

# NFG APPENDIX 4

ORDER: 8400.10

APPENDIX: 3 (FAA designation. Appendix 4 this manual)

BULLETIN TYPE: Flight Standards Handbook Bulletin For Air Transportation (HBAT)

BULLETIN NUMBER: HBAT 06-02A

BULLETIN TITLE: Helicopter Emergency Medical Services (HEMS) Loss of Control (LOC) and Controlled Flight into Terrain (CFIT) Accident Avoidance Programs

EFFECTIVE DATE: 1/23/06

REVISION DATE: 3/14/06

TRACKING NUMBER: N/A

APPLICABILITY:

M/M	ATA Code	14 CFR	PTRS
N/A	N/A	135	1380/1307/1303

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**This HBAT has been revised to provide the correct contact phone number in paragraph 7.**

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1. PURPOSE. This bulletin was developed to provide principal operations inspectors (POI) with guidance related to loss of control (LOC) and controlled flight into terrain (CFIT) accident avoidance programs used by helicopter emergency medical services (HEMS) operators. This bulletin also contains information for POIs to provide to HEMS operators for developing their LOC/CFIT accident avoidance programs, and clarifies the guidance contained in Federal Aviation Administration (FAA) Order 8400.10, Air Transportation Operations Inspector's Handbook, volume 3, chapter 2, section 6, paragraphs 511-517; and section 7, table 3.2.7.4.

2. BACKGROUND.

A. HEMS operate in a demanding environment. They provide an invaluable service to the public by providing crucial, safe, and efficient transportation of critically ill and injured patients to tertiary medical care facilities. While the contribution of HEMS is a profound component of the nation's medical infrastructure, from an operational standpoint, it is, at its

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foundation, a commercial aviation activity performed by FAA-certificated air carrier operators. Therefore, it must be conducted with the highest level of safety.

B. HEMS operations have recently experienced an increasing number of accidents, especially accidents involving LOC and CFIT.

C. Order 8400.10 identifies pilot training and checking standards that are designed to reduce the risk of LOC accidents. However, application of these training and checking standards appears to be inconsistent. Accordingly, this bulletin clarifies the guidance contained in Order 8400.10 and requires a review of operator training programs, including checking modules, to guarantee proper pilot qualification for HEMS operations.

D. Additionally, this bulletin provides guidance and direction to PIs for a review of each General Operations Manual (GOM) so that there is an integrated program in place to avoid CFIT accidents.

**NOTE: Additional background information may be found in Notice 8000.293, Helicopter Emergency Medical Services Operations, dated January 28, 2005; Notice 8000.301, Operational Risk Assessment Programs for Helicopter EMS, dated August 1, 2005; and Notice 8000.307, Special Emphasis Inspection Program for Helicopter Emergency Medical Services, dated September 27, 2005. These may be found at the following Web site:**  
[http://www.faa.gov/library/manuals/examiners\\_inspectors/8000/](http://www.faa.gov/library/manuals/examiners_inspectors/8000/)

3. DEFINITIONS. For helicopters, as distinct from fixed-wing airplanes, within the scope of this bulletin and appendices:

A. **Loss of control (LOC)** is the loss of any combination of flight attitude, airspeed, altitude, or heading control, with no causal aircraft malfunction. Examples of LOC include:

- LOC after attempting continued visual flight rules (VFR) flight in instrument meteorological conditions (IMC)
- LOC due to loss of surface or horizon reference at night in an area with insufficient surface or celestial lighting

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- LOC from spatial disorientation from the loss of a usable horizon due to environmental conditions, such as a haze, whiteout, flat light or brownout, in otherwise visual flying conditions.

B. **Controlled flight into terrain (CFIT)** is any event in which an airworthy aircraft under the control of the flightcrew is flown unintentionally into terrain, obstacles, or water, usually with no prior awareness by the crew. Examples of situations that would result in a CFIT accident include:

- Failing to see and avoid an unlighted ridgeline at night
- A navigation error that places an aircraft on a path toward terrain higher than the altitude being maintained

**NOTE: CFIT accidents may result from loss of surface and horizon reference and the resultant inability of the pilot to see and avoid terrain or obstacles. These accidents differ from LOC accidents in that the aircraft is under control.**

4. DISCUSSION. The avoidance of LOC and CFIT accidents requires a systematic effort involving training, checking, and a review of operational procedures.

A. To avoid LOC accidents, pilots conducting HEMS operations should be trained and demonstrate skill in identifying and avoiding conditions that place the flight at risk for inadvertent IMC encounters and emergency/inadvertent IFR recovery procedures. Equally important is the demonstrated skill to recover from inadvertent IMC should the situation be encountered. Appendix 1 provides guidance on the evaluation of LOC training and checking programs, including amendments to Order 8400.10.

B. To avoid CFIT accidents, operators and pilots should have a program that integrates strategic and tactical CFIT avoidance technologies and procedures. Appendix 2 provides guidance for the evaluation of integrated CFIT avoidance programs.

5. ACTION.

A. POIs assigned to HEMS operators should review the contents of this bulletin and provide a copy to their assigned operators or refer them to the FAA public Web site where it may be

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downloaded at no cost. POIs should encourage the operators to distribute this bulletin to each of the operator's bases and sub-bases.

B. POIs shall, within 90 days of this bulletin, review all training programs (including checking modules) used to train HEMS pilots (including those assigned only to VFR pilot duties) to determine if the programs meet the requirements of Appendix 1.

C. POIs shall, within 90 days of this bulletin, review each assigned HEMS operator's procedures contained in the GOM to ensure that an integrated CFIT accident avoidance program is in place. Guidance on the evaluation of these programs is provided in Appendix 1.

### 6. TRACKING.

A. Document the conveyance of the information contained in this bulletin for each HEMS operator:

(1) Use Program Tracking and Reporting Subsystem (PTRS) code 1380.

(2) Enter "**HBAT0602**" in the "National Use" field (without the quotes).

(3) After dissemination of the bulletin to the certificate holder, close out the PTRS.

B. Document review of the certificate holder's training program to ensure compliance with the requirements set forth in Appendix 1:

(1) Use PTRS code 1307.

(2) Enter "**HBAT0602**" in the "National Use" field (without the quotes).

(3) After completion of the review, close out the PTRS.

C. Document review of the certificate holder's operational procedures to ensure that an integrated CFIT avoidance program is present:

(1) Use PTRS code 1303.

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(2) Enter "HBAT0602" in the "National Use" field (without the quotes).

(3) After completion of the review, close out the PTRS.

7. INQUIRIES. The Air Transportation Division, AFS-200, developed this bulletin. Questions concerning this bulletin should be directed to the Commuter, On Demand, and Training Center Branch, AFS-250, at (202) 267-3437.

8. LOCATION. Appendix 1 of this bulletin will be incorporated into Order 8400.10, volume 3, chapter 2, section 6. Appendix 2 will be incorporated into Order 8400.10, volume 3, chapter 2, section 7.

ORIGINAL SIGNED BY  
THOMAS PENLAND (for)

Thomas Toula  
Manager, Air Transportation Division

ATTACHMENTS

**Appendix 1. To be incorporated into FAA Order 8400.10, volume 3, chapter 2, section 6.**

**511. PIC/SIC FLIGHT TRAINING (ALL TRAINING CATEGORIES): HELICOPTERS.**

*A. Required Maneuvers and Procedures.* Training in the maneuvers and procedures table 3.2.6.10 must be conducted for satisfactory completion of each category of flight training. Those training events annotated with a “SEA” symbol are only required for an operator engaged in water operations.

(1) PICs must complete training in each training event in this table.

(2) SICs must complete training in each training event in this table. SIC training in the following events does not require manipulation of the primary aircraft controls but should emphasize the duties of the pilot-not-flying:

- Category “A” vertical and/or edge takeoffs and landings
- Approach and landing with anti-torque malfunctions

**NOTE: The levels of training devices and/or simulators to be used for the training events listed in table 3.2.6.10 are currently under development.**

*B. Training Emphasis Considerations.* A POI should ensure that the operator’s flight training emphasizes the appropriate areas for these categories of training:

- For initial new-hire training, emphasis should be on specific company procedures
- For transition training, emphasis should be on the handling characteristics and the maneuvers and procedures pertinent to the specific aircraft type
- For upgrade training, emphasis should be on the specific duties and responsibilities pertinent to the crewmember position
- For recurrent training, emphasis should be on new or revised maneuvers or procedures pertinent to line operations
- For all pilot training programs, emphasis should be on avoidance and recovery from inadvertent entry into instrument meteorological conditions (IMC), including the loss of adequate surface or horizontal reference in visual flight rules (VFR) conditions, and the application of the operator’s controlled flight into terrain (CFIT) avoidance program
- For all training programs, emphasis on operations in various environments, such as mountainous areas, deserts, overwater, and in desolate areas

*C. Part 135 Recurrent Flight Training (RFT).* Recurrent flight training must be conducted periodically for both PICs and SICs, at least once every 12 months. Section 135.351(c) specifies that recurrent flight training for pilots must include at least “...flight training in the maneuvers or procedures in this subpart except that satisfactory completion of the check required by § 135.293 (the competency check)... may be substituted for recurrent flight training.” The competency check may include any of the maneuvers and procedures currently required for the original

issuance of the particular pilot certificate, for the operations authorized, and appropriate to the category, class, and type of aircraft involved. The instrument proficiency check, as specified in § 135.293(c), may be substituted for the competency check. Additionally, there are no provisions in part 135 listing the required maneuvers and procedures for flight training or checking. Training on the events in the applicable tables in this section, however, does meet the part 135 competency and instrument proficiency check requirements and, therefore, the recurrent flight training requirements.

*D. Helicopter Flight Training Device and Flight Simulator Usage.* The criteria for the use of helicopter flight training devices and flight simulators are currently under development. Several helicopter training devices and simulators have been individually approved using interim criteria. These devices and simulators may continue to be used in part 135 training and checking activities in accordance with specific approvals currently in effect.

### **513. LOC ACCIDENT AVOIDANCE TRAINING AND CHECKING REQUIREMENTS.**

A. All helicopter emergency medical services (HEMS) pilots must be trained and checked on procedures for the avoidance of loss of control (LOC) accidents, specifically, recovery from inadvertent IMC. It should be noted that inadvertent IMC may occur in meteorological conditions that meet or exceed 14 CFR parts 91, 135, or operation specification (OpSpec)-authorized VFR ceiling and visibility minima. Inadvertent IMC may occur in these conditions when visual conditions do not allow for the determination of a usable horizon, such as flat light conditions, and night operations over unlit surfaces in low-lighting conditions. Even though these conditions may occur in high ceiling and visibility environments, the effect is the same- a loss of horizontal or surface reference by which the pilot typically controls a helicopter in VFR flight. Without adequate training and checking, these conditions may not be survivable.

B. POIs should approve methods appropriate to the aircraft, equipment, and facilities available. POIs should consider the operator's hiring standards and practices (such as requiring a helicopter instrument rating for VFR pilots) in evaluating training and checking modules. POIs shall ensure that an operator's pilots accomplish these training and checking events in the aircraft in which the pilot will be qualified for revenue operations (or in an appropriately equipped simulator or training device). The events should reflect a realistic course of action the pilot might take to escape from an inadvertent encounter with IMC.

C. Consideration should be given to the local flying area's terrain, airspace, air traffic facilities, weather (including seasonal affects such as icing, fog, convective weather), and available airfields and approaches. In all cases, pilots must be able to readily identify the minimum initial altitude and course to take to avoid terrain and obstacle collision.

D. All pilots must receive training on avoidance and recovery from inadvertent encounters with IMC, including those authorized to conduct IFR operations under OpSpecs Part H. Unplanned transition from an intended VFR flight to emergency IFR operations involves a different set of pilot actions, including different navigation and operational procedures, interaction with air traffic control (ATC), and crewmember resource management (CRM).

*E.* Training and checking should emphasize the identification of circumstances conducive to inadvertent IMC encounters. This training and checking must emphasize pilot and operator discipline to abandon continued VFR flight in deteriorating conditions. This discipline should include an established minimum altitude/airspeed combination. If this altitude/airspeed combination cannot be maintained, the discipline will dictate a diversion to better conditions or a return to starting base. Conditions may also dictate a landing short of the destination, even an off-airport precautionary landing, or initiating an emergency transition to IFR as appropriate to the situation.

*F.* Training and checking for all pilots, whether helicopter instrument-rated or not, must include attitude instrument flying, recovery from unusual attitudes, ATC communications, and an instrument approach. If the aircraft is appropriately equipped and the check is conducted at a location where an instrument landing system (ILS) is operational, an ILS approach should be demonstrated. If unable to conduct an ILS approach, if the aircraft is equipped with an IFR approach-capable global positioning system (GPS) receiver, and the operator maintains its GPS to IFR standards, including a current IFR database, and the check conducted where a GPS approach is available, a GPS approach should be demonstrated. If neither ILS nor GPS procedures can be performed, another instrument approach must be performed. Partial panel operations should be considered if attitude and gyroscopic heading information are available from single sources.

*G.* In addition to training, the operator should establish an LOC avoidance policy which supports the emergency authority of the pilot to divert, make a precautionary landing or make an emergency transition to IFR. The operator must also develop a plan of action as a component of the General Operations Manual which describes pilot, medical crew, and ground communications specialist duties, and responsibilities and authorities in the avoidance and recovery from inadvertent IMC encounters. This plan should be adaptable to each facility from which the certificate holder conducts HEMS operations. The plan of action should include a checklist for emergency IFR transition.

(1) This plan of action should integrate all resources to support the pilot's decision-making and performance of the appropriate avoidance and recovery actions. For example, the plan may include the use of on-board medical personnel to assist the pilot by reading frequencies, courses, and altitudes for the pilot, allowing a higher level of pilot concentration on controlling the aircraft during the transition. In this case, the operator should provide appropriate training and aeronautical information reference materials for the medical crew.

(2) Other resources available to the pilot include ground communications specialists and FAA air traffic resources.

**515. CFIT AVOIDANCE.** A review of HEMS accident data indicates that CFIT accidents, especially in night and low visibility conditions are a significant operational risk. This paragraph describes the implementation of CFIT avoidance programs by HEMS operators.

*A. Operator and FAA Actions.*

## Appendix 1

(1) Each operator must develop and use a CFIT avoidance program. The POI must review the operator's program in total to determine its effectiveness in avoiding CFIT accidents.

(2) CFIT avoidance techniques are classified as supporting either tactical or strategic avoidance of terrain or obstacles.

(3) Examples of strategic CFIT accident avoidance systems could include:

(a) *The Use of IFR Procedures.* IFR operations provide path definition (lateral navigation) coupled with obstruction clearance criteria that protect the aircraft from CFIT accidents when operating at or above minimum published altitudes, and in accordance with standard IFR operating procedures.

(b) *The Use of GPS-Based Navigation Routes with Preflight Obstacle Assessment Conducted to Determine the Minimum Safe Altitude Along the Route.* These routes may be pre-planned (such as routes between hospitals or between sites such as highway rest areas and the hospital) or may be made up as required using a variety of computer-based tools. CFIT avoidance is supported by assessing obstacles along the route, and to each side by an appropriate amount (e.g., 2 nautical miles (nm)), and adding a safety buffer (e.g., 300 ft.) above the highest point along the route. Just as in IFR operations, a specific portion of the route may be assessed separately, allowing lower altitudes to be used along certain portions of the route when obstacles do not require the higher altitude.

(4) Examples of tactical CFIT avoidance system include:

(a) *The Integration of Night Vision Goggles (NVG) into VFR Operations.* The use of NVGs in VFR conditions (meeting OpSpecs-authorized minimum ceiling and visibility requirements) can increase the ability of pilots to successfully identify and avoid terrain and obstructions in low lighting conditions at night.

(b) *The Use of a Radio Altimeter (RA) or Terrain Awareness and Warning Systems (TAWS) in VFR Operations.* These devices can enhance situational awareness during VFR flight operations, and can support CFIT avoidance.

(5) The more effective CFIT avoidance programs integrate strategic and tactical CFIT avoidance technologies and procedures. To be acceptable, an integrated CFIT avoidance program must:

(a) Strategically identify flight paths and altitudes that would result in inadequate obstacle/terrain clearance and adjust appropriately.

(b) Provide information and procedures that support the selection of flight paths and altitudes that safely avoid CFIT encounters.

(c) Provide information and procedures that support safe and effective decision-making both in preflight planning as well as inflight operations (to include initiation, cancellation, diversion, or termination of flight operations).

(d) Capitalize on tactical CFIT avoidance capabilities.

*B. CFIT Avoidance Program Integration.* CFIT avoidance programs can exist in a variety of configurations. The following components, or any portion, may be mixed and matched in virtually any combination of other components, depending on operator preference. The success of the desired configuration depends on the integration of available operational information, airborne and ground technology, and operating procedures. The following are examples of components of a CFIT avoidance program:

*(1) Operational Information.*

(a) Obstacle and terrain data must be in a form that is usable by crewmembers in flight planning and execution. Data should be available in common form for pilots and ground communications personnel. Current VFR charts are the minimum standard for this data.

(b) This data may be supplemented by electronic database(s). When electronic database(s) are used, data commonality between ground and flight personnel may not be possible; however, all participants must understand the content, application, and limitations of the electronic database(s).

*(2) Airborne Technology.*

(a) Radar altimeter and TAWS systems. These systems can provide terrain awareness while airborne and when coupled with obstacle/terrain evaluation procedures can be valuable in avoiding CFIT accidents.

(b) *GPS.* The use of GPS is prevalent in the HEMS community and may be applied with tremendous benefit to CFIT avoidance. GPS provides a highly accurate and repeatable navigation capability and, when coupled with obstacle/terrain data through an obstacle evaluation procedure, may result in a high confidence in avoiding CFIT accidents.

*C. Uses of GPS in CFIT Avoidance.*

*(1) Terrain/Obstacle Avoidance through Preflight Obstacle Assessment and Navigation Procedures.* This method integrates navigation performance and obstacle terrain data to specify a route and minimum altitude for CFIT avoidance. The steps in this process include:

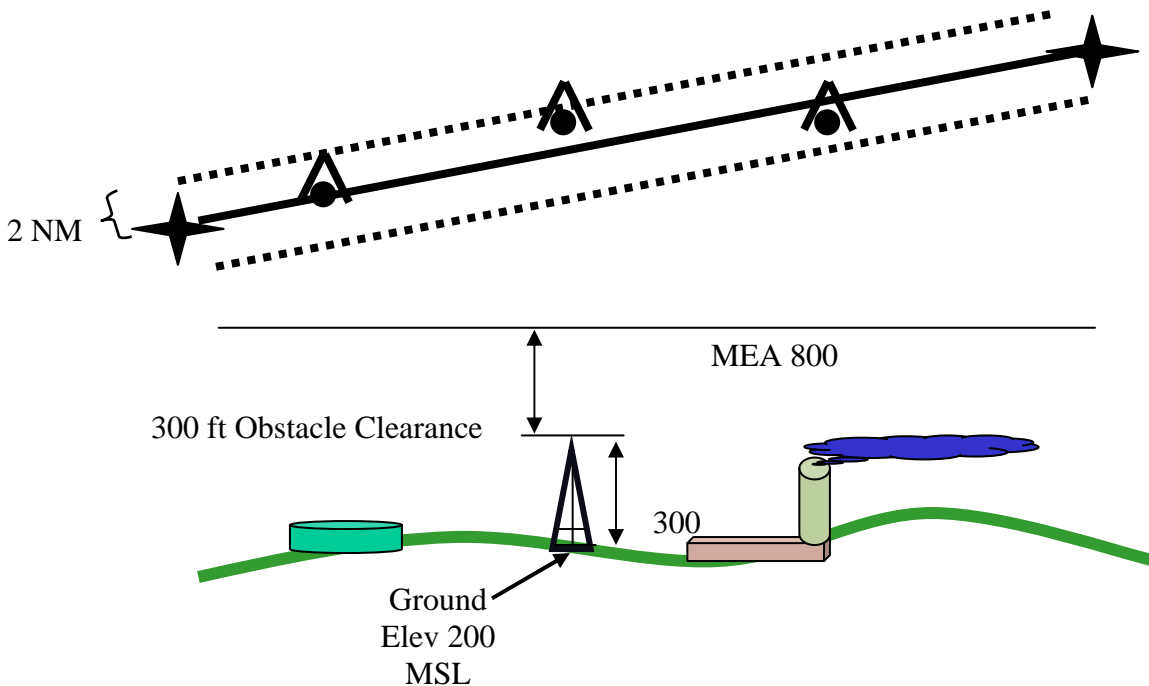
(a) Define routes using latitude/longitude or airport/navigational aid references.

(b) Plot route on the appropriate sectional chart.

(c) Measure 2 nautical miles each side.

- (d) Identify the highest obstacle (the controlling obstacle) and its elevation (MSL).
- (e) Add an appropriate obstacle clearance value (minimum 300 feet) to determine the minimum altitude along this route. This is similar to the application of required obstacle clearance in the design of instrument procedures.
- (f) Load and activate a user-defined flight plan using the preflight planning coordinates.
- (g) While airborne, operate the GPS in the helicopter in the “Terminal” mode, which invokes a 1 nautical mile course deviation indicator (CDI) sensitivity, and a receiver autonomous integrity monitor (RAIM) limit of no more than 1 nautical mile. See Figure 3.2.6.11 for a graphical description of this method of CFIT avoidance.

**FIGURE 3.2.6.11  
USE OF GPS IN CFIT AVOIDANCE**



*(2) Use of GPS for Situational Awareness.*

(a) Operators may use the user-defined waypoint function of their GPS receivers to mark known obstructions and terrain features for enhanced situational awareness. For example, if an operator's area includes a terrain peak or an antennae farm, then that set of obstructions can be entered into the user-defined database using a waypoint identifier such as HIGND, TVTWR, etc., to imply hazard. If multiple entries for similar features in the area are made, numerically sequence the names using some geographical logic (e.g., north to south, near base to far from base) that is agreed to and understood by all users. Examples include TVTR1, TVTR2, HIGD1, HIGD2, etc.

(b) The latitude and longitude may be entered from data found on a sectional chart or by noting the position while overflying the obstacle feature. Many receivers have a "mark position" function that allows users to automatically capture position data and then later name the navigation fix as desired.

**NOTE: When this system is used, procedures should be in place to ensure personnel do not make changes to the user-defined waypoint database that would affect the set of operator-established situational awareness waypoints.**

(c) These user-defined obstruction and terrain waypoints can be used inflight in several ways, depending on equipment capabilities and operator procedures:

- GPS systems with moving map displays that display waypoints may be used by pilots and other crewmembers to orient themselves relative to known significant obstructions/terrain features. Knowledge of the bearing and distance to these features may enhance sensitivity to their proximity and may support effective crewmember division of attention. In reduced visibility or lighting, this information may be critical for obstacle/terrain avoidance
- Systems without moving maps may be equipped with a waypoint alarm feature, which provides an annunciation of approach to a waypoint. While less intuitive than a moving map, this function does improve situational awareness
- Pilots, with or without moving map or alarm features available, may choose to monitor distance and bearing to a selected terrain or obstacle waypoint when operating in the vicinity at or below a designated clearance altitude. The monitoring of position relative to the waypoint may improve situational awareness and, as with the other methods, promote CFIT avoidance.

*(3) Radar Altimeter (RA).*

*(a)* RAs, also known as radio altimeters, can provide critical information of current height above terrain. This information is valuable when combined with position information, terrain elevation, and obstacle information, and can enhance situational awareness.

*(b)* The limitations of RA, however, must be understood. An RA provides only current terrain clearance information. It has no “look-ahead” capability and cannot identify height above obstacles unless it provides a return to the RA transceiver. In fact, the IFR use of RA is limited to determining decision altitude/height-only over surveyed and relatively level terrain.

*(c)* RA systems provide their greatest benefit when integrated with other navigation systems and procedures.

*(4) TAWS.* TAWS provides visual and aural warning of approaching terrain or obstacles that would constitute a hazard to continued flight along the present flight path. While all TAWS systems improve situational awareness, many TAWS systems designed for airplanes employ alerting and warning logic not optimized for helicopter operations, leading to unnecessary alerts and warnings. However, these systems can provide a great increase in the level of pilot awareness of prominent terrain and obstruction features and can greatly enhance safety. Some systems are configured specifically for helicopter operations, and offer additional capability for CFIT avoidance. In all cases, TAWS is best used when integrated into a system of CFIT avoidance which includes planning, navigation, and flight procedures.

*(5) Night Vision Goggles (NVG).*

*(a)* The use of NVGs can substantially reduce the risk of CFIT accidents in low lighting conditions. Their use requires issuance of OpSpec A050 and compliance with the

airworthiness, training, and operations requirements of HBAT 04-02, Night Vision Imaging Systems, current edition, and Order 8400.10, as appropriate.

(b) The use of NVGs as the sole source for CFIT avoidance is a tactical method. However, NVGs can greatly support strategic avoidance of CFIT accidents when integrated into a complete CFIT avoidance program.

*D. Ground Technologies: Use of Ground Communications Specialists (GCS) for Crewmember Decision Support.*

(1) Part 135 operations do not require a certificated aircraft dispatcher. However, most HEMS operations use a GCS for medical coordination and flight locating. These personnel are often familiar with certain areas of helicopter flight operations and may effectively support CFIT avoidance with appropriate training.

(2) GCSs, with training, can support CFIT avoidance by providing weather and terrain/obstacle information as the flight progresses, especially when deviation from the planned flight path or diversion is required due to changing conditions. The role of the GCS must be identified in the certificate holder's GOM or equivalent, along with the duties, responsibilities, and authorities of the GCS.

(3) Technologies that can support GCS's role in CFIT avoidance include graphical user interface navigation charting programs or services, Internet access to weather data (including text and graphical products), Notices to Airmen (NOTAMS) and telecommunications with air traffic facilities. Integrated airborne and ground technologies, such as Automatic Dependent Surveillance (ADS) systems, multilateration, and other surveillance systems can substantially improve the GCS's capabilities to provide timely weather and terrain and obstacle information.

(4) For optimum effectiveness, GCSs should be trained and found competent by the certificate holder in the areas of knowledge referenced in paragraph 517, below.

*E. Operating Procedures.* CFIT avoidance begins with the preflight planning for a flight assignment.

(1) This planning must include:

(a) Identifying the route of flight.

(b) Identifying the terrain and obstacles along the path within the area of expected navigation performance.

(c) Identifying the altitude required to cross the terrain and obstacles by a safe amount.

(d) Considerations for deviation and diversion in the case of deteriorating weather or seeing conditions (where the “soft” direction is; that is, where the terrain and obstacles are lower).

(2) The development of this plan should be made in coordination with other crewmembers and the GCS.

(3) Once the plan is determined, the plan must be briefed by the pilot to other crewmembers and the GCSs so that all have the same understanding of the profile (route and altitude) of the expected flight.

(4) Upon initiation of the flight, the pilot must observe the minimum altitudes to ensure CFIT avoidance. He/she should still maintain a sharp lookout for obstacles and terrain along the route of flight and maneuver as appropriate. All tactical systems must be employed to avoid a CFIT accident (NVGs, RA, TAWS, certain GPS applications, and the use of all available crewmembers in scanning for terrain and obstacles).

(5) If a deviation from the planned flight profile is required, the pilot should consult with the other crewmembers and the GCS, if available and trained, to develop an appropriate course of action. This course of action must include an evaluation of terrain and obstacles along the newly identified path and the determination of a new minimum altitude.

(6) If unable to maintain this altitude due to weather or other consideration, diversion to an alternate destination or a precautionary landing must be considered. If the decision is made to continue, identify all controlling obstacles and terrain (those that penetrate above the minimum clearance height) ahead of the aircraft as early as possible, as the flight progresses. Use all available technologies and personnel aboard the aircraft to facilitate early detection and avoidance of terrain and obstacles. GCSs may assist by aggressively following the flight and providing upcoming terrain and obstacle information.

#### **517. SUGGESTED TRAINING OUTLINE FOR GROUND COMMUNICATIONS SPECIALISTS FOR SUPPORT OF CFIT ACCIDENT AVOIDANCE PROGRAMS.**

A. Ground training should include, at least:

(1) Aviation weather.

(2) Use of aviation weather products.

(3) Navigation techniques appropriate to the assignment.

(4) FAA aircraft communications, navigation, and surveillance systems, such as VHF communications, VOR, NDB, DME, GPS, and radar

(5) Operator communications systems, and surveillance systems (if applicable), such as automatic dependent surveillance (ADS) and multilateration.

(6) Use of aeronautical charts and aeronautical data sources.

(7) Helicopter performance (appropriate to the aircraft in use).

- Range
- Speed
- Fuel consumption
- Operating ceilings

(8) Helicopter weight and balance/loading limitations.

(9) Helicopter operational limitations (day/night, VFR/IFR, icing, etc.).

(10) Helicopter fueling and servicing requirements.

(11) Helicopter system capabilities and limitations (communications, navigation, night vision goggles, airborne weather radar or lightning detection, searchlight).

(12) Landing facility requirements.

(13) Title 14 CFRs.

(14) OpSpecs.

(15) Use of the minimum equipment list.

(16) Certificate holder operational procedures.

(17) Emergency procedures (overdue aircraft, accident/incident reporting).

(18) Aeronautical decision making.

(19) Risk management.

*B. Practical Training: Local Flying Area Orientation.*

(1) Terrain features.

(2) Obstructions.

(3) “Weather producers” (such as industrial areas, fog prone areas, etc.).

## Appendix 1

- (4) Airspace/air traffic facilities.
- (5) Airports/heliports/fuel sources.
- (6) Instrument approaches.
- (7) Predominant air traffic flows.
- (8) Landmarks and cultural features.
- (9) Facility specific information, such as flight locating, dispatch, and communications systems and procedures.
- (10) Air Traffic Control, law enforcement, fire, search and rescue, Coast Guard/marine patrol, forest management, etc. contacts (radio, telephone)
- (11) Lost procedures

**518. - 522. RESERVED**



**FIGURE 3.2.7.4. (Cont'd.)  
PART 135 CHECKING MODULES  
HELICOPTERS**

<b>EVENTS</b>	<b>VFR COMP.</b>	<b>IFR COMP.</b>	<b>INST. PROF.</b>	<b>NOTES</b>
<b>LANDINGS AND APPROACHES TO LANDINGS</b>				
Normal	B	B	P	8
Landing from an ILS			P	
Landing with engine-out	B	B	P	ME Only
Circling approach			P	9
<b>SEA &amp; SKI OPERATIONS</b> (If applicable)				
Normal TO & Landing	B	B	P	
<b>NONNORMAL AND EMERGENCY PROCEDURES</b>				
System Malfunction	B	B	P	#
Recovery from Inadvertent IMC	B	B	B	4
Maneuver by Partial Panel	B	B	P	6
Instrument Approach	B	B	P	
Power failure and Autorotation to a power recovery	B	B	P	SE Only
Hovering Autorotations	B	B	P	SE Only
Tail Rotor Failure	B	B	P	Oral Only
Dynamic Rollover	B	B	P	Oral Only
Low Rotor RPM	B	B	P	Oral Only
Anti-Torque System Failure	B	B	P	Oral Only
Confined Area/Pinnacle Operations	P		P	
Slope Operations	P		P	

NOTES TO FIGURE 3.2.7.4.:

# Both PIC and SIC may be evaluated performing their assigned duties in these events simultaneously when the check pilot is not seated at the controls.

\*\* May be waived at the discretion of the POI and the check airman when the check is not conducted in conjunction with initial new-hire or initial equipment training.

1 See volume 5, paragraph 151 B.

2 See volume 5, paragraph 151 D.

3 The applicant must demonstrate the ability to use all installed equipment including autopilots and flight directors. In multiengine helicopters, an engine out ILS may be substituted for the normal ILS at the option of the inspector or check airman administering the check.

4 The event should reflect a realistic course of action the pilot might take to escape from an inadvertent encounter with IMC conditions. POIs should approve methods appropriate to the aircraft, equipment, and facilities available. Training and checking must provide emphasis on avoidance of inadvertent IFR, including the discipline and decisionmaking required to divert, make a precautionary landing, or make an emergency transition to IFR, as appropriate to the circumstances. This event must include attitude instrument flying, recovery from unusual attitudes, navigation, ATC communications, and at least one instrument approach. If the aircraft is appropriately equipped and the check is conducted at a location where an ILS is operational, an ILS approach should be demonstrated. If unable to conduct an ILS approach, if the aircraft is equipped with an IFR approach capable GPS receiver, and the operator

## Appendix 2

maintains their GPS to IFR standards, including a current IFR database, and the check conducted where a GPS approach is available, a GPS approach should be demonstrated. If neither an ILS nor GPS procedures can be performed, another instrument approach must be performed. Partial panel operations should be considered if attitude and gyroscopic heading information are available from single sources.

5 See volume 5, paragraph 155 A.

6 Helicopters not having standby instrumentation.

7 See volume 5, paragraph 155 B. Any two nonprecision approaches authorized by the OpSpecs may be accomplished at the discretion of the inspector or check airman conducting the check.

8 See volume 5, paragraph 157.

9 SICs need not be evaluated in circling approaches when the operators procedures restrict SICs from conducting this event in revenue service.