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Federal Aviation Administration Aircraft Evaluation Division Operations and Human Factors Evaluation Aid for Enhanced Flight Vision Systems

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12. Abstract

This evaluation aid is designed to assist Federal Aviation Administration (FAA) Aircraft Evaluation Division (AED) personnel in evaluating the human factors aspects of an enhanced flight vision system (EFVS) and aircraft combination for operational suitability evaluations and operational evaluations. This aid supports the evaluation of new or modified EFVSs on different types of aircraft and with different display and sensor implementations. This aid may facilitate early identification of human factors issues that may influence safety or human performance during EFVS procedures and operations. Additionally, the use of this aid may support AED personnel when reviewing the applicant's Evaluation Plan and may facilitate the development of an AED Summary Report, Flight Standardization Board Report, Letter of Authorization, Letter of Authorization Report, Operational Suitability Letter, Operational Suitability Report, or Type Inspection Authorization. This aid takes the form of a workbook, and each chapter can be used alone or in conjunction with other chapters. This evaluation aid comprises five chapters and one appendix—"Introduction"; "Operational Suitability Evaluation"; "Operational Evaluation: Training Recommendations"; "Operational Evaluation: Checking Recommendations"; "Operational Evaluation: Currency Recommendations"; and "Appendix: Key References for the Federal Aviation Administration Aircraft Evaluation Division Operations and Human Factors Evaluation Aid for Enhanced Flight Vision Systems." The "Operational Evaluation: Training Recommendations" and "Operational Evaluation: Checking Recommendations" chapters also include decision trees to support the determination of training difference levels or checking difference levels for a modified EFVS and aircraft combination, respectively. Links to key FAA regulatory, policy, and guidance materials have been provided within each chapter and in the appendix.

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Preface

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Feedback on this document should be sent to Dr. Kelene Fercho (kelene.a.fercho@faa.gov).

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List of Abbreviations

AC	Advisory circular
ACFT	Aircraft
ACSAA	Aircraft Certification, Safety, And Accountability Act Of 2020
AED	Aircraft Evaluation Division
AFM	Airplane flight manual
AR	Augmented reality
AWO	All weather operations
CAMI	Civil Aerospace Medical Institute
CBT	Computer-based tutorial instruction
C.F.R.	Code of Federal Regulations
CPT	Cockpit procedures trainer
CSS	Cockpit system simulator
DA	Decision altitude
DH	Decision height
EASA	European Union Aviation Safety Agency
EFVS	Enhanced flight vision system
EP	Evaluation plan
EVS	Enhanced vision system
FAA	Federal Aviation Administration
FCOM	Flight crew operations manual
FCTM	Flight crew training manual
FD	Flight director
FFS	Full flight simulator
FMS	Flight management system
FOEB	Flight Operations Evaluation Board
FPARC	Flight path angle reference cue
FPV	Flight path vector
FSB	Flight Standardization Board
FSBR	Flight Standardization Board Report
FSTD	Flight simulation training devices
FTD 2-5	Flight training devices (levels 2–5)
FTD 6-7	Flight training devices (level 6 or 7)
GPA	Glidepath angle

List of Abbreviations

HUD	Head-up display
HWD	Head-worn display
IAP	Instrument approach procedures
ICBT	Interactive computer-based training
IFR	Instrument flight rules
InFO	Information for Operators
IR	Infrared
JTA	Job task analysis
LED	Light-emitting diode
LOA	Letter of Authorization
LOAR	Letter of Authorization Report
MDA	Minimum descent altitude
MIRL	Medium intensity runway light
MMEL	Master minimum equipment list
MSpec	Management specification
MR	Mixed reality
NAS	National Airspace System
NPA	Non-precision approach
NUC	Non-uniformity correction
NVG	Night vision goggles
ODR	Operator differences requirements
OE	Operational evaluation
OEM	Original equipment manufacturer
OpSpec	Operational specification
OSE	Operational suitability evaluation
OSL	Operational Suitability Letter
OSR	Operational Suitability Report
PAPI	Precision approach path indicators
PF	Pilot flying
PM	Pilot monitoring
POH	Pilot operating handbook
PTT	Part task trainers
QRH	Quick reference handbook

List of Abbreviations

RFM	Rotorcraft flight manual
RVR	Runway visual range
RWSL	Runway status lights
SAFO	Safety Alerts for Operators
SIM A-B	Simulators level A or B
SIM C-D	Simulators level C or D
SOP	Standard operating procedure
SU	Stand-up lectures
TCPM	Training Center Program Manager
TDZE	Touchdown zone elevation
TERPS	Terminal instrument procedures
TIA	Type Inspection Authorization
V	Video
VASI	Visual approach slope indicator
VDA	Vertical descent angles
VDP	Vertical descent points
VGSI	Visual glide slope indicator
VR	Virtual reality
XR	Extended reality

1. Introduction

The purpose of the *Federal Aviation Administration Aircraft Evaluation Division Operations and Human Factors Evaluation Aid for Enhanced Flight Vision Systems* is to assist U.S. Federal Aviation Administration (FAA) Aircraft Evaluation Division (AED) personnel in an operational suitability evaluation and operational evaluation of an enhanced flight vision system (EFVS) and aircraft combination. The primary focus of this aid is fixed-wing aircraft; additional considerations specific to non–fixed-wing aircraft may be necessary. The aid supports the evaluation of new or modified EFVSs on different types of aircraft and with different display and sensor implementations. This aid may facilitate early identification of human factors issues that may influence safety or human performance during EFVS procedures and operations. Additionally, this aid may support AED personnel when reviewing the applicant's Evaluation Plan (EP) and may facilitate the development of a AED Summary Report, Flight Standardization Board Report (FSBR), Letter of Authorization (LOA), Letter of Authorization Report (LOAR), Operational Suitability Letter (OSL), Operational Suitability Report (OSR), or Type Inspection Authorization (TIA).

This aid was written to be consistent with terminology, definitions, and operational concepts as established in U.S. regulations and articulated in FAA guidance materials; see 14 Code of Federal Regulation (C.F.R.) § 1.1 for general definitions. The FAA distinguishes between enhanced vision systems (EVSs) and EFVSs, with EFVS operations defined in 14 C.F.R. § 91.176. An EVS does not meet the requirements necessary to be considered an EFVS. The International Civil Aviation Organization and other foreign civil aviation authorities may use terminology and operational concepts that differ from those of the FAA.

An EFVS uses an electronic means to provide a display of the forward external scene topography (the applicable natural or manmade features of a place or region, especially in a way to show their relative positions and elevation) using imaging sensors, including but not limited to forward-looking infrared, millimeter wave radiometry, millimeter wave radar, or low-light level image intensification. An EFVS comprises the display element, sensors, computers and power supplies, indications, and controls. Although an EFVS is implemented on a head-up display (HUD) or equivalent (such as a head-worn display), this aid is not intended to be used for operational suitability evaluations or operational evaluations of HUDs or equivalent displays. Any mention of HUD or equivalent display items in this aid applies only to those that are specific and unique to EFVSs.

This aid does not replace FAA regulatory or guidance materials but rather is intended to provide structure to the operational suitability evaluation and operational evaluation of a specific aircraft and EFVS combination. Current FAA regulatory and guidance material takes precedence over the material here. This aid is the product of research led by the FAA CAMI. It is understood that there may be aspects of a specific EFVS and aircraft combination that were not anticipated during the development of this aid. The directions and guidance described herein are not meant to unnecessarily restrict trained AED personnel, and it is expected that the judgment and expertise of AED personnel will be applied.

This aid is not intended to train FAA AED personnel in the use of EFVSs or AED processes. AED personnel and qualified pilot test subjects who will manipulate the controls of an aircraft or

act as pilot in command of an aircraft during an EFVS operation as part of an operational suitability evaluation and/or operational evaluation must be trained in accordance with 14 C.F.R. § 61.66(a) and (b) or meet the provisions of 14 C.F.R. § 61.66(h)(2). It is assumed that users of this evaluation aid are trained AED personnel.

This aid focuses on the roles and responsibilities of FAA AED personnel. There are aspects of an AED operational suitability evaluation and operational evaluation of an EFVS and aircraft combination that are also evaluated by Aircraft Certification; however, the perspectives of these two organizations may differ. The AED is focused on the use of an EFVS and aircraft combination during operations. This includes consideration of how the EFVS and aircraft components interact with each other and support the completion of tasks, maneuvers, and procedures conducted by the pilot flying and the pilot monitoring in the course of completing their roles and responsibilities. AED personnel consider the current and proposed operations; experience of the pilot end users; and how the system may affect the safety of the operation, the pilot or flight crew workload, situation awareness, decision-making, and performance in the context of normal, abnormal, non-normal, or emergency procedures. The AED and the FAA Aircraft Certification Service should coordinate in the development of the operational suitability EP.

1.1(a) Overview and Evaluation Aid Organization

This aid draws evaluation points from human factors standards, guidelines, research, and FAA regulatory and guidance materials. The content was developed and refined during focus group discussions with experienced FAA AED Flight Standardization Board (FSB) Chairs, AED Human Factors Specialists, and EFVS subject matter experts. Field testing was accomplished by AED personnel. This development process generated valuable information and feedback used to improve each iteration of this aid.

To facilitate the user's ability to reference key FAA regulatory, policy, or guidance materials, links to the original source materials are provided in each chapter and the Appendix. The information in this aid is accurate as of the publication date, but the original source material that is referenced is regularly changed or updated. The user is encouraged to check the source materials to ensure that the materials are current and accurate as well as to understand the full context of the references.

This aid takes the form of a workbook that can be completed by AED personnel conducting operational suitability evaluations and operational evaluations of an EFVS and aircraft combination. The aid contains five chapters and one appendix. Chapter 1 is the introduction, and chapters 2 through 5 include checklists specific to the content of the chapter (Table 1). The "Operational Evaluation: Training Recommendations" and "Operational Evaluation: Checking Recommendations" chapters also include decision trees to support the determination of training difference levels or checking difference levels for a modified EFVS and aircraft combination, respectively. Each chapter may be used alone or in conjunction with other chapters.

Table 1.

Topics, Chapters, and Appendix in the Federal Aviation Administration Aircraft Evaluation Division Operations and Human Factors Evaluation Aid for Enhanced Flight Vision Systems

Chapter	Title	Contents
1	Introduction	• Introduction • Overview and evaluation aid organization • Coordination and preparation tasks

2	Operational Suitability Evaluation	• Operational suitability evaluation conditions
		• Document review
		• EFVS imagery
		  ○ Pilot flying display
		  ○ Pilot monitoring display
		• Aircraft flight information and flight symbology
		  ○ Pilot flying display
		  ○ Pilot monitoring display
		• Master Minimum Equipment List (MMEL) requirements

3	Operational Evaluation: Training Recommendations	• Ground training • Flight training • Special emphasis areas • Training differences levels for a modified EFVS and aircraft combination
4	Operational Evaluation: Checking Recommendations	• Proficiency check required by 14 C.F.R. Part 61 • Competency check required by 14 C.F.R. Part 91 subpart K • Proficiency check required by 14 C.F.R. Part 121 • Competency check required by 14 C.F.R. Part 125 • Competency check required by 14 C.F.R. Part 135 • Checking differences levels for a modified EFVS and aircraft combination
5	Operational Evaluation: Currency Recommendations	• EFVS recent flight experience required by 14 C.F.R. Part 61 • EFVS refresher training required by 14 C.F.R. Part 61 • Currency for EFVS abnormal, non-normal, or emergency procedures
Appendix	Key References for the Federal Aviation Administration Aircraft Evaluation Division Operations and Human Factors Evaluation Aid for Enhanced Flight Vision Systems	Provides a list of key references that AED personnel may find helpful to prepare for and accomplish an EFVS operational suitability evaluation or operational evaluation. These key references include FAA regulations, orders, notices, information for operators (InFO), safety alerts for operators (SAFO), advisory circulars, and other technical resources.

1.1(b) Coordination and Preparation Tasks

To prepare for an EFVS operational suitability evaluation or operational evaluation, AED personnel should coordinate with the project technical points of contact both within the FAA and external to the FAA, gain familiarity with and knowledge of applicable FAA regulations and guidance materials, and gather background information on related projects. Suggested coordination tasks are provided in Table 2, and suggested preparation tasks are provided in Table 3.

Table 2.
Suggested Coordination Tasks

Task No.	Suggested Coordination Tasks
1	Accomplish established certification project processes. This includes checking the Certification Project Notification, establishing an FSB, establishing a Flight Operations Evaluation Board (FOEB; if required), and developing an Issue Paper (if appropriate).
2	For domestic EFVS products, coordinate with the FAA Aircraft Certification program manager from the appropriate Aircraft Certification Office. Identify the flight test pilot and flight test engineer assigned to the project.
3	For international EFVS products, coordinate with the international branch program manager. Consider discussing the project with the international certification authority's AED counterpart for information.
4	If an operator is sponsoring the evaluation and providing resources such as an aircraft or flight crew, consider informing the Certificate Management Office/Certificate Handling District Office. Consider Aircrew Program Manager or Principal Operations Inspector involvement in the FSB process.
5	If a 14 C.F.R. Part 142 training provider is sponsoring an evaluation and providing resources such as a flight simulator or instructors, consider informing the Training Center Program Manager (TCPM). Consider TCPM or Flight Training Program Manager involvement in the FSB process.
6	If a full flight simulator is being used for the evaluation, consider notifying the FAA National Simulator Program Branch (AFS-205).

Table 3.
Suggested Preparation Tasks

Task No.	Suggested Preparation Tasks
1	Ensure FSB members required to accomplish EFVS procedures and operations as part of an operational suitability evaluation or operational evaluation have knowledge of the subjects specified in 14 C.F.R. § 61.66(a) and (b); see also 14 C.F.R. § 61.66(h)(2).
2	Review the list of key references in the Appendix.
3	Become familiar with existing EFVS-focused OSRs and FSBRs.
4	Notify the FAA Flight Technologies and Procedures Division, Flight Operations Branch (AFS-410) to garner any background information concerning similar projects.
5	Coordinate inclusion of the operational suitability determination and, if applicable, operational evaluation in the TIA or LOA.

2. Operational Suitability Evaluation

The "Operational Suitability Evaluation" chapter of the *Federal Aviation Administration Aircraft Evaluation Division Operations and Human Factors and Evaluation Aid for Enhanced Flight Vision Systems* is intended to support operational suitability evaluations of an enhanced flight vision system (EFVS) and aircraft combination. This chapter may help inform the determination of operational acceptability or unacceptability of a new or modified EFVS and aircraft combination in accordance with Federal Aviation Administration (FAA) Order 8110.4C, FAA Order 8430.21A, FAA Order 8900.1, and Advisory Circular (AC) 120-53B; see also the FAA Flight Standardization Board (FSB) Job Task Analysis (JTA) 4.1.202.[1] When Aircraft Evaluation Division (AED) personnel are evaluating an EFVS and aircraft combination, this chapter may help ensure that human factors considerations related to operational suitability will be identified and recorded in the Type Inspection Authorization (TIA), Letter of Authorization (LOA), AED Summary Report, Flight Standardization Board Report (FSBR), Letter of Authorization Report (LOAR), Operational Suitability Letter (OSL), or Operational Suitability Report (OSR). Additionally, this evaluation aid may support AED personnel when reviewing the applicant's operational suitability Evaluation Plan (EP).

This aid does not replace FAA regulatory and guidance materials but rather is intended to provide structure to the operational suitability evaluation of a specific EFVS and aircraft combination. The directions and guidance described herein are not meant to unnecessarily restrict trained AED personnel, and it is expected that the judgment and expertise of personnel will be applied.

AED personnel and qualified pilot test subjects who will manipulate the controls of an aircraft or act as pilot in command of an aircraft during an EFVS operation as a part of an operational suitability evaluation and/or operational evaluation must be trained in accordance with Title 14 of the Code of Federal Regulation (C.F.R.) § 61.66(a) and (b) or meet the provisions of 14 C.F.R. § 61.66(h)(2).

2.1 Overview

The AED evaluates operational factors to determine if an EFVS and aircraft combination may be used in the National Airspace System (NAS) and meets the applicable operational regulations (e.g., 14 C.F.R. Parts 61, 91, 97, 121, 125, 133, and 135), FAA advisory circulars, and FAA policies.

Regarding this chapter:
AED personnel are encouraged to review the regulatory, advisory, and guidance materials provided in

- Table 4, Table 5, Table 6, Table 7, Table 8, Table 9 and in the list of key references in the Appendix.

[1] The Job Task Analysis is active at the time of writing but may be retired in the future in accordance with FAA Notice 8900.713.

- If questions arise during the EFVS operational suitability evaluation, AED personnel may wish to contact the FAA Flight Standards Service, Flight Technologies and Procedures Division, Flight Operations Branch (AFS-410).

Of note, Master Minimum Equipment List (MMEL) relief is not directly addressed in this evaluation aid. If the original equipment manufacturer (OEM) requests MMEL relief related to the EFVS, AED personnel should follow the Flight Operations Evaluation Board (FOEB) process. The MMEL relief checklist (Master Minimum Equipment List (MMEL) Requirements) is intended to identify if requested relief is related to the EFVS; the answers to this checklist item may indicate that an FOEB should be initiated (see FAA FOEB JTA 4.1.201).

2.1(a) Chapter Organization

This chapter includes suggestions for operational suitability evaluation conditions and operational suitability evaluation points for EFVS documentation, EFVS imagery, aircraft flight information, and flight symbology. The chapter is organized into the following sections:

- Operational Suitability Evaluation Conditions
- Operational Suitability Evaluation Points: Document Review
  - Aircraft Flight Manual (AFM) and AFM Supplement; Rotorcraft Flight Manual (RFM) and RFM Supplement; Quick Reference Handbook (QRH) or Equivalent; Flight Crew Operations Manual (FCOM), Pilot Operating Handbook (POH) or Equivalent; Flight Crew Training Manual (FCTM)
- Operational Suitability Evaluation Points: EFVS Sensor Image
  - Pilot Flying Display
  - Pilot Monitoring Display
  - Operational Suitability Evaluation Points: Aircraft Flight Information and Flight Symbology
  - Pilot Flying Display
  - Pilot Monitoring Display
- Master Minimum Equipment List (MMEL) Requirements

2.1(b) Terminology

The following terminology and descriptions are used in the context of the *Federal Aviation Administration Aircraft Evaluation Division Operations and Human Factors Evaluation Aid for Enhanced Flight Vision Systems* and do not replace definitions provided elsewhere in FAA regulatory and guidance material.

- ***Aircraft flight information.*** Aircraft flight information includes airspeed, vertical speed, aircraft attitude, heading, altitude, height above ground level, command guidance as appropriate for the approach to be flown, path deviation indications, flight path vector (FPV), and flight path angle reference cue (FPARC).
- ***Evaluation Plan (EP).*** An EP is submitted by the applicant and accepted by the AED to outline the FSB's operational activities, which include crewmember training, checking, identifying any gaps that may occur in operational suitability because of simulator crewmember training (e.g., equipment differences, night conditions, instrument flight rules). The EP should also include an operator differences requirements (ODR) table in accordance with Advisory Circular (AC) 120-53, Guidance for Conducting and Use of Flight Standardization Board Evaluations, if the applicant is seeking differences credit.
- ***Flight symbology.*** Flight symbology includes FPV cue, FPARC with a pitch scale, flare prompt or flare guidance, runway and extended runway centerline symbology (presented during the approach phase), HUD/head-worn display (HWD) symbology, supplementary vertical information (for situation awareness below decision altitude [DA]/decision height [DH] or minimum descent altitude [MDA]), and visual indication of runway of intended landing (e.g., runway outline).
- ***Modified EFVS.*** A modified EFVS refers to an EFVS that has been altered or upgraded through modification, typically to enhance performance, comply with new regulations or guidance, or fulfill a specialized mission. For FSB purposes, a modified EFVS evaluation may be for a previously certified EFVS that has received a modification to its hardware or software but is still installed in the same model of aircraft (e.g., a EFVS certified on aircraft model "X" is modified, but still installed in aircraft model "X").
- ***New EFVS.*** A new EFVS refers to a EFVS in its original design. For FSB purposes, a "new" EFVS evaluation is either (1) an EFVS that has never been certified by the FAA or (2) an EFVS that was previously certified by the FAA in a specific aircraft model and is then installed in a different aircraft model (e.g., an EFVS certified for aircraft model "X" is installed in aircraft model "Y").
- ***Operational evaluation (OE).*** An OE is an AED process to determine pilot type rating, minimum crewmember training, checking and currency requirements, and the unique or special airman certification requirements (e.g., specific flight characteristics, no-flap landing). An OE is associated with all FSBs but can also be completed as a standalone task.
- ***Operational suitability.*** The operational suitability comprises two parts: the evaluation and the results.
    - ***Operational suitability evaluation (OSE).*** An OSE is an AED determination that an aircraft or system may be safely used in the NAS and meets the applicable FAA policies and regulatory requirements.
    - ***Operational acceptability or unacceptability.*** The result of the OSE may be documented via a compliance checklist, the AED summary report, or the LOAR, at the discretion of the FSB chairperson.

2.1(c) Operational Suitability Chapter References

Table 4.
FAA Regulations Included in the "Operational Suitability Evaluation" Chapter

14 C.F.R. Regulations	Title
EFVS Final Rule, 81 Federal Register 90126 (December 13, 2016)	Revisions to operational requirements for the use of Enhanced Flight Vision Systems (EFVSs) and to pilot compartment view requirements for vision systems
§ 1.1	Definitions and Abbreviations
§ 25.773(e)(3)	Personnel and Cargo Accommodations: Pilot Compartment View
§ 60	Flight Simulation Training Device Initial and Continuing Qualification and Use
§ 61.58	Pilot-in-command Proficiency Check: Operation of an Aircraft That Requires More Than One Pilot Flight Crewmember or is Turbojet-Powered
§ 61.66	Enhanced Flight Vision System Pilot Requirements
§ 91.176	Straight-in Landing Operations Below DA/DH or MDA Using an Enhanced Flight Vision System (EFVS) Under IFR
§ 91.189	Category II and III Operations: General Operating Rules
§ 91.1039	IFR Takeoff, Approach and Landing Minimums
§ 91.1065(g)	Initial and Recurrent Pilot Testing Requirements
§ 121 Appendix F	Proficiency Check Requirements
§ 121.419	Pilots and Flight Engineers: Initial, Transition, and Upgrade Ground Training
§ 121.422	Aircraft Dispatchers: Initial and Transition Ground Training
§ 121.427	Recurrent Training
§ 121.441	Proficiency Checks
§ 121.651	Takeoff and Landing Weather Minimums: IFR: All Certificate Holders
§ 125.287(g)	Initial and Recurrent Pilot Testing Requirements
§ 125.325	Instrument Approach Procedures and IFR Landing Minimums
§ 125.381	Takeoff and Landing Weather Minimums: IFR
§ 135.225(j)	IFR: Takeoff, Approach and Landing Minimums
§ 135.293(i)	Initial and Recurrent Pilot Testing Requirements

Table 5.
Orders Included in the "Operational Suitability Evaluation" Chapter

Order No.	Title
Order 8110.4C	Type Certification
Order 8260.3G	United States Standard for Terminal Instrument Procedures (TERPS)
Order 8430.21A	Flight Standards Division, Aircraft Certification Division and Aircraft Evaluation Group Responsibilities
Order 8900.1 CHG 608, Vol.3, Ch32, Sec.5	Flight Manuals for Parts 121 and 135
Order 8900.1, Vol.4, Ch17	EFVS Operations
Order 8900.1 CHG 532, VOL.3 CH32, SEC. 5	Flight Manuals for Parts 121 and 135
Order 8900.1 CHG 532, Vol.8, Ch2, Sec. 3	Flight Operations Evaluation Board

Table 6.
Information for Operators Included in the "Operational Suitability Evaluation" Chapter

Resource	Title
InFO 11004	Enhanced Flight Vision System (EFVS), Enhanced Vision Systems (EVS), and Night Vision Goggles (NVG) Compatibility with Light-Emitting Diodes (LEDs) at Airports and on Obstacles

Table 7.
Safety Alerts for Operators Included in the "Operational Suitability Evaluation" Chapter

Resource	Title
SAFO 09011	Parts 121 and 135 Operators: Constant Angle of Descents Techniques for Nonprecision Approaches
SAFO 09016	Rejected Landing Due to Loss of Visibility
SAFO 10005	Go-Around Callout and Immediate Response
SAFO 15004	Scenario-Based Go-Around Training
SAFO 11009	Runway Status Lights (RWSL)
SAFO 17011	Runway Status Lights (RWSL)

Table 8.
Advisory Circulars Included in the "Operational Suitability Evaluation" Chapter

AC No.	Title
AC 20-167A	Airworthiness Approval of Enhanced Vision System, Synthetic Vision System, Combined Vision System, and Enhanced Flight Vision System Equipment
AC 25.1581-1	Airplane Flight Manual
AC 25-11B	Electronic Flight Displays
AC 90-106B	Enhanced Flight Vision System Operations
AC 120-53B	Guidance for Conducting and Use of Flight Standardization Board (FSB) Evaluations
AC 120-71B	Standard Operating Procedures and Pilot Monitoring Duties for Flight Deck Crewmembers
AC 120-118	Criteria for Approval/Authorization of All Weather Operations for Takeoff, Landing, and Rollout
AC 120-123	Flightpath Management

Table 9.
Other Technical Resources Included in the "Operational Suitability Evaluation" Chapter

Resource	Title
FOEB JTA 4.1.201	Conduct a Flight Operations Evaluation Board (FOEB)
FSB JTA 4.1.202	Conduct a Flight Standardization Board (FSB) Evaluation
AFM JTA 4.1.205	Evaluate an Aircraft Flight Manual
AT JTA 4.1.209	Conduct a Foreign Aircraft Validation
AT JTA 4.1.217	Develop and Process Aircraft Evaluation Division (AED) Issue Papers
AT JTA 4.1.218	Conduct an Operational Evaluation with Foreign Regulatory Authorities
FAA FSB EFVS OSR	Operational Credit for Enhanced Flight Vision Systems (EFVS)
Published FSB Reports	Published FSB and Equipment Operational Suitability Reports (OSR)

2.2 Operational Suitability Evaluation Conditions

Most operational suitability evaluation tasks should be conducted in an aircraft; a limited number of the operational suitability evaluation tasks may be accomplished in a flight simulator. A flight simulator may be used to evaluate conditions that are too difficult to accomplish in an aircraft or for tasks, procedures, or maneuvers that do not require the flight environment provided by an aircraft in the real world. Examples of these tasks, procedures, or maneuvers may include abnormal, non-normal, or emergency scenarios; system malfunctions or failures (e.g., EFVS symbology failures, EFVS sensor malfunctions); or evaluation of flight crew task-sharing procedures such as crew coordination and callouts.

Outside of the limited cases where a flight simulator may be an option, it is *strongly recommended* that all other operational suitability evaluation tasks be conducted in an aircraft. The visual aspects related to EFVS sensor properties, airfield lighting infrastructure, and runways (e.g., reflectivity of contamination, tire markings, runway surface material, runway markings) are practically impossible to accurately model in a flight simulator environment.

The operational suitability evaluation should include conditions representing the full operational envelope of the EFVS. The following examples are provided for consideration but do not constitute an exhaustive list. Each EFVS and aircraft combination is unique and requires trained AED personnel to use their expertise when evaluating the applicant's EP. Examples of operational suitability evaluation conditions may include the use of EFVS in the following situations:

- For operations under 14 C.F.R. § 91.176(a) (i.e., EFVS operations to touchdown) and/or 14 C.F.R. § 91.176(b) (i.e., EFVS operations to 100 feet above the touchdown zone elevation)
- With approach guidance deviation, such as maximum allowable glidepath and lateral deviations
- When airspeed varies due to wind conditions
- For offset approaches up to 30 degrees
- At the maximum terminal instrument procedures (U.S. Standard for Terminal Instrument Procedures [TERPS]) glidepath angle (GPA) allowed for various approach categories (A, B, C, D, E) or by the AFM
- In various sunlight conditions, such as dynamically changing background (ambient) lighting, direct bright sunlight, or sunlight combined with fog or haze
- During day versus night ambient lighting conditions
- In precipitation, such as rain, fog, haze, or snow
- With incandescent and LED airfield lighting
- During takeoff conditions authorized by an operations specification (OpSpec), management specification (MSpec), or LOA. For example, MSpecs that authorize takeoffs when visibility is less than 600 feet RVR; see 14 C.F.R. § 91.1039(e)
- During high workload conditions, such as multitasking; distraction; performing time-sensitive tasks; responding to various system failures or aircraft alerts; when the pilot is fatigued; or conducting operations during turbulent flight, at terrain challenged airfields, or at busy airports with traffic

- In poor environmental conditions, specifically when visibility is reduced to 1000 feet runway visual range (RVR) or below; this is particularly important for evaluating and verifying EFVS sensor performance in conditions near the sensor performance limitations

2.3 Operational Suitability Evaluation Points: Document Review

Operational suitability evaluation tasks may include a review of existing EFVS documentation and/or an analysis of proposed EFVS documentation. For example, an analysis of the EFVS limitations provided in the AFM or RFM is necessary.

Of note, MMEL is developed through the FOEB process; however, during the operational suitability evaluation, the AED may have the opportunity to review some of the EFVS MMEL items, though later evaluation of certain MMEL items in an aircraft may be required through the FOEB process.

Document Review Overview and Instructions

EFVS documentation should be reviewed and analyzed to verify that descriptions of the EFVS are accurate and appropriate. Importantly, this documentation review and analysis should result in concurrence with the AFM and AFM supplement (or RFM and RFM supplement), in accordance with FAA Orders 8110.4C and 8900.1. If other documents are reviewed, AED personnel should verify that EFVS-related information is consistent with the AFM and AFM supplement (or RFM and RFM supplement). The checklists in this section will aid AED personnel in this process.

Operational suitability evaluation points for the following categories of documents are included in this section:

- AFM and AFM supplement (or RFM and RFM supplement): Limitations (1.1)
- AFM and AFM supplement (or RFM and RFM supplement): Normal Procedures (1.2)
- AFM and AFM supplement (or RFM and RFM supplement): Abnormal, Non-normal, or Emergency Procedures (1.3)
- AFM and AFM supplement (or RFM and RFM supplement): System Descriptions (1.4)
- QRH or Equivalent (1.5)
- FCOM, POH, or Equivalent (1.6)
- FCTM or Equivalent (1.7)

Whenever possible, examples are given to provide context for the checklist item. The examples are *not* intended to serve as an exhaustive list, and the examples may not be applicable to every EFVS and aircraft combination.

For each checklist item:

1. Review the operational suitability evaluation point;
2. Select the appropriate “yes,” “no,” or “n/a” suitability determination response for each phase of flight; and
3. Provide additional comments on any noteworthy observations.

1.1 AFM and AFM Supplement		
Limitations	**Phase of Flight**	**Suitable? (Select One)**
The limitations section is accurate and suitable for the safe operation of the EFVS. For example, EFVS usage does not impede operations conducted within the U.S. NAS (e.g., consider glidepath angle [GPA] limitations, lateral offset limitations, maximum crosswinds, etc.).	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 61.66; § 91.176; Order 8900.1 CHG 608, Vol.3, Ch32, Sec.5; Order 8260.3G; InFO 11004
Secondary References: Order 8110.4C; Order 8430.21A; AC 90-106B; AC 25.1581-1; AFM JTA 4.1.205; AT JTA 4.1.209; AT JTA 4.1.217; AT JTA 4.1.218

1.2 AFM and AFM Supplement (or RFM and RFM Supplement)		
Normal Procedures	**Phase of Flight**	**Suitable? (Select One)**
The normal procedures section (and supplementary procedures section, if provided) provides logical information with clear, comprehensive, and accurate descriptions of EFVS procedures. The information integrates into checklists appropriately, with adequate information being communicated. Any required steps and/or callouts are clear and concise, with consideration for operational tempo and logical sequence of action. EFVS normal procedures do not require excessive mental effort or physical demand during flight operations. Mental or physical effort reflects strain from performing EFVS procedures under various environmental conditions for each phase of flight, coupled with the expected capability of the pilot to respond to those imposed demands. Excessive mental or physical effort may result in performance decline that affects the pilots' abilities to perform their roles and responsibilities, or even incidental effects such as fatigue or stress.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 61.66; § 91.176; Order 8900.1 CHG 608, Vol.3, Ch32, Sec.5; InFO 11004
Secondary References: Order 8110.4C; Order 8430.21A; AC 90-106B; AC 25.1581-1; AFM JTA 4.1.205; AT JTA 4.1.209; AT JTA 4.1.217; AT JTA 4.1.218

1.3 AFM and AFM Supplement (or RFM and RFM Supplement)		
Abnormal, Non-Normal, or Emergency Procedures	**Phase of Flight**	**Suitable? (Select One)**
The abnormal, non-normal, or emergency procedures section(s) provide logical information with clear, comprehensive, and accurate descriptions of EFVS abnormal, non-normal, and/or emergency procedures. The information provided includes specific and detailed procedural information related to the unique characteristics of the aircraft and EFVS combination. The information may be provided in a variety of formats, such as narrative or sequential, step-by-step formats. Any required steps and/or callouts for critical situations or emergencies are easily located, clear, and concise, with consideration for operational tempo and logical sequence of action. Importantly, EFVS malfunctions or failures may be annunciated or un-annunciated. The descriptions provided should include any expected auditory, visual, or tactile indicators and support the quick and accurate identification of the problem. EFVS abnormal, non-normal, or emergency procedures do not require excessive mental effort or physical demand during flight operations. Mental or physical effort reflects strain from performing EFVS procedures under various environmental conditions for each phase of flight, coupled with the expected capability of the pilot to respond to those imposed demands. Excessive mental or physical effort may result in performance decline that affects the pilots' abilities to perform their roles and responsibilities, or even incidental effects, such as fatigue or stress.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 61.66; § 91.176; Order 8900.1 CHG 608, Vol.3, Ch32, Sec.5; InFO 11004
Secondary References: Order 8110.4C; Order 8430.21A; AC 90-106B; AC 25.1581-1; AFM JTA 4.1.205; AT JTA 4.1.209; AT JTA 4.1.217; AT JTA 4.1.218

1.4 AFM and AFM Supplement (or RFM and RFM Supplement)		
System Descriptions	**Phase of Flight**	**Suitable? (Select One)**
The system descriptions section (if present) describes the EFVS in a manner appropriate to a qualified pilot trained in the use of EFVS. Information provided should include a description and location of the EFVS controls, as well as the effect that control manipulations have on the EFVS sensor image, aircraft flight information, or flight symbology. Figures or diagrams must be accurate and should include the EFVS controls, EFVS mode indications, and EFVS alerts.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: *EFVS Final Rule*; *§ 61.66*; *§ 91.176*; *Order 8900.1 CHG 608, Vol.3, Ch32, Sec.5*; *InFO 11004*
Secondary References: *Order 8110.4C*; *Order 8430.21A*; *AC 90-106B*; *AC 25.1581-1*; *AFM JTA 4.1.205*; *AT JTA 4.1.209*; *AT JTA 4.1.217*; *AT JTA 4.1.218*

1.5 QRH or Equivalent		
	Phase of Flight	**Suitable? (Select One)**
The AED is not required to review the QRH or equivalent as part of an operational suitability evaluation. However, if a QRH or equivalent is provided, reviewing the documentation for information relevant to the EFVS is important, and any safety-related concerns should be brought to the OEM's attention. For example, it is important that EFVS information is consistent across documentation. Any EFVS procedural steps or limitations associated with the EFVS equipment should be consistent with those provided in the AFM (or AFM Supplement) or RFM (or RFM Supplement). Language should be clear and concise, and information should be easy to locate.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 61.66; § 91.176; Order 8900.1 CHG 608, Vol.3, Ch32, Sec.5; InFO 11004
Secondary References: Order 8110.4C; Order 8430.21A; AC 90-106B; AC 25.1581-1; AFM JTA 4.1.205; AT JTA 4.1.209; AT JTA 4.1.217; AT JTA 4.1.218

1.6 FCOM, POH, or Equivalent		
	Phase of Flight	**Suitable? (Select One)**
The FCOM, POH, or equivalent is typically issued by the manufacturer as a guideline for operators to develop their own Standard Operating Procedures (SOPs) in accordance with applicable requirements for EFVS operations. The AED does not review the FCOM, POH, or equivalent for operational suitability but rather provides feedback to the applicant. This document should accurately reflect AFM (or AFM Supplement) or RFM (or RFM Supplement) limitations, normal procedures, and abnormal, non-normal, or emergency procedures. All system descriptions and procedures must be consistent with system descriptions included in other documents provided by the OEM. The FCOM should include a thorough explanation of how all of the EFVS controls function and the effect controls have on the EFVS sensor image or other aircraft systems, including the EFVS approach minimum settings. The level of detail should be sufficient for the pilot to understand the operation of the EFVS, crew coordination, and EFVS callouts. Figures or diagrams must be accurate and should include the EFVS controls, EFVS mode indications, and EFVS alerts. If the applicant requests the use of EFVS for Category II or Category III operations, the FCOM should address these procedures, instructions, and limitations.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 61.66; § 91.176; § 91.189; § 135.225(j); Order 8900.1 CHG 608, Vol.3, Ch32, Sec.5; InFO 11004; SAFO 09016; SAFO 10005
Secondary References: § 91.1039; § 91.1065(g); Order 8110.4C; Order 8430.21A; SAFO 15004; AC 90-106B; AC 25.1581-1; AC 120-118; AFM JTA 4.1.205; AT JTA 4.1.209; AT JTA 4.1.217; AT JTA 4.1.218

1.7 FCTM or Equivalent		
	Phase of Flight	**Suitable? (Select One)**
The FCTM or equivalent provides the pilot with practical information on maneuvers and techniques to operate the aircraft. The AED does not review the FCTM for operational suitability but rather provides feedback and suggestions to the applicant. The language should be comprehensive, given that the FCTM is provided as guidance for training EFVS maneuvers and techniques. The FCTM may include separate sections on normal, abnormal, non-normal, or emergency procedures, as well as information on crew coordination and callouts. All system descriptions and procedures must be consistent with system descriptions included in other documents provided by the OEM. Figures or diagrams must be accurate and should include the EFVS controls, EFVS mode indications, and EFVS alerts. If the applicant is requesting the use of EFVS for Category II or Category III operations, the FCTM should address these procedures, instructions, and limitations.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 60; § 61.58; § 61.66; § 91.176; § 91.189; § 121 Appendix F; § 121.419; § 121.422; § 121.427; § 121.441; § 125.287(g); § 135.225(j); Order 8900.1 CHG 532, Vol.3, Ch32, Sec.5; InFO 11004; SAFO 09016; SAFO 10005; SAFO 15004;
Secondary References: § 91.1039; § 91.1065(g); § 135.225(j); Order 8110.4C; Order 8430.21A; SAFO 09011; AC 90-106B; AC 25.1581-1; AC 120-118

2.4 Operational Suitability Evaluation Points: EFVS Sensor Image

2.4.1 Pilot Flying Display

Pilot Flying Display Sensor Image Overview and Instructions

Pilot flying display: The EFVS sensor image must support the visual acquisition of the external scene, terrain, obstacles, and the airfield and runway environment, allowing the pilot flying to accomplish their roles and responsibilities. This includes enabling the pilot flying to see a real-time sensor image of the required visual references during approach operations.

Operational suitability evaluation points for the following categories are included in this section:

- Visual Reference Requirements (2.1.1)
- Control Integration (2.1.2)
- Control Adjustability (2.1.3)
- External Scene Perception (2.1.4)
- Deactivation and Reactivation (2.1.5)
- Safe Flight Operations (2.1.6)
- Supports Manual Control (2.1.7)
- Category II and/or Category III Operations (2.1.8)
- Airfields with Mixed Lighting Infrastructure (2.1.9)
- Offset Approaches (2.1.10)
- Obstructions (2.1.11)
- EFVS with More Than One Sensor (2.1.12)

Whenever possible, examples are given to provide context for the checklist item. The examples are *not* intended to serve as an exhaustive list, and the examples may not be applicable to every EFVS and aircraft combination.

For each checklist item:

1. Review the operational suitability evaluation point;
2. Select the appropriate “yes,” “no,” or “n/a” suitability determination response for each phase of flight; and
3. Provide additional comments on any noteworthy observations.

2.1.1 EFVS Sensor Image: Pilot Flying Display

Visual Reference Requirements	Phase of Flight	Suitable? (Select One)
The visual reference requirements for the runway threshold and the runway touchdown zone are distinctly perceptible, identifiable, and comprehendible on the EFVS sensor image. For the runway threshold, this includes the beginning of the runway landing surface, threshold lights, or runway end identifier lights. For the runway touchdown zone, this includes the touchdown zone landing surface, touchdown zone lights, touchdown zone markings, or runway lights.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; Order 8900.1, Vol.4, Ch17; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.1.2 EFVS Sensor Image: Pilot Flying Display		
Control Integration	**Phase of Flight**	**Suitable? (Select One)**
The EFVS sensor image controls are integrated into the aircraft so that they are accessible and discernable to the PF and do not interfere with existing equipment or procedures, or the roles and responsibilities of the pilot flying. EFVS sensor image controls should be functionally grouped with unambiguous labels. Functionally related controls should be located together to permit the PF to view them without having to take an awkward posture. Labels should be readable in all ambient lighting conditions. Controls should be sufficiently spaced apart for easy manipulation and to reduce the likelihood of inadvertent activation, which may be more likely in turbulent conditions. Ideally, controls are identifiable by touch alone without needing to look at them; touch-identifiable controls reduce the likelihood of inadvertent activation. As an example, the EFVS sensor image controls are clearly distinct from the autopilot disconnect such that it is unlikely that the PF would inadvertently engage the wrong control.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; Order 8900.1, Vol.4, Ch17; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.1.3 EFVS Sensor Image: Pilot Flying Display

Control Adjustability	Phase of Flight	Suitable? (Select One)
The EFVS sensor image controls (e.g., brightness, contrast) are easily adjustable, and the association between controls and the display is obvious. The use of EFVS sensor image controls should be consistent with the expectations of the PF, with consideration for basic capabilities such as strength, dexterity, memory, reach, and vision. The movement required to activate a control should be simple and easy to perform, and the direction of control movement should be intuitive (e.g., toggle up = on, toggle down = off). For example, adjusting the controls to reduce display illumination in situations when the PF needs to transition to a head-down position to perform other tasks is intuitive and can be completed with a quick-glance and without error.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; Order 8900.1, Vol.4, Ch17; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.1.4 EFVS Sensor Image: Pilot Flying Display

External Scene Perception	Phase of Flight	Suitable? (Select One)
The EFVS sensor image controls are easily and intuitively adjustable so that the PF can clearly perceive and comprehend elements in the external scene over a wide range of weather and ambient lighting conditions. Elements in the external scene may include visual reference requirements, terrain, obstacles, traffic, or the airfield and runway environment. Weather and lighting conditions may include various types of obscurations to visibility, bright sunlight, or night.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; Order 8900.1, Vol.4, Ch17; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.1.5 EFVS Sensor Image: Pilot Flying Display

Deactivation and Reactivation	Phase of Flight	Suitable? (Select One)
The EFVS sensor image controls provide the means to quickly, easily, and accurately deactivate and reactivate the EFVS sensor image. This may be necessary in several situations. As an example, deactivating the EFVS sensor image may be necessary during an approach, to allow the PF to maintain continuous visual contact with the required visual references. As another example, deactivation may be necessary if the PF perceives a visual artifact, such as blooming during an approach with low fog and bright runway lighting.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; Order 8900.1, Vol.4, Ch17; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.1.6 EFVS Sensor Image: Pilot Flying Display

Safe Flight Operations	Phase of Flight	Suitable? (Select One)
The EFVS sensor image supports safe operations, including those to which visibility credit is not given. The EFVS should not be a distraction or result attention capture or cognitive tunneling during ground maneuvering or flight operations. Cognitive tunneling or attention capture increases the likelihood of the PF failing to detect unexpected ground or air hazards.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; Order 8900.1, Vol.4, Ch17; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.1.7 EFVS Sensor Image: Pilot Flying Display		
Supports Manual Control	**Phase of Flight**	**Suitable? (Select One)**
The EFVS sensor image is sufficient to support manual control of the aircraft to touchdown and rollout.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; Order 8900.1, Vol.4, Ch17; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.1.8 EFVS Sensor Image: Pilot Flying Display		
Category II and/or Category III Operations	**Phase of Flight**	**Suitable? (Select One)**
The EFVS sensor image supports safe Category II and/or Category III operations if requested by the applicant.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; Order 8900.1, Vol.4, Ch17; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.1.9 EFVS Sensor Image: Pilot Flying Display

Airfields with Mixed Lighting Infrastructure	Phase of Flight	Suitable? (Select One)
The EFVS sensor image supports safe operations at airfields with mixed lighting infrastructure, such as an incandescent lightbulb approach lighting system and LED runway lighting. LED lights are significantly less visible than traditional incandescent lightbulbs when viewed through EFVS, though this is dependent on the characteristics of the LED lights and the type of EFVS sensor(s). When mixed lighting infrastructure is in place at an airfield, the EFVS sensor image should not display misleading information when transitioning from a surface marked with incandescent lights to LED lights.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; Order 8900.1, Vol.4, Ch17; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.1.10 EFVS Sensor Image: Pilot Flying Display

Offset Approaches	Phase of Flight	Suitable? (Select One)
The display field of view is usable for offset approaches and the maximum allowed crosswind for EFVS operations (see Appendix I in AC 20-167A for descriptions). The display supports the appropriate distribution of the PF's attention between the external scene and flight deck events without an excessive need to reposition the head to view the obscured part of the external scene. An inappropriate distribution of the pilot's attention may result in missing important information (e.g., EFVS symbology, aircraft flight information, alerts) obtained from flight deck displays.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; Order 8900.1, Vol.4, Ch17; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.1.11 EFVS Sensor Image: Pilot Flying Display

Obstructions	Phase of Flight	Suitable? (Select One)
For EFVSs that integrate synthetic elements into the sensor image (such as with a combined vision system), the synthetic elements do not obstruct or obscure the enhanced visual display of the required visual references or other elements in the external scene, such as terrain, obstacles, traffic, and the airfield and runway environment.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; Order 8900.1, Vol.4, Ch17; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.1.12 EFVS Sensor Image: Pilot Flying Display		
EFVS With More Than One Sensor	**Phase of Flight**	**Suitable? (Select One)**
EFVS may have more than one sensor, such as forward-looking infrared, millimeter wave radiometry, millimeter wave radar, and/or low-light level image intensification. In this case, the method of combining the EFVS sensor imagery should result in a realistic image for the PF to use.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; Order 8900.1, Vol.4, Ch17; SAFO 11009; SAFO 17011; AC 120-118; AC 120-123

2.4.2 Pilot Monitoring Display[2]

Pilot Monitoring Display Sensor Image Overview and Instructions

Pilot monitoring display: If a pilot monitoring (PM) display is evaluated for use in EFVS operations, the EFVS sensor image must support the visual acquisition of the external scene, terrain, obstacles, and the airfield and runway environment, allowing the pilot monitoring to accomplish their roles and responsibilities. This includes enabling the pilot monitoring to see a real-time sensor image of the required visual references during approach operations.

Operational suitability evaluation points for the following categories are included in this section:

- Visual Reference Requirements (2.2.1)
- Supports Intervention (2.2.2)
- Control Integration (2.2.3)
- Undue Visual Obstruction (2.2.4)
- Positioning (2.2.5)
- Size and Location (2.2.6)
- Fixed Brightness (2.2.7)
- Adjustable Brightness (2.2.8)
- Distracting Glare or Reflection (2.2.9)
- Dual-Purpose User Interface Design (2.2.10)
- Acquire External Scene (2.2.11)
- Safe Operations with Mixed Lighting Infrastructure (2.2.12)
- Safe Flight Operations (2.2.13)
- Deactivation and Reactivation (2.2.14)
- EFVS with More Than One Sensor (2.2.15)

Whenever possible, examples are given to provide context for the checklist item. The examples are *not* intended to serve as an exhaustive list, and the examples may not be applicable to every EFVS and aircraft combination.

For each checklist item:

1. Review the operational suitability evaluation point;
2. Select the appropriate “yes,” “no,” or “n/a” suitability determination response for each phase of flight; and
3. Provide additional comments on any noteworthy observations.

[2]A PM display is required for EFVS operations to touchdown and rollout under 14 C.F.R. § 91.176(a). The equipment requirements for a PM display are provided in 14 C.F.R. § 91.176(a)(1). The PM display is intended to enable the PM to see a real-time sensor image of the required visual references and runway environment; however, OEMs and operators may include additional features such as symbology, aircraft flight information, or synthetic elements. Any additional features should not affect the operational suitability of the PM display; see the EFVS Final Rule preamble for the intent of the rule.

2.2.1 EFVS Sensor Image: Pilot Monitoring Display (If Present)		
Visual Reference Requirements	**Phase of Flight**	**Suitable? (Select One)**
The PM display supports visual confirmation of the visual reference requirements in support of the safe conduct of the approach and landing. For the runway threshold, this includes the beginning of the runway landing surface, threshold lights, or runway end identifier lights. For the runway touchdown zone, this includes the touchdown zone landing surface, touchdown zone lights, touchdown zone markings, or runway lights.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.2.2 EFVS Sensor Image: Pilot Monitoring Display (If Present)

Supports Intervention	Phase of Flight	Suitable? (Select One)
The PM display enables the PM to assess the safe conduct of the approach, landing, and rollout and supports intervention, if necessary, in visibilities where natural vision may not be sufficient. An example of an intervention is commanding a missed approach. An intervention does not include transferring responsibilities from the PF to PM during the EFVS operation, especially when at or below the published DA, DH, or MDA.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.2.3 EFVS Sensor Image: Pilot Monitoring Display (If Present)

Control Integration	Phase of Flight	Suitable? (Select One)
The EFVS sensor image controls are integrated into the aircraft so that they are accessible and discernable to the PM and do not interfere with existing equipment or procedures, or the roles and responsibilities of the PM. EFVS sensor image controls should be functionally grouped with unambiguous labels. Functionally related controls should be located together to permit the PM to view them without having to take an awkward posture. Labels should be readable in all ambient lighting conditions. Controls should be sufficiently spaced apart for easy manipulation and to reduce the likelihood of inadvertent activation, which may be more likely in turbulent conditions. Ideally, controls are identifiable by touch alone, without needing to look at them; touch-identifiable controls reduce the likelihood of inadvertent activation. As an example, the EFVS sensor image controls are clearly distinct from the autopilot disconnect such that it is unlikely that the pilot monitoring would inadvertently engage the wrong control.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.2.4 EFVS Sensor Image: Pilot Monitoring Display (If Present)		
Undue Visual Obstruction	**Phase of Flight**	**Suitable? (Select One)**
The PM display is not unduly visually obstructed by flight deck equipment or controls. Effective placement of the PM display supports the PM with developing a mental model of the current flight situation and developing and maintaining situation awareness.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.2.5 EFVS Sensor Image: Pilot Monitoring Display (If Present)		
Positioning	**Phase of Flight**	**Suitable? (Select One)**
The PM display is located in a position where the PM can view the aircraft's flight path from their normal position with minimal head and eye movement. In the case of an EFVS implemented on a head-down display, this is especially important if the display has been installed with a vertical or horizontal tilt.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.2.6 EFVS Sensor Image: Pilot Monitoring Display (If Present)		
Size and Location	**Phase of Flight**	**Suitable? (Select One)**
If it is implemented as a head-down display, the PM display is of sufficient size and in a location that supports a comfortable transition from the head-down EFVS sensor image to head-up natural vision.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.2.7 EFVS Sensor Image: Pilot Monitoring Display (If Present)		
Fixed Brightness	**Phase of Flight**	**Suitable? (Select One)**
If the EFVS sensor image display brightness is fixed, illumination from the PM display allows the PM to perform their normal duties during a variety of ambient lighting conditions (daytime, bright sunlight, nighttime).	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.2.8 EFVS Sensor Image: Pilot Monitoring Display (If Present)		
Adjustable Brightness	**Phase of Flight**	**Suitable? (Select One)**
If a PM display brightness control is present, PM display illumination is easily adjustable to allow the PM to perform their normal duties during a variety of ambient lighting conditions (daytime, bright sunlight, nighttime). The association between controls and the PM display is obvious. The use of PM display controls should be consistent with the expectations of the PM, with consideration for basic capabilities such as strength, dexterity, memory, reach, and vision.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.2.9 EFVS Sensor Image: Pilot Monitoring Display (If Present)		
Distracting Glare or Reflection	**Phase of Flight**	**Suitable? (Select One)**
The PM display does not create distracting glare or reflections on the PM display or other flight deck displays or instruments that would distract the pilot monitoring from performing their normal duties.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.2.10 EFVS Sensor Image: Pilot Monitoring Display (If Present)		
Dual-Purpose User Interface Design	**Phase of Flight**	**Suitable? (Select One)**
For PM displays that are dual-purpose, the user interface design supports an intuitive means for switching the PM display to the EFVS sensor image and back without distracting the PM from performing their normal duties.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.2.11 EFVS Sensor Image: Pilot Monitoring Display (If Present)		
Acquire External Scene	**Phase of Flight**	**Suitable? (Select One)**
The PM display allows the PM to visually acquire the external scene, including terrain, obstacles, traffic, and the airfield and runway environment.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.2.12 EFVS Sensor Image: Pilot Monitoring Display (If Present)		
Safe Operations with Mixed Lighting Infrastructure	**Phase of Flight**	**Suitable? (Select One)**
The PM image supports safe operations at airfields with mixed lighting infrastructure, such as an incandescent lightbulb approach lighting system and LED runway lighting. LED lights are significantly less visible than traditional incandescent lightbulbs when viewed through EFVS, though this is dependent on the characteristics of the LED lights and the type of EFVS sensor(s). When mixed lighting infrastructure is in place at an airfield, the EFVS sensor image should not display misleading information when transitioning from a surface marked with incandescent lights to LED lights.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.2.13 EFVS Sensor Image: Pilot Monitoring Display (If Present)		
Safe Flight Operations	**Phase of Flight**	**Suitable? (Select One)**
The EFVS sensor image supports safe operations, including those to which visibility credit is not given. The EFVS should not be a distraction or result attention capture or cognitive tunneling during ground maneuvering or flight operations. Cognitive tunneling or attention capture increases the likelihood of the PM failing to detect unexpected ground or air hazards.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.2.14 EFVS Sensor Image: Pilot Monitoring Display (If Present)		
Deactivation and Reactivation	**Phase of Flight**	**Suitable? (Select One)**
For PM displays presented on a HUD (or equivalent), the EFVS sensor image controls provide the means to quickly, easily, and accurately deactivate and reactivate the EFVS sensor image. This may be necessary in several situations. As an example, to allow the PM to maintain continuous visual contact with the required visual references during approach and landing. As another example, deactivation may also be necessary if the PM perceives a visual artifact, such as blooming during an approach with low fog and bright runway lighting.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.2.15 EFVS Sensor Image: Pilot Monitoring Display (If Present)		
EFVS With More Than One Sensor	**Phase of Flight**	**Suitable? (Select One)**
EFVS may have more than one sensor, such as forward-looking infrared, millimeter wave radiometry, millimeter wave radar, and/or low-light level image intensification. In this case, the method of combining the EFVS sensor imagery should result in a realistic image on the PM display for the PM to use.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Observations:		

Primary References: EFVS Final Rule; § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; Order 8900.1, Vol.4, Ch17; SAFO 11009; SAFO 17011; AC 120-118; AC 120-123

2.5 Operational Suitability Evaluation Points: Aircraft Flight Information and Flight Symbology

2.5.1 Pilot Flying Display

Pilot Flying Display Aircraft Flight Information and Flight Symbology Overview and Instructions

Pilot flying display: The aircraft flight information and flight symbology on the EFVS display supports the pilot flying with quickly and accurately comprehending information about the aircraft state and position without distorting or obscuring the external scene and in a manner sufficient to allow the pilot flying to accomplish their roles and responsibilities.

- Examples of aircraft flight information include airspeed, vertical speed, aircraft attitude, heading, altitude, height above ground level, command guidance as appropriate for the approach to be flown, path deviation indications, flight path vector, and flight path angle reference cue.
- Examples of flight symbology include FPV cue, FPARC with a pitch scale, flare prompt or flare guidance, runway and extended runway centerline symbology (presented during the approach phase), HUD/HWD symbology, supplementary vertical information (for situation awareness below DA/DH or MDA), visual indication of runway of intended landing (e.g., runway outline).

Operational suitability evaluation points for the following categories are included in this section:

- Visual Reference Requirements (3.1.1)
- Visible Critical Elements (3.1.2)
- Sufficient Information and Guidance (3.1.3)
- Imagery Distinction (3.1.4)
- Control Adjustability (3.1.5)
- Excessive Information (3.1.6)
- Clear and Concise Information (3.1.7)
- Aircraft Attitude (3.1.8)
- Messages and Alerts (3.1.9)
- Visual Anomalies (3.1.10)
- Ambient Lighting Conditions (3.1.11)
- Approach Lighting System (3.1.12)
- Manual Controls (3.1.13)
- Category II and/or Category III Operations (3.1.14)
- Landing Distraction (3.1.15)
- Touchdown and Rollout Distraction (3.1.16)

LIST CONTINUED ON NEXT PAGE

- Maximum Glidepath Angle (GPA) (3.1.17)
- Manual Descent Rate (3.1.18)
- Synthetic Elements (3.1.19)
- FPARC Adjustability (3.1.20)

Whenever possible, examples are given to provide context for the checklist item. The examples are *not* intended to serve as an exhaustive list, and the examples may not be applicable to every EFVS and aircraft combination.

For each checklist item:

1. Review the operational suitability evaluation point;
2. Select the appropriate “yes,” “no,” or “n/a” suitability determination response for each phase of flight; and
3. Provide additional comments on any noteworthy observations.

3.1.1 Aircraft Flight Information and Flight Symbology: Pilot Flying Display

Visual Reference Requirements	Phase of Flight	Suitable? (Select One)
The visual reference requirements for the runway threshold and the runway touchdown zone are clearly visible in full and decluttered modes. For the runway threshold, this includes the beginning of the runway landing surface, threshold lights, or runway end identifier lights. For the runway touchdown zone, this includes the touchdown zone landing surface, touchdown zone lights, touchdown zone markings, or runway lights.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.2 Aircraft Flight Information and Flight Symbology: Pilot Flying Display

Visible Critical Elements	Phase of Flight	Suitable? (Select One)
Critical elements in the external scene are clearly visible in both full and decluttered modes. These critical elements may include terrain, obstacles, the airfield or runway environment, or traffic on or about to incur the runway.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Touchdown and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.3 Aircraft Flight Information and Flight Symbology: Pilot Flying Display

Sufficient Information and Guidance	Phase of Flight	Suitable? (Select One)
The PF has sufficient aircraft flight information and guidance from flight symbology to maintain a head-up position with visual attention focused on the forward external scene, as necessary for safe flight operations. Maintaining visual attention to the external visual scene increases the likelihood of the PF detecting air and ground hazards, such as traffic.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.4 Aircraft Flight Information and Flight Symbology: Pilot Flying Display

Imagery Distinction	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology elements integrate with the EFVS sensor image so that the PF can quickly and easily recognize and understand the presented information. The means that the aircraft flight information and flight symbology have sufficiently distinct contrast and chromaticity to stand out from the background sensor imagery.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.5 Aircraft Flight Information and Flight Symbology: Pilot Flying Display		
Control Adjustability	**Phase of Flight**	**Suitable? (Select One)**
The EFVS display controls, such as brightness or contrast, are easily adjustable (either automatically or manually) so that the aircraft flight information and flight symbology can be recognized and understood by the PF, in support of performing their normal duties.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Aircraft Flight Information Observations:	**Flight Symbology Observations:**	

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.6 Aircraft Flight Information and Flight Symbology: Pilot Flying Display

Excessive Information	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology elements are not excessive in number or size, variety of color, or symbols. They do not obscure essential information or present distracting, disorganized, or unnecessary information. Excessive information could result in cognitive tunneling or a delay in visual detection of alerts or critical elements in the external scene.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.7 Aircraft Flight Information and Flight Symbology: Pilot Flying Display

Clear and Concise Information	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology are clear and concise and do not require excessive effort or concentration to interpret. The symbol design conveys the information it represents and is distinctive from other symbology elements.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.8 Aircraft Flight Information and Flight Symbology: Pilot Flying Display

Aircraft Attitude	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology support a quick and accurate interpretation of aircraft attitude, allowing the PF to quickly recognize and recover from an unusual attitude situation.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.9 Aircraft Flight Information and Flight Symbology: Pilot Flying Display

Messages and Alerts	Phase of Flight	Suitable? (Select One)
Aircraft alerts or messages are conspicuous, quickly detected, and accurately interpreted.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.10 Aircraft Flight Information and Flight Symbology: Pilot Flying Display

Visual Anomalies	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology are recognizable and understandable in the presence of visual anomalies, such as blooming, noise, parallax, jellyfishing, roman candles, burlap sack, thermal crossover, and dead pixels.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.11 Aircraft Flight Information and Flight Symbology: Pilot Flying Display

Ambient Lighting Conditions	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology are easily understood over a wide range of weather and ambient lighting conditions, such as various types of obscurations to visibility, bright sunlight, or night.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.12 Aircraft Flight Information and Flight Symbology: Pilot Flying Display		
Approach Lighting System	**Phase of Flight**	**Suitable? (Select One)**
Approach lighting systems are composed of different amounts of lights, with different intensities, and of different patterns. Any approach lighting system (e.g., MALS, ALSF-2) is clearly visible, and the lighting elements can be easily interpreted.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Aircraft Flight Information Observations:	**Flight Symbology Observations:**	

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.13 Aircraft Flight Information and Flight Symbology: Pilot Flying Display

Manual Controls	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology are sufficient to support manual control of the aircraft to touchdown and rollout (if applicable).	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.14 Aircraft Flight Information and Flight Symbology: Pilot Flying Display

Category II and/or Category III Operations	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology support safe Category II and/or Category III operations, if requested by the applicant.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.15 Aircraft Flight Information and Flight Symbology: Pilot Flying Display		
Landing Distraction	**Phase of Flight**	**Suitable? (Select One)**
The aircraft flight information and flight symbology are not a distraction to the PF when making a decision to land or execute a missed approach procedure at the DA/DH or MDA and operating below the DA/DH or MDA.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	**Flight Symbology Observations:**

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.16 Aircraft Flight Information and Flight Symbology: Pilot Flying Display

Touchdown and Rollout Distraction	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology are not a distraction to the PF during touchdown and rollout.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.17 Aircraft Flight Information and Flight Symbology: Pilot Flying Display

Maximum Glidepath Angle (GPA)	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology support the PF in conducting approach and landing operations at the maximum glidepath angle (GPA) allowed for the approach category (A,B,C,D,E).	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; Order 8260.3G; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.18 Aircraft Flight Information and Flight Symbology: Pilot Flying Display

Manual Descent Rate	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology provide sufficient information (in combination with sensor imagery) to allow the PF to manually keep the aircraft at a descent rate that allows touchdown to occur within the touchdown zone of the runway of intended landing.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.19 Aircraft Flight Information and Flight Symbology: Pilot Flying Display

Synthetic Elements	Phase of Flight	Suitable? (Select One)
For EFVSs that integrate synthetic elements into the sensor image (such as with a combined vision system), the synthetic elements do not obstruct, obscure, or distract the PF from recognizing and understanding the aircraft flight information and flight symbology, the required visual references, or other elements in the external scene such as terrain, obstacles, the airfield and runway environment, or traffic.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.1.20 Aircraft Flight Information and Flight Symbology: Pilot Flying Display		
FPARC Adjustability	**Phase of Flight**	**Suitable? (Select One)**
The FPARC can be manually or automatically selected and adjusted by the PF during an approach. The means of adjusting the FPARC is intuitive, and the PF can quickly and easily override erroneous guidance without taking attention away from the approach and landing operation.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A
Aircraft Flight Information Observations:	**Flight Symbology Observations:**	

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.5.2 Pilot Monitoring Display[3]

Pilot Monitoring Display Aircraft Flight Information and Flight Symbology Overview and Instructions

Pilot monitoring display: If the pilot monitoring display provides aircraft flight information and flight symbology, it should support the pilot monitoring with quickly and accurately comprehending the provided information and guidance without adversely obscuring or distorting the sensor imagery of the runway environment.

- Examples of aircraft flight information include airspeed, vertical speed, aircraft attitude, heading, altitude, height above ground level, command guidance as appropriate for the approach to be flown, path deviation indications, flight path vector, and flight path angle reference cue.
- Examples of flight symbology include FPV cue, FPARC with a pitch scale, flare prompt or flare guidance, runway and extended runway centerline symbology (presented during the approach phase), HUD/HWD symbology, supplementary vertical information (for situation awareness below DA/DH or MDA), and visual indication of runway of intended landing (e.g., runway outline).

Operational suitability evaluation points for the following categories are included in this section:

- Visual Reference Requirements (3.2.1)
- Visible Critical Elements (3.2.2)
- Distinct Contrast and Chromaticity (3.2.3)
- Adjustable Controls (3.2.4)
- Essential Information (3.2.5)
- Recognizable Presented Information (3.2.6)
- Conspicuous Alerts (3.2.7)
- Visual Anomalies (3.2.8)
- Visual Obscurations (3.2.9)
- Approach Lighting Systems (3.2.10)

LIST CONTINUED ON THE NEXT PAGE

[3]A pilot monitoring display is required for EFVS operations to touchdown and rollout under 14 C.F.R. § 91.176(a). The equipment requirements for a pilot monitoring display are provided in 14 C.F.R. § 91.176(a)(1). The pilot monitoring display is intended to enable the pilot monitoring to see a real-time sensor image of the required visual references and runway environment; however, OEMs and operators may include additional features such as symbology, aircraft flight information, or synthetic elements. Any additional features should not affect the operational suitability of the PM display; see the EFVS Final Rule preamble for the intent of the rule.

- Aircraft Monitoring (3.2.11)
- Category II and/or Category III (3.2.12)
- Distractions During Decision-Making (3.2.13)
- Distractions to Pilot Monitoring (3.2.14)
- Support Approach and Landing Operations (3.2.15)
- Obstructions to Required Visual Elements (3.2.16)

Whenever possible, examples are given to provide context for the checklist item. The examples are *not* intended to serve as an exhaustive list, and the examples may not be applicable to every EFVS and aircraft combination.

For each checklist item:

1. Review the operational suitability evaluation point;
2. Select the appropriate “yes,” “no,” or “n/a” suitability determination response for each phase of flight; and
3. Provide additional comments on any noteworthy observations.

3.2.1 Aircraft Flight Information and Flight Symbology: Pilot Monitoring Display

Visual Reference Requirements	Phase of Flight	Suitable? (Select One)
The visual reference requirements for the runway threshold and the runway touchdown zone are clearly visible in full and decluttered modes (if applicable). For the runway threshold, this includes the beginning of the runway landing surface, threshold lights, or runway end identifier lights. For the runway touchdown zone, this includes the touchdown zone landing surface, touchdown zone lights, touchdown zone markings, or runway lights.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.2.2 Aircraft Flight Information and Flight Symbology: Pilot Monitoring Display

Visible Critical Elements	Phase of Flight	Suitable? (Select One)
Critical elements in the external scene are clearly visible in both full and decluttered modes (if applicable). These critical elements may include terrain, obstacles, the airfield or runway environment, or traffic on or about to incur the runway.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.2.3 Aircraft Flight Information and Flight Symbology: Pilot Monitoring Display

Distinct Contrast and Chromaticity	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology elements (if present) integrate with the EFVS sensor image so that the PM can quickly and easily recognize and understand the presented information. The means that the aircraft flight information and flight symbology have sufficiently distinct contrast and chromaticity to stand out from the background sensor imagery.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.2.4 Aircraft Flight Information and Flight Symbology: Pilot Monitoring Display

Adjustable Controls	Phase of Flight	Suitable? (Select One)
The EFVS display controls (if present) are easily adjustable (either automatically or manually) so that the aircraft flight information and flight symbology can be recognized and understood by the PM, in support of performing their normal duties.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.2.5 Aircraft Flight Information and Flight Symbology: Pilot Monitoring Display

Essential Information	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology elements (if present) are not excessive in number or size, variety of color, or symbols. They do not obscure essential information or present distracting, disorganized, or unnecessary information. Excessive information could result in cognitive tunneling or a delay in visual detection of alerts or critical elements in the external scene.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.2.6 Aircraft Flight Information and Flight Symbology: Pilot Monitoring Display

Recognizable Presented Information	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology elements (if present) are sized so that the PM can quickly and easily recognize and understand the presented information.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.2.7 Aircraft Flight Information and Flight Symbology: Pilot Monitoring Display

Conspicuous Alerts	Phase of Flight	Suitable? (Select One)
Any aircraft alerts or messages presented on the PM display are conspicuous, quickly detected, and accurately interpreted.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.2.8 Aircraft Flight Information and Flight Symbology: Pilot Monitoring Display

Visual Anomalies	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology (if present) are recognizable and understandable in the presence of visual anomalies, such as blooming, noise, parallax, jellyfishing, roman candles, burlap sack, thermal crossover, and dead pixels.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.2.9 Aircraft Flight Information and Flight Symbology: Pilot Monitoring Display

Visual Obscurations	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology (if present) are easily understood over a wide range of weather and ambient lighting conditions, such as various types of obscurations to visibility, bright sunlight, or night.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.2.10 Aircraft Flight Information and Flight Symbology: Pilot Monitoring Display

Approach Lighting Systems	Phase of Flight	Suitable? (Select One)
Approach lighting systems are composed of different amounts of lights with different intensities, and of different patterns. Any approach lighting system (e.g., MALS, ALSF-2) is clearly visible, and the lighting elements can be easily interpreted.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.2.11 Aircraft Flight Information and Flight Symbology: Pilot Monitoring Display

Aircraft Monitoring	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology (if present) are sufficient to support monitoring of the aircraft flightpath to touchdown and rollout (if applicable).	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.2.12 Aircraft Flight Information and Flight Symbology: Pilot Monitoring Display

Category II and/or Category III	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology support safe Category II and/or Category III operations if requested by the applicant.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.2.13 Aircraft Flight Information and Flight Symbology: Pilot Monitoring Display

Distractions During Decision-Making	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology (if present) are not a distraction to the PM when making a decision to land or executing a missed approach procedure at the DA/DH or MDA and operating below the DA/DH or MDA.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.2.14 Aircraft Flight Information and Flight Symbology: Pilot Monitoring Display

Distractions to Pilot Monitoring	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology (if present) are not a distraction to the PM during touchdown and rollout.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.2.15 Aircraft Flight Information and Flight Symbology: Pilot Monitoring Display

Support Approach and Landing Operations	Phase of Flight	Suitable? (Select One)
The aircraft flight information and flight symbology (if present) support the PM in conducting approach and landing operations at the maximum glidepath angle (GPA) allowed for the approach category (A,B,C,D,E).	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; Order 8260.3G; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

3.2.16 Aircraft Flight Information and Flight Symbology: Pilot Monitoring Display

Obstructions to Required Visual Elements	Phase of Flight	Suitable? (Select One)
For EFVS that integrate synthetic elements into the sensor image (such as with a combined vision system), the synthetic elements do not obstruct, obscure, or distract the PM from recognizing and understanding the aircraft flight information and flight symbology, the required visual references, or other elements in the external scene, such as terrain, obstacles, the airfield and runway environment, or traffic.	Taxi	☐ Yes ☐ No ☐ N/A
	Takeoff and Climb	☐ Yes ☐ No ☐ N/A
	Rejected Takeoff	☐ Yes ☐ No ☐ N/A
	Cruise	☐ Yes ☐ No ☐ N/A
	Descent	☐ Yes ☐ No ☐ N/A
	Approach	☐ Yes ☐ No ☐ N/A
	Landing and Rollout	☐ Yes ☐ No ☐ N/A
	Missed Approach	☐ Yes ☐ No ☐ N/A
	Balked Landing	☐ Yes ☐ No ☐ N/A

Aircraft Flight Information Observations:	Flight Symbology Observations:

Primary References: EFVS Final Rule; § 25.773(e)(3); § 61.66; § 91.176; InFO 11004; AC 20-167A; AC 25-11B; AC 90-106B; AC 120-53B; AC 120-71B
Secondary References: § 91.189; § 91.1039; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8110.4C; Order 8260.3G; Order 8430.21A; SAFO 11009; SAFO 17011; AC 25.1581-1; AC 120-118; AC 120-123

2.6 Master Minimum Equipment List (MMEL) Requirements

4 MMEL Requirements	
The FAA approved MMEL covers those items of equipment related to airworthiness and operating regulations and other items of equipment that the Administrator finds may be inoperative and yet maintain an equivalent level of safety by appropriate conditions and limitations. The FAA AED reviews and issues MMELs through the FOEB process. Equipment required for EFVS operations is defined in 14 C.F.R. § 91.176(a)(1) and (b)(1). Relief given to any of the required equipment will not allow for EFVS operations under 14 C.F.R. § 91.176(a) and/or (b).	
Does existing MMEL relief affect the equipment required for operations under 14 C.F.R. § 91.176(a) or (b)? *(Select One)*	**Findings**
☐ Yes ☐ No	
If Yes, should the FOEB process be initiated? *(Select One)*	**Findings**
☐ Yes ☐ No	

References: EFVS Final Rule; § 91.176; AC 90-106B; Order 8110.4C; Order 8430.21A; Order 8900.1 CHG 532, Vol.8, Ch2, Sec. 3; FOEB JTA 4.1.201

3. Operational Evaluation: Training Recommendations

The "Operational Evaluation: Training Recommendations" chapter of the *Federal Aviation Administration Aircraft Evaluation Division Operations and Human Factors and Evaluation Aid for Enhanced Flight Vision Systems* is intended to aid in standardizing the Aircraft Evaluation Division (AED) process of determining Federal Aviation Administration (FAA) Flight Standardization Board (FSB) training recommendations, including special emphasis areas, for a new or modified enhanced flight vision system (EFVS) and aircraft combination. The directions described herein are not meant to unnecessarily restrict trained AED personnel, and it is expected that the judgment and expertise of personnel will be applied.

In order to conduct EFVS operations, a pilot must comply with the training provisions of Title 14 of Code of Federal Regulation (C.F.R.) § 61.66. However, additional ground and/or flight training arising from unique characteristics of the EFVS and aircraft combination may be included as a recommendation in the Flight Standardization Board Report (FSBR). The content in this chapter may help to identify any additional areas for recommended training that are specific to the aircraft and EFVS combination. It is important to note that the FAA AED is not the approving office for training programs required by 14 C.F.R. § 61.66(a)(1)(i) and 14 C.F.R. § 61.66(b)(1)(i). The checklists in this chapter are structured to be consistent with 14 C.F.R. § 61.66, as this represents the required information needed for knowledge and familiarity with EFVS operations, tasks, maneuvers, and procedures; however, the AED is not responsible for checking compliance against 14 C.F.R. § 61.66.

As part of the operational evaluation, qualified pilot test subjects are included to help identify characteristics specific to the aircraft and EFVS combination that require special emphasis, guidance, or recommended training to be included in the FSBR. It is important that the pilot test subjects have an appropriate background for the operational evaluation; factors such as EFVS training in accordance with 14 C.F.R. § 61.66, previous qualification in the aircraft, flight experience (including with low visibility operations), and currency should be considered. Additionally, aircraft-specific considerations for FSB operational evaluations may be required. For example, per Section 128 of the Aircraft Certification, Safety, and Accountability Act of 2020 (ACSAA) and FAA Notice 8900.684, the use of domestic and foreign air carrier pilots with varying levels of experience must be included as part of the sample of pilot test subjects for operational evaluations on certain transport airplanes.

AED personnel and qualified pilot test subjects who will manipulate the controls of an aircraft or act as pilot in command of an aircraft during an EFVS operation as a part of an operational suitability determination and/or operational evaluation must be trained in accordance with 14 C.F.R. § 61.66(a) and (b) or meet the provisions of 14 C.F.R. § 61.66(h)(2).

3.1 Overview

For required familiarization training for modified EFVS and aircraft combinations, the provided checklists and decision trees may be used to determine training levels that fulfill the requirements of 14 C.F.R. § 91.176. This chapter is organized in the form of checklists and decision trees, which are largely based on, but do not replace, the regulations in 14 C.F.R. §

61.66 or 14 C.F.R. § 91.176, and guidance in Advisory Circular (AC) 120-53B and AC 90-106B. Current FAA regulatory and guidance material takes precedence over the material here.

Regarding this chapter:

- AED personnel are encouraged to review the regulatory, advisory, and guidance materials provided in Table 11, Table 12,Table 13, Table 14, Table 15, Table 16, Table 17, and in the list of key references in the Appendix.
- If questions arise during the EFVS evaluation, AED personnel may wish to contact the FAA Flight Standards Service, Flight Technologies and Procedures Division, Flight Operations Branch (AFS-410).
- Whenever possible, examples are provided to give context to the knowledge item; these examples should not be considered mandatory and do not constitute an exhaustive list.
- During the training evaluation process, AED personnel are encouraged to consider EFVS tasks, maneuvers, and procedures that may be important to include as a checking item (see the "Operational Evaluation: Checking Recommendations" chapter).

3.1(a) Chapter Organization

3.1(a)(i) Checklists for Ground Training and Flight Training Requirements

Ground training and flight training are required for any pilot manipulating the controls of an aircraft or acting as the pilot in command of an aircraft during an EFVS operation conducted under 14 C.F.R. § 91.176(a) (i.e., EFVS operations to touchdown) or 14 C.F.R. § 91.176(b) (i.e., EFVS operations to 100 feet above the touchdown zone elevation [TDZE]). These training requirements are outlined in 14 C.F.R. § 61.66. This chapter contains checklists for the following areas:

- Ground Training Checklists
- Flight Training Checklists
- Special Emphasis Areas Checklist

3.1(a)(ii) Decision Trees for Modified EFVS Training Difference Level Recommendations

There may be times when a pilot is trained in EFVS on an aircraft in accordance with 14 C.F.R. § 61.66 but now wishes to transition to a modified EFVS on the same aircraft model. For example, aircraft model "X" previously had an EFVS installed and the applicant chooses to modify aircraft model "X" by changing the EFVS hardware, the EFVS camera, or the EFVS software.

For a modified EFVS, AED personnel may use the provided checklists and decision trees (starting in Section 3.3) to determine the recommended training to ensure the pilot has adequate knowledge of and familiarity with the EFVS and the procedures to be used. Guidance provided in AC 120-53B was used to inform the content of the decision trees.

- The decision trees include a series of questions and examples of training methods for each of the Training Difference Levels—A, B, C, D, or E; see Table 10 for an overview.

For a modified EFVS and aircraft combination, AED personnel should complete ground training, flight training, and special emphasis checklists, and also utilize the decision trees (3.3) to determine recommended training based on the level of differences between the base and variant EFVS and aircraft combinations.

Table 10.
Summary of Training Difference Level Methods of Instruction

Training Level	Method of Instruction
A	Self-instruction
B	Aided instruction
C	Systems devices
D	Maneuver devices
E	Level C or D full flight simulator (FFS) or aircraft

3.1(b) Terminology

The following terminology and descriptions are used in the context of the *Federal Aviation Administration Aircraft Evaluation Division Operations and Human Factors Evaluation Aid for Enhanced Flight Vision Systems* and do not replace definitions provided elsewhere in FAA regulatory and guidance material.

- ***Aircraft flight information.*** Aircraft flight information includes airspeed, vertical speed, aircraft attitude, heading, altitude, height above ground level, command guidance as appropriate for the approach to be flown, path deviation indications, flight path vector (FPV), and flight path angle reference cue (FPARC).
- ***Evaluation Plan (EP).*** An EP is submitted by the applicant and accepted by AED to outline the FSB's operational activities, which include crewmember training, checking, identifying any gaps that may occur in operational suitability because of simulator crewmember training (e.g., equipment differences, night conditions, instrument flight rules [IFR]). The EP should also include an operator differences requirements (ODR) table, in accordance with Advisory Circular (AC) 120-53, Guidance for Conducting and Use of Flight Standardization Board Evaluations, if the applicant is seeking differences credit.
- ***Flight symbology.*** Flight symbology includes FPV cue, FPARC with a pitch scale, flare prompt or flare guidance, runway and extended runway centerline symbology (presented during the approach phase), HUD/head-worn display (HWD) symbology, supplementary vertical information (for situation awareness below decision altitude [DA]/decision height (DH) or minimum descent altitude [MDA]), and visual indication of runway of intended landing (e.g., runway outline).
- ***Modified EFVS.*** A modified EFVS refers to an EFVS that has been altered or upgraded through modification, typically to enhance performance, comply with new regulations or guidance, or fulfill a specialized mission. For FSB purposes, a modified EFVS evaluation may be for a previously certified EFVS that has received a modification to its hardware or software but is still installed in the same model of aircraft (e.g., a EFVS certified on aircraft model "X" is modified, but still installed in aircraft model "X").
- ***New EFVS.*** A new EFVS refers to a EFVS in its original design. For FSB purposes, a "new" EFVS evaluation is either (1) an EFVS that has never been certified by the FAA or (2) an EFVS that was previously certified by the FAA in a specific aircraft model and is

then installed in a different aircraft model (e.g., an EFVS certified for aircraft model "X" is installed in aircraft model "Y").

- ***Operational evaluation (OE).*** An OE is an AED process to determine pilot type rating, minimum crewmember training, checking and currency requirements, and the unique or special airman certification requirements (e.g., specific flight characteristics, no-flap landing). An OE is associated with all FSBs but can also be completed as a standalone task.

3.1(c) Training Recommendations Chapter References

Table 11.
FAA Regulations Included in the "Operational Evaluation: Training Recommendations" Chapter

14 C.F.R. Regulations	Title
EFVS Final Rule, 81 Federal Register 90126 (December 13, 2016)	Revisions to operational requirements for the use of Enhanced Flight Vision Systems (EFVSs) and to pilot compartment view requirements for vision systems
§ 1.1	Definitions and Abbreviations
§ 60	Flight Simulation Training Device Initial and Continuing Qualification and Use
§ 61.66	Enhanced Flight Vision System Pilot Requirements
§ 91.176	Straight-in Landing Operations Below DA/DH or MDA Using an Enhanced Flight Vision System (EFVS) Under IFR
§ 91.189	Category II and III Operations: General Operating Rules
§ 91.1039	IFR Takeoff, Approach and Landing Minimums
§ 121.419	Pilots and Flight Engineers: Initial, Transition, and Upgrade Ground Training
§ 121.651	Takeoff and Landing Weather Minimums: IFR: All Certificate Holders
§ 125.325	Instrument Approach Procedures and IFR Landing Minimums
§ 125.381	Takeoff and Landing Weather Minimums: IFR
§ 135.225(j)	IFR: Takeoff, Approach and Landing Minimums

Table 12.
Orders Included in the "Operational Evaluation: Training Recommendations" Chapter

Order No.	Title
Order 8900.1 Vol.4, Ch17	Enhanced Flight Vision System (EFVS) operations

Table 13.
Notices Included in the "Operational Evaluation: Training Recommendations" Chapter

Notice No.	Title
Notice 8900.684	Use of Air Carrier Pilots During Flight Standardization Board Evaluations for Transport Airplanes

Table 14.
Information for Operators Included in the "Operational Evaluation: Training Recommendations" Chapter

Resource	Title
InFO 11004	Enhanced Flight Vision System (EFVS), Enhanced Vision Systems (EVS), and Night Vision Goggles (NVG) Compatibility with Light-Emitting Diodes (LEDs) at Airports and on Obstacles

Table 15.
Safety Alerts for Operators Included in the "Operational Evaluation: Training Recommendations" Chapter

Resource	Title
SAFO 09011	Parts 121 and 135 Operators: Constant Angle of Descents Techniques for Nonprecision Approaches
SAFO 09016	Rejected Landing Due to Loss of Visibility
SAFO 10005	Go-Around Callout and Immediate Response
SAFO 11009	Runway Status Lights (RWSL)
SAFO 15011	Roles and Responsibilities for Pilot Flying (PF) and Pilot Monitoring (PM)
SAFO 15004	Scenario-Based Go-Around Training
SAFO 17011	Runway Status Lights (RWSL)
SAFO 21007	Risk of Potential Adverse Effects on Radio Altimeters when Operating in the Presence of 5G C-Band Interference

Table 16.
Advisory Circulars Included in the "Operational Evaluation: Training Recommendations" Chapter

AC No.	Title
AC 20-167A	Airworthiness Approval of Enhanced Vision System, Synthetic Vision System, Combined Vision System, and Enhanced Flight Vision System Equipment
AC 61-65H, Appendix	Enhanced Flight Vision Systems Training Endorsements
AC 90-106B	Enhanced Flight Vision System Operations
AC 120-53B	Guidance for Conducting and Use of Flight Standardization Board (FSB) Evaluations
AC 120-57C	Surface Movement Guidance and Control System
AC 120-71B	Standard Operating Procedures and Pilot Monitoring Duties for Flight Deck Crewmembers
AC 120-118	Criteria for Approval/Authorization of All Weather Operations for Takeoff, Landing, and Rollout
AC 120-123	Flightpath Management
AC 150/5340-1M	Standards for Airport Markings

Table 17.
Advisory Circulars Included in the "Operational Evaluation: Training Recommendations" Chapter Other Technical Resources Included in the "Operational Evaluation: Training Recommendations" Chapter

Resource	Title
FAA FSB EFVS OSR	Operational Credit for Enhanced Flight Vision Systems (EFVS)
Published FSB Reports	Published FSB and Equipment Operational Suitability Reports (OSR)

3.2 Pilot Training Recommendations Checklists for New or Modified EFVS and Aircraft Combinations

Pilot Training Checklist Overview and Instructions

No person may manipulate the controls of an aircraft or act as pilot in command of an aircraft during an EFVS operation conducted under 14 C.F.R. § 91.176(a) or (b) or serve as a required pilot flight crewmember during an EFVS operation conducted under 14 C.F.R. § 91.176(a), unless that person has met the ground and flight training requirements in 14 C.F.R. § 61.66.

The checklists in this chapter will aid AED personnel in determining if those EFVS training requirements can be met and if there are any additional training recommendations specific to the EFVS and aircraft combination. These checklists may be used for both new and modified EFVS and may be helpful for determining training recommendations in the FSBR.

This chapter includes checklists for:

- Ground Training Checklists
- Flight Training Checklists
- Special Emphasis Areas Checklist

For flight training, a level C or higher full flight simulator (FFS) equipped with an EFVS may be used to meet the flight training requirements. The FFS must be evaluated and qualified for EFVS operations and meet criteria under 14 C.F.R. § 61.66(g).

Whenever possible, examples are given to provide context for the checklist item. The examples are *not* intended to serve as an exhaustive list, and the examples may not be applicable to every EFVS and aircraft combination.

For each checklist item:

1. Review the requirement, including examples;
2. Select the training level; and
3. Provide additional comments on any noteworthy observations.

Complete the Training Differences Level Summaries (Sections 3.3.5 and 3.3.6) for ground training and flight training with the appropriate training difference level and any noteworthy findings.

3.2.1 Ground Training Checklists

1.1 Ground Training	
EFVS Flight Operations and Limitations	
Example topics (not exhaustive): • An overview of the regulations relevant to EFVS operations and procedures, including for dispatch, initiating an approach, and landing • Instruction approach procedures (IAPs) permitted to be used for EFVS operations under 14 C.F.R. § 91.176(a) and (b) • Equipment required by the operating rule • Visual reference requirements under 14 C.F.R. § 91.176(a) and (b), and what the "sight picture" of the visual references should be • Enhanced flight visibility requirements under 14 C.F.R. § 91.176(a) and (b) • Weather types and limitations • Pilot monitoring (PM) display location and sizing (if applicable) • PM display controls, flight information, or symbology (if provided) • Use of flight director (FD) and autopilot during EFVS operations, including autopilot minimum use height considerations and EFVS callouts • Required procedures in the event of system inoperability, visibility, or visual reference requirements not meeting 14 C.F.R. § 91.176 • Limitations specific to rotorcraft operations (if applicable)	
Recommended Training Level? (Select One)	**Comments?**
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; § 1.1; § 91.189; § 91.1039; § 121.419; § 121.651; § 125.325; § 125.381; § 135.225(j); Order 8900.1, Vol.4, Ch17; SAFO 10005; SAFO 21007; AC 20-167A; AC 120-118; AC 120-123; FAA FSB EFVS OSR

1.2 Ground Training

Airplane Flight Manual (AFM) or Rotorcraft Flight Manual Limitations

Example topics (not exhaustive):

- A description of the EFVS
- Type of EFVS operations the EFVS is certified to conduct
- Specific procedures, conditions, or limitations associated with operating the EFVS
- Performance applicable to the use of operational credit
- Visual advantage
- EFVS sensor performance
- Weight and balance
- Maximum crosswind component
- Steep approach limitations
- Abnormal and emergency procedures
- Limitations on the use of the PM display (if applicable)
- Limitations related to 5G C-band interference (if applicable)

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *§ 91.189*; *§ 91.1039*; *§ 121.419*; *§ 121.651*; *§ 125.325*; *§ 125.381*; *§ 135.225(j)*; *SAFO 21007*; *AC 20-167A*; *AC 120-118*

1.3 Ground Training

EFVS Sensor Imagery (Consider Day and Night)

Example topics (*not exhaustive*):

- Understanding the characteristics of the EFVS sensor imagery, including enhanced flight visibility
- EFVS sensor imagery brightness, contrast, and transparency (and their relationship to one another) during day and night
- Cross-checking the HUD or equivalent (such as a HWD) symbology against the EFVS sensor image
- Verifying that the EFVS sensor imagery, attitude symbology, FPV, FPARC, and other cues are aligned with and scaled to the external visual scene
- Verifying that the EFVS sensor imagery and flight symbology do not adversely obscure the pilot's outside view or field of view through the window
- Understanding EFVS image calibrations or other built-in tests, and the effect this may have on EFVS imagery during flight
- Effect of monochrome or colorization on the interpretation of airfield lighting
- Differentiating between the sensor-based elements and the computer-generated elements, for EFVSs that integrate synthetic elements into the EFVS sensor image
- PM display presentation (if applicable)

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *AC 20-167A*

1.4 Ground Training

Required Aircraft Flight Information

Example topics (*not exhaustive)*:

- Airspeed
- Vertical speed
- Aircraft attitude
- Heading
- Altitude
- Height above ground level
- Path deviation indications
- Use of barometric and/or radio altitude at low altitudes, including temperature correction if applicable

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; SAFO 21007; AC 20-167A

1.5 Ground Training

EFVS Symbology

Example topics *(not exhaustive):*

- Use of FPV cue and FPARC with a pitch scale
- Flare prompt or flare guidance
- Runway and extended runway centerline symbology presented during approach and landing
- HUD or HWD symbology
- Use of supplementary vertical information for situation awareness below decision altitude (DA)/decision height (DH) or MDA
- PM display symbology (if applicable)

Recommended Training Level? *(Select One)*	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *AC 20-167A*

1.6 Ground Training

EFVS Display

Example topics *(not exhaustive):*

- EFVS software
- Display field of view
- Image parallax
- EFVS display performance limitations
- EFVS hardware, including PM display (if applicable)

Recommended Training Level? *(Select One)*	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *AC 20-167A*

1.7 Ground Training

EFVS Controls (Consider Day and Night)

Example topics *(not exhaustive):*

- Use of auto versus manual brightness
- Image brightness and contrast controls
- Symbology brightness control
- Non-Uniformity Correction (NUC) control
- On/Off switch (“clear” mode)
- How and where to read control labels, and any challenges while flying during day or night
- Importance of seat position based on design eye position for HUD-based EFVS
- PM display controls (if applicable)

Recommended Training Level? *(Select One)*	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *AC 20-167A*

1.8 Ground Training

EFVS Modes (Consider Day and Night)

Example topics *(not exhaustive):*

- Differences between low, high, and auto gain
- EFVS failure modes
- HUD/HWD operating modes (e.g., AIII mode, declutter HUD mode)
- PM display modes (if applicable)

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; AC 20-167A

1.9 Ground Training

EFVS Features (Consider Day and Night)

Example topics *(not exhaustive):*

- Reflection off water
- City lights dimming versus approach lights
- Engine exhaust plumes
- Recognizing improper presentation of elements in the visual scene during an approach
- PM display location and sizing (if applicable)

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *AC 20-167A*

1.10 Ground Training

EFVS Annunciations

Example topics *(not exhaustive):*

- Normal, abnormal, and failure annunciations, indicators, messages, or alerts
- Location of EFVS visual alerts, including those displayed on the HUD (or equivalent display), PFD, and/or other flight deck locations
- Meaning of any EFVS-related aural alerts
- Recognizing malfunctions of the navigation equipment
- Altitude alerting
- PM display alerts and annunciations (if applicable)

Recommended Training Level? *(Select One)*	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *AC 20-167A*

1.11 Ground Training

EFVS Associated Systems and Components

Example topics *(not exhaustive)*:

- Camera
- Sensor(s) (e.g., forward-looking infrared [IR], millimeter wave radiometry, millimeter wave radar, low-light level image intensification, other real-time imaging technologies)
- Video processor
- Camera "glass" anti-ice
- HUD/HWD
- PM display (if applicable)

Recommended Training Level? *(Select One)*	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *AC 20-167A*

1.12 Ground Training

EFVS Sensor Performance and Sensor Limitations (Consider Day and Night)

Example topics *(not exhaustive)*:

- Various atmospheric condition effects
- Bright sunlight
- Water droplet size effect
- The sensor's ability to detect or not detect obstacles in the environment
- Limitations where sensor performance is variable or unpredictable
- Limitations of specific sensor technology, such as light-emitting diode (LED)/ IR incompatibility
- Sensor field of regard

Recommended Training Level? *(Select One)*	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*; *InFO 11004*
Secondary References: *EFVS Final Rule*; *AC 20-167A*

1.13 Ground Training

EFVS Scene Interpretation (Consider Day and Night)

Example topics *(not exhaustive)*:

- Transitioning from EFVS sensor imagery to real-world natural vision for both the PF and PM
- Interpretation of colored airfield lighting
- Where on HUD/HWD to look for approach lighting systems
- Limitations of specific sensor technology, such as LED/IR incompatibility
- Use and limitations of PM display (if applicable)

Recommended Training Level? *(Select One)*	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*; *InFO 11004*
Secondary References: *EFVS Final Rule*; *SAFO 11009*; *SAFO 17011*

1.14 Ground Training

EFVS Visual Anomalies and Other Visual Effects (Consider Day and Night)

Example topics *(not exhaustive)*:

- Blooming
- Noise
- Parallax
- Jellyfishing
- Roman candles
- Burlap sack
- Thermal crossover
- Dead pixels

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*; *AC 20-167A*
Secondary References: *EFVS Final Rule*

1.15 Ground Training

Preflight Planning for EFVS Operations (Consider Day and Night)

Example topics *(not exhaustive)*:

- Overview of flight planning considerations for sensor performance and limitations
- Understanding of the optimal EFVS settings for different phases of flight and meteorological conditions
- Destination and alternate airport forecast weather, especially if flying into very low visibility conditions
- Destination and alternate airport lighting infrastructure and lighting components (e.g., LED)
- Understanding of the following system preflight and in-flight procedures: (1) an integrity check of the sensor window; (2) system tests and warm-up time; (3) system control adjustments, to include appropriate setting of EFVS contrast, brightness, and symbology; and (4) EFVS sensor image alignment procedures with the natural vision image
- A description of the PM use of the PM display during operations allowed by 14 C.F.R. § 91.176(a). The PM uses the display to assess the safe conduct of the approach, landing, and rollout and intervene (i.e., commanding a missed approach), if necessary

Recommended Training Level? *(Select One)*	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; § 91.189; § 91.1039; § 121.419; § 121.651; § 125.325; § 125.381; § 135.225(j); InFO 11004; SAFO 09016; SAFO 10005; SAFO 11009; SAFO 15011; SAFO 17011; SAFO 21007; AC 120-118

1.16 Ground Training

Operational Considerations Associated with Using EFVS During Taxi

Example topics *(not exhaustive)*:

- Sensor field of regard
- Display field of view
- Parallax
- Monochromatic appearance of airport signage

Recommended Training Level? *(Select One)*	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; InFO 11004; SAFO 11009; SAFO 17011; AC 120-57C; AC 120-123

1.17 Ground Training	
Operational Considerations Associated with Using EFVS During Takeoff (Consider Day and Night)	
Example topics *(not exhaustive)*: • Effect on runway centerline lighting imagery in large droplet fog (blooming) • Changes in visibility during the takeoff roll and abort • Effect of crosswinds on EFVS field of view, including the use of flight symbology caged and uncaged modes (if applicable) • Takeoff operations in visibilities as low as runway visual range (RVR 600 feet, as allowed by 14 C.F.R. § 91.1039(e) • Effect of runway surface type (e.g., unimproved, asphalt, concrete)	
Recommended Training Level? (Select One)	**Comments?**
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; § 91.1039; § 121.651; § 125.381; § 135.225(j); AC 120-118; AC 120-123

1.18 Ground Training

Operational Considerations Associated with Using EFVS During Climb (Consider Day and Night)

Example topics *(not exhaustive)*:

- Auto versus manual brightness when entering cloud bases and exiting cloud tops
- Effect of landing lights when entering clouds
- Effect of crosswinds on EFVS field of view, including the use of flight symbology caged and uncaged modes (if applicable)

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; § 91.1039; § 121.651; § 125.381; § 135.225(j); AC 120-118; AC 120-123

1.19 Ground Training	
Operational Considerations Associated with Using EFVS During Cruise (Consider Day and Night)	
Example topic *(not exhaustive)*: • Cloud avoidance at night	
Recommended Training Level? (Select One)	**Comments?**
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; AC 120-123

1.20 Ground Training

Operational Considerations Associated with Using EFVS During Descent and Landing Phases of Flight when Using EFVS for Instrument Approaches (Consider Day and Night)

Example topics *(not exhaustive)*:

- A confirmation of the availability of all required EFVS equipment and systems (e.g., radio altimeter, FPARC fully functioning) prior to accomplishing the EFVS operation
- Understanding the operational concepts and the procedures under 14 C.F.R. § 91.176(a) and 14 C.F.R. § 91.176(b)
- Expectations of system performance and limitations in reported weather conditions and the minimum visibility for the use of an EFVS (if applicable)
- Reduction in natural visibility during the EFVS operation
- Recognition of improper presentation of elements in the external visual scene
- Transitioning from EFVS sensor imagery to natural vision for detecting required visual references in 14 C.F.R. § 91.176
- Use of EFVS for precision, non-precision, offset, steep, and special approaches
- Offset angles associated with various IAPs where the runway may be outside the EFVS field of view
- Effect of crosswinds on the EFVS field of view and ability to maintain visual references, including the use of flight symbology caged and uncaged modes (if applicable)
- Vertical descent angles (VDAs), vertical descent points (VDPs), visual glide slope indicator (VGSI) angles, and the significance of VDA and VGSI angles that are not coincident
- Obstacle clearance awareness, especially for nonprecision approaches with no published VDP

LIST CONTINUED ON NEXT PAGE

- Importance of considering airfield lighting intensity
- Effect of varying visibility conditions on the EFVS sensor image
- Integrating EFVS into Category II and Category III operations (if desired by the applicant)

Recommended Training Level? *(Select One)*	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; § 91.189; § 91.1039; § 121.651; § 125.381; § 135.225(j); SAFO 09011; SAFO 09016; SAFO 10005; SAFO 15004; AC 120-118; AC 120-123

1.21 Ground Training

Operational Considerations Associated with Using EFVS during Descent and Landing Phases of Flight when Operating Below DA/DH or MDA (Consider Day and Night)

Example topics *(not exhaustive)*:

- Where to look on the display for approach lighting systems
- Reduction in natural visibility during the EFVS operation, its effect on EFVS performance, and appropriate pilot (or flight crew) response
- Use and limitations of supplementary or advisory vertical information for situation awareness below the DA/DH or MDA
- Use of the PM display (if present) to monitor the visual segment of the approach to verify correct airplane approach trajectory

Recommended Training Level? *(Select One)*	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; § 91.1039; § 121.651; § 125.381; § 135.225(j); SAFO 09011; SAFO 09016; SAFO 10005; SAFO 15004; AC 120-118; AC 120-123

1.22 Ground Training

Operational Considerations Associated with Using EFVS During Descent and Landing Phases of Flight when Executing Missed Approaches

Example topics *(not exhaustive)*:

- Requirement for a missed approach if any required component (e.g., IR camera) of the EFVS fails, unless it is safer to continue the approach
- Changes to EFVS symbology or flight information that occur during the missed approach procedure
- Missed approach procedures: all engines operating and one engine inoperative
- Obstacle clearance awareness

Recommended Training Level? *(Select One)*	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *§ 91.1039*; *§ 121.651*; *§ 125.381*; *§ 135.225(j)*; *SAFO 09011*; *SAFO 09016*; *SAFO 10005*; *SAFO 15004*; *AC 120-118*; *AC 120-123*

1.23 Ground Training

Operational Considerations Associated with Using EFVS During Descent and Landing Phases of Flight for Landing (Consider Day and Night)

Example topics *(not exhaustive)*:

- Detecting runway incursions
- Effect of runway surface type and contamination (e.g., unimproved, asphalt, concrete, water, snow)
- For rotorcraft, procedures for flat-light, whiteout, and brownout conditions

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; § 91.1039; § 121.651; § 125.381; § 135.225(j); SAFO 09011; SAFO 09016; SAFO 10005; SAFO 15004; AC 120-118; AC 120-123

1.24 Ground Training

Operational Considerations Associated with Using EFVS During Descent and Landing Phases of Flight for Rollout (Consider Day and Night)

Example topics *(not exhaustive)*:

- Sensor field of regard and display field of view limitations when exiting the runway
- Knowledge of additional aircraft systems that mitigate failures on rollout (e.g., runway lighting, HUD symbology)
- Use of an alternate display for aided rollout in the event of total loss of function of the PF EFVS display
- Effect of runway surface type and contamination (e.g., unimproved, asphalt, concrete, water, snow)

Recommended Training Level? *(Select One)*	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *§ 91.1039*; *§ 121.651*; *§ 125.381*; *§ 135.225(j)*; *SAFO 09011*; *SAFO 09016*; *SAFO 10005*; *SAFO 15004*; *AC 120-118*; *AC 120-123*

1.25 Ground Training

Operational Considerations Associated with Using EFVS During Descent and Landing Phases of Flight for Balked Landings (Consider Day and Night)

Example topic *(not exhaustive)*:

- Transitioning from EFVS or natural vision to flight instruments

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; § 91.1039; § 121.651; § 125.381; § 135.225(j); SAFO 09011; SAFO 09016; SAFO 10005; SAFO 15004; AC 120-118; AC 120-123

1.26 Ground Training	
Weather Associated with Low Visibility Conditions and its Effect on EFVS Performance (Consider Day and Night)	
Example topic *(not exhaustive)*: • All types of obscurations to vision, including haze, smoke, rain, snow, and fog (including various types of fog)	
Recommended Training Level? (Select One)	**Comments?**
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *AC 20-167A*

1.27 Ground Training

Normal Procedures when Using EFVS

Example topics *(not exhaustive)*:

- When and where to perform any required EFVS tests
- Time requirement for system warm-up

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *AC 120-123*

1.28 Ground Training

Abnormal Procedures when Using EFVS

Example topics *(not exhaustive)*:

- Frozen image
- Pixel degradation
- Loss of visual cues from the airfield environment
- Loss of HUD relevant symbology for all phases of flight
- Detecting runway incursions
- Misalignment of the EFVS sensor image with the EFVS symbology or external visual scene
- Techniques for identifying EFVS system failures and corresponding procedures. For example, a cross-check of the EFVS symbology presentations against the EFVS sensor image may help with recognition of malfunctions of the navigation equipment or improper presentation of elements in the external visual scene
- Other abnormal procedures outlined in the Airplane Flight Manual (AFM) or Rotorcraft Flight Manual (RFM)

Recommended Training Level? *(Select One)*	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *AC 120-123*; *AC 20-167A*

1.29 Ground Training

Emergency Procedures when Using EFVS

Example topics *(not exhaustive)*:

- Importance of timely recognition, and accurate and timely response to flight deck alerts, annunciations, messages, or indications (e.g., misleading information)
- Failure in the critical phases of flight—takeoff, approach, landing, and rollout (e.g., misleading EFVS imagery, loss of required visual references, initiating a missed approach below minimums, loss of EFVS approach capability)
- Loss of HUD-based visual information, or HUD-relevant symbology is erroneous or misleading, particularly during final approach
- Obstruction of the view through the HUD, especially during takeoff and final approach.
- Emergency procedures, both with and without a PM display
- Other emergency procedures delineated in the AFM or RFM

Recommended Training Level? *(Select One)*	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *AC 120-123*

1.30 Ground Training

Crew Coordination Procedures when Using EFVS

Example topics *(not exhaustive)*:

- PF and PM communications, to include the following: callouts for continuing descent below the DA/DH or MDA using the EFVS; callouts for transitioning from the EFVS sensor image to natural vision at 100 feet height above the TDZE; callouts to clearly communicate the decision to land or go around; and callouts for abnormal EFVS operations
- Interpretation and use of the PM display (if applicable)
- Failure in the critical phases of flight—takeoff, approach, landing, and rollout (e.g., misleading EFVS imagery, loss of required visual references, initiating a missed approach below minimums, loss of EFVS approach capability
- Loss of HUD-based visual information, or HUD relevant symbology is erroneous or misleading, particularly during final approach
- Emergency procedures, both with and without a PM display

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; SAFO 10005; SAFO 15011; AC 120-71B; AC 120-123

1.31 Ground Training

Interpretation of Approach and Runway Lighting Systems and Their Display Characteristics when Using an EFVS (Consider Day and Night)

Example topics *(not exhaustive)*:

- Approach lighting systems including those with sequenced flashing lights
- Identifying green runway threshold lights
- Visual approach slope indicators (VASIs) and precision approach path indicators (PAPIs) lighting versus the green EFVS sensor image overlay
- Runway lighting
- Taxiway lighting
- Importance of considering lighting intensity setting
- LED incompatibility with IR-based EFVS

Recommended Training Level? *(Select One)*	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*; *InFO 11004*
Secondary References: *EFVS Final Rule*; *SAFO 11009*; *SAFO 17011*

3.2.2 Flight Training Checklists

2.1 Flight Training	
Preflight and Inflight Preparation of EFVS Equipment for EFVS Operations, Including EFVS Setup and Use of Display (Consider Day and Night)	
Example topics (*not exhaustive*): • Importance of the "design eye position" in acquiring the proper EFVS sensor image • Time requirement for system warm-up	
Recommended Training Level? (Select One)	**Comments?**
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; § 91.189; § 91.1039; § 121.419; § 121.651; § 125.325; § 125.381; § 135.225(j); InFO 11004; SAFO 09016; SAFO 10005; SAFO 11009; SAFO 15011; SAFO 17011; SAFO 21007; AC 120-118

2.2 Flight Training

Preflight and Inflight Preparation of EFVS Equipment for EFVS Operations, Including EFVS Setup and Use of Controls (Consider Day and Night)

Example topics (*not exhaustive*):

- NUC control
- On/Off switch (“clear” mode)
- Symbology brightness control
- EFVS sensor imagery brightness control
- EFVS sensor imagery contrast control
- EFVS sensor imagery contrast control
- PM display controls (if provided)

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *AC 20-167A*

2.3 Flight Training	
Preflight and Inflight Preparation of EFVS Equipment for EFVS Operations, Including EFVS Setup and Use of Modes and Associated Systems	
Example topics (*not exhaustive*): • EFVS setup, including the use of associated systems (if applicable) • Low versus high versus auto gain during day versus night • EFVS failure modes • HUD/HWD operating modes (e.g., AIII mode/declutter HUD mode)	
Recommended Training Level? (Select One)	**Comments?**
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; AC 20-167A

2.4 Flight Training

Preflight and Inflight Preparation of EFVS Equipment for EFVS Operations, Including Adjustments for Brightness and Contrast (Consider Day and Night)

Example topics (*not exhaustive*):

- EFVS sensor imagery brightness, contrast, and transparency (and their relationship to one another) during day versus night
- Use of auto versus manual brightness, including when entering cloud bases and exiting cloud tops

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *AC 20-167A*

2.5 Flight Training	
Proper Piloting Techniques Associated with Using EFVS During Taxi (Consider Day and Night)	
Example topics (*not exhaustive*): • Sensor field of regard • Display field of view • Parallax • Monochromatic appearance of airport signage	
Recommended Training Level? (Select One)	**Comments?**
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *InFO 11004*; *SAFO 11009*; *SAFO 17011*; *AC 120-57C*; *AC 120-123*

2.6 Flight Training

Proper Piloting Techniques Associated with using EFVS During Takeoff (Consider Day and Night)

Example topics (*not exhaustive*):

- Effect on runway centerline lighting imagery in large droplet fog (blooming)
- Changes in visibility during the takeoff roll and abort
- Effect of crosswinds on the EFVS field of view, including the use of flight symbology caged and uncaged modes (if applicable)
- Takeoff operations in visibilities as low as 600 feet RVR, as allowed by 14 C.F.R. § 91.1039(e)
- Takeoff operations for Part 91 operators (other than Part 91, Subpart K operators) who intend to use the EFVS for takeoffs in visibilities as low as RVR 0 feet
- Effect of runway surface type and contamination (e.g., unimproved, asphalt, concrete, water, snow)

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; § 91.1039; § 121.651; § 125.381; § 135.225(j); AC 120-118; AC 120-123

2.7 Flight Training	
Proper Piloting Techniques Associated with Using EFVS During Climb (Consider Day and Night).	
Example topic (*not exhaustive*): • Auto versus manual brightness when entering cloud bases and exiting cloud tops	
Recommended Training Level? (Select One)	**Comments?**
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *§ 91.1039*; *§ 121.651*; *§ 125.381*; *§ 135.225(j)*; *AC 120-118*; *AC 120-123*

2.8 Flight Training

Proper Piloting Techniques Associated with using EFVS During Cruise (Consider Day and Night)

Example topic (*not exhaustive*):

- Cloud and adverse weather avoidance at night

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *AC 120-123*

2.9 Flight Training

Proper Piloting Techniques Associated with Using EFVS During Descent (Consider Day and Night)

Example topics (*not exhaustive*):

- Time requirement for system warm-up
- A confirmation of the availability of all required EFVS equipment and systems (e.g., radio altimeter, FPARC fully functioning) prior to accomplishing the EFVS operation
- Reduction in natural visibility during the EFVS operation, its effect on EFVS performance, and appropriate pilot (or flight crew) response

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; § 91.1039; § 121.651; § 125.381; § 135.225(j); SAFO 09011; SAFO 09016; SAFO 10005; SAFO 15004; AC 120-118; AC 120-123

2.10 Flight Training

Proper Piloting Techniques Associated with Using EFVS During Landing and Rollout (Consider Day and Night)

Example topics (*not exhaustive*):

- Recognition of the improper presentation of elements in the external visual scene
- Transition from EFVS sensor imagery to natural vision for detecting any of the visual references required by 14 C.F.R. § 91.176
- Minimum visibility requirements
- Sensor field of regard and display field of view limitations when exiting the runway
- Integrating EFVS into Category II and Category III operations
- Landings and rollouts with the minimum runway infrastructure (lighting and markings) that support the IAP, considering that the minimum for non-precision approach (NPA) procedures may include, for example, fewer runway markings, no approach lighting system, and medium intensity runway lights (MIRLs)
- Knowledge of additional aircraft systems that mitigate failures on roll-out (e.g., runway lighting, HUD symbology)
- Use of an alternate display for aided rollout in the event of total loss of function of the PF EFVS display
- Use of the PM display (if present) to monitor the visual segment of the approach to verify correct airplane approach trajectory
- Effect of runway surface type and contamination (e.g., unimproved, asphalt, concrete, water, snow)

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; § 91.189; § 91.1039; § 121.651; § 125.381; § 135.225(j); SAFO 09011; SAFO 09016; SAFO 10005; SAFO 15004; AC 120-118; AC 120-123; AC 150/5340-1M

2.11 Flight Training

Proper Piloting Techniques Associated with Using EFVS During Missed Approaches

Example topics (*not exhaustive*):

- Requirement for a MA if any required component (e.g., IR camera) of the EFVS fails, unless it is safer to continue the approach
- Changes to EFVS symbology or flight information that occur during the missed approach procedure
- Missed approach procedures: all engines and engine inoperative
- Obstacle clearance awareness during day versus night

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; § 91.1039; § 121.651; § 125.381; § 135.225(j); SAFO 09011; SAFO 09016; SAFO 10005; SAFO 15004; AC 120-118; AC 120-123

2.12 Flight Training

Proper Piloting Techniques Associated with Using EFVS During Balked Landings

Example topic (*not exhaustive*):

- Transitioning from EFVS or natural vision to flight instruments

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; § 91.1039; § 121.651; § 125.381; § 135.225(j); SAFO 09011; SAFO 09016; SAFO 10005; SAFO 15004; AC 120-118; AC 120-123

2.13 Flight Training

Proper Piloting Techniques for the Use of EFVS During Instrument Approaches, to Include Operations Below DA/DH or MDA as Applicable to the EFVS Operations to Be Conducted (Consider Day and Night)

Example topics (*not exhaustive*):

- Minimum visibility requirements under 14 C.F.R. § 91.176(a) and 14 C.F.R. § 91.176(b)
- IAPs flown with a FD, FPV cue, and FPARC, as well as using the EFVS during the flare, touchdown, and rollout under 14 C.F.R. § 91.176(a) and 14 C.F.R. § 91.176(b)
- Use of EFVS for precision, nonprecision, steep, and special approaches in VMC and IMC with:
    - Different ceiling and visibility conditions
    - Crosswinds in flight symbology caged and uncaged modes
    - Different approach lighting systems
- Maximum offset angles associated with the various types of IAPs or the equipment limitations of the AFM or RFM
- Understanding how crosswind conditions and offset angles affect the limited EFVS field of view
- Understanding of published VDAs, VDPs, VGSI angles, and the significance of VDA and VGSI angles that are not coincident
- Obstacle clearance awareness, especially for NPAs with no published VDP
- Use of EFVS controls versus other aircraft system controls
- Use of EFVS controls and the effect on the EFVS sensor image
- Effect of monochrome or colorization on the interpretation of airfield lighting
- Verify airfield lighting is optimally set for the airfield, based on properties of the EFVS and environmental conditions

CHECKLIST CONTINUED ON NEXT PAGE

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; § 91.1039; § 121.651; § 125.381; § 135.225(j); SAFO 09011; SAFO 09016; SAFO 10005; SAFO 15004; AC 120-118; AC 120-123

2.14 Flight Training

Determining Enhanced Flight Visibility (Consider Day and Night)

Example topics (*not exhaustive*):

- Determining enhanced flight visibility over a range of actual or simulated low-visibility conditions

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*

2.15 Flight Training

Transitioning from EFVS Sensor Imagery to Natural Vision Acquisition of Required Visual References and the Runway Environment (Consider Day and Night)

Example topics (*not exhaustive*):

- Identifying any of the required visual references over a range of actual or simulated low-visibility conditions
- Training should provide an opportunity for pilots to experience what the "sight picture" of relevant visual references should be (consider effect of HUD and HWD, as applicable)

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; InFO 11004; SAFO 11009; SAFO 17011

2.16 Flight Training

Using EFVS Sensor Imagery, Required Aircraft Flight Information, and Flight Symbology to Touchdown and Rollout, if the System is Certified to Conduct EFVS Operations Under 14 C.F.R. § 91.176(a) (Consider Day and Night)

Example topics (*not exhaustive*):

- Using the FPV cue and FPARC during instrument approaches, and, if possible, to airports where there is a lack of airport visual cues, such as no runway centerline lighting or touchdown zone lighting
- Cross-checking alignment of the HUD/HWD symbology against the EFVS sensor image
- Verifying EFVS sensor imagery is aligned with and scaled to the external visual scene
- Flare prompt or flare guidance

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; AC 120-123

2.17 Flight Training

Normal Procedures When Using an EFVS

Example topics (*not exhaustive*):

- Time requirement for system warm-up
- Understanding EFVS image calibrations or other built-in tests, and the effect this may have on EFVS imagery during flight
- HUD/HWD symbology

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *AC 120-123*

2.18 Flight Training

Abnormal Procedures When Using an EFVS

Example topics (*not exhaustive*):

- Frozen image
- Pixel degradation
- Loss of visual cues from airfield environment
- Loss of HUD relevant symbology
- Detecting runway incursions
- Other abnormal procedures delineated in the AFM or RFM

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; AC 120-123

2.19 Flight Training

Emergency Procedures when Using an EFVS

Example topics (*not exhaustive*):

- EFVS and non-EFVS failures that affect EFVS operations during all phases of flight
- Importance of timely recognition and accurate and timely response to flight deck alerts or indications
- Failure in the critical phases of flight—takeoff, approach, landing, and rollout (e.g., misleading EFVS imagery, loss of required visual references, initiating a missed approach below minimums, loss of EFVS approach capability
- PF loses all HUD-based visual information, or HUD-relevant symbology is erroneous or misleading, particularly during final approach
- Obstruction of the view through the HUD, especially during takeoff and final approach
- Emergency procedures, both with and without a PM display
- Other emergency procedures delineated in the AFM or RFM

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: *§ 61.66*; *§ 91.176*; *AC 90-106B*
Secondary References: *EFVS Final Rule*; *AC 120-123*

2.20 Flight Training

Crew Coordination Procedures when Using an EFVS

Example topics (*not exhaustive*):

- Duties of the PF and PM, crew briefings, procedures, callouts, and coordination items for EFVS normal, abnormal, and emergency operations, including annunciation of published minimums and operation below the DA/DH or MDA
- Crew procedures for using the PM display (if applicable)
- Failure in the critical phases of flight—takeoff, approach, landing, and rollout (e.g., misleading EFVS imagery, loss of required visual references, initiating a missed approach below minimums, loss of EFVS approach capability
- PF loses all HUD-based visual information, or HUD relevant symbology is erroneous or misleading, particularly during final approach
- Emergency procedures, both with and without a PM display

Recommended Training Level? (Select One)	Comments?
☐ A ☐ B ☐ C ☐ D ☐ E	

Primary References: § 61.66; § 91.176; AC 90-106B
Secondary References: EFVS Final Rule; SAFO 10005; SAFO 15011; AC 120-71B; AC 120-123

3.2.3 Special Emphasis Areas Checklist

3	Special Emphasis Areas
A Special Emphasis Area may include a training requirement unique to the aircraft, based on a system, procedure, or maneuver, that requires additional highlighting during training. It may also require additional training time, specialized flight simulation training devices (FSTD), or training equipment.	
Are There Any Special Emphasis Areas for Initial Training? (Select One)	**Findings?**
☐ Yes ☐ No	
Are There Any Special Emphasis Areas for Refresher Training? (Select One)	**Findings?**
☐ Yes ☐ No	

Reference: FSBR Template (FAA Internal Only)

3.3 Training Difference Levels for a Modified EFVS and Aircraft Combination

Training Difference Levels Overview and Decision Tree Instructions

For a modified EFVS and aircraft combination, the decision trees included in this section may be used to determine the recommended level of training for familiarization. Decision trees and example training methods are provided for Training Difference Levels A, B, C, D, and E. This material is based on the guidance provided in AC 120-53B.

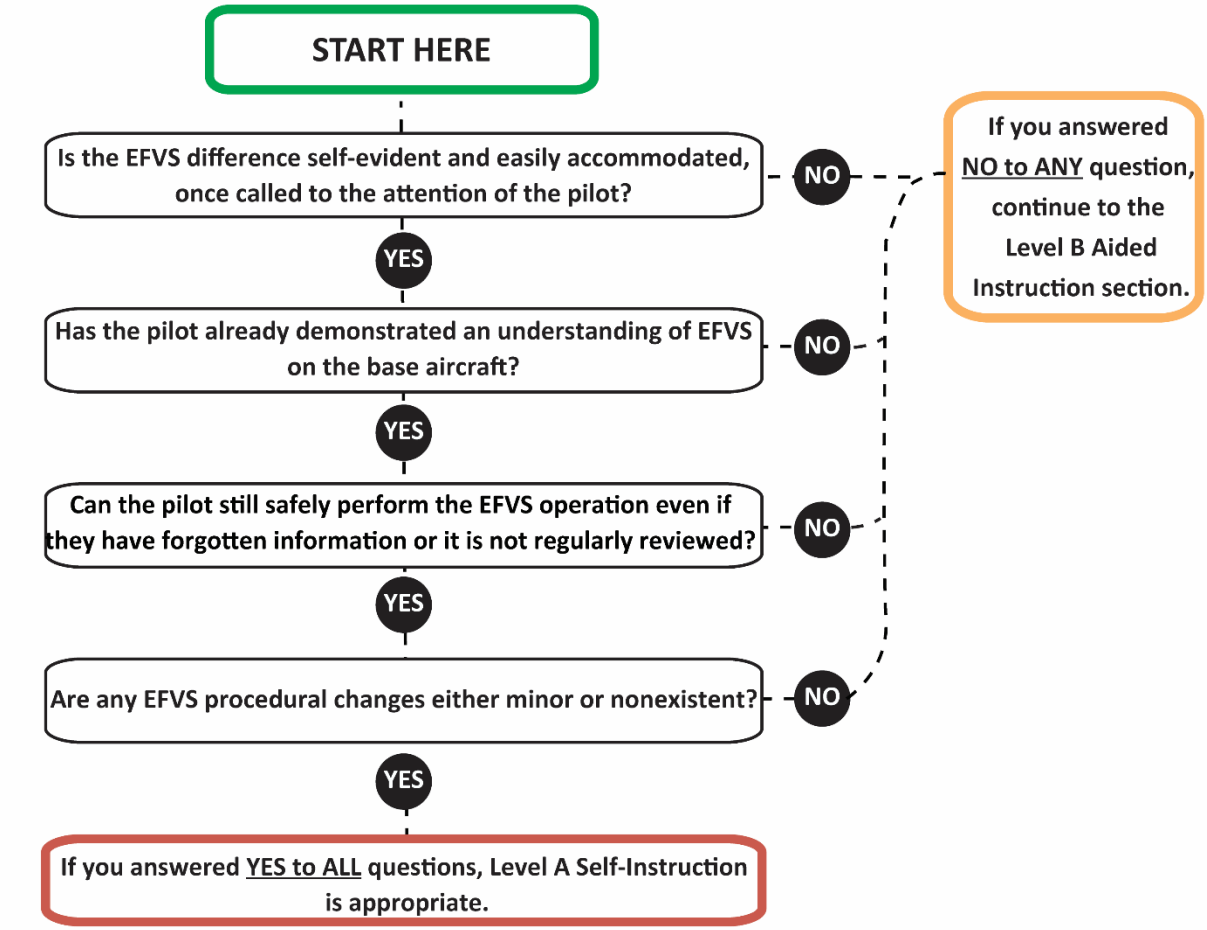
The decision trees in this section may be used to determine difference-level training recommendations for a modified EFVS and aircraft combination.

AED personnel may utilize the trees as follows:

- Start with the decision tree for Training Difference Level A;
- Answer the yes/no questions;
  - A "no" response to any question indicates that the category training level may not be sufficient.
- Continue to the next higher training level.

Complete the Training Difference Level Summaries for ground training and flight training with the appropriate training difference level and any noteworthy findings.

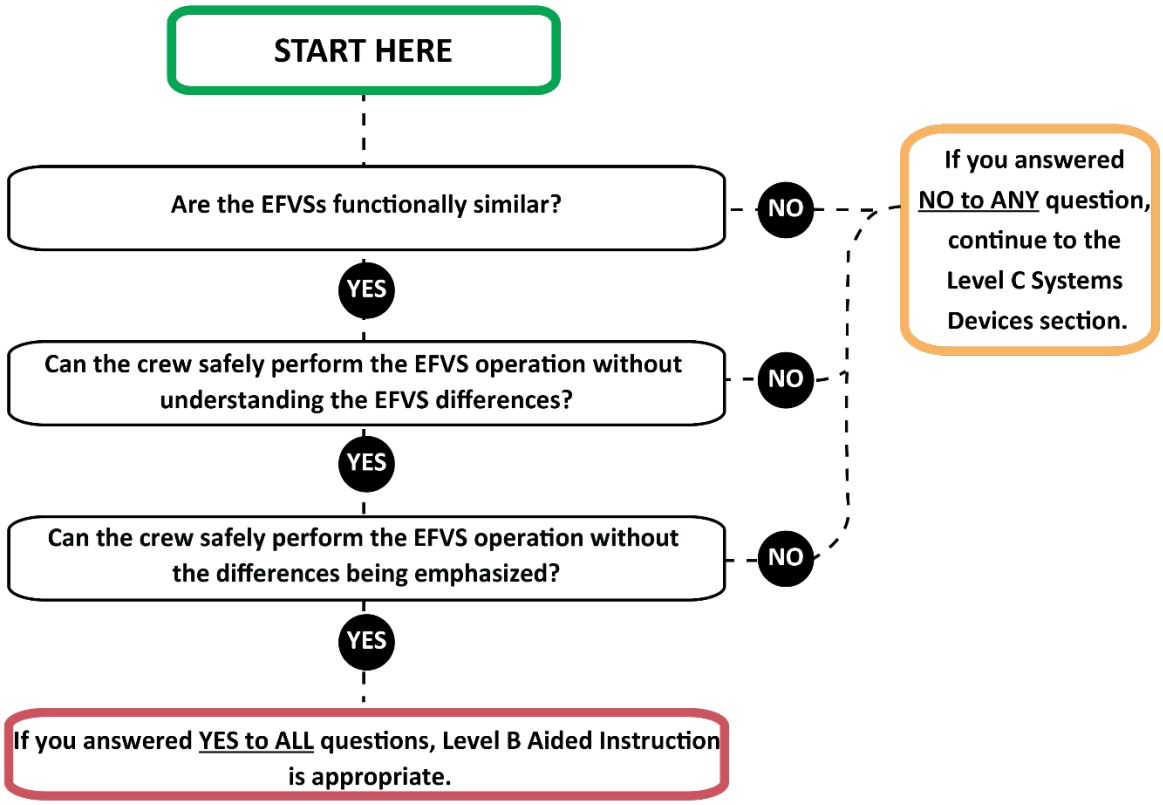
3.3.1 Category A: Difference Level A Self-Instruction Decision Tree



Category A Self-Instruction Training Methods

Difference Level A Self-Instruction Examples
Issuing operating manual page revisions (Hand-out; HO)
Dissemination of operating bulletins (HO)
Differences handouts to describe minor differences (HO)

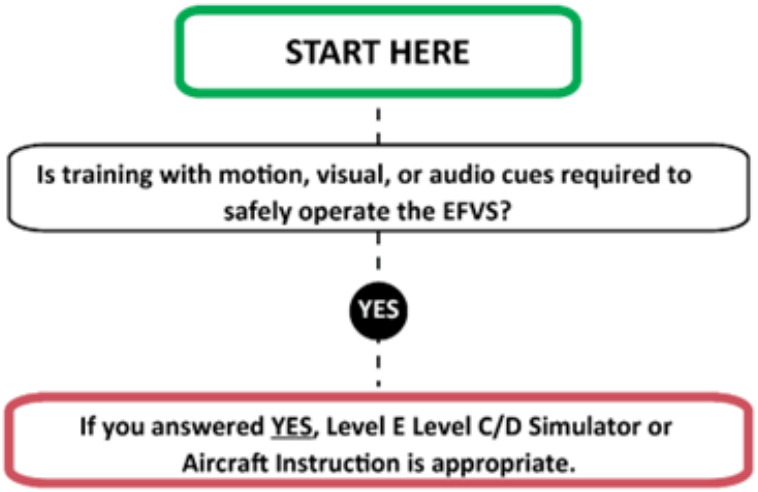
3.3.2 Category B: Difference Level B Aided Instruction Decision Tree



Category B Aided Instruction Training Methods

Difference Level B Aided Instruction Examples
Non-interactive computer-based tutorial instruction (CBT)
Stand-up lectures (SU)
Video (V)

3.3.3 Category C: Difference Level C Systems Devices Decision Tree



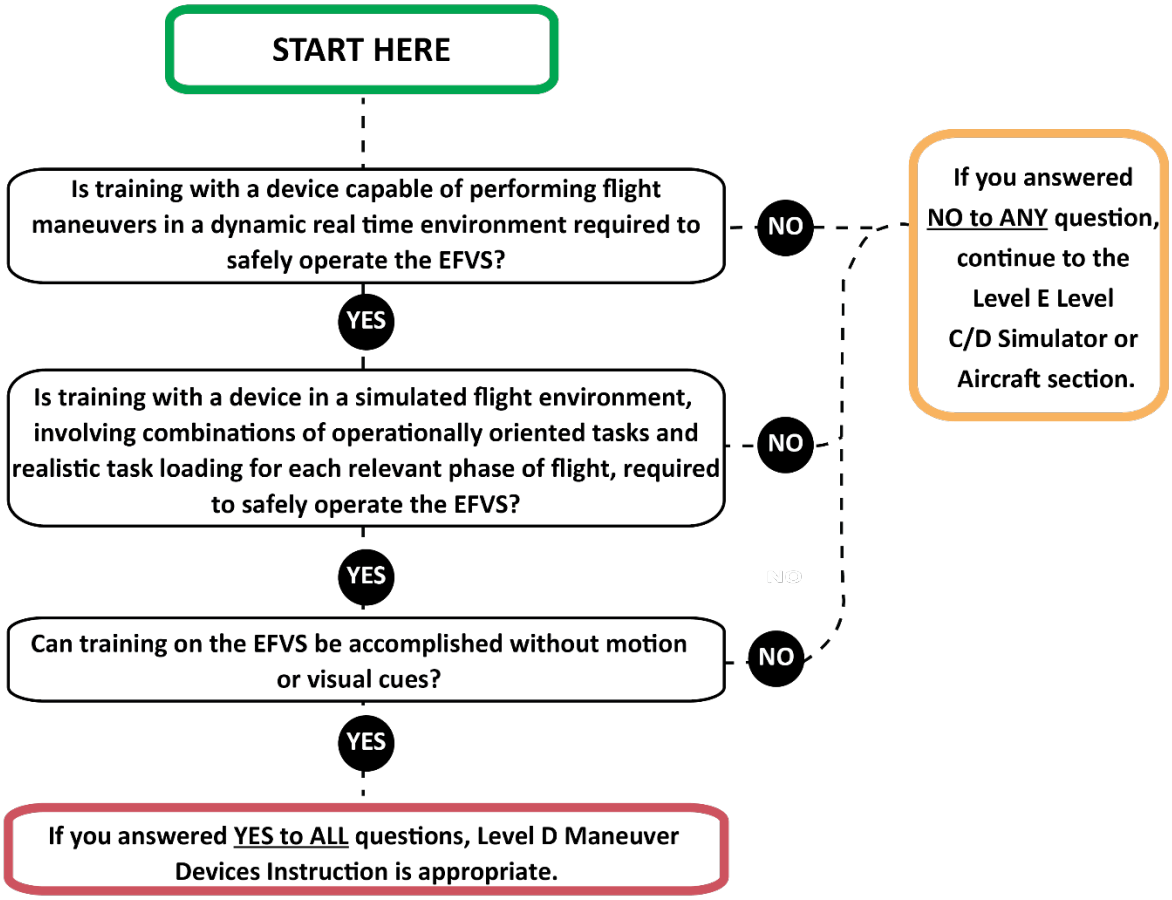
CATEGORY C SYSTEMS DEVICES TRAINING METHODS ON NEXT PAGE

Category C Systems Devices Training Methods

Difference Level C Systems Devices Examples
Interactive computer-based training (ICBT)
Cockpit system simulator (CSS)
Cockpit procedures trainer (CPT)
Part task trainers (PTTs)
Flight training devices levels 2–5 (FTD 2–5)
Extended reality–based training (XR)[4]

[4] A system device may include extended reality (XR), such as virtual-reality (VR), augmented-reality (AR), or mixed-reality (MR) technologies. These evolving technologies are used for education and training applications. Here, we have included XR as a Level C training device; however, AED personnel should evaluate the implementation to determine the training level categorization. Briefly, VR tries to recreate and replace the real-world environment with a virtual one; AR allows virtual objects to be overlaid on a live view of the real world; and MR is a hybrid of virtual and augmented reality that blends the physical world with the digital world. The quality and effectiveness of the XR training may depend on the specific type of technology (VR, AR, MR), the display device (e.g., HWD, computer display), the level of interactivity, usability, immersion (e.g., presence of spatial sounds, screen resolution, frame rate, quality of graphics), and any lag among body or gesture movements, pointer movements, and display updates, as a few examples. Fidelity will vary by application, and appearance may not equate to functionality.

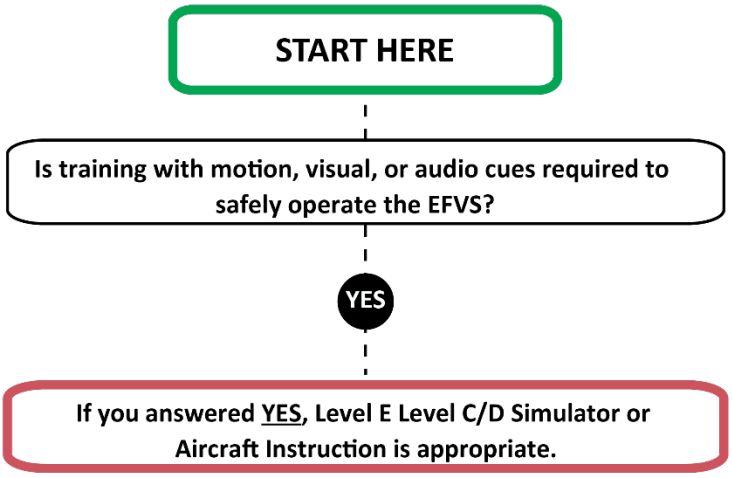
3.4 Category D: Difference Level D Maneuver Devices Decision Tree



Category D Maneuver Devices Training Methods

Difference Level D Maneuver Devices Examples
Flight training devices level 6 or 7 (FTD 6/7)
Simulators level A or B (SIM A/B)

3.3.5 Category E: Difference Level E Level C/D Simulator or Aircraft Instruction Decision Tree



Category E Level C/D Simulator or Aircraft Instruction Training Methods

Difference Level E Level C/D Simulator or Aircraft Instruction Examples
Simulators level C or D (SIM C/D)
Aircraft (ACFT)

3.3.6 Master Difference Level Ground Training Summary

1	Ground Training Differences Level Summary
For a New or Modified EFVS and Aircraft Combination, What Is the Highest Recommended Level for Any Individual Ground Training Item? (Select One)	
☐ Level A: Self-Instruction	
☐ Level B: Aided Instruction	
☐ Level C: Systems Devices	
☐ Level D: Maneuver Devices	
☐ Level E: Level C or D Full Flight Simulator (FFS) or Aircraft	
Findings?	

3.3.7 Master Difference Level Flight Training Summary

2	Flight Training Differences Level Summary
For a New or Modified EFVS and Aircraft Combination, What Is the Highest Recommended Level for Any Individual Flight Training Item? (Select One)	
☐ Level A: Self-Instruction	
☐ Level B: Aided Instruction	
☐ Level C: Systems Devices	
☐ Level D: Maneuver Devices	
☐ Level E: Level C or D Full Flight Simulator (FFS) or Aircraft	
Findings?	

4. Operational Evaluation: Checking Recommendations

The “Operational Evaluation: Checking Recommendations” chapter of the *Federal Aviation Administration Aircraft Evaluation Division Operations and Human Factors and Evaluation Aid for Enhanced Flight Vision Systems* is intended to aid in standardizing the aircraft evaluation division (AED) process of determining Federal Aviation Administration (FAA) Flight

Standardization Board (FSB) checking levels recommendations for a new or modified enhanced flight vision system (EFVS) and aircraft combination. When AED personnel are evaluating a training curriculum recommended by an original equipment manufacturer (OEM) or training provider, this chapter may be used to ensure recommended knowledge and skills checking specific to the EFVS and aircraft combination are identified.

This aid does not replace FAA regulatory and guidance materials but rather serves as a tool to provide structure to determine FAA FSB EFVS checking levels recommendations specific to the aircraft and EFVS combination, which may be included in a Flight Standardization Board Report (FSBR). The directions described herein are not meant to unnecessarily restrict trained AED personnel, and it is expected that the judgment and expertise of personnel will be applied. The term *check* is used in the context of AED roles and responsibilities as defined in Appendix 1 of AC 120-53B. AC 120-53B defines “check” as an assessment of crewmember proficiency during which limited training or practice is allowed or the assessment is of knowledge and skill in tasks to the standards identified by the FAA.

As part of the operational evaluation, qualified pilot test subjects are included to help identify checking items to be included as a recommendation in the FSBR. It is important that the pilot test subjects have an appropriate background for the operational evaluation; factors such as EFVS training in accordance with 14 C.F.R. § 61.66, previous qualification in the aircraft, flight experience (including with low visibility operations), and currency should be considered.

Additionally, aircraft-specific considerations for FSB operational evaluations may be required. For example, per Section 128 of the Aircraft Certification, Safety, and Accountability Act of 2020 (ACSAA) and FAA Notice 8900.684, the use of domestic and foreign air carrier pilots with varying levels of experience must be included as part of the sample of pilot test subjects for operational evaluations on certain transport airplanes.

AED personnel and qualified pilot test subjects who will manipulate the controls of an aircraft or act as pilot in command of an aircraft during an EFVS operation as a part of an operational suitability determination and/or operational evaluation must be trained in accordance with 14 C.F.R. § 61.66(a) and (b) or meet the provisions of 14 C.F.R. § 61.66(h)(2).

4.1 Overview

This chapter is organized in the form of checklists and decision trees, which are largely based on but do not replace the regulations in 14 C.F.R. § 61.58, § 91.176, § 91.1065(g), § 121.441, § 121 Appendix F., § 125.287(g), § 135.293(i) and guidance in AC 120-53B, AC 90-106B, and AC 120-118 (see Checking Recommendations Chapter References).

Regarding this chapter:

AED personnel are encouraged to review the regulatory, advisory, and guidance materials provided in Table 18, Table 19, Table 20, Table 21, Table 22, Table 23, and in the list of key references in the Appendix.

- If questions arise during the EFVS evaluation, AED personnel may wish to contact the FAA Flight Standards Service, Flight Technologies and Procedures Division, Flight Operations Branch (AFS-410).
- Descriptions accompany each checking item to provide context for the evaluation.

4.1(a) Chapter Organization

4.1(a)(i) Checklists for Checking Requirements

14 C.F.R. § 61.66 does not contain any checking requirements for pilots to conduct EFVS operations using new or modified EFVS and aircraft combinations. However, 14 C.F.R. § 61, § 91 Subpart K, § 121, § 125, and § 135 do provide checking requirements. AED personnel may identify areas specific to the EFVS and aircraft combination, which may be included as a recommended checking item in the FSBR. This chapter includes five checklists to assist with identifying EFVS aeronautical knowledge areas, areas of operations, or tasks, maneuvers, or procedures that should be included as part of a proficiency or competency check for each of the following operating rules:

- Proficiency Check Required by 14 C.F.R. Part 61
- Competency Check Required by 14 C.F.R. Part 91
- Proficiency Check Required by 14 C.F.R. Part 121
- Competency Check Required by 14 C.F.R. Part 125
- Competency Check Required by 14 C.F.R. Part 135

During the training evaluation process (see the "Operational Evaluation: Training Recommendations" chapter), AED personnel are encouraged to consider areas specific to the aircraft and EFVS combination that may be included as part of a competency or proficiency check.

4.1(a)(ii) Decision Trees for Modified EFVS Checking Difference Level Recommendations

There may be instances when an applicant has modified an EFVS on the same aircraft model, such as installing different EFVS hardware or software. These modifications may result in EFVS tasks, maneuvers, or procedures that should be included as part of a check. Section 4.3 contains decision trees that were informed by guidance in AC 120-53B. AED personnel may use the decision trees to help determine recommended checking levels to ensure the pilot has adequate knowledge of and familiarity with the EFVS and the procedures to be used following differences training. The decision trees include a series of questions and examples of checking methods for each of the Checking Difference Levels—A, B, C, D, or E.

4.1(b) Terminology

The following terminology and descriptions are used in the context of the *Federal Aviation Administration Aircraft Evaluation Division Operations and Human Factors Evaluation Aid for Enhanced Flight Vision Systems* and do not replace definitions provided elsewhere in FAA regulatory and guidance material.

- ***Check.*** The term *check* generally refers to an assessment of crewmember proficiency during which limited training or practice is allowed, or the assessment is of knowledge and skill in tasks to the standards identified by the FAA (see AC 120-53B, Appendix 1 for a definition).
- ***Evaluation Plan (EP).*** An EP is submitted by the applicant and accepted by AED to outline the FSB's operational activities, which include crewmember training, checking, and identifying any gaps that may occur in operational suitability because of simulator crewmember training (e.g., equipment differences, night conditions, instrument flight rules [IFR]). The EP should also include an operator differences requirements (ODR) table, in accordance with Advisory Circular (AC) 120-53, Guidance for Conducting and Use of Flight Standardization Board Evaluations, if the applicant is seeking differences credit.
- ***Modified EFVS.*** A modified EFVS refers to an EFVS that has been altered or upgraded through modification, typically to enhance performance, comply with new regulations or guidance, or fulfill a specialized mission. For FSB purposes, a modified EFVS evaluation may be for a previously certified EFVS that has received a modification to its hardware or software but is still installed in the same model of aircraft (e.g., a EFVS certified on aircraft model "X" is modified, but still installed in aircraft model "X").
- ***New EFVS.*** A new EFVS refers to a EFVS in its original design. For FSB purposes, a "new" EFVS evaluation is either (1) an EFVS that has never been certified by the FAA or (2) an EFVS that was previously certified by the FAA in a specific aircraft model and is then installed in a different aircraft model (e.g., an EFVS certified for aircraft model "X" is installed in aircraft model "Y").
- ***Operational evaluation (OE).*** An OE is an AED process to determine pilot type rating, minimum crewmember training, checking and currency requirements, and the unique or special airman certification requirements (e.g., specific flight characteristics, no-flap landing). An OE is associated with all FSBs but can also be completed as a standalone task.

4.1(c) Checking Recommendations Chapter References

Table 18.
FAA Regulations Included in the "Operational Evaluation: Checking Recommendations" Chapter

14 C.F.R. Regulations	Title
Aircraft Certification, Safety, and Accountability Act of 2020 (ACSAA)	Section 128 of ACSAA Addresses Pilot Operational Evaluation Requirements, Including the Use of Pilots from Air Carriers with Varying Levels of Experience for Transport Airplane Certification Projects
EFVS Final Rule, 81 Federal Register 90126 (December 13, 2016)	Revisions to Operational Requirements for the Use of Enhanced Flight Vision Systems (EFVSs) and to Pilot Compartment View Requirements for Vision Systems
§ 60	Flight Simulation Training Device Initial and Continuing Qualification and Use
§ 61.58	Pilot-in-command Proficiency Check: Operation of an Aircraft That Requires More Than One Pilot Flight Crewmember or Is Turbojet-Powered
§ 61.66	Enhanced Flight Vision System Pilot Requirements
§ 91.176	Straight-in Landing Operations Below DA/DH or MDA Using an Enhanced Flight Vision System (EFVS) Under IFR
§ 91.189	Category II and III Operations: General Operating Rules
§ 91.1039	IFR Takeoff, Approach and Landing Minimums
§ 91.1065(b)	Initial and Recurrent Pilot Testing Requirements
§ 91.1065(g)	Initial and Recurrent Pilot Testing Requirements
§ 121.441	Proficiency Checks
§ 121.651	Takeoff and Landing Weather Minimums: IFR: All Certificate Holders
§ 121 Appendix F	Proficiency Check Requirements
§ 125.287(g)	Initial and Recurrent Pilot Testing Requirements
§ 125.325	Instrument Approach Procedures and IFR Landing Minimums
§ 125.381	Takeoff and Landing Weather Minimums: IFR
§ 135.225(j)	IFR: Takeoff, Approach and Landing Minimums
§ 135.293(i)	Initial and Recurrent Pilot Testing Requirements

Table 19.
Orders Included in the "Operational Evaluation: Checking Recommendations" Chapter

Order No.	Title
Order 8900.1	Volume 3, Chapter 18: Operational Specifications Volume 4, Chapter 17: EFVS Operations Volume 5, Chapter 2: Certification of Pilots and Flight Instructors

Table 20.
Notices Included in the "Operational Evaluation: Checking Recommendations" Chapter

Notice No.	Title
Notice 8900.684	Use of Air Carrier Pilots During Flight Standardization Board Evaluations for Transport Airplanes

Table 21.
Safety Alerts for Operators Included in the "Operational Evaluation: Checking Recommendations" Chapter

Resource	Title
SAFO 09011	Parts 121 and 135 Operators: Constant Angle of Descents Techniques for Nonprecision Approaches
SAFO 09016	Rejected Landing Due to Loss of Visibility
SAFO 10005	Go-Around Callout and Immediate Response
SAFO 15011	Roles and Responsibilities for Pilot Flying (PF) and Pilot Monitoring (PM)

Table 22.
Advisory Circulars Included in the "Operational Evaluation: Checking Recommendations" Chapter

AC No.	Title
AC 90-106B	Enhanced Flight Vision System Operations
AC 120-53B	Guidance for Conducting and Use of Flight Standardization Board (FSB) Evaluations
AC 120-57C	Surface Movement Guidance and Control System
AC 120-118	Criteria for Approval/Authorization of All Weather Operations for Takeoff, Landing, and Rollout
AC 120-123	Flightpath Management

Table 23.
Other Technical Resources Included in the "Operational Evaluation: Checking Recommendations" Chapter

Resource	Title
FAA Practical Test Standards	Practical Test Standards (PTS)
FAA Airman Certification Standards	Airman Certification Standards (ACS)
FAA FSB EFVS OSR	Operational Credit for Enhanced Flight Vision Systems (EFVS)

4.2 Pilot Checking Recommendations Checklists for New or Modified EFVS and Aircraft Combinations

Checking Chapter Checklist Overview and Instructions

There are no checking requirements in 14 C.F.R. § 61.66 for new or modified EFVS and aircraft combinations. However, other regulations describe the requirement or expectation that EFVS tasks, procedures, or maneuvers be included as part of competency or proficiency checks (see 14 C.F.R. Parts 61, 91 Subpart K, 121, 125, and 135). The checklists in this chapter will aid AED personnel in determining checking recommendations specific to the aircraft and EFVS combination. These checklists may be used for both new and modified EFVS.

This chapter includes checklists for the following:

- Proficiency Check Required by 14 C.F.R. Part 61
- Competency Check Required by 14 C.F.R. Part 91
- Proficiency Check Required by 14 C.F.R. Part 121
- Competency Check Required by 14 C.F.R. Part 125
- Competency Check Required by 14 C.F.R. Part 135

Whenever possible, examples are given to provide context for the checklist item. The examples are not intended to serve as an exhaustive list, and the examples may not be applicable to every EFVS and aircraft combination.

For each checklist item:

- Consider EFVS aeronautical knowledge areas, areas of operations, or tasks, maneuvers, or procedures;
- Select the appropriate “yes,” “no,” or “n/a” response; and
- Provide details on the items to include in the check and the frequency of the check.

For each checklist, AED personnel should consider EFVS tasks, procedures, or maneuvers specific to Category II and Category III combined operations. For current information, consult with FAA Flight Technologies and Procedures Division, Flight Operations Branch (AFS-410).

4.2.1 Proficiency Check Required by 14 C.F.R. Part 61

1 Proficiency Check Required by Part 61	

14 C.F.R. § 61.58 addresses pilot-in-command proficiency checks specific to the operation of an aircraft that requires more than one pilot flight crewmember or is turbojet-powered.
Although § 61.58 does not directly address EFVS, AED personnel should consider the use of EFVS for any tasks, procedures, or maneuvers detailed in the applicable Airman Certification Standard (ACS) or Practical Test Standards (PTS), such as:
• Any EFVS-focused tasks, such as aeronautical knowledge, risk management, and skill areas
• Crew coordination and timely utilization of appropriate EFVS checklists
• Some checking considerations are the lowest visibility conditions allowed by the operating rule or letter of authorization (LOA), such as:
  ○ Instrument takeoffs at the lowest visibility allowed with EFVS by the operating rule or LOA
  ○ Instrument approach and landing at the lowest visibility allowed for EFVS operations (14 C.F.R. § 91.176[a] or § 14 C.F.R. § 91.176[b]) or LOA[5]	

After reviewing 14 C.F.R. § 61.58, are there any recommended EFVS aeronautical knowledge areas, areas of operations, or tasks, maneuvers, or procedures that should be included as part of a proficiency check? (Select One)	**If yes, what are they *and* how often should they be checked? (Specify)**
☐ Yes ☐ No ☐ N/A	

Primary References: § 61.58; § 91.176; AC 90-106B; AC 120-53B; FAA FSB EFVS OSR; FAA Practical Test Standards or FAA Airman Certification Standards
Secondary References: EFVS Final Rule; § 91.189; § 61.66; Order 8900.1 (see vol. 3, ch. 18; vol. 4, ch. 17; vol. 5, ch. 2); SAFO 09016; SAFO 10005; SAFO 15011; AC 120-118; AC 120-123

[5]The FAA Flight Technologies and Procedures Division, Flight Operations Branch (AFS-410) should be contacted for information on EFVS-focused OpSpecs, MSpecs, LOAs, and EFVS Category II or Category III combined operations (§ 91.189).

4.2.2 Competency Check Required by 14 C.F.R. Part 91

2	Competency Check Required by Part 91 Subpart K
14 C.F.R. § 91 Subpart K (see § 91.1065[g]) addresses competency checks for conducting EFVS operations. If the program manager is authorized to conduct EFVS operations, the competency check must include tasks, maneuvers, and procedures appropriate to the EFVS operations the certificate holder is authorized to conduct. Some checking considerations are the lowest visibility conditions allowed by the operating rule or management specification (MSpec), such as: • Instrument takeoffs at the lowest visibility allowed with EFVS by the operating rule or MSpec (e.g., 14 C.F.R. § 91 Subpart K allows runway visual range (RVR) 600 feet for takeoff with EFVS) • Instrument approach and landing at the lowest visibility allowed for EFVS operations (14 C.F.R. § 91.176[a] or 14 C.F.R. § 91.176[b]) or MSpec[6]	
After reviewing 14 C.F.R. § 91 Subpart K, are there any EFVS aeronautical knowledge areas, areas of operations, or tasks, maneuvers, or procedures that should be included as a competency check? (Select One)	**If yes, what are they *and* how often should they be checked? (Specify)**
☐ Yes ☐ No ☐ N/A	

Primary References: § 91.1065(b); § 91.1065(g); § 91.1039; § 91.176; AC 90-106B; AC 120-53B; FAA FSB EFVS OSR; FAA Practical Test Standards or FAA Airman Certification Standards
Secondary References: EFVS Final Rule; § 91.189; § 61.66; Order 8900.1 (see vol. 3, ch. 18; vol. 4, ch. 17; vol. 5, ch. 2); SAFO 09016; SAFO 10005; SAFO 15011; AC 120-118; AC 120-123

[6]The FAA Flight Technologies and Procedures Division, Flight Operations Branch (AFS-410) should be contacted for information on EFVS-focused OpSpecs, MSpecs, LOAs, and EFVS Category II or Category III combined operations (§ 91.189).

4.2.3 Proficiency Check Required by 14 C.F.R. Part 121

3 Proficiency Check Required by Part 121	
14 C.F.R. § 121.441 addresses pilot-in-command proficiency checks, and Appendix F provides EFVS procedures and maneuvers related to approaches and landings to be included. Some checking considerations are the lowest visibility conditions allowed by the operating rule or operational specification (OpSpec), such as: • Instrument takeoffs at the lowest visibility allowed with EFVS by the operating rule or OpSpec • Instrument approach and landing at the lowest visibility allowed for EFVS operations (14 C.F.R. § 91.176[a] or 14 C.F.R. § 91.176[b]) or OpSpec[7]	
After reviewing 14 C.F.R. § 121.441 and Appendix F, are there any additional EFVS aeronautical knowledge areas, areas of operations, or tasks, maneuvers, or procedures that should be included as a proficiency check? (Select One)	**If yes, what are they *and* how often should they be checked? (Specify)**
☐ Yes ☐ No ☐ N/A	

Primary References: § 121 Appendix F; § 91.176; AC 90-106B; AC 120-53B; FAA FSB EFVS OSR; FAA Practical Test Standards or FAA Airman Certification Standards
Secondary References: EFVS Final Rule; § 91.189; § 61.66; § 121.441; § 121.651; Order 8900.1 (see vol. 3, ch. 18; vol. 4, ch. 17; vol. 5, ch. 2); SAFO 09011; SAFO 09016; SAFO 10005; SAFO 15011; AC 120-118; AC 120-57C; AC 120-123

[7]The FAA Flight Technologies and Procedures Division, Flight Operations Branch (AFS-410) should be contacted for information on EFVS-focused OpSpecs, MSpecs, LOAs, and EFVS Category II or Category III combined operations (§ 91.189).

4.2.4 Competency Check Required by 14 C.F.R. Part 125

4 Competency Check Required by Part 125	
14 C.F.R. § 125.287(g) addresses competency checks for conducting EFVS operations. If the certificate holder is authorized to conduct EFVS operations, the competency check must include tasks, maneuvers, and procedures appropriate to the EFVS operations the certificate holder is authorized to conduct. Some checking considerations are the lowest visibility conditions allowed by the operating rule or OpSpec, such as: • Instrument takeoffs at the lowest visibility allowed with EFVS by the operating rule or OpSpec • Instrument approach and landing at the lowest visibility allowed for EFVS operations (14 C.F.R. § 91.176[a] or 14 C.F.R. § 91.176[b]) or OpSpec[8]	
After reviewing 14 C.F.R. § 125.287(g), are there any EFVS aeronautical knowledge areas, areas of operations, or tasks, maneuvers, or procedures that should be included as a competency check? (Select One)	**If yes, what are they *and* how often should they be checked? (Specify)**
☐ Yes ☐ No ☐ N/A	

Primary References: § 125.287(g); § 91.176; AC 90-106B; AC 120-53B; FAA FSB EFVS OSR; FAA Practical Test Standards or FAA Airman Certification Standards
Secondary References: EFVS Final Rule; § 91.189; § 61.66; § 125.325; § 125.381; Order 8900.1, Vol.4, Ch17; SAFO 09016; SAFO 10005; SAFO 15011; AC 120-118; AC 120-123

[8]The FAA Flight Technologies and Procedures Division, Flight Operations Branch (AFS-410) should be contacted for information on EFVS-focused OpSpecs, MSpecs, LOAs, and EFVS Category II or Category III combined operations (§ 91.189).

4.2.5 Competency Check Required by 14 C.F.R. Part 135

5 Competency Check Required by Part 135	
14 C.F.R. § 135.293(i) addresses competency checks for conducting EFVS operations. If the certificate holder is authorized to conduct EFVS operations, the competency check must include tasks, maneuvers, and procedures appropriate to the EFVS operations the certificate holder is authorized to conduct. Some considerations are the lowest visibility conditions allowed by the operating rule or OpSpec, such as: • Instrument takeoffs at the lowest visibility allowed with EFVS by the operating rule or OpSpec • Instrument approach and landing at the lowest visibility allowed for EFVS operations (14 C.F.R. § 91.176[a] or 14 C.F.R. § 91.176[b]) or OpSpec[9]	
After reviewing 14 C.F.R. § 135.293(i), are there EFVS aeronautical knowledge areas, areas of operations, or tasks, maneuvers, or procedures that should be included as a competency check? (Select One)	**If yes, what are they *and* how often should they be checked? (Specify)**
☐ Yes ☐ No ☐ N/A	

Primary References: § 135.293(i); § 91.176; AC 90-106B; AC 120-53B; FAA FSB EFVS OSR; FAA Practical Test Standards or FAA Airman Certification Standards
Secondary References: EFVS Final Rule; § 91.189; § 61.66; § 135.225(j); Order 8900.1, Vol.4, Ch17; SAFO 09011; SAFO 09016; SAFO 10005; SAFO 15011; AC 120-118; AC 120-123

[9]The FAA Flight Technologies and Procedures Division, Flight Operations Branch (AFS-410) should be contacted for information on EFVS-focused OpSpecs, MSpecs, LOAs, and EFVS Category II or Category III combined operations (§ 91.189).

4.3 Checking Difference Levels for a Modified EFVS and Aircraft Combination

Decision Tree Instructions

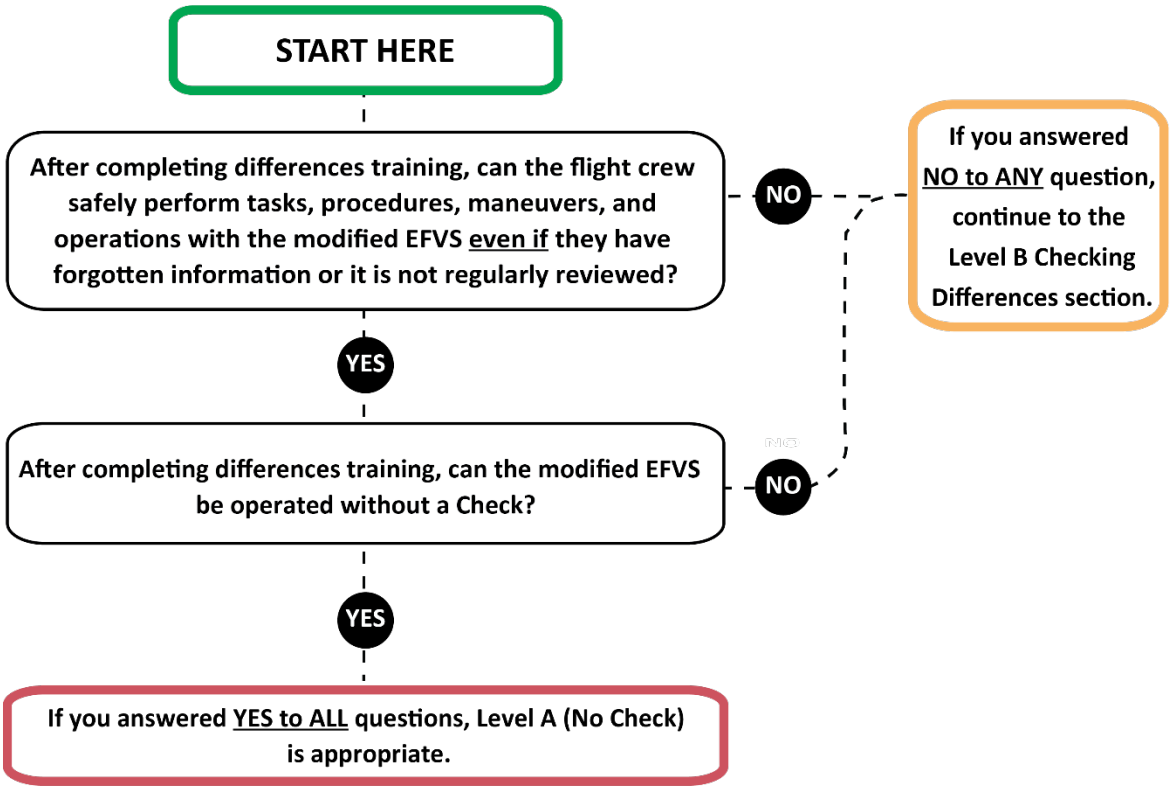
Decision trees and example checking methods are provided for Checking Difference Levels A, B, C, D, and E. This material is based on the guidance provided in AC 120-53B.

The decision trees in this section can be used to assist in determining difference level checking recommendations for a modified EFVS and aircraft combination.

AED personnel may utilize the trees as follows:

1. Start with the decision tree for Difference Level A;
2. Answer the yes/no questions;
    a. A “no” response to any question indicates that the category training level may not be sufficient.
3. Continue to the next higher checking level; and
4. Complete the Master Differences Level Checking Summary with the appropriate checking difference level and any noteworthy findings.

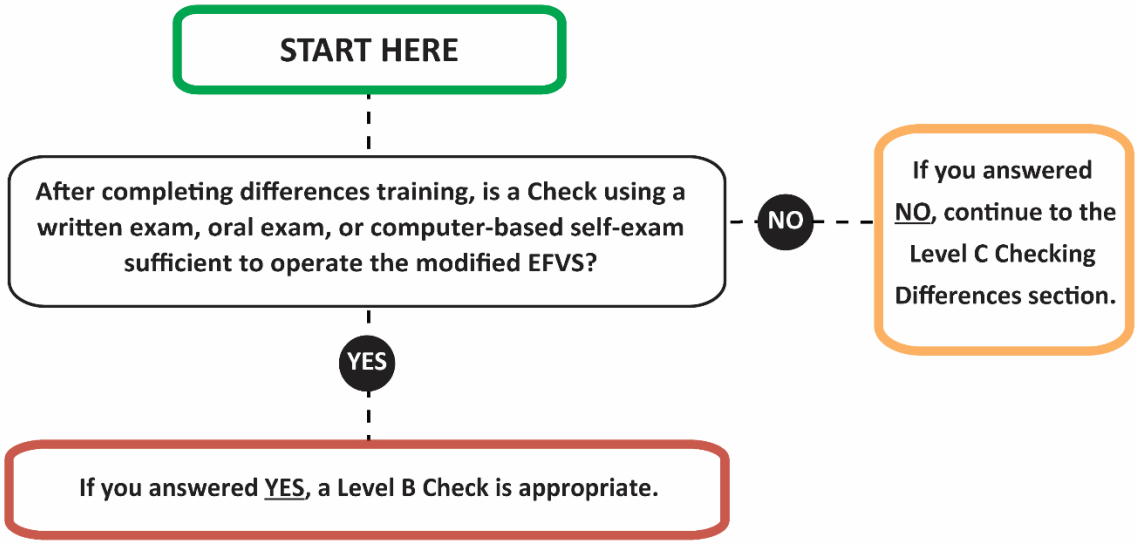
4.3.1 Level A Checking Differences



Level A Difference Check Example

Level A Difference Check Example	
Example 1	**Task Check Example 1**
A minor modification to EFVS software or hardware that does not significantly affect the available functions, features, or presentation of information and does not significantly affect any user interface or control.	Level A (No Check) is recommended after differences training because the change is minor, is not associated with any procedural changes, and does not adversely affect safety if the information is not reviewed or is forgotten.

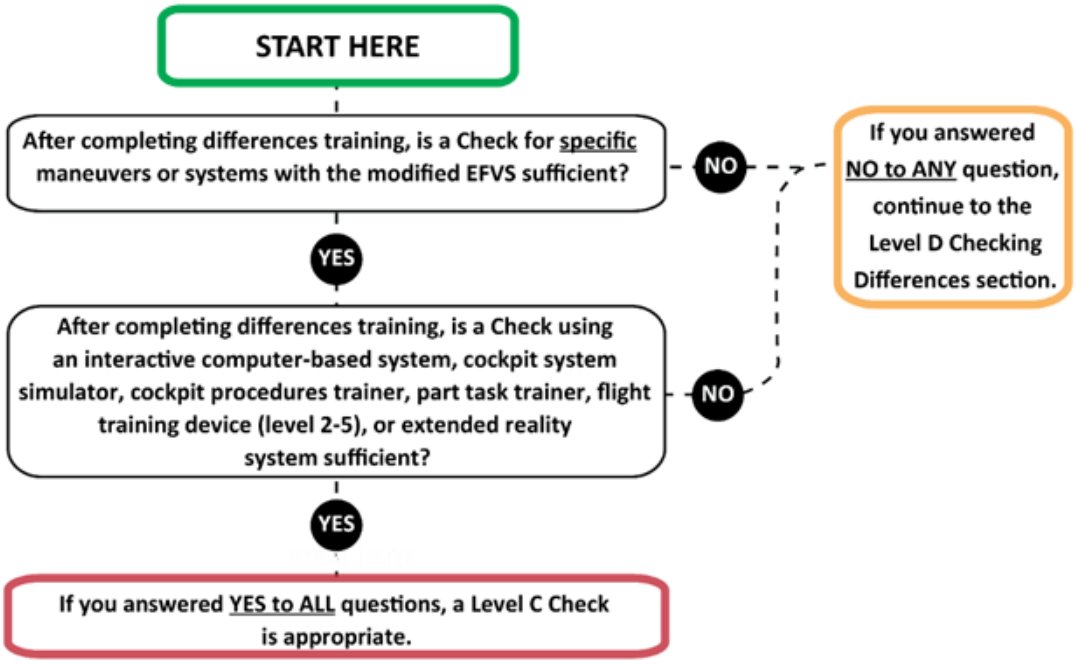
4.3.2 Level B Checking Differences



Level B Difference Check Examples

Level B Checking Examples	
Example 1	**Task Check Example 1**
An EFVS control has been replaced or modified (e.g., the control for adjusting brightness).	If the process of adjusting brightness has been modified, during the Check the pilot may be asked to describe the new process of adjusting the EFVS brightness level.
Example 2	**Task Check Example 2**
The modification to the EFVS has resulted in minor changes to alerting system messages or auditory annunciations.	If the presentation of alerting system information has been modified, the Check may utilize a computer-based test of the alerting system messages or annunciations, including the appropriate pilot response.

4.3.3 Level C Checking Differences



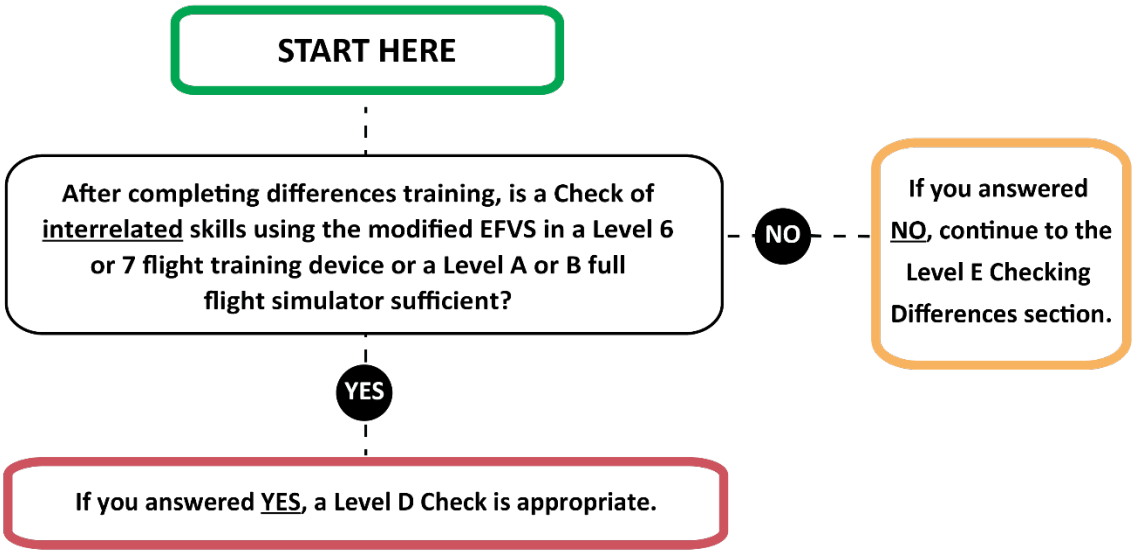
LEVEL C CHECKING EXAMPLES ON NEXT PAGE

Level C Difference Check Examples

Level C Checking Examples	
Example 1	**Task Check Example 1**
A modification results in a new process to set up the EFVS using the Flight Management System (FMS); for example, the input keys on the FMS to control auto brightness have been modified.	A system device[10] is recommended for a Check of the pilot's ability to use the FMS to properly set up the EFVS for flight.
Example 2	**Task Check Example 2**
A new head-up display (HUD) has been installed, resulting in a modified sequence of steps for adjusting the EFVS display settings.	A system device is recommended for a Check of the pilot's ability to use the new HUD controls to properly adjust the EFVS display settings.

[10]A system device may include extended reality (XR), such as virtual-reality (VR), augmented-reality (AR), or mixed-reality (MR) technologies. These evolving technologies are used for education and training applications. Here, we have included XR as a Level C checking device; however, AED personnel should evaluate the implementation to determine the checking level categorization. Briefly, VR tries to recreate and replace the real-world environment with a virtual one; AR allows virtual objects to be overlaid on a live view of the real world; and MR is a hybrid of virtual and augmented reality that blends the physical world with the digital world. The quality and effectiveness of the XR training may depend on the specific type of technology (VR, AR, MR), the display device (e.g., HWD, computer display), the level of interactivity, usability, immersion (e.g., presence of spatial sounds, screen resolution, frame rate, quality of graphics), and any lag between body or gesture movements, pointer movements, and display updates, as a few examples. Fidelity will vary by application, and appearance may not equate to functionality.

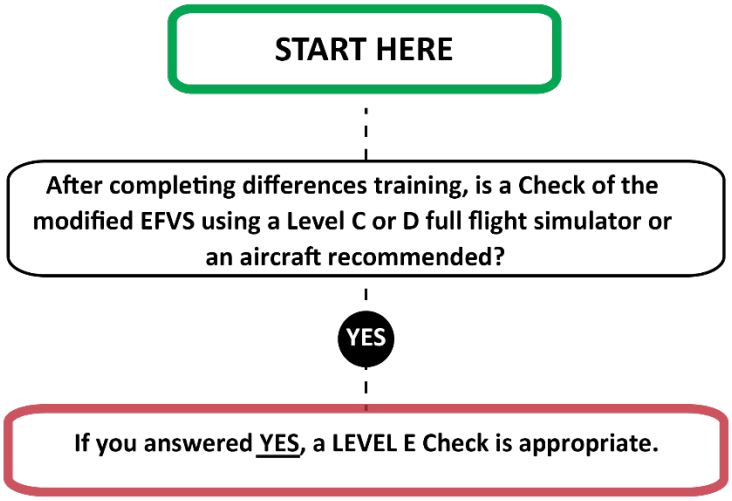
4.3.4 Level D Checking Differences



Level D Difference Check Example

Level D Checking Example	
Example 1	**Task Check Example 1**
A modification to the EFVS results in a change in the interrelationship between different aircraft systems.	A Check of the pilot's understanding of the interrelated systems or skills performed using scenarios that represent a real-time flight environment and device is recommended. This may include a simulator or flight training device that has realistic controls and instruments, but simplified visual cues, motion cues, or environmental conditions are acceptable (see 14 C.F.R. § 60 for a description).

4.3.5 Level E Checking Differences



Level E Difference Check Example

Level E Checking Example	
Example 1	**Task Check Example 1**
A modification to the EFVS has significant full-task differences that require a high-fidelity environment.	A high-fidelity Level C or D full flight simulator (FFS) with advanced visual display and motion, or an aircraft, is recommended for a Check of the pilot's ability to conduct an EFVS operation (see 14 C.F.R. § 60 for a description).

4.3.6 Master Differences Level Checking Summary

1 Checking Differences Level Summary
For the modified EFVS and aircraft combination, what is the highest recommended level check for any individual item? (Select One)
☐ Level A: No Check ☐ Level B Check ☐ Level C Check ☐ Level D Check ☐ Level E Check
Findings?

5. Operational Evaluation: Currency Recommendations

The "Operational Evaluation: Currency Recommendations" chapter of the *Federal Aviation Administration Aircraft Evaluation Division Operations and Human Factors and Evaluation Aid for Enhanced Flight Vision Systems* is intended to aid in standardizing the Aircraft Evaluation Division (AED) process of determining the Federal Aviation Administration (FAA) Flight Standardization Board (FSB) currency recommendations for a new or modified enhanced flight vision system (EFVS) and aircraft combination. When AED personnel are evaluating a training curriculum recommended by an original equipment manufacturer (OEM) or training provider, this chapter may be used to ensure recommended currency of EFVS tasks, procedures, or maneuvers specific to the EFVS and aircraft combination are identified.

This aid does not replace FAA regulatory and guidance materials but rather serves as a tool to provide structure to determine FAA FSB EFVS currency recommendations specific to the aircraft and EFVS combination, which may be included in a Flight Standardization Board Report (FSBR). The directions described herein are not meant to unnecessarily restrict trained AED personnel, and it is expected that the judgment and expertise of personnel will be applied.

The term *currency* is used in the context of AED roles and responsibilities as defined in Appendix 1 of advisory circular (AC) 120-53B and refers to the experience necessary, within a specified period of time, for the safe operation of aircraft, equipment, and systems as determined by the FSB. Currency may include but is not limited to recency of experience. With respect to flight experience, recency of experience means a pilot's completion of the required number of takeoffs and landings as sole manipulator of the controls within a specified period of time. As a reminder, a logbook or training record endorsement from an authorized training provider may be granted after the required training; Title 14 of the Code of Federal Regulations (C.F.R.) § 61.2 addresses currency in relation to exercising the privilege of an endorsement.

As part of the operational evaluation, qualified pilot test subjects are included to help identify currency tasks, procedures, or maneuvers to be included as a recommendation in the FSBR. It is important that the pilot test subjects have an appropriate background for the operational evaluation; factors such as EFVS training in accordance with 14 C.F.R. § 61.66, previous qualification in the aircraft, flight experience (including with low visibility operations), and currency should be considered. Additionally, aircraft-specific considerations for FSB operational evaluations may be required. For example, per Section 128 of the Aircraft Certification, Safety, and Accountability Act of 2020 (ACSAA) and FAA Notice 8900.684, the use of domestic and foreign air carrier pilots with varying levels of experience must be included as part of the sample of pilot test subjects for operational evaluations on certain transport airplanes.

AED personnel and qualified pilot test subjects who will manipulate the controls of an aircraft or act as pilot in command of an aircraft during an EFVS operation as a part of an operational suitability determination and/or operational evaluation must be trained in accordance with 14 C.F.R. § 61.66(a) and (b) or meet the provisions of 14 C.F.R. § 61.66(h)(2).

5.1 Overview

This chapter includes three checklists, which are largely based on but do not replace the regulations in 14 C.F.R. § 61.66 and guidance in AC 90-106B and AC 120-53B. These checklists may be used for both new and modified EFVS evaluations.

Regarding this chapter:

- AED personnel are encouraged to review the regulatory, advisory, and guidance materials provided in Table 24, Table 25, Table 26, Table 27, Table 28 and in the list of key references in the Appendix.
- If questions arise during the EFVS evaluation, AED personnel may wish to contact the FAA Flight Standards Service, Flight Technologies and Procedures Division, Flight Operations Branch (AFS-410).

5.1(a) Chapter Organization

5.1(a)(i) Checklists for Currency Recommendations

Recent flight experience is required for any pilot manipulating the controls of an aircraft or acting as the pilot in command of an aircraft during an EFVS operation conducted under 14 C.F.R. § 91.176(a) (i.e., EFVS operations to touchdown) or 14 C.F.R. § 91.176(b) (i.e., EFVS operations to 100 feet above the touchdown zone elevation [TDZE]). This recent flight experience is outlined in 14 C.F.R. § 61.66 and is used to inform the first two checklists in this chapter. Additionally, a third checklist is included for those tasks, procedures, or maneuvers that are not mandatory and not accomplished during training or checking but are still important to occasionally practice or demonstrate.

- EFVS Recent Flight Experience Required by 14 C.F.R. Part 61
- EFVS Refresher Training Required by 14 C.F.R. Part 61
- Currency for EFVS Abnormal, Non-Normal, or Emergency Procedures

5.1(b) Terminology

The following terminology and descriptions are used in the context of the *Federal Aviation Administration Aircraft Evaluation Division Operations and Human Factors Evaluation Aid for Enhanced Flight Vision Systems* and do not replace definitions provided elsewhere in FAA regulatory and guidance material.

- ***Currency.*** The term *currency* is used in the context of AED roles and responsibilities as defined in Appendix 1 of AC 120-53B and refers to the experience necessary, within a specified period of time, for the safe operation of aircraft, equipment, and systems as determined by the FSB. Currency may include but is not limited to recency of experience.
- ***Evaluation Plan (EP).*** An EP is submitted by the applicant and accepted by AED to outline the FSB's operational activities, which include crewmember training, checking, and identifying any gaps that may occur in operational suitability as a result of simulator crewmember training (e.g., equipment differences, night conditions, instrument flight rules (IFR), etc.). The EP should also include an operator differences requirements (ODR) table, in accordance with Advisory Circular (AC) 120-53, Guidance for Conducting and Use of Flight Standardization Board Evaluations, if the applicant is seeking differences credit.

- ***Modified EFVS.*** A modified EFVS refers to an EFVS that has been altered or upgraded through modification, typically to enhance performance, comply with new regulations or guidance, or fulfill a specialized mission. For FSB purposes, a modified EFVS evaluation may be for a previously certified EFVS that has received a modification to its hardware or software but is still installed in the same model of aircraft (e.g., a EFVS certified on aircraft model "X" is modified, but still installed in aircraft model "X").
- ***New EFVS.*** A new EFVS refers to a EFVS in its original design. For FSB purposes, a "new" EFVS evaluation is either (1) an EFVS that has never been certified by the FAA or (2) an EFVS that was previously certified by the FAA in a specific aircraft model and is then installed in a different aircraft model (e.g., an EFVS certified for aircraft model "X" is installed in aircraft model "Y").
- ***Operational evaluation (OE).*** An OE is an AED process to determine pilot type rating, minimum crewmember training, checking and currency requirements, and the unique or special airman certification requirements (e.g., specific flight characteristics, no-flap landing). An OE is associated with all FSBs but can also be completed as a standalone task.

5.1(c) Currency Recommendations Chapter References

Table 24.
FAA Regulations Included in the "Operational Evaluation: Currency Recommendations" Chapter

14 C.F.R. Regulations	Title
Aircraft Certification, Safety, and Accountability Act of 2020 (ACSAA)	Section 128 of ACSAA Addresses Pilot Operational Evaluation Requirements, Including the Use of Pilots from Air Carriers with Varying Levels of Experience for Transport Airplane Certification Projects
EFVS Final Rule, 81 Federal Register 90126 (December 13, 2016)	Revisions to Operational Requirements for the Use of Enhanced Flight Vision Systems (EFVSs) and to Pilot Compartment View Requirements for Vision Systems
§ 61.2	Exercise of Privilege
§ 61.66	Enhanced Flight Vision System Pilot Requirements
§ 91.176	Straight-in Landing Operations Below DA/DH or MDA Using an Enhanced Flight Vision System (EFVS) Under IFR
§ 91.189	Category II and III Operations: General Operating Rules
§ 91.1065(g)	Initial and Recurrent Pilot Testing Requirements
§ 121.427	Recurrent Training
§ 121.441	Proficiency Checks
§ 121 Appendix F	Proficiency Check Requirements
§ 125.287(g)	Initial and Recurrent Pilot Testing Requirements

14 C.F.R. Regulations	Title
§ 135.293(i)	Initial and Recurrent Pilot Testing Requirements

Table 25.
Orders Included in the "Operational Evaluation: Currency Recommendations" Chapter

Order No.	Title
Order 8900.1, Vol.4, Ch17	EFVS Operations

Table 26.
Notices Included in the "Operational Evaluation: Currency Recommendations" Chapter

Notice No.	Title
Notice 8900.684	Use of Air Carrier Pilots During Flight Standardization Board Evaluations for Transport Airplanes

Table 27.
Advisory Circulars Included in the "Operational Evaluation: Currency Recommendations" Chapter

AC No.	Title
AC 90-106B	Enhanced Flight Vision System Operations
AC 120-53B	Guidance for Conducting and Use of Flight Standardization Board (FSB) Evaluations
AC 120-118	Criteria for Approval/Authorization of All Weather Operations for Takeoff, Landing, and Rollout

Table 28.
Other Technical Resources Included in the "Operational Evaluation: Currency Recommendations" Chapter

Resource	Title
Published FSB Reports	Published FSB and Equipment Operational Suitability Reports (OSR)

5.2 Pilot Currency Recommendations Checklists for New or Modified EFVS Evaluations

Currency Checklist Overview and Instructions

14 C.F.R. § 61.66 contains currency requirements for performing EFVS operations, though additional tasks, maneuvers, or procedures may also be recommended. The checklists in this chapter will aid AED personnel in determining currency recommendations specific to the aircraft and EFVS combination. These checklists may be used for both new and modified EFVS.

This chapter includes checklists for 14 C.F.R.:

- EFVS Recent Flight Experience Required by 14 C.F.R. Part 61
- EFVS Refresher Training Required by 14 C.F.R. Part 61
- Currency for EFVS Abnormal, Non-Normal, or Emergency Procedures

For each checklist item:

1. Consider EFVS tasks, maneuvers, or procedures;
2. Select the appropriate “yes” or “no” response; and
3. Provide details on the items and the frequency that they should be performed.

For each checklist, AED personnel should consider EFVS tasks, procedures, or maneuvers specific to Category II and Category III combined operations. For current information, consult with FAA Flight Technologies and Procedures Division, Flight Operations Branch (AFS-410).

5.2.1 EFVS Recent Flight Experience Required by 14 C.F.R. Part 61

1 EFVS Recent Flight Experience Required by Part 61	
14 C.F.R. § 61.66(d) states that no person may manipulate the controls of an aircraft during an EFVS operation or act as pilot in command of an aircraft during an EFVS operation unless, within six calendar months preceding the month of the flight, that person performs and logs six instrument approaches as the sole manipulator of the controls using an EFVS under any weather conditions in the category of aircraft for which the person seeks the EFVS privilege. The instrument approaches may be performed in day or night conditions; and one approach must terminate in a full stop landing; and for persons authorized to exercise the privileges of 14 C.F.R. § 91.176(a), the full stop landing must be conducted using the EFVS. However, exceptions to the recency of experience requirements are provided in 14 C.F.R. § 61.66(h).	
After reviewing 14 C.F.R. § 61.66 (especially paragraphs [d] and [h]), and reviewing the "Operational Evaluation: Training Recommendations" chapter and the "Operational Evaluation: Checking Recommendations" chapter of this evaluation aid, are there any additional EFVS tasks, maneuvers, or procedures that should be performed to maintain currency specific to the aircraft and EFVS combination? (Select One)	**If yes, what are they and how often should they be performed? (Specify)**
☐ Yes ☐ No	

Primary References: § 61.2; § 61.66; AC 90-106B; AC 120-53B
Secondary References: EFVS Final Rule; § 91.176; § 91.189; § 91.1065(g); § 121.427; § 125.287(g); § 135.293(i); Order 8900.1, Vol.4, Ch17; AC 120-118

5.2.2 EFVS Refresher Training Required by 14 C.F.R. Part 61

2	EFVS Refresher Training Required by Part 61
14 C.F.R. § 61.66(e) addresses EFVS Refresher Training. In the event that the recency intervals outlined in 14 C.F.R. § 61.66(d) are allowed to lapse, a person may reestablish EFVS currency by satisfactorily completing an approved EFVS refresher course in the category of aircraft for which the person seeks the EFVS privilege. The EFVS refresher course must consist of the subjects and tasks included in ground training 14 C.F.R. § 61.66(a)(2) and flight training 14 C.F.R. § 61.66(b)(2). However, exceptions to the refresher training requirements are provided in § 61.66(h).	
After reviewing 14 C.F.R. § 61.66 (especially paragraphs [a] [b] [e] and [h]), and the "Operational Evaluation: Training Recommendations" chapter and "Operational Evaluation: Checking Recommendations" chapter of this evaluation aid, are there any additional EFVS tasks, maneuvers, or procedures specific to the aircraft and EFVS combination that should be performed as part of a refresher training course? (Select One)	**If yes, what are they and how often should they be performed? (Specify)**
☐ Yes ☐ No	

Primary References: *§ 61.2*; *§ 61.66*; *AC 90-106B*; *AC 120-53B*
Secondary References: *EFVS Final Rule*; *§ 91.176*; *§ 91.189*; *§ 91.1065(g)*; *§ 121.427*; *§ 125.287(g)*; *§ 135.293(i)*; *Order 8900.1, Vol.4, Ch17*; *AC 120-118*

5.2.3 Currency for EFVS Abnormal, Non-Normal, or Emergency Procedures

3	Currency for EFVS Abnormal, Non-Normal, or Emergency Procedures
AC 120-53B indicates that although checking addresses competency for non-normal maneuvers or procedures, there may be abnormal, non-normal, or emergency maneuvers or procedures that are not mandatory for checking or training. In this situation, it may be necessary to periodically practice or demonstrate those maneuvers or procedures even though it is not required to complete them during each check. In such instances, the FSB may specify a currency recommendation for training or checking applicable to abnormal, non-normal, or emergency maneuvers or procedures that are to be performed. This is to ensure that extended periods of time do not elapse in a series of repeated training and checking events in which significant maneuvers or procedures may never be accomplished.	
Are there any EFVS abnormal, non-normal, or emergency procedures that are not mandatory and not accomplished during training or checking but are still important to occasionally practice or demonstrate? (Select One)	**If yes, what are they *and* how often should they be performed? (Specify)**
☐ Yes ☐ No	

Primary References: § 61.2; § 61.66; AC 90-106B; AC 120-53B
Secondary References: EFVS Final Rule; § 91.176; § 91.189; § 91.1065(g); § 121 Appendix F; § 121.427; § 121.441; § 125.287(g); § 135.293(i); Order 8900.1, Vol.4, Ch17; AC 120-118

Appendix

Key References for the Federal Aviation Administration Aircraft Evaluation Division Operations and Human Factors Evaluation Aid for Enhanced Flight Vision Systems

This appendix contains a list of key references that Aircraft Evaluation Division (AED) personnel may find helpful to prepare for and accomplish an Enhanced Flight Vision System (EFVS) operational suitability evaluation or operational evaluation. These key references include FAA regulations, orders, notices, information for operators (InFO), safety alerts for operators (SAFOs), advisory circulars (ACs), and other technical resources.

Regulations

14 C.F.R. Regulations	Title	Purpose
EFVS Final Rule, 81 Federal Register 90126 (December 13, 2016)	Revisions to Operational Requirements for the Use of Enhanced Flight Vision Systems (EFVSs) and to Pilot Compartment View Requirements for Vision Systems	The final rule contains the preamble explaining the rule. This final rule permits operators to use an EFVS in lieu of natural vision to continue descending from 100 feet above the touchdown zone elevation (TDZE) to the runway and to land on certain straight-in IAPs under instrument flight rules (IFR). This final rule also revises and relocates the regulations that permit operators to use an EFVS in lieu of natural vision to descend to 100 feet above the TDZE using certain straight-in IAPs. Additionally, this final rule addresses provisions that permit operators who conduct EFVS operations under parts 121, 125, or 135 to use EFVS-equipped aircraft to dispatch, release, or takeoff under instrument flight rules (IFR) and revises the regulations for those operators to initiate and continue an approach when the destination airport weather is below authorized visibility minimums for the runway of intended landing. This final rule establishes pilot training and recent flight experience requirements for operators who use EFVS in lieu of natural vision to descend below the decision altitude (DA)/decision height (DH) or minimum descent altitude (MDA). This final rule also revises pilot compartment view certification requirements for vision systems using a transparent display surface located in the pilot's outside field of view.

14 C.F.R. Regulations	Title	Purpose
§ 1.1	Definitions and Abbreviations	This rule provides definitions and abbreviations, including those for EFVS operations, enhanced flight visibility, and Enhanced Flight Vision Systems (EFVSs).
§ 25.773(e)(3)	Personnel and Cargo Accommodations: Pilot Compartment View	This rule provides requirements for the pilot compartment view, which includes vision systems with transparent displays.
§ 60	Flight Simulation Training Device Initial and Continuing Qualification and Use	This rule provides descriptions for flight training devices and flight simulators and includes information that may be helpful for differentiating among Levels A, B, C, and D flight simulators or Levels 4, 5, 6, and 7 flight training devices. For the purposes of EFVS operational evaluations, § 60.15 describes the initial qualification of a simulator to include subsystems (e.g., EFVS) of the aircraft it's simulating.
§ 61.2	Exercise of Privilege	This rule addresses validity and currency, including recency requirements for exercising privileges of an airman certificate, rating, endorsement, or authorization.
§ 61.58	Pilot-in-Command Proficiency Check: Operation of an Aircraft That Requires More Than One Pilot Flight Crewmember or is Turbojet-Powered	This rule addresses pilot-in-command proficiency checks for operations of an aircraft that require more than one pilot or is turbojet powered.
§ 61.66	Enhanced Flight Vision System Pilot Requirements	This rule provides the ground training, flight training, supplementary training, recent flight experience, and refresher training requirements for pilots to conduct EFVS operations.
§ 91.176	Straight-in Landing Operations Below DA/DH or MDA Using an Enhanced Flight Vision System (EFVS) Under IFR	This rule contains the operating rules for EFVS operations to touchdown and rollout and for EFVS operations to 100 feet above the TDZE. It addresses equipment requirements, operating requirements, and visibility and visual reference requirements. It states that each required pilot flight crewmember must have adequate knowledge of and familiarity with the aircraft, the EFVS, and the procedures to be used.
§ 91.189	Category II and III Operations: General Operating Rules	This rule contains the operating rules for Category II and Category III operations; paragraphs (d) and (e) reference § 91.176.

14 C.F.R. Regulations	Title	Purpose
§ 91.905	List of Rules Subject to Waivers	This rule contains a list of the rules that are subject to waivers, which includes § 91.176.
§ 91.1039	IFR Takeoff, Approach and Landing Minimums	This rule addresses IFR takeoff, approach, and landing minimums; § 91.1039(e) permits part 91 subpart K operators to conduct takeoff operations using EFVS when the visibility is less than 600 feet. This rule references § 91.176.
§ 91.1065(b)	Initial and Recurrent Pilot Testing Requirements	This rule provides initial and recurrent pilot testing requirements for part 91 subpart K operations.
§ 91.1065(g)	Initial and Recurrent Pilot Testing Requirements	This rule provides initial and recurrent pilot testing requirements for part 91 subpart K operations.
§ 121 Appendix F	Proficiency Check Requirements	Appendix F to part 121 provides maneuvers and procedures required for a pilot proficiency check and addresses EFVS required checking, such as the amount and type of EFVS instrument approaches; see subdivisions III.(c)(5), V.(g), and V.(h).
§ 121.419	Pilots and Flight Engineers: Initial, Transition and Upgrade Ground Training	This rule addresses upgrade ground training for pilots and flight engineers, which includes instruction applicable to their assigned duties (e.g., EFVS operations).
§ 121.422	Aircraft Dispatchers: Initial and Transition Ground Training	This rule addresses initial and transition ground training for aircraft dispatchers and includes instruction applicable to their assigned duties, which may include EFVS operability and dispatch procedures.
§ 121.427	Recurrent Training	This rule addresses recurrent training requirements.
§ 121.441	Proficiency Checks	This rule provides the requirements for pilot proficiency checks and references § 121 Appendix F.
§ 121.651	Takeoff and Landing Weather Minimums: IFR: All Certificate Holders	This rule addresses EFVS operations and references § 91.176.
§ 125.287(g)	Initial and Recurrent Pilot Testing Requirements	This rule provides initial and recurrent pilot testing requirements for Part 125 operations.
§ 125.325	Instrument Approach Procedures and IFR Landing Minimums	This rule addresses instrument approach procedures and references § 91.176.
§ 125.381	Takeoff and Landing Weather Minimums: IFR	This rule addresses EFVS operations and references § 91.176.

14 C.F.R. Regulations	Title	Purpose
§ 135.225(j)	IFR: Takeoff, Approach and Landing Minimums	This rule addresses EFVS operations and references § 91.176.
§ 135.293(i)	Initial and Recurrent Pilot Testing Requirements	This rule provides initial and recurrent pilot testing requirements for Part 135 operations.

Orders

Order No.	Title	Purpose
Order 8110.4C CHG 6	Type Certification	This order sets procedures for evaluating and approving aircraft, engine, and propeller type design data and changes to approved type design data.
Order 8110.52B	Type Validation and Post-Type Validation Procedures	This order defines the policy and procedures to issue a type certificate (TC) for a product (aircraft, aircraft engine, or propeller as defined in Title 14 of the Code of Federal Regulations (14 C.F.R.) 21.1 or a supplemental type certificate (STC) for a major change to a product as well as approving follow-on changes to these certificates, when the United States is not the State of Design pursuant to 14 C.F.R. 21.29.
Order 8260.3G	United States Standard for Terminal Instrument Procedures (TERPS)	This order prescribes standardized methods for designing and evaluating instrument flight procedures (IFPs) in the United States and its territories. It is to be used by all personnel responsible for the preparation, approval, and promulgation of IFPs. These criteria are predicated on normal aircraft operations and performance.
Order 8430.21A	Flight Standards Division, Aircraft Certification Division and Aircraft Evaluation Group Responsibilities	This order provides supplemental instructions and guidelines for regional Flight Standards Divisions, Aircraft Certification Divisions, and Aircraft Evaluation Groups assigned aircraft certification and operational evaluation responsibilities.
Order 8900.1, Vol.3, Ch32, Sec.5	Manuals, Procedures, and Checklists for 14 C.F.R. PARTS 91K, 121, 125, AND 135: Flight Manuals for Parts 121 and 135	This section contains direction and guidance to be used by principal operations inspectors (POIs) in the evaluation of flight manuals for Title 14 of the Code of Federal Regulations (14 C.F.R.) parts 121 and 135 operators.

Order No.	Title	Purpose
Order 8900.1, Vol.4, Ch17	Enhanced Flight Vision System (EFVS) Operations	This order provides references, information, and guidance for principal inspectors (PIs) and supporting aviation safety inspectors (ASIs) to perform an evaluation of an operator's application for the initial issuance or amendment to operations specification (OpSpec)/management specification (MSpec)/Letter of Authorization (LOA) C048.
Order 8900.1, Vol.8, Ch2, Sec. 3	Flight Operations Evaluation Board	This section establishes the Federal Aviation Administration (FAA) Flight Standards Service (AFS) policy guidance for the establishment and conduct of the Aircraft Evaluation Group (AEG) Flight Operations Evaluation Board (FOEB). The FOEB develops and maintains each aircraft's Master Minimum Equipment List (MMEL).

Notices

Resource	Title	Purpose
Notice 8900.684	Use of Air Carrier Pilots During Flight Standardization Board Evaluations for Transport Airplanes	This notice provides information and guidance to the Aircraft Evaluation Division (AED) (AFS-100) regarding the use of domestic and foreign air carrier pilots during Flight Standardization Board (FSB) operational evaluations. Based on the implementation of Section 128 of the Aircraft Certification, Safety, and Accountability Act of 2020 (ACSAA), the FSB's procedures must now include the use of air carrier pilots of varying levels of experience for transport airplane-type certification projects.
Notice 8900.650	Clarification on the Operational Evaluation Process	This notice provides information and guidance to the Aircraft Evaluation Division (AED) on the FSB Operational Evaluation (OE) Policy Initiative resulting from the Air Carrier Training Aviation Rulemaking Committee (ACT ARC) and the Flight Standardization Board Workgroup (FSB WG) recommendations on OE.

Information for Operators

Resource	Title	Purpose
InFO 11004	Enhanced Flight Vision System (EFVS), Enhanced Vision Systems (EVS), and Night Vision Goggles (NVG) Compatibility with Light-Emitting Diodes (LEDs) at Airports and on Obstacles	This Information for Operators (InFO) advises operators that LED lights are significantly less visible than traditional incandescent lightbulbs when viewed through EFVS, EVS, and NVG.

Safety Alerts for Operators

Resource	Title	Purpose
SAFO 09011	Parts 121 and 135 Operators: Constant Angle of Descents Techniques for Nonprecision Approaches	Operator training programs should develop and implement procedures for the use of constant angle of descent techniques during non-precision approach procedures. The use of constant angle of descent techniques should be a focal point during all flight crew training, testing, and checking.
SAFO 09016	Rejected Landing Due to Loss of Visibility	The purpose of this safety alert for operators (SAFO) is to emphasize to operators and flight crews the importance of recognizing and acting on rapidly deteriorating weather conditions in regard to landings.
SAFO 10005	Go-around Callout and Immediate Response	The purpose of this SAFO is to recommend that all operators should provide written policy to flight crews emphasizing that either pilot may make a go-around callout and that the response to a go-around callout is an immediate missed approach.
SAFO 11009 and SAFO 17011	Runway Status Lights (RWSL)	These SAFOs serve to ensure that aircraft operators, pilots, and airport personnel are aware of the installation, meaning, and use of RWSLs. Note that the perceived color of RWSLs may be affected by the EFVS and that light-emitting diode (LED)–based RWSL may not be displayed on an EFVS display.
SAFO 15011	Roles and Responsibilities for Pilot Flying (PF) and Pilot Monitoring (PM)	This SAFO encourages operators to define roles and responsibilities for the PF and PM.
SAFO 15004	Scenario-Based Go-Around Training	This SAFO encourages air carriers to incorporate scenario-based go-around training into pilot training curricula.

Resource	Title	Purpose
SAFO 21007	Risk of Potential Adverse Effects on Radio Altimeters when Operating in the Presence of 5G C-Band Interference	This SAFO provides information and guidance to operators regarding the risk of potential adverse effects on radio altimeters when operating in the presence of 5G C-Band wireless broadband signals.

Advisory Circulars

AC Number	Title	Purpose
AC 20-167A	Airworthiness Approval of Enhanced Vision System, Synthetic Vision System, Combined Vision System, and Enhanced Flight Vision System Equipment	This advisory circular (AC) provides guidance for gaining airworthiness approval for enhanced and synthetic vision systems in aircraft. Specifically, it provides one acceptable means for complying with 14 C.F.R. Part 23, 25, 27, or 29 airworthiness regulations when installing a synthetic vision system (SVS), enhanced vision system (EVS), combined vision system (CVS), or enhanced flight vision system (EFVS) in an airplane or rotorcraft.
AC 25-11B	Electronic Flight Displays	This advisory circular (AC) provides guidance for showing compliance with certain requirements of Title 14, Code of Federal Regulations part 25 for the design, installation, integration, and approval of electronic flight deck displays, components, and systems installed in transport category airplanes. Revision B adds appendices F and G to the original AC and updates references to related rules and documents.
AC 25.1581-1	Airplane Flight Manual (AFM)	The primary purpose of the Federal Aviation Administration (FAA)–approved transport category AFM is to provide an authoritative source of information considered necessary for safely operating the airplane. AC identifies the information that must be provided in the AFM under the airworthiness regulations and provides guidance as to the form and content of the approved portion of an AFM.
AC 61-65H, Appendix	Enhanced Flight Vision Systems Training Endorsements	This AC provides guidance for pilot and instructor applicants, pilots, flight instructors, ground instructors, and examiners on the certification standards, knowledge test procedures, and other requirements in Title 14 of the Code of Federal Regulations (14 C.F.R.) part 61. Appendix provides sample endorsements to use for EFVS ground training, EFVS flight training, EFVS ground

AC Number	Title	Purpose
		and flight training, and EFVS supplementary training.
AC 90-106B	Enhanced Flight Vision System Operations	This AC provides an overview of the EFVS operation to 100 feet above the touchdown zone elevation (TDZE) and the EFVS operation to touchdown and rollout, as well as the EFVS training, checking, and recent flight experience necessary to conduct the operations. In addition, it includes a means for obtaining an EFVS authorization, developing an EFVS training curriculum, and using EFVS operational credit.
AC 120-118	Criteria for Approval/Authorization of All Weather Operations for Takeoff, Landing, and Rollout	This AC provides an acceptable means, but not the only means, for obtaining and maintaining authorization of operations in Category (CAT) I, CAT II, and CAT III landing weather minima and instrument flight rules (IFR) lower-than-standard takeoff minima. It also addresses operations utilizing EFVS and SVGS during All Weather Operations (AWO) operations, as well as operations involving hybrid approach and landing systems.
AC 120-53B	Guidance for Conducting and Use of Flight Standardization Board (FSB) Evaluations	This AC provides a means, but not the only means, of evaluating manufactured or modified aircraft by the use of standard systems, processes, and tests necessary to determine pilot training and qualification requirements. It also describes an acceptable means, but not the only means, of compliance with applicable Title 14 of the Code of Federal Regulations (14 C.F.R.) that provide for differences in training and qualification between aircraft with the same type certificate (TC).
AC 120-57C	Surface Movement Guidance and Control System	This AC describes the standards and provides guidance in the development of a Surface Movement Guidance and Control System (SMGCS) plan for U.S. airports where scheduled Air Carriers are authorized to conduct operations when the visibility is less than 1200 feet runway visual range (RVR). An SMGCS plan facilitates the safe movement of aircraft and vehicles on the airport by establishing more rigorous control procedures and requiring enhanced visual aids.

AC Number	Title	Purpose
AC 120-71B	Standard Operating Procedures and Pilot Monitoring Duties for Flight Deck Crewmembers	This AC provides guidance for the design, development, implementation, evaluation, and updating of standard operating procedures (SOPs) and for pilot monitoring (PM) duties.
AC 120-123	Flightpath Management	This AC provides guidance and recommended practices for operators to implement operational procedures and training for the planning, execution, and assurance of the guidance and control of aircraft trajectory and energy. This is known as flightpath management (FPM).
AC 150/5340-1M	Standards for Airport Markings	This AC change contains the Federal Aviation Administration (FAA) standards for markings used on airport runways, taxiways, and aprons.

Additional Resources

Resource	Title	Purpose
ACSAA	Aircraft Certification, Safety, and Accountability Act of 2020 (ACSAA)	Section 128 of ACSAA addresses Pilot Operational Evaluation requirements, including the use of pilots from air carriers with varying levels of experience for transport airplane certification projects.
DOT Technical Reports Database	United States Department of Transportation (DOT) National Transportation Library	This database provides access to DOT technical reports and can be searched for scientific references related to Enhanced Flight Vision Systems (EFVSs).
FAA AIM	Aeronautical Information Manual (AIM)	Chapter 5 addresses the use of EFVSs on Instrument Approaches and provides a general description of EFVS operations ([a] and [b]), equipment and operating requirements, pilot and visibility/visual requirements, and other topics relevant to EFVSs (e.g., LED lighting).
FAA Air Transportation Job Task Analysis (AT JTA) 4.1.201	Conduct a Flight Operations Evaluation Board (FOEB)	An FOEB is a technically qualified group of specialists responsible for matters related to a particular aircraft. The board's responsibility is to develop and revise a Master Minimum Equipment List (MMEL) for that aircraft. This process is intended for formal and "electronic" FOEBs.

Resource	Title	Purpose
FAA Air Transportation Job Task Analysis (AT JTA) 4.1.202	Conduct a Flight Standardization Board (FSB) Evaluation	A Flight Standardization Board (FSB) determines the pilot type rating; pilot training, checking, and currency requirements; and operational suitability/acceptability for both new and modified aircraft.
FAA Air Transportation Job Task Analysis (AT JTA) 4.1.205	Federal Aviation Administration Aircraft Evaluation Division Evaluate an Aircraft Flight Manual	The purpose of this Job Task Analysis (JTA) is to define the performance factors and evaluation criteria for operational suitability of submitted aircraft flight manual/rotorcraft flight manual/pilot operating handbook documents or supplements thereto. The minimum requirements for both original and supplemental documents are identified within this JTA, and the steps to complete the function are defined.
FAA Air Transportation Job Task Analysis (AT JTA) 4.1.209	Conduct a Foreign Aircraft Validation	Type validation is a special form of aircraft certification used to establish compliance of a foreign-manufactured aircraft with U.S. airworthiness standards. During the type of validation process, AEG operations inspectors assigned to the aircraft provide operational expertise to the foreign aircraft manufacturer. Their primary goal is to ensure that the aircraft is “Operationally Acceptable/Suitable” for U.S. operations in accordance with the Operational Rules of Title 14 of the Code of Federal Regulations (14 C.F.R.). Some Foreign Civil Aviation Authorities (FCAAs) have different operational requirements. An inspector should be prepared to address these differences and be able to provide information from appropriate 14 C.F.R. sections.
FAA Air Transportation Job Task Analysis (AT JTA) 4.1.217	Develop and Process Aircraft Evaluation Division (AED) Issue Papers	Issue Papers provide a means for identifying and resolving significant technical, regulatory, and administrative issues occurring during the certification process. Issue Papers are primarily intended to provide an overview of significant issues, a means of determining the status of issues, and a basis for a postcertification summary statement.

Resource	Title	Purpose
FAA Air Transportation Job Task Analysis (AT JTA) 4.1.218	Conduct an Operational Evaluation with Foreign Regulatory Authorities	This JTA describes the process used when: 1. The FAA is invited by the aircraft manufacturer to participate in an operational evaluation of an aircraft manufactured and certified in a foreign country OR 2. Foreign regulatory authorities are invited by a U.S. aircraft manufacturer to participate in an FAA operational evaluation of an aircraft manufactured and certified in the United States Examples of these evaluations include determinations of pilot type rating requirements, developing specifications for crewmember training, checking or currency, evaluation of MMEL relief proposals, or evaluating other technologies, such as Electronic Flight Bag (EFB), Enhanced Vision Systems (EVSs), and Head-Up Display (HUD).
FAA Flight Standards AFS-410 EFVS Resource Page	FAA Flight Technologies and Procedures Division, Flight Operations Branch (AFS-410) EFVS Resource Page	This FAA Flight Standards EFVS resource website provides an overview of FAA regulations for EFVS operations, guidance documents, the EFVS newsletter, and additional information.
FAA FSB EFVS OSR	Operational Credit for Enhanced Flight Vision Systems (EFVS)	This Operational Suitability Report (OSR) supports the authorization of EFVS operational credit in Operations Specification (OpSpec) C048, Enhanced Flight Vision System Operations, and contains recommendations for EFVS operational credit provided by the Flight Technologies and Procedures Division (AFS-410).
FAA-H-8083-16B	Instrument Procedures Handbook (IPH)	The IPH is designed as a technical reference for all pilots who operate under instrument flight rules (IFR) in the National Airspace System (NAS) and includes a description of EFVS operations.
FAA OAM Technical Reports Database	FAA Aerospace Medicine Technical Reports Database	This database provides access to FAA Office of Aerospace Medicine technical reports and can be searched for scientific references related to EFVSs.

Resource	Title	Purpose
FAA Published FSB Reports	Published Flight Standardization Board Reports (FSBRs)	The FAA Dynamic Regulatory System (DRS) contains completed FSBRs and OSRs, including completed AED EFVS evaluations.
FAA Practical Test Standards	Practical Test Standards (PTS)	The Flight Standards Service of the Federal Aviation Administration (FAA) has developed the PTS to be used by examiners. Instructors are expected to use the PTS when preparing applicants for practical tests. Applicants should refer to these standards during their training.
FAA Airman Certification Standards	Airman Certification Standards (ACS)	These FAA ACS documents communicate the aeronautical knowledge, risk management, and flight proficiency standards for the instrument rating, airline transport pilot (ATP) certification, and type rating certification in the airplane category and the following classes: single-engine land, single-engine sea, multiengine land, and multiengine sea.
RTCA SC-213	Enhanced Flight Vision Systems and Synthetic Vision Systems (EFVS/SVS)	This RTCA Special Committee (SC) develops the Minimum Aviation Performance Standards (MASPS)–level guidance for SVS, EFVS, EVS, and combined architectures to identify intended operations and systems architectures and enable the development of Minimum Operational Performance Standards (MOPS) and DO-315B, Minimum Aviation System Performance Standards (MASPS) for EVS, SVS, Combined Vision Systems (CVS) and EFVS.