

WPR21FA143

**OPERATIONAL FACTORS/HUMAN PERFORMANCE**

Group Chair's Factual Report - Attachment 11

CFIT-A Manual Excerpts

October 25, 2022

## CFIT-A POLICIES AND PROCEDURES

The policies and procedures laid out here are to be used as a guideline for operating in conditions that have the highest risk for CFIT accidents. The Federal Aviation Regulations, Helicopter flight manual, Soloy Operations Manual and any other applicable laws or regulations take precedence over the information in this manual.

In all cases the Pilot in Command (PIC) shall use their best judgement to determine the correct course of action. Extra planning and caution should be used whenever flying in adverse weather conditions. Pilots are encouraged to err on the side of caution, slow down if possible, and not disregard the opportunity to land safely before reaching a critical situation.

CFIT avoidance is primarily concerned with white-out/brown-out conditions, flat-light, deteriorating visibility, and inadvertent IMC. However, CFIT is possible in any meteorological conditions including VMC and pilots must not get complacent with regard to terrain and obstacle clearances.

## WHITE-OUT CONDITIONS

The PIC shall ensure VFR flight is conducted with positive ground reference at all times. Pilots should always try to utilize at least two visual references in case one visual reference point becomes obscured. At no time shall a pilot fly past his last visual reference point.

Prior to taking off or landing pilots shall make an assessment of the weather and ground conditions to determine the possibility of encountering white-out conditions during approach or departure. If white-out conditions are possible, approaches and departures shall be conducted in a manner that ensures visible references remain visible during the entire approach or departure. Consideration needs to be given to ground conditions that can induce a white-out or brown out condition from the helicopters rotor wash. Ground white-out conditions can be induced even during bright, sunny days with good visibility and ceilings.

If unfavorable ground conditions are present for landing then the PIC shall either:

- a. Attempt to clear the ground conditions by coming into a high hover on approach and blowing excess snow or dust clear of the landing zone while maintaining adequate visual references, clear of obscuring debris in a high hover.
- b. Minimize rotor wash during landing by carrying out a no-hover, into wind, zero speed spot landing. This maneuver includes minimizing aft cyclic inputs to decrease the amount of rotor wash in front of the helicopter.
- c. Add additional man-made visual references to the landing zone such as dyes, ribbons, etc.

If inadvertent white-out conditions are encountered it is important to rely on instrument indications and carefully attempt to fly away from obstacles and terrain until visible references can be re-established. If visible references cannot be reestablished then proceed as inadvertent IMC.

## FLAT-LIGHT CONDITIONS

Flying in flat-light conditions can be done safely with good judgement and proper planning. The PIC shall ensure that visibility minimums are adhered to at all times. As with white-out conditions, maintaining visual references is important. Situational awareness in flat-light conditions must be maintained as a false sense of security can be developed if some references are visible. The use of blue-blocker eyewear can help enhance visibility in some flat-light conditions and should be considered.

Extra caution should be taken for take-off and landing in flat-light conditions. Take-off and landing in these conditions shall be accomplished in a manner that allows visual references to be maintained throughout the maneuver. Thought should be given to arrival and departure routes to ensure safe transitions to and from a hover.

Extra terrain clearances and minimum altitudes should be utilized at all times in flat-light conditions as there may be covered terrain that is not discernable. If terrain clearances cannot be safely ensured than alternate flight paths should be utilized.

If featureless terrain is encountered and safe terrain clearances cannot be ensured than do not proceed across unknown terrain or beyond visual references.

## DETERIORATING VISIBILITY

The PIC shall ensure that ceiling, cloud clearances, and visibility minimums are adhered to at all times. The PIC shall use the most restrictive minimums between the FAA regulations, customer policy, personal minimums, and safe judgment.

- The minimums used shall never be less than ½ statute mile in-flight visibility.

To ensure that visibility minimums are adhered to the pilot must estimate in-flight visibility when visibility is limited. This can be accomplished with a number of methods one of which we will lay out here:

A time-distance calculation is often one of the easier methods to use to estimate visibility. To do so time how long it takes you to reach visible reference you are flying towards. To find the distance, multiply your speed by the time it took you to reach your reference point.

- For example at 60 knots you cover 1 nm every minute  
(60 nm/60 min) X 1 min = 1 nm
- At 120 knots you cover 2 nm every minute  
(120 nm/60 min) X 1 min = 2 nm
- A good rule of thumb is you should be able to see references at least 30 seconds away if you are traveling 60kts to ensure that you are within the regulatory minimum of ½ nm.

If in-flight visibility drops below minimums do not discount the need to land. If a safe landing cannot be accomplished slow down and attempt to return to areas of better visibility. If ground reference is lost proceed as inadvertent IMC.

## INADVERTENT IMC

If inadvertent IMC is encountered the importance to **fly the aircraft** must not be discounted. A smooth, and stable transition to instrument flying must be accomplished before directing attention to other resources. It is important to maintain smooth coordinated control of the aircraft while trusting the instrumentation while making the transition to instrument flight. Once stabilized instrument flight is obtained, then the pilot can dedicate resources to determining the safest method to depart the IMC conditions and return to VFR flight.

The most common method to return to VFR flight is to make a 180° turn and return to the last known position of VFR flight. This may not be possible in quickly changing weather conditions or if terrain clearance considerations do not allow it to be accomplished safely.

- Any external resources should be utilized if available including but not limited to:
  - ATC services
  - Communicating with ground personnel
  - Other aircraft
  - Ground navigation equipment
  - Onboard navigation equipment
- It is important to fly the aircraft smoothly and not over-control or lose the basic attitude of the helicopter due to erroneous flight control inputs. It is important in IMC flight to **trust the instruments** as your inner ear and outside visual cues can lead to improper and dangerous control inputs.
- If necessary, contact ATC or utilize 121.5 to declare an emergency and request emergency services.

In any of these scenarios the PIC shall communicate as soon as practicable any potentially hazardous weather conditions or the failure of any navigation or communication facilities if he or she considers that the knowledge of these conditions pose a hazard to other aircraft.

## ADVANCED AIRCRAFT SYSTEMS AND INSTRUMENTATION

Any installed aircraft systems that can help improve situational awareness should be utilized in adverse weather conditions. **DO NOT** switch off operable systems that are designed to provide additional situational awareness unless they are creating an undue hazard or pilot distraction.

Advanced systems that the pilot is unfamiliar with will require additional training to utilize properly. If a pilot is unfamiliar with a particular system it is important to request additional training to ensure safe operation of that system. Advanced systems can include Terrain Proximity Warning Systems (TPWS), ABS traffic systems, multi-function displays, thermal imaging, etc.

Radar altimeters are one of the most basic systems used for additional situational awareness in adverse weather conditions. It is important to know how to use the specific radar altimeter in the aircraft that you are flying and remember a few important points when utilizing radar altimeters for additional situational awareness.

- Radar altimeters are limited to displaying the altitude above the terrain **directly below the aircraft**. They cannot see or provide information about terrain ahead or to the sides of the aircraft.
- Radar altimeters can become inaccurate or inconsistent depending on the terrain surface. Clear ice, reflective snowpack, choppy seas, or other inconsistent terrain cover can affect the reliability and accuracy of the radar altimeter's indication. Use extra caution when operating in these conditions.
- Radar altimeters become unreliable during external load operations.

In all cases, if the aircraft is equipped with advanced instrumentation or systems it is important to understand how to properly utilize the equipment to aid in situational awareness and safety.

### CFIT-A GENERAL SUBJECTS

OBJECTIVE	Familiarize candidate with Controlled Flight into Terrain concepts, conditions, policy, procedures and avoidance.
MATERIALS	AC 00-6 Aviation Weather, AC 00-45 Aviation Weather Services, METAR Guidelines, AIM, Company CFIT-A Manual
STANDARD	75% on written or oral test

#### ELEMENTS

##### CFIT Definition

###### CFIT Causes

Loss of Situational Awareness, Cockpit Distractions, Complacency, Lack of Technical or Operational Experience, Lack of Adequate Preparation, Confusion

###### Accident review

###### Regulations and Policies

##### CFIT Avoidance

###### Recognition and avoidance procedures

###### Company Policies and Procedures

###### Flight Planning and Preparation

##### Flat-Light Conditions

###### Weather related factors

###### Environment related factors

###### Equipment related factors

##### Whiteout Conditions

###### Weather related factors

###### Environment related factors

##### Deteriorating Visibility Conditions

###### Weather factors

###### Estimating in-flight visibility

##### Inadvertent IMC

###### Returning to VMC conditions

###### Resources available

###### Declaring an emergency

##### Additional Training

Review key lessons and subjects in area(s) pilot is lacking as determined by pilot experience

Review key points of the lesson and solicit any questions

Solicit training evaluation feedback and comments

Evaluate candidate understanding with appropriate test

Find areas of weakness as revealed by test results

Provide any needed clarification and re-check candidate understanding

Summary statement and DOCUMENTATION OF TRAINING

## ATD SIMULATOR TRAINING

OBJECTIVE	Utilize an ATD to familiarize pilots with common CFIT scenarios and CFIT avoidance procedures
MATERIALS	AC 00-6 Aviation Weather, AC 00-45 Aviation Weather Services, METAR Guidelines, AIM, FAA-S-8081-4E, Soloy CFIT-A Manual
STANDARD	Completion of all 4 CFIT scenarios in the ATD simulator. All maneuvers for this lesson shall be completed within double the limits set forth in the FAA Instrument Helicopter Practical Test Standards to allow for deficiencies in ATD equipment.

### ELEMENTS

#### Scenario #1 – White Out

This scenario will expose the pilot to potentially hazardous white-out conditions and allow the pilot to perform the prescribed procedures for operating in potential white-out conditions.

Simulator set-up: Visibility should be set to ½ mile in winter conditions. Let the pilot make a normal approach to a landing zone. Before the helicopter reaches 50' AGL decrease the visibility to 0'/0NM, simulating a white-out situation caused by rotor wash and blowing snow.

- The correct course of action is to attempt a go-around if all visual references are suddenly lost. Once the pilot initiates a go-around, increase the visibility back to ½ mile and allow the pilot to attempt an approach and landing utilizing any of the white-out approach techniques.
- If the pilot recognizes the possibility of white-out prior to commencing a normal approach allow the pilot to land utilizing the white-out landing techniques.

Completion standards for this scenario are:

- Correct recognition of white-out conditions, and the correct application of a white-out landing procedure.
- Initiation of a go-around followed by a white-out landing procedure or initiation of a go-around followed by the selection of a more suitable landing area.

#### Scenario #2 – Flat-light

This scenario will expose the pilot to flat-light conditions where terrain clearances cannot be assured.

Simulator Set-up: The simulator should be set up with level flight in mountainous terrain and unrestricted visibility with a cloud layer that obscures the tops of the mountains. The pilot should be requested to fly across featureless terrain (i.e. a glacier). As the pilot departs the visual references visibility should be reduced to obscure visual references on the far side of the featureless terrain, requiring the pilot to execute a 180° turn back to VFR conditions.

Completion standards for this scenario are:

- Correct recognition of flat-light conditions, and the correct application of flat-light avoidance procedure.
- Initiation of a 180° turn prior to loss of visual references.

## ATD SIMULATOR TRAINING (Cont'd)

### Scenario #3 – Deteriorating Visibility

This scenario will expose the pilot to deteriorating visibility conditions and allow the pilot to perform the prescribed procedures for making correct decisions before visibility deteriorates below prescribed minimums.

Simulator set-up: Visibility should be set to 2 miles in winter conditions. Let the pilot establish level cruise flight while attempting to reach a pre-determined destination. Prior to reaching the destination slowly begin reducing the visibility in ¼ mile increments.

- The pilot's correct course of action is to verify the visibility is deteriorating and make a corrective action prior to visibility being reduced below ½ mile.
- Corrective actions can include turning around to return to the departure area, slowing down prior to making a decision, and landing before visibility drops below minimums.
  - The pilot may also elect to utilize outside resources including automated weather reports, contacting ATC, and radioing ahead to update known weather conditions.

Completion standards for this scenario are:

- Recognition of deteriorating visibility conditions, and the application of a deteriorating visibility procedure.
- The ability to apply a visibility estimating technique prior to visibility dropping below minimums or entering inadvertent IMC.

### Scenario #3 – Inadvertent IMC

This scenario will expose the pilot to inadvertent IMC conditions and allow the pilot to perform the prescribed procedures while utilizing single-pilot resource management and basic attitude instrument flying skills.

Simulator set-up: Weather should be set to night VFR conditions on a route from PANC to 87AK. The pilot should establish level cruise flight with positive visual references. After cruise flight is established, reduce the weather to IFR conditions and have the pilot transition to basic attitude instrument flying and deviate from the VFR route.

- The pilot's correct course of action is to maintain altitude during the transition to basic attitude instrument flying and recognize the transition to inadvertent IMC.
- Corrective actions can include turning around to return to VFR weather conditions, maintaining altitude and heading while determining the closest VFR weather conditions, or turning towards known VFR weather conditions.
  - The pilot may also elect to utilize outside resources including automated weather reports, contacting ATC, and radioing ahead to update known weather conditions.
  - The pilot may also elect to declare an emergency and contact ATC for assistance.

Completion standards for this scenario are:

- Recognition of inadvertent IMC conditions, and the positive transition to basic attitude instrument flying. Altitude loss should be limited to less than 500' of cruising altitude.
- The ability to understand the resources available while determining the safest route to return to known areas of VFR conditions.



### ATD SIMULATOR TRAINING (Cont'd)

If any scenarios are not completed satisfactorily, pause the simulation and review key policies and procedures prior to restarting the failed scenario. If the pilot cannot satisfactorily complete a scenario in 3 attempts, end the simulator training and note unsatisfactory performance on training forms. Review all classroom training prior to recommencing simulator training.

Review key points of the lesson and solicit any questions

Solicit training evaluation feedback from pilot

Evaluate candidate's ability with all procedures and scenarios

Find areas of weakness as revealed by scenario results

Provide any needed clarification and re-check candidate's understanding

Summary statement and DOCUMENTATION OF TRAINING