



# Advisory Circular

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**Subject: STANDARD OPERATING  
PROCEDURES FOR FLIGHT DECK  
CREWMEMBERS**

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**Date: 2/27/03  
Initiated By: AFS-210**

**AC No: 120-71A**

## **I. PURPOSE.**

**a. General.** Standard operating procedures (SOPs) are universally recognized as basic to safe aviation operations. Effective crew coordination and crew performance, two central concepts of crew resource management (CRM), depend upon the crew's having a shared mental model of each task. That mental model, in turn, is founded on SOPs. This advisory circular (AC) presents background, basic concepts, and philosophy in respect to SOPs. It emphasizes that SOPs should be clear, comprehensive, and readily available in the manuals used by flight deck crewmembers.

**b. Using this Advisory Circular.** This AC is designed to provide advice and recommendations about the development, implementation, and updating of SOPs. Appendix 1, Standard Operating Procedures Template, provides many important topics that should be addressed in SOPs. Stabilized Approach, characterized by a constant-angle, constant-rate of descent ending near the touchdown point where the landing maneuver begins, is among the SOPs specifically identified in this AC and is described in Appendix 2, Stabilized Approach: Concepts and Terms. These and the other appendices represent a baseline and a starting point. Start-up certificate holders and existing certificate holders should refer to the Template in Appendix 1, to Stabilized Approach in Appendix 2, and to the other appendices in developing comprehensive SOPs for use in training programs and in manuals used by their flight deck crewmembers.

**c. What's New in this Advisory Circular.** AC 120-71A revises and supersedes the earlier version, AC 120-71. Many minor changes have been made to improve clarity, accuracy, completeness, and consistency. Two significant changes are the conversion of the term pilot not flying (PNF) to pilot monitoring (PM) and the addition of a related Appendix addressing "Crew Monitoring and Cross-Checking." It is increasingly acknowledged that it makes better sense to characterize pilots by what they *are* doing rather than by what they are not doing. Hence, pilot flying (PF) remains an appropriate term and is unchanged in this AC. But the term pilot not flying misses the point. Studies of crew performance, accident data, and pilots' own experiences all point to the vital role of the non-flying pilot as a monitor. Hence, the term pilot monitoring (PM) is now widely viewed as a better term to describe that pilot. The term PM is used liberally throughout this AC. In those instances where the older term PNF appears, it should be understood that pilot monitoring (PM) is the preferred meaning.

2. **CANCELLATION.** This AC cancels AC 120-71, Standard Operating Procedures for Flight Deck Crewmembers, dated August 10, 2000.

3. **SCOPE.** Appendix 1 consolidates many topics viewed by operators and by the FAA as important to be addressed as SOPs in air carrier training programs and in the manuals used by air carrier flight deck crewmembers. **This AC does not list every important SOP topic or dictate exactly how each topic should be addressed by a certificate holder.** Instead, this AC offers a baseline of topics to be used as a reference. In practice, each certificate holder's manuals and training programs are unique. Each certificate holder could omit certain topics shown in the template when they do not apply, and, on the other hand, could add other topics not shown in the template when they do apply. This AC contains guidance intended for use primarily by Title 14 of the Code of Federal Regulations (14 CFR) part 119 certificate holders authorized to conduct operations under part 121. But operators of aircraft under 14 CFR parts 135, 125, 91, and others should also find this guidance useful.

4. **RELATED REGULATIONS.** 14 CFR part 121, sections 121.133, 121.141, 121.401; 14 CFR part 125, section 125.287; 14 CFR part 135, section 135.293.

5. **RELATED READING MATERIAL.**

a. AC 120-51 as amended, Crew Resource Management Training.

b. AC 120-48, Communication and Coordination between Flight Crewmembers and Flight Attendants.

c. AC 120-54, Advanced Qualification Program.

d. AC 121-32, Dispatch Resource Management Training.

**NOTE: ACs may be obtained by choosing "Advisory Circulars" at the following FAA public Web site:**

<http://www.airweb.faa.gov>

e. Controlled Flight into Terrain Education and Training Aid (Flight Safety Foundation, ICAO, and Federal Aviation Administration) <http://www1.faa.gov/avr/afs/afs200/afs210/index.cfm>

f. Flight Safety Digest, Nov. 98 – Feb. 99 (Flight Safety Foundation).

g. Approach-and-landing Risk Awareness Tool, as revised (Flight Safety Foundation) [http://www.flightsafety.org/pdf/alar\\_risk\\_tool.pdf](http://www.flightsafety.org/pdf/alar_risk_tool.pdf)

h. CFIT Checklist, as revised (Flight Safety Foundation): [http://www.flightsafety.org/pdf/cfit\\_check.pdf](http://www.flightsafety.org/pdf/cfit_check.pdf)

i. Human Performance Considerations in the Use and Design of Aircraft Checklists (FAA).  
<http://www1.faa.gov/avr/afs/afs200/afs210/index.cfm>

j. FAA Flight Standardization Board (FSB) Reports.  
<http://www.opspecs.com/AFSDData/FSBRs/Final/>

## 6. BACKGROUND.

a. Many aviation safety organizations including the FAA have recently reaffirmed the importance of SOPs.

b. For many years the National Transportation Safety Board (NTSB) has identified deficiencies in standard operating procedures as contributing causal factors in aviation accidents. Among the most commonly cited deficiencies involving flightcrews has been their non-compliance with established procedures; another has been the non-existence of established procedures in some manuals used by flightcrews.

c. The International Civil Aviation Organization (ICAO) has also recognized the importance of SOPs for safe flight operations. Recent amendments to ICAO Annex 6 establish that each member state should require that SOPs for each phase of flight be contained in the operations manual used by pilots.

d. Non-government aviation safety organizations such as Flight Safety Foundation, (Alexandria, VA) have concluded that airlines perform with higher levels of safety when they establish and adhere to adequate SOPs.

e. In 1997 the FAA joined with representatives from the National Aeronautics and Space Administration (NASA) and from a broad cross-section of aviation organizations to form the Commercial Aviation Safety Team (CAST). Chartered by the White House to reduce the commercial aviation accident rate by 80 percent in 10 years, this Team chose controlled flight into terrain (CFIT) as one of the first major aviation hazards to be addressed in meeting this challenge. The Team used a data-driven approach to identify interventions with the highest possible safety leverage, and to develop a comprehensive agenda to implement those interventions.

f. In its study of CFIT accidents, a CAST analysis team including the FAA corroborated the findings of the NTSB, ICAO, and other groups. Almost 50 percent of the 107 CFIT interventions identified by that analysis team related to the flightcrew's failure to adhere to SOPs or the certificate holder's failure to establish adequate SOPs. Subsequent CAST teams confirmed their analysis further.

g. This AC is in large part the final report and end-product of one of the CAST sub-teams, a group comprised of subject matter experts in aviation human factors, in airline operations, and in flightcrew training.

7. **THE MISSION OF SOPs.** To achieve consistently safe flight operations through adherence to SOPs that are clear, comprehensive, and readily available to flight crewmembers.

8. **APPLYING THE SOPs TEMPLATE AND OTHER APPENDICES.** Generally, each SOP topic identified in the template (following as Appendix 1) is important; the certificate holder should address them in some manner, if applicable. Stabilized Approach (Appendix 2) is a particularly important SOP. Other important SOPs, such as those associated with special operating authority or with new technology, are not shown in the template, but should be addressed as well, when applicable. Because each certificate holder's operation is unique, the certificate holder should develop the specific manner in which SOPs are addressed. Topics expanded and illustrated in the Appendices are for example only, and represent renditions of SOPs known to be effective. **No requirement is implied or intended to change existing SOPs based solely on these examples.** An SOP topic shown in the Appendices may be addressed in detail, including text and diagrams, or in very simple terms. For example, an SOP may be addressed in a simple statement such as: "ABC Airlines does not conduct Category 3 approaches."

#### 9. KEY FEATURES OF EFFECTIVE SOPs.

a. Many experts agree that implementation of any procedure as an SOP is most effective if:

- (1) The procedure is appropriate to the situation.
- (2) The procedure is practical to use.
- (3) Crewmembers understand the reasons for the procedure.

(4) Pilot Flying (PF), Pilot Not Flying (PNF) / Pilot Monitoring (PM), and Flight Engineer duties are clearly delineated.

(5) Effective training is conducted.

(6) The attitudes shown by instructors, check airmen, and managers all reinforce the need for the procedure.

b. If all elements (above) are not consistently implemented, flightcrews too easily become participants in an undesirable double standard condoned by instructors, check airmen, and managers. Flightcrews may end up doing things one way to satisfy training requirements and checkrides, but doing them another way in "real life" during line operations. When a double standard does appear in this way, it should be considered a red flag that a published SOP may not be practical or effective for some reason. That SOP should be reviewed and perhaps changed.

#### 10. THE IMPORTANCE OF UNDERSTANDING THE REASONS FOR AN SOP.

a. **Effective Feedback.** When flight crewmembers understand the underlying reasons for an SOP they are better prepared and more eager to offer effective feedback for improvements. The



certificate holder, in turn, benefits from more competent feedback in revising existing SOPs and in developing new SOPs. Those benefits include safety, efficiency, and employee morale.

**b. Troubleshooting.** When flight crewmembers understand the underlying reasons for an SOP, they are generally better prepared to handle a related in-flight problem that may not be explicitly or completely addressed in their operating manuals.

## 11. COLLABORATING FOR EFFECTIVE SOPs.

**a.** In general, effective SOPs are the product of healthy collaboration among managers and flight operations people, including flightcrews. A safety culture promoting continuous feedback from flightcrews and others, and continuous revision by the collaborators distinguishes effective SOPs at airlines of all sizes and ages.

**b.** New operators, operators adding a new aircraft fleet, or operators retiring one aircraft fleet for another must be especially diligent in developing SOPs. Collaborators with applicable experience may be more difficult to bring together in those instances.

**c.** For a startup certificate holder, this AC and its appendices should be especially valuable tools in developing SOPs. The developers should pay close attention to the approved airplane flight manual (AFM), to AFM revisions and operations bulletins issued by the manufacturer, and to the applicable Flight Standardization Board (FSB) report issued by the FAA. Desirable partners in the collaboration would certainly include representatives of the airplane manufacturer, pilots having previous experience with the airplane or with the kind of operations planned by the operator, and representatives from the FAA, including the principal operations inspector (POI), members of the Certificate Management Team, and members of the Certification, Standardization, and Evaluation Team (CSET). It is especially important for a new operator to maintain a periodic review process that includes line flightcrews. Together, managers and flightcrews are able to review the effectiveness of SOPs and to reach valid conclusions for revisions. The review process will be meaningful and effective when managers promote prompt implementation of revisions to SOPs when necessary.

**d.** An existing certificate holder introducing a new airplane fleet should also collaborate using the best resources available, including the AFM, operations bulletins, and the FSB report. Experience has shown that representatives of the airplane manufacturer, managers, check airmen, instructors, and line pilots work well together as a team to develop effective SOPs. A trial period might be implemented, followed by feedback and revision, in which SOPs are improved. By being part of an iterative process for changes in SOPs, the end user, the flight crewmember, is generally inclined to accept the validity of changes and to implement them readily.

**e.** Long-established operators should be careful not to assume too readily that they can operate an airplane recently added to the fleet in the same, standard way as older types or models. Managers, check airmen, and instructors should collaborate using the best resources available, including the AFM, operations bulletins, and the FSB report to ensure that SOPs they develop or adapt for a new airplane are in fact effective for that aircraft, and are not inappropriate carryovers.

**12. SUMMARY.** Safety in commercial aviation continues to depend on good crew performance. Good crew performance, in turn, is founded on standard operating procedures that are clear, comprehensive, and readily available to the flightcrew. This AC provides an SOPs template and many other useful references in developing SOPs. Development of SOPs is most effective when done by collaboration, using the best resources available including the end-users themselves, the flightcrews. Once developed, effective SOPs should be continually reviewed and renewed.

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