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Operational Suitability Report (OSR)

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Universal Avionics Systems Corporation
InSight EFI-1040P Avionics Package ST04534CH for the Dassault Aviation Mystere-Falcon 20

Approved by the Aircraft Evaluation Division
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HIGHLIGHTS OF CHANGE

0. Original Document; all Sections.

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1. PURPOSE.

The Aircraft Evaluation Division (AED), Air Carrier Branch, evaluated a Dassault Aviation Mystere-Falcon 20 modified in accordance with Supplemental Type Certificate (STC) No. ST04534CH. This Operational Suitability Report (OSR) acknowledges the operational suitability of this STC package as observed. This report also establishes the minimum training and checking levels in accordance with the standards published in Advisory Circular (AC) 120-53B CHG 1, Guidance for Conducting and Use of Flight Standardization Board Evaluations, for flightcrew members transitioning between an unmodified Mystere-Falcon 20 and one equipped per ST04534CH. Due to the age of the aircraft type, a Flight Standards Board Report (FSBR) does not exist. This report does not contain all the information normally found within an FSBR and is not intended as a replacement.

2. DESCRIPTION.

2.1 STC No. ST04534CH is applicable to the Dassault Aviation Mystere-Falcon 20 series as defined in FAA Type Certificate Data Sheet (TCDS) No. A7EU. For the purposes of this report, an unmodified Mystere-Falcon 20 is the base aircraft and will be referred to as "Mystere-Falcon 20." The aircraft evaluated was modified in accordance with STC No. ST04534CH and will be referred to as "InSight Falcon 20."

2.2 Although ST04534CH includes several optional configurations, this report is only concerned with Option 1, in which the original electro-mechanical and Rockwell Collins Electronic Flight Information System (EFIS)-85 primary flight instruments are replaced with Universal Avionics EFI-1040P InSight liquid crystal display (LCD) flat panel displays and associated controls. Option 1 also includes the addition of several other pieces of hardware allowing further utilization of the InSight system capabilities. The primary system components in Option 1 are:

- (3) Universal Avionics EFI-1040P Displays,
- (1) Universal Avionics Data Concentrator Unit (DCU),
- (2) Universal Avionics Electronic Control Display Units (ECDU),
- (2) Universal Avionics Alphanumeric Keyboards (ANK),
- (1) Universal Avionics Reference Select Panel (RSP),
- (1) Universal Avionics UniLink 801 Communications Management Unit (CMU),
- (1) Universal Avionics CVR-120A Cockpit Voice Recorder (CVR), and
- (1) Latitude Technologies DL150 Iridium Satellite Communications (SATCOM) (Data Link).

2.3 The existing primary flight instruments and displays are replaced with three Universal Avionics Insight LCD Flight Displays configured as pilot and co-pilot primary flight displays (PFD) and one pilot multifunction display (MFD), along with associated control panels and hardware.

2.4 EFIS display modes, flight management system (FMS) programming, radio tuning, traffic and ground proximity alerting, and onboard weather radar are controlled via the ECDUs and ANKs. The system is interfaced to the existing Collins APS-85 Automatic Flight Control System (AFCS). This modification will allow the aircraft to fly coupled lateral navigation (LNAV), vertical navigation (VNAV), and localizer performance with vertical guidance (LPV) approach types. The installed equipment provides functionality for Synthetic Vision System (SVS) on both PFDs and ability to display Jeppesen aeronautical charts (via Universal Avionics eChart) on the single MFD. Datalink communications (Future Air Navigation System 1/A+ (FANS 1/A+) and Aeronautical Telecommunication Network B1 (ATN B1)) is also available.

2.5 ST10319CH assumes a base aircraft with dual Universal Avionics UNS-1Fw FMS and two existing Global Positioning Satellite (GPS) antennas mounted on top of the fuselage mid-cabin already installed.

2.6 The observation and evaluation of this installation was conducted in March 2023 using the criteria described in FAA AC 120-53B CHG 1. The aircraft used was a Dassault Aviation Mystere-Falcon 20F-5. The InSight software revision loaded was SCN 1026.0.10. The results of this evaluation were consistent with those of previously evaluated Falcon InSight installations.

3. PILOT TYPE RATING.

The Dassault Aviation Mystere-Falcon 20 type rating designation is DA-20 and remains unchanged by ST04534CH.

4. PILOT TRAINING.

4.1 Airmen receiving differences training in the InSight Falcon 20 should have previous multiengine transport turbojet aircraft, glass cockpit, and FMS experience. Pilots without this experience may require additional training. The Universal Avionics UNS-1 FMS has been in use in multiple aircraft fleets for many years and is part of the base aircraft configuration. The training recommendations in this report assume pilot-demonstrated proficiency with both the Mystere-Falcon 20 and UNS-1 FMS within the previous 24 calendar-months.

4.2 Evaluated minimum training recommendations are:

a) Fourteen (14) Planned Hours of Universal Avionics Systems Corporation web-based InSight curriculum.

b) Two (2) Planned Hours of aided instruction in the form of a presentation on InSight Falcon 20 interface, normal and non-normal procedures and special emphasis training items listed below provided by instructors with operational experience in InSight Falcon 20.

c) Three (3) Planned Hours of part task skill training utilizing the InSight Falcon 20 aircraft on the ground with ground power applied.

4.2.1 Operators must develop normal, abnormal, and emergency operating procedures from the Universal Avionics Systems Corporation InSight Operator's Manual and the InSight Falcon 20 Airplane Flight Manual Supplement (AFMS). These procedures must be included in the appropriate approved operator training course when required by Title 14 of the Code of Federal Regulations (14 CFR).

4.2.2 Principal Operations Inspectors (POI) may contact the AED for technical assistance in evaluating training and checking for individual operators that have unique issues not addressed in this report, or with other questions or concerns.

4.3 The AED recommends special emphasis flightcrew training for the following items associated with this STC:

a) Potential for inadvertent selection of the DISP display reversion button instead of the HOME button on the ECDU, resulting in a timer countdown to PFD screen blanking and reversion of PFD to MFD.

b) Recognition and awareness that, in the event of inadvertent display reversion prior to takeoff, upon returning the displays to their normal configuration, the V speeds will revert to an OFF indication and need to be selected again.

c) Radio-tuning procedures. ECDU "TUNE" button default or last tuned function may result in non-desired radio selected.

d) Taxi diagram and chart management on MFD during takeoff, approach, and landing phases.

e) Location and operation of dedicated transponder ident button.

f) Awareness that low speed awareness cues are indexed to user assigned V speeds (e.g., V_2, V_{REF}) and are not associated with aircraft configuration or angle of attack (AOA).

g) Due to highly configurable display options, a standardized company display setup is highly recommended.

4.4 An aircraft modified with STC No. ST04534CH or comparable part task trainer must be used for those skills and procedures unique to the InSight Falcon 20.

4.5 Pilots must receive differences training between the Mystere-Falcon 20 and InSight Falcon 20. The level of training is Level C.

5. PILOT CHECKING

Pilots must receive differences checking between the Mystere-Falcon 20 and InSight Falcon 20. The level of checking is Level B.

6. PILOT CURRENCY

There are no additional currency requirements for the InSight Falcon 20 other than those already specified in 14 CFR parts 61 and 135.

7. OPERATIONAL SUITABILITY

The AED found the InSight Falcon 20 to be operationally suitable for operations under 14 CFR parts 91 and 135.

APPENDIX 1

DIFFERENCES LEGEND

Training Differences Legend

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

Checking Differences Legend

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

APPENDIX 2

MASTER DIFFERENCES REQUIREMENTS (MDR) TABLE

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

To Related Aircraft ↓	**From Base Aircraft →**	**Mystere-Falcon 20**	**InSight Falcon 20**
InSight Falcon 20		C/B	Not applicable
Mystere-Falcon 20		Not applicable	Not evaluated

APPENDIX 3

DIFFERENCES TABLES

Design Differences Table

FROM BASE AIRCRAFT: Mystere-Falcon 20 TO RELATED AIRCRAFT: InSight Falcon 20	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	General	Panel layout, ECDU control of display content, ANK for data entry, and Radar-controlled thru ECDU.	No	Yes	B	A
	Charts and SVS	Added functionality embedded in EFI-1040Ps: Synthetic Vision data, Jeppesen eChart data, and Terrain database.	No	Yes	C	B
	Autoflight	Interface between new Reference Select Panel, ECDUs, and existing Autopilot system, as well as the introduction of Flight Mode Annunciation on PFDs.	No	Yes	C	B
	Communications	Radio control units removed. Radio tuning accomplished through ECDUs.	No	Yes	C	B
	Communications	Datalink capability.	No	Yes	B	B

FROM BASE AIRCRAFT: Mystere-Falcon 20 TO RELATED AIRCRAFT: InSight Falcon 20	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Indicating/Recording Systems	Linear Speed Tape Display with reference and limitation speeds.	No	Yes	B	A
	Indicating/Recording Systems	PFD screen reversion.	No	Yes	B	B
	Navigation	Universal UNS-1Fw SCN upgrade.	No	Yes	C	B
	Navigation	Baro Knob function moved to ECDU.	No	Yes	B	A
	Navigation	eChart, Moving Map added functionality.	No	Yes	C	B
	Fuselage	Two (2) GPS wide area augmentation system (WAAS) capable antennae added. Third very high frequency (VHF) anntena added for datalink. Iridium antenna added.	No	Yes	A	A

FROM BASE AIRCRAFT: Mystere-Falcon 20 TO RELATED AIRCRAFT: InSight Falcon 20	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Preflight Inspection	Three (3) Universal Avionics EFI-1040P LCD Adaptive Flight Displays (AFD), V speed Settings, Radio Tuning, and Control.	No	Yes	B	B
	Intrument Approaches	Three (3) Universal Avionics EFI-1040P LCD AFDs, Radio Tuning, and Control, LNAV/VNAV; LPV approach.	No	Yes	C	B
	Normal Procedures	Three (3) Universal Avionics EFI-1040P LCD AFDs, Radio Tuning, and Control.	No	Yes	B	B
	Abnormal Procedures	Three (3) Universal Avionics EFI-1040P LCD AFDs, Reversion Control now controlled thru ECDU, Radio Tuning, and Control.	No	Yes	C	B
	Inflight Maneuvers	Three (3) Universal Avionics EFI-1040P LCD AFDs.	No	Yes	B	B
	Emergency Procedures	Three (3) Universal Avionics EFI-1040P LCD AFDs, Reversion Control, Radio Tuning, and Control.	No	Yes	B	B