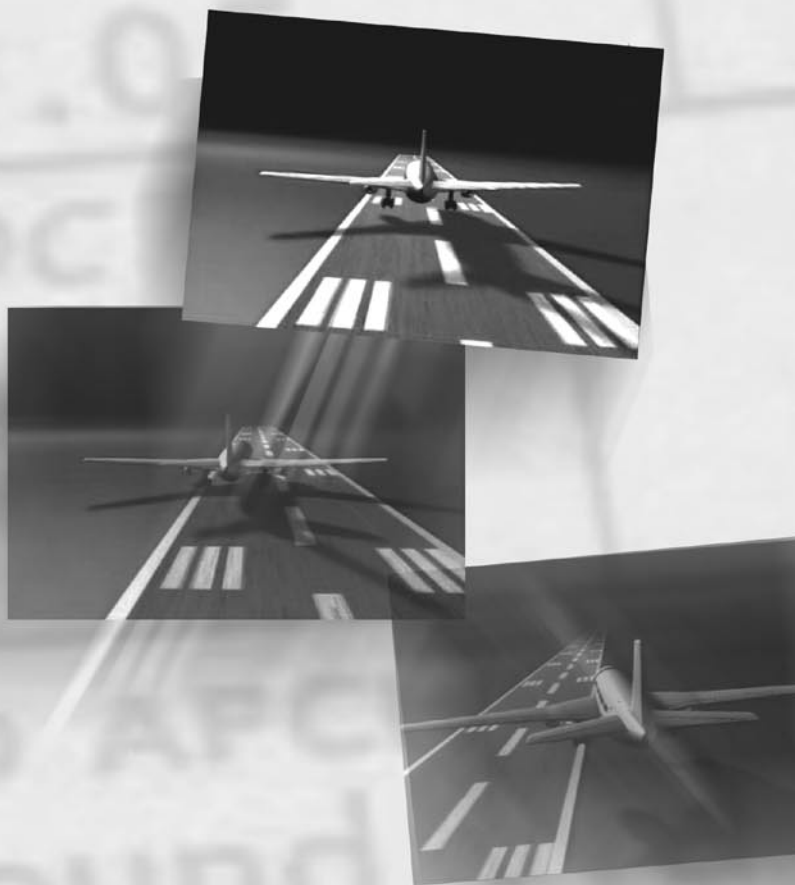


Data from numerous safety studies indicate that approach and landing accidents account for a significant proportion of air transport accidents. The aviation industry is committed to reducing the number of these accidents. One effort has led to the creation of a toolkit containing industry data and recommendations for use by airlines worldwide.

## FLIGHT OPERATIONS

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# TOOLS FOR THE REDUCTION OF APPROACH AND LANDING ACCIDENTS

**A**ccording to the Flight Safety Foundation, approximately 56 percent of commercial jet airplane accidents occur during the approach and landing phases of flight and account for 44 percent of all fatalities worldwide. In contrast, the duration of the approach and landing phases typically is 16 percent of the total flight time.

The prevention of approach and landing accidents (ALA) is one of the top priorities of the aviation industry. One effort, spearheaded by the Flight Safety Foundation, is the *Approach-and-Landing Accident Reduction (ALAR) Tool Kit*, a CD-ROM containing quantitative data, conclusions, recommendations, and training materials.

This article discusses the following:

1. Development of the toolkit.
2. Content of the toolkit.
3. Implementation of the toolkit.

## 1 DEVELOPMENT OF THE TOOLKIT

During the early 1990s, the Flight Safety Foundation launched an effort to reduce commercial airplane accidents caused by controlled flight into terrain (CFIT). A second phase of this effort began in 1996 with the creation of a task force to focus on reducing ALAs.

The ALAR Task Force was composed of four working groups: Air Traffic Control Training and Procedures/Airport Facilities, Aircraft Equipment, Data Acquisition and Analysis, and Operations and Training. Membership was international in scope and represented airframe manufacturers, airlines, industry associations, regulators, and suppliers.

These working groups collected data and recommended actions and appropriate training to help prevent ALAs. The results of these efforts were compiled into the ALAR Tool Kit.

## 2 CONTENT OF THE TOOLKIT

The ALAR Tool Kit presents a wide range of information to ensure that all segments of the aviation industry find it applicable and useful. The kit contains the following information:



- **ALAR Task Force briefing notes.** Thirty-four briefing notes cover various topics on preventing ALAs, including ALAs involving CFIT. Each briefing note contains statistical data, a discussion section, a summary, and lists of references and related readings. The briefing notes are organized into eight broad subject areas: altimeter and altitude, approach hazards, approach techniques, crew coordination, descent and approach, the go-around, landing techniques, and standard operating procedures (SOP).
- **ALAR Task Force conclusions and recommendations.** The ALAR Task Force's eight data-driven conclusions about ALAs (table 1) and 50 strategies for reducing ALAs are explained in detail.
- **ALAR Task Force final report.** This authoritative reference document on CFIT and ALAR, "Killers in Aviation," replaces qualitative ideas with quantitative facts. For example, it was widely believed in the aviation industry that non-passenger-carrying airplanes have higher ALA rates. The task force quantified this belief by determining that the ALA rate for ferry, freight, and positioning flights is eight times greater than that for passenger flights.
- **Approach and landing risk-awareness tool.** This supplement to the normal approach briefing increases flight crew awareness of hazards and describes the elements of a stabilized approach.





- **Approach and landing risk-reduction guide.** These guidelines present industry best practices to help chief pilots, flight-training managers, and dispatchers strategically evaluate their training, SOPs, and airplane equipment.
- **SOP template.** Airlines can use this tool to check their procedures and training manuals. Adapted from the U.S. Federal Aviation Administration Advisory Circular AC 120-71, *Standard Operating Procedures for Flight Deck Crewmembers*, the SOP template provides a comparison of the operations procedures and training manuals of several airlines and lists the areas for which most airlines have written procedures.
- **CFIT checklist.** Guidelines for assessing the relative risk of CFIT for various operations are presented in Arabic, Chinese, English, French, Russian, and Spanish.
- **CFIT alert.** Procedures are outlined for immediate flight crew response to an alert from a ground proximity warning system or a terrain awareness and warning system.
- **Flight operations and training.** The ALAR Task Force's eight conclusions (table 1) and 50 recommendations for improved approach and landing safety are provided as a Microsoft® PowerPoint® presentation. The presentation contains explanatory notes, data, procedures, and recommendations for airplane operators and flight crews.

- **Equipment for airplane and air traffic control.** A PowerPoint presentation (with explanatory notes) describes the ALAR Task Force's analysis of airplane and air traffic control (ATC) equipment and methods for optimal use.
- **ATC communications.** A PowerPoint presentation (with explanatory notes) is designed to help improve communication between flight crews and air traffic controllers and increase their understanding of each other's respective operating environments.
- **Flight crew guide to preventing CFIT.** This PowerPoint presentation is designed to inform flight crews of CFIT hazards and prevention methods. The presentation is provided because most CFIT accidents occur when the airplane is lined up on the runway centerline, and two-thirds occur within 8 nmi from the runway threshold.



- **ALA data overview.** A PowerPoint presentation (with explanatory notes) highlights data from ALAR Task Force findings, conclusions, and recommendations. The data are based on high-level analyses of 287 fatal ALAs between 1980 and 1996, detailed studies of 76 ALAs between 1984 and 1997, and the assessment of human factors for 3,300 flights.
- **ALA video.** A 19-min video, *An ALA: It Could Happen to You*, presents specific data, findings, and recommendations related to the reduction of ALAs. The video

## 1

### ALAR TASK FORCE CONCLUSIONS

TABLE

The ALAR Task Force developed 50 strategies, or recommendations, based on the following eight data-driven conclusions:

- Establishing and adhering to adequate SOPs and flight crew decision-making processes improve approach and landing safety.
- Failing to recognize the need for a missed approach and failing to execute a missed approach are major causes of ALAs.
- Executing unstabilized approaches causes ALAs.
- Improving communication between controllers and flight crews increases their mutual understanding of each other's operational environment and results in improved approach and landing safety.
- Conducting operations in low light or poor visibility; on wet runways or runways contaminated by standing water, snow, slush, or ice; or with the presence of visual or physiological illusions increases the risk of ALAs.
- Using the radio altimeter effectively helps prevent ALAs.
- Collecting and analyzing in-flight data (e.g., through flight operational quality assurance programs) can identify trends that can be used to improve approach and landing safety.
- Sharing aviation information globally decreases the risk of ALAs.



highlights four strategies that most likely would have prevented many ALAs: initiating a go-around, adhering to SOPs, conducting an approach briefing, and performing a pull-up maneuver.

- **CFIT video.** A 32-min video of CFIT statistics, *CFIT Awareness and Prevention*, presents analyses of three representative CFIT accidents and how they might have been avoided.
- **Links to aviation statistics on the Internet.** The kit provides the addresses of 16 international web sites, some of which provide data specific to CFIT and ALAs. All contain statistical data on airplane accidents in general.
- **Additional items.** A section of miscellaneous information lists ALAR Task Force members, select Flight Safety Foundation publications, and available informational posters about reducing ALAs.



### 3 IMPLEMENTATION OF THE TOOLKIT

The Flight Safety Foundation has organized the CFIT/ALAR Action Group (CAAG) to direct the implementation of the ALAR Tool Kit throughout the aviation industry. The group has assigned regional team leaders to adapt the toolkit to their respective regions of the world through language translations, workshops, and regulations. Regional team leaders have been established in Africa, Australia, Central and South America, Iceland, Indonesia, Malaysia, the Middle East, Myanmar, South Africa, South Asia, Southeast Asia, and Thailand.

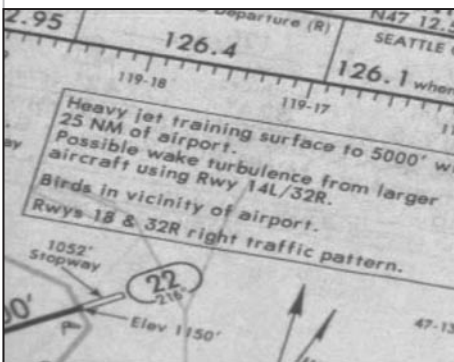
In North America, the ALAR Tool Kit is being implemented by the Commercial Aviation Safety Team (CAST), which is a joint effort of government organizations, industry associations, and individual aerospace companies, including Boeing. CAST was formed in June 1998 to significantly reduce the rate of fatal commercial aviation accidents. In Europe, a similar team—the Joint Aviation Authorities Safety Strategy Initiative—is leading implementation efforts.

Boeing has distributed the ALAR Tool Kit to all its airplane customers. Boeing also is actively involved in the CAAG and in assisting regional team leaders.

*Editor's note: For information on how to obtain an ALAR Tool Kit, contact the Flight Safety Foundation at the following address.*

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Alexandria, VA 22314-1756 USA*

*Telephone: 703-739-6700  
Fax: 703-739-6708  
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## SUMMARY

The aviation industry can reduce the ALA rate by increasing awareness of ALA hazards and methods of prevention. The ALAR Tool Kit, which contains quantitative data, conclusions, recommendations, and training materials, is a valuable resource in this effort. Implementation of the toolkit is under way worldwide.