

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