

Appendix C

Flight Safety Foundation CFIT Checklist Evaluate the Risk and Take Action

Flight Safety Foundation (FSF) designed this controlled-flight-into-terrain (CFIT) risk-assessment safety tool as part of its international program to reduce CFIT accidents, which present the greatest risks to aircraft, crews and passengers. The FSF CFIT Checklist is likely to undergo further developments, but the Foundation believes that the checklist is sufficiently developed to warrant distribution to the worldwide aviation community.

Use the checklist to evaluate specific flight operations and to enhance pilot awareness of the CFIT risk. The checklist is divided into three parts. In each part, numerical values are assigned to a variety of factors that the pilot/operator will use to score his/her own situation and to calculate a numerical total.

In Part I: CFIT Risk Assessment, the level of CFIT risk is calculated for each flight, sector or leg. In Part II: CFIT Risk-reduction Factors, Company Culture, Flight Standards, Hazard Awareness and Training, and Aircraft Equipment are factors, which are calculated in separate sections. In Part III: Your CFIT Risk, the totals of the four sections in Part II are combined into a single value (a positive number) and compared with the total (a negative number) in Part I: CFIT Risk Assessment to determine your CFIT Risk Score. To score the checklist, use a nonpermanent marker (do not use a ball point pen or pencil) and erase with a soft cloth.

Part I: CFIT Risk Assessment

Section 1—Destination CFIT Risk Factors

Value

Score

Airport and Approach Control Capabilities:

ATC approach radar with MSAWS	0	_____
ATC minimum radar vectoring charts.....	0	_____
ATC radar only.....	-10	_____
ATC radar coverage limited by terrain masking	-15	_____
No radar coverage available (out of service/not installed).....	-30	_____
No ATC service.....	-30	_____

Expected Approach:

Airport located in or near mountainous terrain	-20	_____
ILS	0	_____
VOR/DME	-15	_____
Nonprecision approach with the approach slope from the FAF to the airport TD shallower than 2 3/4 degrees	-20	_____
NDB	-30	_____
Visual night “black-hole” approach	-30	_____

Runway Lighting:

Complete approach lighting system	0	_____
Limited lighting system.....	-30	_____

Section 1—Destination CFIT Risk Factors (continued)	Value	Score
Controller / Pilot Language Skills:		
Controllers and pilots speak different primary languages.....	-20	_____
Controllers’ spoken English or ICAO phraseology poor	-20	_____
Pilots’ spoken English poor.....	-20	_____
Departure:		
No published departure procedure	-10	_____
Destination CFIT Risk Factors Total		(-) _____

Section 2—Risk Multiplier	Value	Score
Your company’s Type of Operation (select single highest applicable value):		
Scheduled	1.0	_____
Nonscheduled	1.2	_____
Corporate.....	1.3	_____
Charter	1.5	_____
Business owner/pilot	2.0	_____
Regional	2.0	_____
Freight	2.5	_____
Domestic.....	1.0	_____
International.....	3.0	_____
Departure/Arrival Airport (select single highest applicable value):		
Australia/New Zealand.....	1.0	_____
United States/Canada.....	1.0	_____
Western Europe	1.3	_____
Middle East	1.1	_____
Southeast Asia	3.0	_____
Euro-Asia (Eastern Europe and Commonwealth of Independent States)	3.0	_____
South America/Caribbean	5.0	_____
Africa.....	8.0	_____
Weather/Night Conditions (select single highest applicable value):		
Night—no moon.....	2.0	_____
IMC	3.0	_____
Night and IMC	5.0	_____
Crew (select only one value):		
Single-pilot flight crew	1.5	_____
Flight crew duty day at maximum and ending with a night nonprecision approach.....	1.2	_____
Flight crew crosses five or more time zones	1.2	_____
Third day of multiple time-zone crossings.....	1.2	_____
Add Multiplier Values to Calculate Risk Multiplier Total		_____
Destination CFIT Risk Factors Total x Risk Multiplier Total = CFIT Risk Factors Total		(-) _____

Part II: CFIT Risk-Reduction Factors

Section 1—Company Culture	Value	Score
Corporate/company management:		
Places safety before schedule	20	_____
CEO signs off on flight operations manual	20	_____
Maintains a centralized safety function.....	20	_____
Fosters reporting of all CFIT incidents without threat of discipline	20	_____
Fosters communication of hazards to others	15	_____
Requires standards for IFR currency and CRM training.....	15	_____
Places no negative connotation on a diversion or missed approach.....	20	_____
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115–130 points	Tops in company culture	
105–115 points	Good, but not the best	Company Culture Total
80–105 points	Improvement needed	(+) <u> </u>
Less than 80 points	High CFIT risk	
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Section 2—Flight Standards	Value	Score
Specific procedures are written for:		
Reviewing approach or departure procedures charts	10	_____
Reviewing significant terrain along intended approach or departure course	20	_____
Maximizing the use of ATC radar monitoring.....	10	_____
Ensuring pilot(s) understand that ATC is using radar or radar coverage exists.....	10	_____
Altitude changes	10	_____
Ensuring checklist is complete before initiation of approach	10	_____
Abbreviated checklist for missed approach.....	10	_____
Briefing and observing MSA circles on approach charts as part of plate review	10	_____
Checking crossing altitudes at IAF positions	10	_____
Checking crossing altitudes at FAF and glideslope centering	10	_____
Independent verification by PNF of minimum altitude during stepdown DME (VOR/DME or LOC/DME) approach.....	20	_____
Requiring approach/departure procedure charts with terrain in color, shaded contour formats	20	_____
Radio-altitude setting and light-aural (below MDA) for backup on approach	10	_____
Independent charts for both pilots, with adequate lighting and holders.....	10	_____
Use of 500-foot altitude call and other enhanced procedures for NPA.....	10	_____
Ensuring a sterile (free from distraction) cockpit, especially during IMC/night approach or departure	10	_____
Crew rest, duty times and other considerations especially for multiple-time-zone operations	20	_____
Periodic third-party or independent audit of procedures.....	10	_____
Route and familiarization checks for new pilots		
Domestic.....	10	_____
International.....	20	_____
Airport familiarization aids, such as audiovisual aids.....	10	_____

Section 2—Flight Standards (continued)		Value	Score
First officer to fly night or IMC approaches and the captain to monitor the approach.....		20	_____
Jump-seat pilot (or engineer or mechanic) to help monitor terrain clearance and the approach in IMC or night conditions.....		20	_____
Insisting that you fly the way that you train.....		25	_____
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300–335 points	Tops in CFIT flight standards		
270–300 points	Good, but not the best	Flight Standards Total	(+)_____
200–270 points	Improvement needed		
Less than 200 points	High CFIT risk		

Section 3—Hazard Awareness and Training		Value	Score
Your company reviews training with the training department or training contractor.....		10	_____
Your company’s pilots are reviewed annually about the following:			
Flight standards operating procedures.....		20	_____
Reasons for and examples of how the procedures can detect a CFIT “trap”.....		30	_____
Recent and past CFIT incidents/accidents.....		50	_____
Audiovisual aids to illustrate CFIT traps.....		50	_____
Minimum altitude definitions for MORA, MOCA, MSA, MEA, etc.		15	_____
You have a trained flight safety officer who rides the jump seat occasionally.....		25	_____
You have flight safety periodicals that describe and analyze CFIT incidents.....		10	_____
You have an incident/exceedance review and reporting program.....		20	_____
Your organization investigates every instance in which minimum terrain clearance has been compromised.....		20	_____
You annually practice recoveries with GPWS in the simulator.....		40	_____
You train the way that you fly.....		25	_____
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285–315 points	Tops in CFIT training		
250–285 points	Good, but not the best	Hazard Awareness and Training Total	(+)_____
190–250 points	Improvement needed		
Less than 190 points	High CFIT risk		

Section 4—Aircraft Equipment		Value	Score
Aircraft includes:			
Radio Altimeter with cockpit display of full 2,500-foot range—captain only.....		20	_____
Radio Altimeter with cockpit display of full 2,500-foot range—copilot.....		10	_____
First-generation GPWS.....		20	_____
Second-generation GPWS or better.....		30	_____
GPWS with all approved modifications, data tables and service bulletins to reduce false warnings.....		10	_____
Navigation display and FMS.....		10	_____
Limited number of automated altitude callouts.....		10	_____
Radio-altitude automated callouts for Nonprecision approach (not heard on ILS approach) and procedure.....		10	_____
Preselected radio altitudes to provide automated callouts that would not be heard during normal nonprecision approach.....		10	_____
Barometric altitudes and radio altitudes and radio altitudes to give automated “decision” or “minimums” callout.....		10	_____
An automated excessive “bank angle” callout.....		10	_____

Section 4—Aircraft Equipment (continued)

	Value	Score
Auto flight/vertical speed model	10	_____
Auto flight/vertical speed mode with no GPWS	20	_____
GPS or other long-range navigation equipment to supplement NDB-only approach	15	_____
Terrain-navigation display	20	_____
Ground-mapping radar	10	_____
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175–195 points	Excellent equipment to minimize CFIT risk	
155–175 points	Good, but not the best	Aircraft Equipment Total
115–155 points	Improvement needed	(+) _____ *
Less than 115 points	High CFIT risk	

**Company Culture _____ + Flight Standards _____ + Hazard Awareness and Training _____
+ Aircraft Equipment _____ = CFIT Risk-reduction Factors Total (+) _____**

** If any section in Part II scores less than “Good,” thorough review is warranted of that aspect of the company’s operation.*

Part III: Your CFIT Risk

Part I CFIT Risk Factors Total (–) _____ + Part II CFIT Risk-Reduction Factors Total (+) _____
= CFIT Risk Score (+) _____

A negative CFIT Risk Score indicates a significant threat; review the sections in Part II and determine what changes and improvements can be made to reduce CFIT risk

In the interest of aviation safety, this checklist may be reprinted in whole or in part but credit must be given to Flight Safety Foundation. To request more information or to offer comments about the FSF CFIT Checklist, contact James M Burin, director of technical programs, Flight Safety Foundation, 601 Madison Street, Suite 300, Alexandria, VA 22314 U.S., Telephone: +1 (703) 739-6700 Fax: +1 (703) 739-6708

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