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Flight Standardization Board (FSB) Report

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Manufacturer
Textron Aviation, Inc.

Type Certificate Data Sheet (TCDS)	TCDS Identifier	Marketing Name	Pilot Type Rating
A24CE	1900	Beechcraft 1900	BE-1900
A24CE	1900C	Beechcraft 1900	BE-1900
A24CE	1900D	Beechcraft 1900	BE-1900

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TABLE OF CONTENTS

Section	Page
1. RECORD OF REVISIONS	3
2. INTRODUCTION	3
3. HIGHLIGHTS OF CHANGE	3
4. BACKGROUND	4
5. ACRONYMS.....	4
6. DEFINITIONS.....	5
7. PILOT TYPE RATING	6
8. RELATED AIRCRAFT.....	7
9. PILOT TRAINING.....	7
10. PILOT CHECKING.....	10
11. PILOT CURRENCY	12
12. OPERATIONAL SUITABILITY.....	13
13. MISCELLANEOUS	14
APPENDIX 1. DIFFERENCES LEGEND	16
APPENDIX 2. MASTER DIFFERENCES REQUIREMENTS (MDR) TABLE.....	18
APPENDIX 3. DIFFERENCES TABLES	19

1. RECORD OF REVISIONS

Revision Number	Sections(s)	Page(s) Affected	Date
1900/1900C (Original)		All	11/30/1983
1900D (Original)	All	All	04/16/1992
1	All	All	09/28/2010
2	Appendix 4	Appendix 4	02/28/2011
3	7, 10, and Appendices 1 and 4	14, 15, 16, and Appendices 1 and 4	10/05/2012
4	2.1, 3.1.1, 10.2.6, 11	5, 7, and 16	12/17/2014
5	5.2.2, 6.1.2, 6.2.1	9, 12, and 13	09/28/2016
6	All	All	04/02/2018

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 requirement;, 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 change the manufacturer name from Beechcraft Corporation to Textron Aviation, to add differences requirements for aircraft equipped with Garmin Touchscreen Navigation (GTN)-725 Global Positioning System (GPS) using dual Rockwell Collins Pro Line 21 Integrated Display Systems (IDS), to update the format of the report for Section 508 compliance, and to delete repetitive regulatory information.

4. BACKGROUND

The Kansas City AEG formed a Flight Standardization Board (FSB) that evaluated the BE-1900 as defined in FAA Type Certificate Data Sheet (TCDS) # A24CE. The evaluation was conducted during November 1983 for the BE-1900 and BE-1900C models, and again in April 1992 for the BE-1900D.

In June of 2017, the FSB conducted flight evaluations of an avionics upgrade in the Textron Model 1900D aircraft as per FAA AC 120-53B, Change 1, Guidance for Conducting and Use of Flight Standardization Board Evaluations. The legacy avionic system was upgraded to Garmin GTN-725 GPS with LPV approach capability and dual Rockwell Collins Pro Line 21 IDS. The upgrade was found to be operationally suitable. Training and checking requirements are listed in Appendix 2, Master Differences Requirements (MDR) Table.

5. ACRONYMS

14 CFR	Title 14 of the Code of Federal Regulations
AC	Advisory Circular
ACS	Airman Certification Standards
ADC	Air Data Computer
ADHRS	Air Data and Heading Reference System
ADF	Automatic Direction Finder
AEG	Aircraft Evaluation Group
AFM	Airplane Flight Manual
AFX	Auto Feather
AHRS	Attitude Heading Reference System
ATP	Airline Transport Pilot
CCP	Cursor Control Panel
CKP	Cursor Knob Panel
CHP	Course Heading Panel
CVR	Cockpit Voice Recorder
CWS	Control Wheel Steering
DCP	Display Control Panel
DIU	Digital Interface Unit
DME	Distance Measuring Equipment
DPU	Display Processor Unit
EADI	Electronic Attitude Director Indicator
EFB	Electronic Flight Bag
EFIS	Electronic Flight Information System
EHSI	Electronic Horizontal Situation Indicator
FAA	Federal Aviation Administration
FD	Flight Director
FDR	Flight Data Recorder
FFS	Full Flight Simulator
FSB	Flight Standardization Board

FSU	File Server Unit
FSTD	Flight Simulation Training Device
GPS	Global Positioning System
GTN	Garmin Touchscreen Navigator
IAP	Instrument Approach Procedure
IDS	Integrated Display System
IFIS	Integrated Flight Information System
ITT	Interstage Turbine Temperature
LNAV	Lateral Navigation
LPV	Localizer Performance with Vertical Guidance
LSA	Low Speed Awareness
MDR	Master Differences Requirements
MFD	Multifunction Display
NAS	National Airspace System
PFD	Primary Flight Display
PIC	Pilot in Command
POH	Pilot's Operating Handbook
PTS	Practical Test Standards
RAD ALT	Radar Altimeter
RB	Rudder Boost
RNP	Required Navigation Performance
RTO	Rejected Takeoff
SFAR	Special Federal Aviation Regulation
SID	Standard Instrument Departure
SOE	Supervised Operating Experience
STAR	Standard Terminal Arrival
STC	Supplemental Type Certificate
SVS	Synthetic Vision System
TAWS	Terrain Awareness and Warning System
TCAS	Traffic Alert and Collision Avoidance System
TCDS	Type Certificate Data Sheet
TRQ	Torque
VHF	Very High Frequency
VNAV	Vertical Navigation
WAAS	Wide Area Augmentation System
XPDR	Transponder
YD	Yaw Damper

6. DEFINITIONS

These definitions are for the purposes of this report only.

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

- 6.2. Current. A crewmember meets all requirements to operate the aircraft under the applicable operating part.
- 6.3. Differences Tables. Describe the differences between a pair of related aircraft and the minimum levels operators must use to conduct differences training and checking of crewmembers. Difference levels range from A to E.
- 6.4. Master Differences Requirements (MDR). Specifies the highest training and checking difference levels between a pair of related aircraft derived from the Differences Tables.
- 6.5. Mixed Fleet Flying. The operation of a base aircraft and one or more related aircraft for which credit may be taken for training, checking, and currency events.
- 6.6. Operational Evaluation. An AEG process to determine pilot type rating, minimum crewmember training, checking, and currency requirements, and unique or special airman certification requirements (e.g., specific flight characteristics, no-flap landing).
- 6.7. Operational Suitability. An AEG determination that an aircraft or system may be used in the National Airspace System (NAS) and meets the applicable operational regulations (e.g., Title 14 of the Code of Federal Regulations (14 CFR) parts 91, 121, 133, 135).
- 6.8. Qualified. A crewmember holds the appropriate airman certificate and ratings as required by the applicable operating part.
- 6.9. Related Aircraft. Any two or more aircraft of the same make with either the same or different type certificates that have been demonstrated and determined by the Administrator to have commonality.
- 6.10. Seat Dependent Tasks. Maneuvers or procedures using controls that are accessible or operable from only one flightcrew member seat.
- 6.11. Special Emphasis Area. A training requirement unique to the aircraft, based on a system, procedure, or maneuver, which requires additional highlighting during training. It may also require additional training time, specialized training devices, or training equipment.
- 6.12. Specific Flight Characteristics. A maneuver or procedure with unique handling or performance characteristics that the FSB has determined must be checked.

7. PILOT TYPE RATING

7.1. Type rating.

7.1.1 The type rating designation for Textron Models 1900, 1900C, and 1900D aircraft is “BE-1900”.

7.1.2 A BE-1900 pilot type rating may be issued with the limitation “BE-1900 Second in Command Required” as applicable.

7.2. Common type ratings.

Not applicable.

7.3. Military equivalent designations.

Military aircraft that qualify for the BE-1900 can be found on the [faa.gov](http://www.faa.gov/licenses_certificates/airmen_certification/) website under Licenses and Certificates, Airmen Certification, Online Services, Aircraft Type Rating Designators. This webpage is kept up-to-date and can be found at http://www.faa.gov/licenses_certificates/airmen_certification/.

8. RELATED AIRCRAFT

8.1. Related Aircraft on same TCDS.

The Textron Models 1900, 1900C, and 1900D are all related aircraft.

8.2. Related Aircraft on different TCDS.

Not applicable.

9. PILOT TRAINING

9.1. Airman Experience.

9.1.1 Airmen receiving initial 1900, 1900C, and 1900D training should have previous experience in multiengine turbo-propeller powered airplanes. Pilots without this experience may require additional training.

9.1.2 Airmen receiving differences 1900, 1900C, and 1900D training are assumed to have completed initial, upgrade, or transition training and be fully Pilot in Command (PIC) qualified in one related aircraft to receive differences training in another related aircraft consistent with the MDR table.

9.2. Special Emphasis Areas.

9.2.1 Pilots must receive special emphasis on the following areas during initial, transition, upgrade, differences, recurrent, and requalification ground training:

- Model 1900D: Electronic Flight Information System (EFIS) function and procedures should be emphasized throughout training. Special significance should be placed on Display Processor Unit (DPU) failures and EFIS Reversionary Switching.
- Models 1900, 1900C, and 1900D: Aircraft performance must be emphasized. The 1900/1900C and 1900D (Commuter Category) are certificated to very different performance requirements. There must be a thorough understanding of

the respective aircraft performance in mixed fleet flying.

- Model 1900D: Training should emphasize Airplane Flight Manual (AFM) criteria required to conduct Reduced Power Takeoffs.
- Model 1900: Stall warning characteristics with ice accumulation must be emphasized. The first indication may be airframe buffet in lieu of the reliability of the audible stall warning.
- Model 1900D with Pro Line 21 IDS: Training should emphasize the need to confirm Flight Director (FD) mode selection due to reposition of the FD Control Panel from the instrument panel (within pilot line of sight) to the center console (out of pilot line of sight).
- Model 1900D aircraft equipped with G950, IDS-3000, or G750 with Pro Line 21 IDS: Training should emphasize indications on the airspeed tape for high- and low-speed awareness cues.

9.2.2 Pilots must receive special emphasis on, and perform the following areas during, initial, transition, upgrade, differences, recurrent, and requalification flight training as applicable to an operator's fleet of aircraft:

- EFIS Reversionary Switching: Train and demonstrate the use of Composite Mode to conduct Precision and Non-Precision Approaches, with and without the FD.
- Model 1900D Reduced Power Takeoffs: Train and demonstrate the conduct of reduced power normal takeoffs for "Flaps 17" in accordance with AFM criteria.
- Model 1900D with Pro Line 21 IDS (FD Mode Selection): Train and demonstrate use of the FD Control Panel and emphasize confirmation of the mode selected.

9.3. Specific Flight Characteristics.

Maneuvers/procedures required to be checked as referenced in the Airline Transport Pilot (ATP) and Type Rating Practical Test Standards (PTS) or Airman Certification Standards (ACS), as applicable, and/or Appendix F of part 121.

There are no specific flight characteristics.

9.4. Seat Dependent Tasks.

9.4.1 Pilots must receive training in these seat dependent tasks:

- a) Engine starting (left seat); initial, transition, upgrade, differences, recurrent, and requalification training.
- b) Pretakeoff checks (left seat); initial, transition, upgrade, differences, recurrent, and requalification training.
- c) Powerplant fire/failure during takeoff before and after V_1 (left seat); initial, transition, upgrade, differences, recurrent, and requalification training.

- d) One Engine Inoperative (OEI) climb (left seat); initial, transition, upgrade, differences, recurrent, and requalification training.
- e) Inflight powerplant shutdown and restart (left seat); initial, transition, upgrade, differences, recurrent, and requalification training.
- f) OEI precision and non-precision approaches (left seat); initial, transition, upgrade, differences, recurrent, and requalification training.
- g) Ice accumulation (left seat); initial, transition, upgrade, differences, recurrent, and requalification training.
- h) Anti-icing and deicing systems and operation (left seat); initial, transition, upgrade, differences, recurrent, and requalification training.
- i) Aircraft and engine fires (left seat); initial, transition, upgrade, differences, recurrent, and requalification training.
- j) Smoke control (left seat); initial, transition, upgrade, differences, recurrent, and requalification training.
- k) Powerplant malfunctions (left seat); initial, transition, upgrade, differences, recurrent, and requalification training.
- l) Electrical system malfunctions (left seat); initial, transition, upgrade, differences, recurrent, and requalification training.

9.4.2 Due to the orientation of equipment controls, a pilot being trained as a single pilot must occupy the left seat for all training tasks.

9.5. Regulatory Training Requirements which are Not Applicable to the 1900, 1900C, or 1900D.

9.5.1 Aircraft used in Part 121 Operations:

14 CFR part 121, §§ 121.409(d), 121.424(a), and 121.427(d)(1) low-altitude windshear flight training is not required for the 1900 as per §121.358(d)(1). Ground training on escaping from severe weather situations, including low-altitude windshear, is an acceptable substitute.

Part 121 Appendix E Flight Training:

- Turns with and without spoilers. Not applicable to the 1900, 1900C, or 1900D, no substitute available.
- Tuck and Mach Buffet. Not applicable to the 1900, 1900C, or 1900D, no substitute available.
- Operation of Flight Engineer (FE) station. Not applicable to the 1900, 1900C, or 1900D, no substitute available.

- Autopilot (if not installed). Not applicable to the 1900, 1900C, or 1900D. Demonstration of the aircraft's FD is an acceptable substitute.
- Fuel jettisoning. Not applicable to the 1900, 1900C, or 1900D, no substitute available.
- Landings with manual reversion. Not applicable to the 1900, 1900C, or 1900D, no substitute available.

9.5.2 Aircraft used in Part 135 Operations:

None.

9.6. Flight Simulation Training Devices (FSTD).

There are no specific systems, procedures, or maneuvers that are unique to the 1900, 1900C, or 1900D that require a specific FSTD for training.

9.7. Training Equipment.

There are no specific systems or procedures that are unique to the 1900, 1900C, or 1900D that require specific training equipment.

9.8. Differences Training Between Related Aircraft.

Pilots must receive differences training between the 1900, 1900C, and 1900D aircraft. The level of training is specified in Appendix 3, Differences Tables.

10. PILOT CHECKING

10.1. Landing from a No Flap or Non-Standard Flap Approach.

The probability of flap extension failure on the 1900, 1900C, and 1900D is not extremely remote due to system design. Therefore, demonstration of a no flap approach and landing during pilot certification or part 91, § 91.1065 competency check, § 121.441 proficiency check, and part 135, § 135.293 competency check is required. This applies to initial, transition, upgrade, and recurrent checking.

Refer to FAA Order 8900.1, Volume 5 when the test or check is conducted in an aircraft versus a Full Flight Simulator (FFS).

10.2. Specific Flight Characteristics.

Maneuvers/procedures required to be checked as referenced in the ATP and Type Rating PTS or ACS, as applicable, and/or Appendix F of part 121.

There are no specific flight characteristics.

10.3. Seat Dependent Tasks.

10.3.1 Pilots must be checked in these seat dependent tasks:

- a) Engine starting (left seat); initial, transition, upgrade, differences, recurrent, and requalification checking.
- b) Pretakeoff checks (left seat); initial, transition, upgrade, differences, recurrent, and requalification checking.
- c) Powerplant fire/failure during takeoff before and after V_1 (left seat); initial, transition, upgrade, differences, recurrent, and requalification checking.
- d) OEI climb (left seat); initial, transition, upgrade, differences, recurrent, and requalification checking.
- e) Inflight powerplant shutdown and restart (left seat); initial, transition, upgrade, differences, recurrent, and requalification checking.
- f) OEI precision and non-precision approaches (left seat); initial, transition, upgrade, differences, recurrent, and requalification checking.
- g) Ice accumulation (left seat); initial, transition, upgrade, differences, recurrent, and requalification checking.
- h) Anti-icing and deicing systems and operation (left seat); initial, transition, upgrade, differences, recurrent, and requalification checking.
- i) Aircraft and engine fires (left seat); initial, transition, upgrade, differences, recurrent, and requalification checking.
- j) Smoke control (left seat); initial, transition, upgrade, differences, recurrent, and requalification checking.
- k) Powerplant malfunctions (left seat); initial, transition, upgrade, differences, recurrent, and requalification checking.
- l) Electrical system malfunctions (left seat); initial, transition, upgrade, differences, recurrent, and requalification checking.

10.3.2 Due to the orientation of equipment controls, a pilot being checked as a single pilot must occupy the left seat for all checking tasks.

10.4. Other Checking Items.

10.4.1 Aircraft performance calculations and required aircraft handling to achieve performance should be demonstrated.

10.4.2 For 1900D, selection and use of EFIS displays, raw data, FD, and Reversion/Composite modes, including DPU failure, should be demonstrated.

10.4.3 During checking of pilots operating as a two-pilot crew, the following tasks, procedures, or maneuvers require demonstration from a particular crew position (e.g., left seat or right seat).

- Cockpit Preflight.
- Rejected Takeoff.
- Engine Fire and Failure During Takeoff After V₁.
- Abnormal Procedures for OEI and Landing.

10.5. FSTDs.

There are no specific systems, procedures, or maneuvers that are unique to the 1900, 1900C, or 1900D that require a specific FSTD for checking.

10.6. Equipment.

There are no specific systems or procedures that are unique to the 1900, 1900C, or 1900D that require specific equipment.

10.7. Differences Checking Between Related Aircraft.

10.7.1 Pilots must receive difference checking between the 1900/1900C and 1900D aircraft. The level of checking is specified in Appendix 3.

10.7.2 For mixed fleet flying, § 121.441 proficiency checks and § 135.293 competency check should alternate checks between the 1900/1900C and 1900D aircraft.

11. PILOT CURRENCY

11.1. Operating Experience and Supervised Operating Experience (SOE).

11.1.1 Due to the orientation of equipment controls, PICs completing Operating Experience (OE) as a single pilot must occupy the left pilot seat.

11.1.2 Due to the orientation of equipment controls, pilots completing SOE in accordance with 14 CFR part 61, § 61.64(g) must occupy the left pilot seat.

11.2. Differences Currency Between Related Aircraft.

11.2.1 Pilots must receive differences currency from the 1900/1900C to the 1900D aircraft (including mixed fleet flying) as follows:

- a) Operating the 1900D through a complete flight cycle, including an instrument approach procedure, within the previous 90 days.

- b) Currency may be reestablished by completing at least one of the following in the 1900D:
 - 1) One complete flight cycle with a qualified PIC, including an instrument approach;
 - 2) A Line Check;
 - 3) A Proficiency or Competency Check; or
 - 4) Recent instrument experience in compliance with § 61.57(c) or (d).

11.2.2 Pilots must receive differences currency from the 1900D to the 1900/1900C aircraft (including mixed fleet flying) as follows:

- a) Operating the 1900/1900C within the previous 180 days.
- b) Currency may be reestablished by a review of Placards, Limitations, and Operating Procedures prior to operating the 1900/1900C.

11.2.3 Pilots must receive differences currency from the 1900D (EFIS-84) to the 1900D aircraft equipped with either G950, IDS-3000, or Rockwell Collins Pro Line 21 dual Primary Flight Display (PFD) IDS (including mixed fleet flying) as follows:

- a) Operating the 1900D equipped with either G950, IDS-3000, or Pro Line 21 dual PFD IDS through a complete flight cycle, including an instrument approach procedure, within the previous 90 days.
- b) Currency may be reestablished by completing at least one of the following in the 1900D aircraft equipped with either G950, IDS-3000, or Pro Line 21 dual PFD IDS:
 - 1) One complete flight cycle with a qualified PIC, including an instrument approach;
 - 2) A Line Check;
 - 3) A Proficiency or Competency Check; or
 - 4) Recent instrument experience in compliance with § 61.57(c) or (d).

12. OPERATIONAL SUITABILITY

The 1900, 1900C, and 1900D aircraft are operationally suitable for operations under parts 91, 121, and 135. The list of operating rules evaluated is on file at the Kansas City AEG.

13. MISCELLANEOUS

13.1. Forward Observer Seat.

The 1900, 1900C, and 1900D aircraft do not have a dedicated Forward Observer Seat in original type design. The left forward passenger seat in a 19-passenger seat configuration complies with the observer seat requirements of §§ 121.581 and 135.75 by utilizing the most forward passenger seat, passenger oxygen mask with the addition of audio capability at the seat location. This most forward passenger seat location is adequate for Enroute Inspection and Line Checks per §§ 121.440 and 135.299. The completion of Proficiency Checks or Pilot Type Rating Practical Tests may require additional equipment. For Single Pilot evaluations, the right pilot seat is an available observer seat.

13.2. Landing Minima Categories.

13.2.1 Reference 14 CFR part 97, § 97.3. The 1900, 1900C, and 1900D are considered Category B for the purposes of determining “straight-in landing weather minima” when “Flaps Landing” or “Flaps 35” configuration is used for landing.

13.2.2 The 1900, 1900C, and 1900D are considered Category C for the purposes of determining “straight-in landing weather minima” when “Flaps Approach” or “Flaps 17” configuration is approved by Supplemental Type Certificate (STC) and used for Normal landing.

13.3. Aircraft Proving Tests.

Proving tests in accordance with §§ 121.163 or 135.145 are appropriate when the 1900, 1900C, and/or 1900D is new to an operator.

13.4. Electronic Flight Bag (EFB).

13.4.1 For 1900D aircraft with IDS-3000 installation, a single source File Server Unit (FSU) provides EFB functions. With single Multifunction Display (MFD), FSU, and Cursor Control Panel (CCP), dual redundancy is not met. Additional electronic equipment is required to comply with §§ 91.503, 135.83, 121.97, 121.117, or 121.549.

13.4.2 Printed Pilot Checklist is required to comply with §§ 91.503 and 135.83 or part 121. No electronic checklists (ECL) have been evaluated for this aircraft.

13.4.3 Electronic Approach Charts (Standard Instrument Departures (SID), Standard Terminal Arrivals (STAR), and Approach Procedures) are available through the Integrated Flight Information System (IFIS)-5000 FSU. Redundancy is required for a suitable source of electronic aeronautical information. The enhanced map overlays do not meet requirements for Enroute Charts, and therefore, another suitable source of Enroute Chart information must be available at the pilot station.

13.4.4 For 1900D aircraft with the G950 installation, a single MFD provides EFB chart functions. With single MFD, dual redundancy is not met. Additional electronic equipment is required to comply with §§ 91.503, 121.97, 121.117, 121.549, or 135.83. Electronic Charts is a single source of Aeronautical Information limited to Instrument Approach Procedures (IAP) only (SID, STAR, Approach Procedures). No Enroute Charts are available.

APPENDIX 1. DIFFERENCES LEGEND

Training Differences Legend

Differences Level	Type	Training Method Examples	Conditions
A	Self-Instruction	<ul style="list-style-type: none"> • Operating manual revision (HO) • Flightcrew operating bulletin (HO) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Audiovisual presentation (AV) • Tutorial computer based-instruction (TCBI) • Stand-up instruction (SU) 	<ul style="list-style-type: none"> • Systems are functionally similar. • Crew understanding required. • Issues need emphasis. • Standard methods of presentation required.
C	Systems Devices	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Level 6 or 7 flight training device (FTD 6-7) • Level A or B full flight simulator (FFS A-B) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Level C or D full flight simulator (FFS C-D) • Aircraft (ACFT) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Oral or written exam • Tutorial computer-based instruction self-test (TCBI) 	<ul style="list-style-type: none"> • Individual systems or related groups of systems.
C	<ul style="list-style-type: none"> • 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) 	<ul style="list-style-type: none"> • Checking can only be accomplished using systems devices. • Checking objectives focus on mastering individual systems, procedures, or tasks.
D	<ul style="list-style-type: none"> • Level 6 or 7 flight training device (FTD 6-7) • Level A or B full flight simulator (FFS A-B) 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Level C or D full flight simulator (FFS C-D) • Aircraft (ACFT) 	<ul style="list-style-type: none"> • 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.

Related Aircraft ↓	Base Aircraft →	1900/1900C	1900D
1900/1900C		B/B 1	C/B
1900D		D/C	B/B 2,3,4,5

Notes:

- 1) Differences within the 1900/1900C are the Fuel System and specific aircraft equipage.
- 2) Differences within 1900D are specific aircraft equipage.
- 3) Differences for G950 installation are D/D.
- 4) Differences for IDS-3000 installation are D/D.
- 5) Differences for Rockwell Collins Pro Line 21 dual Primary Flight Display (PFD) Integrated Display System (IDS) installation are D/D.

APPENDIX 3. DIFFERENCES TABLES

This Design Differences table, from the 1900/1900C to the 1900D, was proposed by Textron Aviation, Inc. and validated by the Flight Standardization Board (FSB). It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: 1900/1900C TO RELATED AIRCRAFT: 1900D	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	General Airplane Configuration	1900/1900C Part 23 and Special Federal Aviation Regulation (SFAR) 41. 1900D Part 23 Commuter Category.	Yes	Yes	A	B
	Weights	Weights vary slightly by model and modification status, including gross weight increase.	No	No	A	B
	Airworthiness Limitations	Numerous changes in system design to address Rotor Burst criteria. Changed Fatigue Life.	No	No	A	B
	Placards and Markings	Different Placards listed in Airplane Flight Manual (AFM)/Pilot's Operating Handbook (POH).	No	No	A	B
	Engines	1900/1900C has PT6A-65B. 1900D has PT6A-67D.	Yes	Yes	B	B

FROM BASE AIRCRAFT: 1900/1900C TO RELATED AIRCRAFT: 1900D	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Flight Deck	Wide center pedestal, Revised Overhead Panel, Various Instrument Panel Changes.	No	No	A	B
	Instrument Panel Layout	1900D has Rockwell Collins EFIS-84.	No	Yes	D	C
	Cabin	New interior design but same max passenger configuration.	No	No	A	B
	Flight Controls	1900D adds Aileron Rudder interconnect and Rudder Boost option. 1900/1900C has Power Steering option.	Yes	Yes	B	B
	Aerodynamic Controls	1900/1900C have four position Flaps. 1900D has three position Flaps.	Yes	Yes	D	C
	21 Air Conditioning	Increased Max Differential Pressure and changes to Bleed Air, Environmental Air, and Pressurization components.	No	No	B	B
	22 Autoflight	1900D optional APS-65 Autopilot. 1900C optional SPZ-2000 or SPI-4000 Autopilot.	No	Yes	B	B
	23 Communications	Upgraded Rockwell Collins Communications Radios and Cockpit Voice Recorder (CVR).	No	No	A	A
	24 Electrical Power	Dual AC Bus System.	No	Yes	B	B

FROM BASE AIRCRAFT: 1900/1900C	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
TO RELATED AIRCRAFT: 1900D						
	25 Equipment/Furnishings	New Interior.	No	No	A	A
	26 Fire Protection	Changes in Firewall and Aft Nacelle.	No	No	A	A
	27 Flight Controls	Add Aileron Rudder interconnect and Rudder Boost option. Dual Pushrod Trim Tabs, Optional Electric Trim without autopilot.	Yes	Yes	B	B
	28 Fuel	1900 fuel system has bladder fuel cells, 1900C fuel system changes to wet wings, 1900D has changes to fuel venting to accommodate wing tip extension.	No	No	A	A
	30 Ice and Rain Protection	Additional Deice Boot coverage, Deice Annunciators, and Pitot Heat Annunciator System.	No	Yes	B	B
	31 Indicating/Recording Systems	Upgrade Flight Data Recorder (FDR) standard, Revised Annunciator Panel.	No	No	A	A
	32 Landing Gear	Revised Gear Position Indicators (various).	No	No	A	A
	33 Lights	Add Dual Position Lights, New EL Panel Lighting.	No	Yes	B	B

FROM BASE AIRCRAFT: 1900/1900C TO RELATED AIRCRAFT: 1900D	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	34 Navigation	Upgraded Rockwell Collins Navigation Radios and EFIS-84 Displays, Standby Attitude Indicator.	Yes	Yes	D	C
	35 Oxygen	New Crew Mask Container and Mask Mic.	No	Yes	D	B
	36 Pneumatics	Changes in Bleed Air Pressure and Vacuum readings.	No	Yes	A	A
	37 Vacuum	Vacuum Flight Instruments removed on Right Side.	No	Yes	B	B
	52 Doors	Larger Airstair, Cargo, and Emergency Exit Doors. *Refer to Title 14 of the Code of Federal Regulations 14 CFR part 91, § 91.1083, part 121, § 121.417, and part 135, § 135.331 for the specific emergency exit door training requirements.	No	No	A*	A
	53 Fuselage	Oval Cabin Shape for Standup Cabin.	No	No	A	A
	54 Nacelles/Pylons	Changed Nacelle Firewall and Aft Nacelle.	No	No	A	A
	55 Horizontal and Vertical Stabilizer	Twin Ventral Fins and larger Taillets.	Yes	No	B	B

FROM BASE AIRCRAFT: 1900/1900C	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
TO RELATED AIRCRAFT: 1900D						
	56 Windows	Taller cabin windows and New cockpit sun visor.	No	No	A	A
	57 Wings	Wing tip extensions and winglets, vortex generators on outboard flaps.	No	No	A	A
	61 Propellers	Composite blade construction with nickel leading edge.	No	No	A	A
	71 Powerplant	New engine truss and New Autofeather annunciations.	No	Yes	B	B
	72 Engine (Turbine)	PT6A-67D engines (PT6A-65B 1900/1900C).	No	Yes	B	B
	73 Fuel Fuel and Control	PT6A-67D has Duplex Fuel nozzles.	No	No	B	A
	78 Exhaust	Larger constant area Exhaust Stacks and Heat Dissipation Concerns.	No	No	A	A

This Maneuver Differences table, from the 1900/1900C to the 1900D, was proposed by Textron Aviation, Inc. and validated by the FSB. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: 1900/1900C TO RELATED AIRCRAFT: 1900D	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Preflight	Various Exterior, Interior, and Cockpit changes.	No	Yes	B	B
	Engine Start	Start procedures and characteristics.	No	Yes	B	B
	Taxi	Early 1900/1900C had Power Steering.	Yes	Yes	B	B
	Takeoff	1900/1900C Takeoff Distance is to 50 foot obstacle height with no Accelerate Stop consideration. 1900D Takeoff Distance is to 35 foot obstacle height and considers factors listed in AFM. 1900D has Reduced Power Takeoff.	Yes	Yes	D	C
	Rejected Takeoff (RTO) or V ₁ Fail	1900D has Accelerate/Stop Performance and Takeoff Flight Path gradient required.	Yes	Yes	B	B
	Climb Cruise Descent	1900D Performance includes Takeoff Flight Path requirements.	Yes	Yes	B	B
	Instrument Approaches	EFIS-84 navigation information display.	Yes	Yes	D	C
	Landing	Use of V _{Ref} for landing and Balked Landing.	Yes	Yes	B	B

FROM BASE AIRCRAFT: 1900/1900C TO RELATED AIRCRAFT: 1900D	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Normal Procedures	Preflight, Takeoff, Landing, Go-Around.	Yes	Yes	D	C
	Abnormal Procedures	EFIS-84 Reversion/Composite/FD.	No	Yes	D	C
	Emergency Procedures	Aircraft Performance Profile and various Emergency Procedures.	No	Yes	B	B

This Design Differences table, from the 1900D to the 1900/1900C, was proposed by Textron Aviation, Inc. and validated by the FSB. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: 1900D	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
TO RELATED AIRCRAFT: 1900/1900C						
	General Airplane Configuration	1900/1900C Part 23 and SFAR 41. 1900D Part 23 Commuter Category.	Yes	Yes	A	A
	Weights	Weights vary slightly by model and modification status, including GW increase.	No	No	A	A
	Airworthiness Limitations	Numerous changes in system design. Changed Fatigue Life.	No	No	A	A
	Placards and Markings	Different Placards listed in AFM/POH.	No	No	A	A
	Engines	1900/1900C has PT6A-65B. 1900D has PT6A-67D.	Yes	Yes	B	B
	Flight Deck	Narrow center pedestal, Revised Overhead Panel, Various Instrument Panel Changes.	No	No	A	A
	Instrument Panel Layout	1900C has mechanical Flight Instruments.	No	Yes	C	B
	Cabin	New interior design but same max passenger configuration.	No	No	A	A
	Flight Controls	1900C has no Rudder Boost. 1900/1900C has Power Steering option.	Yes	Yes	B	B

FROM BASE AIRCRAFT: 1900D TO RELATED AIRCRAFT: 1900/1900C	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Aerodynamic Controls	1900/1900C have four position Flaps. 1900D has three position Flaps.	Yes	Yes	B	A
	21 Air Conditioning	Decreased Max Differential Pressure and changes to Bleed Air, Environmental Air, and Pressurization components.	No	No	B	B
	22 Autoflight	1900D optional APS-65 Autopilot. 1900C optional SPZ-2000 or SPI-4000 Autopilot.	No	Yes	B	B
	23 Communications	Different Rockwell Collins Communications Radios and CVR.	No	No	A	A
	24 Electrical Power	Single AC Bus System.	No	Yes	B	B
	25 Equipment/Furnishings	Different Interior.	No	No	A	A
	26 Fire Protection	Changes in Firewall and Aft Nacelle.	No	No	A	A
	27 Flight Controls	No Rudder Boost option. Four Flap Settings.	Yes	Yes	B	B
	28 Fuel	1900 fuel system has bladder fuel cells, 1900C fuel system changes to wet wings, changes to fuel venting for wing tip difference.	No	No	A	A

FROM BASE AIRCRAFT: 1900D TO RELATED AIRCRAFT: 1900/1900C	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	30 Ice and Rain Protection	Different Deice Boot coverage, Deice Annunciators, and Pitot Heat Annunciator System.	No	Yes	B	B
	31 Indicating/Recording Systems	Different FDR, standard and Annunciator Panel.	No	No	A	A
	32 Landing Gear	Gear Position Indicators (various).	No	No	A	A
	33 Lights	Different cockpit lighting.	No	Yes	A	A
	34 Navigation	Different Rockwell Collins Navigation Radios and Mechanical Displays, No Standby Attitude Indicator.	Yes	Yes	C	B
	35 Oxygen	Crew Mask Container and Mask Mic.	No	Yes	C	B
	36 Pneumatics	Changes in Bleed Air Pressure and Vacuum readings.	No	Yes	A	A
	37 Vacuum	Vacuum Flight Instruments on Right Side.	No	Yes	B	B
	52 Doors	Smaller Airstair, Cargo, and Emergency Exit Doors. *Refer to §§ 91.1083, 121.417, and 135.331 for the specific emergency exit door training requirements.	No	No	A*	A

FROM BASE AIRCRAFT: 1900D	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
TO RELATED AIRCRAFT: 1900/1900C						
	53 Fuselage	Round Cabin Shape no standup height.	No	No	A	A
	54 Nacelles/Pylons	Changed Nacelle Firewall and Aft Nacelle.	No	No	A	A
	55 Horizontal and Vertical Stabilizer	Single Ventral Fins and smaller Taillets.	Yes	No	A	A
	56 Windows	Smaller cabin windows and cockpit sun visor.	No	No	A	A
	57 Wings	Smaller Wing Tips, no winglets.	No	No	A	A
	61 Propellers	Metal Propeller Blades.	No	No	A	A
	71 Powerplant	Different engine truss and Autofeather annunciations.	No	Yes	B	B
	72 Engine (Turbine)	PT6A-65B 1900/1900C.	No	Yes	B	B
	73 Engine and Fuel Control	No Duplex Fuel nozzles.	No	No	B	A
	78 Engine Exhaust	Smaller Exhaust Stacks.	No	No	A	A

This Maneuver Differences table, from the 1900D to the 1900/1900C, was proposed by Textron Aviation, Inc. and validated by the FSB. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: 1900D	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
TO RELATED AIRCRAFT: 1900/1900C	Preflight	Various Exterior, Interior, and Cockpit changes.	No	Yes	B	B
	Engine Start	Start procedures/characteristics.	No	Yes	B	B
	Taxi	Early 1900/1900C had Power Steering.	Yes	Yes	B	B
	Takeoff	1900/1900C Takeoff Distance is to 50 foot obstacle height with no Accelerate Stop consideration. 1900D Takeoff Distance is to 35 foot obstacle height and considers factors listed in AFM.	Yes	Yes	B	B
	RTO or V ₁ Fail	1900C has no Accelerate/Stop Performance and Takeoff Flight Path gradient required.	Yes	Yes	B	B
	Climb Cruise Descent	No Takeoff Flight Path requirements.	Yes	Yes	B	B
	Instrument Approaches	Mechanical navigation information display.	Yes	Yes	C	B
	Landing	No V _{Ref} for landing.	No	Yes	B	B
	Normal Procedures	Preflight, Takeoff, Landing, Go-Around.	Yes	Yes	B	B
	Abnormal Procedures	Minor Changes.	No	No	A	A

FROM BASE AIRCRAFT: 1900D TO RELATED AIRCRAFT: 1900/1900C	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Emergency Procedures	Aircraft Performance Profile and various Emergency Procedures.	No	Yes	B	B

This Design Differences table, from the 1900D (EFIS-84) to the 1900D (G950), was validated by the FSB. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (G950)	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	General Airplane Configuration	Garmin G950 integrated flight deck Primary Flight Display (PFD)/Multifunction Display (MFD) replaces existing EFIS-84 Electronic Attitude Director Indicator (EADI) and Electronic Horizontal Situation Indicator (EHSI) along with all analog flight and engine instruments. Systems indicators located in the lower panels are retained, including flaps and fuel quantity indicators.	NO	YES	C	B
	Weights	Revised Weight and Balance (W&B)/Equipment List.	NO	NO	A	A

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (G950)	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Limitations	Limitations related to the avionics/Flt Inst. Kinds of Operations Equipment List change to include G950 system. Limits for Class A Terrain Awareness and Warning System (TAWS), Traffic Alert and Collision Avoidance System (TCAS)-1, Global Positioning System (GPS) Wide Area Augmentation System (WAAS), Required Navigation Performance (RNP)-4, and Localizer Performance with Vertical Guidance (LPV).	NO	YES	B	B
	Placards and Markings	New Placard Formats replace existing placards.	NO	NO	A	A
	Flight Deck	Replace EFIS-84, Mechanical Flt/Eng Inst., FDC-65, Alt Alerter, and Pro Line 2 Radios with G950 System. XM weather Data (optional). GSR-56 Iridium Satcom (optional). Excludes FCS-65 Autopilot interface.	NO	YES	C	C

	Instrument Panel Layout	<p>G950 PFD/MFD format replaces all Primary Flight Inst, and Engine Inst.</p> <p>G950 PFD includes Synthetic Vision System (SVS).</p> <p>Display Unit reversion controlled by GMA-1347 Display Backup button.</p> <p>Lower Inst. Panel switches unchanged.</p> <p>Change from dual Rockwell Collins EFIS 84, Mechanical Flt/Eng indicators, Rockwell Collins FDC-65 Flight Director, Rockwell Collins Pro Line 2 radios to Garmin G950 Integrated flight deck system.</p> <p>Changed from EADI/EHSI EFIS-84 and Mechanical Primary Flight Inst. to dual PFD (GDU-1040).</p> <p>Radio Magnetic Indicator removed, bearing on PFD.</p> <p>Engine Instruments now displayed on MFD (GDU-1500).</p> <p>Replaced mechanical Standby Attitude Indicator with three-in-one standby display (MD302).</p> <p>Prop synch moved to MFD.</p> <p>FDC-65 Flight Director Controllers replaced with</p>	NO	YES	C	C
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FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (G950)	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
		<p>GMC-710 FDC top center instrument panel.</p> <p>MFD controller (GCU-477) on left forward center pedestal.</p> <p>Pro Line 2 audio replaced by two (GMA-1347) audio panels outboard of PFDs.</p> <p>Yaw Damper self-test relocated to center pedestal switch with annunciation on PFD.</p> <p>GWX-70 Weather Radar displayed on MFD.</p> <p>Autofeather (AFX) displayed in engine instrument grouping of the MFD.</p> <p>Altitude Alerter moved to G950 PFD and FD using GMC-710.</p> <p>System adds synthetic vision and HITS displays (optional).</p> <p>Garmin GPS400 replaced by G950 system WAAS GPS.</p> <p>Garmin GDU-1500 integrated TAWS Class A installed exclusively.</p>				

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (G950)	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	22 Autoflight	FYD-65 Yaw Damper retained with YD Test moved to center console button. Converter added to interface with existing FYD-65. FCS-65 not approved with this STC. Control Wheel Steering (CWS) button on yoke. FCP-65 FD Controller replace with one GCU-710 top center instrument panel.	NO	YES	B	B
	23 Communications	G950 Dual VHF (GIA-63W) replace Pro Line 2 radios, tuned with Display Control Panel (DCP) on GDU-1040s. Abnormal Tuning Procedures added. GMA-1327 audio panels replace Pro Line 2 audio panels. Cohbam Model 240 provides PA system for GMA-1347 Audio Panels and cabin briefer.	NO	YES	C	B

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (G950)	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	24 Electrical Power	115v AC/400 Hz remains but no G950 use. Changes to Circuit Breaker Panel. Attitude Heading Reference System (AHRS)/Air Data Computer (ADC)/PFD/MFD/GEA power sources. Each PFD has own PS-835 Standby Battery and Standby Battery Switch. RH AC Bus Transfer removed.	NO	NO	A	A
	27 Flight Controls	Interface Control added for Yaw Damp (YD)/Rudder Boost (RB) function convert digital to analog signal.	NO	NO	A	A
	31 Indicating/Recording Systems	AFX Green Ann. on MFD b/w ITT and Torq Prop Syncphaser indicator on MFD. YD Ann. on PFD. PFD/MFD cooling fan functions added. G950 interfaces with L3 FDR and CVR. New Annunciator Switches for Prop Sync and Emergency Frequency along with Dimming Selection.	NO	NO	B	B

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (G950)	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	33 Lights	G950 Internal Display lighting. Existing Cockpit Lighting control function.	NO	NO	B	B
	34 Navigation	PFD Display Format replace Basic T. Dual G950 VHF Navs. Single ADF, DME, and Radar Altimeter (RAD ALT) on G950.	NO	YES	D	D
	34 Navigation	Navigation Display and Flight Plan. Dual GPS WAAS with GIA-63A, w/ RNP-4. LNAV/VNAV and LPV Approaches.	NO	YES	D	D
	34 Navigation	G950 integrated ADC (GDC-7400) with Pitot/Static interface changes. Baro-set and Alt. Alerter. Low Speed Awareness (LSA) on speed tape. Tape Altimeter and Vertical Speed. G950 integrated Air Data and Heading Reference System (ADHRS) (GRC-77).	NO	YES	C	C

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (G950)	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	34 Navigation	GTX-33 Transponder controlled by PFD DCP or GDU-477. Rockwell Collins DME-42 retained w/ G950 display. Rockwell Collins ADF-462 retained w/ bearing on PFDs. RAC-870 Converter installed to retain Rockwell Collins ALT-55 RAD ALT on PFD. Weather Radar (GWX-70). TCAS (GTS-855). TAWS Class A integrated in G950 PFD/MFD.	NO	YES	B	B
	46 Information Systems	G950 EFB Functions. IAP only, no Enroute Charts. Emergency Power Chart availability. XM weather Data (GDL-69A).	NO	YES	C	B
	53 Fuselage	Add GPS WAAS antennas, XM Antenna, and two OAT Probes.	NO	NO	A	A
	61 Propellers	Propeller Synchrophase Indication on MFD. Propeller Synchrophase Switch now push button. AFX Green Ann. on MFD.	NO	NO	A	A

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (G950)	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	77 Engine Indicating	<p>The engine instruments included in the Garmin G950 using two GEA-71 engine/airframe data concentrators with Signal Conditioners.</p> <p>Eng. Inst. Primary display is in the MFD with reversionary displays in the PFDs. Engine displays include: Prop RPM X 2. Torque X 2. Turbine speed X 2. Turbine Temperature X 2. Fuel Flow X 2. Engine oil pressure X 2. Engine oil Temperature X 2.</p> <p>The engine displays include alerting for operation outside normal ranges. AFX indication above each torque Indicator. Prop Sync indication is between RPM indicators. Engine indication for ITT rescales for starting and once the engine is started, displays normal scaling.</p>	NO	YES	C	B

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (G950)	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	80 Engine Starting	Engine starting is unchanged except where impacted by Engine Indicating and Electrical Power distribution procedures.	NO	YES	A	A

This Maneuver Differences table, from the 1900D (EFIS-84) to the 1900D (G950), was validated by the FSB. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (G950)	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Preflight	G950 Cockpit Preflight Procedures	NO	YES	B	B
	Before Start	Electrical Power Procedures, Busing, Standby Power, and Displays. Delete EFIS-84 checks.	NO	YES	B	B
	Engine Start	Electronic Engine Gauges on MFD.	NO	YES	C	B
	After Start and Taxi	G950 System Checks.	NO	YES	C	B
	Takeoff	G950 PFD/MFD setup, V-speeds. PFD/MFD Inst reference for Takeoff.	NO	YES	C	B
	RTO or V ₁ Fail	PFD airspeed and attitude reference. MFD Engine indications.	NO	NO	C	B
	Climb Cruise Descent	Flight Director Use, LSA. Altitude Alerter Use. Navigation, Navigation Source, FD.	NO	YES	C	B
	In-Flight Maneuvers	Maneuvers affected by PFD Flight Inst. (Steep Turns, Stall LSA, FD, Navigation).	NO	NO	D	D

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (G950)	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Instrument Approaches	Flight Plan selection procedures. Approach selection, activation, FD use. LNAV/VNAV and LPV approach procedures.	NO	YES	D	D
	Landing	PFD Inst. reference and setting V-speeds. MFD Engine Inst. reference.	NO	YES	C	B
	Shutdown	G950 Display shutdown procedures.	NO	YES	C	B
	Normal Procedures	AFMS Procedures for G950 Display System, TCAS, TAWS.	NO	YES	D	D
	Abnormal Procedures	AFMS Procedures for G950 Display System, TCAS, TAWS.	NO	YES	C	B
	Emergency Procedures	AFMS Procedures for G950 Display System, TCAS, TAWS.	NO	YES	C	C

This Design Differences table, from the 1900D (EFIS-84) to the 1900D with IDS-3000, was validated by the FSB. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D with IDS-3000	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	General Airplane Configuration	Pro Line PFD/MFD IDS replaces existing EFIS-84 EADIs and EHSIs along with all analog flight and engine instruments	NO	YES	B	A
	Weights	Change in basic operating weight and equipment list.	NO	NO	A	A
	Airworthiness Limitations	Limitations for IDS-3000. Engine Display Markings.	NO	NO	A	B
	Flight Deck	Center Pedestal extended aft to accommodate relocation of radio controls, Mode Select Panel, and MFD control.	NO	YES	B	A

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D with IDS-3000	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Instrument Panel Layout	Install IDS-3000 PFD1, PFD2, and MFD. Removal EFIS-84 flight instruments, analog engine indications. Relocated following from Instrument Panel to Center Pedestal: #1 and #2 FCP-65 Control Panel. (2)#1 and #2 VHF NAV/Com Transceiver Control Head. #1 and #2 ADF Control Head. Transponder Control Head. TCAS Control Head. Add Audio Panel with Compass Control and PFD dimming, reversionary panel with MFD dimming, Gnd Comm Pwr, AP select, TCAS, DME Vol., intercom, Rad Alt., Xpdr, and Prop Sync. Add Display Control Panels with Integrated Altitude Alerter.	NO	YES	C	B

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D with IDS-3000	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	22 Autoflight	Original Rockwell Collins APS-65 Autopilot is retained, adding dual AHRS monitoring. Autopilot Mode Annunciation and Disconnect Annunciation now on PFD. AP/FD Flight Control Panel and Remote Mode Annunciator Panel moved from above EADI to forward Center Pedestal. AP/FD couple arrow not functional for AP. AP selector on Reversionary Panel. Dual FD installation. YD annunciation.	NO	YES	B	B
	23 Communications	VHF Com, VHF Navigation, ADF, Transponder (XPDR), and TCAS Control Heads relocated to pedestal.	NO	NO	A	A

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D with IDS-3000	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	24 Electrical Power	Add Emergency Power sources control panel on top center instrument panel. Add PS-835 Emergency Power Supplies for emergency power of PFD1 and MFD. Normal PFD1 and MFD power #2 avionics bus, Normal PFD 2 power right Gen Bus. Standby Horizon Power and lighting remains. Circuit Breaker Panel changes and additions. 115v AC no longer utilized by aircraft. 26v AC remains for FD, AP, Radar Stab.	NO	YES	B	B
	26 Fire Protection	Engine Fire Indication added to Engine Display inside TRQ/ITT indicator.	NO	NO	A	A
	30 Ice and Rain Protection	Low Speed Awareness for Icing conditions requires use of REFS V _t selected to 160 kts. No Low Speed Awareness automated adjustment for icing conditions included.	NO	YES	B	B

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D with IDS-3000	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	31 Indicating/Recording Systems	No Changes to main Annunciator Panels. Remote Annunciators changed, removed, or relocated: AFX green remote annunciation is now on MFD Engine Display inside TRQ/ITT. Autopilot Disconnect and Mode annunciation is now on PFD. GPWS/EGPWS annunciators relocated above PFD1 and PFD2 on Remote Ann. Panel. TCAS annunciation now on PFD/MFD. FDR status annunciation moved to remote annunciator panel above PFD1. FD/AP/YD mode Remote Annunciator Panel moved to center pedestal with FCP-65 relocation. Flight Control Annunciations are duplicated on PFD1 and PFD2. Reversion annunciation is on PFD.	NO	YES	B	B

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D with IDS-3000	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	32 Landing Gear	Protrusion of Parking Brake Knob through the Center Pedestal Cover creates potential for inadvertent release of Parking Brake.	NO	NO	B	B
	33 Lights	Cockpit lighting control changes to multiple dimming controls. PFD dimming on Audio Panel, MFD dimming on Reversion Panel. Minor changes in EL Panel format and labels.	NO	YES	A	B

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D with IDS-3000	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	34 Navigation	EADI/EHSI EFIS displays replaced by 8x10" LCD PFD EFIS displays. Separate EADI and EHSI replaced with composite PFD format. NORM or FREE Heading slave mode control relocated to Audio Panel. Analog Flight Instruments replaced with composite PFD format. Separate mechanical pneumatic Airspeed, Altimeter, and Vertical Speed replaced with composite PFD format. RMI removed, bearing selections displayed on composite PFD format. New EFIS format/control/selections: Two DCPs for PFD. One Course Heading Panel (CHP). Two Digital Interface Units (DIU). One CCP for MFD.	NO	YES	C	C

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D with IDS-3000	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	34 Navigation	Add Dual Garmin GPS400W required. (GPS1 and GPS2) Navigation Display available on lower composite PFD format and on MFD. Add LNAV, LNAV/VNAV, and LPV Approach capability. No Baro-VNAV.	NO	YES	C	C
	34 Navigation	Install Dual ADC-85 Air Data Computers. Add Low Speed Awareness to speed tape. Altitude Baro Set is provided on DCP. Altitude Alerter/Pre-selector Controller is provided on DCP.	NO	YES	C	A
	34 Navigation	Rockwell Collins TCAS-4000 (TCAS II) display is selectable to PFD and MFD. WX Radar only selectable to MFD. Honeywell Mk 6 TAWS (TAWS B only) Class B only because no Terrain Display.	NO	YES	C	A

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D with IDS-3000	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	46 Information Systems	IFIS-5000 installed for Electronic Charts and/or Graphical Weather. IFIS-5000 is not linked to Flight Plan. Chart selection is workload intensive using rotary knob on CCP. Own-Ship-Position is available on IFIS-5000 provided graphics.	NO	YES	C	B
	53 Fuselage	Add two exterior antennas for GPS/XM.	NO	NO	A	A
	61 Propellers	Propeller Synchronization switch is relocated to Reversionary Panel. Propeller Syncrophaser is indicated on Engine Display. AFX green annunciation added to Engine Display, replacing remote annunciators.	NO	NO	A	A

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D with IDS-3000	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	77 Engine Indicating	Separate Analog Engine Instruments replaced Engine Display. (Normal on MFD, Reversion on PFD). Exceedances are annunciated in Red. Abnormal indications are annunciated in Amber. Primary for power Torque and ITT combined round dial gauge and digital display, Propeller RPM is round dial gauge and digital display: N ₁ is round dial gauge and digital display. Fuel Flow, Oil Pressure, and Oil Temp are digital only. AC powered Torque Indicators are replaced with self-generating torque sending units. Placement and function of DCUs and EDUs (two each).	NO	YES	C	B
	80 Engine Starting	Engine Instruments on MFD.	NO	NO	B	B

This Maneuver Differences table, from the 1900D (EFIS-84) to the 1900D with IDS-3000, was validated by the FSB. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D with IDS-3000	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Preflight	PFD/MFD power distribution.	NO	YES	C	B
	Engine Start	Use of MFD Engine Display and PFD/MFD power distribution.	NO	YES	C	B
	Taxi	Flight Instrument checks.	NO	YES	C	B
	Takeoff	V-speed and Altitude Selection. Airspeed Indication on tape format.	NO	YES	C	B
	RTO or V ₁ Fail	Airspeed Indication on tape format. Attitude indications on PFD format. Low Speed Awareness cues.	NO	YES	C	B
	Climb Cruise Descent	PFD format for all flight instruments. Low Speed Awareness cues. Selection and use of Navigation Sources.	NO	YES	C	B
	Instrument Approaches	Navigation Source Selection and display format. LNAV, LNAV/VNAV, and LPV approaches.	NO	YES	D	D

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D with IDS-3000	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Landing	V-speed and Altitude Selection. Airspeed Indication on tape format.	NO	YES	C	B
	Normal Procedures	Navigation Source selection, Navigation Display format, Autopilot, and FD control. IFIS-5000 use procedures. TCAS and TAWS use procedures.	NO	YES	D	C
	Abnormal Procedures	Abnormal procedures for Avionics/Flight Instruments of IDS-3000 system.	NO	YES	C	B
	Emergency Procedures	Emergency procedures for Dual Generator Failure, AC Inverter Failures, Emergency Power Management, and Standby Flight Instruments.	NO	YES	C	C
	In-Flight Maneuvers	Tape format and Low Speed Awareness for Steep Turns and Stalls.	NO	YES	D	D

This Design Differences table, from the 1900D (EFIS-84) to the 1900D (with Pro Line 21 Dual PFD IDS), was proposed by IMP Electronic Systems and validated by the FSB on June 7, 2017. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (Pro Line 21 Dual PFD IDS)	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	General Airplane Configuration	Dual Pro Line 21 PFDs replace existing EFIS-84 EADIs and EHSIs along with all analog flight and instruments. Analog engine instruments are retained. Systems indicators located in the lower panels are retained, including flaps and fuel quantity indicators.	NO	YES	B	A
	Weights	Change in BOW and equipment list.	NO	NO	A	A
	Airworthiness Limitations	No Change to basic aircraft limitations. (GPS/GNSS approach limits when GTN725 optional configuration is installed)	NO	NO	A	A
	Flight Deck	Center Pedestal rearranged for relocation of FCS-65 Mode Select Panels installation of CCP, Cursor Knob Panel (CKP), and reversion panel.	NO	YES	B	A

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (Pro Line 21 Dual PFD IDS)	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Instrument Panel Layout	Install Pro Line 21 PFD1 and PFD2. Removal EFIS-84 flight instruments. Relocated following from Instrument Panel to Center Pedestal: One #1 and #2 FCP-65 Control Panel. Rework Audio Panels and Compass Control Panels DME Vol, Gnd Comm Pwr, Intercom. Add two DCPs with Integrated Altitude Alerter.	NO	YES	C	B

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (Pro Line 21 Dual PFD IDS)	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	22 Autoflight	Original Rockwell Collins FYD-65 Flight Director/Yaw Damper is retained. FD Mode Annunciation now on PFD. YD Disconnect annunciation now on dedicated annunciator adjacent to each PFD. FD Flight Control Panel and Remote Mode Annunciator Panel moved from above EADI to forward Center Pedestal. AP/FD couple arrow not functional for FD. FD selector on Reversionary Panel. Dual FD installation. YD annunciation.	NO	YES	C	C
	23 Communications	No Change to VHF Com, VHF Navigation, ADF, XPDR, and TCAS Control Heads. Rearrangement of audio control panels.	NO	NO	A	A

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (Pro Line 21 Dual PFD IDS)	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	24 Electrical Power	ADC 2: Right Gen, Triple Feed ADC 1: Triple Feed, Triple Feed PFD 2 Heater: Right Gen PFD 2: Right Gen PFD 1 Heater: Left Gen PFD 1: Triple Feed AHC 1: Triple Feed, Triple Feed AHC 2: Right Gen, Triple Feed DCP 2: Right Gen DCP 1: Triple Feed DIU 1: Triple Feed, Triple Feed DIU 2: Right Gen, Triple Feed GPS: Right Gen Standby Attitude, Altitude, and Airspeed have dedicated emergency power. Circuit Breaker Panel changes and additions. 26v AC remains for FD, Radar Stab.	NO	YES	B	B
	30 Ice and Rain Protection	No Low Speed Awareness automated adjustment for icing conditions included.	NO	YES	B	B

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (Pro Line 21 Dual PFD IDS)	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	31 Indicating/Recording Systems	No Changes to main Annunciator Panels. Remote Annunciators changed, removed or relocated: FD/YD Mode annunciation is now on PFD. YD Disconnect annunciator and coupled arrows on dedicated annunciators adjacent to the PFDs. GPWS/EGPWS annunciators relocated above PFD1. TCAS annunciation now on PFD. FD/YD mode Remote Annunciator Panel moved to center pedestal with FCP-65 relocation. Flight Control Annunciations are duplicated on PFD1 and PFD2. Reversion annunciation is on PFD.	NO	YES	B	B

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (Pro Line 21 Dual PFD IDS)	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	33 Lights	Overhead cockpit lighting controls re-worked to dim Pro Line components. No change to labels. Integral lighting control rocker switch on the PFD “trims” display brightness.	NO	YES	A	A

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (Pro Line 21 Dual PFD IDS)	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	34 Navigation	<p>EADI/EHSI CRT EFIS displays replaced by 8x10" LCD PFD EFIS displays.</p> <p>Separate EADI and EHSI replaced with composite PFD format.</p> <p>NORM or FREE Heading slave mode control relocated to switch panels adjacent to each PFD.</p> <p>Analog Flight Instruments replaced with composite PFD format.</p> <p>Separate mechanical pneumatic Airspeed, Altimeter, and Vertical Speed replaced with composite PFD format.</p> <p>RMI removed, bearing selections displayed on composite PFD format.</p> <p>New EFIS format, control, and selections.</p> <p>Two DCPs for PFD. One CHP (center pedestal). Two DIUs.</p> <p>One CKP (center pedestal).</p>	NO	YES	D	D

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (Pro Line 21 Dual PFD IDS)	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	34 Navigation	Add (optional) Garmin GTN725 (GPS1). Navigation Display available on lower composite PFD. Add LNAV, LNAV/VNAV, and LPV Approach capability. No Baro-VNAV.	NO	YES	C	C
	34 Navigation	Install Dual ADC-85 Air Data Computers. Add Low Speed Awareness to speed tape. Altitude Baro Set is provided on DCP. Altitude Alerter/Pre-selector Controller is provided on DCP.	NO	YES	C	C
	34 Navigation	BFG TCAS (TCAS I) display is selectable to PFDs. WX Radar selectable to PFDs.	NO	YES	C	A
	46 Information Systems	No Change in base configuration. Flight Plan info when GTN725 is installed.	NO	YES	C	B

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (Pro Line 21 Dual PFD IDS)	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	53 Fuselage	Legacy GPS antenna replaced with GTN725 antenna when GTN725 is installed.	NO	NO	A	A
	77 Engine Indicating	No Change to arrangement of analog engine instruments. They are relocated to the RIGHT approx. 0.5 inch.	NO	NO	A	A

This Maneuver Differences table, from the 1900D (EFIS-84) to the 1900D (Pro Line 21 Dual PFD IDS), was proposed by IMP Electronic Systems and validated by the FSB on June 7, 2017. It lists the minimum differences levels operators must use to conduct differences training and checking of flightcrew members.

FROM BASE AIRCRAFT: 1900D (EFIS-84)	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
TO RELATED AIRCRAFT: 1900D (Pro Line 21 Dual PFD IDS)	Preflight	PFD power distribution.	NO	YES	B	B
	Before Start	Electrical Power Procedures, Busing, Standby Power, and Displays. Delete EFIS-84 checks.	NO	YES	B	B
	After Engine Start	Pro Line 21 Power on and system checks.	NO	YES	C	B
	Taxi	Flight Instrument checks.	NO	YES	C	B
	Takeoff	V-speed and Altitude Selection. Airspeed Indication on tape format.	NO	YES	C	B
	RTO or V ₁ Fail	Airspeed Indication on tape format. Attitude indications on PFD format. Low Speed Awareness cues.	NO	YES	C	B

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (Pro Line 21 Dual PFD IDS)	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Climb Cruise Descent	PFD format for all flight instruments. Low Speed Awareness cues. Altitude Alerter. Selection and use of Navigation Sources.	NO	YES	C	B
	Instrument Approaches	Navigation Source Selection and display format. LNAV, LNAV/VNAV, and LPV approaches.	NO	YES	D	D
	Landing	V-speed and Altitude Selection. Airspeed Indication on tape format.	NO	YES	C	B
	Normal Procedures	Navigation Source selection, Navigation Display format, FD control and YD control. Radar display, TAWS, and TCAS (when installed)	NO	YES	D	D
	Abnormal Procedures	Abnormal procedures for Avionics/Flight Instruments.	NO	YES	C	C

FROM BASE AIRCRAFT: 1900D (EFIS-84) TO RELATED AIRCRAFT: 1900D (Pro Line 21 Dual PFD IDS)	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Emergency Procedures	Emergency procedures for Dual Generator Failure, AC Inverter Failures, Emergency Power Management, and Standby Flight Instruments.	NO	YES	C	C
	In-Flight Maneuvers	Tape format and Low Speed Awareness for Steep Turns and Stalls.	NO	YES	D	D