identified as:

- B-737-100/-200/-200C or 737.
- B-737-300/-400/-500 or 737 Classic (CL).
- B-737-600/-700/-700C/-800/-800BCF/-800 Short Field Performance (SFP)/-900/-900ER or 737NG.
- B-737-8/-9 or 737 MAX.

NOTE 1: "737," "737CL," "737NG," and "737 MAX" are used throughout this report to identify series aircraft and is the default for terminology. When one of those series needs further clarification, the specific series number (e.g., 737-800) is used.

NOTE 2: The 737-700C includes the Boeing -700 Convertible and the Navy C-40A. The BBJ 1 is a -700 series with primary flight display (PFD)/navigation display (ND) and HUD. The BBJ 2 is a 737-800 series with PFD/ND and HUD. The BBJ 3 is a 737-900ER series with PFD/ND and HUD. The BBJ MAX 8 is a 737-8 series with HUD.

8.2 Related Aircraft on Different TCDS. Not applicable.

9. PILOT TRAINING

9.1 Airman Experience. Airmen receiving initial, differences, upgrade, or transition training are assumed to have previous airman experience. Applicable previous experience may include multiengine transport turbojet aircraft, new generation avionics, high altitude operations, military, or flight management system (FMS). Pilots without this experience may require additional training.

9.2 Special Emphasis Areas.

NOTE: References to "pilots" in this section include both pilots in command (PIC) and seconds in command (SIC) unless otherwise specified.

9.2.1 Pilots must receive special emphasis on the following areas during ground training:

9.2.1.1 Multiple flight deck alerts during non-normal conditions. Training must include instances where a single malfunction results in multiple flight deck alerts, and flightcrew alert prioritization and analysis of the need to conduct additional NNCs. This training must be included in initial, upgrade, transition, and recurrent training.

9.2.1.2 Automatic landings. When an operator is authorized for autoland operations, ground training is required during a preflight briefing prior to

flight training. This item must be included in initial, upgrade, transition, differences, and recurrent training. The 737NG and 737 MAX autoland systems are identical and do not require differences training unless transitioning between the Fail Passive system and the Fail Operational system.

9.2.1.3 Enhanced Digital Flight Control System (EDFCS). When an EDFCS that supports Fail Operational autoland operations with a Fail Passive Rollout system is used, ground training is required during a preflight briefing prior to flight training. This item must be included in initial, upgrade, transition, differences, and recurrent training. The 737NG and 737 MAX autoland systems are identical and do not require differences training unless transitioning between the Fail Passive system and the Fail Operational system.

9.2.1.4 737 MAX 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. These items must be included in initial, transition, differences, and recurrent training.

9.2.1.5 737 MAX FCC. MCAS ground training must address the latest FCC system description, functionality, and associated failure conditions to include flightcrew alerting. This training must be included in initial, transition, differences, and recurrent training.

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

9.2.1.7 737 MAX gear handle. Gear handle operation to address normal and non-normal procedures. This item must be included in initial, transition, differences, and recurrent training.

9.2.2 Pilots must receive special emphasis on the following areas during flight training.

9.2.2.1 Automatic landings. When an operator is authorized for autoland operations, flight training must occur with the appropriate autopilot (AP) autoland systems (e.g., Fail Operational vs. Fail Passive). This training can occur in either a full flight simulator (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. The 737NG and 737 MAX autoland systems are identical and do not require differences training unless transitioning between the Fail Passive system and the Fail Operational system.

9.2.2.2 EDFCS. When an EDFCS that supports Fail Operational autoland operations with a Fail Passive Rollout system is used, flight training can occur in either an FFS or airplane and should address dual channel AP approaches. This item must be included in initial, upgrade, transition, differences, and recurrent training. The 737NG and 737 MAX autoland systems are identical and do not require differences training unless transitioning between the Fail Passive system and the Fail Operational system.

9.2.2.3 HUD. When HUD is installed and an operator is authorized HUD operations, 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.

9.2.2.4 Stabilizer trim.

9.2.2.4.1 Training must emphasize the following during electric and manual stabilizer trim operations:

a) Manufacturer recommended procedures for the proper use of main electric stabilizer trim during normal and non-normal conditions, and manual stabilizer trim during normal and non-normal conditions;

b) The different manual trim techniques recommended by the manufacturer; and

c) The effects of airspeed and aerodynamic loads on the stabilizer and the resulting trim forces in both the nose-up and nose-down directions during operations at low and high airspeeds.

d) Use of manual stabilizer trim during approach, go-around, and level off.

9.2.2.4.2 Electric and manual stabilizer trim operation during normal and non-normal conditions. This item must be included in initial or transition training and must be accomplished at least once every 36 months during recurrent training.

9.2.2.5 Runaway stabilizer. Training must emphasize runaway stabilizer recognition and timely pilot actions required by the Runaway Stabilizer NNC. Demonstrate control column functionality and its effect on a runaway stabilizer condition. Emphasize the need to attempt to reduce control column forces with main electric stabilizer trim prior to selecting STAB TRIM cutout. This item must be included in initial or transition

training and must be accomplished at least once every 36 months during recurrent training.

9.2.2.6 Multiple flight deck alerts during non-normal conditions. Training must include scenario-based training where a single malfunction results in multiple flight deck alerts that require timely pilot actions to include recognition and interpretation of the non-normal condition and prioritization of the required pilot actions. This training must be included in initial, upgrade, transition, and recurrent training.

9.2.2.7 Unreliable airspeed. This training applies to pilots flying the 737NG, 737 MAX, or conducting 737NG/737 MAX Mixed Fleet Flying (MFF). Training must include erroneous high angle of attack (AOA) malfunctions. This training must also include a demonstration of Flight Director (FD) behavior (biasing out of view) during a go-around or missed approach. This item must be included in initial, transition, and differences training and must be accomplished at least once every 36 months during recurrent training. Either pilot may serve as pilot flying (PF) for this training task. Recurrent training may be accomplished in either a 737NG or 737 MAX FFS.

9.3 Specific Flight Characteristics. Maneuvers or procedures required to be checked as referenced in the Airline Transport Pilot (ATP) and Type Rating for Airplane Airman Certification Standards (ACS) and 14 CFR part 121 appendix F.

NOTE: There are no specific flight characteristics.

9.4 Seat-Dependent Tasks. Pilots must receive training in these seat-dependent tasks.

a) HUD (left seat, right seat, when installed); initial, transition, upgrade, and recurrent training.
b) Nosewheel steering (left seat, right seat, when installed); initial, transition, upgrade, and recurrent training.
c) Manual Landing Gear Extension (right seat); initial, transition and recurrent training.

9.5 Regulatory Training Requirements Which Are Not Applicable to the 737.

9.5.1 Part 121 Appendix E.

a) Tuck and Mach Buffet Training. The 737, 737CL, 737NG, and 737 MAX 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.

b) Fuel Jettisoning. The 737, 737CL, 737NG, and 737 MAX do not have fuel jettisoning capability.

9.6 FSTD. The enhanced flight vision 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 737 that require specific training equipment.

9.8 Differences Training Between Related Aircraft. Pilots must receive differences training between the 737 and 737CL, 737CL electronic flight instrument system (EFIS) and 737CL non-EFIS, 737CL and 737NG, certain variations of 737NG, 737NG and 737 MAX, and variations of 737 MAX.

9.8.1 737NG to 737 MAX Ground Training. Ground training is required for differences between the 737NG and 737 MAX. See Appendices 2, 3, and 7.

9.8.2 737NG to 737 MAX Flight Training. Flight training is required for differences between the 737NG and 737 MAX. See Appendices 2, 3, and 7.

9.8.3 737CL (EFIS and Non-EFIS) Aircraft to 737NG PFD/ND Aircraft Only. PFD/ND differences require a minimum of 12 hours in an interactive computer-based training (CBT), 6 programmed hours in a Level 6 flight training device (FTD), and supervised line flying (SLF) as described in Appendix 4, Supervised Line Flying (SLF) Table. 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 curriculum:

- Flight Mode Annunciator (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.
- Localizer (LOC) and glideslope (GS) deviation.
- Selected altitude indication (BUG).
- Ground speed display.
- Radio altitude display.
- Traffic Alert and Collision Avoidance System (TCAS) resolution advisories.
- Time critical warnings.
- Approach reference area.
- Marker beacon indication.
- System failures and flags.
- No “compact display” (display unit (DU) switching only).

9.8.4 Blended, Split Scimitar, and Advanced Technology Winglet. Operators engaged in MFF 737 aircraft with and without winglets must address differences at the 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.

9.8.5 Roll Command Alerting System (RCAS). RCAS consists of a ROLL/YAW ASYMMETRY alert, ROLL AUTHORITY alert and a Roll Command Arrow. RCAS is optional equipment on the 737NG and standard on the 737 MAX. The FSB found Level B training to be sufficient for differences.

9.8.6 Runway Situational Awareness Tools (RSAT) System. RSAT consists of On-Ground Overrun Warning, In-Air Overrun Warning, and a Speedbrake Warning. RSAT is optional equipment on the 737NG and 737 MAX. The FSB found Level B training to be sufficient for differences.

9.8.7 Rockwell Collins Head-Up Guidance System (HGS)-4000 and HGS-6000. The HGS-4000 and HGS-6000 is optional equipment on the 737NG and 737 MAX. The FSB found for pilots already qualified on one system that Level A differences training is sufficient to qualify on the other Rockwell Collins HGS.

9.8.8 Integrated Standby Flight Display (ISFD). Training for ISFD may be satisfied with Level B differences training for all 737 aircraft. No flight training required.

9.8.9 Display Installation. Universal avionics flat panel display/FMS installations (Supplemental Type Certificate (STC) No. ST03355AT/ST03356AT) into 737-300 series or Innovative Solutions & Support (IS&S) flat panel display installation (No. ST03125NY) into the 737-400 series. The FSB found Level D differences training to be sufficient.

9.8.10 FMS for 737-200 Series. Universal avionics FMS installations (STC No. ST03362AT) into the 737-200 series. The FSB found Level C differences training to be sufficient.

9.8.11 Future Air Navigation System (FANS). Differences training for FANS 1 and/or FANS 2 may be satisfied with Level C training in accordance with AC 90-117, Data Link Communications (as amended) for all 737 aircraft. Flightcrew who have completed FANS 1 training may qualify on FANS 2 with Level A training.

9.8.12 Alternate Navigation System (ANS). The ANS consists of use of the ISFD and Alternate Navigation Control Display Unit (ANCDU) as a means to provide alternate navigation guidance in the event of an all Flight Management Computer

(FMC) fail situation. It is standard equipment on the 737 MAX BBJ. The FSB has determined Level A training to be sufficient for differences.

9.8.13 FMS for 737NG and 737 MAX. On the 737NG and the 737 MAX, the FMS consists of a single or dual FMC with software U13 or newer.

9.8.13.1 Flightcrew qualified on FMC U13 may qualify on a FMC U14 with Level A training.

9.9 Special Training. Completion of the ground and flight training specified in Appendix 7 is required before flying the 737 MAX.

10. PILOT CHECKING

10.1 Landing from a No-Flap or Nonstandard Flap Approach. The probability of flap extension failure on the 737, 737CL, 737NG, and 737 MAX aircraft is extremely remote due to system design; therefore, demonstration of a no-flap approach and landing is not required. However, a partial flap approach and landing, with the leading edge devices in either the extend or full extend position, and trailing edge flaps less than 15, is required during pilot certification. During a 14 CFR part 61, § 61.58 proficiency check (PC), part 91, § 91.1065 competency check, part 121, § 121.441 PC, part 125, § 125.287 competency check, or a part 135, § 135.293 competency check, this task may be required. Refer to FAA Order 8900.1, Volume 5, Airman Certification when the test or check is conducted in an aircraft versus an FFS.

10.2 Specific Flight Characteristics. Maneuvers or procedures required to be checked as referenced in the ATP and Type Rating for Airplane ACS and part 121 appendix F.

NOTE: There are no specific flight characteristics.

10.3 Seat-Dependent Tasks. Pilots must be checked in these seat-dependent tasks.

a) HUD (left seat, right seat when installed).
b) Nosewheel steering (left seat, right seat when installed).

10.4 Other Checking Items.

10.4.1 Precision Approach Using HUD and EFVS. When HUD and/or EFVS use is approved, checking must include suitable demonstration of HUD and/or EFVS use for modes and phases of flight authorized.

10.4.2 HUD vs. FD and Raw Data. When HUD and/or EFVS is installed, PC maneuvers, Line-Oriented Flight Training (LOFT), Line-Operational Simulation (LOS), or other demonstrations may be completed using HUD at the check pilot/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 Category (CAT) I FD operations are

authorized, the airman being checked may be requested to perform the maneuver without HUD).

10.5 FSTD. 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 737 that require specific equipment.

10.7 Differences Checking Between Related Aircraft.

10.7.1 Alternating PC for 737, 737CL, 737NG, and 737 MAX Series Groups. For MFF between series groups, the FSB recommends alternating the PC each 6 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 may be satisfied by ground training, written questionnaire, oral review, or other method approved by the Principal Operations Inspector (POI) or Training Center Program Manager (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 Nonprecision Approach (NPA), missed approach, holding, diversion to an alternate or route re-clearance, and pertinent non-normal scenarios. Scenarios used should include routes, airports, air traffic control (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 737, 737CL, 737NG, and 737 MAX 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 737, 737CL, 737NG, and 737 MAX are operationally suitable for operations under parts 91, 121, 125, and 135. The list of operating rules evaluated is on file at the Transport Aircraft Seattle AEG.

13. MISCELLANEOUS

13.1 Extended Operations (ETOPS).

- 737-200 and 737CL aircraft are approved for 120-minute ETOPS.
- 737NG aircraft are approved for 180-minute ETOPS (see note below).
- 737 MAX aircraft are approved for 180-minute ETOPS.

NOTE: The 737-800BCF is not approved for ETOPS.

13.2 Forward Observer Seat. The 737, 737CL, 737NG, and 737 MAX forward center observer seat has been evaluated and determined to meet requirements of §§ 121.581(a), 125.317(b), 135.75(b) and AC 120-83, Flight Deck Observer Seat and Associated Equipment.

13.3 Aircraft Approach Category. All operators should reference 14 CFR part 97, § 97.3 and use an approach category appropriate to the speed of reference landing speed (V_{REF}). Air carriers may be further restricted by their operations specifications (OpSpecs) for circling approaches. Approach categories for 737, 737CL, 737NG, and 737 MAX series aircraft are as follows:

Aircraft	Category
737	C
737CL	C
737-600/700	C
737-800/900/900ER	C or D
737 MAX	C or D

NOTE: Due to the numerous maximum landing weight options among the 737NG series group and the 737 MAX series group, determining an aircraft approach category may be done using the certificated maximum flap setting of FLAPS 40 and the particular airplane's AFM maximum certificated landing weight.

13.4 Normal Landing Flaps. The 737, 737CL, 737NG, and 737 MAX series aircraft normal "final flap setting" per § 91.126(c) is 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 LEGEND

Training Differences Legend

Differences Level	Type	Training Method Examples	Conditions
A	Self-Instruction	• Operating manual revision (handout (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

Differences Level	Checking Method Examples	Conditions
A	None	None
B	• Oral or written exam • Tutorial computer-based instruction (TCBI) self-test	Individual systems or related groups of systems.
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.

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.

To Related Aircraft ↓	**From Base Aircraft →**	**737**	**737CL (Non-EFIS)**	**737CL (EFIS)**	**737NG**	**737 MAX**
737		A/A NAV - B/B PMS - C/B AFCS - C/B (1) ADV-B/A	C*/C*	C*/C*	D/D	Not Evaluated
737CL (Non-EFIS)		C*/C (2) LIMITED FMS - C/B	A/A	C/B	(3) C/B	Not Evaluated
737CL (EFIS)		C*/C* (2) LIMITED FMS - C/B	C/B	A/A	(3) C/B PFD/ND – D/C	Not Evaluated
737NG		D/D	(3) C/B PFD/ND – D/C	(3) C/B PFD/ND – D/C	A/A (3) EFIS to PFD/ND- C/B PFD/ND to EFIS– D/C EDFCS – C/C	B/B
737 MAX		Not Evaluated	Not Evaluated	Not Evaluated	(E*) B/B	A/A

E* - Prior to operating the 737 MAX aircraft with FCC software version P12.1.2 or later, each pilot must complete the required training outlined in Appendix 7.

NOTE: Appendix 7 serves as special training for ground and flight training requirements for 737 MAX pilot qualification. The asterisk MDR annotation, "(E*) B/B" is intentionally used in the table to call attention to special training requirements.

C* - Level C training or checking, which requires use of a Level 5 FSTD or higher.

(1) All Model 737-200 series airplanes having serial numbers 20492 and on are of the -200 advanced (737-200 ADV) series airplane and require Level B differences training when transitioning from the 737-100/-200. All earlier airplanes can be kit-modified to the advanced configuration.

(2) Limited FMS pertains to 737CL airplanes, which retain partial FMS functions.

(3) Level C training requirement may be satisfied by interactive CBT.

APPENDIX 3. DIFFERENCES TABLES

This Design Differences Table, from the Boeing 737-800 to the Boeing 737-8, was proposed by Boeing and validated by the FSB on 8/2016, 1/2020, and 9/2020. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: 737-800 TO RELATED AIRCRAFT: 737-8	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Configuration	Nose Landing Gear Lengthened 8 in. Dual Tail Anti-Collision/Position Lights.	No	No	A	A
	Panel Layout	New MAX DISPLAY SYSTEM (MDS).	No	No	B	B
	Panel Layout	New Two-Position Landing Gear Control Lever.	No	Yes	B	B
	Limitations	Size/type/system limitations.	No	No	A	A
	Limitations	Ground wind operating envelope.	No	No	A	A

FROM BASE AIRCRAFT: 737-800 TO RELATED AIRCRAFT: 737-8	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Weights	Increased to: • Maximum Taxi Weight (MTW) - 181,700 lb. • Maximum Takeoff Weight (MTOW) - 181,200 lb. • Maximum Landing Weight (MLW) - 152,800 lb. • Maximum Zero Fuel Weight (MZFW) - 145,400 lb.	No	No	A	A
	ATA 21 Air Conditioning	PACKS: Electronic Pack Flow Control System.	No	No	B	B
	ATA 21 Air Conditioning	PACKS: Revised PACK light logic.	No	Yes	A	A
	ATA 21 Air Conditioning	EQUIPMENT COOLING: EQUIP SMOKE light and Detection System.	No	Yes	B	B

FROM BASE AIRCRAFT: 737-800 TO RELATED AIRCRAFT: 737-8	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 22 Autoflight	FCC: Added MCAS (see Appendix 7).	No	No	B	B
	ATA 22 Autoflight	FCC: Updated AFDS functionality logic (see Appendix 7).	No	No	B	B
	ATA 22 Autoflight	FCC: Revised STAB OUT OF TRIM light logic (see Appendix 7).	No	Yes	B	B
	ATA 22 Autoflight	FCC: Revised SPEED TRIM FAIL light logic (see Appendix 7).	No	Yes	B	B

FROM BASE AIRCRAFT: 737-800 TO RELATED AIRCRAFT: 737-8	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 24 Electrical Power	Relocated four circuit breakers from aisle stand to P-6.	No	No	A	A
	ATA 27 Flight Controls	FLIGHT CONTROL SYSTEMS: Fly-by-Wire Spoiler System.	No	No	B	B
	ATA 27 Flight Controls	FLIGHT CONTROL SYSTEMS: Maneuver Load Alleviation.	No	No	B	B
	ATA 27 Flight Controls	FLIGHT CONTROL SYSTEMS: LAM.	No	No	B	B
	ATA 27 Flight Controls	FLIGHT CONTROL SYSTEMS: Elevator Jam Landing Assist.	No	No	B	B
	ATA 27 Flight Controls	FLAPS/SLATS: Position indicator relocated to MDS.	No	No	B	B
	ATA 27 Flight Controls	SPEEDBRAKES/SPOILERS: Emergency Descent Speedbrakes (EDS).	No	No	B	B

FROM BASE AIRCRAFT: 737-800 TO RELATED AIRCRAFT: 737-8	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 27 Flight Controls	SPEEDBRAKES/SPOILERS: SPEEDBRAKE EXTENDED light logic.	No	No	B	B
	ATA 27 Flight Controls	SPEEDBRAKES/SPOILERS: SPOILERS light added.	No	Yes	B	B
	ATA 27 Flight Controls	SPEEDBRAKES/SPOILERS: ASSIST ON light added.	No	Yes	B	B
	ATA 27 Flight Controls	STABILIZER TRIM: STAB TRIM cutout switches panel nomenclature.	No	No	B	B
	ATA 28 Fuel	CONTROLS AND INDICATORS: Additional System Alerts (see ATA 34 Navigation)	No	Yes	B	B

FROM BASE AIRCRAFT: 737-800 TO RELATED AIRCRAFT: 737-8	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 28 Fuel	CONTROLS AND INDICATORS: Revised fuel FILTER BYPASS light logic.	No	Yes	B	B
	ATA 29 Hydraulic Power	CONTROLS AND INDICATORS: System indications relocated to MDS Page.	No	No	A	A
	ATA 30 Ice and Rain Protection	ENGINE ANTI-ICE: ADDITIONAL ENG ANTI-ICE alert.	No	Yes	B	B
	ATA 30 Ice and Rain Protection	ENGINE ANTI-ICE: REVISED COWL VALVE NOMENCLATURE AND COLOR (AMBER).	No	Yes	B	B

FROM BASE AIRCRAFT: 737-800 TO RELATED AIRCRAFT: 737-8	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 30 Ice and Rain Protection	WING ANTI-ICE: L/R VALVE ALERTS COLOR (AMBER).	No	Yes	B	B
	ATA 31 Indicating/Recording Systems	INCORPORATION OF MDS: Four Large Liquid Crystal Display (LCD) Units.	No	No	B	B
	ATA 31 Indicating/Recording Systems	LIGHTING CONTROLS: Updated and Relocated Engine Display Control Panel.	No	Yes	B	B
	ATA 31 Indicating/Recording Systems	LIGHTING CONTROLS: Revised Display Brightness, Display Select Switch Panels, Master Dim, and Test.	No	No	B	B

FROM BASE AIRCRAFT: 737-800 TO RELATED AIRCRAFT: 737-8	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 31 Indicating/Recording Systems	ENGINE DISPLAY CONTROL PANEL: Added Engine Transfer Switch.	No	No	B	B
	ATA 31 Indicating/Recording Systems	ENGINE DISPLAY CONTROL PANEL: Added Multifunction Display (MFD) Info Switch.	No	Yes	B	B
	ATA 31 Indicating/Recording Systems	ENGINE DISPLAY CONTROL PANEL: Revised N_1 and Speed Set Selectors.	No	No	B	B
	ATA 31 Indicating/Recording Systems	PFD: Expanded Sky Ground and Compass Display.	No	No	B	B
	ATA 31 Indicating/Recording Systems	EFIS CONTROL PANEL: Dedicated Vertical Situation Display (VSD) switch.	No	No	B	B

FROM BASE AIRCRAFT: 737-800 TO RELATED AIRCRAFT: 737-8	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 31 Indicating/Recording Systems	EFIS CONTROL PANEL: ND/Weather Radar (WXR) Range Selector - revised functionality.	No	No	B	B
	ATA 31 Indicating/Recording Systems	STANDBY FLIGHT INSTRUMENTS: ISFD basic.	No	No	B	B
	ATA 31 Indicating/Recording Systems	AUX DISPLAY: Added Information Displayed.	No	No	B	B
	ATA 31 Indicating/Recording Systems	AUX DISPLAY: Added Flight number, Transponder, Selective Calling (SELCAL), Coordinated Universal Time (UTC), Date, and Elapsed time.	No	No	B	B
	ATA 31 Indicating/Recording Systems	AUX DISPLAY: Added Clock start/stop switches and relocated to glareshield.	No	No	B	B

FROM BASE AIRCRAFT: 737-800 TO RELATED AIRCRAFT: 737-8	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 31 Indicating/Recording Systems	MAINT LIGHT (replaces proximity switch electronic unit (PSEU) light).	No	Yes	B	B
	ATA 32 Landing Gear	NOSEWHEEL STEERING: Switch relocated.	No	No	B	B
	ATA 32 Landing Gear	Brake accumulator pressure indicator relocated.	No	No	B	B
	ATA 32 Landing Gear	Autobrake switch relocated.	No	No	B	B
	ATA 32 Landing Gear	Landing Gear Warning Cutout switch relocated.	No	No	B	B
	ATA 32 Landing Gear	Revised landing gear lock override switch.	No	No	B	B
	ATA 34 Navigation	FMS: FMC SOFTWARE U13 basic.	No	No	B	B

FROM BASE AIRCRAFT: 737-800 TO RELATED AIRCRAFT: 737-8	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 34 Navigation	FMS: Variable Takeoff Rating function.	No	No	B	B
	ATA 34 Navigation	FMS: Fuel Alerting and Fuel Management.	No	No	B	B
	ATA 34 Navigation	CONTROL DISPLAY UNIT (CDU) PAGES NEW OR REVISED: Perf Init page 1/2.	No	No	B	B
	ATA 34 Navigation	CDU PAGES NEW OR REVISED: N_1 Limit.	No	No	B	B
	ATA 34 Navigation	CDU PAGES NEW OR REVISED: Fuel Progress page 5/5.	No	Yes	B	B
	ATA 34 Navigation	FMC AND ENGINE DISPLAY ALERT MESSAGES: USING RSV FUEL.	No	Yes	B	B

FROM BASE AIRCRAFT: 737-800 TO RELATED AIRCRAFT: 737-8	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 34 Navigation	FMC AND ENGINE DISPLAY ALERT MESSAGES: FUEL DISAGREE.	No	Yes	B	B
	ATA 34 Navigation	FMC AND ENGINE DISPLAY ALERT MESSAGES: INSUFFICIENT FUEL.	No	Yes	B	B
	ATA 34 Navigation	FUEL FLOW (engine display only).	No	Yes	B	B
	ATA 36 Pneumatic	BLEED AIR CONTROL PANEL: Removed RAM DOOR FULL OPEN lights.	No	No	A	A
	ATA 36 Pneumatic	BLEED AIR CONTROL PANEL: Revised BLEED TRIP OFF nomenclature to BLEED.	No	Yes	A	A
	ATA 36 Pneumatic	BLEED AIR CONTROL PANEL: Revised BLEED light logic.	No	Yes	B	B

FROM BASE AIRCRAFT: 737-800 TO RELATED AIRCRAFT: 737-8	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 49 Airborne Auxiliary Power	SYSTEM OPERATION: Removed Auxiliary Power Unit (APU) MAINT light.	No	No	A	A
	ATA 49 Airborne Auxiliary Power	SYSTEM OPERATION: Removed APU exhaust gas temperature (EGT) gauge.	No	No	A	A
	ATA 49 Airborne Auxiliary Power	SYSTEM OPERATION: Added retractable door.	No	No	B	B
	ATA 49 Airborne Auxiliary Power	SYSTEM OPERATION: Added DOOR light.	No	Yes	B	B
	ATA 72, 73, 77, 78, 80 Powerplant	ENGINES: New LEAP-1B engines.	No	Yes	B	B
	ATA 72, 73, 77, 78, 80 Powerplant	ELECTRONIC ENGINE CONTROL (EEC) SYSTEM: Removal of Overboost rating.	No	No	B	B

FROM BASE AIRCRAFT: 737-800 TO RELATED AIRCRAFT: 737-8	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 72, 73, 77, 78, 80 Powerplant	EEC SYSTEM: Addition of Icing Idle speed.	No	No	B	B
	ATA 72, 73, 77, 78, 80 Powerplant	INDICATORS: Revised Display Format.	No	No	B	B
	ATA 72, 73, 77, 78, 80 Powerplant	INDICATORS: Compact engine display removed.	No	No	A	A
	ATA 72, 73, 77, 78, 80 Powerplant	INDICATORS: Added THRUST alert.	No	Yes	B	B
	ATA 72, 73, 77, 78, 80 Powerplant	INDICATORS: Added MOTORING indication for bowed rotor logic.	No	No	B	B

FROM BASE AIRCRAFT: 737-800 TO RELATED AIRCRAFT: 737-8	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 72, 73, 77, 78, 80 Powerplant	THRUST REVERSER SYSTEM: Added REVERSER COMMAND and REVERSER AIR/GND alerts.	No	Yes	B	B
	ATA 72, 73, 77, 78, 80 Powerplant	THRUST REVERSER SYSTEM: Replaced REVERSER alert with REVERSER LIMITED.	No	Yes	B	B

This Maneuver Differences Table, from the Boeing 737-800 to the Boeing 737-8, was proposed by Boeing and validated by the FSB in 03/2020 and 09/2020. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: 737-800 TO RELATED AIRCRAFT: 737-8	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Preflight Inspection	Optional installation of two-position tailskid.	No	Yes	A	A
	Climb	After takeoff checklist - Landing gear handle.	No	Yes	B	B
	Non-Normal	Read and do Checklist changes due to annunciation and system changes listed in DESIGN differences tables (see Appendix 7).	No	Yes	A	A
	Cross-FCC Trim Monitor	See Appendix 7.	No	No	E*	A
	Demonstration of MCAS Activation	See Appendix 7.	No	No	E*	A
	Erroneous High AOA during Takeoff	See Appendix 7.	No	No	E*	A

Note: See Appendix 7 for additional training requirements.

E* - Prior to operating the 737 MAX aircraft with FCC software version P12.1.2 or later, each pilot must complete the required training outlined in Appendix 7.

This Design Differences Table, from the Boeing 737-800 to the Boeing 737-800BCF, was proposed by Boeing and validated by the FSB in January 2018. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: 737-800 **TO RELATED AIRCRAFT: 737-800BCF**	**DESIGN**	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**TRAINING**	**CHECKING**
	General	Added Main Deck Cargo capability.	No	No	A	A
	Configuration	Added Main Deck Cargo door control panel. Added Rigid Cargo Barrier and Supernumerary area.	No	Yes	A	A
	ATA 21 Air Conditioning	Removed Recirculation Fans.	No	Yes	A	A
	ATA 26 Fire Protection	Added Main Deck smoke detectors. Added Main Deck indications and controls to Cargo Fire Control Panel.	No	Yes	A	A

FROM BASE AIRCRAFT: 737-800 TO RELATED AIRCRAFT: 737-800BCF	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 29 Hydraulic Power	Added Main Deck Cargo Door to System A.	No	No	A	A
	ATA 33 Lights	Added Main Deck Cargo Door not secure to takeoff configuration warning.	No	Yes	A	A
	ATA 35 Oxygen	Added Supernumerary Masks.	No	No	A	A
	ATA 52 Doors	Added Main Deck Cargo Door flight deck indication. Flight Deck door removed. All overwing Type III emergency exits deactivated. Both flight deck No. 2 windows can be opened from outside the aircraft.	No	No	A	A

This Design Differences Table, from the Boeing 737-8 to the Boeing 737-800, was proposed by Boeing and validated by the FSB in 03/2020 and 09/2020. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: 737-8 TO RELATED AIRCRAFT: 737-800	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Configuration	Nose Landing Gear 8 in shorter. Single Tail Anti-Collision/Position Light.	No	No	A	A
	Panel Layout	Changed to Common Display System (CDS).	No	No	B	B
	Panel Layout	Three-Position Landing Gear Control Lever.	No	Yes	B	B
	Limitations	Size/type/system limitations.	No	No	A	A
	Limitations	Ground wind operating envelope removed.	No	No	A	A

FROM BASE AIRCRAFT: 737-8 TO RELATED AIRCRAFT: 737-800	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Weights	Decreased to: • MTW - 174,700 lb. • MTOW - 174,200 lb. • MLW - 144,000 lb. • MZFW - 136,000 lb.	No	No	A	A
	ATA 21 Air Conditioning	PACKS: Simplified Electronic Pack Flow Control System.	No	No	B	B
	ATA 21 Air Conditioning	PACKS: Revised PACK light logic.	No	Yes	A	A
	ATA 21 Air Conditioning	EQUIPMENT COOLING: EQUIP SMOKE light and Detection System removed.	No	Yes	B	B

FROM BASE AIRCRAFT: 737-8 TO RELATED AIRCRAFT: 737-800	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 22 Autoflight	FCC: Removed MCAS.	No	No	A	A
	ATA 22 Autoflight	FCC: Changed AFDS functionality logic.	No	No	A	A
	ATA 22 Autoflight	FCC: Revised STAB OUT OF TRIM light logic.	No	Yes	A	A
	ATA 22 Autoflight	FCC: Revised SPEED TRIM FAIL light logic.	No	Yes	A	A
	ATA 24 Electrical Power	Relocated four circuit breakers from P-6 to aisle stand.	No	No	A	A

FROM BASE AIRCRAFT: 737-8 TO RELATED AIRCRAFT: 737-800	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 27 Flight Controls	FLIGHT CONTROL SYSTEMS: Mechanical Spoiler System.	Yes	No	B	B
	ATA 27 Flight Controls	FLIGHT CONTROL SYSTEMS: Maneuver Load Alleviation removed.	Yes	No	B	B
	ATA 27 Flight Controls	FLIGHT CONTROL SYSTEMS: LAM removed.	Yes	No	B	B
	ATA 27 Flight Controls	FLIGHT CONTROL SYSTEMS: Elevator Jam Landing Assist System removed.	Yes	No	B	B
	ATA 27 Flight Controls	FLAPS/SLATS: Fixed position mechanical indicator.	No	No	B	B

FROM BASE AIRCRAFT: 737-8 TO RELATED AIRCRAFT: 737-800	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 27 Flight Controls	SPEEDBRAKES/SPOILERS: EDS removed.	Yes	No	B	B
	ATA 27 Flight Controls	SPEEDBRAKES/SPOILERS: SPEEDBRAKE EXTENDED light logic.	No	Yes	B	B
	ATA 27 Flight Controls	SPEEDBRAKES/SPOILERS: SPOILERS light removed.	No	Yes	B	B
	ATA 27 Flight Controls	SPEEDBRAKES/SPOILERS: ASSIST ON light removed.	No	Yes	B	B
	ATA 27 Flight Controls	STABILIZER TRIM: STAB TRIM cutout switches panel nomenclature.	No	No	B	B

FROM BASE AIRCRAFT: 737-8 TO RELATED AIRCRAFT: 737-800	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 28 Fuel	CONTROLS AND INDICATORS: Fewer System Alerts (see ATA 34 Navigation).	No	Yes	B	B
	ATA 28 Fuel	CONTROLS AND INDICATORS: Revised fuel FILTER BYPASS light logic.	No	Yes	B	B
	ATA 29 Hydraulic Power	CONTROLS AND INDICATORS: System indications relocated to Lower DU.	No	No	A	A
	ATA 30 Ice and Rain Protection	ENGINE ANTI-ICE: ENG ANTI-ICE alert removed.	No	Yes	B	B
	ATA 30 Ice and Rain Protection	ENGINE ANTI-ICE: REVISED COWL VALVE NOMENCLATURE AND COLOR (BLUE).	No	Yes	B	B

FROM BASE AIRCRAFT: 737-8 TO RELATED AIRCRAFT: 737-800	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 30 Ice and Rain Protection	WING ANTI-ICE: L/R VALVE ALERTS COLOR (BLUE).	No	Yes	B	B
	ATA 31 Indicating/Recording Systems	CDS: Six DUs.	No	No	B	B
	ATA 31 Indicating/Recording Systems	LIGHTING CONTROLS: Updated and Relocated Engine Display Control Panel.	No	Yes	B	B
	ATA 31 Indicating/Recording Systems	LIGHTING CONTROLS: Revised Display Brightness, Display Select Switch Panels, Master Dim, and Test.	No	No	B	B
	ATA 31 Indicating/Recording Systems	ENGINE DISPLAY CONTROL PANEL: Engine Transfer Switch removed.	No	No	A	A

FROM BASE AIRCRAFT: 737-8 TO RELATED AIRCRAFT: 737-800	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 31 Indicating/Recording Systems	ENGINE DISPLAY CONTROL PANEL: MFD Info Switch removed.	No	Yes	B	B
	ATA 31 Indicating/Recording Systems	ENGINE DISPLAY CONTROL PANEL: Revised N_1 and Speed Set Selectors.	No	No	B	B
	ATA 31 Indicating/Recording Systems	PFD: Sky Ground and Compass Display changes.	No	No	B	B
	ATA 31 Indicating/Recording Systems	EFIS CONTROL PANEL: Dedicated VSD switch removed.	No	No	B	B
	ATA 31 Indicating/Recording Systems	EFIS CONTROL PANEL: ND/WXR Range Selector - revised functionality.	No	No	B	B

FROM BASE AIRCRAFT: 737-8 TO RELATED AIRCRAFT: 737-800	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 31 Indicating/Recording Systems	STANDBY FLIGHT INSTRUMENTS: Three Standby Flight Instruments basic.	No	No	B	B
	ATA 31 Indicating/Recording Systems	AUX DISPLAY: Removed AUX DISPLAY.	No	No	A	A
	ATA 31 Indicating/Recording Systems	PSEU light (replaces MAINT light).	No	Yes	B	B
	ATA 32 Landing Gear	NOSEWHEEL STEERING: Switch relocated.	No	No	B	B
	ATA 32 Landing Gear	Brake accumulator pressure indicator relocated.	No	No	B	B
	ATA 32 Landing Gear	Autobrake switch relocated.	No	No	B	B

FROM BASE AIRCRAFT: 737-8 TO RELATED AIRCRAFT: 737-800	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 32 Landing Gear	Landing Gear Warning Cutout switch relocated.	No	No	B	B
	ATA 32 Landing Gear	Revised landing gear lock override switch.	No	No	B	B
	ATA 34 Navigation	FMS: FMC SOFTWARE U13 not basic.	No	No	B	B
	ATA 34 Navigation	FMS: Variable Takeoff Rating function.	No	No	B	B
	ATA 34 Navigation	FMS: Fuel Alerting and Fuel Management.	No	No	B	B
	ATA 34 Navigation	CDU PAGES REMOVED OR REVISED: Perf Init page 1/2.	No	No	B	B

FROM BASE AIRCRAFT: 737-8 TO RELATED AIRCRAFT: 737-800	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 34 Navigation	CDU PAGES REMOVED OR REVISED: N_1 Limit.	No	No	B	B
	ATA 34 Navigation	CDU PAGES REMOVED OR REVISED: Fuel Progress page 5/5.	No	Yes	B	B
	ATA 34 Navigation	FMC AND ENGINE DISPLAY ALERT MESSAGES REMOVED: USING RSV FUEL.	No	Yes	B	B
	ATA 34 Navigation	FMC AND ENGINE DISPLAY ALERT MESSAGES REMOVED: FUEL DISAGREE.	No	Yes	B	B
	ATA 34 Navigation	FMC AND ENGINE DISPLAY ALERT MESSAGES REMOVED: INSUFFICIENT FUEL.	No	Yes	B	B
	ATA 34 Navigation	Removed FUEL FLOW message (engine display only).	No	Yes	B	B

FROM BASE AIRCRAFT: 737-8 TO RELATED AIRCRAFT: 737-800	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 36 Pneumatic	BLEED AIR CONTROL PANEL: Added RAM DOOR FULL OPEN lights.	No	No	A	A
	ATA 36 Pneumatic	BLEED AIR CONTROL PANEL: Changed BLEED light to BLEED TRIP OFF light.	No	Yes	A	A
	ATA 36 Pneumatic	BLEED AIR CONTROL PANEL: Revised BLEED TRIP OFF light logic.	No	Yes	B	B
	ATA 49 Airborne Auxiliary Power	SYSTEM OPERATION: Added MAINT light.	No	No	A	A
	ATA 49 Airborne Auxiliary Power	SYSTEM OPERATION: Added APU EGT gauge.	No	No	A	A

FROM BASE AIRCRAFT: 737-8 TO RELATED AIRCRAFT: 737-800	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 49 Airborne Auxiliary Power	SYSTEM OPERATION: Removed retractable door.	No	No	B	B
	ATA 49 Airborne Auxiliary Power	SYSTEM OPERATION: Removed APU DOOR light.	No	Yes	B	B
	ATA 72, 73, 77, 78, 80 Powerplant	ENGINES: CFM56-7 engines.	No	Yes	B	B
	ATA 72, 73, 77, 78, 80 Powerplant	EEC SYSTEM: Added Overboost rating.	No	No	B	B
	ATA 72, 73, 77, 78, 80 Powerplant	EEC SYSTEM: Removed Icing Idle speed.	No	No	B	B
	ATA 72, 73, 77, 78, 80 Powerplant	INDICATORS: Revised Display Format.	No	No	B	B

FROM BASE AIRCRAFT: 737-8 TO RELATED AIRCRAFT: 737-800	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	ATA 72, 73, 77, 78, 80 Powerplant	INDICATORS: Added compact engine display.	No	No	A	A
	ATA 72, 73, 77, 78, 80 Powerplant	INDICATORS: Removed THRUST alert.	No	Yes	B	B
	ATA 72, 73, 77, 78, 80 Powerplant	INDICATORS: Removed MOTORING indication for bowed rotor logic.	No	No	B	B
	ATA 72, 73, 77, 78, 80 Powerplant	THRUST REVERSER SYSTEM: Removed REVERSER COMMAND and REVERSER AIR/GND alerts.	No	Yes	B	B
	ATA 72, 73, 77, 78, 80 Powerplant	THRUST REVERSER SYSTEM: Replaced REVERSER LIMITED light with REVERSER light.	No	Yes	B	B

This Maneuver Differences Table, from the Boeing 737-8 to the Boeing 737-800, was proposed by The Boeing Company and validated by the FSB on 03/30/2020. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: 737-8 TO RELATED AIRCRAFT: 737-800	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Preflight Inspection	Optional installation of two-position tailskid.	No	Yes	A	A
	Climb	After takeoff checklist - Landing gear handle.	No	Yes	B	B
	Non-Normal	Read and do Checklist changes due to annunciation and system changes listed in DESIGN differences tables.	No	Yes	A	A

This Design Differences Table, from the BBJ 2 to the BBJ MAX 8, was proposed by Boeing and validated by the FSB in February 2018. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members. This table in conjunction with the Design Differences and Maneuver Differences tables for the Boeing 737-800 to the Boeing 737-8 list the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: BBJ 2 **TO RELATED AIRCRAFT: BBJ MAX 8**	**DESIGN**	**REMARKS**	**FLT CHAR**	**PROC CHNG**	**TRAINING**	**CHECKING**
	General	Height: 41 ft, 2 in (12.55 m).	No	No	A	A
	ATA 28 Fuel	Auxiliary fuel controls and indications.	No	No	A	A
	ATA 32 Landing Gear	Combined Tire Pressure Indication and Brake Temperature Monitoring System.	No	No	A	A
	ATA 33 Lights	Flashing landing lights.	No	No	A	A
	ATA 34 Navigation	ANS. Overrun Warnings. Perspective Runway Indications (HUD).	No	No	A	A

This Design Differences Table, from the Boeing 737-8 to the Boeing 737-9, was proposed by Boeing and validated by the FSB on 09/9/2017. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: 737-8 TO RELATED AIRCRAFT: 737-9	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	General	Turning radius and passenger capacity.	No	No	A	A
	Configuration	Two-position tailskid standard.	No	No	A	A
	Dimensions	Length: 138 ft, 2 in (42.11 m).	No	No	A	A
	Limitations	Revised flap placard speeds.	No	No	A	A
	Weights	Increased to: • MTW - 195,200 lb. • MTOW - 194,700 lb. • MLW - 163,900 lb. • MZFW - 156,500 lb.	No	No	A	A
	ATA 52 Doors	Added Mid Exit Doors and flight deck indications.	No	No	A	A

This Maneuver Differences Table, from the Boeing 737-8 to the Boeing 737-9, was proposed by Boeing and validated by the FSB on 09/09/2017. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: 737-8 TO RELATED AIRCRAFT: 737-9	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Preflight Inspection	Installation of two-position tailskid.	No	Yes	A	A
	Non-Normal Procedures	Added MID EXIT DOOR NNC.	No	Yes	A	A

APPENDIX 4. SUPERVISED LINE FLYING (SLF) TABLE

Operating Experience (OE) for flying multiple series may be accomplished in any B737. Additional SLF must be accomplished in accordance with 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 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 two SLF Legs as specified below.

SUPERVISED LINE FLYING (SLF)

To Related Aircraft ↓	**From Base Aircraft →**	**737**	**737CL (Non-EFIS)**	**737CL (EFIS)**	**737NG**	**737 MAX**
B737		Not Required	2/5	2/5	2/5	Not Evaluated
737CL (Non-EFIS)		2/5	Not Required	2/5	2/5	Not Evaluated
737CL (EFIS)		2/5	2/5	Not Required	2*	Not Evaluated
737NG		2/5	2/5	2*	Not Required	Not Required
737 MAX		Not Evaluated	Not Evaluated	Not Evaluated	Not Required	Not Required

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 two flight segments.

APPENDIX 5. HEAD-UP GUIDANCE TRAINING

The HUD pilot training requirements consist 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 737 airplane.

1. 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 procedures. 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 and Control System (SMGCS)) and airborne CAT III system. Air carrier policies and procedures concerning low visibility operations should include a reporting process, minimum equipment list (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 interrelationship 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.

1.1.4 A crew procedures guide clearly delineating PF and pilot monitoring (PM) duties, responsibilities, and procedural callouts and responses during all phases of flight during which HUD operations are anticipated.

1.1.5 Emphasis on the availability and limitations of visual cues encountered on approach both before and after decision height (DH). This would include:

a) Procedures for unexpected deterioration of conditions to less than minimum Runway Visual Range (RVR) encountered during approach, flare, and rollout.

b) Demonstration of expected visual references with weather at minimum conditions.

c) Expected sequence of visual cues during an approach in which visibility is at or above landing minima.

d) A video 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 callouts and responses. All critical procedural callout possibilities should be covered.

e) If the HUD is used to conduct CAT II/III landings, emphasis on the need for rigorous crew discipline, coordination, and adherence to procedural guidelines is required.

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 an FFS is used, only an FAA-approved 737 FFS with both a visual and the HGS 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 1,000 ft above ground level (AGL) (3 to 4 nautical miles (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 very high frequency omni-directional range (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 (visual meteorological conditions (VMC) mode):

- Perform one approach showing deviations above and below GS for symbology/runway relationship.
- Straight-in landings, no wind, repeat with 10-kts crosswind, and at night.
- Circling approaches and landing with 10-kts crosswind, if applicable.

NOTE 1: 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.

NOTE 2: 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:

1.2.2.1.1 Perform a CAT I approach to 200-ft DH, 2400 RVR, wind calm.

1.2.2.1.2 Demonstrate failures and incorrect settings on approach (i.e., misset runway elevation, airspeed, selected course).

1.2.2.1.3 Illustrate unique characteristics of symbology in windshear conditions (i.e., erratic wind speed and direction, flight path, flight path acceleration, and speed error).

1.2.2.1.4 NPA, VOR approach, 600-2 RVR, 15-kts crosswind.

1.2.2.2 For operators wishing credit for low visibility operations predicated on use of the HUD:

1.2.2.2.1 Perform a CAT II approach to 100-ft DH, 1200 RVR, 5 to 10-kts crosswind.

1.2.2.2.2 Perform a CAT III instrument landing system (ILS) approach and landing starting on a 30° intercept to the ILS, below GS, weather clear and calm.

1.2.2.2.3 CAT III ILS with 700 RVR, wind calm, and another ILS with a 10-kts crosswind.

1.2.2.2.4 CAT III ILS with various reasons for a missed approach (system downgrade, “APCH WARN,” etc.).

1.2.2.2.5 CAT III 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. Demonstration of system/component failures could include flap asymmetry problems, engine-out operations, HGS sensor failures, etc. Demonstrate 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-ft RVR, 5-kts crosswind.
- Takeoff, 300-foot RVR, 5-kts crosswind, engine failure prior to takeoff decision speed (V_1).

- Takeoff, 300-ft RVR, 5-kts crosswind, engine failure after V_1.
- Takeoff with HGS failure, 300-ft RVR.

1.2.4 For part 121 operators, pilots who have completed HUD training as part of an initial, transition, or upgrade course should complete their OE for HUD CAT II/IIIa operations within 60 days. SICs should be certified to perform CAT II/IIIa PM duties upon satisfactory completion of the HUD training program.

1.2.5 Check pilots must certify the satisfactory completion of OE for PICs completing initial, transition, and upgrade training. This requirement should include three HUD-assisted takeoffs, one visual approach, and three instrument approaches in conditions not less than RVR 1800.

1.2.6 For all operators, prior to utilizing the HUD in instrument meteorological conditions (IMC) below RVR 1800, each PIC must accomplish at least 25 manually flown HUD approaches to CAT II/IIIa minima in VMC. Each approach must terminate in a manually controlled HUD-assisted landing or HUD-assisted go-around. In addition, each PIC must accomplish at least 25 HUD-assisted takeoffs in VMC prior to using the HUD mode in IMC. 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 OpSpecs.

1.3 Recurrent Training and Checking. For operators wishing credit for low visibility operations on use of the HUD, during the 6-month recurrent training and PC, the following low visibility operations should be performed in addition to regular requirements:

- Approach and landing, 700-ft RVR, 10-kts crosswind.
- Approach, 700-ft RVR, 10-kts crosswind, light turbulence with missed approach.
- Takeoff, 300-ft RVR, 10-kts crosswind.
- Takeoff, 300-ft RVR, engine failure either before or after V_1.
- Selected ground training subjects should be reviewed annually.

2. HGS 4000 EFVS TRAINING: INSTALLED ON BBJ AIRCRAFT—NOT FOR LANDING CREDIT.

2.1 Initial Ground Training Required (4 Hours).

NOTE: Completing the HGS 4000 EFVS CBT completes the basic ground training. CBT learning material will be summarized during the Familiarization Flight briefing.

- General.
- Infrared (IR) theory.
- EFVS architecture.
- Enhanced Vision System (EVS) HUD symbology.
- EVS HUD format.

- EVS videos of flight scenarios.
- Runway markings and lighting.
- EVS operating procedures and limitations.
- Title 14 CFR part 91, § 91.175(c)(2).
- Noise and “blooming.”
- Roman candle effect – rain.
- Burlap effect.
- Burn in – how to eliminate.
- Non-Uniformity Correction Calibration (NUCC).
- Weather conditions (fog and visual reference).
- Flightcrew qualification and training.
- Transition from EVS imagery to non-EVS, visual conditions.
- Crew briefings and callouts.
- Duties of PF and PM.
- 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:

a) VMC takeoff and landing.

b) Precision approach and landing (any one of these):

- ILS,
- Global Positioning System Landing System (GLS).
- Lateral approach procedures with vertical guidance (LPV).

c) Precision approach and missed approach (any one of these):

- ILS.
- GLS.
- LPV.

d) NPA and landing. LOC only to minimum descent altitude (MDA).

e) Required Navigation Performance (RNP) approach and landing, if applicable.

APPENDIX 6. ALTERNATE GO-AROUND FLAPS TRAINING

Alternate go-around flaps operations require a separate AFM appendix, a supplementary procedure defining flightcrew actions, and operational approval. Alternate go-around flaps for 737NG and 737 MAX aircraft certified to conduct Flaps 30 approaches using Flaps 5 during go-around requires flightcrew training. The FSB conducted an operational suitability evaluation and found no handling quality differences between the 737NG and the 737 MAX when conducting the alternate go-around flaps operations in accordance with the AFM appendix. A flightcrew member who completed training on either the 737NG or the 737 MAX does not need to repeat training in the other series aircraft.

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} in order to maintain the performance requirements of 14 CFR part 25, § 25.121(d). 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 737NG or the 737 MAX 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.

Flight training for flightcrews current in the 737NG or the 737 MAX aircraft is established at Level D. Training 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.

APPENDIX 7. BOEING 737 MAX SPECIAL TRAINING FOR FLIGHTCREWS

The purpose of this appendix is to describe ground and flight training requirements associated with pilot qualification on the 737 MAX. The MDR Table makes reference to this appendix with the use of an asterisk (shown as E*).

No pilot may operate the 737 MAX unless the ground and flight training documented in this appendix has been completed. References to “pilots” in this section include both PICs and SICs unless otherwise specified. These Special Training segments can be standalone or embedded into another training curriculum. Some tasks outlined in this appendix are purposely omitted from Section 9.2, Special Emphasis Areas. The required training is as follows:

1. GROUND TRAINING

1.1 Training on the following NNCs:

- Runaway Stabilizer.
- SPEED TRIM FAIL.
- STABILIZER OUT OF TRIM.
- Stabilizer Trim Inoperative.
- Airspeed Unreliable.
- ALT DISAGREE.
- AOA DISAGREE.

1.2 Training in this section emphasizes the design differences associated with FCC software version P12.1.2 for the 737 MAX. This training also emphasizes necessary ground training between the 737NG and 737 MAX with FCC software version P12.1.2 or later. Pilots may complete this training by accomplishing the applicable 737 MAX CBT provided by Boeing or an FAA-approved equivalent.

1.2.1 ATA 22 – Autoflight – FCC – MCAS:

- MCAS function description.
- Conditions for operation.
- Erroneous FCC trim commands.
- Flight deck alerting of the failure of the MCAS function.

1.2.2 ATA 22 – Autoflight – FCC – AFDS:

- Automatic AP disengagement.
- Temporary FD removal.
- AFDS pitch mode changes following stick shaker.
- Inhibiting of AP nose up trim.

1.2.3 ATA 22 – Autoflight – FCC – STAB OUT OF TRIM:

- Alert illumination logic (ground vs. flight).
- Revised NNC.

1.2.4 ATA 22 – Autoflight – FCC – SPEED TRIM FAIL:

- Function of the SPEED TRIM FAIL light.
- Revised NNC.

1.3 Training on the following bullet points that emphasize Boeing-recommended procedures. Pilots may complete this training by accomplishing the applicable 737 CBT provided by Boeing or an FAA-approved equivalent.

1.3.1 737 Manual Trim Operation:

- Manual stabilizer trim operation.
- Manual stabilizer trimming techniques.
- Effects of airspeed and aerodynamic loads on manual stabilizer trim operation.

1.3.2 737 Unreliable Airspeed – Determining a Reliable Airspeed:

- Recognition of flight deck effects of an unreliable airspeed condition.
- Memory pitch and thrust settings associated with the NNC.
- Determination of reliable airspeed indication.

2. FLIGHT TRAINING

Training is required to be conducted in a 737 MAX Level C or D FFS. The following bullet points emphasize the objectives of each maneuver. This training applies to pilots flying the 737 MAX, or conducting 737NG/737 MAX MFF. A 737NG Level C or D FFS may be used for some conditions where noted below.

2.1 Demonstration of MCAS activation accomplished by each pilot acting as PF.

2.1.1 MCAS activation during an impending stall (or full stall) and recovery demonstration during manual flight in a clean configuration.

2.1.2 Demonstrate MCAS activation stabilizer trim responses:

- Stabilizer trim in the nose down direction when above threshold AOA for MCAS activation during stall.
- Stabilizer trim in the nose up direction when below threshold AOA for MCAS activation during recovery.

2.2 Runaway stabilizer condition requiring use of manual stabilizer trim accomplished by each pilot acting as PF.

2.2.1 Runaway stabilizer training as described in subparagraph 9.2.2.5.

2.2.2 Operation of each manual trim technique (as defined by Boeing).

2.2.3 This training can be completed in a 737 MAX or 737NG FFS.

2.3 Use of manual stabilizer trim during approach, go-around, and level off accomplished by each pilot acting as PF.

2.3.1 Use of manual stabilizer trim as described in subparagraph 9.2.2.4.

2.3.2 This training can be completed in a 737 MAX or 737NG FFS.

2.4 A Cross-FCC Trim Monitor activation demonstration accomplished by either pilot acting as PF.

2.4.1 Condition must terminate in a landing in order to demonstrate the updated STAB OUT OF TRIM light functionality.

2.5 Erroneous high AOA during takeoff that leads to an unreliable airspeed condition accomplished by either pilot acting as PF.

2.5.1 Demonstrates flight deck effects (i.e., aural, visual, and tactile) associated with the failure.

2.5.2 Fault occurring during the takeoff procedure.

2.5.3 Must include a go-around or missed approach flown with erroneous high AOA condition.

2.5.3.1 Special emphasis placed on FD behavior biasing out of view upon selecting takeoff/go-around (TO/GA).