Commercial Aviation Safety Team

CAST Safety Portfolio Background for Cargo Air Carriers

April 2017

REVISION LOG

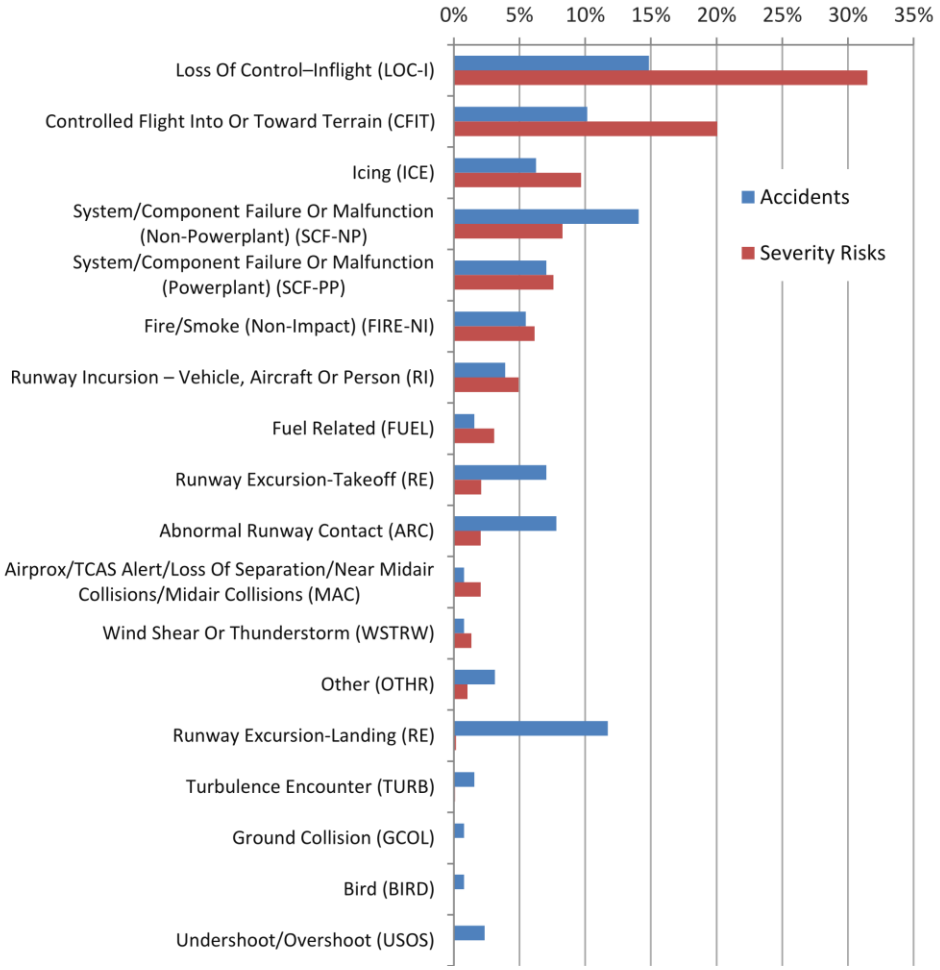
Date	Updates
02/04/2016	SE 127 OP4 completed and closed. SE 212 OP2 completed and closed.
06/02/2016	SE 193 OP1 completed and closed. SE 196 OP2 completed and closed. SE 219 OP4 completed and closed.
08/04/2016	SE 217 OP1 completed and closed.
10/06/2016	SE 196 OP4 completed and closed. SE 227 OP1 and OP2 added to portfolio. SE 229 OP2 added to portfolio.
12/01/2016	SE 213 OP1 completed and closed. SE 215 OP7 completed and closed.
02/02/2017	SEs 193, 195, 197, and 215 completed and closed. SE 194 OP2 completed and closed. SEs 223, 224, 225, and 226 added to portfolio.
04/06/2017	SE 196 completed and closed. SE 198 OP2 completed and closed.

1. Introduction

CAST Overview

The Commercial Aviation Safety Team (CAST) is a Government and industry collaboration of major organizations sharing the common aviation safety mission to reduce the commercial aviation accident rate.

CAST uses an integrated, data-driven strategy to reduce the U.S. commercial aviation fatality risk[1] and promote new Government and industry safety initiatives throughout the world. CAST prioritizes its efforts based on historical accident risk. The following bar chart displays 1987–2011 U.S. Hull Loss and Fatal Accidents and the percent of the total for each associated contributing factor.[2]



[1] Fatality risk is the fatal accident rate computed in terms of equivalent fully fatal airplane loads. It does not include ramp or security-related fatalities. It does include cargo operations. An accident that is fatal to 50 percent of the people on board equates to a 0.50 fatality risk.

[2] CAST/International Civil Aviation Organization Common Taxonomy Team Aviation Occurrence Category definitions: http://www.intlaviationstandards.org/Documents/CICTTOccurrenceCategoryDefinitions.pdf.

As of April 2017, CAST has adopted 101 voluntary safety enhancements (SE), 78 completed and 23 underway. During the CAST studies, some potential mitigations were discussed that were not mature enough to add to the CAST Plan. These research and development (R&D) SEs do not directly reduce accident risk, but were adopted for further research or studies that CAST hopes will lead to opportunities for additional risk reduction. In the future, as the research is conducted, aspects of these R&D SEs may be added to the CAST Plan.

CAST chartered the Remaining Risk (RR) Joint Safety Analysis Team (JSAT) and the RR Joint Safety Implementation Team (JSIT) with developing interventions that could reduce the risk of fatal accidents in cargo operations. After reviewing contributing factors in cargo operation accidents, CAST added the following 6 SEs to the CAST Plan to help mitigate the cargo accident rate:

- SE 121, Cargo Loading Training and SOPs
- SE 125, HazMat Processing
- SE 127, Cargo Fire Management
- SE 129, Compliance, Enforcement, and Restricted Operations
- SE 130, Oversight
- SE 131, Safety Culture

The RR JSIT also recommended R&D (SE 126, Mitigations for Hazardous Material Fires) to address hazardous materials fire risk. CAST added two additional SEs to the CAST plan based on the SE 126 Working Group's recommendations:

- SE 223, Hazardous Material Fires – Prevention and Mitigation
- SE 226, Hazardous Material Fires – Enhanced Protection of Occupants and Aircraft

CAST seeks to have industry and Government voluntarily implement the SEs, which can be as effective as rulemaking, but take less time. Safety experts report the fatality risk for commercial aviation in the United States has been reduced by 83 percent from 1998 to 2008 by implementing the voluntary SEs described in this CAST portfolio.

Current CAST goals include

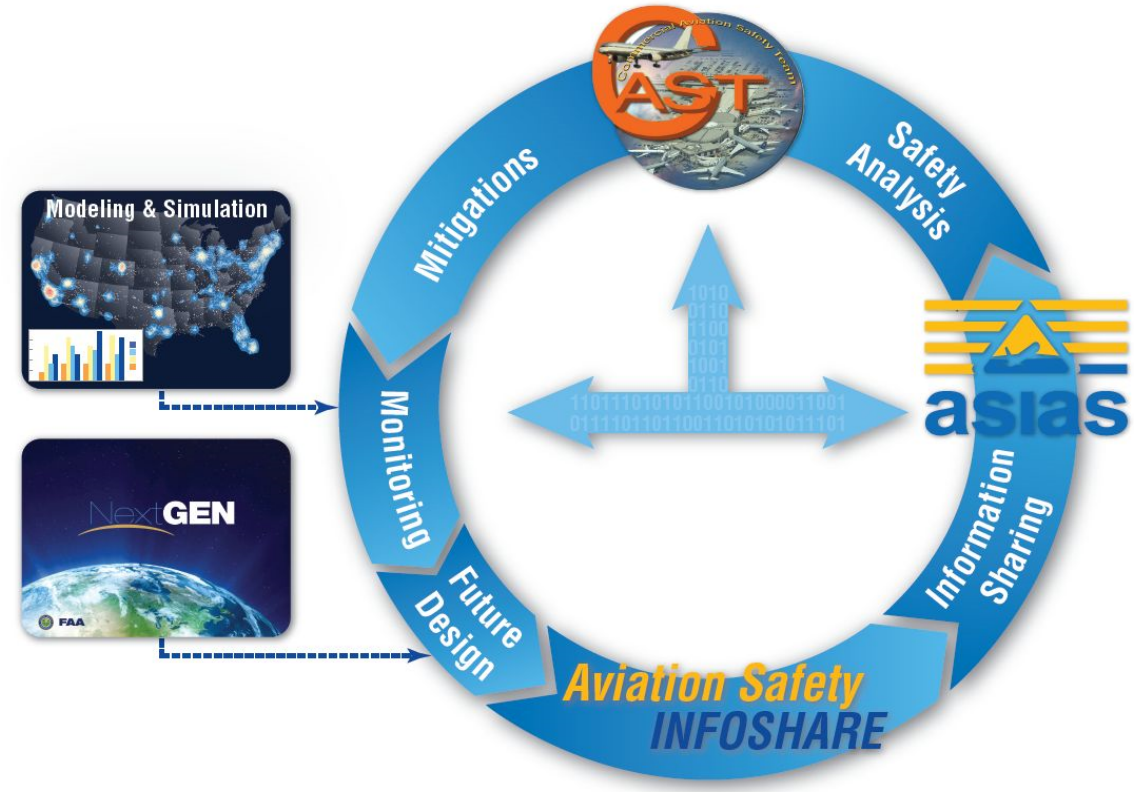
- Reducing the U.S. commercial aviation fatality risk by at least 50 percent from 2010 to 2025.
- Continuing to work with our international partners to reduce fatality risk in worldwide commercial aviation.

ASIAS Overview

The Federal Aviation Administration (FAA) created Aviation Safety Information Analysis and Sharing (ASIAS) as a means to provide a national resource for data analysis to discover common, systemic safety problems spanning multiple aspects of the global air transportation system. ASIAS uses safety data collected from the public sector and internal FAA databases,

and proprietary data from industry stakeholders (air carriers and manufacturers) to assess identified safety issues and monitor multiple data sources for potential high-risk safety vulnerabilities. Proprietary ASIAS data is governed by policies that protect the interests of the supplier(s) while allowing the broader aviation community to benefit from aggregate data analysis. Data from the public sector is available online at http://www.asias.faa.gov. Analysts are available to assist with public data pulls by emailing ASIAS@faa.gov.

CAST, ASIAS, and InfoShare—A System-Wide Safety Management System



Aviation Safety InfoShare (InfoShare) is a semiannual event where air carriers and others come together in an open environment to voluntarily share safety findings and potential issues. InfoShare is a vital part of the aviation safety community. By participating in InfoShare, air carriers can fulfill the Title 14, Code of Federal Regulations (14 CFR) § 13.401[3] requirement for disclosing Flight Operational Quality Assurance (FOQA) data.

[3] Flight Operational Quality Assurance Program: Prohibition against use of data for enforcement purposes.

CAST, ASIAS, and InfoShare together are part of the global Safety Management System (SMS) process. ASIAS uses all available data to study systemic issues raised at InfoShare and better understand the underlying contributing factors. When appropriate, ASIAS shares its directed studies with CAST for potential mitigation. CAST develops voluntary SEs to mitigate potential fatality risk threats. CAST also monitors implementation and effectiveness of its safety plan to ensure it is adopted in a manner consistent with the agreed-to plan and CAST goals. The ultimate goal is to generate corrective actions before new types of accidents emerge.

Air carriers are encouraged to voluntarily implement the CAST SEs discussed in this portfolio.

PORTFOLIO LAYOUT

This portfolio describes 63 of the 101 CAST voluntary SEs, including 6 of the 8 SEs focused on cargo operations. These SEs involve specific cargo operator actions to reduce the risk of fatal accidents in cargo operations. This portfolio also describes 4 of the 21 R&D SEs.

This portfolio will be updated after each CAST meeting (typically every 2 months) to reflect the status of SEs in the CAST Plan. The summaries in this portfolio are intended to explain each SE as it pertains to air carriers. A complete listing of all CAST SEs is available at the website: http://www.skybrary.aero/index.php/Portal:CAST_SE_Plan.

Each SE may involve several actions (or outputs) needed from multiple sources, such as regulators, manufacturers, or air carriers for successful implementation. This portfolio focuses only on all SEs with air carrier actions and outputs.

Twenty-one SEs in this portfolio are considered "underway" (17 CAST voluntary SEs and 4 R&D SEs). Specific outputs, or actions, of these SEs may already be complete; however, the SE as a whole is not.

Forty-six SEs in this portfolio are considered "completed." Because CAST SEs are voluntary, the classification "completed" does not mean every air carrier implemented the SE as specified.

Air carriers are encouraged to determine whether the SEs have been implemented. If the SEs have not been implemented, air carriers are encouraged to review the SEs and evaluate whether implementing them would improve their safety margin.

The following is a list of the CAST voluntary SEs and R&D SEs included in this portfolio.

Topic	*Completed*	*Underway*	*Category*
SE 1: Terrain Awareness and Warning System (TAWS)	X		Airworthiness
SE 2: Standard Operating Procedures (SOP)	X		Operations
SEs 3–8: Precision-Like Approach Implementation	X		Operations
SE 10: Airline Proactive Safety Programs (FOQA & ASAP)	X		Operations
SE 11: Crew Resource Management (CRM)	X		Operations

Topic	*Completed*	*Underway*	*Category*
SE 12: CFIT Prevention	X		Operations
SEs 14–16: Policies for ALAR (Safety Culture)	X		Operations
SEs 17–20: Maintenance Procedures	X		Airworthiness
SE 21: Flight Deck Equipment Upgrade/Installation To Improve Altitude Awareness and Checklist Completion	X		Operations
SE 23: Flight Crew Training	X		Operations
SE 24: Aircraft Design	X		Airworthiness
SE 26: Standard Operating Procedures (SOP)	X		Operations
SE 27: Risk Assessment and Management	X		Operations
SE 28: Policies	X		Operations
SE 29: Policies	X		Operations
SE 30: Human Factors and Automation	X		Operations
SE 31: Advanced Maneuvers	X		Operations
SE 49: Runway Incursion Prevention	X		Operations
SE 51: SOPs for Tow Tug Operators	X		Operations
SE 60: Pilot Training	X		Operations
SE 84: Disk Inspection Initiative	X		Airworthiness
SE 120: TAWS Improved Functionality			
Output 1	X		Operations
Outputs 3 and 4			Airworthiness
SE 121: Cargo Loading Training and SOPs	X		Operations
SE 125: HazMat Processing	X		Operations
SE 127: Cargo Fire Management		X	Airworthiness
SE 131: Safety Culture	X		Operations
SE 136: Engine Surge Recovery	X		Operations
SE 165: TCAS Policies and Procedures			
Outputs 2 and 3	X		Operations
Output 6			Airworthiness
SE 169: Work Cards/Shift Change/Responsibilities/ Manuals	X		Airworthiness
SE 170: OEM Continuous Monitoring of Service History	X		Airworthiness
SE 175: Flight Critical Configurations Changes Made During Maintenance			
Output 1	X		Airworthiness
Output 2			Operations

Topic	*Completed*	*Underway*	*Category*
SE 183: Cockpit Moving Map Display and Runway Awareness System		X	Airworthiness
SE 185: TAWS and RNAV Visual or Other Procedures		X	Airworthiness
SE 186: TCAS-Sensitivity Level Command		X	Operations
SE 192: Low Airspeed Alerting	X		Airworthiness
SE 193: Non-Standard, Non-Revenue Flights	X		Operations
SE 194: SOPs Effectiveness and Adherence		X	Operations
SE 195: Flight Crew Training Verification and Validation	X		Operations
SE 196: Effective Upset Prevention and Recovery Training, Including Approach-to-Stall	X		Operations
SE 197: Policy and Training for Non-Normal Situations	X		Operations
SE 198: Scenario-Based Training for Go-Around Maneuvers		X	Operations
SE 199: Enhanced CRM Training		X	Operations
SE 209: Simulator Fidelity		X	Research
SE 211: Training for Attention Management		X	Research
SE 212: Equipment and Procedures To Improve Route Entry for RNAV Departures		X	Operations
SE 213: Safe Operating and Design Practices for STARs and RNAV Departures		X	Airworthiness
SE 215: Landing Distance Assessment	X		Operations
SE 216: Flight Crew Landing Training		X	Operations
SE 217: Takeoff Procedures and Training		X	Operations
SE 218: Overrun Awareness and Alerting Systems		X	Operations
SE 219: Policies, Procedures, and Training To Prevent Runway Excursions		X	Operations
SE 223: Hazardous Material Fires – Prevention and Mitigation		X	Airworthiness
SE 224: Hazardous Material Fires – Enhanced Fire Detection Systems		X	Research
SE 225: Hazardous Material Fires – Containment and Suppression		X	Research
SE 226: Hazardous Material Fires – Enhanced Protection of Occupants and Aircraft		X	Airworthiness
SE 227: Air Carrier Procedures for Takeoff Configuration		X	Operations
SE 229: Takeoff Configuration Warning System Maintenance and Operational Assurance		X	Airworthiness

Section 2 of this portfolio includes a list and summary of the airworthiness CAST voluntary SEs, with associated cargo air carrier actions. The SEs from the Remaining Risk Cargo JSIT are listed first.

Section 3 of this portfolio includes a list and summary of the operations CAST voluntary SEs, with associated cargo air carrier actions. The SEs from the Remaining Risk Cargo JSIT are listed first.

Section 4 of this portfolio includes a list and summary of the R&D SEs, with associated air carrier actions.

Section 5 of this portfolio includes a checklist for air carriers to use to determine if they have implemented the 63 voluntary SEs with air carrier actions. In this section, the SEs are categorized by safety topic.

FEEDBACK

If you have questions or suggested changes on the utility of the information, please email your feedback to ASIAS@faa.gov.

2. Safety Enhancements—Airworthiness

SE 127: Cargo Fire Management (Underway)

CARGO

This SE is underway. Aspects of this SE are being worked on and will be altered from this draft version once they are complete.

This SE is designed to reduce cargo fires through new or revised standards for the construction of standardized and improved cargo containers including fire-suppression or fire-containment systems.

This SE calls for the development of improved fire containment/suppression systems in Class B or E cargo areas. These systems could include: 1) improved containers/unit load devices (ULD) capable of internally containing or suppressing a fire; 2) fire containment bags/blankets, which would be used to cover palletized cargo or cargo containers; or 3) fire suppression systems external to the pallets/ULDs. These improved containment/suppression systems should be implemented when available.

Output 4

SAE International published Aerospace Specification AS6453 on August 6, 2013. Portions of the SAE standard were adopted by reference in FAA TSO–C203, effective July 1, 2014.

Cargo operators should use fire containment covers conforming with TSO–C203 on palletized cargo.

Completed and closed February 4, 2016.

Output 8

Product development and testing activities are underway for ULDs made of more fire-resistant materials, as well as ULDs with internal fire suppression systems. If the testing shows such products to be viable, standards for these types of ULDs will be developed. Cargo operators should install and use these new ULDs if they become available.

SE 183: Cockpit Moving Map Display and Runway Awareness System (Underway)

This SE is underway. Aspects of this SE are being worked on and will be altered from this draft version once they are complete.

This SE is designed to reduce wrong runway departures and runway incursions by encouraging the installation of ownship moving map display and/or runway awareness systems.

Output 1

Air carriers should—

- Review the latest version of Advisory Circular (AC) 120–76, Guidelines for the Certification, Airworthiness, and Operational Use of Electronic Flight Bags, and other applicable ACs that enable use of moving map display in conjunction with company implementation of electronic flight bags (EFB).
- Evaluate all available runway awareness systems for forward fit and retroactive implementation, and consult with original equipment manufacturers (OEM) and third-party suppliers for detailed costs and technical capabilities of any system that provides airport position and/or aural warnings and alerts for airport runways.
- Install and implement moving map displays and/or runway awareness systems and activate the software to provide crews with knowledge of airplane position during taxi operations.

SE 185: TAWS AND RNAV VISUAL OR OTHER PROCEDURES (UNDERWAY)

This SE is underway. Aspects of this SE are being worked on and will be altered from this draft version once they are complete.

This SE is designed to reduce terrain awareness warning system (TAWS) alerts and provide better separation from terrain by providing Area Navigation (RNAV) Visual or other procedures that mitigate known TAWS and terrain issues.

Output *3*

Airlines for America (A4A) should identify a lead air carrier for each prioritized location identified for RNAV Visual procedures mitigation**.**

1. Eagle County Regional Airport (EGE)
2. Crested Butte Regional Airport (GUC)
3 Yampa Valley Airport (HDN)
4. Gallatin Airport (BZN)
5. Albuquerque International Sunport Airport (ABQ)
6. Burlington International Airport (BTV)
7. Spokane International (GEG)
8. Denver International (DEN)
9. John Wayne-Orange County Airport (SNA)
10. Metropolitan Oakland International Airport (OAK)
11. McCarran International Airport (LAS)
12. Bradley International Airport (BDL)
13. O'Hare International Airport (ORD)
14. Portland International (PDX)
15. San Diego International Airport (SAN)
16. Luis Munoz Marin International Airport (SJU)
17. Bob Hope Airport (BUR)
18. Dallas-Ft Worth International Airport (DFW)
19. Washington Dulles International Airport (IAD)
20. Manchester Airport (MHT)
21. Miami International Airport (MIA)
22. Reno/Tahoe International Airport (RNO)
23. Boise Air Terminal/Gowen Field (BOI)
24. Guam International Airport (GUM)
25. Jackson Hole Airport (JAC)
26. San Francisco International Airport (SFO)
27. Long Beach Daugherty Airport (LGB)
28. Dallas Love Airport (DAL)
29. Los Angeles International Airport (LAX)
30. Phoenix Sky Harbor International Airport (PHX)
31. Midway International Airport (MDW)
32. Ontario International Airport (ONT)

The lead air carrier will start approval process in accordance with FAA Order 8260.55, Special Area Navigation Visual Flight Procedures, issued March 8, 2010: http://www.faa.gov/documentLibrary/media/Order/8260.55.pdf.

FAA Order 8260.55 provides:

Reference document/publications,

Design considerations,

Equipment requirements,

Weather requirements, and

Charting requirements.

Once procedures are developed, A4A should advise other air carriers of the availability of the approved procedure.

Completed and closed December 31, 2014.

Output 4

Air carriers should share the historical analysis of TAWS alerts among ASIAS carrier participants. The analysis will identify specific hotspot areas within the highest TAWS warning airports. For each of these airports, the arrival procedures that help mitigate or reduce TAWS alerts should be shared on a common public server. RNAV Visual flight procedures should be initiated by a lead air carrier for those facilities not scheduled to update instrument approach procedures (IAP) within the next 15 months.

This output supersedes previously described Outputs 1–3.

- A4A, the Regional Airline Association (RAA), and the National Air Carrier Association (NACA) should perform a preliminary analysis of the airports for trends and potential terrain issues based on groupings or clusters of TAWS events in close proximity to actual terrain for each runway. This analysis can be conducted using current analysis tools or other three-dimensional analysis programs (available through Google Earth or other commercial or proprietary sources) of the current TAWS hotspots.
- A4A, RAA, and NACA should identify airports that are: 1) candidates for new procedures, 2) candidates for validating existing procedures, and 3) those showing no clear terrain-related history from the preliminary analysis. Air carrier associations should conduct detailed analysis of candidate airports for new improvements. When a detailed analysis shows an opportunity for RNAV Visual operations, a lead air carrier should be identified for development based on the current proportion of operations and future schedule plans. Air carriers should identify any RNAV Visual approaches already developed but not yet shared. Once an existing RNAV Visual approach is identified or an air carrier has developed a new RNAV Visual approach, the procedure should be posted on an A4A server for other 14 CFR part 121 air carriers and approved 14 CFR part 135 and approved 14 CFR part 91 operators to access.
- Action items should be considered flexible because this process is repeated biannually and as improvements in technology or methodology are identified.

SE 213: Safe Operating and Design Practices for STARs and RNAV Departures (Underway)

This SE is underway. Aspects of this SE are being worked on and will be altered from this draft version once they are complete.

This SE is designed to mitigate errors on Standard Terminal Arrival Routes (STAR) and RNAV departures through FAA and industry collaboration to develop and implement safe operating and design practices for these procedures.

Output 1

Air carriers are encouraged to collaborate with the FAA to develop guidance to align training for flightcrews, training for controllers, and procedure and chart design and implementation.

Completed and closed December 1, 2016.

Output 2

Air carriers are encouraged to collaborate with FAA Flight Standards Service (AFS) to update ACs containing details of commonly accepted safe operating practices for flightcrews to mitigate errors on STARs and RNAV departures.

Air carrier training organizations should develop, review and amend training syllabuses as well as air carrier policies and procedures to be consistent with the guidance in the ACs for conducting STARs and RNAV departures.

Output 3

Air carriers are encouraged to provide input and assist the FAA Air Traffic Organization (ATO) in developing commonly accepted safe operating practices for air traffic control of STARs and RNAV departures.

SE 223: Hazardous Material Fires – Prevention and Mitigation (Underway) CARGO

This SE is underway. Aspects of this SE are being worked on and will be altered from this draft version once they are complete.

This SE is designed to encourage air carriers, aircraft manufacturers, lithium battery manufacturers, and shippers of hazardous materials to develop and implement means to prevent fires involving hazardous materials from occurring on board aircraft, or to prevent any fires that do occur from endangering the aircraft or its occupants.

Output 1

Air carriers should develop policies and procedures requiring all lithium batteries tendered as cargo to be identified to the operator and information on the shipment provided to the flightcrew.

Output 2

The FAA should develop performance-based fire mitigation standards for hazardous materials packaging.

Output 3

Air carriers should implement one or more of the following state-of-the-art containment or suppression systems as best fits their operational needs, as feasible:

1. Fire containment covers (FCC),
2. Fire-resistant containers (FRC),
3. A container-based fire suppression system, or
4. Aircraft-based systems that deliver a suppression agent into ULDs.

Output 4

The FAA should publish guidance material for a risk assessment process that enables air carriers to determine the amount and type of hazardous materials that, if carried on an aircraft and involved in a fire, results in a fire that can be managed by the air carrier's fire protection methodologies.

Output 5

Air carriers should develop policies and procedures for conducting risk assessments for the hazardous materials allowed on their aircraft, and accompanying policy to limit the amount and type of hazardous materials that are within the capability of the fire protection method(s) used.

SE 226: Hazardous Material Fires – Enhanced Protection of Occupants and Aircraft (Underway)

CARGO

This SE is underway. Aspects of this SE are being worked on and will be altered from this draft version once they are complete.

This SE is designed to encourage air carriers to provide additional training and equip their fleets (as feasible) with systems to enhance the protection of occupants and aircraft and increase the flightcrew's ability to continue safe flight and landing in response to an onboard fire involving hazardous materials, including lithium batteries.

Output 1

Aircraft manufacturers should implement in new type designs and existing in-production type designs, as feasible, the installation of a single full-face crew smoke mask/oxygen system with state-of-the art communications technologies that accommodate glasses at each critical flightdeck position.

If this SE is implemented and results in new equipment, air carriers operating airplanes with new full-face crew smoke mask/oxygen systems will need to train crews on its use.

Output 2

Air carriers should implement in existing type designs a means to maintain pilots' view of necessary flight information and, where possible, visual references outside the aircraft in dense continuous smoke conditions on the flightdeck, in new type designs.

Air carriers and manufacturers of this equipment should also study the feasibility of implementing such systems in existing in-production and out-of-production airplane designs.

Output 3

Air carriers should implement installation of a system to upload emergency route information to aircraft using Controller Pilot Data Link Communications (CPDLC).

SE 229: Takeoff Configuration Warning System Maintenance and Operational Assurance (Underway)

This SE is underway. Aspects of this SE are being worked on and will be altered from this draft version once they are complete.

This SE is designed to mitigate the risk of flightcrews attempting to take off with flaps in an improper setting by ensuring air carrier maintenance programs include appropriate actions and procedures to ensure proper operation of the takeoff configuration warning system (TCWS).

Output 2

Air carriers should review their maintenance programs related to the TCWS to ensure acceptable in-service reliability:

- Ensure maintenance programs meet the latest manufacturer recommendations for maintenance intervals and procedures on TCWS.
- Review maintenance programs to ensure any circuit breakers bulled during maintenance or troubleshooting that could affect availability of the TCWS are re-engaged before release for flight.
- Review Minimum Equipment Lists (MEL) to ensure the procedures do not allow flightcrews to disable the TCWS by pulling circuit breakers.

SE 1: Terrain Awareness and Warning System (TAWS) (Completed)

This SE is designed to reduce or eliminate controlled flight into terrain (CFIT) accidents by improving pilot situational awareness. It also establishes appropriate procedures for the installation and use of TAWS equipment. Procedures include proper flightcrew reaction in response to TAWS aural and visual warnings.

Output 5

Air carriers should use a comprehensive system to support TAWS. The system should include information on installation, maintenance, training, and use of TAWS equipment.

Although SE 1 was originally written to be a voluntary safety enhancement, 14 CFR §§ 91.223 and 121.354 have required TAWS since 2005 for all turbine-powered airplanes in part 121 air carrier service. Air carriers are encouraged to implement CAST SE 120 for additional TAWS functionality.

AC 20–138D, Airworthiness Approval of Positioning and Navigation Systems, Change 2, issued April 7, 2016, initiated by the FAA Aircraft Certification Service (AIR), Systems and Equipment Standards Branch (AIR–130) is available for guidance: https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_20-138D_Chg_2.pdf.

SEs 17–20: Maintenance Procedures (Completed)

The purpose of these SEs is to reduce approach and landing accidents by reemphasizing current maintenance rules, policies, and procedures developed by commercial air carriers and the FAA. The reemphasis should specifically direct—

1. Approved maintenance programs, related to the servicing of components, incorporate all OEM safety-related components and procedures;
2. Oversight of subcontractor activity is increased by both the air carriers and regulators; and
3. MEL policies and procedures are strictly adhered to.

The reemphasis could be acted on almost immediately.

Output 4

Air carrier directors of safety should—

- Determine if quality control procedures have been implemented to ensure those deficiencies are continually addressed.
- Ensure an internal audit is conducted to determine whether rules relating to maintenance deficiencies in the specified bulletins, listed above, are being met through adequate maintenance procedures.
- Establish system safety procedures to ensure continuing conformance with the bulletins listed above.
- Determine whether the maintenance deficiencies described in the following bulletins and policy letters have been remedied:
    - Flight Standards Information Bulletin for Airworthiness 97–10 dated March 3, 1997: http://www.skybrary.aero/bookshelf/books/1561.pdf.

- Handbook Bulletin Airworthiness (HBAW) 96–05C dated December 15, 1997: http://www.skybrary.aero/bookshelf/books/1562.pdf.
- HBAW 98–01 dated February 3, 1998: http://www.skybrary.aero/bookshelf/books/1563.pdf.
- HBAW 98–09 dated April 28, 1998: http://www.skybrary.aero/bookshelf/books/1564.pdf.
- Handbook Bulletin Air Transportation (HBAT) 98–18 dated April 28, 1998: http://www.skybrary.aero/bookshelf/books/1564.pdf.
- MMEL Policy Letter 87 Revision 10, dated August 10, 2010: NAVAID http://fsims.faa.gov/PICDetail.aspx?docId=237672117617D63C86257784006C2EED.
- National Transportation Safety Board (NTSB) Safety Recommendation A–96–166: http://www.ntsb.gov/investigations/AccidentReports/_layouts/ntsb.recsearch/Recommendation.aspx?Rec=A-96-166.
- NTSB Safety Recommendation A–97–74 and A–97–57: http://www.ntsb.gov/investigations/AccidentReports/_layouts/ntsb.recsearch/Recommendation.aspx?Rec=A-97-074.

SE 24: Aircraft Design (Completed)

This SE is designed to incorporate 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 air carriers should review SAE Aerospace Standards Aerospace Recommended Practice (ARP) 5150, Safety Assessment of Transport Airplanes in Commercial Service, to ensure their continuing airworthiness processes incorporate risk management techniques to help ensure the original design level of safety is not degraded.

Air carriers should adequately monitor and assess fleet performance to verify that 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.

SE 84: Disk Inspection Initiative (Completed)

This SE is designed to eliminate uncontained engine failures (UEF) by mandatory inspections of the disks of turbine engines during shop visits.

Output 1

Air carriers should develop and implement enhanced disk inspection to detect cracks and help prevent UEFs of high-energy rotating parts.

Guidance on disk inspections can be found in U.S. Department of Transportation (DOT)/FAA/AR–04/28, Turbine Engine Fan Disk Crack Detection Test, issued September 2004: http://www.tc.faa.gov/its/worldpac/techrpt/ar04-28.pdf.

SE 120: TAWS Improved Functionality (Completed)

This SE is designed to increase the potential safety effect of SE 1, Terrain Avoidance Warning System (TAWS), by developing procedures to include Global Positioning System (GPS) sensors for TAWS, and to ensure updates to terrain databases, alerting algorithms, and new options to TAWS are incorporated as soon as possible.

Output 3

Air carriers should install GPS capability on all airplanes with multisensor RNAV Flight Management Systems (FMS), Electronic Flight Instruments and Electronic Map Displays. Note: These airplanes may have distance measuring equipment (DME)/DME or triple Inertial Navigation System positioning capability rather than GPS.

As a minimum, air carriers should modify TAWS to GPS TAWS. In addition, all air carriers should enable GPS to the TAWS box at any applicable maintenance opportunities. To minimize CFIT risk, air carriers not installing GPS at this time should implement Standard Operating Procedures (SOP) that advise flightcrews of the possible increased risk of operating into areas with limited ground-based navigation aids (NAVAID) and that help verify the aircraft's actual position relative to displayed ground track when appropriate.

Air carriers that fly standard airplanes, equipped with non-GPS TAWS, into regions with minimal navigation aids, should modify standard TAWS to GPS TAWS or conduct a risk assessment to develop and implement effective risk mitigation (such as no dual DME, or poor ground-based NAVAID reliability).

Output 4

Air carriers should develop and implement procedures to ensure TAWS terrain databases are updated in accordance with the manufacturer's recommendations on all airplanes.

SE 165: TCAS Policies and Procedures (Completed)

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

Output 6

TCAS DO–185, Version 7.1 includes TCAS reversal logic as well as a change from "Adjust Vertical Speed Adjust" to "Level off-Level off."

Air carriers should consider the benefits associated with TCAS DO–185, Version 7.1. If air carriers are conducting maintenance on their TCAS units, they should consider upgrading to TCAS DO–185, Version 7.1.

For more information on TCAS DO–185, Version 7.1, see Introduction to TCAS II Version 7.1: http://www.skybrary.aero/bookshelf/books/1927.pdf.

SE 169: Work Cards/Shift Change/Responsibilities/Manuals (Completed)

This SE is designed to reduce accidents related to improper or incomplete maintenance by ensuring—

- Work cards or other written instructions are used at the start of each task, with written and oral status reports at every shift change;
- Procedures are written to include clear responsibility and authority for work assignments; and
- Necessary manuals (operational and maintenance) are complete, accurate, available, and appropriately used.

Output 2

Air carriers should audit their compliance with AC 120–16F, Air carrier Maintenance Programs, and implement changes where needed, including both procedural content and procedural use. AC 120–16F, issued November 15, 2012, is available for guidance: http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC%20120-16F.pdf.

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, Maintenance Procedures.

Air carriers should review their guidance material in an appropriate and timely manner to establish their level of alignment with the material.

SE 170: OEM Continuous Monitoring of Service History (Completed)

This SE is designed to reduce accidents caused by improper maintenance. It is designed to ensure maintenance task difficulty data is collected and reported to the OEM and proper maintenance is being performed to ensure aircraft systems continue to function as designed.

Output 2

Air carriers and maintenance organizations should develop processes to follow the intent of and incorporate best practices into their reporting processes for maintenance task difficulties.

(See ATA[4] Spec 119, Continuous Monitoring of Maintenance Instructions, January 2014, http://www.skybrary.aero/bookshelf/books/2866.pdf)

SE 175: Flight Critical Configurations Changes Made During Maintenance (Completed)

This SE is designed to reduce accidents, caused by loss of pitot static systems, by providing visible tagging any time ports of the pitot static system are covered during maintenance or servicing. This SE is also designed to enhance preflight walk-around procedures to include specific verification that pitot static ports are uncovered.

Output 1

OEMs and air carriers should review, and amend, procedures to ensure multiple levels of alerting, including visible tagging, are used anytime the pitot static system is covered. Such levels should include visible tagging, or similar readily-visible alerting, a work card, and logbook entry.

Air carrier directors of safety, in conjunction with directors of maintenance, should ensure appropriate procedures are covered in maintenance information, including work cards.

Air carriers should include adherence to the process within the internal audit process of their SMS (or equivalent).

SE 192: Low Airspeed Alerting (Completed)

This SE is designed to further improve, throughout the U.S. fleet, early flightcrew awareness of a decreasing energy state.

Output 1

Air carriers should review the available service bulletins, determine applicability of the available bulletins to their specific fleets, and develop an implementation plan for prioritizing incorporation of these bulletins at their earliest convenience.

Completed and closed April 2, 2015.

[4] Airlines for America, formerly known as Air Transport Association of America (ATA). The specifications are still known as "ATA specs."

3. Safety Enhancements—Operations

SE 186: TCAS-Sensitivity Level Command (Underway)

This SE is underway. Aspects of this SE are being worked on by a JIMDAT subgroup. This SE will be altered from this draft version once they are complete.

This SE is designed to reduce the rate of unnecessary TCAS alerts at high altitude airports. Based on site-specific analysis, a determination will be made whether a change to TCAS sensitivity, operational practices, or additional guidance will contribute to improved awareness by ATC and aircrews.

Output 4

Develop changes in operating practices at Denver International Airport (DEN) to reduce TCAS RAs. These changes should consider altitudes, merge points, distance between aircraft, and the potential operational impact on the traffic flow.

Air carriers should coordinate implementation of these changes with Denver TRACON representatives and other air traffic representatives.

SE 194: SOPs Effectiveness and Adherence (Underway)

This SE is underway. Aspects of this SE are being worked on and will be altered from this draft version once they are complete.

This SE is designed for air carriers to develop and implement improved SOPs to increase flightcrew adherence to SOPs most relevant to issues leading to fatality risk in 14 CFR part 121 air travel.

Output 1

Air carrier industry associations should communicate with their air carrier members, explaining the analysis undertaken by CAST regarding loss of ASA, the role of that non-adherence to SOPs played in the accidents, and the purpose of the CAST SE.

Air carriers should—

- Review SOPs for consistency with the CAST Plan, focusing on completeness for all phases of flight and improved awareness and response during operations that are more prone to reduced ASA.
- Consult with manufacturers to check that SOPs are consistent with current manufacturer recommendations.
- Review SOPs for compatibility with the most current ATC procedures, paying attention to airports where data show higher rates of unstabilized approach or excessive bank angles.

- Validate and update SOPs as needed based on above review ensuring that procedures are clear, logical, prioritized, and incorporate human factors best practices.

Output 2

Air carriers should—

- Prioritize SOPs for monitoring and evaluation based on relevance of the SOPs to the highest areas of fatality risk in part 121 air carrier operations.
- Determine level of adherence to current SOPs through data and operational monitoring programs, prioritizing assessment and evaluation based on the results of Output 1.
- Determine which of the prioritized SOPs have lower adherence rates and identify possible reasons.
- Communicate with their industry associations when they have completed this assessment.

Completed and closed February 2, 2017, based on air carrier industry association member implementation surveys.

Output 3

Air carriers should—

- Based on the results of Output 2, improve or clarify SOPs that have high correlation to ASA issues and low adherence rates and develop suitable training to address causes for noncompliance.
- Implement training and revise syllabuses as appropriate.
- Revise SOPs and other policies as needed, and incorporate processes to periodically review and update SOPs, other policies, and training based on results of monitoring programs developed in Output 2 for SOP adherence.
- Periodically review and reprioritize SOPs that have high correlation to the highest areas of fatality risk in part 121 air travel, and review additional CAST or manufacturer recommendations as they become available.

SE 198: Scenario-Based Training for Go-Around Maneuvers (Underway)

This SE is underway. Aspects of this SE are being worked on and will be altered from this draft version once they are complete.

This SE is designed for air carriers to incorporate scenario-based go-around training (both initial and recurrent) that matches realistic situations. In addition, air carriers should perform an assessment to identify additional improvements to go-around procedures and training. This assessment would include a review of ongoing go-around initiatives, research planning, review of ASIAS metrics and data, and review of ATC go-around procedures.

Output 2

Air carriers should—

- Review their current go-around policies, SOPs, manuals, and training programs for consistency with the recommendations in the FAA guidance material addressing scenario-based go-around training.
- Consult with airplane manufacturers to develop airplane-specific procedures for those scenarios not already covered in their training.
- Update their go-around policies, SOPs, manuals, and training programs to incorporate the proposed scenarios.
- Coordinate with their pilot labor organizations to communicate these revisions and the rationale behind them to the line pilot community.
- Conduct the scenario-based training for the line pilots in initial and recurrent training.

Completed and closed April 7, 2017, based on air carrier association reports of operator implementation. CAST will continue to monitor the metrics.

SE 199: Enhanced CRM Training (Underway)

This SE is underway. Aspects of this SE are being worked on and will be altered from this draft version once they are complete.

This SE is designed to reduce accidents and incidents because of loss of ASA.

Output 2

Air carriers should review their crew resource management (CRM) policies in light of the revised FAA guidance in AC 120–51E, Crew Resource Management Training, and revise as necessary.

Output 3

Air carriers should develop, in cooperation with the pilot labor organizations, revised CRM training programs based on guidance of the FAA-revised AC 120–51E and the air carrier policies developed from Output 2. These programs will include simulator scenarios, classroom instruction and case studies in accordance with the latest version of AC 120–51E.

Air carriers should implement the revised training in initial and recurrent training programs.

(See AC 120–51E, Crew Resource Management Training, January 22, 2004, http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/list/AC%20120-51E/$FILE/AC120-51e.pdf)

Output 4

Air carriers should develop a process to solicit ongoing feedback from line pilots, flight standards organizations, and training department instructors and revise CRM training accordingly.

SE 212: Equipment and Procedures To Improve Route Entry for RNAV Departures (Underway)

This SE is underway. Aspects of this SE are being worked on and will be altered from this draft version once they are complete.

This SE is designed to reduce the frequency of crew errors during initial FMS programming of departure routes. Air carriers should take steps to address issues concerning pre-departure clearances (PDC) and pre-departure route changes.

Output 1

To improve the likelihood that air carrier dispatch should file routes that are not changed in the cleared route of flight by ATC, air carrier dispatch organizations should review and update procedures to coordinate with ATO.

Completed and closed June 2, 2015.

Output 2

Air carriers should modify and standardize PDC format and update as appropriate to clearly communicate PDC to pilots and reduce crew errors.

Completed and closed February 4, 2016.

Output 3

Air carriers are encouraged to deploy the capability to autoload pre-departure route clearances, with crew acknowledgement, into the FMS.

SE 216: Flight Crew Landing Training (Underway)

This SE is underway. Aspects of this SE are being worked on and will be altered from this draft version once they are complete.

This SE is designed to reduce runway excursion (RE) accidents by air carriers defining, publishing, and training proper techniques for stabilized approach, flare, touchdown, and use of available airplane stopping devices.

Output 1

Air carrier industry associations should communicate with their member air carriers, explaining the analysis undertaken by CAST regarding REs and the factors that result in reduced or minimal landing margins.

Air carriers should consult airplane manufacturer guidance to ensure consistency with their policies and operating procedures as related to the proper use of available airplane stopping devices.

Air carriers should develop/revise their operational procedures for landing on runways with reduced or minimal landing distance margin, including processes to identify runways within their sphere of operations having a higher risk of REs. These processes should use feedback from operational data-monitoring programs such as ASAP, FOQA, and ASIAS to measure risk based on industry-developed and accepted RE metrics. Data from the monitoring programs should be fed back into flightcrew training and procedures.

Air carriers should develop and implement procedures for stabilized approach, flare, and landing and train to these procedures. These procedures and associated training should be driven from operational data-monitoring programs such as ASAP, FOQA, and ASIAS. The related risk assessment should include all key risk issues that are recognized in contributing to REs. The results of that risk assessment should be used to establish training to include any or all of the following:

- Emphasis on flying a stable approach in accordance with the air carrier's SOPs and on executing a go-around when the approach becomes unstable.
- Emphasis on transitioning from a stable approach to a stable flare and touchdown within -250 feet to +500 feet of the aiming point markings or, where there are no runway aiming point markings, 750 feet to 1500 feet from the approach threshold of the runway as consistent with the current FAA Airline Transport Pilot Practical Test Standards. Training should reinforce that the crew should consider a go-around if the airplane does not touch down in the defined touchdown zone.
- Emphasis on early deployment of available stopping devices (such as speedbrakes/ground spoilers, reverse thrust to at least the flight idle position) for all landings, and the early use of appropriate levels of wheel braking on the first half of the runway, where friction levels tend to be higher in contaminated conditions.
- Specific instruction for the pilot monitoring to verify and call out deployment of stopping devices after touchdown.
- Simulator-based practice for airplane-specific handling guidelines in gusty tailwind conditions (within approved airplane-specific limits), to be performed in full flight simulators with capability to support the training.
- Simulator-based practice for landing and stopping on wet/contaminated runways, to be performed in full flight simulators with capability to support the training.

- Simulator-based practice for operation into runways with higher risk of RE, as identified by the processes developed to identify runways within the air carrier's sphere of operations with a higher risk of REs.
- Potential effects of MEL conditions on airplane stopping performance.
- Promotion of awareness and use of the Flight Safety Foundation's Runway Excursion Risk Awareness Tool.

Output 2

Air carrier industry associations should communicate with their member air carriers, explaining the analysis undertaken by CAST regarding REs and the factors that result in directional control issues.

Air carriers should consult airplane manufacturer guidance to ensure consistency with their policies and operating procedures as related to airplane performance in crosswinds, including—

- Maximum demonstrated crosswind values;
- Airplane-specific flight handling characteristics in gusty crosswind conditions;
- Airplane-specific ground handling characteristics on wet/contaminated runways when operating in gusty crosswind conditions;
- Emphasis on proper use of tiller during ground rollout, including the risk of nose gear steering malfunctions or over control if the tiller is used at high speeds; and
- Potential effects of MEL conditions on directional control (such as single reverser inoperative).

Air carriers should develop and implement procedures concerning proper techniques for maintaining directional control in crosswind conditions or in response to an airplane system failure resulting in a directional asymmetry and train to those procedures. These procedures and associated training should use feedback from operational data-monitoring programs such as ASAP, FOQA, and ASIAS and should include simulator practice (in full flight simulators with capability to support the training) of the following:

- Landing and rollout in gusty crosswinds on a contaminated runway, within air carrier crosswind landing guidelines for contaminated runways; and
- Recognition and control of asymmetric thrust reverser deployment.

SE 217: Takeoff Procedures and Training (Underway)

This SE is underway. Aspects of this SE are being worked on and will be altered from this draft version once they are complete.

This SE is designed to reduce RE accidents by air carriers improving takeoff safety.

Output 1

AFS will publish guidance that includes formal processes that ensure accurate takeoff performance data.

During the development and publishing of the guidance, air carriers and air carrier industry associations should give input to AFS.

Completed and closed August 4, 2016.

Output 2

Once complete, air carrier industry associations should communicate with their member air carriers, explaining the analysis CAST has undertaken regarding REs and the factors that result in takeoff overruns, and request they review and revise their procedures, as necessary, to be in accordance with the revised guidance material developed in Output 1.

Air carriers should review and revise their procedures and training, as necessary, in accordance with the guidance from Output 1, and respond to their air carrier organizations when this task is complete.

Output 3

Air carrier industry associations should communicate with the air carrier members, explaining the analysis undertaken by CAST regarding REs and the specific risk that rejected takeoff (RTO) scenarios pose in contributing to REs.

Air carriers should define and update SOPs related to the RTO decision, using guidance as recommended in the 2005 revision of the Pilot Guide to Takeoff Safety, Takeoff Safety Training Aid, and train to the procedures. Procedures and associated training for the RTO decision should address the following points as a minimum:

- Using good CRM in briefing for a possible RTO and crew responsibilities during an RTO;
- Promoting awareness of and adherence to SOPs regarding the RTO decision, including emphasis on the startle effect;
- Emphasizing in training scenarios on RTO decision making on non-engine-failure-related events that occur during the takeoff roll, such as—
    - Airspeed discrepancies;
    - Takeoff configuration warnings;
    - Cargo/door warning lights;
    - Mechanical issues;
    - Tire failures;
    - ATC comments, “instruction” to reject, or canceled clearance;
    - Birdstrike; and

- Scenarios (other than engine failure) that, according to air carrier SOPs, should instigate an RTO.

- Reinforcing in training the underlying rationale for the RTO procedures, based on airplane stopping characteristics.

The Pilot Guide to Takeoff Safety, Takeoff Safety Training Aid, is available for guidance: http://www.faa.gov/other_visit/aviation_industry/airline_operators/training/media/takeoff_safety.pdf.

SE 218: Overrun Awareness and Alerting Systems (Underway)

This SE is underway. Aspects of this SE are being worked on and will be altered from this draft version once they are complete.

This SE is designed to reduce landing overrun accidents through the development by manufacturers and the implementation by manufacturers and operators of onboard technologies to reduce or prevent landing overruns on new and existing airplanes and airplane designs, as applicable and as feasible.

Output 3

Air carrier industry associations should communicate with their air carrier members, explaining the analysis undertaken by CAST regarding REs and the potential benefits of onboard technologies that reduce or prevent landing overruns.

Air carriers should study the feasibility of incorporating these technologies into their specific fleets (both existing airplanes and new purchases) and operations. Studies should take into account current and potential future availability of systems from manufacturers. Air carriers should consider results from manufacturer-developed onboard technology that reduces or prevents landing overruns on new, current production, and out-of-production transport category airplane programs.

Air carriers should implement systems based on results of their feasibility assessments, where applicable, and report to air carrier industry associations whether they intend to incorporate systems in their fleet.

SE 219: Policies, Procedures, and Training To Prevent Runway Excursions (Underway)

This SE is underway. Aspects of this SE are being worked on and will be altered from this draft version once they are complete.

This SE is designed to reduce the risk of RE accidents through the development or modification by FAA ATO of policies, procedures, and training related factors that contribute to the risk of REs.

Output 3

Air carriers and AFS will assist ATO Safety and Technical Training (AJI), in the development and implementation of training for air traffic controllers on significant factors that that can contribute to the risk of REs.

Completed and closed April 7, 2016.

Output 4

Air carrier industry associations should communicate with their air carrier members, asking them to review and revise policies to reinforce a culture for flightcrews to declare "unable" to ATC clearances that, in the opinion of the flightcrew, could lead to an unstable approach.

Air carriers, ATO, and labor organizations should encourage reporting by both flightcrews and air traffic controllers of approach procedures where flightcrews often refuse clearances, and periodically review the resulting data to identify and correct potential systemic issues with those approaches.

Completed and closed June 2, 2016.

SE 227: Air Carrier Procedures for Takeoff Configuration (Underway)

This SE is underway. Aspects of this SE are being worked on and will be altered from this draft version once they are complete.

This SE is designed to mitigate the risk of flightcrews attempting to take off with flaps in an improper setting by recommending air carriers to review and/or amend their SOPs relating to setting proper flap/slat configuration for takeoff.

Output 1

Air carriers should review and assess current policies and procedures for takeoff configuration and evaluate against recommended best practices derived from analysis of flight operational data and pilot reports for takeoff flap misconfiguration events.

Output 2

Air carriers should revise their procedures as necessary in accordance with the results of Output 1.

SE 121: Cargo Loading Training and SOPs (Completed)

CARGO

This SE is designed to reduce cargo-related accidents and incidents by—

- Publishing and enforcing clear, concise, and accurate SOPs.
- Teaching the rationale behind those procedures.
- Ensuring company training programs are approved and monitored.

- Ensuring adequacy of contractor training.

Output 1

Cargo operators should conduct/improve the surveillance of contractor cargo-loading training. Cargo operators should ensure an audit/surveillance of their cargo-loading program is being conducted with an emphasis on contracted work. Cargo operators should improve audit/surveillance programs as necessary.

AC 120–59A, Air carrier Internal Evaluation Programs, issued April 17, 2006, is available for guidance:
http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/list/AC%20120-59A/$FILE/AC%20120-59a.pdf.

Output 4

Operators should incorporate AC 120–85, Air Cargo Operations into their SOPs and train those procedures including emphasis of the rationale behind those procedures.

Operators should develop and obtain approval, from their principal operations inspector, of SOPs that adopt best practices.

AC 120–85A, issued June 25, 2015, is available for guidance:
https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_120-85A.pdf.

SE 125: HAZMAT PROCESSING (COMPLETED) CARGO

This SE is designed to reduce cargo-related accidents and incidents by preventing undeclared hazardous material from entering the shipping system.

This SE is designed to encourage cargo operators (air and ground) to develop and implement a multi-tier system to identify and process undeclared hazardous material. This system should include education, identification, inspection, regulation, and oversight.

Output 2

Cargo operators should incorporate best practices or a comprehensive system including education, identification, and inspection to prevent shipping undeclared hazardous materials.

Resource Material for Air carriers and Passengers from the Office of Hazardous Materials Safety is available for guidance:
http://www.faa.gov/about/office_org/headquarters_offices/ash/ash_programs/hazmat/

SE 131: SAFETY CULTURE (COMPLETED) CARGO

This SE is designed to reduce cargo-related accidents and incidents by encouraging a safety culture, which includes the following outputs.

Output 2

Air carriers should implement a self-audit process as part of the SMS program to further enhance safety.

Information on SMS is available for guidance:
http://www.faa.gov/about/initiatives/sms/explained/.

Output 3

Air carriers should implement an operational risk management program.

See CAST SE 27, Risk Assessment and Management.

Output 5

Air carriers should implement a safety reporting system and develop a quality assurance program appropriate for their operations.

SE 2: Standard Operating Procedures (SOP) (Completed)

This SE is designed to improve aviation safety by ensuring air carriers establish flightcrew SOPs that fit each air carrier's particular operation. It will also improve safety by ensuring all air carriers train their SOPs and encourage the use of all SOPs in all normal operations.

All air carriers should have SOPs that addresses all projected normal situations crew/company personnel will encounter. SOP manuals should address—

1. Use of checklists,
2. Personnel responsibilities,
3. Use of available equipment, and
4. Expected procedures to be used during—
    a. Preflight,
    b. Taxi,
    c. Takeoff,
    d. Climb,
    e. Cruise,
    f. Descent,
    g. Approach,
    h. Missed approach,
    i. Landing,
    j. Taxi, and

k. Parking.

Air carriers should involve flightcrew in SOP development activities to increase acceptance and understanding of new procedures. Air carriers should develop, publish, and train SOPs for any new equipment before any new equipment is used or installed. Air carriers should train proficiency in their SOPs and crews should use published company SOPs.

Output 4

Air carriers should adopt SOPs and revise their training manuals and programs to incorporate the proposed SOP template for the technology of the equipment in the aircraft.

SOP template items can be found in appendix 1 of AC 120–71A, Standard Operating Procedures for Flight Deck Crewmembers,

AC 120–71A, issued February 27, 2003 is available for guidance: http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/list/AC%20120-71A/$FILE/AC120-71A.pdf.

AC 120–71B was issued January 10, 2017. The SOP template is no longer published in the AC, but the revised AC contains additional information on SOP policy, checklist development, and Pilot Monitoring (PM) duties: https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_120-71B.pdf.

SEs 3–8: Precision-Like Approach Implementation (Completed)

These SEs were designed to reduce the possibility of CFIT accidents by identifying the means by which all flightcrew can fly an appropriate stabilized vertical path to the runway end for all instrument approach procedures. These SEs will direct or encourage the aviation community to—

1. Identify criteria for the development of appropriate stabilized continuous descent approach procedures to the runway end for all instrument approaches and air carrier aircraft types.
2. Address any changes necessary to ensure adequate training and certification of flightcrews.
3. Address any changes necessary for certification and authorization of aircraft and procedures.
4. Take advantage of existing aircraft capabilities to improve approach and landing safety to the maximum extent practical.
5. Transition to use of new and evolving aircraft capabilities, which can further improve approach and landing safety at the earliest practical time.

The potential technologies for precision-like approach implementation include Non-Precision Approach with Vertical Angles, Visual Glide Slope Indicator (VGSI), DME, RNAV 3D, Required Navigation Performance (RNP)–RNAV, and laterally and vertically guided approach

path (xLS), instrument landing system (ILS), Microwave Landing System (MLS), and Global Navigation Satellite System Landing System (GLS). The following outputs apply to all of these technologies.

Output 3

Air carriers should update all appropriate pilot documentation to explain the revised instrument procedures as detailed in SEs 3 through 8.

Output 6

Air carriers should develop crew procedures and update their training program to promote new instrument procedures as specified is SEs 3 through 8.

Output 11

Air carriers should develop crew procedures/techniques to fly stabilized approach procedures that replace "dive and drive" procedures. Air carriers should tailor existing crew procedures and techniques to individual operational requirements.

SE 10: Airline Proactive Safety Programs (FOQA & ASAP) (Completed)

This SE is designed for air carriers to develop and implement a mutually agreed upon methodology to use deidentified FOQA and ASAP information to proactively identify safety-related issues and corrective actions.

Output 1

FAA AFS and the Office of the Chief Counsel (AGC) worked with industry groups to draft and issue a notice of proposed rulemaking (NPRM) preventing use of data collected under FOQA and ASAP programs in certificate actions against the airlines or their employees. This NPRM resulted in 14 CFR § 13.401, Flight Operational Quality Assurance Program: Prohibition against use of data for enforcement purposes, on May 9, 2002.

Employee groups should work with operators to draft contractual language to prevent the use of FOQA or ASAP information as a basis for disciplinary actions.

Operators worked with employee groups to develop legislative language to exempt FOQA and ASAP information from disclosure under the Freedom of Information Act of 1966 § 552 of Title 5 of the United States Code (U.S.C.) and prevent misuse of FOQA and ASAP information. This legislative language resulted in 49 U.S.C. § 44735, Limitation on disclosure of safety information.

Output 2

A FOQA steering committee and ASAP policy subcommittee comprised of Government and industry representatives, endorsed by FAA, provided guidance to operators regarding the implementation of FOQA and ASAP programs (mentoring). Each steering committee was

responsible for the development and establishment of standards for FOQA and ASAP programs. In addition, each steering committee documented standards for FOQA and ASAP programs.

The FAA convened a group to draft and coordinate ASAP AC 120–66B and FOQA AC 120–82. A re-draft of the ASAP AC is in production.

(See AC 120–66B, Aviation Safety Action Program (ASAP), November 15, 2002, http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC120-66B.pdf)

(See AC 120–82, Flight Operational Quality Assurance, April 12, 2004, http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/list/AC%20120-82/$FILE/AC120-82.pdf)

Output 3

The FAA convened a group of the referenced organizations to draft HBAT guidance regarding approval of FOQA & ASAP programs. FAA AFS was the lead organization for HBAT development.

Output 4

Air carriers and manufacturers developed a process to identify and communicate "Hot Topic" items of focus or review that could be monitored for a specific period.

Currently, ASIAS handles the sharing of trend information and corrective actions from FOQA and ASAP programs.

Output 5

The Flight Safety Foundation promoted and advertised FOQA overview documentation.

Air carriers, through the FOQA Task Force, drafted and coordinated documentation outlining suggested methods and procedures regarding key components of analysis and trend identification programs and suggested items to monitor in FOQA and ASAP programs.

FAA and the National Aeronautics and Space Administration (NASA) published results of studies reviewing existing FOQA and ASAP programs and the analysis tools those programs employ.

NASA undertook studies to develop analytical tools and methods that both large and small operators could apply to FOQA and ASAP information.

SE 11: Crew Resource Management (CRM) (Completed)

This SE is designed to reduce CFIT accidents by promoting comprehensive SOPs as a key element of air carrier CRM training programs. Under SE 2, Standard Operating Procedures (SOP), a template for comprehensive SOP has been developed, including SOP that specifically addresses CFIT accident prevention.

Output 3

Air carriers should incorporate CFIT prevention and training in their approved CRM training program.

Guidance regarding this training is available in AC 120–71B, issued January 10, 2017: https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_120-71B.pdf.

SE 12: CFIT Prevention Training (Completed)

This SE is designed to reduce or eliminate CFIT accidents by adding CFIT prevention training and procedures to air carrier training curriculums. This SE is also designed to emphasize flightcrew situational awareness and escape procedures for flightcrew to use in the event of a terrain warning indication.

Output 5

All 14 CFR part 121 air carriers and 14 CFR part 142 training centers should incorporate the CFIT Education and Training Aid or similar training in their approved training programs.

The CFIT Education and Training Aid can be found on the FAA website: http://www.skybrary.aero/bookshelf/books/2507.pdf

If not already incorporated, part 121 air carriers and part 142 training centers should submit revised training programs to their principal operations inspector for approval incorporating CFIT prevention training and procedures.

SEs 14–16: Policies for ALAR (Safety Culture) (Completed)

The purpose of these SEs is to develop a strategy to promote a safety culture at each air carrier specifically targeting approach and landing accident reduction (ALAR). They are designed to ensure essential safety information generated by airplane manufacturers and the FAA is included in company operating manuals and in training programs for pilots and other appropriate employee groups.

Teams within each air carrier should jointly develop manuals and training programs striving for the highest safety goals. They should further ensure the content of those manuals are rigorously followed in training programs and in day-to-day operations. It is recognized that rulemaking may be necessary to clarify existing requirements specifying the content and use of company operating manuals.

Output 1

Air carrier chief executive officers (CEO) and other key officers should be made more visible and more effective in promoting safety culture.

Safety culture guidance material can be found in the following documents:

- Operator's Flight Safety Handbook: http://flightsafety.org/files/OFSH_english.pdf,
- FAA Audit Tool, or
- Other similar guidance, endorsed by CAST.

Outputs 2 and 3

Air carrier directors of safety should be made more visible and more effective in promoting safety culture.

Air carrier directors of safety should also ensure the establishment of a process to identify, review, analyze and include appropriate safety information in training programs and in manuals used by flightcrews and maintenance staff.

Air carrier directors of safety should accomplish the above in the following ways:

- Promote HBAT 99–19 endorsed by CAST as good guidance material.
- Working through senior management, should implement guidance contained in HBAT 99–19.

HBAT 99–19, 14 CFR part 121 and 135 Air carrier Safety Departments, Programs, and the Director of Safety, is available for guidance:
http://www.skybrary.aero/bookshelf/books/1556.pdf.

SE 21: Flight Deck Equipment Upgrade/Installation To Improve Altitude Awareness and Checklist Completion (Completed)

This SE is designed to ensure altitude awareness and accomplishment of checklist items. Air carriers should develop guidelines and procedures for a flightdeck smart-alerting system. Air carriers should incorporate procedures and operational training based on—

1. The installation of automated checklist devices to provide a positive means for checklist completion (described in Human Performance Considerations in the Use and Design of Aircraft Checklists, issued January 1995: http://www.skybrary.aero/bookshelf/books/1566.pdf;
2. Research and assessment of existing technology in flightdeck smart-alerting system design; and
3. The installation of equipment to provide automatic aural altitude alert call-outs on final approach or other such altitude alerting systems.

Outputs 1 and 3

Air carriers should develop training syllabuses and procedures for interactive checklists and smart alerting system use.

(AC 25.1322–1, Flightcrew Alerting, is available for guidance:
http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC%2025.1322-1.pdf

SE 23: Flight Crew Training (Completed)

This SE is designed to ensure air carriers implement syllabuses that train and evaluate flightcrew on stabilized approaches, unusual attitudes, and upset recoveries.

Output 3

Air carriers should assist their assigned principal operations inspectors and director of safety, or equivalent, in conducting a review using the ALAR JSIT Training Guide, to ensure the following topics are included in their approved training programs:

- Stabilized approaches;
- Go-around gates and missed approach criteria;
- Approach procedures and briefings;
- Non-normal aircraft conditions;
- CRM courses and training;
- Basic airmanship skills;
- Specific turbojet, high speed, versus propeller, low speed aircraft characteristics for transitioning pilots if appropriate;
- Basic instrument and visual airmanship;
- Transfer of aircraft control; and
- Upset recoveries, unusual attitudes, mountain flying, heavy aircraft operations.

Information for Operators (InFO) 08029, Supportive Information, contains guidance on the above topics in appendix 1, ALAR JSIT Training Guide: http://www.skybrary.aero/bookshelf/books/1573.pdf.

SE 26: Standard Operating Procedures (SOP) (Completed)

This SE is designed to ensure all air carriers publish and enforce clear, concise, and accurate flightcrew SOPs. Air carrier instructors and check airmen should ensure these SOPs are trained and enforced in their flightcrew proficiency and standardization programs. Flightcrew SOPs 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 un-stabilized approaches;
- Rejected landings and missed approaches;

- In-flight pilot icing reporting; and
- Flightcrew coordination.

Output 4

Air carriers should adopt the revised SOP information from AC 120–71A (the current version is AC 120–71B) and revise their training programs and manuals to incorporate the proposed revisions.

Air carriers should revise their company training programs and manuals to incorporate as many SOP item revisions as appropriate.

AC 120–71B, issued January 10, 2017, is available for guidance: https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_120-71B.pdf.

SE 27: Risk Assessment and Management (Completed)

This SE is designed to identify, or develop and implement, methods for air carriers to prioritize safety-related decisions. This SE 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

Air carrier directors of safety or their equivalents should ensure all appropriate managers implement and use risk assessment tools to prioritize safety related decisions. Guidance materials on risk assessment and risk management tools to prioritize safety related decisions for operational issues are in Guide to Methods and Tools for Airline Flight Safety Analysis, second edition, issued June 2003: http://www.skybrary.aero/bookshelf/books/237.pdf.

Air carrier directors of safety or their equivalents, working through senior management, should apply the principles contained in AC 120–92B, Safety Management Systems for Aviation Service Providers, to training programs and manuals used by operations and maintenance staff.

AC 120–92B, is available for guidance: https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_120-92B.pdf.

SE 28: Policies (Completed)

This SE is designed to ensure 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. Air carriers should develop a means to improve the performance of those flightcrew members who meet the minimum criteria, but have shown a limited proficiency.

Output 1

Air carriers should develop reliable processes to ensure flight operations and maintenance personnel are made aware of and incorporate essential operating information in a timely manner.

- Air carriers should distribute essential operating information identified by the manufacturers to flightcrews and maintenance staff in an appropriate and timely manner.
- Air carrier directors of safety or their equivalents should ensure the establishment of a process to identify, review, analyze, and include essential operating information in training programs and in manuals used by flightcrews and maintenance staff.
- Air carriers should revise the company flight manual(s) in a timely manner as essential operating information is amended or added.

SE 29: Policies (Completed)

This SE is designed to ensure air carriers have a process to enhance pilot proficiency.

Output 2

Air carriers, in collaboration with pilot associations, should ensure their training and qualification processes use information from programs such as FOQA, Advanced Qualification Program (AQP), and Aviation Safety Action Plan (ASAP) to assist in assuring pilot proficiency.

- Pilot associations and air carriers should review existing programs and collaborate to develop a mechanism to continuously improve pilot performance and proficiency.
- Improved overall flightcrew performance and proficiency should be paramount in program design.
- The program should be a joint effort among pilot associations and air carriers, with safeguards designed to protect confidentiality of individuals and information.
- The program shall be non-punitive, voluntary, and managed by the individual air carriers. Entry into the program can either be by voluntary self-disclosure or through encouragement by the pilot associations Professional Standards or Standardization and Training committees.

SE 30: Human Factors and Automation (Completed)

This SE is designed to reduce loss of control accidents by encouraging air carriers to adopt consensus policies and procedures relating to mode awareness and energy-state management.

Output 4

Air carriers should review the generic automation policies as published and implement them as appropriate.

Guidance can be found in SE 30, Mode Awareness and Energy State Management Aspects of Flight Deck Automation, final report:
http://www.cast-safety.org/pdf/cast_automation_aug08.pdf.

SE 31: Advanced Maneuvers (Completed)

This SE is designed to implement training for the prevention and recovery from loss-of-control events.

Output 3

Air carriers should implement loss of control flight training via ground and simulator instruction within the certified flight envelope with emphasis on recognition, prevention, and recovery techniques. A check airman should administer this flight training.

Guidance can be found on the FAA website under Airline Operator Training:
http://www.faa.gov/other_visit/aviation_industry/airline_operators/training/.

SE 49: Runway Incursion Prevention (Completed)

This SE is designed to reduce the risk of runway incursions and surface incidents by recommending all 14 CFR part 121 and 14 CFR part 135 operators establish, document, train, and follow SOPs for ground operations.

Output 4

All part 121 and part 135 operators should revise their company training programs and policy manuals to incorporate as many SOP template items in AC 120–71A, as appropriate, for the scope of the operation.

AC 120–71A, issued February 27, 2003 is available for guidance:
http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/list/AC%20120-71A/$FILE/AC120-71A.pdf.

AC 120–71B was issued January 10, 2017:
https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_120-71B.pdf

SE 51: SOPs for Tow Tug Operators (Completed)

This SE is designed for the development and use of recommended best practices, for ground operations for use by mechanics and others who tow or otherwise move aircraft within the airport movement area, and it will improve aviation safety by reducing the frequency and severity of runway incursions.

Output 1

AFS developed a template for best practices to prevent runway incursions and other surface incidents. Air carriers should train mechanics and others who tow or otherwise move aircraft within the airport movement area on the recommended best practices.

SE 60: Pilot Training (Completed)

This SE is designed to substantially reduce or eliminate the risk of runway incursions. It is designed to incorporate runway incursion training into approved flightcrew qualification training and other pilot training programs. This training should increase the pilot's ability to recognize and avoid situations leading to runway incursions.

Output 7

Air carriers should use the guidance in AC 120–51E, Crew Resource Management Training, to implement scenario-based flight simulator training in ground taxi operations that emphasize flightcrew vigilance in avoiding runway incursions.

AC 120–51E, issued January 22, 2004, is available for guidance: http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/list/AC%20120-51E/$FILE/AC120-51e.pdf.

SE 120: TAWS Improved Functionality (Completed)

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

Output 1

Air carriers should—

- Establish, as appropriate, SOPs that communicates to flightcrew the rationale behind the necessity for these TAWS procedures.
- Advise flightcrew the possible increased risk of operating into areas with limited ground-based NAVAID which help verify the aircraft's actual position relative to displayed ground track when appropriate.
- Reference events involving map shifts and/or ground navigation equipment failures.
- Develop policies that match aircraft capability to the NAVAID environment at the expected arrival location.

SE 136: Engine Surge Recovery (Completed)

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

Output 1

Air carriers should include engine malfunction recognition and response training materials in training programs.

Information on engine malfunction recognition and response is available on the CAST website: http://www.cast-safety.org/apex/f?p=180:1:13916167188449::NO::P1_X:engine

SE 165: TCAS Policies and Procedures (Completed)

This SE is designed to prevent midair collisions by encouraging air carriers to require flightcrews to follow TCAS RAs, even in the presence of contravening ATC instructions. It also establishes recommended 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

Air carriers should establish SOPs, and standardized ground school and simulator training, on pilot response to TCAS RAs for aircraft equipped with TCAS II. The training should ensure pilots follow the RA promptly and accurately even in the presence of contravening ATC instructions. Simulator training should include a scenario(s) involving contravening ATC instructions.

AC 120–55C, Air Carrier Operational Approval and Use of TCAS II, Change 2, issued March 18, 2013, is available for guidance: https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_120-55C_CHG_1.pdf.

Output 3

Air carriers should establish procedures for TCAS range setting appropriate to traffic situations (such as using maximum range in low-traffic situations).

AC 120–55C, paragraph 12d, TCAS Good Operating Practices, is available for guidance: https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_120-55C_CHG_1.pdf.

SE 175: Flight Critical Configurations Changes Made During Maintenance (Completed)

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

Output 2

OEMs and air carriers should confirm pilots performing pre-flight walk-around procedures ensure pitot/static ports are uncovered.

Air carrier directors of safety, in conjunction with its director of operations, should ensure the appropriate pre-flight walk-around procedures are covered in Flight Operations Manual.

Air carriers should include adherence to the process within the internal audit process of their SMS (or equivalent).

SE 193: Non-Standard, Non-Revenue Flights (Completed)

This SE is designed to reduce accidents and incidents because of loss of airplane state awareness (ASA) during high-risk maneuvers in functional check flights, as well as in other non-standard, non-revenue flight operations.

Output 1

AFS published InFO 16006, identifying risks and summarizing recommendations while conducting non-revenue flights.

(See InFO 16006, Non-Revenue Flight Procedures, https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info/all_infos/media/2016/InFO16006.pdf, and the Flight Safety Foundation Functional Check Flight Compendium, http://flightsafety.org/current-safety-initiatives/functional-check-flights.)

Completed and closed June 2, 2016.

Output 2

Air carriers should implement the guidance developed from Output 1 to create operational risk assessment guidelines and training standards that mitigate risk associated with non-standard, non-revenue flights.

Air carriers should incorporate these practices into their SOPs, policies, training, and SMS.

Completed and closed February 2, 2017, based on air carrier industry association member implementation surveys.

SE 195: Flight Crew Training Verification and Validation (Completed)

This SE is designed to improve flightcrew proficiency in handling issues that can lead to loss of ASA.

Output 1

Air carriers should—

- Implement a process to ensure their aircrew training program, including any contractor training, is consistent with current air carrier and manufacturer policy and procedures.
- Implement a process to validate the qualification and currency of trainers, including contractor trainers.
- Validate contractor training by periodically observing training and/or checking events and auditing records to ensure consistency of aircrew training and pilot proficiency.

Completed and closed February 2, 2017, based on air carrier industry association member implementation surveys.

SE 196: Effective Upset Prevention and Recovery Training, Including Approach-to-Stall (Completed)

This SE is designed for air carriers to review, incorporate, and adopt the best practices recognized by the aeronautical community concerning upset prevention and recovery training (UPRT).

Output 2

Air carriers should review AC 120–109, Stall and Stick Pusher Training, and revise their training programs as necessary to ensure the following components are included in recurrent and initial training approach-to-stall and stall recovery training:

1. The key concept that reduction of angle of attack is the most important response when confronted with a stall event. The training should emphasize treating an approach to stall the same as a full stall, executing the stall recovery at the first indication of the stall and emphasizing that reduction of angle of attack is the most important response.
2. Airline Transport Pilot and Aircraft Type Rating Practical Test Standards, recently revised, as they relate to checking approach to stall recognition and recovery, including evaluation criteria for a recovery from a stall or approach-to-stall that does not mandate a predetermined value for altitude loss and should consider the multitude of external and internal variables which affect the recovery altitude.
3. Academic training on specific aircraft characteristics that identify a stalled condition, the characteristics that can predict an imminent stall departure, and the role air data system failures can play in contributing to a stall and the proper diagnosis and response to these failures.
4. Realistic scenarios that could be encountered in operational conditions.

Air carriers should coordinate with their pilot labor organizations to communicate these revisions and the rationale supporting them to the line pilot community.

Air carriers should conduct approach-to-stall recovery training for their line pilots in initial and recurrent training, including in accordance with these revisions, in appropriately validated flight simulator devices. Air carriers should undertake simulator qualification through their normal procedures in coordination with the FAA National Simulator Program (NSP), using available guidance bulletins for approach-to-stall and stall recovery maneuvers.

(See AC 120–109A, Stall and Stick Pusher Training, November 24, 2015, https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_120-109A.pdf)

Completed and closed June 2, 2016.

Output 4

Air carrier recurrent and initial UPRT procedures should be revised to be conducted using realistic scenarios based on industry best practices and FAA guidance material.

Air carriers should—

- Assess their training programs to ensure their recurrent and initial training include the principles in the guidance and revise their training programs as necessary.
- Conduct revised UPRT for their line pilots in initial and recurrent training in appropriately qualified flight simulator devices. Air carriers should undertake simulator qualification through their normal procedures in coordination with the FAA NSP, using available guidance bulletins for upset prevention and recovery.
- Coordinate with their pilot labor organizations to communicate these revisions and the rationale behind them to the line pilot community.

Completed and closed October 6, 2016.

Output 5

Air carriers should implement the changes, as necessary, made by airplane and simulator manufacturers to update training devices to satisfactorily represent airplane characteristics for additional proposed training scenarios.

Air carriers should make additional revisions to their training programs to support the additional scenarios and communicate these actions to the industry associations.

Completed and closed April 6, 2017, based on the requirements being satisfied in 14 CFR part 60.

SE 197: Policy and Training for Non-Normal Situations (Completed)

This SE is designed to improve flightcrew proficiency during upsets or non-normal situations.

Output 1

Air carriers should review their policies and procedures for handling non-normal situations to ensure they clearly include the following concepts:

1. Fly the airplane first (establish controlled and stabilized flight).
2. Practice crew coordination (such as determining who will fly the aircraft, who will read the checklist, and who will communicate with ATC).
3. Identify the non-normal situation and correct checklist.
4. Identify the appropriate time to complete the non-normal checklist (for example, if on takeoff, complete the after-takeoff checklist first if the situation does not require immediate attention).
5. Complete the appropriate checklist.

Based on the review, air carriers should revise their manuals, as necessary, to include the above information.

Air carriers should coordinate with pilot labor organizations to communicate the policies, ensure they are understood by the line pilot community, and gather feedback.

Output 2

Air carrier training organizations should review and amend, as necessary, their ground and flight training syllabuses to emphasize the air carrier's policy relating to the handling of non-normal situations as stated in Output 1.

Completed and closed February 2, 2017, based on air carrier industry association member implementation surveys.

SE 215: Landing Distance Assessment (Completed)

This SE is designed to improve flightcrew awareness of the landing distance margin and the factors and variables that can affect those margins. Flightcrews should assess landing performance based on conditions existing at the time of arrival (not conditions presumed at dispatch), including weather, runway conditions (using standardized terminology), aircraft weight, braking systems, and performance assumptions.

Output 7

Air carriers should implement the guidance material and the manufacturer landing distance data to develop air carrier-specific landing distance assessment procedures and associated performance tools.

Air carriers should develop and implement training based on the developed landing distance assessment procedures for flightcrews to perform such an assessment and use associated tools.

Completed and closed December 1, 2016.

4. Safety Enhancements—Research

SE 209: Simulator Fidelity (Underway)

This SE is designed to improve pilot performance during recovery from a full stall and to determine the benefits of using various levels of prototype advanced aerodynamic modeling of full stall characteristics to perform full stall recovery training.

Output 1

Air carrier training organizations and pilot labor organizations should assist AFS in developing learning objectives related to recovery from full aerodynamic stall.

Output 4

Air carriers should provide pilots to assist AFS with a study that uses an in-flight simulator to confirm the model characteristics used to train upset prevention and recovery techniques will transfer to flight.

SE 211: Training for Attention Management (Underway)

This SE is designed for the aviation community (Government, industry and, academia) to perform research and develop and assess training methods and realistic scenarios that can address the attention-related human performance limitations observed in the ASA event data, including channelized attention, confirmation bias, startle/surprise, and diverted attention, with accompanying performance measures.

Output 1

Air carriers should provide research organizations access to operational expertise that can help improve effectiveness and feasibility of detection methods.

Output 2

Air carriers should assist NASA in developing methods for creating realistic, high workload scenarios that can incite human performance limitations, including channelized attention, confirmation bias, startle/surprise, and diverted attention. These methods should use the technologies developed in Output 1 for measuring human attention issues.

Air carrier training organizations, in conjunction with research organizations, should use these methods to develop scenarios and training-based mitigations, including but not limited to—

- Improved instrument-scanning behaviors in both nominal and off-nominal conditions, with emphasis on scan patterns for glass cockpits;
- Recognition of channelized or diverted attention in one flightcrew member by the other flightcrew member, and appropriate methods of intervention and correction;
- Self-diagnosis methods for flightcrew members to recognize and recover from channelized attention, confirmation bias, startle/surprise, and diverted attention; and

- Reinforcement of proper air carrier procedures regarding recognition of and response to flight deck alerts.

Air carriers and research organizations should assess the effectiveness of these scenarios and mitigations and report results to JIMDAT and CAST for review and reference.

SE 224: Hazardous Material Fires – Enhanced Fire Detection Systems

CARGO

This SE is designed for the aviation community (Government and industry) to perform research, development, and certification of technologies that enhance flightcrew awareness of smoke, fire, fumes, and/or other fire effects within the cargo compartments.

Output 2

Air carriers should assist the FAA in publishing research results on fire detection and alerting systems installed within cargo containers, including collapsible containers and containers with rain covers, that provide timely alerting to the flightcrew.

Output 3

Air carriers should assist the FAA in publishing research results on fire detection and alerting systems that can be installed within the aircraft and can detect fires within a container, on a pallet (with or without a fire containment cover (FCC)), or in a bulk load, and provide timely alerting to the flightcrew.

Output 4

Air carriers should assist the FAA in publishing research results on optimization of a multi-criteria fire detection system on aircraft that can detect fires (including lithium battery fires) in a more timely manner than existing state of the art and that are less (no more) prone to false alarms.

SE 225: Hazardous Material Fires – Containment and Suppression

CARGO

This SE is designed to encourage air carriers, aircraft manufacturers, lithium battery manufacturers, shippers of hazardous materials, manufacturers of ULDs, and manufacturers of packaging for hazardous materials to conduct research and develop systems for mitigating the effects of a fire involving hazardous materials through improved containment and/or suppression.

Output 1

Air carriers should assist the FAA in developing standards and R&D results for containment and/or suppression solutions that are integrated into cargo containers and capable of mitigating hazardous material fires (including but not limited to those involving lithium batteries) for at least 6 hours.

Output 2

Air carriers should assist the FAA in developing standards and R&D results for containment and/or suppression systems that are integrated into the aircraft and capable of mitigating hazardous material fires (including but not limited to those involving lithium batteries) for at least 6 hours.

Output 3

Air carriers should assist the FAA in—

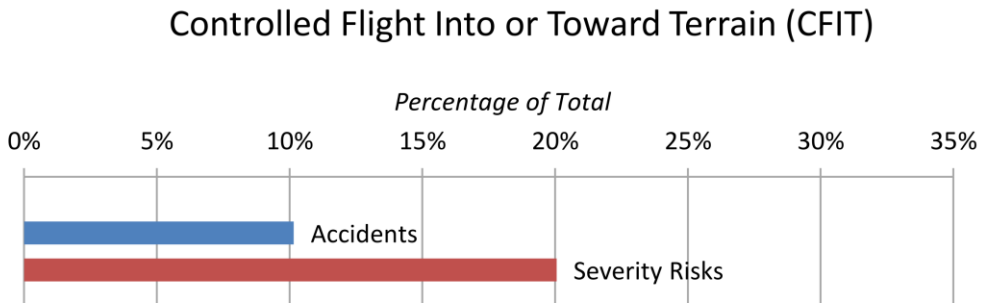
- Developing standards and R&D results for containment and/or suppression solutions that are integrated into hazardous material packaging and capable of mitigating hazardous material fires (including but not limited to those involving lithium batteries) for at least 6 hours.
- Implementing performance-based fire mitigation standards for hazardous materials packaging.

Output 4

Air carriers should assist the FAA in developing standards for the exclusion of smoke in the cockpit when the smoke is produced from hazardous materials (including but not limited to those involving lithium batteries). Research and develop results on barriers and/or smoke removal systems with specific regards to smoke, pressure, temperature, and flammable vapors.

5. Operator Action Safety Enhancement Check-List

Controlled Flight into Terrain (CFIT)



SE 1: Terrain Avoidance Warning System (TAWS)

Output 5

- ☐ Are you using a comprehensive system to support TAWS that includes information on installation, maintenance, training, and the use of TAWS equipment?

SE 2: Standard Operating Procedures (SOP)

Output 4

- ☐ Has your air carrier developed SOPs that incorporate the proposed SOP template items as appropriate for the technology of the equipment in the aircraft?

- ☐ Has your air carrier revised training manuals and programs to incorporate the SOP items above as appropriate for the technology of the equipment in the aircraft?

SEs 3-8: Precision-Like Approach Implementation

Output 3

- ☐ Has your air carrier updated all appropriate pilot documentation to explain the revised instrument procedures including VGSI, DME, RNAV 3D, RNP–RNAV, xLS, MLS, and GLS?

Output 6

- ☐ Has your air carrier developed crew procedures and updated their training program to promote new instrument procedures including VGSI, DME, RNAV 3D, RNP–RNAV, xLS, MLS, and GLS?

Output 11

- ☐ Has your air carrier developed crew procedures/techniques to fly stabilized approach procedures that replace "dive and drive" procedures?

- ☐ Has your air carrier tailored existing crew procedures and techniques to your operational requirements?

SE 11: Crew Resource Management (CRM)

Output 3

- ☐ Does your air carrier have CFIT training incorporated in your approved CRM training program?

SE 12: CFIT Prevention Training

Output 5

- ☐ Does your air carrier have CFIT education and training aid, or similar training, in your approved training program?

- ☐ Has your air carrier submitted your revised training program to your principal operations inspector for approval?

SE 120: TAWS Improved Functionality

Output 1

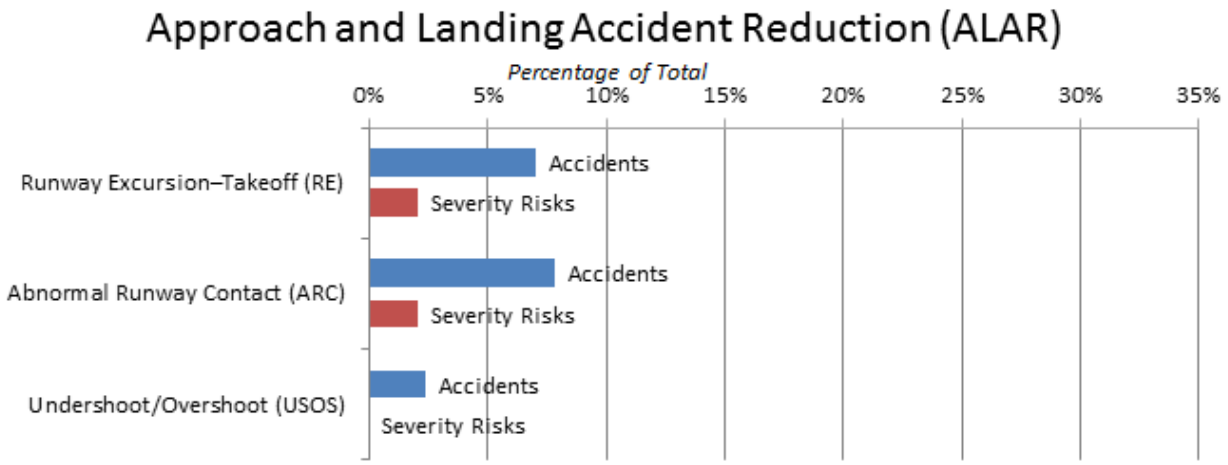
- ☐ Has your air carrier established SOPs that communicates to flightcrews the rationale behind the necessity for these SOPs?

- ☐ Has your air carrier advised flightcrews the possible increased risk of operating into areas with limited ground-based NAVAID that help verify the aircraft's actual position relative to displayed ground track when appropriate?

- ☐ Has your air carrier referenced events involving map shifts and/or ground navigation equipment failures?

- ☐ Has your air carrier developed policies that match aircraft capability to the NAVAID environment at the expected arrival location?

Approach and Landing Accident Reduction (ALAR)



SEs 14–16: Policies for ALAR (Safety Culture)

Output 1

- ☐ Is your air carrier's chief executive officer visible and effective in promoting safety culture?

Outputs 2 and 3

- ☐ Is your air carrier's director of safety visible and effective in promoting safety culture?
- ☐ Does your air carrier's director of safety ensure the establishment of a process to identify, review, analyze, and include appropriate safety information in training programs and in manuals used by flightcrews and maintenance staff?

SEs 17–20: Maintenance Procedures

Output 4

- ☐ Has your air carrier's director of safety determined that the maintenance deficiencies, described in the bulletins and policy letters listed in this document, have been remedied?
- ☐ Has your air carrier's director of safety determined that quality control procedures have been implemented to ensure that those deficiencies are continually addressed?
- ☐ Has your air carrier's director of safety ensured an internal audit has been conducted to determine that rules relating to the maintenance deficiencies described in the specified bulletins are being met through adequate maintenance procedures?
- ☐ Has your air carrier's director of safety established system safety procedures to ensure continuing conformance with the bulletins?

SE 21: Flight Deck Equipment Upgrade/Installation to Improve Altitude Awareness and Checklist Completion

Outputs 1 and 3

- ☐ Has your air carrier developed training syllabuses and procedures for interactive checklists and smart alerting system use?

SE 23: Flight Crew Training

Output 3

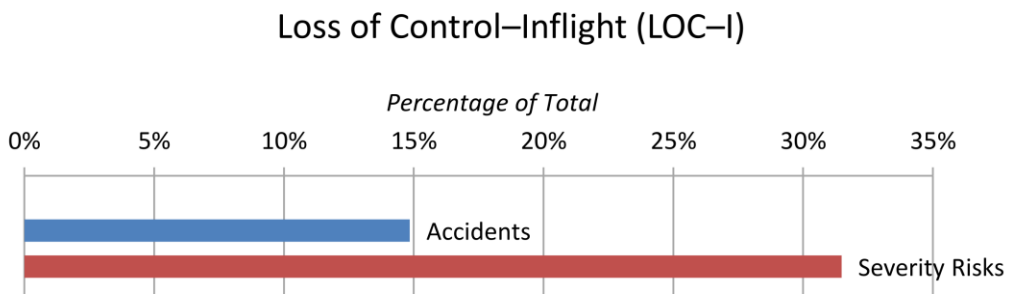
- ☐ Has your air carrier assisted your principal operations inspector and director of safety (or designees) in conducting a review to determine if your air carrier addresses the topics, listed in this document, under your flightcrew qualifications program?

SE 24: Aircraft Design

Output 3

- ☐ Has your air carrier reviewed SAE ARP 5150, Safety Assessment of Transport Airplanes in Commercial Service, to ensure your continuing airworthiness processes incorporates risk management techniques that help ensure that the original design level of safety is not degraded?

Loss of Control (LOC)



SE 26: Standard Operating Procedures (SOP)

Output 4

- ☐ Has your air carrier adopted the revised SOP information from AC 120–71B and revised your training programs and manuals to incorporate the proposed revisions?

- ☐ Has your air carrier revised the company training programs and manuals to incorporate as many SOP item revisions as appropriate?

SE 27: Risk Assessment and Management

Output 3

- ☐ Has your air carrier established a risk management program that—

  a) Prioritizes safety related decisions?

  b) Implements risk management methods in operations and maintenance departments?

SE 28: Policies

Output 1

- ☐ Has your air carrier distributed essential operating information identified by the manufacturers to flightcrews and maintenance staff?

- ☐ Has your air carrier's director of safety or equivalent ensured the establishment of a process to identify, review, analyze, and include essential operating information in training programs and in manuals used by flightcrews and maintenance staff?

- ☐ Has your air carrier revised the company flight manual(s) as essential operating information is amended or added?

SE 29: Policies

Output 2

- ☐ Has your air carrier ensured the training and qualification processes use information from programs such as FOQA, AQP, and ASAP to assist in assuring pilot proficiency?

SE 30: Human Factors and Automation

Output 4

- ☐ Has your air carrier reviewed the generic automation policies as published and implemented them as appropriate?

SE 31: Advanced Maneuvers

Output 3

- ☐ Has your air carrier developed and implemented maneuvers and procedures for the prevention and recovery from loss of control events in ground and flight training?

- ☐ If so, does it include—

  a) Stall onset recognition and recovery?

b) Unusual attitudes?

c) Upset recovery?

d) Effects of icing?

e) Energy awareness and management?

f) Causal factors that lead to loss of control?

SE 192: Low Airspeed Alerting

Output 1

- ☐ Do your air carrier's applicable airplanes have the available manufacturer service bulletins regarding low airspeed alerting functionality installed?

SE 193: Non-Standard, Non-Revenue Flights

Output 1

- ☐ Has your air carrier reviewed the FAA guidance material providing best practices on the conduct of non-standard, non-revenue flights?

Output 2

- ☐ Has your air carrier revised its SOPs and policies, as applicable, regarding conduct of non-standard, non-revenue flight operations to reflect the guidance?

SE 194: SOPs Effectiveness and Adherence

Output 1

- ☐ Has your air carrier reviewed its existing SOPs for consistency with the latest versions of the CAST Plan, manufacturer recommendations, and ATC procedures?

- ☐ Has your air carrier updated its SOPs, as necessary, to become consistent with the latest version of the CAST Plan, manufacturer recommendations, and ATC procedures?

Output 2

- ☐ Has your air carrier completed an assessment to determine the level of adherence to current SOPs and identified possible reasons for insufficient adherence?

Output 3

- ☐ Has your air carrier revised its training program, as necessary, based on the first round of SOP reviews and revisions?

- ☐ Have all pilots employed by your air carrier received the first round of training?

SE 195: Flight Crew Training Verification and Validation

Output 1

- ☐ Has your air carrier completed a review of its air crew training to ensure the quality is verified and validated, with emphasis on contractor provided training?
- ☐ Has your air carrier implemented processes to assess trainer currency and qualification?
- ☐ Has your air carrier made an initial observation/validation visit to any contracted training organizations they use, as applicable?

SE 196: Effective Upset Prevention and Recovery Training, Including Approach-to-Stall

Output 2

- ☐ Has your air carrier revised its approach-to-stall training, as necessary, to reflect the guidance material and industry best practices?
- ☐ Have all pilots employed by your air carrier received approach-to-stall training?

Output 4

- ☐ Has your air carrier revised its UPRT, as necessary, to reflect the guidance material and industry best practices?
- ☐ Have all pilots employed by your air carrier received the UPRT?

Output 5

- ☐ Has your air carrier implemented the changes, as necessary, made by airplane and simulator manufacturers to update training devices to satisfactorily represent airplane characteristics for additional proposed training scenarios?
- ☐ Has your air carrier made additional revisions to its training programs to support the additional scenarios and communicate these actions to the industry associations?

SE 197: Policy and Training for Non-Normal Situations

Output 1

- ☐ Has your air carrier reviewed and revised their policies and manuals emphasizing the importance of flying the aircraft and crew coordination in non-normal situations?

Output 2

- ☐ Has your air carrier revised training in accordance emphasizing the importance of flying the aircraft and crew coordination in non-normal situations, as necessary?

- ☐ Have all pilots employed by your air carrier received the training emphasizing the importance of flying the aircraft and crew coordination in non-normal situations?

SE 198: Scenario-Based Training for Go-Around Maneuvers

Output 2

- ☐ Has your air carrier revised its go-around training, as necessary, to reflect the published guidance material addressing scenario-based go-around training?

- ☐ Have all pilots employed by your air carrier received the scenario-based go-around training?

SE 199: Enhanced CRM Training

Output 2

- ☐ Has your air carrier revised its CRM policies to align the FAA-revised guidance in AC 120–51?

Output 3

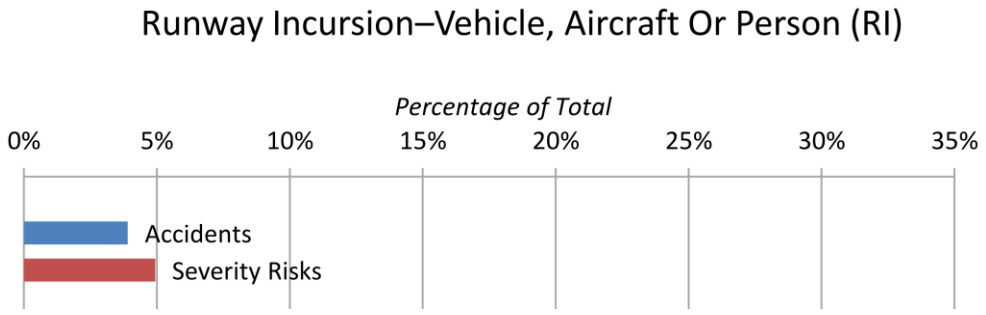
- ☐ Has your air carrier revised training in accordance with the recommendations of the FAA-revised AC 120–51 and air carrier policies regarding CRM training, as necessary?

- ☐ Have all pilots employed by your air carrier received training with the recommendations of the FAA-revised AC 120–51 and air carrier policies regarding CRM?

Output 4

- ☐ Has your air carrier implemented a process for soliciting feedback and revising training, as necessary?

Runway Incursion



SE 49: Runway Incursion Prevention

Output 4

- ☐ Has your air carrier incorporated the proposed SOP template items in AC 120–71A into policy manuals and training programs as appropriate?

- ☐ Has your air carrier revised the company training programs and policy manuals to incorporate as many SOP template items as appropriate?

SE 51: SOPs for Tow Tug Operators

Output 1

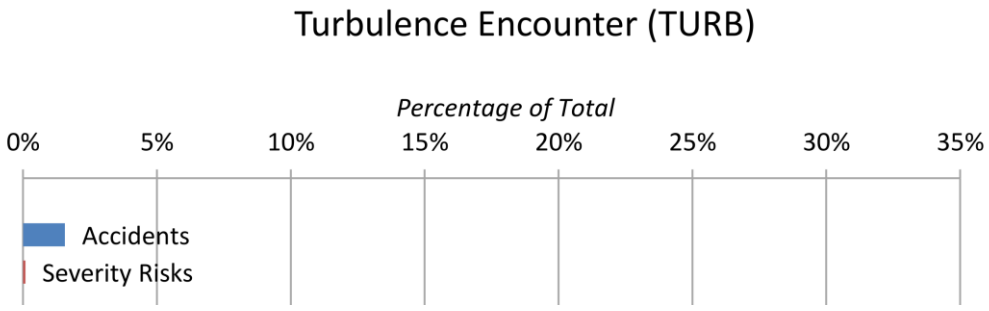
- ☐ Has your air carrier trained its mechanics and others who tow or otherwise move aircraft within the airport movement area on the recommended best practices developed to prevent runway incursions and other surface incidents?

SE 60: Pilot Training

Output 7

- ☐ Has your air carrier used the guidance modified within AC 120–51E to provide clear delineation of captain command oversight training and first officer monitoring responsibilities during surface movements?

TURBULENCE



CARGO

SE 121: CARGO LOADING TRAINING AND SOPS

Output 1

- ☐ Has your air carrier conducted/improved the surveillance of contractor cargo loading training?

Output 4

- ☐ Has your air carrier incorporated AC 120–85 into the SOP?
- ☐ Does your air carrier train those procedures including emphasis of the rationale behind those procedures?
- ☐ Has your air carrier developed and obtained approval/acceptance of SOPs that adopt best practices?

SE 125: HAZMAT PROCESSING

Output 2

- ☐ Has your cargo air carrier incorporated best practices, as shared on the FAA Office of Hazardous Materials Safety website: http://www.faa.gov/about/office_org/headquarters_offices/ash/ash_programs/hazmat/?

SE 127: CARGO FIRE MANAGEMENT

Output 4

- ☐ Has your cargo air carrier incorporated the new fire suppression and/or containment systems developed by manufacturers?

Output 8

- ☐ If they are available, does your cargo air carrier have the new ULD installed?

SE 131: Safety Culture

Output 2

- ☐ Has your air carrier implemented a self-audit process to further enhance safety?

Output 3

- ☐ Has your air carrier implemented an operational risk management program?

Output 5

- ☐ Has a safety reporting system been implemented? Has a quality assurance program appropriate for your operations been developed?

SE 223: Hazardous Material Fires – Prevention and Mitigation

Output 1

- ☐ Has your air carrier developed policies and procedures requiring all lithium batteries tendered as cargo to be identified to the operator and information on the shipment provided to the flightcrew?

Output 3

- ☐ Has your air carrier implemented FCCs, FRCs, a container-based fire suppression system, and/or aircraft-based systems that deliver a suppression agent into ULDs?

Output 5

- ☐ Has your air carrier developed policies and procedures for conducting risk assessments for the hazardous materials allowed on their aircraft, and accompanying policy to limit the amount and type of hazardous materials that are within the capability of the fire protection method(s) used?

SE 226: Hazardous Material Fires – Enhanced Protection of Occupants and Aircraft

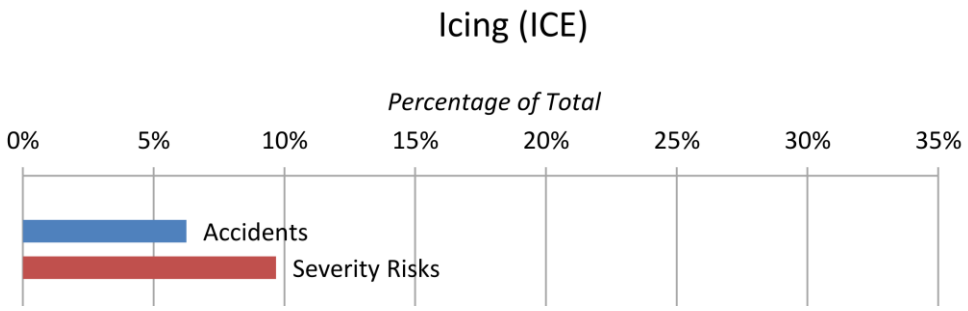
Output 2

- ☐ Has your air carrier implemented equipment to provide a means to maintain pilots' view of necessary flight information and, where possible, visual references outside the aircraft in dense continuous smoke conditions on the flightdeck?

Output 3

- ☐ Has your air carrier implemented installation of a system to upload emergency route information to aircraft using CPDLC (pending ATC equipage)?

ICING

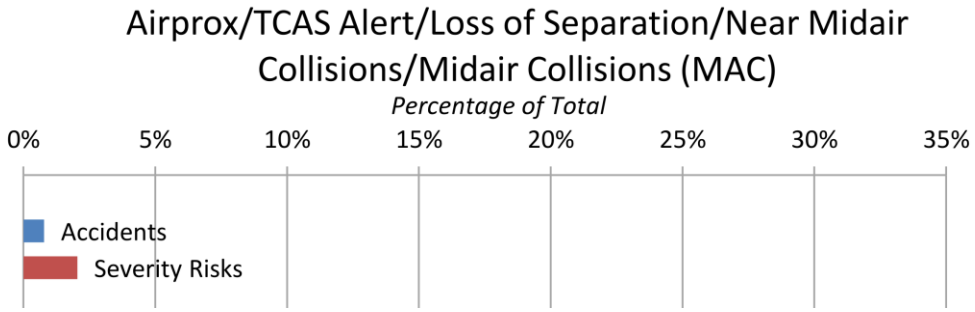


SE 136: ENGINE SURGE RECOVERY

Output 1

- ☐ Does your air carrier include the engine malfunction recognition and response training materials in the training program?

MIDAIR



SE 165: TCAS POLICIES AND PROCEDURES

Output 2

- ☐ For aircraft equipped with TCAS II, has your air carrier established SOPs and standardized training on pilot response to TCAS RAs?

Output 3

- ☐ Has your air carrier established procedures for TCAS range setting appropriate to the traffic situation?

SE 186: TCAS-Sensitivity Level Command

Output 4

- ☐ Has your air carrier developed changes in operating practices at Denver International Airport (DEN) to reduce TCAS RAs?

SE 212: Equipment and Procedures to Improve Route Entry for RNAV Departures

Output 1

- ☐ Has your air carrier's dispatch organization reviewed and updated procedures to coordinate with ATO to improve the likelihood that dispatchers will file routes that are not changed in the cleared route?

Output 2

- ☐ Has your air carrier modified and standardized its PDC format and updated as appropriate to clearly communicate PDC to pilots and reduce crew errors?

Output 3

- ☐ Has your air carrier deployed the capability to autoload pre-departure route clearances, with crew acknowledgement, into the FMS?

SE 213: Safe Operating and Design Practices for STARs and RNAV Departures

Output 1

- ☐ Has your air carrier collaborated with the FAA to develop guidance to align training for flightcrews, training for controllers, and procedure and chart design and implementation?

Output 2

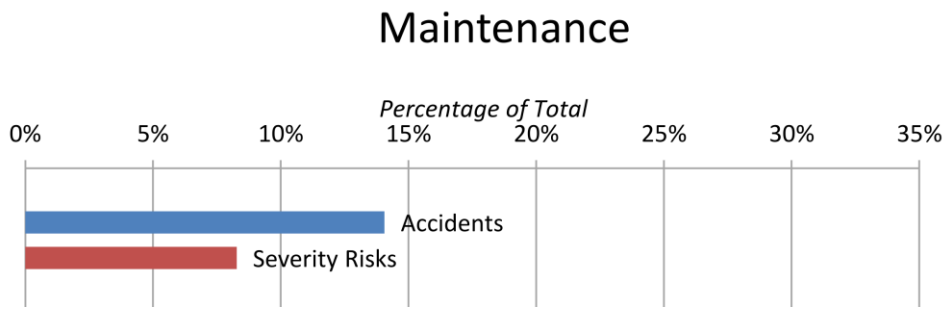
- ☐ Has your air carrier collaborated with AFS to update ACs containing details of commonly accepted safe operating practices for flightcrews to mitigate errors on STARs and RNAV departures?

- ☐ Has your air carrier's training organization developed, reviewed, and amended its training syllabuses and air carrier policies and procedures to be consistent with the guidance in the ACs for conducting STARs and RNAV departures?

Output 3

- ☐ Has your air carrier provided input to assist the FAA in developing commonly accepted safe operating practices for air traffic control of STARs and RNAV departures?

MAINTENANCE



SE 169: WORK CARDS/SHIFT CHANGE/RESPONSIBILITIES/MANUALS

Output 2

- ☐ Has your air carrier audited your compliance with AC 120–16F?

SE 170: OEM CONTINUOUS MONITORING OF SERVICE HISTORY

Output 2

- ☐ Has your air carrier developed processes to follow the intent of the guidance material?
- ☐ Has your air carrier incorporated the best practices into your reporting processes for maintenance task difficulties?

SE 175: FLIGHT CRITICAL CONFIGURATIONS CHANGES MADE DURING MAINTENANCE

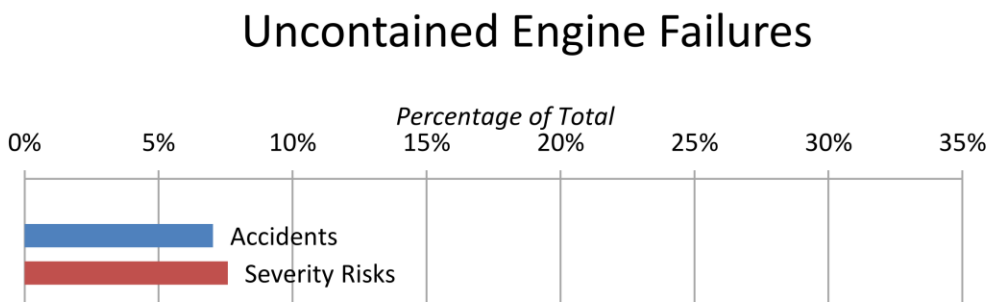
Output 1

- ☐ Has your air carrier reviewed, and amended, procedures as appropriate to ensure that multiple levels of alerting, including visible tagging, are used anytime the pitot static system is covered?
- ☐ Has your air carrier ensured that maintenance procedures include multiple levels of protection to ensure timely removal of covering?
- ☐ Has your air carrier's director of safety, in conjunction with its director of maintenance, ensured the appropriate procedures are covered in maintenance information, including work cards?
- ☐ Does your air carrier include adherence to the process within the internal audit process of their SMS?

Output 2

- ☐ Has your air carrier ensured that pre-flight walk around procedures ensure that pitot/static ports are uncovered?

UNCONTAINED ENGINE FAILURES

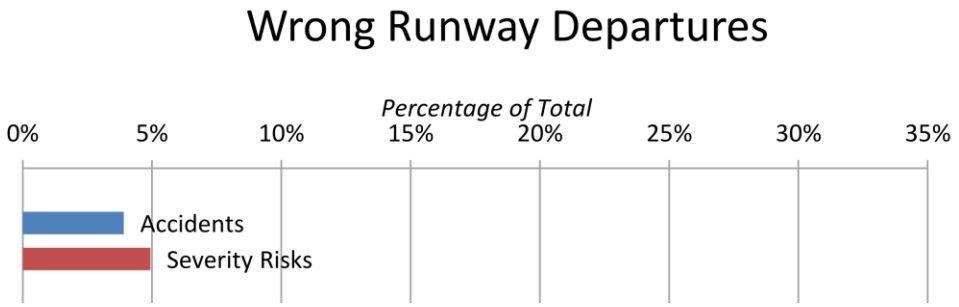


SE 84: DISK INSPECTION INITIATIVE

Output 1

- ☐ Has your air carrier developed and implemented enhanced disk inspection to detect cracks and help prevent UEF of high energy rotating parts?

WRONG RUNWAY DEPARTURES

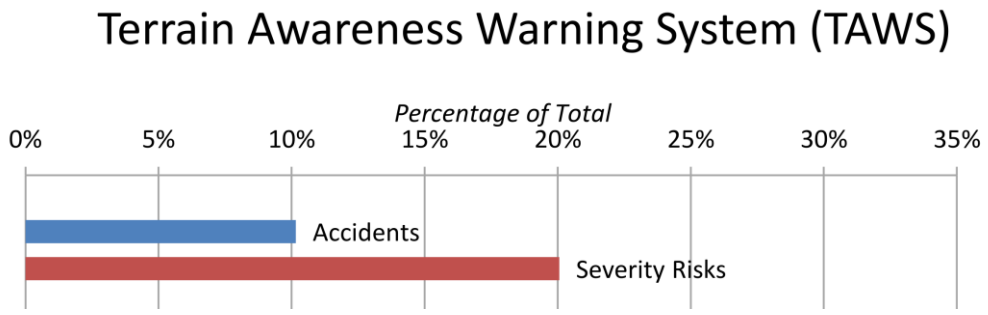


SE 183: COCKPIT MOVING MAP DISPLAY AND RUNWAY AWARENESS SYSTEM

Output 1

- ☐ Has your air carrier installed ownship moving map display and/or runway awareness systems?

TERRAIN AWARENESS WARNING SYSTEM



SE 120: TAWS IMPROVED FUNCTIONALITY

Output 3

- ☐ Has your air carrier installed GPS capability on all airplanes with multisensor RNAV FMS, electronic flight instruments and electronic map displays?

- ☐ If your air carrier flies standard airplanes equipped with non GPS TAWS into regions with minimal NAVAID, have you modified standard TAWS to GPS TAWS, or conducted a risk assessment to develop and implement effective risk mitigation?

Output 4

- ☐ Has your air carrier developed and implemented procedures to ensure that TAWS terrain databases are updated in accordance with the manufacturer's recommendations on all airplanes?

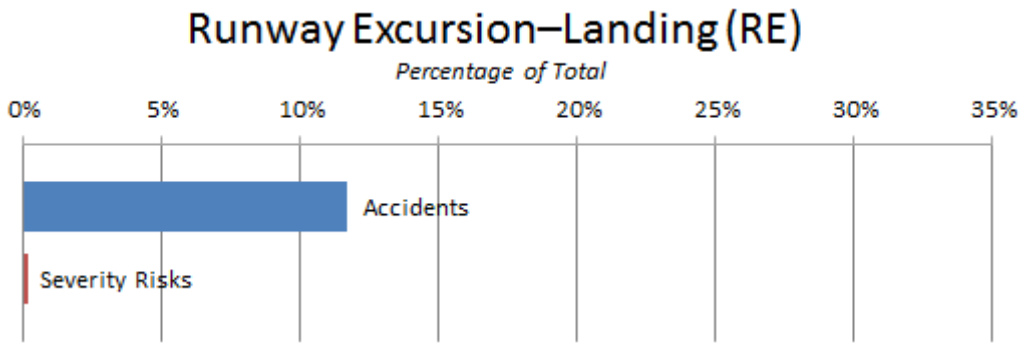
SE 185: TAWS AND RNAV VISUAL OR OTHER PROCEDURES

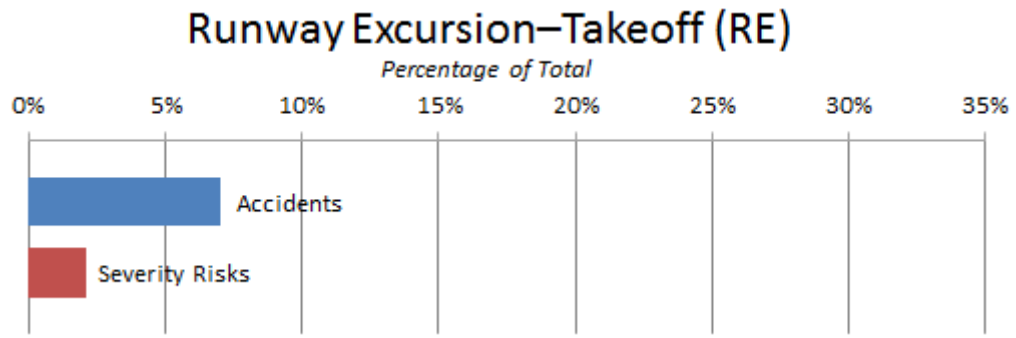
Output 4

- ☐ Has your air carrier shared a historical analysis of TAWS alerts among ASIAS carrier participants?

- ☐ Has your air carrier been identified as a lead air carrier for RNAV Visual approach development at an airport?

RUNWAY EXCURSION





SE 215: LANDING DISTANCE ASSESSMENT

Output 7

- ☐ Has your air carrier updated its procedures to include a landing distance assessment consistent with the new FAA guidance material incorporating the TALPA ARC recommendations addressing procedures for conducting such an assessment?

- ☐ Have all your air carrier's pilots received training in the use of the landing distance assessment and performance tools?

SE 216: FLIGHT CREW LANDING TRAINING

Output 1

- ☐ Has your air carrier revised its policies, procedures, and training related to the proper use of available airplane stopping devices?

- ☐ Have all of your air carrier's pilots received stabilized approach, flare, and landing training during initial or recurrent training?

- ☐ Has your air carrier developed/revised its operational procedures for landing on runways with reduced or minimal landing distance margin?

- ☐ Have all your air carrier's pilots received training for landing on runways with reduced or minimal landing distance margin, during initial or recurrent training?

Output 2

- ☐ Has your air carrier consulted with manufacturers to ensure consistency with their policies and operating procedures as related to airplane performance in crosswinds?

- ☐ Has your air carrier developed and implemented procedures concerning proper techniques for maintaining directional control in crosswind conditions or in response to an airplane system failure resulting in a directional asymmetry?

- ☐ Have all your air carrier's pilots received training concerning proper techniques for maintaining directional control in crosswind conditions or in response to an airplane system failure resulting in a directional asymmetry?

SE 217: Takeoff Procedures and Training

Output 1

- ☐ Has your air carrier assisted AFS and air carrier industry associations with publishing guidance to include formal processes that ensure accurate takeoff performance data?

Output 2

- ☐ Has your air carrier reviewed and revised its procedures and training, as necessary, in accordance with the guidance from Output 1?

- ☐ Has your air carrier responded to its industry associations after its procedures and training revisions were complete?

Output 3

- ☐ Has your air carrier defined and updated its SOPs related to the RTO decision?

SE 218: Overrun Awareness and Alerting Systems

Output 3

- ☐ Has your air carrier incorporated onboard technologies that reduce or prevent landing overruns into its specific fleet (both existing airplanes and new purchases) and operations?

- ☐ Has your air carrier implemented systems based on results of its feasibility assessments, where applicable?

- ☐ Has your air carrier reported to industry associations whether it intends to incorporate systems in its fleet?

SE 219: Policies, Procedures, and Training to Prevent Runway Excursions

Output 3

- ☐ Has your air carrier assisted AJI in the development and implementation of training for air traffic controllers on significant factors that can contribute to the risk of REs?

Output 4

- ☐ Has your air carrier encouraged reporting for both flightcrews of instances in which flightcrews refuse clearances they believe could lead to an unstable approach?
- ☐ Does your air carrier periodically review the resulting metrics to identify and correct potential systemic issues with those approaches?

Takeoff Misconfiguration

SE 227: Air Carrier Procedures for Takeoff Configuration

Output 1

- ☐ Has your air carrier reviewed and assessed its operational data and pilot safety reports to determine its exposure to the risk of improper flap settings on takeoff?
- ☐ Has your air carrier evaluated its SOPs relating to setting takeoff flaps/slats against recommended best practices?
- ☐ If applicable, has your air carrier performed a risk assessment for revising SOPs relating to setting takeoff flaps/slats?

Output 2

- ☐ Do the results of the risk exposure analysis and risk assessment in Output 1 justify revising your air carrier's SOPs relating to setting takeoff flaps/slats?
- ☐ If applicable, has your air carrier updated its SOPs relating to setting takeoff flaps/slats to align with recommended best practices?

SE 229: Takeoff Configuration Warning System Maintenance and Operational Assurance

Output 2

- ☐ Has your air carrier reviewed its maintenance programs related to TCWS to ensure they meet the latest manufacturer recommendations for maintenance intervals and procedures?

- ☐ Has your air carrier reviewed its maintenance procedures to ensure circuit breakers pulled during maintenance or troubleshooting that could affect TCWS availability are re-engaged before releasing the aircraft for flight?

- ☐ Has your air carrier reviewed its MEL procedures to ensure approved procedures do not allow the TCWS to be disabled by pulling circuit breakers, including circuit breakers for integrated/related systems?

- ☐ Does your air carrier periodically review its maintenance programs related to the TCWS to ensure acceptable in-service reliability?