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FLIGHT STANDARDIZATION BOARD REPORT

Revision: 4

Mitsubishi Heavy Industries America, Inc

MU-2B Series
TCDS # A2PC & A10SW

Date: 11/30/2011
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REVISION RECORD

Revision	Sections	Date	Chairman
Draft	All	12/16/2005	John Vetter
Original	All	01/20/2006	John Vetter
Revision 1	2,3,4,9,10	09/25/2006	John Vetter
Revision 2	3,4,5,7,9	06/01/2007	John Vetter
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Revision 1 Changes

The following technical writing corrections and changes have been made:

- 2.2 Clarify effective compliance requirements with FSB report
- 2.2.3.2 Engine Failure on Takeoff / Unable to Climb procedure, clarify training methods.
- 2.2.4 Reformat paragraphs and titles to clarify applicability to One Engine Inoperative Instrument approach procedures.
- 3.1 Reformat Master Common Requirements to make clear what is applicable to common requirements (3.1) versus what are difference requirements (3.3).
- 4.1.1 Clarify applicability of Differences Program Hours.
- 4.1.2 Add Level of training for Requalification & specify Recurrent Program Hours as “or”
- 9 Specify flight instructors (simulator) and (airplane).
- 10 Clarify the recommendation for climb data is for One Engine Inoperative.

Revision 2 Changes

- 3.4 Changed wording in paragraph about ODR Tables.
- 4.1 Add Pilot-in-Command requirement to requalification training.
- 4.1.1 Changed format of Differences for clarity.
- 4.1.2 Add statement to address checking credited to training program hours.
- 5 Specify MU-2B maneuvers to be included in Part 135 checking.
- 7 Identify Cockpit Checklists that comply with regulatory requirements and this report.
- 9 Changed format of flight instructor paragraph to clarify basic qualification requirements. Changed Flight Instructor (Simulator) to require use of FAA Approved Training Program.

Revision 3 Changes

- 2.2.4.1 Change paragraph title and description for all APV approaches in addition to Precision Approaches.
- 2.2.4.2 Change paragraph title to accommodate glidepath distinction for instrument approaches.
- 6 Add paragraph to allow SFAR compliance to be counted for compliance with 61.56.

Revision 4 Changes Add Differences for G600 STC

- 2.2.4 Add NOTE to incorporate AC 120-108 CDFA procedures
- 3.3 Move MDR Table to Appendix 1 & Add G600 NOTE to MDR Table
- 4.1 Revise Differences Paragraph for Level D
- 4.1.1 Revise Ground Training Differences for Level D
- 4.1.2 Revise Flight Training to Add Differences for Level D
- 5. Add Differences Checking requirements for Level D
- 6. Add Differences Currency requirements for Level D
- 7. Add Cockpit Checklist requirements for aircraft modified from original type design

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1. PURPOSE AND APPLICABILITY

1.1 Purpose

The Mitsubishi Heavy Industries Model MU-2B Flight Standardization Board (FSB) convened to evaluate proposed training, checking, and currency requirements for pilots operating the MU-2B aircraft. This FSB was convened as part of a Safety Evaluation of the MU-2B aircraft undertaken in July 2005. The FSB evaluated operating characteristics and techniques to propose training, checking and currency requirements applicable to the MU-2B aircraft. The objectives of this FSB were to:

- Review aircraft procedures for consistency and effectiveness.
- Identify training, checking and currency requirements necessary to improve the safety of operating the MU-2B aircraft.
- Evaluate the complexity of the MU-2B to determine if a pilot, with or without training, can safely operate the aircraft in all certificated operating conditions.
- Identify if any unique requirements exist for MU-2B operation.
- Describe acceptable training program and training device characteristics.
- Establish checking and currency standards for MU-2B operation, if required.

1.2 Applicability

All models of the MU-2B were evaluated in conjunction with this report, including several modifications to the MU-2B that were available at the time.

The provisions of this report apply to all operations of all models of the MU-2B. This report is also applicable to all training and checking conducted in the aircraft, as well as the currency and experience provisions. This report is effective until amended, superceded or withdrawn by subsequent revision.

2. AIRCRAFT DETERMINATION (AMEL)

2.1 Background

In conducting its evaluation of the MU-2B the Board utilized the evaluation process outlined in Advisory Circular AC 120-53 and the Common Procedures Document for Conducting Operational Evaluation Boards (JAA, TCCA, FAA, 10 June 2004). The Board evaluated the MU-2B design and operating characteristics in the Areas of Operation required for a Commercial Pilot - Multiengine - Instrument Rating by the Practical Test Standard (PTS). For the purpose of design and operating characteristics the MU-2B falls within the Small Multiengine Aircraft Group (AMEL), Turbo-Propeller.

The FSB requested and received a proposed MU-2B training program from Mitsubishi Heavy Industries America, Inc (MHIA). FSB members completed ground school inclusive of all models of the MU-2B aircraft. A Level 5 MU-2B Flight Training Device was utilized for procedural training and checklist review including a LOFT scenario with Normal, Abnormal and Emergency Procedures. Flight training was conducted in four different models of the MU-2B selected to be representative of the entire MU-2B fleet. The training was consistent with that proposed by Mitsubishi Heavy Industries America, Inc. (MHIA) and provided under the supervision of MHIA. The MHIA Training Program was modified throughout the FSB process

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so that at the conclusion of the FSB the MHIA Training Program complies with the FSB recommendations.

A modified T2 test was conducted for the Areas of Operation required by the Practical Test Standard for Commercial Pilot - Multiengine - Instrument Rating. The T2 was modified to incorporate testing of both the aircraft and the Flight Training Devices available at the time of the FSB. T3/T5 tests were conducted to validate proposed training, checking and currency. The testing also included workload analysis to determine if the MU-2B design is consistent with acceptable pilot workload for a single pilot with adequate training.

2.2 Determination of Type Rating

The FSB has identified Level E training, checking and currency for the MU-2B aircraft. Level E requirements are normally eligible for designation of a Type Rating. However, current regulatory requirements for a single pilot type rated aircraft are not adequate to address training, checking and currency necessary for safe operation. The FSB recommends implementation of a single standard for training, checking and currency for the MU-2B. Regulatory changes to type rating requirements or special regulatory measures are needed. Timely implementation of a single standard of training, checking and currency to all MU-2B operations, including Part 91 operations, is necessary to achieve safety and comply with the requirements of this report.

The Board determined the MU-2B met the Advisory Circular 120-53 criteria for Level E Training in the following Areas of Operation:

2.2.1 Takeoff and Landing

Takeoff and landing characteristics for the MU-2B are affected by the position of the landing gear relative to the aircraft's center of gravity. Standard crosswind techniques apply to the MU-2B but the flight characteristics differ in crosswind operations due to a combination of landing gear positioning, center of gravity and spoiler control. Proper techniques to control crosswind roll and weight shift on the landing gear are necessary to stabilize directional control. These takeoff and landing characteristics are most prominent in the short body MU-2B models. In a crosswind the direct nose wheel steering requires the rudder to be centered when the nose wheel touches down. Options for Flaps 5 and Flaps 20 takeoff configurations need to be trained and characteristics for each understood when selecting the appropriate configuration. No Flap Landings must also be performed. The combination of all of these factors and the need to use care with propeller control to maintain stable directional control on landing is best trained in the aircraft. Level E training applies.

2.2.2 Performance, Steep Turns and Stalls

An accelerated stall maneuver is recommended as a special maneuver (Special Flight Characteristics) for the MU-2B aircraft. The design of the MU-2B wing utilizes a full-span flap that results in variable wing loading. With this characteristic, pilot awareness of configuration, speed, bank angle and stall margin is critical. At a safe altitude, the aircraft is configured clean and trimmed at 115 KIAS. The aircraft then begins entry toward a 60 degree bank turn. Stall warning (stick shaker) will normally be detected prior to 40 degrees of bank, depending on weight, and the aircraft is recovered to straight and level flight using bank, power and pitch. Level E differences apply to this maneuver.

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2.2.3 Emergency Operations

All One Engine Inoperative Training Maneuvers must utilize the manufactures recommendation for zero thrust applicable to the MU-2B model being operated.

2.2.3.1 Engine Failure During Takeoff - Takeoff Continued.

The AFM procedure for engine failure on takeoff for the MU-2B requires pilot decision making during the event. This event requires pilot proficiency with the MU-2B aircraft and knowledge of the MU-2B aircraft operation. Consideration of landing gear position and transit, flap positions, available runway remaining, acceleration versus climb performance, rudder forces, use of trim aileron to eliminate roll spoiler drag and Beta Follow-Up are areas requiring training. The combined knowledge and skill needed to safely operate the MU-2B in this Area of Operation requires Level E training.

2.2.3.2 Engine Failure after Liftoff / Unable to Climb

The AFM checklist and procedure for engine failure on takeoff for the MU-2B requires pilot decision making during this event. In the event the aircraft is unable to climb with one engine inoperative, the maneuver for returning to the runway or landing straight ahead must be trained. Pilot awareness of available aircraft performance must be accomplished prior to the start of takeoff to ensure the correct decision is made in the event of an engine failure on takeoff. MU-2B Certification Basis for Engine Failure on Takeoff does not require the aircraft be able to continue the takeoff in takeoff configuration. This being the case, the MU-2B certification basis requires the aircraft be able to return to the ground safely. Safely in this circumstance means under control but not necessarily without damage to the aircraft. The outcome of an Engine Failure on Takeoff in the MU-2B is very much dependent on when the engine failure occurs.

Pilot training for the Engine Failure after Liftoff / Unable to Climb maneuver is Level E. However, aircraft operation does not normally permit completion of this maneuver in the aircraft. While completion of the Return to Runway maneuver has been safely demonstrated in the aircraft using extensive preparation, specific considerations and adequate runway, it is the recommendation of the FSB the maneuver primarily be trained in a FTD or simulator. When training in the aircraft is utilized and adequate safety considerations are not available to conduct the maneuver on a runway, the FSB recommends the maneuver be discussed on the ground in the cockpit with emphasis on pilot actions relative to pitch attitude and landing gear position. At the discretion of the instructor, replication of the maneuver at a safe operating altitude consistent with applicable instruction techniques may be utilized.

2.2.3.3 One Engine Inoperative Maneuvering / Loss of Directional Control

The Private and Commercial Practical Test Standard maneuver for V_{mc} demonstration is best accomplished using a One Engine Inoperative Maneuvering profile. The One Engine Inoperative - Loss of Directional Control maneuver is best trained and accomplished using early recognition and recovery techniques. Seat position and rudder travel should be emphasized during this maneuver. Rudder blocking by the instructor is encouraged to produce loss of directional control at V_{mc} plus 10 knots because early recognition and recovery is the primary objective for this maneuver. The FSB recommends the maneuver be accomplished at a safe altitude in a Flaps 20 takeoff configuration. Trim the aircraft to 120

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knots in level flight with one engine set at zero thrust. Apply takeoff power to the other engine while increasing pitch to cause a deceleration rate of 1 knot per second. Recover to straight and level flight at first indication of the loss of directional control. Level E training applies to this maneuver.

2.2.3.4 Approach and Landing with One Engine Inoperative

Flight characteristics and performance of the MU-2B aircraft operating with one engine inoperative requires adherence to the AFM procedures for safe operation. Airspeed maintenance is paramount to the safe completion of the maneuver. With one engine inoperative, the aircraft has slow acceleration from a deteriorated airspeed in landing configuration and requires vigilant airspeed management throughout the approach and landing maneuver. Aircraft configuration is selected to minimize drag prior to the point where landing is assured and final descent is initiated. Coordinated flight and roll trim management are essential to maximize one engine inoperative performance. Level E training applies to this maneuver.

2.2.4 One Engine Inoperative Instrument Approach

All One Engine Inoperative Training Maneuvers must utilize the manufacturer's recommendation for zero thrust applicable to the MU-2B model being operated.

2.2.4.1 Approaches with Vertical Guidance (APV)

Conduct of instrument approach procedures in the MU-2B aircraft with one engine inoperative requires pilot decision-making, approach planning and proficient adherence to AFM operating procedures. The preferred one engine inoperative instrument approach procedure is an approach with vertical guidance. The Precision Instrument Approach provides the most consistent and stable approach procedure with least deviation from normal operating procedures for the safest operation. LDA with glidepath and RNAV with glidepath such as LPV and LNAV/VNAV (including Baro-VNAV) also meet this criterion. AFM compliance with Flaps 20 only when landing is assured is required to maximize available performance. Level E training applies to this Area of Operation.

NOTE: Release of AC 120-108, Continuous Descent Final Approach, provides FAA published procedures recommended for stable and continuous Non-Precision Approaches without published Approach Vertical Guidance. This procedure may be used as a substitute for published Approach Vertical Guidance provided the procedures for AC 120-108 are adhered to, the approach has a published VDA and the aircraft is equipped with RNAV or DME that provides a means to determine distance to the runway on the approach to ensure descent position accuracy to preclude any deviation in descent rate from the MDA to the runway. This CDFA procedure substitution will allow extension of the Landing Gear at the FAF instead of Landing Assured for a One Engine Inoperative Approach.

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2.2.4.2 Non-Precision Approaches without Vertical Guidance (NPA)

The Straight in Non-Precision Approach is acceptable when necessary with one engine inoperative. Vertical approach guidance should be utilized when available. Selection of Flaps 5 at the FAF is recommended per the AFM and the descent is planned to preclude extensive maneuvering upon reaching MDA with consideration given to aircraft weight and density altitude to maintain MDA. One Engine Inoperative Circling Approach should be conducted only when absolutely necessary and must be trained if utilized. For all One Engine Inoperative Non-Precision approaches without vertical guidance, landing gear extension and Flaps 20 should be selected only when landing is assured and descent from MDA for landing is initiated. Adherence to configuration and speeds prescribed by the AFM is necessary for safe operation. Level E training applies to this Area of Operation.

2.3 Conclusion

The Board recommends the MU-2B aircraft be trained at Level E for Initial Qualification and Level C for Recurrent and Requalification Training.

3. MASTER REQUIREMENTS (Including MCR, MDR and ODR)

3.1 Master Common Requirements

Master Requirements for all models MU-2B Initial and Transition Training, Checking and Currency are E/E/E respectively.

Master Requirements for all models MU-2B Recurrent and Requalification Training, Checking and Currency are C/D/E respectively.

The following are specific master common requirements for the MU-2B:

- Landing Minima Category for the MU-2B is normally Category “C”.
- Normal “Landing Flap Setting” is Flap 20 or Flap 40.
- Normal “Takeoff Flap Setting” is Flap 5 or Flap 20.
- “No Flap Landing”. Training and checking for the MU-2B requires demonstration of “No Flap” landings. “No Flap” approach and landing procedures include Flaps 0 and Flaps 5.

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3.2 Areas of Special Interest and Emphasis

The FSB has determined that certain aspects of pilot knowledge, skills and abilities must be emphasized and evaluated during the training and checking process for the MU-2B.

- Accelerated stall awareness and training maneuvers with emphasis on configuration management. Awareness of the margin to stall in all flight operations and configurations should be emphasized throughout training.
- Vmc awareness and early recognition should be trained and checked. Minimum airspeeds for one engine inoperative must be emphasized in all configurations.
- Airspeed management and recognition of airspeed deterioration below AFM recommended speeds and recovery methods must be emphasized throughout training and checking.
- Knowledge of icing conditions and encounters must be emphasized throughout training and checking including; equipment requirements, certification standards, minimum airspeeds, use of autopilot and other AFM procedures. This information should conform to the standard of training set out by the Icing Training Video established for AD compliance for the MU-2B
- Knowledge of certification standards for aircraft performance, both All Engine and One Engine Inoperative operations, should be emphasized as essential for decision-making regarding aircraft operation.

3.3 Master Difference Requirements Tables

The Master Difference Requirements indicate the required level of Differences Training/Checking/Currency for MU-2B crewmembers. (See Appendix 1)

3.4 Operator Difference Requirement Tables

ODR tables are used to show operator compliance methods for aircraft model differences. Any ODR requirements must be based on the above MDR Table. Acceptable MU-2B ODR Tables are shown in Appendix 2. For ODR Table proposals not published in Appendix 2, Principal Inspectors should coordinate with the Kansas City Aircraft Evaluation Group. (See Appendix 2)

4. FSB SPECIFICATIONS FOR TRAINING

The FSB recommends annual (within preceding 12 calendar months) training for the MU-2B aircraft. This annual training requirement must be met with an FSB compliant FAA Approved Training Program for all MU-2B operations. The FSB compliant FAA Approved Training Program must comply with the recommendations of this report and include a determination that Training Completion Standards have been met.

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4.1 Training Requirements

The MU-2B is a single pilot in the AMEL category/class. No training credit is given for Second in Command Training (no credit for right seat in FTD). Upgrade Training is not applicable.

Initial / Transition Training: Applies to any pilot without documented MU-2B pilot operating experience within the last two years.

Requalification Training: Applies to any pilot with documented MU-2B Pilot-in-Command flight time served in the last two years who does not meet eligibility for Recurrent Training.

Recurrent Training: Applies to any pilot who completed and documented training on an FSB compliant FAA Approved Training Program for the MU-2B in the last 12 months and is MU-2B current in accordance with this report. Training completed the month before or after the month it is due is considered completed in the due month.

Differences Training: Applies to any pilot who operates more than one MU-2B model addressed by MDR Table or more than one equipage of the same model addressed by MDR NOTES. Required Differences Training is in accordance with differences between applicable MU-2B aircraft to be operated.

4.1.1 Ground Training Minimum Program Hours

Initial / Transition: 20 hours

Requalification: 12 hours

Recurrent: 8 hours

Differences: Initial Differences; 1.5 hours for Level B model differences (See Appendix 1)
(Base + 1 model = 1.5) (Base + 2 or more models at one time = 3.0)
(Any model qualification added independently is 1.5 hours)

4.0 hours when Level D differences are established.

Recurrent Differences; MU-2B Differences Currency (See Appendix 1)

Level A or B recurrent differences do not require program hours.

Level D recurrent differences must be trained in Recurrent Training. No additional ground program hours are required provided currency is maintained in applicable aircraft. Initial Differences Training will apply if currency is not maintained in either the base or variant MU-2B aircraft.

All Training Programs must include ground instruction in the following:

- All applicable aircraft systems modules by ATA subjects.
- Weight and Balance.
- Aircraft Performance. (ref. AC 120-91)
- MU-2B Icing Training consistent with Icing Training Video for AD compliance.
- Controlled Flight Into Terrain (CFIT) training according to FAA guidelines.
- Cockpit Resource Management/Single Pilot Resource Management (CRM/SPRM).

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4.1.2 Flight Training Minimum Program Hours

Initial / Transition: 12 hours with a minimum of 6 hours of Level E training

Requalification: 8 hours, Level C or higher

Recurrent: 4 hours at Level E Training, or 6 hours at Level C Training

Differences: Initial Differences;

Level A or B recurrent differences do not require flight training.

Level D Differences require 4.0 hours Flight Training.

Recurrent Differences;

Level A or B recurrent differences do not require flight training.

Level D Differences must be trained in Recurrent Flight Training. No additional program hours above Recurrent Program Hours apply provided currency is maintained in both Level D variant aircraft. For mixed fleet flying of Base Model and Level D variant aircraft, alternating Recurrent Training may be accomplished to meet Recurrent Flight Training for both base and variant aircraft provided currency is maintained in both aircraft.

FAA Order 8900.1, Volume 3, Chapter 19, Section 6, Paragraph 3-1231, Course Completion Requirements regarding Training Program Hours is applicable without the subsequent checking requirement being met.

Checking Events may be credited towards Minimum Flight Training Program Hours for Requalification and Recurrent Training provided all training program tasks are accomplished and the minimum number of training program hours are completed.

Training Completion Standards are performance of all required maneuvers to Commercial Multiengine and Instrument Practical Test Standards.

All Training Programs must include Flight Training in the following:

- All maneuvers applicable for Commercial Multiengine Instrument PTS for instrument rated pilots. Maneuvers applicable for Commercial Multiengine PTS for non-instrument rated pilots.
- All specific maneuvers identified in Sections 2.2.1 through 2.2.4 of this report.
- All Training Maneuvers must be consistent with the most Current FAA Approved AFM procedures (latest revision) and AFM compliant cockpit checklists.
- Training in the use of the autopilot, if installed.
- Icing Awareness Procedures applicable to the MU-2B.
- CFIT procedures and CRM/SPRM procedures.

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5. FSB SPECIFICATIONS FOR CHECKING

No additional checking requirements are specified for 14 CFR Part 91, MU-2B operations.

Checking for the MU-2B is in accordance with current regulations of 14 CFR 135 and must include the maneuvers identified in Sections 2.2.1 through 2.2.4 of this report.

The MU-2B is considered a separate type of aircraft as described in 14 CFR 135.293(b) for the purpose of recurrent testing. Twelve month testing currency applies to the MU-2B exclusively for compliance with FAR 135.293.

Differences Checking for Level B differences may be accomplished by a qualified MU-2B Instructor verification of knowledge without use of any training device. (Oral or Written Exam)

Differences Checking for Level D differences must include the maneuvers in Sections 2.2.2 through 2.2.4. Differences Checking for Level D differences mixed fleet flying of Base Model and Level D difference aircraft may be alternated to maintain qualification in both.

6. FSB SPECIFICATIONS FOR CURRENCY

Landing currency requirements of FAR 61.57 must be maintained in the MU-2B aircraft exclusively. Landings in other AMEL aircraft will not be credited for landing currency in the MU-2B aircraft. Landings in either short or long body MU-2B aircraft may be credited toward landing currency in both model groups.

Differences Currency for Level B variant aircraft is maintained and reestablished by self review.

Differences Currency for Level D variant aircraft is maintained by showing compliance with 14 CFR 61.57(c) Instrument Experience for the Level D difference aircraft. For mixed fleet flying of Base Model and Level D variant aircraft the requirements of 14 CFR 61.57(c) Instrument Experience must be maintained in both aircraft. 14 CFR 61.57 (c) may be used to maintain currency up to 12 months provided the Pilot in Command is current and qualified in the MU-2B in accordance with SFAR 108 and the operation complies with SFAR 108, 2.(b)(3) for simulated instrument flight.

Differences Currency for Level D variant aircraft may be reestablished in accordance with 14 CFR 61.57 (d) provided the Instrument Proficiency Check to reestablish Differences Currency is given by an MU-2B instructor qualified in accordance with SFAR 108 provided Initial or Recurrent Differences for the variant aircraft is maintained.

Instrument experience to satisfy FAR 61.57 is not MU-2B exclusive except as prescribed by this report. FAA Approved Recurrent Training is required to the Commercial Pilot - Multiengine and Instrument PTS to maintain MU-2B currency.

Satisfactory completion of FAA approved Initial/Transition, Requalification or Recurrent Training in accordance with this report and SFAR 108 may be considered compliance with 61.56 provided the training is conducted in an airplane or in accordance with FAR 142 approvals as prescribed in FAR 61.56.

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Satisfactory completion of a Flight Review to satisfy FAR 61.56 is valid for operation of an MU-2B only if that Flight Review is conducted in an MU-2B. Any Flight Review conducted in an MU-2B aircraft must include training in Areas of Operation identified in Sections 2.2.1 through 2.2.4 of this report and be given by an MU-2B qualified instructor meeting the minimum experience level established within this report for aircraft instruction.

7. AIRCRAFT REGULATORY COMPLIANCE CHECKLIST

A full Compliance Checklist has not been included in this report due to the extensive operating experience of the Mitsubishi MU-2B fleet. (Appendix 4, Reserved)

Proving tests to satisfy FAR 135.145 should be conducted in accordance with FAA Order 8900.1, Volume 3, Chapter 29.

The following Cockpit Checklists, or subsequent changes accepted by the FSB, specific to each MU-2B model and series have been accepted by the FSB for compliance with regulatory requirements for Cockpit Checklists and the recommendations of this report:

- YET06244A MU-2B
- YET06245A MU-2B-10
- YET06246A MU-2B-15
- YET06247A MU-2B-20
- YET06248A MU-2B-25 (except S/N 313SA)
- YET06253A MU-2B-25 (S/N 313SA only)
- YET06249A MU-2B-26 (except S/N 349SA)
- YET06254A MU-2B-26 (S/N 349SA only)
- YET06255A MU-2B-26A
- YET06250A MU-2B-30
- YET06251B MU-2B-35
- YET06252B MU-2B-36
- YET06257B MU-2B-36A
- YET06256A MU-2B-40
- YET06220C MU-2B-60

NOTE: The letter at the end of each Cockpit Checklist document number indicates the revision level. These revisions or later revisions accepted by the MU-2B FSB are FAA accepted checklists for the MU-2B aircraft.

Cockpit Checklists for MU-2B aircraft modified from original type design with design changes affecting Normal, Abnormal and/or Emergency procedures must be revised to reflect the new procedures. The method and content of revised Cockpit Checklist procedures must be accepted by the MU-2B FSB to comply with SFAR 108. Several STCs applicable to MU-2B aircraft have associated checklist change instructions accepted by the MU-2B FSB included in the STC Installation Package.

G600 MFD Charts Page.

Electronic Approach Charts (SIDS, STARS, Approach Procedures) are an available option on the G600 MFD Charts Page. The electronic display of Approach Charts on the G600 MFD does not meet the basic AC 120-76 EFB electronic chart capability to display the entire approach chart equally viewable to the paper chart being replaced. No evaluation of an alternative format presentation has been accomplished therefore another suitable source of aeronautical information must be available at the pilot station when required.

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G600 MFD Navigation Map Page data does not meet aeronautical information requirements for Enroute charts therefore another suitable source of Enroute Chart information must be available at the pilot station when required.

8. FSB SPECIFICATIONS FOR SIMULATORS AND DEVICES

Requests for device approval should be made in accordance with FAA procedures.

Credit for flight training in an approved Flight Training Device (FTD) is allowed in accordance with the Commercial Pilot - Multiengine Practical Test Standards except where this report is more restrictive. An MU-2B aircraft may be used for all levels of training, checking and currency.

Level C Flight Training and Checking specified in this report must be conducted in an approved Level 5 FTD. In addition to Level 5 FTD basic requirements, the FTD must be representative of the MU-2B aircraft with MU-2B cockpit controls and a visual system as a minimum. Any higher approval FTD or Simulator may be used provided it has MU-2B cockpit controls and a visual system.

Level D Flight Training specified in this report must be conducted in an approved Level 6 FTD with a visual system as a minimum, an approved simulator or the variant aircraft.

Level D Checking specified in this report must be conducted in an approved simulator or the variant aircraft.

Level E Flight Training and Checking specified in this report may be conducted in an approved Level C or D Simulator, or in the variant aircraft.

There was no approved Level 6 or 7 FTD, or simulator in existence at the time of this FSB evaluation. The FSB was able to evaluate an approved Level 5 FTD with MU-2B cockpit controls and a visual system for training in maneuvers and procedures for the MU-2B. The training credit allowed for Level C training and checking in this report is based on the demonstrated ability of the particular Level 5 device to accomplish effective training and is the foundation for the specific additional requirements imposed in this report for Level 5 FTDs.

9. INSTRUCTORS, CHECK AIRMEN AND EXAMINERS

Instruction given for the MU-2B must be consistent with manufacturer's recommendations and comply with latest revision FAA Approved AFM procedures and AFM compliant checklists.

Flight Instructors (simulator) and Flight Instructors (airplane):

1. Must be PIC qualified in the MU-2B aircraft in accordance with this report, and
2. Must receive instructor training in the requirements of this report, the FAA Approved Training Program, and currency and use of FAA Approved Airplane Flight Manual and FAA accepted Cockpit Checklists.

Flight Instructors (airplane), to provide instruction in the airplane, must have a minimum of 2000 hours total time, 800 hours of multiengine time and 300 hours PIC in the MU-2B. 50 hours of MU-2B PIC experience must be within the last 12 months.

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Flight Instructors (simulator), to provide instruction in an FTD or simulator, must be a qualified instructor in accordance with an FAA Approved Training Program and have a minimum of 2000 hours total time, 800 hours of multiengine time, 100 hours PIC in the MU-2B and 25 hours of which is within the last 12 months and 300 hours providing instruction in an MU-2B approved training device in accordance with this report.

For the purpose of checking, FAA Aviation Safety Inspectors, Designated Pilot Examiners, Training Center Evaluators and Check Airmen must have completed appropriate qualification in the MU-2B aircraft in accordance with this report. Examiners and Check Airmen must have 100 hours PIC in the MU-2B and maintain currency in accordance with this report.

10. MISCELLANEOUS RECOMMENDATION

The FSB recommends that all MU-2B operations be conducted with standard Normal, Abnormal and Emergency cockpit checklists in user-friendly format consistent with the latest FAA Approved Aircraft Flight Manual to comply with 14 CFR 91.503 and 14 CFR 135.83, as applicable.

To support the Takeoff Procedures for Engine Failure on Takeoff, the FSB recommends MHI publish One Engine Inoperative climb/descent performance data for both Flaps 5 and Flaps 20 with the landing gear retracted. This would provide essential information to assist the pilot in deciding whether or not to continue a takeoff after experiencing an engine failure on takeoff after liftoff.

The FSB recommends all single pilot IFR operations be conducted with an autopilot. The Work Load Analysis conducted by the FSB during training and the LOFT scenario demonstrated that workload was significantly reduced during transition phases of flight through the effective use of an autopilot.

The FSB recommends installation of Trim in Motion Warning and Autopilot Disconnect systems. The Trim in Motion Warning and Autopilot Disconnect are useful warning indications and low speed awareness tools for all operating conditions.

11. APPLICATION OF FSB REPORT

All MU-2B aircraft operations are subject to the provisions of this report. This report becomes effective when given final approval by the FAA.

All training and checking for the MU-2B aircraft must be conducted in accordance with an FAA Approved Training Program that complies with all provisions of this report for the MU-2B aircraft. All FAA Approved Training Programs must incorporate the latest FAA Approved AFM Procedures, AFM compliant checklist and manufacturer's recommendations for training maneuvers.

12. ALTERNATE MEANS OF COMPLIANCE

Alternate means of compliance to requirements of this report must be approved by the FSB. If alternate compliance is sought, operators must show that the proposed alternate means provides an equivalent level of safety to the provisions of AC 120-53 and this FSB report. Analysis, demonstrations, proof of concept testing, differences documentation or other evidence may be required.

12.1 Equivalent Safety

Significant restrictions may apply in the event alternate compliance is sought, and the reporting requirements may be increased to ensure equivalent safety. The FSB will generally not consider relief through alternate compliance unless sufficient lead-time has been planned by an operator to allow for any necessary testing and evaluation.

12.2 Interim Programs

In the event of clearly unforeseen circumstances in which it is not possible for an operator to comply with provisions of this report, the operator may seek an interim program approval rather than a permanent alternate compliance method. Financial arrangements, scheduling adjustments and other such reasons are not considered “unforeseen circumstances” for the purposes of this provision.

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Appendix 1
Master Differences Requirements Table (MDR)

Master Differences Requirements for MU-2B models are the following table:

TO FROM	B, D 2B 2B-10	F 2B-20 (short)	G 2B-30 (long)	K (short)	J (long)	M (short)	L (long)	P (short)	N (long)	Solitaire 2B-40 (short)	Marquise 2B-60 (long)
B, D 2B 2B-10	//	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B
F 2B-20 (short)	B/B/B	//	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B
G 2B-30 (long)	B/B/B	B/B/B	//	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B
K 2B-25 (short)	B/B/B	B/B/B	B/B/B	//	B/B/B	A/A/A	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B
J 2B-35 (long)	B/B/B	B/B/B	B/B/B	B/B/B	//	B/B/B	A/A/A	B/B/B	B/B/B	B/B/B	B/B/B
M 2B-26 (short)	B/B/B	B/B/B	B/B/B	A/A/A	B/B/B	//	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B
L 2B-36 (long)	B/B/B	B/B/B	B/B/B	B/B/B	A/A/A	B/B/B	//	B/B/B	B/B/B	B/B/B	B/B/B
P 2B-26A (short)	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	//	B/B/B	B/B/B	B/B/B
N 2B-36A (long)	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	//	B/B/B	B/B/B
Solitaire 2B-40 (short)	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	//	B/B/B
Marquise 2B-60 (long)	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	B/B/B	//

NOTE 1: STC's for EFIS Systems in the MU-2B require Level D Differences for training, checking and currency.

NOTE 2: Installation of Garmin G600 per STC # SA02153LA-D requires D/D/D Differences for training, checking and currency to and from the variant aircraft. All other M/M/S Differences remain per this MDR Table.

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Appendix 2
Operator Differences Requirements (ODR)

Definitions used in the Tables:	
X	= Pilot's Operating Handbook and or Flight Manual Supplement
CBT	= Computer Based Training
ICBT	= Interactive Computer Based Training
FTD	= Flight Training Device (Level 1 to 7)
FBS	= Fixed Base Simulator (Level 5 to 7)
FFS	= Full Flight Simulator (Level A, B, C, D)

DIFFERENCES TABLE					COMPLIANCE METHOD				
DIFFERENCE AIRCRAFT: MU-2B Series with G600 Flight Display									
BASE AIRCRAFT: MU-2B Series					TRAINING				CHKG/CURR
DESIGN	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
General Airplane Configuration	No Change								
Weights	No Change								
Airworthiness Limitations	Geographic operating area limitation for IFR operations. Changes to required equipment.	NO	YES		X			B	B
Placards and Markings	Airspeed limitations indicated on GDU 620 display.	NO	NO		X			B	B
Servicing	Additional process to verify databases are current.	NO	YES		X			B	B
Engines	No Change								
Flight Deck	No Change								
Instrument Panel Layout	GDU 620 Display replaces attitude indicator, HSI, VSI, Airspeed, and altimeter. Standby attitude, airspeed, and altimeter added adjacent to display. Turn Coordination now Beta Target on Attitude Indicator and Rate of Turn on HSI	NO	YES				FFS FTD LVL 6	D	D
Cabin	No Change								
Flight Controls	No Change								
Aerodynamic Controls	No Change								

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DIFFERENCES TABLE				COMPLIANCE METHOD					
DIFFERENCE AIRCRAFT: MU-2B Series with G600 Flight Display									
BASE AIRCRAFT: MU-2B Series				TRAINING				CHKG/CURR	
MANEUVER	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
Engine Start	No Change								
Preflight	Additional actions to verify databases are current and display setup, speed bugs.	NO	YES			FTD ICBT		B	B
Taxi	Action to consider G600 system status and functions.	NO	NO		X			B	B
Takeoff	No Change								
RTO Or V1 Fail	No Change								
Climb Cruise Decent	No Change								
Instrument Approaches	Operating instructions for G600 system differ from those for previously installed equipment that performed same functions Train approach set-up procedures.	NO	YES				FFS FTD LVL 6	D	D
Landing	No Change								
Normal Procedures	Operating instructions for G600 system differ from those for previously installed equipment that performed same functions.	NO	YES			FTD ICBT		C	C
Abnormal Procedures	Additional actions for loss of G600 system functions including attitude, heading, and air data.	NO	YES			FTD ICBT		B	C
Emergency Procedures	TAWS procedures	NO	YES			FTD		B	C
In-Flight Maneuvers	Low Speed Awareness indications Steep Turns, Stalls, Slow Flight, Unusual Attitude Recovery, SVS setup and use	NO	NO				FFS FTD LVL 6	D	D

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DIFFERENCES TABLE				COMPLIANCE METHOD					
DIFFERENCE AIRCRAFT: MU-2B Series with G600 Flight Display								CHKG/CUR R	
BASE AIRCRAFT: MU-2B Series				TRAINING					
SYSTEM	REMARKS	FLT CHAR	PROC CHNG	LVL A	LVL B	LVL C	LVL D	CHK	CURR
22 Auto-Flight	Autopilot Course/Heading information is provided from GDU 620. Flight director is displayed on GDU 620. Added ability to couple autopilot to roll steering commands via discrete HDG/GPSS switch. Optionally, attitude source for autopilot may be changed to GRS 77AHRS and GAD43 adapter. Limited availability of Altitude Capture function in FD or Autopilot Turn Coordinator may remain to run Yaw Damper	NO	YES			FTD		D	D
23 Communications	No Change								
24 Electrical Power	G600 Power sources	NO	NO		X			B	C
25 Equipment / Furn.	No Change								
27 Flight Controls	No Change								
31 Indicating/Record	No Change								
33 Lights	No Change								
34 Navigation	Mechanical primary flight instruments replaced with electronic PFD and mechanical standby instruments. Optionally, RMI replaced with electronic RMI. Addition of moving map. Optionally, weather radar and radar altimeter may be displayed on PFD. Optionally, traffic advisory and TCAS I traffic may be displayed on PFD/MFD. Optionally, TAWS-B functions may be provided by G600.	NO	YES				FFS FTD Level 6	D	D
35 Oxygen	No Change								
36 Pneumatics	No Change								
37 Vacuum	Vacuum driven instruments (if equipped) replaced with electronic instruments.	NO	NO		X			B	B
45 Maintenance Computer	No Change								
46 Information Systems	Safe Taxi, FliteChart and Chart View Not Evaluated for Aeronautical Information.								

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Appendix 3
Sample Training Program (RESERVED)

MU-2B FAA Approved Training Program is published in the Appendix to SFAR 108, February 6, 2008 and also available from Mitsubishi Heavy Industries America, Inc. as a Part Number controlled YET document.

Appendix 4
Compliance Checklist (RESERVED)