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Manufacturer
Dassault Aviation

Type Certificate Data Sheet (TCDS)	TCDS Identifier	Marketing Name	Pilot Type Rating
A59NM	Falcon 7X	Falcon 7X	DA-7X
A59NM	Falcon 7X	Falcon 8X	DA-7X

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1. RECORD OF REVISIONS

Revision Number	Sections(s)	Page(s) Affected	Date
Original	ALL	ALL	07/03/2007
1	ALL	ALL	06/30/2008
2	ALL	ALL	06/20/2010
3	ALL	ALL	03/11/2011
4	ALL	ALL	04/04/2016
5	ALL	ALL	07/18/2018

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 requirements; and 3) operational suitability.

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

3. HIGHLIGHTS OF CHANGE

The purpose of this revision is to add evaluations done on the Falcon 8X to include 7X differences, flightcrew sleeping quarters, FalconEye Head-Up Display (HUD), and steep approach. This report removes information on enhanced flight vision system (EFVS) training, checking, and currency requirements that has been codified. This report also transitions to the new standardized template while deleting regulatory repetitive information. No change bars will be used in this revision. It is recommended to review the entire document.

4. BACKGROUND

The Seattle AEG formed a Flight Standardization Board (FSB) that evaluated the Falcon 7X as defined in FAA Type Certificate Data Sheet (TCDS) #A59NM. The evaluation was conducted in 2007 using the methods described in FAA Advisory Circular (AC) 120-53, Crew Qualification and Pilot Type Rating Requirements for Transport Category Aircraft Operated under FAR Part 121.

The FSB conducted an evaluation of the Honeywell Enhanced Avionics System (EASy) II avionics upgrade. It, as well as the associated Airplane Flight Manual (AFM) addition, was found to be operationally suitable. Training and checking requirements are listed in Appendix 7, EASy II Avionics.

Beginning in April 2016, the FSB conducted evaluations of the Falcon 8X. The Falcon 8X is the commercial designation for a stretch variation of the Falcon 7X that incorporates modifications M1000 and M1254 (EASy III) installed in production. It, as well as the associated Falcon 8X AFM, was found to be operationally suitable.

5. ACRONYMS

14 CFR	Title 14 of the Code of Federal Regulations
AAL	Above Airport Level
AC	Advisory Circular
ADI	Attitude Director Indicator
ADM	Automatic Descent Mode
ADS-B	Automatic Dependent Surveillance-Broadcast
AEG	Aircraft Evaluation Group
AFM	Airplane Flight Manual
AOA	Angle of Attack
A/T	Autothrottle
ATC	Air Traffic Control
ATN	Aeronautical Telecommunications Network
BFL	Balanced Field Length
BOW	Basic Operating Weight
CAS	Crew Alert System
CAT	Category (e.g., CAT II ILS)
CCD	Cursor Control Device
CDI	Course Deviation Indicator
CG	Center of Gravity
CODDE	Crew Operational Documentation for Dassault EASy
CPDLC	Controller Pilot Data Link Communication
CPT	Cockpit Procedures Trainer
CVS	Combined Vision System
DA	Decision Altitude
DTS	Desktop Simulation
EASy	Enhanced Avionics System
ECL	Electronic Checklist
EFB	Electronic Flight Bag
EFVS	Enhanced Flight Vision System
EGPWS	Enhanced Ground Proximity Warning System
EPM	Electronic Performance Manual
EVS	Enhanced Vision System
FAA	Federal Aviation Administration
FAF	Final Approach Fix
FCS	Flight Control System
FD	Flight Director
FFS	Full Flight Simulator
FL	Flight Level
FMS	Flight Management System

FMW	Flight Management Window
FPS	Flight Path Symbol
FPV	Flight Path Vector
FSB	Flight Standardization Board
FSTD	Flight Simulation Training Device
FTD	Flight Training Device
GFS	Graphical Flight Simulation
GOLD	Global Operational Link Document
GPS	Global Positioning System
HGS	Head-Up Guidance System
HSI	Horizontal Situation Indicator
HUD	Head-Up Display
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
I-NAV	Interactive Navigation
IPFD	Integrated Primary Flight Display
IPT	Instrument Procedures Trainer
IRS	Inertial Reference System
KT	Knot (Nautical Mile per Hour)
LPV	Localizer Performance with Vertical Guidance
LSC	Low Speed Cue
LSS	Lightning Strike Sensor
MCDU	Multipurpose Control and Display Unit
MDU	Multifunction Display Unit
MDR	Master Differences Requirements
MKB	Multifunction Keyboard
MMEL	Master Minimum Equipment List
MRW	Maximum Ramp Weight
MTOW	Maximum Takeoff Weight
NADP	Noise Abatement Departure Procedure
NAS	National Airspace System
OE	Operating Experience
OpSpec	Operations Specification
OSR	Operational Suitability Report
PAL	Pilot Assist List
PAPI	Precision Approach Path Indicator
PDU	Primary Display Unit
PF	Pilot Flying
PIC	Pilot in Command
PM	Pilot Monitoring
PNF	Pilot not Flying
QRH	Quick Reference Handbook
RAAS	Runway Awareness Advisory System
RNAV	Area Navigation
RNP	Required Navigation Performance
RVR	Runway Visual Range

SA	Special Authorization
SBAS	Satellite-Based Augmentation System
SFD	Secondary Flight Display
SIC	Second in Command
SMGCS	Surface Movement Guidance and Control System
SVS	Synthetic Vision System
TCAS	Traffic Alert and Collision Avoidance System
TCDS	Type Certificate Data Sheet
TCS	Touch Control Steering
TOD	Top of Descent
TOGA	Takeoff/Go-Around
TOLD	Takeoff and Landing Data
VMC	Visual Meteorological Conditions
VNAV	Vertical Navigation
VREF	Reference Landing Approach Speed
VSD	Vertical Situation Display
VTA	Vertical Track Alert
WAAS	Wide Area Augmentation System
WSHR	Windshear

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.** The Falcon 7X and the Falcon 8X type rating designation is DA-7X.
- 7.2 Common Type Ratings.** Not applicable.
- 7.3 Military Equivalent Designations.** Military aircraft that qualify for the DA-7X 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 Falcon 8X is related to the Falcon 7X.
- 8.2 Related Aircraft on Different TCDS.** Not applicable.

9. PILOT TRAINING

- 9.1 Airman Experience.** Airmen receiving DA-7X initial type training will benefit from prior experience operating multi-engine transport turbojet aircraft. Additionally, a working knowledge of advanced aircraft systems, highly integrated avionics systems with electronic flight displays, and flight management system (FMS) is highly recommended. Pilots without this experience may require additional training.

9.2 Special Emphasis Areas.

9.2.1 Pilots must receive special emphasis on the following areas during Falcon 7X EASy I initial ground and flight training (see Appendix 7 for EASy II):

- Interpretation and use of the Crew Alert System (CAS).
- Use of the electronic checklist (ECL) and quick reference handbooks (QRH).
- Proper use and interpretation of the Flight Path Symbol (FPS) and Acceleration Chevron.
- Proper use and interpretation of the Low Speed Cues (LSC).
- Use and interpretation of color codes of avionics system.
- Operating techniques – reflex actions.
- Use of manual pressurization mode.
- Ground steering.
- Use of airbrakes with autopilot engaged.
- Go-around using takeoff/go-around (TOGA) pushbuttons on throttles.
- Emergency panel on the pedestal.
- Primary Display Unit (PDU) and/or Multifunction Display Unit (MDU) multiple failures.
- Use of Secondary Flight Display (SFD) instrument landing system (ILS) raw deviations.
- Use of Master Minimum Equipment List (MMEL).
- Sidestick priorities.
- Takeoff operations at different center of gravity (CG).
- Full aft stick rotation technique.
- Procedure associated to CAS message “FCS: THS DEGRAD.”
- Maneuvering in Direct Law (light weight/rear CG).
- Use of pitch trim in backup mode.
- Use and understanding of overhead panel pushbuttons logics.
- Use of Cursor Control Device (CCD).
- Autothrottle.
- Vertical navigation (VNAV) mode without lateral navigation (LNAV).
- Touch Control Steering (TCS).
- Takeoff and landing procedures with crosswind.
- Possible late and slow rotation at takeoff.
- Undamped Dutch Roll oscillations at high altitude/mach.

9.2.2 Pilots must receive special emphasis on the following areas during differences ground and flight training from the Falcon 7X (EASy II) to the Falcon 8X:

- Proficiency in operating EASy III FMS.
- Proficiency in operating RDR-4000.
- Windshear maneuver (only for aircraft without M1759).
- Location of the TCS pushbutton on the Falcon 8X sidesticks.
- Landing technique in CLEAN configuration.

- Possible late and/or slow rotation at takeoff.
- EASy III: Heading legs and Floating desired track (DTK) legs.
- Engine thrust setting during takeoff in crosswind conditions.
- Takeoff and landing procedure in crosswind conditions.

9.2.3 Pilots must receive special emphasis on the following areas during Falcon 8X initial ground and flight training:

- Interpretation and use of the CAS.
- Use of the ECL and QRHs.
- Proper use and interpretation of the FPS and Acceleration Chevron.
- Proper use and interpretation of the LSC.
- Use and interpretation of color codes of avionics system.
- Operating techniques – reflex actions.
- Use of manual pressurization mode.
- Ground steering.
- Use of airbrakes with autopilot engaged.
- Go-around using TOGA pushbuttons on throttles.
- Emergency panel on the pedestal.
- PDU and/or MDU multiple failures.
- Use of SFD ILS raw deviations.
- Use of MMEL.
- Sidestick priorities.
- Takeoff operations at different CG.
- Full aft stick rotation technique.
- Procedure associated to CAS message “FCS: THS DEGRAD.”
- Maneuvering in Direct Law (light weight/rear CG).
- Use of pitch trim in backup mode.
- Use and understanding of overhead panel pushbuttons logics.
- Use of CCD.
- Proficiency in using Flight Path Vector (FPV) vertical and lateral displacement (un-caged) FPV in new integrated primary flight display (IPFD) design.
- Proficiency in performing ILS/LPV approaches in raw data.
- Proficiency in using FPV in connection with synthetic vision (terrain, virtual runway).
- Proficiency in using TOGA modes of EASy III.
- Autothrottle.
- TCS.
- Takeoff and landing procedures with crosswind.
- Proficiency in operating EASy III FMS.
- Proficiency in operating RDR-4000.
- Windshear maneuver (only for aircraft without M1759).
- Location of the TCS pushbutton on the Falcon 8X sidesticks.
- Landing technique in CLEAN configuration.

- Engine thrust setting during takeoff in crosswind condition.
- Possible late and/or slow rotation at takeoff.
- Undamped Dutch Roll oscillations at high altitude/mach.
- EASy III: Heading legs and Floating DTK legs.
- VNAV mode without LNAV.

9.2.4 Pilots must receive special emphasis on the following areas during differences ground and flight training from the Falcon 8X to the Falcon 7X (EASy II):

- Proficiency in operating weather radar P880.
- Location of the TCS pushbutton on the Falcon 7X sidesticks.
- Takeoff and landing procedures with crosswind.

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. There are no specific flight characteristics.

9.4 Seat Dependent Tasks. There are no seat dependent tasks identified by the FSB. However, pilots should be trained in applying the parking brake from both seats. Operators who elect to install the optional HUD must train seat dependent tasks associated with the HUD.

9.5 Regulatory Training Requirements which are Not Applicable to the Falcon 7X. None.

9.6 Flight Simulation Training Devices (FSTD).

9.2.5 When HUD training is conducted in a simulator, it must be trained in a Level C or higher full flight simulator (FFS) with a Head-Up Guidance System (HGS) and an operative visual system. See additional information in Appendix 4, Head-Up Display.

9.2.6 EFVS must be trained in a Level C or higher FFS with a daylight visual system. See additional information in Appendix 5, HUD with Enhanced Flight and/or Synthetic Vision Systems.

9.7 Training Equipment. There are no specific systems or procedures that are unique to the Falcon 7X that require specific training equipment.

9.8 Differences Training Between Related Aircraft. Pilots must receive differences training between the Falcon 7X and Falcon 8X. 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 Falcon 7X is not extremely remote due to system design. Therefore,

demonstration of a no-flap approach and landing during pilot certification or a 14 CFR part 61, § 61.58 proficiency check, part 91, § 91.1065 competency check, or part 135, § 135.293 competency check is required. Refer to FAA Order 8900.1, Volume 5 when the test or check is conducted in an aircraft versus an FFS. No-flap and hydraulic system abnormal approaches may be combined and should be addressed during checking. Leading edge slats may be extended for this approach and landing.

- 10.2** Specific Flight Characteristics. There are no specific flight characteristics.
- 10.3** Seat Dependent Tasks. There are no seat dependent tasks. Operators who elect to install the optional HUD must check seat dependent tasks associated with the HUD.
- 10.4** Other Checking Items. Not applicable.
- 10.5** FSTDs. There are no specific systems, procedures, or maneuvers that are unique to the Falcon 7X that require a specific FSTD for checking.
- 10.6** Equipment. There are no specific systems or procedures that are unique to the Falcon 7X that require specific equipment.
- 10.7** Differences Checking Between Related Aircraft. There are no differences checking required between the Falcon 7X and the Falcon 8X.

11. PILOT CURRENCY

There are no additional currency requirements for the Falcon 7X other than those already specified in parts 61 and 135.

- 11.1** Differences Currency Between Related Aircraft. None.

12. OPERATIONAL SUITABILITY

The Falcon 7X is operationally suitable for operations under parts 91, 91 subpart K (part 91K), 121, and 135.

13. MISCELLANEOUS

- 13.1** Flightcrew 12 Facility (Part 135). The DA-7X Flightcrew Sleeping Facilities as installed by modifications M-OPT0063, M-OPT0506, M-OPT317, M-OPT325, M-OPT359, M-OPT393, M-OPT0664, M-OPT0037, M-OPT0655, M-OPT0837, M-OPT 0957, M-OPT0879, M-OPT0986, and M-OPT0838 have been evaluated and determined to meet requirements of parts 91K, 121, and 135, AC 121-31, Flightcrew Sleeping Quarters and Rest Facilities, and FAA Order 8900.1.

- 13.2** Forward Observer Seat. The DA-7X forward observer seat as installed by type certificate A59NM has been evaluated and determined to meet requirements of § 135.75.
- 13.3** Landing Minima Categories. Reference 14 CFR part 97, § 97.3. The DA-7X is considered Category C aircraft for the purposes of determining “straight-in landing weather minima.”
- 13.4** Normal Landing Flaps. The DA-7X normal “final landing flap setting” per § 91.126(c) is SF3.
- 13.5** Electronic Flight Bag (EFB). Refer to the Operational Suitability Report (OSR) titled, Dassault-Aviation Electronic Flight Bag (EFB) Type B Software, Jeppesen FliteDeck, Mobile FD, and EPM for EASy cockpit Presented on the CMC CMA-1100 and iPad2.
- 13.6** Close-In Noise Abatement Departure Procedure (NADP). Some airports requiring a steep approach procedure may also require a noise abatement procedure. The FSB, at the request of Dassault Aviation, evaluated an NADP developed by Dassault Aviation for the Falcon 7X. The NADP, as evaluated by the FSB, requires a thrust reduction at 400 feet above airport elevation after takeoff and the PATH angle to be set (reference Crew Operational Documentation for Dassault EASy (CODDE) 2). This procedure has been found suitable by the FSB and does not contradict AC 91-53A, Noise Abatement Departure Profiles. This paragraph is also applicable to the Falcon 8X.

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 →	Falcon 7X EASy I	Falcon 7X EASy II	Falcon 8X EASy III
Falcon 7X EASy I		Not Applicable	C/A	Not Evaluated
Falcon 7X EASy II		D/A	Not Applicable	B/A
Falcon 8X EASy III		Not Evaluated	B/A	Not Applicable

APPENDIX 3. DIFFERENCES TABLES

This Design Differences table, from the **Falcon 7X EASy I to the Falcon 7X EASy II**, was proposed by Dassault Aviation 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: Falcon 7X EASy I	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
TO RELATED AIRCRAFT: Falcon 7X EASy II						
	Autoflight	Takeoff/Go-Around (TOGA) Autothrottle (A/T) Windshear (WSHR) Automatic Descent Mode (ADM)	No	Yes	B	A
	Communications	ADS-B Out capability Datalink (CPDLC): FANS-1/A and ATN-B1	No	Yes	B	A
	Indicating/Recording Systems	Multifunction Keyboard (MKB) I-PFD SVS	No	No	D	A

FROM BASE AIRCRAFT: Falcon 7X EASy I TO RELATED AIRCRAFT: Falcon 7X EASy II	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Navigation	Autospeed QFE/QNH calculator Temperature compensation function LPV approach TOLD Graphical Flight Planning INAV VGP SBAS RAAS XM Graphical Weather Dual Jeppesen Charts	No	Yes	C	A

This Maneuver Differences table, from the **Falcon 7X EASy I to the Falcon 7X EASy II**, was proposed by Dassault Aviation 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: Falcon 7X EASy I TO RELATED AIRCRAFT: Falcon 7X EASy II	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Takeoff		No	No	D	A
	Go-Around		No	No	D	A
	Operating Techniques		No	Yes	B	A

This Design Differences table, from the **Falcon 7X EASy II to the Falcon 7X EASy I**, was proposed by FlightSafety International 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: Falcon 7X EASy II TO RELATED AIRCRAFT: Falcon 7X EASy I	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Autoflight	Takeoff/Go-Around (TOGA) Autothrottle (A/T) Windshear (WSHR) Automatic Descent Mode (ADM)	No	Yes	B	A
	Communications	ADS-B Out capability Datalink (CPDLC): FANS-1/A and ATN-B1	No	Yes	A	A
	Indicating/Recording Systems	Multifunction Keyboard (MKB) I-PFD SVS	No	No	C	A

FROM BASE AIRCRAFT: Falcon 7X EASy II TO RELATED AIRCRAFT: Falcon 7X EASy I	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Navigation	Autospeed QFE/QNH calculator Temperature compensation function LPV approach TOLD Graphical Flight Planning INAV VGP SBAS RAAS XM Graphical Weather Dual Jeppesen Charts	No	Yes	B	A

This Maneuver Differences table, from the **Falcon 7X EASy II to the Falcon 7X EASy I**, was proposed by FlightSafety International 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: Falcon 7X EASy II TO RELATED AIRCRAFT: Falcon 7X EASy I	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Takeoff		No	No	B	A
	Go-Around		No	No	B	A
	Operating Techniques		No	Yes	B	A

This Design Differences table, from the **Falcon 7X EASy II** to the **Falcon 8X EASy III**, was proposed by Dassault Aviation 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: Falcon 7X EASy II	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
TO RELATED AIRCRAFT: Falcon 8X EASy III						
	Dimensions		No	No	A	A
	Flight Deck		No	No	A	A
	Engine Type		No	No	A	A
	Documentation		No	No	A	A
	Air Conditioning and Pressurization	Controls and Indications	No	Yes	B	A
	Autoflight	Autothrottle (AT) Windshear (WSHR) VNAV FMS Speeds	No	Yes	B	A
	Communications	Datalink	No	No	B	A
	Flight Controls		No	Yes	B	A
	Fuel	Controls, Indications, and Procedures	No	Yes	A	A
	Gear/Wheels/Brakes		No	No	A	A

FROM BASE AIRCRAFT: Falcon 7X EASy II TO RELATED AIRCRAFT: Falcon 8X EASy III	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Navigation	Avionics Page FMW Graphical Flight Planning AEDB CDI/HSI TCAS Weather Radar Sensor Page	No	Yes	B	A
	Oxygen	Optional supplementary oxygen bottle	No	No	A	A
	Water/Waste	Toilet system	No	No	A	A
	Airframe/Doors	Engine Cover	No	Yes	A	A
	Limitations	Weights Loading Engines Maximum crosswind demonstration	No	No	B	A

This Maneuver Differences table, from the **Falcon 7X EASy II** to the **Falcon 8X EASy III**, was proposed by Dassault Aviation 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: Falcon 7X EASy II TO RELATED AIRCRAFT: Falcon 8X EASy III	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Normal Operations	Fuel Crosswind Takeoff Steep Approach	No	Yes	B	A
	Abnormal Operations	Air Conditioning FCS Fuel	No	Yes	B	A
	Operating Techniques	WSHR Recovery	No	Yes	B	A

This Design Differences table, from the **Falcon 8X EASy III to the Falcon 7X EASy II**, was proposed by Dassault Aviation 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: Falcon 8X EASy III	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
TO RELATED AIRCRAFT: Falcon 7X EASy II	Dimensions		No	No	A	A
	Flight Deck		No	No	A	A
	Engine Type		No	No	A	A
	Documentation		No	No	A	A
	Air Conditioning and Pressurization	Controls and Indications	No	Yes	B	A
	Autoflight	Autothrottle (AT) Windshear (WSHR) VNAV FMS Speeds	No	Yes	B	A
	Communications	Datalink	No	No	B	A
	Flight Controls		No	Yes	B	A
	Fuel	Controls, Indications, and Procedures	No	Yes	A	A
	Gear/Wheels/Brakes		No	No	A	A

FROM BASE AIRCRAFT: Falcon 8X EASy III TO RELATED AIRCRAFT: Falcon 7X EASy II	DESIGN	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Navigation	Avionics Page FMW Graphical Flight Planning AEDB CDI/HSI TCAS Weather Radar Sensor Page	No	Yes	B	A
	Oxygen	Supplementary oxygen bottle	No	No	A	A
	Water/Waste	Toilet system	No	No	A	A
	Airframe/Doors	Engine Cover	No	Yes	A	A
	Limitations	Weights Loading Engines Crosswind limitation	No	No	B	A

This Maneuver Differences table, from the **Falcon 8X EASy III to the Falcon 7X EASy II**, was proposed by Dassault Aviation 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: Falcon 8X EASy III TO RELATED AIRCRAFT: Falcon 7X EASy II	MANEUVER	REMARKS	FLT CHAR	PROC CHNG	TRAINING	CHECKING
	Normal Operations	Avionics Setup Fuel Steep Approach	No	Yes	B	A
	Abnormal Operations	Fuel	No	Yes	A	A
	Operating Techniques	WSHR Recovery	No	Yes	B	A

APPENDIX 4. HEAD-UP DISPLAY

1. BACKGROUND

This appendix pertains to Rockwell Collins Head-Up Guidance System (HGS) 5860 installed in the Falcon 7X and the FalconEye Head-Up Display (HUD) installed in the Falcon 8X. Additional training requirements for these systems equipped with enhanced flight vision systems (EFVS) and/or Synthetic Vision Systems (SVS) are described in Appendix 5, HUD with Enhanced Flight and/or Synthetic Vision Systems.

2. PILOT TYPE RATING

The pilot type rating for aircraft designated as DA-7X remains unchanged with the Rockwell Collins HGS 5860 or FalconEye HUD installed.

3. RELATED AIRCRAFT

Not Applicable.

4. PILOT TRAINING

Prior to HUD use, in any weather or operation, pilots should be trained in accordance with the requirements listed in this Flight Standardization Board (FSB) report. Ground and flight (simulator or aircraft) training is required. Unless covered concurrently during an initial or transition type rating course, a prerequisite to beginning this course is prior training, qualification, and currency in the DA-7X airplane. This training program focuses primarily on the pilot flying (PF), but pilot monitoring (PM) indoctrination and training is also essential. Where there are procedural differences for the PM when the PF is using the HUD, training of PM duties in the right seat is required.

See Appendix 5 for EFVS/SVS training requirements. Training centers may develop courses that combine HUD and EFVS/SVS training.

NOTE: Dassault documentation includes references to the pilot not flying (PNF). For the purposes of this document, the terms “PNF” and “PM” are used synonymously.

The recommended duration of ground training is 4 hours. The recommended duration of flight training per crew position is 2 hours. However, pilots who have completed PF (i.e., left seat) training need not complete any PM training since callouts in the PM position remain the same regardless of HUD use. Training centers may develop courses that consider prior HUD experience to reduce the duration requirement.

The training program described here is generic in nature. It does not establish training requirements. Each operator has unique requirements, route structures, fleet composition, and

operational policies to consider in developing their training program. Therefore, training described here is to assist an operator tailoring a HUD training program to fit their specific operation or approved Operations Specifications (OpSpecs).

This training can be conducted as a standalone course or integrated into any training curriculum (i.e., initial, transition, upgrade, recurrent). If part of a curriculum, the FSB recommends conducting this training early to allow as much use of the HUD as practical during the remaining training.

For operational approval, system limitations, normal operating procedures, and Abnormal/Emergency procedures, refer to the respective Airplane Flight Manual (AFM) supplement, Crew Operational Documentation for Dassault EASy (CODDE), and quick reference handbook (QRH).

4.1 Ground Training. Ground training can be instructor led or provided through computer-based training (CBT). An initial ground training program should include the following elements:

4.1.1 General.

- i.** HUD equipment.
- ii.** HUD controls.
- iii.** HUD modes of operation.
- iv.** HUD symbology, including the interrelationship with airplane aerodynamics, limit conditions and failures, inertial factors, and environmental conditions.
- v.** Operational concepts, crew duties and responsibilities, crew coordination, callouts and responses, and operational procedures including preflight, normal, and non-normal pilot activities.
- vi.** Description of the availability and limitations of visual cues encountered on approach both before and after decision altitude (DA). This would include:
 - i.** Procedures for unexpected deterioration of conditions to less than minimum Runway Visual Range (RVR) encountered during approach, flare, and rollout.
 - ii.** Demonstration of expected visual references with weather at minimum conditions.
 - iii.** Expected sequence of visual cues during an approach in which visibility is at or above landing minima.
- vii.** If the HUD is used as a Category (CAT) II/CAT III landing system, emphasis on the need for rigorous crew discipline, coordination, and adherence to procedural guidelines as is required for other CAT II/CAT III landing systems.

- viii.** For operators wishing credit for low visibility operations predicated on use of the HUD, additional training should include:
 - i.** Narrative descriptions and several low weather approach demonstrations with procedural callouts and responses. All critical procedural callout possibilities should be covered.
 - ii.** Information on the operational characteristics, capabilities, limitations of the ground facilities (i.e., Surface Movement Guidance and Control System (SMGCS)), and airborne CAT III system.
 - iii.** Operator policies and procedures concerning low visibility operations including the reporting process, Minimum Equipment List (MEL) issues, operation following a missed approach, Operating Experience (OE), and currency requirements.
 - iv.** Consideration of FAA Advisory Circular (AC) 120-28D, Criteria for Approval of Category III Weather Minima for Takeoff, Landing, and Rollout, and AC 120-29A, as applicable, Criteria for Approval of Category I and Category II Weather Minima for Approach.

4.1.2 Areas of Special Emphasis:

- a.** Rockwell Collins HUD Only (distance measuring equipment (DME) distance during lateral approach procedures with vertical guidance (LPV) approach). The crew must be aware that the DME distance displayed in the Rockwell Collins HUD during LPV approach must be disregarded, as per AFM procedure, until a HUD fix is available (DME distance displayed in the integrated primary flight display (IPFD) remains correct).
- b.** FalconEye Only:
 - i.** Instrument landing system (ILS) deviations instead of expected LPV deviations. ILS frequency must not be selected when flying an LPV approach, as the course deviation indicator (CDI) information may be inaccurate. If an ILS frequency is tuned during an LPV approach, the ILS deviations will replace the LPV deviations. The crew must be aware of not tuning an ILS frequency during LPV approaches
 - ii.** DME distance during LPV approaches (until a HUD fix is available). The crew must be aware that the DME distance displayed in the FalconEye HUD during LPV approaches is the distance to the runway threshold.
 - iii.** Lateral deviation scale. Crew must be aware that during a localizer interception following a flight management system (FMS) arrival, two lateral deviation scales (with no labels) are displayed: the lower scale is active (full pointer) for FMS deviation, and the upper scale is armed (empty pointer) until localizer interception.

- iv. Thrust Director dynamic. PF must be aware that, when manually using the Thrust Director, the HUD Speed Error Tape indicator anticipates Thrust Director dynamic.
- v. Possible Flight Path Vector (FPV) saturation (until a HUD fix is available). PF must be aware that, in some flight conditions (e.g., windshear), the FPV saturates early at the bottom of the HUD. The Vertical Path Reference Line may also disappear. In this case, the FPV is no longer conformal but the value of the Aircraft Path Angle can be read on the pitch scale. The main task of the PF, which is to follow the flight director (FD) with the FPV, is not affected by the saturation of the FPV. The FD is positioned relative to the FPV and is correct when FPV is saturated.
- vi. FalconEye HUD must only be used in the standard inertial reference system (IRS) configuration. Until a HUD fix is available, HUD can only be used in the standard IRS configuration: IRS 1 selected on LH side, IRS 2 selected on RH side, HUD stowed in all other configurations.
- vii. Controls localization and accessibility. PF must be aware of HUD front panel controls localization and accessibility in day and night conditions.

4.2 Flight Training. Unless integrated with initial or transition training, flight training dedicated to HUD familiarization and proficiency is in addition to other required elements.

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

NOTE: When a simulator is used, training should be conducted in FAA-approved Level C or D simulators with HUD installed.

4.2.1 Takeoff. Emphasis should be placed on the pilot's ability to transition from using outside visual cues to utilizing the HUD during the takeoff roll and departure. Emphasis should also be placed on the HUD symbology relevant to takeoff and departure operations.

NOTE: Per OpSpecs, air carrier takeoff operations below 1600 RVR are only permitted with certain limitations and provisions. Title 14 of the Code of Federal Regulations (14 CFR) part 91 operators are not restricted in the same manner, but should be trained to understand the hazards associated with departing in a low visibility environment, as well as possible safety mitigations.

4.2.2 Airwork. Emphasis should be placed on HUD unique symbology (i.e., flight path, flight path acceleration, airspeed error tape, Angle of Attack (AOA) limit bracket, and excessive pitch chevrons). When this training is complete, the trainee should have a

thorough understanding of the relationship between aircraft flight path parameters and the HUD symbology.

- 4.2.3** Visual Approaches. Emphasis should be placed on the HUD symbology relevant to approach and landing operations and optimizing circling approach techniques and procedures. Approaches should begin beyond 3 nautical miles (NM) to the runway threshold.

NOTE: Approaches should be flown at various airports with dissimilar runway lighting systems.

- 4.2.4** Instrument Approaches. Emphasis should be placed on the pilot's ability to transition from utilizing the HUD during approach to using outside visual cues for landing. Instructors should demonstrate failures and incorrect settings on approach (e.g., incorrect runway elevation, airspeed, inbound course). Instructors should also demonstrate unique symbology characteristics in windshear conditions (e.g., erratic wind speed and direction, flight path acceleration, airspeed errors) All required instrument approaches should be begin outside the final approach fix (FAF).

- 4.2.5** Additional Operational Considerations. Following initial training, pilots should gain proficiency utilizing the HUD in visual meteorological conditions (VMC) prior to utilizing the HUD in low visibility operations. Although part 91 operators are not required to comply with air carrier requirements, it is worth noting the additional experience required by air carriers to utilize the HUD in line operations.

- 4.2.6** In all cases, air carrier operators must comply with their OpSpecs regarding authorization to conduct HUD operations. Although requirements may differ, typically air carrier pilots are required to complete OE within 60 days of completing HUD training.

- 4.3** Multiple Curricula Training Programs (Reduced Planned Hour Training Programs). The FSB has determined that the Rockwell or FalconEye HUD systems installed in the DA-7X shares common characteristics with the same HUD system installed in the DA-EASy (all variations) and the DA-2EASy (all variations). It may be possible, in accordance with FAA Order 8900.1 Volume 3, Chapter 19, Section 1, Scope, Concepts, and Definitions, to develop reduced planned hour HUD training programs for pilots who hold the respective type rating and have completed training in the respective HUD system.

5. PILOT CHECKING

Pilot checking requirements are dependent upon the training program objectives, and operational parts and will be defined by each training program.

6. PILOT RECURRENT TRAINING

For pilots who have previously completed HUD initial training, in conjunction with a Pilot in Command (PIC) proficiency check required by 14 CFR parts 61, 121, or 135, a PIC must demonstrate proficiency using the appropriate HUD system.

7. OPERATIONAL SUITABILITY

The FSB has evaluated the Rockwell Collins HGS 5860 and the FalconEye HUD and find them operationally suitable for HUD operations under parts 91, part 91 subpart K, (part 91K), 121, and 135.

APPENDIX 5. HUD WITH ENHANCED FLIGHT AND/OR SYNTHETIC VISIONS SYSTEMS

1. BACKGROUND

This appendix addresses Head-Up Display (HUD) systems with additional capabilities, including enhanced flight vision systems (EFVS), Synthetic Vision Systems (SVS), or a combination of the two. Specifically, this pertains to Rockwell Collins Head-Up Guidance System (HGS) 5860 and the FalconEye HUD installed in the DA-7X.

The operational goal of EFVS and SVS is to improve aviation safety during operations at night and in low visibility conditions due to weather or other environmental factors. Pilots using EFVS and SVS should be careful not to conclude that the flight path is free of hazards merely because none are visible in the HUD. In some situations, imaging sensor performance can be variable and unpredictable.

The requirements in this report are for the use of this equipment for situational awareness. As of the publication of Revision 5 of this Flight Standardization Board (FSB) report, only the Rockwell Collins HGS 5860 has been evaluated and approved for operational credit during instrument approach operations under Title 14 of the Code of Federal Regulations (14 CFR) part 91, § 91.176(b). The FalconEye HUD (Mark 1) has been evaluated and is awaiting certification for operational credit under § 91.176(b). The requirements defined in 14 CFR part 61, § 61.66 must be completed prior to taking operational credit for EFVS equipment when conducting operations below decision altitude (DA) or minimum descent altitude (MDA) or for applying visual advantage.

2. PILOT TYPE RATING

The pilot type rating for aircraft designated as DA-7X remains unchanged with the Rockwell Collins HGS 5860 or FalconEye HUD installed with EFVS, SVS, or combined vision system (CVS).

3. RELATED AIRCRAFT

Not applicable.

4. PILOT TRAINING

In order to use a HUD system with advanced features, pilots must first be trained to conduct HUD operations. See Appendix 4 for HUD training requirements. Training centers may develop courses that combine HUD and EFVS/SVS training.

For operational approval, system limitations, normal operating procedures, and Abnormal/Emergency procedures, refer to the respective Airplane Flight Manual (AFM) supplement, Crew Operational Documentation for Dassault EASy (CODDE) and quick reference handbook (QRH).

All EFVS and SVS training can be conducted as a standalone course or integrated into any training curriculum (i.e., initial, transition, upgrade, recurrent). If part of a curriculum, the FSB recommends conducting this training early to allow as much use of the system as practical during the remaining training.

Flight training is required and must be provided in an aircraft or an FAA-approved simulator qualified to Level C with a daylight visual system or to Level D with the appropriate HUD system installed. The EFVS standards must at least meet the requirements contained in the Guidance Bulletin 03-03, Enhanced Flight Vision System (EFVS) FSTD Qualification, issued by the National Simulator Program Branch or any other relevant regulation.

The simulator provides the ideal EFVS training environment and its use is preferred for this training. Simulators provide the ability to change training locations, set specific weather minimums, and change weather rapidly and significantly to provide a greater variety of training situations. They also provide the ability to freeze the training, allowing the student to positively identify the differences between enhanced and natural vision at key times. Aircraft training is acceptable, but operators need to understand and account for these limitations. Pilots must also be aware that the visual contrast in simulators is often better than in the aircraft.

When able, training should be conducted to/from airfields with a mountainous environment in order to demonstrate the benefit of various technologies (e.g., St. Johns, Newfoundland, Canada (CYYT), Aspen, Colorado (KASE)).

The recommended duration of ground training is 4 hours. The recommended duration of flight training per crew position is 2 hours. However, pilots who have completed pilot flying (PF) (i.e., left seat) training need not complete any pilot monitoring (PM) training since callouts in the PM position remain the same regardless of HUD use. Training centers may develop courses that consider prior HUD experience to reduce the duration requirement.

A list of applicable regulation requirements should be displayed for the trainees (e.g., § 91.176, 14 CFR part 135, § 135.225).

4.1 EFVS.

In order to use the EFVS in instrument meteorological conditions (IMC), the PF and PM should complete an approved training program meeting the specifications below. The training program should primarily focus on the PF, but PM indoctrination and training is also essential. Where there are procedural differences for the PM when the PF is using the HUD, training of PM duties in the right seat is required. Operating procedures described in CODDE 2 should be used as a reference concerning the crew tasks allocations, callouts and recommended displays of Enhanced Vision System (EVS) image. Focus must be made on crew coordination, especially concerning the minima annunciation (unless the operator has a specific approved procedure).

All EFVS training should address the following areas of special emphasis:

- 4.1.1** Infrared theory and associated limitations. The PF should be made aware of the general infrared theory and the characteristics of the EFVS image, including the dependency of the image on the weather conditions, thermal crossover (not exhaustive). The trainee should be made aware of the effect of rain (roman candles ...) which may degrade the EFVS image and require it to be removed.
- 4.1.2** Low altitude flight maneuver. Under certain meteorological conditions (night clear sky) the quality of the image gives the PF the impression that he or she can fly the aircraft trajectory through the image. The PF should be made aware that this is false. Furthermore, in bad weather conditions, if the aircraft trajectory was flown through the image, the PF would have a natural tendency to « dive » into the runway. Some approaches not aligned along the runway axis would necessitate low altitude flight maneuvers to recover runway axis, which is to be avoided using the image.
- 4.1.3** Precision approach path indicator (PAPI) lights. The PF should be made aware about PAPI indication through the EFVS: PAPI always shows four white lights in HUD/EVS image, indicating HIGH even if the aircraft is on the correct descent slope, which could make the PF descend for the 2 RED/2 WHITE, which never appears.
- 4.1.4** Crosswind approaches. The PF should be made aware of the characteristics of the EFVS display during approaches made in crosswind conditions.

NOTE For the purposes of this section, the acronyms “EFVS”, and “EVS” are used synonymously.

4.2 Rockwell Collins HGS 5860 with EFVS.

- 4.2.1** See Appendix 4 for HUD training recommendations.
- 4.2.2** EFVS. Ground and flight training should include the elements in § 61.66(a)(2) and (b)(2) and the current edition of FAA Advisory Circular (AC) 90-106, Enhanced Flight Vision Systems, as applicable.
- 4.2.3** General training should include:
 - a.** The DA-7X operational documentation and procedures related to the Model 5860 (i.e., CODDE 1, 2, 3, AFM, Master Minimum Equipment List (MMEL)) including:
 - i.** Limitations.
 - ii.** Tasks and callouts.

iii. Pilot controls and operational recommendations.

b. Rockwell Collins Model 5860 handbook.

4.2.4 Areas of special emphasis. Training should emphasize the following:

- a.** No deviation from standard escape procedures. The pilot must be made aware that EVS image may not be used to deviate from standard escape procedures contained in Dassault Aviation Limitations, Operating Procedures, and Performances, when enhanced ground proximity warning system (EGPWS), Traffic Alert and Collision Avoidance System (TCAS), or windshear warnings are triggered.
- b.** Crew coordination. PM in right seat should be trained with a PF in the left seat during the EVS pilot training course. Concerning human factors, to avoid tunnel effect or any other anomalies affecting the PF's perception, the task of the PM is very important in the final approach phase when the real scene appears through the EVS image. The callouts from both pilots during this phase of flight are critical.
- c.** Visual contrast in full flight simulator (FFS) compared to in aircraft. Pilots must be advised that the visual contrasts in the FFS are better than those in the aircraft.
- d.** Areas of special emphasis for operational credits:

- i.** Sensorial illusions.

- During EFVS ground course ("operational credits" part), the trainees should be made aware of the effects of lack of peripheral vision, which are sensorial illusions and image fascination. These effects give the rationale for not flying the aircraft trajectory through the EFVS image but flying it using the flight director (FD) until natural vision is acquired. The EFVS image is used to back up the lateral alignment and the touchdown point on the runway.

- ii.** Possible automatic callouts delay.

- The trainee should be made aware of the importance of the PM callout "EVS MINIMUM" at the EVS minimum because of possible delays in automatic EFVS callouts due to prioritization of others automatic callouts (e.g., callout of autopilot disconnection).

- iii.** Low altitude flight maneuver.

- Under certain meteorological conditions (night clear sky), the quality of the image gives the pilot the impression that he or she can fly the aircraft trajectory through the image. The trainee should be made aware that this is false. Furthermore, in bad weather conditions, if the aircraft trajectory was flown through the image, the pilot would have a natural tendency to dive into the

runway. Some approaches not aligned along the runway axis would necessitate low altitude flight maneuvers to recover runway axis, which is to be avoided using the image.

iv. Eligibility of runway for EFVS approach.

Based on approach charts, the trainee should be capable to recognize runways eligible for EFVS approaches with “operational credits” from the ones not eligible. For example, discuss one eligible nonprecision approach and one noneligible nonprecision approach and explain.

v. Role of the kill/dim switch.

In addition to check of proper operating condition, the trainee should be made aware that the use of the kill/dim switch before arriving to minima is useful for transition from EFVS to visual, as it improves the “see through”.

4.3 FalconEye HUD/SVS/EVS/CVS. In addition to providing flight guidance information, the FalconEye HUD system combines synthetic, database-driven terrain mapping (SVS) along with thermal and low-light camera images (EVS) to provide additional information to increase the pilot’s situational awareness. In order to ensure that pilots are able to safely operate the HUD in all phases of flight, training must include detailed information on the following:

4.3.1 See Appendix 4 for HUD training recommendations. Training centers may develop courses that consider prior HUD experience to reduce the duration requirement.

4.3.2 EVS. Ground and flight training should include the elements in § 61.66(a)(2) and (b) (2) and the current edition of AC 90-106, as applicable.

4.3.3 SVS.

a. SVS concepts.

b. Database information.

i. Terrain.

ii. Obstacles.

iii. Airports and other ground features.

c. Display symbology.

d. Pilot controls (control panel, yoke, high/low selector) and recommended settings.

4.3.4 CVS.

- a.** CVS concepts.
- b.** System architecture.
- c.** Pilot controls and recommended settings.

4.3.5 Areas of special emphasis:

- i.** Crew coordination. PM in right seat should be trained with a PF in the left during the EVS/SVS/CSV pilot training course. Concerning human factors, to avoid tunnel effect or any other anomalies affecting the PF's perception, the task of the PM is very important in the final approach phase when the real scene appears through the EVS/CSV image. The callouts from both pilots during this phase of flight are critical.
- ii.** No deviation from standard escape procedures. The pilot must be made aware that SVS/EVS/CSV image shall never be used to deviate from standard escape procedures contained in Dassault Aviation Limitations, Operating Procedures, and Performances, when EGPWS, TCAS, or windshear warnings are triggered.
- iii.** LH pilot perception of weather conditions. Crew must be aware that the display of an SVS or CVS image in the HUD may impair LH pilot vision of weather conditions.
- iv.** SVS Runway Clear Zone activation. Crew must be aware that the SVS Runway Clear Zone is not activated in HUD until V-Speeds have been sent to EASy (via the Send soft key in the FMW Landing Data tab). Otherwise, outside visual references or EVS image could be masked by the SVS image.
- v.** EVS contrast setting. PF must be proficient at using EVS contrast settings in order to improve the rendering of EVS image details in various lighting and weather conditions.
- vi.** Possible misalignment cases. Crew must be aware that the conformal runway may not exactly coincide with the real runway; crew should be ready to remove it when visual cues are to be acquired. Also, SVS image may be shifted; although SVS image and Conformal Runway can be removed, shifted runway axis remains.
- vii.** Video quality. PF must be aware that video quality is impacted when dimmed with the XVS brightness on the stick.

4.4 Flight Operations Following Training Completion.

- 4.4.1** Due to the significant amount of information presented on the FalconEye HUD with EVS/SVS/CSV, the FSB recommends that pilots limit FalconEye use in flight until

the following in-aircraft flight experience using the Falconeye is completed in sequence:

- a. Approximately 5 hours above flight level (FL) 180, then
- b. Approximately 5 hours below FL 180, then
- c. Five takeoffs, five approaches (including satellite (i.e., Area Navigation (RNAV)) and ground-based (i.e., instrument landing system (ILS)) procedures), and five landings in Visual Meteorological Conditions (VMC).

4.4.2 Training courses should include these recommendations and encourage pilots to increase their proficiency prior to conducting takeoffs, approaches, and landings in low IMC.

4.5 Multiple Curricula Training Programs (Reduced Planned Hour Training Programs). The FSB has determined that the Rockwell or FalconEye HUD systems installed in the DA-7X shares common characteristics with the same HUD system installed in the DA-EASy (all variations) and the DA-2EASy (all variations). It may be possible, in accordance with FAA Order 8900.1 Volume 3, Chapter 19, Section 1, Scope, Concepts, and Definitions, to develop reduced planned hour HUD training programs for pilots who hold a respective type rating and have completed training in the respective HUD system.

5. PILOT CHECKING

At the completion of the ground school segment, each trainee should be evaluated through a written test, checking the successful completion of the training performance objectives in compliance with the applicable regulations.

Additional pilot checking requirements are dependent upon the training program objectives, and operational parts and will be defined by each training program.

6. PILOT CURRENCY

While the AFM establishes no explicit requirement regarding continuing qualification, it is strongly recommended that pilots use the EFVS, SVS, and/or CVS frequently enough in flight to retain proficiency in its operation. HUD, EFVS, and SVS proficiency can be maintained if all are used on a regular basis. Apart from the requirements listed in this appendix, EFVS, SVS, and/or CVS training should emphasize the need to perform HUD, EFVS, SVS and/or CVS operations as regularly as possible during normal operations, especially during takeoff, approach, and landing phases of flight.

Procedures should be addressed in recurrent training.

7. OPERATIONAL SUITABILITY

The FSB has evaluated the Rockwell Collins HGS 5860 with EFVS and the FalconEye HUD with EFVS/SVS/CVS and find them operationally suitable under parts 91, part 91 subpart K (part 91K), 121, and 135.

APPENDIX 6. STEEP APPROACH LANDING OPERATIONS

1. BACKGROUND

A Flight Standardization Board (FSB) was convened in May and June 2009 to evaluate operational suitability and to determine training, checking, and currency requirements for conducting steep approach landing operations in the Falcon 7X aircraft. An FSB was again convened in March 2017 to evaluate the Falcon 8X aircraft using the same regulatory material and methodology. Supporting regulatory material is the FAA Issue Paper (IP) AEG-O-8, Operational Suitability.

Steep approach landing operations in the DA-7X are defined as those glide paths greater than 4.5 degrees and less than or equal to 6.0 degrees. Dassault Aviation modifications for steep approach landing operations are defined by M194 and M196 for the Falcon 7X and M1721 for the Falcon 8X.

The FSB evaluation included numerous steep approach landing operations, both on the full flight simulator (FFS) and on the actual aircraft. London City airport (EGLC) was flown on the FFS, and Lugano airport (LSZA) was flown using the actual aircraft. Some steep approach landing operations were also flown with the actual aircraft in Istres (LFMI).

Steep approach landing operations were conducted during day and night conditions using either 5.5- or 6.0-degree approach angles. Some abuse cases up to 8.0-degree approach angle were also conducted. All engines operative and one engine inoperative (OEI) steep approach landing operations were flown, terminating either with a landing or execution of a missed approach or bailed landing procedure. Although steep approach landing operations in the DA-7X must be conducted with all engines operative, the FSB evaluated piloting skills required to perform an OEI extraction should an engine fail at or below decision altitude (DA).

Evaluation approaches were performed with Autopilot on and off, Autothrottle on and off, flight director (FD) on and off, and with Head-Up Display (HUD) deployed and stowed.

In April 2018, the FSB evaluated the Falcon 8X for steep approach while displaying enhanced flight vision system (EFVS) on the FalconEye HUD (Mark 1) and found it operationally suitable for situational awareness.

2. PILOT TYPE RATING

Not applicable.

3. RELATED AIRCRAFT

Not applicable.

4. PILOT TRAINING

The FSB has determined that the conduct of steep approach landing operations requires no higher piloting skill level than that of normal (3.0-degree) approaches. However, since steep approach landing operations are often tailored to demanding airports – located in mountainous areas, short runways – the FSB requires academic and flight training for competency in conducting steep approach landing operations.

Unless DA-7X steep approach training is integrated with, or occurs sequentially preceding, an initial qualification pilot proficiency check, a prerequisite to steep approach training is prior training, qualification, and currency in the DA-7X.

Any pilot in command (PIC)/second in command (SIC) who has been properly qualified in the DA-7X under Title 14 of the Code of Federal Regulations (14 CFR) part 61, § section 61.55, part 91 subpart K (part 91K), part 121, or part 135 may conduct steep approach landing operations provided the training, checking, and currency requirements of this appendix have been satisfactorily accomplished.

4.1 Ground Training. The following areas should be included in the training and is appropriate to any aircrew position:

- Airplane Flight Manual (AFM) Annex and Crew Operational Documentation for Dassault EASy (CODDE) 2 review to include: Limitations, Abnormal Procedures, Emergency Procedures, Normal Procedures, and Performance with special emphasis on increased landing distance.
- Stages of the steep approach to include: stabilized approach concept as a key success for steep approach landing, appropriate slats/flaps/airbrakes configuration, and approach speed.
- Comparison of the steep approach sight picture to that of 3.0-degree (normal) approach.
- Pilot techniques to include: avoidance of abrupt control inputs, ground rush illusion.
- Identification of airports with steep approaches to include: the specificity of airports with steep approach (e.g., the landing distance safety factor for EGLC).

4.2 Flight Training. Flight training for either aircrew position may be conducted in either a simulator or aircraft. Training must include steep approaches with and without the FD displayed. Include use of the HUD if equipped.

4.3 Special Emphasis Areas. Training completed in one variation of the DA-7X is adequate for all variations; however, pilots must receive special emphasis on the final approach configuration differences between the Falcon 7X and the Falcon 8X (i.e., the airbrake setting).

5. PILOT CHECKING

Pilot checking requirements are dependent upon the training program objectives and operational parts and will be defined by each training program. There is no requirement for knowledge checking or flight proficiency testing for the DA-7X steep approach qualification. Proof of completion of steep approach training is sufficient for showing qualification.

6. PILOT RECURRENT TRAINING

The FSB recommends, regardless of the number of steep approaches completed, a review of all academic and flight training items be accomplished annually and documented in a manner acceptable to the Administrator.

7. OPERATIONAL SUITABILITY

The DA-7X is operationally suitable for steep approach operations under parts 91, 91K, 121, and 135 with aircrew trained in accordance with the requirements set in this appendix.

This FSB report does not constitute operational approval for the execution of steep approaches in the DA-7X. Additionally, be advised, it is common that individual airport authorities have training and documentation requirements specific to their airfields with regard to steep approaches.

APPENDIX 7. EASY II AVIONICS

1. BACKGROUND

This appendix to the Flight Standardization Board (FSB) report is for the Honeywell Enhanced Avionics System (EASy) II avionics upgrade to the Dassault Falcon 7X aircraft.

Dassault Aviation has developed an upgrade to the current Honeywell avionics suite in the Falcon aircraft designated as EASy aircraft. This upgrade will be an option that may be purchased by operators with options within the upgrade that may be purchased individually. The operational suitability evaluation incorporated all options available at the time of certification of this product and the FSB found them operational suitable when operated by crewmembers trained and qualified according to the provisions of this FSB report appendix. A future option will include Required Navigation Performance Authorization Required (RNP AR) 0.3.

The following major EASy II avionics functions were evaluated:

- Automatic Dependent Surveillance-Broadcast (ADS-B) Out.
- Runway Awareness Advisory System (RAAS).
- Automatic Descent Mode (ADM).
- Paperless Charts.
- Localizer performance with vertical guidance (LPV) approach capability.
- Synthetic Vision System (SVS).
- XM™ graphical weather display.
- Air traffic control (ATC) data link.
- Lightning Strike Sensor (LSS).

For U.S.-registered aircraft, the Airplane Flight Manual (AFM) Supplement for this installation restricts EASy II use to qualified pilots who have been trained in accordance with the requirements listed in this FSB report. Ground school training, procedures training, and simulator training is required unless a Multiple Curricula Training Program (reduced planned hour training program) exists (see paragraph 4.8 of this appendix).

2. PILOT TYPE RATING

The pilot type rating for the aircraft designated as DA-7X remains unchanged with the addition of the EASy II avionics suite.

3. RELATED AIRCRAFT

Not applicable.

4. PILOT TRAINING

In addition to the requirements for ground, procedures, and flight training identified in this appendix, to serve as a pilot on an aircraft with the EASy II avionics, that pilot must have received a minimum 1 hour of training in pilot monitoring (PM) duties, as defined by the appropriate Crew Operational Documentation for Dassault EASy (CODDE), using a device defined in Appendix 1 for Level D training.

For a pilot that could serve as a pilot in command (PIC), the pilot flying (PF) flight training must be done from the left seat. The PM training may be accomplished from the right seat. For a pilot that is limited to second in command (SIC) privileges, the PF and PM training must be accomplished from the right seat.

Dassault Operational Method and Crew Resource Management practices will be applied during all phases of training.

- 4.1** Ground Training. To be qualified in either seat position, and to operate as either the PF or PM, in accordance with the provisions of this FSB report, both pilots must have attended 4 hours of ground school differences training. This ground school training should precede the flight training.
- 4.2** Procedures Training. To be qualified to serve as a pilot on an aircraft with the EASy II avionics, that pilot must have received a minimum 2 hours of differences training using a device defined in Appendix 1 for Level C training.
- 4.3** Flight Training. To be qualified to serve as a pilot on an aircraft with the EASy II avionics, that pilot must have received a minimum 2 hours of differences training as PF, as defined by the appropriate CODDE, using a device defined in Appendix 1 for Level D training.
- 4.4** Special Emphasis Areas.
 - 4.4.1** Pilots must receive special emphasis on the following areas during differences training from EASy I to EASy II avionics suite:
 - Proficiency in using all flight management system (FMS) windows.
 - Proficiency in using takeoff/go-around (TOGA) modes of EASy II.
 - Using Flight Path Vector (FPV) vertical and lateral displacement (un-caged).
 - Performing instrument landing system (ILS)/localizer performance with vertical guidance (LPV) approaches in raw data.
 - Using FPV with synthetic vision (terrain, virtual runway).
 - Vertical navigation (VNAV) mode.
 - 4.4.2** Pilots must receive special emphasis on the following areas during initial training on the EASy II avionics suite:
 - Interpretation and use of the Crew Alert System (CAS).
 - Use of the Electronic Checklist (ECL) and quick reference handbooks (QRH).

- Proper use and interpretation of the Flight Path Symbol (FPS) and Acceleration Chevron.
- Proper use and interpretation of the Low Speed Cues (LSC).
- Use and interpretation of color codes of avionics system.
- Operating techniques – reflex actions.
- Use of manual pressurization mode.
- Ground steering.
- Use of airbrakes with autopilot engaged.
- Go-around using TOGA pushbuttons on throttles.
- Emergency panel on the pedestal.
- Primary Display Unit (PDU) and/or Multifunction Display Unit (MDU) multiple failures.
- Use of Secondary Flight Display (SFD) ILS raw deviations.
- Use of Master Minimum Equipment List (MMEL).
- Sidestick priorities.
- Takeoff operations at different center of gravity (CG).
- Full aft stick rotation technique.
- Procedure associated to CAS message “FCS: THS DEGRAD.”
- Maneuvering in Direct Law (light weight/rear CG).
- Use of pitch trim in backup mode.
- Use and understanding of overhead panel pushbuttons logics.
- Use of Cursor Control Device (CCD).
- Proficiency in using FPV vertical and lateral displacement (un-caged) FPV in integrated primary flight display IPFD design.
- Proficiency in performing ILS/ LPV approaches in raw data.
- Proficiency in using FPV in connection with synthetic vision (terrain, virtual runway).
- Proficiency in using all FMS windows.
- Proficiency in using TOGA modes of EASy II.
- VNAV mode without lateral navigation (LNAV).
- Autothrottle.
- Touch Control Steering (TCS).
- Takeoff and landing procedures with crosswind.
- Possible late and slow rotation at takeoff.
- Undamped Dutch Roll oscillations at high altitude/mach.
- It is strongly recommended that EASy II initial programs incorporate autothrottle inoperative during go-around scenarios in flight training to help facilitate the limitations of EASy I aircraft

4.4.3 Pilots must receive special emphasis on the following areas during differences training from EASy II to EASy I avionics suite:

- PDU.
- Avionics page difference.
- Flight Management Window (FMW) Phase of Flight differences.

- Absence of TOGA.
- Absence of dual checklists.
- Absence of Temp Comp.
- Absence of RAAS.
- Data Management Unit (DMU) Loaded Charts.
- Absence of ADS-B.
- Absence of ADM.
- Absence of LPV.
- Absence of SVS.

4.5 Training Devices. All training conducted in Falcon 7X that requires the use of Desktop Simulation (DTS), Graphical Flight Simulation (GFS), Instrument Procedures Trainers (IPT), or full flight simulators (FFS) for either EASy I or EASy II modifications must represent the appropriate modification being taught. However, it is possible for EASy II training devices to be used with EASy I only qualified pilots if a training program is developed to limit the EASy II functionality to simulate the EASy I system following the guidance in paragraph 4.6 below.

4.6 EASy I Crew Training on EASy II Devices.

4.6.1 Training Duration. A minimum of 2 hours of ground training is required for specific differences from EASy I to the EASy II training device. A minimum of 2 hours of flight training per crewmember is required using a device defined in Appendix 1 for Level D training. Since the 2-hour flight requirement is to allow for 1 hour of training in PF duties and 1 hour in PM duties, the training for two crewmembers can be accomplished concurrently in a 2-hour block.

4.6.1.1 Noted Differences. Differences between EASy II and EASy I must be discussed and/or demonstrated.

4.6.1.2 Training Credit. Time spent training under this paragraph (4.6) cannot be used for any credit towards any other time requirements set forth in this appendix or any other approved training program.

4.6.1.3 For pilots who have not previously been qualified on EASy II, this training (EASy I Crew Training on EASy II Device) must be completed prior to all training that requires the use of an EASy II training device unless the pilot has completed this training within the previous 6 months.

4.7 ATC Data Link Training. ATC data link functions (both Future Air Navigation System 1/A (FANS 1/A) and Aeronautical Telecommunications Network (ATN) B1) are part of the EASy II avionics suite. Operators should ensure that flightcrew are thoroughly familiar with all relevant aspects of data link operations according to the International Civil

Aviation Organization (ICAO) Global Operational Data Link Document (GOLD) prior to operation. Training elements must include, but are not limited to:

- Messages and user interface used in FANS 1/A and in ATN B1 are similar but not identical.
- Dialogues differences between FANS 1/A and ATN B1: the crew shall be made aware that the construction of the dialogues are different between FANS 1/A and ATN B1.
- Format of data (flight level (FL) and Mach) to be entered in multipurpose control and display unit (MCDU) is specific and different between FANS 1/A and ATN B1.
- Complete content of message may not be displayed in first page, and in this case, crew has to look at the other page(s) where a required answer from the crew to the ATC may be displayed (with a specific mention that the acknowledge key for Oceanic Clearances is visible on first page).
- It is recommended that the PM displays the page in his PDU and not in the MDU shared area.
- There is no direct access to Oceanic Clearances via shortcut because Oceanic Clearances is part of a subpage: crew needs to navigate in the page to get the message.
- There is no automatic handover between FANS 1/A and ATN B1. Handover should follow CODDE 2 procedure.
- FANS 1/A clearance is to be manually loaded in the flight plan (it is not automatic).

4.8 Multiple Curricula Training Programs (Reduced Planned Hour Training Programs). The FSB has determined that DA-7X EASy II avionics shares common characteristics with the EASy II avionics (including ATC data link) in the DA-EASy and DA-2EASy. It may be possible, in accordance with FAA Order 8900.1 Volume 3, Chapter 19, Section 1, Scope, Concepts, and Definitions, to develop reduced planned hour EASy II avionics training programs for pilots who hold a respective type rating and have completed EASy II avionics training.

5. PILOT CHECKING

Pilot checking requirements are dependent upon the training program objectives and operational parts and will be defined by each training program.

6. PILOT RECURRENT TRAINING

The FSB recommends that pilots use all available options of the EASy II system during recurrent simulator training.

The FSB also recommends that LPV/wide area augmentation system (WAAS) approaches are conducted with each check or currency event if the pilot is authorized by operations specifications (OpSpecs) to do so.

7. OPERATIONAL SUITABILITY

The FSB has found EASy II avionics suite to be operationally suitable for operations under Title 14 of the Code of Federal Regulations (14 CFR) parts 91, part 91 subpart K (part 91K), 121, and 135.