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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Parts 1, 91, 121, 125, and 135

[Docket No. FAA-2003-14449; Notice No. 03-03]

RIN 2120-AH78

Enhanced Flight Vision Systems

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: The FAA is proposing to revise its regulations for takeoff and landing under instrument flight rules (IFR) to allow for the use of FAA-certified enhanced flight vision systems (EFVS) that would enable the pilot to meet enhanced flight visibility requirements. The action would allow the use of new technology. This NPRM also contains proposed EFVS-related changes to the FAA's previously published Area Navigation (RNAV) NPRM, which was published on December 17, 2002.

DATE: Send your comments on or before March 27, 2003 [insert date 45 days after date of publication in the Federal Register].

ADDRESSES: Address your comments to the Docket Management System, U.S. Department of Transportation, Room Plaza 401, 400 Seventh Street, SW, Washington, DC 20590-0001. You must identify the docket number FAA-2003-14449 at the beginning of your comments, and you should submit two copies. If you wish to receive confirmation that the FAA has received your comments, include a self-addressed, stamped postcard on which the docket number appears.

You may also submit comments through the Internet to http://dms.dot.gov. You may review the public docket containing comments to these proposed regulations in person in the Dockets Office between 9:00 a.m. and 5:00 p.m., Monday through Friday, except Federal holidays. The Dockets Office is on the plaza level of the Nassif Building at the Department of Transportation at the above address. Also, you may review public dockets on the Internet at http://dms.dot.gov.

FOR FURTHER INFORMATION CONTACT: Les Smith, Flight Technologies and Procedures Division, Flight Standards Service, AFS-400, Federal Aviation Administration, 800 Independence Ave. SW, Washington, DC 20591; telephone: (202) 385-4586.

SUPPLEMENTARY INFORMATION:

Comments Invited

The FAA invites interested persons to participate in this rulemaking by submitting written comments, data, or views. The FAA also invites comments on the economic, environmental, energy, or federalism impacts that might result from adopting the proposals in this document. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. The FAA asks that you send two copies of written comments.

The FAA will file in the docket all comments it receives, as well as a report summarizing each substantive public contact with FAA personnel concerning this proposed rulemaking. The docket is available for public inspection before and after the comment closing date. If you wish to review the docket in person, go to the address in

the ADDRESSES section of this preamble between 9:00 a.m. and 5:00 p.m., Monday through Friday, except Federal holidays. You may also review the docket using the Internet at the web address in the ADDRESSES section.

Anyone is able to search the electronic form of all comments received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act statement in the Federal Register published on April 11, 2002 (65 FR 19477-19478) or you may visit http://dms.dot.gov.

Before acting on this proposal, the FAA will consider all comments it receives on or before the closing date for comments. The FAA will consider comments filed late if it is possible to do so without incurring expense or delay. The FAA may change this proposal in light of comments.

If you want the FAA to acknowledge receipt of your comments on this proposal, include with your comments a pre-addressed, stamped postcard on which the docket number appears. The FAA will stamp the date on the postcard and mail it to you.

Availability of Rulemaking Documents

You can get an electronic copy of this document using the Internet by:

(1) Searching the Department of Transportation's electronic Docket Management System (DMS) webpage (http://dms.dot.gov/search);

(2) Visiting the Office of Rulemaking's web page at http://www.faa.gov/avr/armhome.htm; or

(3) Accessing the Government Printing Office's web page at http://www.access.gpo.gov/su_docs/aces/aces140.html.

You can also get a copy by submitting a request to the Federal Aviation Administration, Office of Rulemaking, ARM-1, 800 Independence Avenue, SW, Washington, DC 20591, or by calling 202-267-9680. Be sure to identify the docket number, or notice number with amendment number, of this rulemaking.

List of Abbreviations Used in this Document

APV—Approach procedure with vertical guidance
ASR—Airport surveillance radar
DA—Decision altitude
DH—Decision height
EFVS—Enhanced flight vision system
HUD—Head-up display
IFR—Instrument flight rules
ILS—Instrument landing system
MDA—Minimum descent altitude
PAR—Precision approach radar
RNAV—Area navigation

Background

Section 91.175 of 14 CFR prescribes flight visibility requirements when operating under instrument flight rules (IFR) using natural vision, to identify the approach lights and runway environment. These procedures were developed and improved over the years to provide for a high level of safety when operating an aircraft during reduced visibility conditions; however the current rules on instrument approach procedures do not allow for the use of new technologies such as enhanced flight vision systems (EFVS), which use imaging-sensor technology that provides a real-time image of the external topography, or synthetic vision systems, which uses a database computer-generated image of the external

topography. Nor do the present rules define new terms such as "enhanced flight visibility" or "synthetic vision" as they relate to flight operations.

EFVS--As mentioned above, an EFVS uses imaging-sensor technologies that provide a real-time visual image of the external scene topography. During some reduced visibility conditions, an EFVS can display imagery that may significantly improve the pilot's capability to detect objects, such as approach lights and visual references of the runway environment, that may not otherwise be visible. This type of technology would be allowed (but not required) under this NPRM.

Synthetic vision--By contrast, a synthetic vision image is a computer-generated image of the external scene topography from the perspective of the flight deck that is derived from aircraft attitude, high-precision navigation solution, database of terrain, obstacles, and relevant cultural features. A synthetic vision system is an electronic means to display a synthetic vision image of the external scene topography to the flight crew. This NPRM would not provide for the use of this type of technology in the regulations; however, the FAA wishes to distinguish it from EFVS to be clear that synthetic vision systems are not being proposed as a means to comply with its flight visibility regulations.

Flight visibility-- Section 1.1 of 14 CFR defines the term "flight visibility" as "...the average forward horizontal distance, from the cockpit of an aircraft in flight, at which prominent unlighted objects may be seen and identified by day and prominent lighted objects may be seen and identified by night." Present rules do not allow the use of an EFVS to determine flight visibility as defined in the FAA's regulations. The proposed rule would allow for the use of an EFVS to determine "enhanced flight visibility," and would permit descent and operation below decision height (DH), decision

altitude (DA), or minimum descent altitude (MDA) based on the pilot's observation of images when using an EFVS.

Section 91.175 (c) and (d)--Section 91.175 (c) and (d) of 14 CFR specifies flight visibility requirements for operations below DA or MDA and landing under IFR and states that, when making an instrument approach to a civil airport, a pilot must use a standard instrument approach procedure prescribed for the airport.

Paragraph (c), Operation below DH or MDA, states that, where a DH or MDA is applicable, no pilot may operate an aircraft, except a military aircraft of the United States, at any airport below the authorized MDA or continue an approach below the authorized DH unless the flight visibility under paragraph (c)(2) is not less than the visibility prescribed in the standard instrument approach being used. Paragraph (c)(3) lists visual references that must also be distinctly visible and identifiable to the pilot.

Paragraph (d), Landing, states that "No pilot operating an aircraft except a military aircraft of the United States, may land that aircraft when the flight visibility is less than the visibility prescribed in the standard instrument approach procedure being used."

Based upon the existing §91.175 regulation, the pilot cannot descend below the DH or MDA if the flight visibility is less than the visibility prescribed in the standard instrument approach procedure. The present §91.175 (c)(2) flight visibility requirements are not based upon a pilot's use of an EFVS.

Previous type designs—In 2001, the FAA issued special conditions for the airworthiness approval of one manufacturer's type design. The special conditions limited

the scope of the intended function to the identification of the visual references listed in §91.175 (c)(3). The system design, under this limited intended function, was not approved for meeting the flight visibility requirements of §91.175 (c)(2) because its infrared sensor did not sense energy in the visual portion of the electromagnetic spectrum. In addition, the current operating rules do not establish criteria for the use of equipment that operates in non-visible portions of the electromagnetic spectrum. The proposed amendment would provide operational criteria for the desired function of an EFVS, which operates outside the visible portion of the electromagnetic spectrum.

Related NPRM

The FAA is conducting a thorough review of its rules to ensure consistency between the operating rules of 14 CFR and future proposed area navigation (RNAV) operations for the National Airspace System (NAS). On December 17, 2002, the FAA published a proposed rule entitled, "Area Navigation (RNAV) and Miscellaneous Amendments" (67 FR 77326; Dec. 17, 2002). That NPRM would enable the use of space-based navigation aid sensors for aircraft RNAV systems through all phases of flight (departure, en route, arrival, and approach) to enhance the safety and efficiency of the NAS.

The December 17, 2002 RNAV proposed rule also introduced the new terms "approach procedure with vertical guidance (APV)" and "decision altitude (DA)." In the NPRM, the FAA proposed to add definitions of these terms to §1.1 as follows:

"Approach procedure with vertical guidance (APV)" is an instrument approach procedure based on lateral path and vertical glide path. These procedures may not conform to requirements of precision approaches.

"Decision altitude (DA) is a specified altitude at which a person must initiate a missed approach if the person does not see the required visual reference. Decision altitude is expressed in feet above mean sea level."

That NPRM also proposed to change §§91.175 (c) introductory text, 121.651 (c) introductory text and (d) introductory text, 125.381 (c), and a portion of 135.225 (c), which would also be amended in this NPRM. The proposed amendments to those sections are, therefore, shown in this document with the proposed RNAV-related changes and the proposed EFVS-related changes in place. See the chart comparing the current rules and the RNAV and EFVS proposals following the Section-by-Section analysis below.

Discussion of the Proposal

The FAA proposes to amend its rules to allow for the operational use of an EFVS, which can display imagery that may significantly improve the pilot's capability to detect objects that may not otherwise be visible. The provisions of this NPRM would apply to operations conducted under parts 91, 121, 125, 129, and 135.

The proposal also would provide that the pilot of an aircraft could use this system to determine "enhanced flight visibility" while flying a standard instrument approach procedure. An EFVS would enable the pilot to determine "enhanced flight visibility" at the DA, DH, or MDA, in lieu of "flight visibility" (as currently defined), by using a

head-up display (HUD) to display sensor imagery of the approach lights or other visual references for the runway environment at a distance no less than the visibility prescribed in the instrument approach procedure being used.

The FAA would define "enhanced flight visibility" as the average forward horizontal distance, from the cockpit of an aircraft in flight, at which prominent topographical objects may be clearly distinguished and identified by day or night by a pilot using an EFVS. This definition would be substantially equivalent to the flight visibility requirement in §91.175 (c)(2). The pilot would use this enhanced flight visibility and go through a similar decision-making process as required by existing regulations to continue the approach from the DA, DH, or MDA and safely maneuver the aircraft for a landing on the intended runway.

Possible operational benefits--This proposed rule would not require the use of an EFVS. However, using an EFVS would allow operations in reduced visibility conditions that would not otherwise be possible. The proposed rule, therefore, could allow for operational benefits, reduce costs, and increase safety for aircraft equipped with an EFVS. Use of an EFVS with a HUD may improve the level of safety by improving position awareness, providing visual cues to maintain a stabilized approach, and minimizing missed approach situations. In addition to using an EFVS to satisfy §91.175 (l) requirements, an EFVS may allow the pilot to observe an obstruction on the runway, such as an aircraft or vehicle, earlier in the approach, and observe potential runway incursions during ground operations in reduced visibility conditions. Even in situations

where the pilot experiences marginal visibility at the DA, DH, or MDA, he or she could still use an EFVS to have better situational awareness than may be possible without it.

Category I operations--The intent of this proposed rule is to retain the existing straight-in-landing Category I instrument landing system (ILS) or nonprecision instrument approach minima and to authorize the pilot to use FAA-certified EFVS imaging-sensor technologies to determine enhanced flight visibility. This proposed rule would allow a pilot to fly a straight-in landing Category I or nonprecision approach and descend below the DA, DH, or MDA using an EFVS.

Category II and Category III ILS approach procedures--This proposed rule would not allow the use of an EFVS for Category II and III ILS approach procedures. Proposed enhanced flight vision systems for these approaches would have to comply with the more stringent reliability, redundancy, and other criteria, as prescribed in applicable sections of 14 CFR and applicable advisory circulars.

Visual references-- Section 91.175 (c)(3) lists ten visual references, of which only one is required for the pilot to descend below the DH or MDA. The visual references are: (1) The approach light system, (2) threshold, (3) threshold markings, (4) threshold lights, (5) runway end identifier lights, (6) visual approach slope indicator, (7) touchdown zone or touch down zone markings, (8) touchdown zone lights, (9) runway or runway markings, and (10) the runway lights. If the approach light system is used as the reference, the pilot may not descend below 100 feet above the touchdown zone elevation unless the red terminating bars or the red side row bars are also distinctly visible and

identifiable. As a parallel, the proposed rule states that, when using an EFVS, the approach light system (if installed), the runway threshold lights or markings, and the runway touchdown zone lights or markings would have to be distinctly visible and identifiable to the pilot.

Because the imaging-sensor technologies may not sense or display all of the identifying features of the visual references (e.g., may not distinguish colored lights), the FAA is proposing that the approach light system (if installed), or the runway threshold and the touchdown zone, would have to be distinctly visible to the pilot when using the EFVS prior to descent from the DA, DH, or MDA. At 100 feet above the touchdown zone elevation and below, there would have to be sufficient flight visibility (without reliance on an EFVS) for the intended runway to be distinctly visible and identifiable to the pilot to continue to a landing.

Pilot qualifications--To use the EFVS equipment while conducting an instrument approach procedure under this proposal, the pilot(s) would have to be current and qualified in accordance with existing applicable requirements in 14 CFR part 61, 121, 125 or 135. Each foreign pilot would have to be qualified in accordance with the requirements of the civil aviation authority of the State of the operator. Foreign air carriers would be required to comply with this rule and their operations specifications. For all operators, this would include knowledge of the EFVS training requirements, operational procedures, and limitations as prescribed in the approved Airplane or Rotorcraft Flight Manual for the specific system.

Certification process--An EFVS proposed for use under this proposed rule would have to provide the pilot with sufficient guidance and visual cues so that the pilot could manually maneuver the aircraft to a landing on the intended runway. The sensor image alone may not be suitable to maneuver the aircraft. For the pilot(s) to maximize situational awareness while maneuvering the aircraft in the visual segment of the instrument approach procedure, at low altitudes and reduced visibility conditions, the FAA is proposing that several key components be provided by an EFVS to provide an adequate level of safety. The EFVS sensor imagery would have to be presented on a HUD that is centrally located in the pilot's primary field of view and in the pilot's line of vision along the flight path. The imagery must be real-time, independent of the navigation solution derived from the aircraft avionics, and must be clearly displayed so that it does not adversely obscure the pilot field of view through the cockpit window. Aircraft flight symbology, such as airspeed, vertical speed, attitude, heading and altitude would have to be displayed on the HUD and be clearly visible to the pilot. The displayed sensor imagery and aircraft symbology could not adversely obstruct the pilot's vision looking through the aircraft's forward windshield.

The FAA would conduct the certification and evaluation process in accordance with published guidance and current policy. The FAA would also evaluate the capabilities, operational procedures, training and limitations for the specific system as it is designed and flight-tested. In all cases, the applicant for an airworthiness type design would provide the FAA's Aircraft Certification Office (ACO) with a certification plan. The FAA would evaluate the plan to determine if it is addressed by current regulations or if special conditions would have to be established for the certification. The proposed

EFVS would be evaluated in an operational context to determine if the system provides an equivalent level of safety when in operation compared to the present rules.

Section-by-Section Analysis

Section 1.1 General definitions

The FAA proposes to amend §1.1 to add definitions for the terms "enhanced flight visibility," and "enhanced flight vision system (EFVS)." Including these terms in the FAA's regulations would allow for the use of new technology and establish the characteristics the FAA believes are essential for safe operations.

The FAA also proposes to add definitions for the terms "synthetic vision" and "synthetic vision system." Although this proposed rule would not allow for synthetic vision, which is a database computer-generated image, the FAA believes it is necessary to distinguish it from an enhanced vision system, which uses imaging-sensor technology.

Section 1.2 Abbreviations and symbols

The FAA is proposing to add the abbreviation "EFVS" to §1.2 to reflect the addition of the proposed new term "enhanced flight vision system (EFVS)" in §1.1.

Section 91.175 Takeoff and landing under IFR

Paragraph (c)--Paragraph (c) introductory text (as proposed at 67 FR 77341; Dec. 17, 2002), would be further amended to add the phrase "except as provided in §91.175 (l) of this section,...." As discussed below, paragraph (l) would be added to allow the pilot to descend below the DA, DH, or MDA on a standard instrument approach using an

EFVS. If a pilot cannot meet the requirements of §91.175 (c) using natural vision, the exception to those requirements as provided in paragraph (l) using an EFVS would apply.

Paragraph (d)--The FAA proposes to revise paragraph (d) to add a new requirement that no pilot operating an aircraft may land that aircraft when, for operations conducted under proposed paragraph (l), the requirements of proposed paragraph (l)(4) are not met. This would mean that, when the aircraft is operated from 100 feet above the touchdown zone elevation to the runway surface, without reliance on an EFVS, there would have to be sufficient flight visibility for the lights or markings of the threshold or the lights or markings of the touchdown zone to be distinctly visible and identifiable to the pilot to land the aircraft. For all other operations that are not conducted under §91.175 (l), the pilot could not land the aircraft if the flight visibility is less than the visibility prescribed in the standard instrument approach procedure being used.

Paragraph (e)--For the missed approach procedures in §91.175 (e), the FAA is proposing to revise the introduction to (e)(1) to add a reference to proposed paragraph (l). The operator of the aircraft first would have to determine whether the aircraft would be operated in accordance with §91.175 (c) (for flight visibility using natural vision) or with §91.175 (l) (using an EFVS). Once that decision is made, different requirements determine when a missed approach must be executed. If a pilot chose to operate under §91.175 (c) without an EFVS, he or she would follow existing rules for missed approaches. This proposed rule would not change the existing requirements under §91.175 (c).

If, on the other hand, the pilot chose to use an EFVS in accordance with §91.175 (l), the missed approach procedures remain the same as those published on the approach

charts. If the pilot could not meet the requirements of §91.175 (l)(1) through (4), a missed approach must be executed. The requirements of §91.175 (l)(1) through (4) differ from the requirements of §91.175 (c)(1) through (3); however, these requirements provide a parallel to the decision-making process in §91.175 (c). For an operation conducted under §91.175 (l) with an EFVS, between the DA, DH, or MDA to 100 feet above the touchdown zone elevation of the runway of intended landing, an appropriate missed approach procedure would have to be immediately executed if the pilot were unable to continuously maintain the aircraft in a position from which a descent to a landing on the intended runway could be made at a normal rate of descent using normal maneuvers. For an operation conducted under part 121 or part 135, an appropriate missed approach procedure would have to be immediately executed if the pilot were unable to control the descent rate of the aircraft to allow touchdown to occur within the touchdown zone of the runway of intended landing. Under (l)(2), for all operations, below DA, DH, or MDA an appropriate missed approach procedure would have to be immediately executed when the pilot determined that the enhanced flight visibility observed by use of an EFVS is less than the visibility prescribed in the standard instrument approach procedure being used. Also if the visual references specified under (l)(3) were not distinctly visible and identifiable to the pilot in the EFVS display, a missed approach would have to be executed. Under (l)(4), for operations, between 100 feet above the touchdown zone elevation of the runway of intended landing and any lower altitude, the pilot would have to immediately execute a missed approach if, without reliance on an EFVS, there were not sufficient flight visibility for either the lights or

markings of the threshold or the lights or markings of the touchdown zone to be distinctly visible and identifiable to the pilot.

Paragraph (l)--Paragraph (l) would be added to §91.175 to describe the requirements for approach to straight-in landing operations below DA, DH, or MDA using an EFVS. The proposed rule would apply to pilots operating under parts 91, 121, 125, 129 and 135, and would require that parts 119 and 125 certificate holders, and part 129 operations specifications holders, be authorized to use an EFVS in their operations specifications.

Paragraph (l)(1) would state that the aircraft must be continuously in a position from which a descent, at normal rate using normal maneuvers, can be made. The proposed paragraph would also state that the descent rate for parts 121 and 135 operations would allow touchdown to occur within the touchdown zone of the runway of intended landing.

Proposed paragraph (l)(2) would provide an enhanced flight visibility requirement that would be equivalent to §§91.175 (c)(2) and 121.651 (c)(2) and (d)(2), except that the pilot could use an EFVS to determine "enhanced flight visibility" as compared to "flight visibility" with natural vision.

Paragraph (l)(3) would specify that the approach light system (if installed) or the runway threshold and the touchdown zone would have to be distinctly visible and identifiable to the pilot in the enhanced flight vision system display at the DA, DH, or MDA.

Paragraph (l)(4) would require that, at 100 feet above the touchdown zone elevation and below, the threshold lights or markings, or the touchdown zone lights or

markings, would have to be distinctly visible and identifiable without relying on the enhanced flight vision system for the pilot to continue to a landing.

In (l)(5), the proposed rule would provide that pilots using EFVS-equipped aircraft be qualified in accordance with the applicable requirements of 14 CFR part 61 and part 121, 125, or 135, as applicable. Foreign operators would have to be qualified in accordance with their civil aviation authorities' requirements.

In (l)(6), the proposed rule would authorize EFVS operations for parts 119 and 125 certificate holders and part 129 operations specifications holders through their operations specifications.

In (l)(7), the proposed rule would require that the aircraft be equipped with an EFVS, the display of which would have to be suitable for maneuvering the aircraft. The EFVS and display would be required to have an FAA type design approved by the United States. For foreign-registered aircraft, the EFVS and display would have to be of a type design approved by the United States and comply with all requirements as if the aircraft were registered in the United States.

Paragraph (m)--Proposed paragraph (m) would establish the characteristics and features the FAA would require when approving an EFVS. It would ensure that a pilot using an EFVS remained in his or her normal sitting position and would be looking straight ahead along the forward flight path. The EFVS would have to include a head-up display centrally located in the pilot's primary field of view and would display the sensor imagery and the aircraft's flight's symbology so that the pilot's forward vision would not be adversely obscured. Because the pilot could not rely on the EFVS at 100 feet above the touchdown zone elevation and below for purposes of identifying items in proposed

(l)(4), the FAA believes it would be essential for him or her to remain in a forward-looking position and be able to focus outside the cockpit with minimal transition from using the sensor imagery display to visual flying conditions (using natural vision) without the EFVS. The display characteristics and dynamics would have to be suitable for manual control of the aircraft.

Section 121.651 Takeoff and landing weather minimums: IFR: All certificate holders

The FAA's Area Navigation (RNAV) NPRM published on December 17, 2002 (67 FR 77341; Dec. 17, 2002), set forth proposed amendments to the current provisions contained in §121.651. By this document (i.e., the Enhanced Flight Visibility Systems NPRM), the FAA amends the December 17, 2002 RNAV NPRM regarding this section in three ways.

First, in regard to paragraph (c) in the December 17, 2002 RNAV NPRM, the FAA makes the following amendments: The words "and touch down" would be removed. Thus, regardless of which proposals are adopted first (i.e., RNAV or EFVS), those three words would be removed from paragraph (c) of §121.651. The FAA is proposing to remove those words because it believes they are redundant of the landing requirements in both the existing and the proposed §91.175 (d), which also apply to part 121 operations.

Second, in paragraph (c), the words "if either the requirements of §91.175 (l) of this chapter, or the following requirements are met" would be added at the end. Thus, if the proposed amendments in this EFVS NPRM are adopted at the same time as the RNAV NPRM or after the adoption of the RNAV proposals, then today's proposal would

allow for operations under the current requirements of §121.651 (c), or approach to straight-in-landing operations using an EFVS under §91.175 (l) when the EFVS proposals are adopted. By the same token, if the RNAV proposed rules are adopted before the EFVS proposals are adopted, then the language in proposed §121.651 (c) in this document would be adopted but without the reference to §91.175 (l). That is, the FAA would adopt proposed paragraph (c) without the clause "... either the requirements of §91.175 (l) of this chapter or ....". Thus, in this situation, that language would only be adopted when the substantive EFVS rules are adopted.

Third, in paragraph (d), by this document (i.e., the Enhanced Flight Visibility Systems NPRM), the FAA amends its December 17, 2002 proposal. Paragraph (d) introductory text, as proposed in the FAA's Area Navigation (RNAV) NPRM published on December 17, 2002 (67 FR 77341; Dec. 17, 2002), would be further revised to include the words "the requirements of §91.175 (l) of this chapter, or the following requirements are met" at the end. This would allow for operations under the current requirements of §121.651 (d), or approach to straight-in-landing operations using an EFVS under §91.175 (l). (Note that the abbreviation "PAR" stands for "precision approach radar.") Thus, if the RNAV proposal is adopted first, then the new proposed language in proposed §121.651 (d) in this document (i.e., "... the requirements of §91.175 (l) of this chapter, or the following requirements are met:...") would not be adopted at that time but would only be adopted when, and if, the proposals in the EFVS NPRM are adopted.

Section 125.381 Takeoff and landing weather minimums: IFR

The FAA is proposing to further amend paragraph (c) as proposed in the FAA's Area Navigation (RNAV) NPRM published on December 17, 2002 (67 FR 77346). There are several reasons for the FAA's actions. First, as currently published in the Code of Federal Regulations, it appears as if a clause that is wholly contained within paragraph (c)(3) only applies to (c)(3), when, in fact, that language was, and is, intended to apply to paragraphs (c)(1), (c)(2) and (c)(3).That language begins ".. the approach may be continued ...." Thus, in this proposal, the FAA has reorganized the regulatory language to more clearly set forth the requirements.

Second, the FAA proposes to remove language in the current rule (i.e., "...and a landing may be made...") and similar language (i.e., "... and landing ...") in the RNAV NPRM. The FAA is proposing this because this language is redundant of the regulatory requirements in the existing §91.175 (d), which does, and would continue to, apply to part 125 operators, and it is redundant of the proposed requirements in proposed §91.175 (d).

Third, all of the following changes to the proposed §125.381 (c) in the RNAV NPRM that are described in this paragraph would be adopted regardless of which rule is adopted first. In other words, the section and paragraph citations below are in reference to the proposed regulatory sections and paragraphs in the RNAV NPRM. Moreover, if the proposals in the EFVS NPRM are adopted first, the changes described below would amend the current §125.381 (c), even though the other proposals in the RNAV NPRM would not have been adopted at that point. The FAA is proposing to amend the end of paragraph (c) introductory text by changing the words, "continue with the approach and

landing only if both of the following conditions are met--" to read "continue with the approach only if the requirements of §91.175 (l) of this chapter, or both of the following conditions are met--." The FAA is also proposing to make technical corrections to paragraph (c)(1) to specify that the airplane would have to be in one of the prescribed approach phases of the flight (not a landing phase) when a later weather report is received indicating below minimum conditions, or the pilot in command would not be authorized to continue the approach to DA, DH, or MDA. Also, in (c)(1)(i), the word "approach" would be added after "APV" to improve readability. In (c)(1)(iii), the paragraph would be reworded to define the final approach on ASR/PAR (airport surveillance radar/precision approach radar) procedures and be renumbered as (c)(1)(ii). Paragraph (c)(1)(ii) would be renumbered as (c)(1)(iii) and be rewritten to more specifically describe the airplane position during the nonprecision final approach. In paragraph (c)(2) of the RNAV proposal (and in paragraph (c)(3) of the existing rule), the reference to "MAP" (missed approach point) would be corrected with "MDA." Also in paragraph (c)(2) of the RNAV proposal the reference to the words "in the certificate holder's operations specifications" would be replaced with the words "for the procedure being used" because the minimums would not be prescribed in operations specifications. If only the RNAV proposal is adopted, the changes described above would be included in the RNAV final rule except for references to §91.175 (l).

Section 135.225 IFR: Takeoff, approach, and landing minimums

The FAA is proposing to further amend §135.225 (c) as proposed in the FAA's Area Navigation (RNAV) NPRM published on December 17, 2002 (67 FR 77346).

There are several reasons for the FAA's actions. First, as currently published in the Code of Federal Regulations, it appears that the clause, "...the approach may be continued and a landing made ..." in paragraph (c)(3)(ii) only applies to (c)(3)(ii), when, in fact, that language was, and is, intended to apply to paragraphs (c)(1), (c)(2), and (c)(3)(i) as well. Second, in this proposal, the words "and a landing made" would be removed. Additionally, a second clause in (c)(3)(ii) beginning with the words "...if a pilot finds..." would be recodified as a new condition for paragraph (c). This would be renumbered as (c)(2). All of the paragraphs in (c)(1) would be renumbered and the content of those paragraphs would mirror the proposal of §125.381 as explained above, except that the word "aircraft" would be used instead of "airplane." The proposed changes to the sections and paragraphs of the RNAV NPRM in this EFVS NPRM would be adopted regardless of which rule is adopted first. However, if only the RNAV proposal is adopted, these proposed changes would be included in the RNAV final rule except for references to §91.175 (l). The proposed changes in the RNAV NPRM are no longer being considered for adoption.

Comparison of Current Rules and RNAV and EFVS Proposals (§§91.175, 121.651, 125.381, and 135.225)

§ 91.175 Current Rule	**RNAV Proposed Rule**	**EFVS Proposed Rule**
§ 91.175 Takeoff and landing under IFR. ***** (c) *Operation below DH or MDA..* Where a DH or MDA is applicable, no pilot may operate an aircraft, except a military aircraft of the United States, at any airport below the authorized MDA or continue an approach below the authorized DH unless – ***** (d) *Landing.* No pilot operating an aircraft, except a military aircraft of the	**§91.175 Takeoff and landing under IFR.** ***** (c) *Operation below DA/DH or MDA..* Where a DA/DH or MDA is applicable, no pilot may operate an aircraft, except a military aircraft of the United States, at any airport below the authorized MDA or continue an approach below the authorized DA/DH unless-- ***** (e) * * *	**§91.175 Takeoff and landing under IFR.** ***** (c) *Operation below DA, DH or MDA.* Except as provided in paragraph (l) of this section, where a DA, DH or MDA is applicable, no pilot may operate an aircraft, except a military aircraft of the United States, at any airport below the authorized MDA or continue an approach below the authorized DA/DH unless— *****

§ 91.175 Current Rule	RNAV Proposed Rule	EFVS Proposed Rule
United States, may land that aircraft when the flight visibility is less than the visibility prescribed in the standard instrument approach procedure being used. (e) *Missed approach procedures.* Each pilot operating an aircraft, except a military aircraft of the United States, shall immediately execute an appropriate missed approach procedure when either of the following conditions exist: (1) Whenever the requirements of paragraph (c) of this section are not met at either of the following times: (i) When the aircraft is being operated below MDA; or (ii) Upon arrival at the missed approach point, including a DH where a DH is specified and its use is required, and at any time after that until touchdown. *****	(1) * * * (ii) Upon arrival at the missed approach point, including a DA/DH where a DA/DH is specified and its use is required, and at any time after that until touchdown. *****	(d) *Landing.* No pilot operating an aircraft, except a military aircraft of the United States, may land that aircraft when-- (1) For operations conducted under paragraph (l) of this section, the requirements of (l)(4) of this section are not met; or (2) For all other part 91 operations and parts 121, 125, 129, and 135 operations, the flight visibility is less than the visibility prescribed in the standard instrument approach procedure being used. ***** (e) * * * (1) Whenever operating an aircraft pursuant to paragraph (c) or (l) of this section and the requirements of that paragraph are not met at either of the following times: ***** (l) *Approach to straight-in landing operations below DA, DH, or MDA using an enhanced flight vision system (EFVS).* No pilot operating under this section or §§121.651, 125.381, and 135.225 of this chapter may operate an aircraft at any airport below the authorized MDA or continue an approach below the authorized DA or DH and land unless-- (1) The aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at a normal rate of descent using normal maneuvers, and, for operations conducted under part 121 or part 135 of this chapter, the descent rate will allow touchdown to occur within the touchdown zone of the runway of intended landing; (2) The pilot determines that the enhanced flight visibility observed by use of a certified enhanced flight vision system is not less than the visibility prescribed in the standard instrument approach procedure being used; (3) The following visual references for the intended runway are distinctly visible and identifiable to the pilot using the enhanced flight vision system: (i) The approach light system (if installed); or (ii) The runway threshold and the touchdown zone; (4) At 100 feet above the touchdown zone elevation of the runway of intended landing and below that altitude, the flight visibility must be sufficient for the following to be distinctly visible and identifiable to the pilot without reliance on the enhanced flight vision system to continue to a landing: (i) The lights or markings of the threshold; or (ii) The lights or markings of the touchdown zone; (5) The pilot(s) is qualified to use an EFVS as follows-- (i) For parts 119 and 125 certificate holders, the applicable training, testing and

§ 91.175 Current Rule	RNAV Proposed Rule	EFVS Proposed Rule
		qualification provisions of parts 121, 125 and 135 of this chapter; (ii) For foreign persons, in accordance with the requirements of the civil aviation authority of the State of the operator; or (iii) For persons conducting any other operation, in accordance with the applicable qualification and proficiency requirements of part 61 of this chapter and the operating limitations specified in the approved Airplane or Rotorcraft Flight Manual; (6) For parts 119 and 125 certificate holders, and part 129 operations specifications holders, their operations specifications authorize use of EFVS; and (7) The aircraft is equipped with, and the pilot uses, an enhanced flight vision system, the display of which is suitable for maneuvering the aircraft and has either an FAA type design approval or, for a foreign-registered aircraft, the EFVS is of a type design approved by the United States and complies with all of the requirements of this chapter that would be applicable to that aircraft were it registered in the United States, including the requirements for a U.S. standard airworthiness certificate. (m) For purposes of this section, "enhanced flight vision system" (EFVS) is an installed airborne system comprised of the following features and characteristics: (1) An electronic means to provide a display of the forward external scene topography (natural or manmade features of a place or region especially in a way to show their relative positions and elevation) through the use of imaging sensors, such as a forward-looking infrared, millimeter wave radiometry, millimeter wave radar, and low-light level image intensifying; (2) The EFVS sensor imagery and aircraft flight symbology (i.e. at least airspeed, vertical speed, aircraft attitude, heading, altitude) are presented on a head-up display so that they are clearly visible to the pilot flying in his or her normal position and line of vision and looking forward along the flight path; (3) The displayed imagery and aircraft flight symbology does not adversely obscure the pilot's outside view or field of view through the cockpit window; (4) The EFVS includes the display element, sensors, computers and power supplies, indications, and controls. It may receive inputs from an airborne navigation system or flight guidance system; and (5) The display characteristics and dynamics are suitable for manual control of the aircraft.

§ 121.651 Current Rule	RNAV Proposed Rule	EFVS Proposed Rule
§ 121.651 Takeoff and landing weather minimums: IFR: All certificate holders. ***** (c) If a pilot has begun the final approach segment of an instrument approach procedure in accordance with paragraph (b) of this section and after that receives a later weather report indicating below-minimum conditions, the pilot may continue the approach to DH or MDA. Upon reaching DH or at MDA, and at any time before the missed approach point, the pilot may continue the approach below DH or MDA and touch down if – ***** (d) A pilot may begin the final approach segment of an instrument approach procedure other than a Category II or Category III procedure at an airport when the visibility is less than the visibility minimums prescribed for that procedure if that airport is served by a operative ILS and an operative PAR, and both are used by the pilot. However, no pilot may operate an aircraft below the authorized MDA, or continue an approach below the authorized DH, unless -- *****	**§121.651 Amended** ***** (c) In paragraph (c), replace the term "DH" with the term "DA/DH" wherever it appears. ***** (d) A pilot may begin the final approach segment of a Category I precision approach procedure at an airport when the visibility is less than the visibility minimums prescribed for that procedure if that airport is served by an operative PAR and another operative precision instrument approach system, and both the PAR and the precision approach are used by the pilot. However, no person may continue an approach below the authorized DA, unless— *****	**§121.651 Takeoff and landing weather minimums: IFR: All certificate holders.** ***** (c) If a pilot has begun the final approach segment of an instrument approach procedure in accordance with paragraph (b) of this section, and after that receives a later weather report indicating below-minimum conditions, the pilot may continue the approach to DA/DH or MDA. Upon reaching DA/DH, or at MDA, and at any time before the missed approach point, the pilot may continue the approach below DA/DH or MDA if either the requirements of §91.175 (l) of this chapter, or the following requirements are met: ***** (d) A pilot may begin the final approach segment of a Category I precision approach procedure at an airport when the visibility is less than the visibility minimums prescribed for that procedure if that airport is served by an operative PAR and another operative precision instrument approach system, and both the PAR and the precision approach are used by the pilot. However, no person may continue an approach below the authorized DA unless the requirements of §91.175 (l) of this chapter, or the following requirements are met:

§125.381 Current Rule	RNAV Proposed Rule	EFVS Proposed Rule
§ 125.381 Takeoff and landing weather minimums: IFR. ***** (c) If a pilot initiates an instrument approach procedure when the latest weather report indicates that the specified visibility minimums exist, and a later weather report indicating below minimums conditions is received after the airplane -- (1) Is on an ILS final approach and has passed the outer marker, (2) Is on final approach segment using a nonprecision approach procedure, or (3) Is on PAR final approach and has been turned over to the final approach controller, the approach may be continued and a landing may be made if the pilot in command finds, upon reaching the authorized MAP or DH, that actual weather conditions are at least equal to the minimums prescribed in the operations specifications.	**§125.381 Takeoff and landing weather minimums: IFR.** ***** (c) If a pilot initiates an instrument approach procedure based on a weather report that indicates that the specified visibility minimums exist and subsequently receives another weather report that indicates that conditions have worsened to below the minimum requirements, then the pilot may continue with the approach and landing only if both of the following conditions are met-- (1) The later weather report is received when the airplane is in one of the following landing phases: (i) The airplane is on a precision approach or APV and has passed the precision final approach fix. (ii) The airplane is on the final approach segment using a nonprecision approach procedure. (iii) The airplane is on a PAR final approach and has been turned over to the final approach controller. (2) The pilot in command finds, on reaching the authorized MAP or DA/DH, that the actual weather conditions are at or above the minimums prescribed in the certificate holder's operations specifications.	**§125.381 Takeoff and landing weather minimums: IFR.** ***** (c) If a pilot initiates an instrument approach procedure based on a weather report that indicates that the specified visibility minimums exist and subsequently receives another weather report that indicates that conditions are below the minimum requirements, then the pilot may continue with the approach only if, the requirements of §91.175(l) of this chapter, or both of the following conditions are met— (1) The later weather report is received when the airplane is in one of the following approach phases: (i) The airplane is on a precision or APV approach and has passed the precision final approach fix; (ii) The airplane is on an ASR or PAR final approach and has been turned over to the final approach controller; or (iii) The airplane is on a nonprecision final approach and the airplane— (A) Has passed the appropriate facility or final approach fix; or (B) Where a final approach fix is not specified, has completed the procedure turn and is established inbound toward the airport on the final approach course within the distance prescribed in the procedure; and (2) The pilot in command finds, on reaching the authorized MDA, or DA/DH, that the actual weather conditions are at or above the minimums prescribed for the procedure being used.

§ 135.225 Current Rule	RNAV Proposed Rule	EFVS Proposed Rule
§ 135.225 IFR: Takeoff, approach and landing minimums. ***** (c) If a pilot has begun the final approach segment of an instrument approach to an airport under paragraph (b) of this section and a later weather report indicating below minimum conditions is received after the aircraft is -- (1) On an ILS final approach and has passed the final approach fix; or (2) On an ASR or PAR final approach and has been turned over to the final approach controller; or (3) On a final approach using a VOR, NDB, or comparable approach procedure; and the aircraft -- (i) Has passed the appropriate facility or final approach fix; or (ii) Where a final approach fix is not specified, has completed the procedure turn and is established inbound toward the airport on the final approach course within the distance prescribed in the procedure; the approach may be continued and a landing made if the pilot finds, upon reaching the authorized MDA or DH, that actual weather conditions are at least equal to the minimums prescribed for the procedure. *****	**§135.225 IFR: Takeoff, approach and landing minimums.** ***** (c) * * * (1) On a precision or APV approach and has passed the precision final approach fix; or ***** (3) On a nonprecision final approach; and the aircraft – ***** (ii) Where a final approach fix is not specified, has completed the procedure turn and is established inbound toward the airport on the final approach course within the distance prescribed in the procedure. The approach may be continued, and a landing made, if the pilot finds, upon reaching the authorized MDA or DA/DH, that actual weather conditions are at or above the minimums prescribed for the procedure.	**§135.225 IFR: Takeoff, approach, and landing minimums.** ***** (c) If a pilot has begun the final approach segment of an instrument approach to an airport under paragraph (b) of this section, and the pilot receives a later weather report indicating that conditions have worsened to below the minimum requirements, then the pilot may continue the approach only if the requirements of §91.175 (l) of this chapter, or both of the following conditions, are met— (1) The later weather report is received when the aircraft is in one of the following approach phases: (i) The aircraft is on a precision or APV approach and has passed the precision final approach fix; (ii) The aircraft is on an ASR or PAR final approach and has been turned over to the final approach controller; or (iii) The aircraft is on a nonprecision final approach and the aircraft— (A) Has passed the appropriate facility or final approach fix; or (B) Where a final approach fix is not specified, has completed the procedure turn and is established inbound toward the airport on the final approach course within the distance prescribed in the procedure; and (2) The pilot in command finds, on reaching the authorized MDA or DA/DH, that the actual weather conditions are at or above the minimums prescribed for the procedure being used.

Paperwork Reduction Act

The Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)) requires that the FAA consider the impact of paperwork and other information collection burdens imposed on the public. The FAA has determined that there are no new information collection requirements associated with this proposed rule.

International Compatibility

In keeping with United States obligations under the Convention on International Civil Aviation, it is the FAA's policy to comply with International Civil Aviation Organization (ICAO) Standards and Recommended Practices to the maximum extent practicable. The FAA has determined that there are no ICAO Standards and Recommended Practices that corresponded to these proposed regulations.

Economic Evaluation

Proposed changes to regulations must undergo several economic analyses. First, Executive Order 12866 directs each Federal agency proposing or adopting a regulation to only upon a reasoned determination that the benefits of the intended regulation justify its costs. Second, the Regulatory Flexibility Act of 1980 requires agencies to analyze the economic impact of the regulatory changes on small entities. Third, the Trade Agreements Act (19 U.S.C. 2531-2533) prohibits agencies from setting standards that create unnecessary obstacles to the foreign commerce of the United States. In developing U.S. standards, the Trade Agreements Act requires agencies to consider international standards and, where appropriate, as the basis of U.S. standards. Fourth, the Unfunded Mandates Reform Act of 1995 (Pub.L. 104-4) requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local, or tribal governments, in the aggregate, or by the private sector, of $100 million or more annually (adjusted for inflation).

In conducting these analyses, FAA has determined this rule: (1) Has benefits that justify its costs, is not a "significant regulatory action" as defined in section 3 (f) of

Executive Order 12866, and is not "significant" as defined in DOT's Regulatory Policies and Procedures; (2) will not have a significant economic impact on a substantial number of small entities; (3) will not reduce barriers to international trade; and does not impose an unfunded mandate on state, local, or tribal governments, or on the private sector.

However, for regulations with an expected minimal impact the above-specified analyses are not required. The Department of Transportation Order DOT 2100.5 prescribes policies and procedures for simplification, analysis, and review or regulations. If it is determined that the expected impact is so minimal that the proposal does not warrant a full evaluation, a statement to that effect and the basis for it is included in proposed regulation.

This rulemaking would allow, but does not require, operators to use an enhanced flight vision system on board their aircraft provided their pilots are properly trained. Therefore, this proposed rule would not impose any cost on any operator. As discussed above under "Discussion of the Proposal," the FAA believes that this NPRM would provide operational benefits and improve the level of safety.

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) establishes "as a principle of regulatory issuance that agencies shall endeavor, consistent with the objective of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of the business, organizations, and governmental jurisdictions subject to regulation." To achieve that principle, the RFA requires agencies to solicit and consider flexible regulatory proposals and to explain the rationale for their actions. The RFA covers a

wide-range of small entities, including small businesses, not-for-profit organizations and small governmental jurisdictions.

Agencies must perform a review to determine whether a proposed or final rule will have a significant impact on a substantial number of small entities. If the determination is that it will, the agency must prepare a regulatory flexibility analysis as described in the RFA.

However, if an agency determines that a proposed or final rule is not expected to have a significant economic impact on a substantial number of small entities, section 605(b) of the RFA provides that the head of the agency may so certify and a regulatory flexibility analysis is not required. The certification must include a statement providing the factual basis for this determination, and the reasoning should be clear.

The FAA certifies that this proposed rule will not have a significant economic impact on a substantial number of small entities. The use of the enhanced flight vision system would not be mandatory. This rulemaking would allow the operators the option of using this equipment. Therefore, this rulemaking would not impose any cost on any operators. The FAA solicits comments from the public regarding this determination of no significant economic impact on a substantial number of small entities.

International Trade Impact Analysis

The Trade Agreement Act of 1979 prohibits Federal agencies from establishing any standards or engaging in related activities that create unnecessary obstacles to the foreign commerce of the United States. Legitimate domestic objectives, such as safety,

are not considered unnecessary obstacles. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards.

The FAA has assessed the potential effect of this proposed rule and determined that it will not apply to foreign entities or to trade with foreign entities. In accordance with the above statute, the FAA has assessed the potential effect of this proposed rule and has determined that it would have only a domestic impact and, therefore create no obstacles to the foreign commerce of the United States.

Unfunded Mandates Assessment

The Unfunded Mandates Reform Act of 1995 (the Act), enacted as Pub. L. 104-4 on March 22, 1995 is intended, among other things, to curb the practice of imposing unfunded Federal mandates on State, local, and tribal governments. Title II of the Act requires each Federal agency to prepare a written statement assessing the effects of any Federal mandate in a proposed of final agency rule that may result in an expenditure of $100 million or more expenditure (adjusted annually for inflation) in any one year by State, local, and tribal governments, in the aggregate, or by the private sector; such a mandate is deemed to be a "significant regulatory action."

The proposed rule would not contain such a mandate. Therefore, the requirements of Title II of the Unfunded Mandates Reform Act of 1995 do not apply.

Executive Order 13132, Federalism

The FAA has analyzed this proposed rule under the principles and criteria of Executive Order 13132, Federalism. The FAA has determined that this action would not

have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. Therefore, we determined that this notice does not have federalism implications.

Environmental Analysis

FAA Order 1050.1D defines FAA action as that may be categorically excluded from preparation of a National Environmental Policy Act (NEPA) environmental impact statement. In accordance with FAA Order 1050.1D, appendix 4, paragraph 4(j), this proposed rulemaking action qualifies for a categorical exclusion.

Energy Impact

The energy impact of this proposed rule has been assessed in accordance with the Energy Policy and Conservation Act (EPCA) (Pub. L. 94-163, as amended; 42 U.S.C. 6362) and FAA Order 1053.1. The FAA has determined that the proposed rule is not a major regulatory action under the provisions of the EPCA.

List of Subjects

14 CFR Part 1

Air transportation.

14 CFR Part 91

Agriculture, Air traffic control, Aircraft, Airmen, Airports, Aviation safety, Canada, Freight, Mexico, Noise control, Political candidates.

14 CFR Part 121

Air carriers, Aircraft, Airmen, Aviation safety, Charter Flights, Safety, Transportation.

14 CFR Parts 125 and 135

Aircraft, Airmen, Aviation safety.

The Proposed Amendments

In consideration of the foregoing, the Federal Administration Aviation proposes to amend chapter I of 14 CFR as follows:

PART 1—DEFINITIONS AND ABBREVIATIONS

1. The authority for part 1 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

2. Amend §1.1 by adding the following definitions in alphabetical order to read as follows:

§1.1 General definitions.

* * * * *

Enhanced flight visibility means the average forward horizontal distance, from the cockpit of an aircraft in flight, at which prominent topographical objects may be clearly

distinguished and identified by day or night by a pilot using an enhanced flight vision system.

Enhanced flight vision system (EFVS) means an electronic means to provide a display of the forward external scene topography (natural or manmade features of a place or region especially in a way to show their relative positions and elevation) through the use of imaging sensors, such as a forward looking infrared, millimeter wave radiometry, millimeter wave radar, low light level image intensifying.

* * * * *

Synthetic vision means a computer-generated image of the external scene topography from the perspective of the flight deck that is derived from aircraft attitude, high-precision navigation solution, and database of terrain, obstacles and relevant cultural features.

Synthetic vision system means an electronic means to display a synthetic vision image of the external scene topography to the flight crew.

* * * * *

3. Section 1.2 is amended by adding the following abbreviation in alphabetical order to read as follows:

§1.2 Abbreviations and symbols.

* * * * *

EFVS means enhanced flight vision system

* * * * *

PART 91 – GENERAL OPERATING AND FLIGHT RULES

4. The authority citation for part 91 continues to read as follows:

Authority: 49 U.S.C. 106(g), 1155, 40103, 40113, 40120, 44101, 44111, 44701, 44709, 44711, 44712, 44715, 44716, 44717, 44722, 46306, 46315, 46316, 46504, 46506-46507, 47122, 47508, 47528-47531, articles 12 and 29 of the Convention on International Civil Aviation (61 Stat. 1180).

5. Amend §91.175 by revising paragraphs (c) introductory text, as proposed at 67 FR 77341; Dec. 17, 2002, (d), and (e)(1) introductory text, and by adding paragraphs (l) and (m) to read as follows:

§91.175 Takeoff and landing under IFR.

* * * * *

(c) Operation below DA, DH or MDA. Except as provided in paragraph (l) of this section, where a DA, DH, or MDA is applicable, no pilot may operate an aircraft, except a military aircraft of the United States, at any airport below the authorized MDA or continue an approach below the authorized DA/DH unless—

* * * * *

(d) Landing. No pilot operating an aircraft, except a military aircraft of the United States, may land that aircraft when--

(1) For operations conducted under paragraph (l) of this section, the requirements of paragraph (l)(4) of this section are not met; or

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of this chapter

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(2) For all other part 91 operations and parts 121, 125, 129, and 135 operations, the flight visibility is less than the visibility prescribed in the standard instrument approach procedure being used.

(e) * * *

(1) Whenever operating an aircraft pursuant to paragraph (c) or (l) of this section and the requirements of that paragraph are not met at either of the following times:

* * * * *

(l) Approach to straight-in landing operations below DA, DH, or MDA using an enhanced flight vision system (EFVS). No pilot operating under this section or §§121.651, 125.381, and 135.225 of this chapter may operate an aircraft at any airport below the authorized MDA or continue an approach below the authorized DA or DH and land unless--

(1) The aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at a normal rate of descent using normal maneuvers, and, for operations conducted under part 121 or part 135 of this chapter, the descent rate will allow touchdown to occur within the touchdown zone of the runway of intended landing;

(2) The pilot determines that the enhanced flight visibility observed by use of a certified enhanced flight vision system is not less than the visibility prescribed in the standard instrument approach procedure being used;

(3) The following visual references for the intended runway are distinctly visible and identifiable to the pilot using the enhanced flight vision system:

(i) The approach light system (if installed); or

(ii) The runway threshold and the touchdown zone;

(4) At 100 feet above the touchdown zone elevation of the runway of intended landing and below that altitude, the flight visibility must be sufficient for the following to be distinctly visible and identifiable to the pilot without reliance on the enhanced flight vision system to continue to a landing:

(i) The lights or markings of the threshold; or

(ii) The lights or markings of the touchdown zone;

(5) The pilot(s) is qualified to use an EFVS as follows--

(i) For parts 119 and 125 certificate holders, the applicable training, testing and qualification provisions of parts 121, 125, and 135 of this chapter;

(ii) For foreign persons, in accordance with the requirements of the civil aviation authority of the State of the operator; or

(iii) For persons conducting any other operation, in accordance with the applicable qualification and proficiency requirements of part 61 of this chapter and the operating limitations specified in the approved Airplane or Rotorcraft Flight Manual;

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(6) For parts 119 and 125 certificate holders of this chapter, and part 129 operations specifications holders, their operations specifications authorize use of EFVS; and

(7) The aircraft is equipped with, and the pilot uses, an enhanced flight vision system, the display of which is suitable for maneuvering the aircraft and has either an FAA type design approval or, for a foreign-registered aircraft, the EFVS is of a type design approved by the United States and complies with all of the requirements of this chapter that would be applicable to that aircraft were it registered in the United States, including the requirements for a U.S. standard airworthiness certificate.

(m) For purposes of this section, "enhanced flight vision system" (EFVS) is an installed airborne system comprised of the following features and characteristics:

(1) An electronic means to provide a display of the forward external scene topography (natural or manmade features of a place or region especially in a way to show their relative positions and elevation) through the use of imaging sensors, such as a forward-looking infrared, millimeter wave radiometry, millimeter wave radar, and low-light level image intensifying;

(2) The EFVS sensor imagery and aircraft flight symbology (i.e. at least airspeed, vertical speed, aircraft attitude, heading, altitude) are presented on a head-up display so that they are clearly visible to the pilot flying in his or her normal position and line of vision and looking forward along the flight path;

(3) The displayed imagery and aircraft flight symbology does not adversely obscure the pilot's outside view or field of view through the cockpit window;

(4) The EFVS includes the display element, sensors, computers and power supplies, indications, and controls. It may receive inputs from an airborne navigation system or flight guidance system; and

(5) The display characteristics and dynamics are suitable for manual control of the aircraft.

PART 121—OPERATING REQUIREMENTS: DOMESTIC FLAG, AND SUPPLEMENTAL OPERATIONS

6. The authority citation for part 121 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 40119, 41706, 44101, 44701-44702, 44705, 44709-44711, 44713, 44716-44717, 44722, 44901, 44903-44904, 44912, 46105.

7. Amend §121.651 by revising paragraphs (c) introductory text and (d) introductory text, as proposed at 67 FR 77345; Dec. 17, 2002, to read as follows:

§121.651 Takeoff and landing weather minimums: IFR: All certificate holders.

* * * * *

(c) If a pilot has begun the final approach segment of an instrument approach procedure in accordance with paragraph (b) of this section, and after that receives a later weather report indicating below-minimum conditions, the pilot may continue the approach to DA/DH or MDA. Upon reaching DA/DH, or at MDA, and at any time before the missed approach point, the pilot may continue the approach below DA/DH or MDA if either the requirements of §91.175 (l) of this chapter, or the following requirements are met:

* * * * *

(d) A pilot may begin the final approach segment of a Category I precision approach procedure at an airport when the visibility is less than the visibility minimums prescribed for that procedure if that airport is served by an operative PAR and another operative precision instrument approach system, and both the PAR and the precision approach are used by the pilot. However, no person may continue an approach below the

authorized DA unless the requirements of §91.175 (l) of this chapter, or the following requirements are met:

* * * * *

PART 125—CERTIFICATION AND OPERATIONS: AIRPLANES HAVING A SEATING CAPACITY OF 20 OR MORE PASSENGERS OR A MAXIMUM PAYLOAD CAPACITY OF 6,000 POUNDS OR MORE; AND RULES GOVERNING PERSONS ON BOARD SUCH AIRCRAFT

8.. The authority citation for part 125 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701-44702, 44705, 44710-44711, 44713, 44716-44717, 44722.

9. Amend §125.381 by revising paragraph (c), as proposed at 67 FR 77346; Dec. 17, 2002, to read as follows:

§125.381 Takeoff and landing weather minimums: IFR.

* * * * *

(c) If a pilot initiates an instrument approach procedure based on a weather report that indicates that the specified visibility minimums exist and subsequently receives another weather report that indicates that conditions are below the minimum requirements, then the pilot may continue with the approach only if, the requirements of §91.175(l) of this chapter, or both of the following conditions are met—

(1) The later weather report is received when the airplane is in one of the following approach phases:

(i) The airplane is on a precision or APV approach and has passed the precision final approach fix;

(ii) The airplane is on an ASR or PAR final approach and has been turned over to the final approach controller; or

(iii) The airplane is on a nonprecision final approach and the airplane—

(A) Has passed the appropriate facility or final approach fix; or

(B) Where a final approach fix is not specified, has completed the procedure turn and is established inbound toward the airport on the final approach course within the distance prescribed in the procedure; and

(2) The pilot in command finds, on reaching the authorized MDA, or DA/DH, that the actual weather conditions are at or above the minimums prescribed for the procedure being used.

* * * * *

PART 135-OPERATING REQUIREMENTS: COMMUTER AND ON-DEMAND OPERATIONS

10. The authority citation for part 135 continues to read as follows:

Authority: 49 U.S.C. 106(g), 44113, 44701-44702, 44705, 44709, 44711-44713, 44715-44717, 44722.

11. Amend §135.225 by revising paragraph (c), as proposed at 67 FR 77348, Dec. 17, 2002, to read as follows:

§135.225 IFR: Takeoff, approach, and landing minimums.

* * * * *

(c) If a pilot has begun the final approach segment of an instrument approach to an airport under paragraph (b) of this section, and the pilot receives a later weather report indicating that conditions have worsened to below the minimum requirements, then the pilot may continue the approach only if the requirements of §91.175 (l) of this chapter, or both of the following conditions, are met—

(1) The later weather report is received when the aircraft is in one of the following approach phases:

(i) The aircraft is on a precision or APV approach and has passed the precision final approach fix;

(ii) The aircraft is on an ASR or PAR final approach and has been turned over to the final approach controller; or

(iii) The aircraft is on a nonprecision final approach and the aircraft—

(A) Has passed the appropriate facility or final approach fix; or

(B) Where a final approach fix is not specified, has completed the procedure turn and is established inbound toward the airport on the final approach course within the distance prescribed in the procedure; and

(2) The pilot in command finds, on reaching the authorized MDA or DA/DH, that the actual weather conditions are at or above the minimums prescribed for the procedure being used.

* * * * *

Issued in Washington, DC on February 4, 2003

Louis C. Cusimano
Acting Director, Flight Standards Service

Certified to be a True Copy
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