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Operational Suitability Report (OSR)

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Operational Credit for Enhanced Flight Vision Systems (EFVS)

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RECORD OF REVISIONS

Revision Number	Sections	Date	Administrator
0 (Original)	All	07/02/2018	C. McLellan
1	1, 2, 3, 4, 5, and Appendix 1	08/22/2018	C. McLellan
2	All	01/31/2020	C. McLellan

HIGHLIGHTS OF CHANGE

- 0. Original Document; all Sections.
- 1. Changed “EFVS Minimum Visibility” to “Minimum Visibility for Use with EFVS” throughout Sections 1-3, deleted paragraph 3.2, changed values in table in Section 5 from fractions to percentages, added part 129 to lists of affected operators, and added Kollsman EVS-SP, Kollsman EVS-II, and Kollsman EVS-I system performance information to Appendix 1.
- 2. Removed content from Sections 1-6 that had a potential to conflict with the efforts of the Aircraft Certification Service to standardize the methodology for quantifying visual advantage. Updated recommendations for EFVS operational credit to include recommendations for Collins EVS-3000, Collins EVS-3600, CMC CMA-2600, CMC CMA-2700, and Elbit/Universal Avionics EVS5000. Updated EVS-II aircraft installations to include MD-11, MD-10, B-777, B-767, and B-757. Added Appendix 2 about collecting feedback from pilots conducting EFVS operations and Appendix 3 about potential aircraft and EFVS sensor combinations.

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1. PURPOSE.

1.1 This Operational Suitability Report (OSR) provides an overview of quantified enhanced flight vision system (EFVS) visual advantage and EFVS operational credit.

1.2 This OSR includes a list of known sensors and the recommendations for selecting EFVS operational credit in operations specifications (OpSpecs) for EFVS operations (OpSpec C048, *Enhanced Flight Vision System (EFVS) Operations*) for Title 14 of the Code of Federal Regulations (14 CFR) parts 121, 125, 129, and 135.

1.3 This OSR includes instructions for participating in a voluntary Federal Aviation Administration (FAA) program to collect feedback from pilots conducting EFVS operations.

1.4 This OSR does not provide methodology for quantifying visual advantage.

1.5 This OSR does not provide training, checking, or currency information for an EFVS.

Note: The Flight Technologies and Procedures Division reserves responsibility and authority to reevaluate and modify sections of this report. This OSR will be published until such time the Flight Technologies and Procedures Division determines the operation concepts and guidance for the authorization of EFVS operational credit have sufficiently matured to a point where it is no longer necessary. Direct questions, comments, and change proposals about this document to the Flight Technologies and Procedures Division.

2. AUDIENCE.

2.1 FAA Principal Operations Inspectors (POI) evaluating applications for OpSpec C048 that authorize provisions using EFVS operational credit.

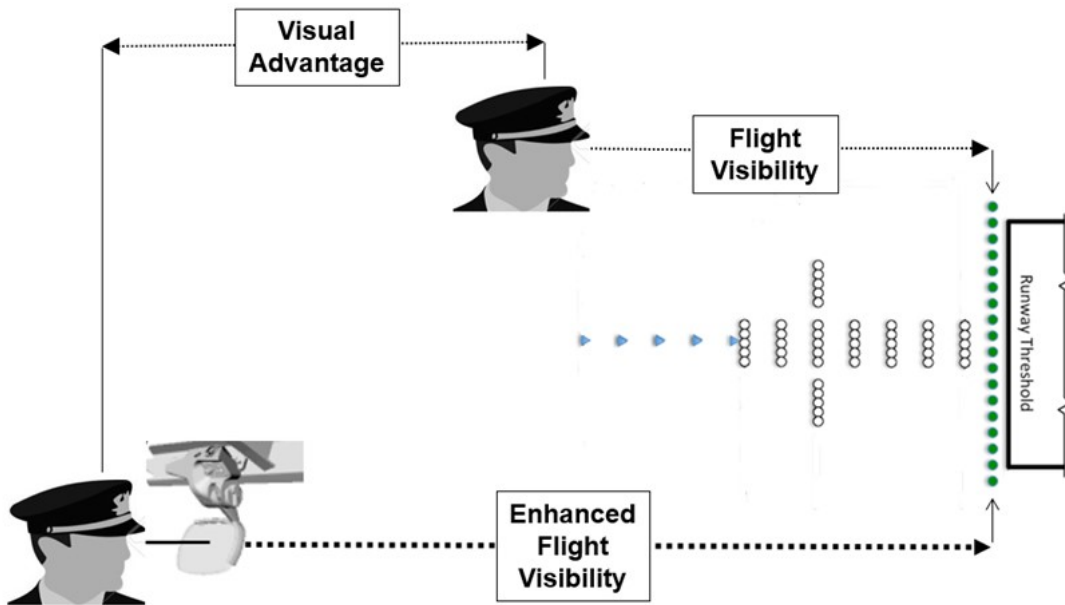
2.2 Persons preparing an application for OpSpec C048 seeking to authorize provisions using *EFVS Operational Credit* in part 121, 125, 129, or 135 operations.

3. OPERATIONAL CONCEPT.

Parts 121, 125, 129, and 135 operators with the appropriate provisions authorized in OpSpec C048 may use an EFVS to meet certain flight visibility requirements. Operational concepts supporting these provisions require a specific demonstration of EFVS performance (visual advantage). The visual advantage is then used to support the use of operational credit (EFVS operational credit) to allow the EFVS to meet a portion of required flight visibility for purposes of releasing a flight or beginning an approach. The greater the visual advantage an EFVS sensor demonstrates may enable an operator to release a flight or begin an approach in lower forecast or reported visibilities. The authorization to use EFVS operational credit to release a flight or begin approaches is authorized through the operational application process for OpSpec C048.

4. QUANTIFIED VISUAL ADVANTAGE.

4.1 Visual advantage is a measure of EFVS performance. The visual advantage is the difference between the distance a pilot can see using an EFVS (enhanced flight visibility) compared to the distance the pilot can see without the use of the EFVS (flight visibility). The visual advantage measurement supports an operational concept designed to increase the likelihood the pilot will be able to identify the required visual references when conducting an EFVS operation.



4.2 The responsible Aircraft Certification Service offices evaluate flight test methodology and data used to quantify visual advantage. The responsible Aircraft Certification Service offices are supported by the Aircraft Evaluation Division and the Flight Technologies and Procedures Division to provide an operational perspective to ensure the visual advantage data supports the operational concepts.

5. EFVS OPERATIONAL CREDIT.

5.1 EFVS operational credit is a credit for that portion of the flight visibility requirements that is satisfied by the enhanced image provided by an EFVS.

5.2 EFVS operational credit is selectable and available in OpSpec C048 for parts 121, 125, 129, and 135 operators. It is used to determine the minimum authorized visibilities required to depart to a destination or begin an instrument approach.

5.3 The Flight Technologies and Procedures Division, with the assistance of the appropriate Aircraft Evaluation Group (AEG), makes recommendations for EFVS operational credit based on a quantified EFVS sensor performance determined from data supporting the operational concepts.

APPENDIX 1

EFVS SENSORS AND RECOMMENDATIONS FOR OPERATIONAL CREDIT

This appendix documents the recommendations of the Flight Technologies and Procedures Division for selecting EFVS operational credit in OpSpec C048 for installed EFVS sensors. If an installed EFVS sensor is not included in this report, the Flight Technologies and Procedures Division has no recommendations regarding that sensor.

The Flight Technologies and Procedures Division EFVS Focal Point should be contacted at (202) 267-4363 to answer any questions about the recommendations in this appendix.

The Flight Technologies and Procedures Division may revise these recommendations based on the receipt of additional sensor performance data.

Sensors utilizing only infrared (IR) technology may not be able to provide a visual advantage in identifying required visual references that use light-emitting diode (LED) lighting. Operators should be aware of this limitation when operating in this environment.

EFVS Sensors

Kollsman EVS-SP (EVS-III)
Recommended EFVS Operational Credit: 33%
Applicable Installations: G500, G600

Kollsman EVS-II
Recommended EFVS Operational Credit: 33%
Applicable Installations: G280, G450, G550, G650, MD-11, MD-10, B-777, B-767, B-757

Kollsman EVS-I
Recommended EFVS Operational Credit: 25%
Note: The recommendation for the EVS-I sensor is based on operational data provided to the Flight Technologies and Procedures Division that is not consistent with current visual advantage performance testing criteria, but was sufficient to justify operational credit.
Applicable Installations: Gulfstream Aircraft

Elbit/Universal Avionics EVS5000
Recommended EFVS Operational Credit: 33%
Applicable Installations: Dassault Falcon 8X, F2000 series and F900 series (The EVS5000 can be identified as the Dassault FalconEye on these aircraft).

Collins EVS-3600
Recommended EFVS Operational Credit: 33%
Applicable Installations: Bombardier Global 7500

Collins EVS-3000, CMC CMA-2600, CMC CMA-2700
Recommended EFVS Operational Credit: The Flight Technologies and Procedures Division did not receive or evaluate visual advantage performance data for these sensors prior to the publication of this report. More data is required to be eligible for EFVS operational credit.
Applicable Installations: Embraer 550, some Bombardier aircraft, some Dassault aircraft

APPENDIX 2

EFVS PERFORMANCE FEEDBACK

The FAA is interested in collecting feedback from pilots conducting EFVS operations. The information will be used to evaluate the effectiveness of operational concepts as well as to identify areas where EFVS operational credit can be expanded.

The Civil Aerospace Medical Institute developed a tablet application to allow pilots to input data related to the EFVS operation and database to store, consolidate, and filter the information for future analysis. Pilots with the application downloaded on their tablets will be able to easily transmit information about their experience during an EFVS operation to the database.

Sample Tablet Application

The screenshot shows a tablet application interface for reporting EFVS performance. At the top, it displays the title "Cloud-based Testing Operations Performance Synergies at CAMI" and logos for the Federal Aviation Administration, the Civil Aerospace Medical Institute, and EFVS. The interface includes several input fields and buttons:

- Airport ID:** A dropdown menu with "KDCA" selected and a "Clear" button.
- Landing Time / Approach Time:** A dropdown menu with "UTC: Oct 04 14:53" selected, a "Local: Oct 04 10:53" display, and a "Clear" button.
- Aircraft Type:** A dropdown menu with a red asterisk and a "Clear" button.
- Type of Ops:** A dropdown menu with "Part 121" selected and a "Clear" button.
- Approach procedure used:** A dropdown menu with "ILS OR LOC RWY 01" selected and a "Clear" button.
- Published RVR or Visibility minimums used:** A dropdown menu with "1400 ft" selected, an "or" option, and a "Clear" button.
- Operation Status:** Two buttons: "Landed" (highlighted in green) and "Missed Approach" (with a "Clear" button).
- Reason for missed approach:** A dropdown menu with "Select reason for missed approach" and a "Clear" button.
- Missed approach remarks:** A text input field with a "Clear" button.

At the bottom, there are two buttons: "Reported" and "Observed" (with a question mark icon). A disclaimer on the right side of the screen reads: "Disclaimer: The NACO approach chart is provided for visibility minimums reference only. The visibility minimums are identical to Jeppesen charts." Below the disclaimer is a small image of an approach chart.

Although participation is voluntary, the FAA hopes that EFVS users will recognize the mutual benefits of collecting such information since any one pilot might experience only a few EFVS operations annually. Thus, a collective effort by all EFVS users will provide meaningful data to be used in future operational credit policy development.

If you are interested in participating, please contact the Flight Technologies and Procedures Division EFVS Focal Point at (202) 267-4363.

APPENDIX 3

AIRCRAFT AND EFVS COMBINATIONS

This appendix contains information regarding potential aircraft and EFVS sensor combinations. The tables are advisory only and do not replace the information found in an operator’s Airplane Flight Manual (AFM)/Airplane Flight Manual Supplement (AFMS). The information was compiled via a combination of analysis of existing OpSpec/management specification (MSpec)/Letter of Authorization (LOA) C048 authorizations, online research, and communication with individuals from industry. Please contact the Flight Technologies and Procedures Division EFVS Focal Point with any aircraft and EFVS combination that is not listed in the tables below.

Boeing			
Aircraft	EFVS		Remarks
	Manufacturer	Model	
B757	Kollsman	EVS II	FedEx STC
B767	Kollsman	EVS II	FedEx STC
B777	Kollsman	EVS II	FedEx STC
MD-10	Kollsman	EVS II	FedEx STC
MD-11	Kollsman	EVS II	FedEx STC

Bombardier			
Aircraft	EFVS		Remarks
	Manufacturer	Model	
BD-700-1A10 (Global Express/XRS)	Esterline CMC	SureSight CMA 2600	
BD-700-1A10 (Global 6000)	Esterline CMC	SureSight CMA 2700	
BD-700-1A11 (Global 5000)	Esterline CMC	SureSight CMA 2600	Honeywell Flight Deck
BD-700-1A11 (Global 5000)	Esterline CMC	SureSight CMA 2700	Vision Flight Deck
CL-600-2B16 (Challenger 604/605/650)	Esterline CMC	SureSight CMA 2700	
BD-700-1A12 (Global 7500)	Collins Aerospace	EVS3600	

Dassault			
Aircraft	EFVS		Remarks
	Manufacturer	Model	
Falcon 7X	Esterline CMC	SureSight CMA 2600	
Falcon 8X	Elbit/Universal Avionics	EVS5000 (FalconEye)	
Falcon-900	Elbit/Universal Avionics	EVS5000 (FalconEye)	
Falcon-900	Esterline CMC	SureSight CMA 2600	
Falcon-2000	Elbit/Universal Avionics	EVS5000 (FalconEye)	
Falcon-2000	Esterline CMC	SureSight CMA 2600	

Embraer			
Aircraft	EFVS		Remarks
	Manufacturer	Model	
EMB-550	Rockwell Collins	EVS3000	

Gulfstream			
Aircraft	EFVS		Remarks
	Manufacturer	Model	
G280	Kollsman	EVS II	
G-IV	Kollsman	EVS I	
G-V	Kollsman	EVS I	
G-V (G450)	Kollsman	EVS I	Prior to N4142
G-V (G450)	Kollsman	EVS II	N4142 and beyond
G-V (G550)	Kollsman	EVS I	Prior to N5214
G-V (G550)	Kollsman	EVS II	N5214 and beyond
G-VI (G650/650ER)	Kollsman	EVS II	
G-VII (G500/G600)	Kollsman	EVS III (SP)	