COMMERCIAL AVIATION SAFETY TEAM

Air Carriers
Safer Skies Safety Enhancements

Safety Enhancement: 1   CFIT

Title: Terrain Avoidance Warning System (TAWS)   *Completed*

This SE substantially reduces or eliminates controlled flight into terrain (CFIT) accidents by improving pilot situational awareness. The SE establishes appropriate procedures for the installation and use of TAWS equipment. Procedures include proper flight crew reaction in response to TAWS aural and visual warnings.

☐ **Output 5**   The regulator will develop a comprehensive system to support TAWS including installation, maintenance, training, and use of TAWS equipment for operators. Operators and manufacturers will apply for supplemental/amended type certificates (TC) for approval by the regulator.

Safety Enhancement: 2   CFIT

Title: Standard Operating Procedures (SOP)   *Completed*

Action: The FAA issued a final rule in March 2000 requiring all new commercial aircraft to be equipped with TAWS equipment by March 2003, and the entire commercial fleet equipped by March 2005.

☐ **Output 4**   Operators will adopt standard operating procedures (SOP) and revise their training manuals and programs to incorporate the proposed SOP template items as appropriate for the technology of the equipment in the aircraft.

Safety Enhancement: 3   CFIT

Title: Precision-Like Approach Implementation-Vertical Angles   *Completed*

This SE develops criteria to support the inclusion of vertical angles on all existing instrument approach procedures, allowing for a stabilized vertical descent to the runway end at all certificated airports within the United States.

☐ **Output 10**   The regulators and operators will develop/tailor new and existing crew procedures/techniques to fly stabilized approach procedures that replace "dive and drive" procedures in individual carriers operational requirements.

☐ **Output 6**   Operators will develop a crew procedures and training program to promote new instrument procedures in lieu of existing procedures. The training and crew procedures should address current issues including such events as notifying the pilot when the aircraft reverts out of VNAV path and the integrity of the navigation database.

Air Carriers
Safer Skies Safety Enhancements

Safety Enhancement: 10   CFIT

Title: Institute Proactive Safety Plans: FOQA and ASAP   *Completed*

This SE develops and implements a mutually agreed upon methodology to use de-identified FOQA and ASAP information to identify safety-related issues and corrective actions. This will give operators the tools to identify safety issues and trends, and initiate corrective actions prior to an accident. It will also allow air carriers to share safety information.

☐ **Output 4**   Manufacturers and operators will develop guidance documentation outlining voluntary procedures and protocols for the sharing of trend information or corrective actions amongst the user community. Additionally, a process for sharing "hot topic" items for focus and review will be drafted.

Safety Enhancement: 11   CFIT

Title: Training - Crew Resource Management (CRM)   *Completed*

This SE reduces controlled flight into terrain (CFIT) accidents by promoting comprehensive standard operating procedures (SOP) as a key element of every Title 14, Code of Federal Regulations part 121 air carrier's CRM training program. Under a related project, a template for comprehensive SOP is being developed, including SOPs that specifically address CFIT accident prevention.

☐ **Output 3**   Operators will incorporate CFIT training into their approved CRM training program and submit to their principal operations inspectors (POIs) for approval.

Safety Enhancement: 12   CFIT

Title: Training - CFIT Prevention   *Completed*

This SE substantially reduces or eliminates controlled flight into terrain (CFIT) accidents by adding CFIT prevention training and procedures to all Title 14, Code of Federal Regulations part 121 air carrier training curriculums, emphasizing pilot situational awareness and escape procedures for flightcrews to use in the event of a terrain warning indication.

☐ **Output 5**   Operators and training centers will incorporate the CFIT Education and Training Aid or similar training to their approved training programs.

Air Carriers
Safer Skies Safety Enhancements

Safety Enhancement: 14   ALAR

Title: Policies for ALAR (Safety Culture)-CEO and DOS Visibility   *Completed*

This SE develops a strategy to make chief executive officers (CEO) and other key officers of Part 121 air carriers more visible and more effective in promoting a safety culture targeted to preventing approach and landing accidents.

☐ **Output 1**   Operators will ensure CEOs and other key officers are made more visible and more effective in promoting Safety Culture.

The regulator will issue safety culture guidance material such as the Operator's Aviation Safety Handbook, SAE-G18 Committee document, and the FAA Audit Tool.

Safety Enhancement: 15   ALAR

Title: Policies for ALAR (Safety Culture)-Safety Info in Manuals   *Completed*

This SE tasks the director of safety (DOS) with establishing a process to identify, review, analyze, and include appropriate safety information in training programs and manuals used by flightcrews and maintenance staff.

☐ **Output 1**   Air carriers will enable their directors of safety (DOS) to ensure the establishment of a process to identify, review, analyze, and include appropriate safety information in training programs and in manuals used by flight crews and maintenance staff using HBAT 99-07.

Safety Enhancement: 20   ALAR

Title: Maintenance Procedures-DOS Internal Survey   *Completed*

This SE tasked the directors of safety (DOS) to determine (1) maintenance deficiencies described in safety enhancements 17–19 which have been remedied, and (2) that quality control procedures have been implemented to ensure that those deficiencies are continually addressed.

☐ **Output 1**   Operators will assign their directors of safety (DOS) to ensure an internal audit is conducted to determine that rules relating to the maintenance deficiencies described in the specified bulletins are being met through adequate maintenance procedures. Further, the DOS will establish system safety procedures to ensure continuing conformance with the bulletins. The DOS will report the outcome of the audit to his/her respective CAST member.

Air Carriers

Safer Skies Safety Enhancements

Safety Enhancement: 21   ALAR

Title: Flight Deck Equipment Upgrade/Installation to Improve   *Completed*
    Altitude Awareness and Checklist Completion

This SE ensures altitude awareness and accomplishment of checklist items. This will be accomplished through the development of guidelines and procedures for a flight deck smart-alerting system design and supporting operational procedures and training based on—
•The installation of automated checklist devices to provide a positive means for checklist completion;
•Research and assessment of existing technology in flight deck smart-alerting system design; and
•The installation of equipment to provide automatic aural altitude alert call-outs on final approach or other such altitude alerting systems.

☐ **Output 1**   The regulator and industry will develop advisory material defining the characteristics of interactive checklists and smart alerting systems for all new type designs along with compatible operational guidance.   This guidance material should address—
•Reduced nuisance alerts,
•Reduced redundant alerts,
•Flight-phase sensitive alerts (e.g., some alerts attenuated on takeoff roll, others on short final approach), and
•Built-in logic prompting the flightcrew to appropriate actions.

         Manufacturers will design and Install on the new type design aircraft.

         Operators will develop training syllabi and procedures for use.

☐ **Output 3**   Manufacturers should provide automatic aural altitude call outs on final approach for all new type design aircraft (including arrival at minimum descent altitude (MDA)/decision height (DH)).

Safety Enhancement: 23   ALAR

Title: Flight Crew Training   *Completed*

This SE ensures that Title 14, Code of Federal Regulations part 121 air carriers implement syllabi that train and evaluate flightcrews on stabilized approaches, unusual attitudes, and upset recoveries. Specific topics related to stabilized approaches should include: crew resource management, go-around criteria, approaches with system malfunctions, unusual conditions, emphasis on basic airmanship, approach briefings, and approach and missed approach procedures.

☐ **Output 4**   Operators will evaluate their flight crew qualification programs using the CFIT/ALAR JSIT Training Guide and submit revised qualification programs if appropriate. POIs will evaluate the revisions and approve if applicable.

Air Carriers
Safer Skies Safety Enhancements

Safety Enhancement: 24   ALAR

Title: Implementation Plan For Aircraft Design   *Completed*

This SE promotes incorporation of fault-tolerant design principles for flight-critical system components and facilitates critical-point, flight-realistic-condition, and certification testing/analysis. Changes to flight-critical system components will be considered a major change unless the applicant can show the change is minor and monitors the continued airworthiness (in-service failures) of these systems using a risk-assessment focused methodology.

☐ **Output 3**   Manufacturers and operators will review SAE ARP 5150 "Safety Assessment of Transport Airplanes in Commercial Service" to ensure their continuing airworthiness process(es) incorporates risk management techniques help ensure the original design level of safety is not degraded.

Operators will institute continuing airworthiness processes that adequately monitor and assess fleet performance to verify the level of safety intended by the product's original basis of certification remains unchanged, by application of safety risk management processes to identify and prioritize safety critical threats/trends and mitigating corrective action.

Safety Enhancement: 26   Loss of Control

Title: Policies and Procedures - Standard Operating Procedures (SOP)   *Completed*

This SE ensures that all operators publish and enforce clear, concise, and accurate flightcrew SOP. These SOP should include expected procedures during pre/post flight and all phases of flight—checklists, simulator training, pilot-flying/pilot-not-flying duties, transfer of control, automation operation, rushed and/or unstabilized approaches, rejected landings and missed approaches, in-flight pilot icing reporting, and flightcrew coordination. Operator instructors and check airmen should ensure these SOP are trained and enforced in their aircrew proficiency and standardization programs.

☐ **Output 4**   Operators should adopt the revised SOP information and revise their training programs and manuals to incorporate the proposed revisions from AC 120-71.

Air Carriers
Safer Skies Safety Enhancements

Safety Enhancement: 27   Loss of Control

Title: Policies and Procedures - Risk Assessment and Management   *Completed*

This SE identifies or develops and implements methods for operators, regulators, and manufacturers to prioritize safety-related decisions. The project will improve methods of risk assessment for operational issues related to service bulletins, aircraft accident/incident analysis, flight-critical safety information, and recurring intermittent failures related to dispatch.

☐ **Output 3**   Operators, regulators, manufacturers, and directors of safety (DOS) or their equivalents should ensure all appropriate managers implement and use risk assessment tools to prioritize safety related decisions developed in SE 27 Output 2 (guidance materials for operators on risk assessment/management tools to prioritize safety related decisions for operational issues).

Safety Enhancement: 28   Loss of Control

Title: Policies and Procedures-Process to Inform Personnel/Flight Crew   *Completed*

This SE ensures that essential safety information and operational procedures generated by airplane manufacturers are included in operating manuals and training programs for pilots, and other appropriate employee groups.

☐ **Output 1**   Manufacturers should review their processes for distributing essential operating information and to identify its significance.

Operators should distribute essential operating information identified by the manufacturers to flight crews and maintenance staff in an appropriate and timely manner.

Directors of safety or their equivalent should ensure the establishment of a process to identify, review, analyze, and include essential operating information in training programs and in manuals used by flight crews and maintenance staff.

Safety Enhancement: 29   Loss of Control

Title: Policies and Procedures- Flight Crew Proficiency Program   *Completed*

This SE ensures that air carriers have a process to enhance pilot proficiency.

☐ **Output 1**   Operators, in collaboration with pilot associations, should ensure their training and qualification processes utilize information from programs such as FOQA, AQP, and ASAP to assist in assuring pilot proficiency.

Air Carriers
Safer Skies Safety Enhancements

Safety Enhancement: 30   Loss of Control

Title: Human Factors and Automation   *Completed*

This SE is designed to reduce loss of control accidents by encouraging Title 14, Code of Federal Regulations part 121 air carriers to adopt consensus policies and procedures relating to mode awareness and energy-state management, as appropriate to their respective operations.

☐ **Output 1**   Air carrier trade associations will create a compilation of industry automation policies and procedures dealing with mode awareness and energy state management. The A4A will request that operators and manufacturers provide copies of their current policies and procedures pertaining to the use of automation for mode awareness and energy state management.

Safety Enhancement: 31   Loss of Control

Title: Training - Advanced Maneuvers   *Completed*

Advanced maneuvers training (AMT) refers to training to prevent and recover from hazardous flight conditions outside of the normal flight envelope. Examples include in-flight upsets, stalls, ground proximity and windshear escape maneuvers, and inappropriate energy-state management conditions. This SE collects and provides AMT material and encourages Title 14, Code of Federal Regulations part 121 operators to use these materials to implement advanced-maneuver ground and flight training using appropriate flight training equipment. Emphasis should be given to stall onset recognition and recovery, unusual attitudes, upset recoveries, effects of icing, energy awareness and management, and causal factors that can lead to loss of control. Additionally, research should be conducted to determine how existing flight simulation devices may be used effectively in AMT.

☐ **Output 2**   The regulator should issue a Handbook Bulletin for Air Transportation (HBAT) to announce and recommend the use of the AMT training materials.
Air carrier trade associations should report the level of commitment by the operator's flight operations and training departments and operators should implement AMT ground training.
The regulator should revise policy and rules in 14 CFR Part 121 to require AMT ground training and to promote AMT flight training in suitable flight simulation devices.

☐ **Output 3**   Operators shall provide AMT. This training will be accomplished via ground and simulator instruction within the certified flight envelope, with emphasis on recognition, prevention and recovery techniques.
Air carrier trade associations should promote a high level of commitment to AMT by operator flight operations and training departments. A check airman will administer AMT flight training.

Air Carriers

Safer Skies Safety Enhancements

Safety Enhancement: 49   Runway Incursion

Title: Standard Operating Procedures for Ground Operations   *Completed*

This SE reduces the risk of runway incursions and surface incidents by recommending that all Title 14, Code of Federal Regulations part 121 operators and part 135 operators establish, document, train, and follow SOP for ground operations.

☐ **Output 4**   Operators should revise their company training programs and policy manuals to incorporate as many SOP-template items as appropriate for the scope of the operation.

Safety Enhancement: 78   Turbulence

Title: Cabin Injury Reduction During Turbulence   *Completed*

This SE reduces turbulence injuries to flight attendants and passengers through improved situational awareness, turbulence encounter management procedures—before, during and after encounter—and enhanced communication methodologies standardized across all part 121 air carriers.

☐ **Output 3**   Operators shall revise procedures, develop airline training programs, and implement them in annual recurrent training for flight and cabin crews.

Air Carriers
Safer Skies Safety Enhancements

Safety Enhancement: 120   CFIT

Title: TAWS Improved Functionality   *Completed*

This SE increases the potential safety impact of SE–1, "Terrain Avoidance Warning System (TAWS)," by developing procedures to include GPS sensors for TAWS, and to ensure that updates to terrain databases, alerting algorithms, and new options to TAWS are incorporated as soon as possible.

☐ **Output 1**   Operators shall establish, as appropriate, standard operating procedures (SOP) that advise flight crews of the possible increased risk of operating into areas with limited ground based navigation aids and that help verify the aircraft's actual position relative to displayed ground track when appropriate. Operators shall also develop policies that match aircraft capability to the NAVAID environment at the expected arrival location.

☐ **Output 3**   Air carrier trade associations will communicate with all operators the rationale for the incorporation of GPS equipment for TAWS functionality. Operators that fly standard airplanes equipped with non-GPS TAWS into regions with minimal navigation aids (e.g., No dual DME, or poor ground based navaid reliability) should modify standard TAWS to GPS TAWS or conduct a risk assessment and develop and implement effective risk mitigation.

☐ **Output 4**   Manufacturers of TAWS equipment will provide recommendations for the incorporation of TAWS terrain database updates to operators.
Operators will develop and implement procedures for updating TAWS terrain databases on all airplanes in accordance with the manufacturer's recommendations.

☐ **Output 5**   Air carrier trade associations and operators shall establish procedures to review and form a consensus on TAWS manufacturers' recommended updates associated with the underlying TAWS alerting algorithms. Manufacturers, operators, and regulators, shall work together to incorporate those updates considered beneficial to enhancing controlled flight into terrain (CFIT) protection.

☐ **Output 6**   Air carrier trade associations and operators shall establish procedures to review available optional/selectable TAWS features not currently used by the operator and form a consensus on those features that would enhance CFIT protection for their operation.   Manufacturers, operators, and regulators, shall work together to facilitate efficient incorporation of those desired optional/selectable TAWS features.

Air Carriers
Safer Skies Safety Enhancements

Safety Enhancement: 121   Cargo

Title: Cargo Loading Training and SOP   *Completed*

This SE reduces cargo-related accidents and incidents by: publishing and enforcing clear, concise, and accurate standard operating procedures; teaching the rationale behind those procedures; ensuring company training programs are approved and monitored; and ensuring adequacy of contractor training.

☐ **Output 1**   Operators will ensure audit/surveillance (e.g., Internal Evaluation Program, AC120-59A) of cargo loading programs is being conducted with an emphasis on contracted work. Operators will improve audit/surveillance programs as necessary.

☐ **Output 4**   Operators should incorporate cargo loading best practices into their standard operating procedures, and train those procedures, including emphasis of the rationale behind those procedures.

Safety Enhancement: 127   Cargo

Title: Fire Containment   *Underway*

This SE reduces cargo fires through new or revised standards for the construction of standardized and improved cargo containers that include fire-suppression or fire-containment systems.

☐ **Output 4**   Cargo airlines/operators will perform a risk assessment and incorporate the new fire suppression and/or containment systems developed under SE 127.2 Output 3 as necessary to mitigate identified risk.

Safety Enhancement: 131   Cargo

Title: Safety Culture   *Underway*

This SE reduces cargo-related accidents and incidents by encouraging a safety culture that includes: (1) development of an accident/incident cost-analysis tool, (2) a self-audit process, (3) risk-management programs, (4) revised standards for the director of safety, and (5) development of incident reporting and quality assurance.

☐ **Output 2**   Operators are to implement a self-audit process to further enhance safety.

☐ **Output 3**   Operators should implement an operational risk management program.

☐ **Output 5**   Operators should implement a safety reporting system and develop a quality assurance program.

Air Carriers
Safer Skies Safety Enhancements

Safety Enhancement: 136   Icing

Title: Training – Engine Event Recovery   *Completed*

This SE reduces the risk of accidents from engine surge caused by ice ingestion. The SE includes the engine failure recognition and response training materials in air carrier training programs.

☐ **Output 1**   The regulator will make engine malfunction recognition and response (EMRR) training materials available to all operators. Operators will incorporate EMRR training materials in airline training programs.

Safety Enhancement: 165   Midair

Title: TCAS Policies and Procedures   *Completed*

This SE prevents midair collisions by requiring flightcrews to follow Traffic Collision Avoidance System (TCAS) resolution advisories, even in the presence of contravening ATC instructions. It also establishes procedures for TCAS range setting, and recommends that TCAS-capable simulators and flight-training devices be used for training TCAS responses and maneuvers.

☐ **Output 2**   Operators should establish standard operating procedures (SOP) and standardized training (ground school and simulator training) on pilot response to TCAS RA's, including following the resolution advisory (RA) promptly and accurately even in the presence of contravening ATC instructions (reference AC 120-55B). Simulator training should include a scenario(s) that involves contravening ATC instructions.

☐ **Output 3**   Operators will establish procedures for TCAS range setting appropriate to the traffic situation (e.g., use maximum range in low-traffic situations). The procedures will highlight/emphasize AC 120-55B, paragraph 11.d.3. "Good Operating Practices."

☐ **Output 6**   Air carrier trade associations will prepare letters to their operators encouraging them to incorporate TCAS DO-185, Change 7.1, if installation is not made mandatory.

Air Carriers
Safer Skies Safety Enhancements

Safety Enhancement: 169   Maintenance

Title: Policy & Procedures – Work Cards / Shift Change / Responsibilities /   ***Completed***
Manuals

This SE reduces accidents related to improper or incomplete maintenance by ensuring: (1) work cards or other written instructions are used at the start of each task, with written and oral status reports at every shift change; (2) procedures are written to include clear responsibility and authority for work assignments; and (3) necessary manuals (operational and maintenance) are complete, accurate, available, and appropriately used.

☐ **Output 2**   Each operator's director of safety, in conjunction with its director of maintenance, should ensure that the guidance is properly reviewed and that appropriate changes are made to the company's maintenance procedures.

Operators will audit their compliance with guidance materials and implement changes where needed, including both procedural content and procedural use. Successful implementation of procedural enhancements may additionally require changes to associated company policies and philosophy, and a sound organizational commitment to safety culture (see SE 17).

Safety Enhancement: 170   Maintenance

Title: Aircraft Design – OEM Continuous Monitoring of Service History   ***Underway***

This SE reduces accidents due to improper maintenance by ensuring maintenance task difficulty data is collected and reported to the original equipment manufacturer and proper maintenance is being performed to ensure aircraft systems continue to function as designed.

☐ **Output 2**   Operators and maintenance organizations will incorporate the best practices into their reporting processes for maintenance task problems. OEMs will incorporate reported maintenance task difficulties into their continuing airworthiness/design review processes.

Air Carriers
Safer Skies Safety Enhancements

Safety Enhancement: 175   Maintenance

**Title: Policy & Procedures – Flight Critical Configurations Changes Made   *Completed*
       During Maintenance**

This SE reduces accidents due to loss of pitot static systems by providing visible tagging any time ports of the pitot static system are covered during maintenance or servicing, and by enhancing preflight walk-around procedures to include specific verification that pitot static ports are uncovered.

☐ **Output 1**   Operators should review, and amend, maintenance procedures as appropriate to ensure that multiple levels of alerting, including visible tagging, are used anytime the pitot static system is covered.

☐ **Output 2**   Operators should ensure that pre-flight walk-around procedures ensure that pitot/static ports are uncovered.
Each operator's director of safety, in conjunction with its director of operations, should ensure that the appropriate procedures are covered in flight operations manual. Operators include adherence to the process within the internal audit process of their Safety Management System (or equivalent).

Safety Enhancement: 183   Wrong Runway Departure

Title: Cockpit Moving Map Display and Runway Awareness System   *Underway*

This SE reduces wrong runway departures and runway incursions by encouraging the installation of own-ship moving map display and/or runway awareness systems, and by encouraging the FAA to expedite the development of standards for integration of class II electronic flight bags with the airplane systems.

☐ **Output 1**   The regulator will determine the cost for fleet wide deployment and operators will install, where feasible, own-ship moving map display and/or runway awareness systems.

Safety Enhancement: 185   TAWS

Title: TAWS and RNAV Visual or other procedures   *Underway*

This SE reduces or eliminates TAWS alerts by providing better separation from terrain at identified sites. The SE provides RNAV Visual or other procedures that mitigate known TAWS and terrain issues as identified in the TAWS Directed Study.

☐ **Output 2**   The regulator and and air carriers will identify the potential for RNAV Visual procedures or other procedures to mitigate TAWS alerts at prioritized sites.