

SECTION I: SE OVERVIEW

**Study Topic
Overview
Summary**

CAST chartered the Airplane State Awareness (ASA) Joint Safety Analysis Team (JSAT) in August 2010 and the ASA Joint Safety Implementation Team (JSIT) in 2012 as a follow-on activity to the previous Loss of Control (LOC) JSAT in 2000. Historically, Loss of Control-Inflight (LOC-I) has been, and continues to be, one of the largest categories of commercial aviation fatal accidents. Loss of ASA is a subset of LOC-I accidents and incidents, defined as events in which the flightcrew lost awareness of the airplane's attitude or energy state. Between 2001 and 2010, half of all LOC-I accidents involved loss of ASA. The ASA JSIT recommended, and CAST adopted, 19 ASA SEs, 2 of which focus on air carrier operations.

In the ASA JSAT's study of 18 LOC accidents and incidents, insufficient adherence to SOPs was a factor in 15 events.

SE Objective

CAST recommends air carriers develop and implement improved SOPs to increase flightcrew adherence to SOPs most relevant to issues leading to fatality risk in Title 14, Code of Federal Regulations (14 CFR) part 121 air travel.

**Primary Risks
Mitigated**

Loss of Control-Inflight (LOC-I)

Action	Organization(s)	Strategy	Description	Due Date
Action 1	Air Carriers	Procedures	Review and update SOPs for consistency with the CAST Plan, manufacturer recommendations, and air traffic control procedures.	08/31/2014
<i>Comments: CAST closed this action based on air carrier survey results.</i>				
Action 2	Air Carriers	Procedures	Perform assessments to determine level of adherence to current SOPs.	10/31/2016
<i>Comments: CAST closed this action based on air carrier industry association member implementation surveys.</i>				
Action 3	Air Carriers	Procedures, Training	Augment training and safety programs that address causes for noncompliance with SOPs.	10/31/2018
<i>Comments: CAST closed this action based on implementer feedback received to date.</i>				

See section II of this SE for detailed action descriptions.

References: The detailed analysis in the ASA JSAT Final Report (June 5, 2015) and the ASA JSIT Final Report (December 31, 2014) is available through CAST.



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Augment training/safety programs that address causes for noncompliance with SOPs

SECTION III: SUPPLEMENTAL INFORMATION

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This section contains the following additional information that may be of interest to implementers:

- Source Study
- Related Initiatives
- Total Cost / Resource Overview

SECTION IV: REVISION LOG

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This section provides a history of revisions to this SE.

SECTION II: DETAILED ACTION INFORMATION

Action 1: Review and update SOPs for consistency

Primary
Implementer

Air Carriers

Action Objective

Air carriers should review their SOPs and update as needed for consistency with the CAST Plan, manufacturer recommendations, and air traffic control (ATC) procedures.

Action Timeline

Flow Time: 12 months

Due Date: 08/31/2014

Timeline/Flow for
Future Adopters

TBD

CAST Lead

Airlines for America (A4A)

#	Organization(s)	Detailed Steps
1a	Air Carrier Industry Assns.	Communicate with air carrier members, explaining the analysis undertaken by CAST regarding loss of ASA, the role that non-adherence to SOPs played in the accidents, and the purpose of the CAST SE.
		<i>Complete.</i>
1b	Air Carriers	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 issues that result in high fatality risk (such as rushed and/or unstabilized approaches, go-arounds, transfer of control, automation interaction, pilot flying/pilot monitoring duties).
		<i>Complete.</i>
1c	Air Carriers	Consult with manufacturers to check that SOPs are consistent with current manufacturer recommendations.
		<i>Complete.</i>
1d	Air Carriers	Review SOPs for compatibility with the most current ATC procedures, paying attention to airports where data show higher rates of unstabilized approaches or excessive bank angles.
		<i>Complete.</i>
1e	Air Carriers	Validate and update SOPs as needed based on above review, ensuring that procedures are clear, logical, prioritized, and incorporate human factors best practices.
		<i>Complete.</i>
1f	Air Carriers	Air carrier actions are complete when the air carrier has— a. Reviewed existing SOPs for consistency with the latest versions of the CAST Plan, manufacturer recommendations, and ATC procedures; and b. Updated SOPs as necessary.
		<i>Complete</i>
1g	Air Carrier Industry Assns.	Track implementation of member air carriers and report progress to JIMDAT and CAST.
		<i>Reported to JIMDAT and CAST in October 2014.</i>

Notes

ATC procedures can be found in the most recent version of FAA Order 7110.65, Air Traffic Control.

Note: See Section III for detailed costs and resources.



SECTION II: DETAILED ACTION INFORMATION

Action 2: Perform assessments to determine level of adherence to current SOPs

Primary
Implementer

Air Carriers

Action Objective

Air carriers should perform assessments to determine the level of adherence to current SOPs and identify possible reasons for insufficient adherence.

Action Timeline

Flow Time: 26 months (upon completion of [Action 1](#))

Due Date: 10/31/2016

Timeline/Flow for
Future Adopters

TBD

CAST Lead

Airlines for America (A4A)

#	Organization(s)	Detailed Steps
2a	Air Carriers	Prioritize SOPs for monitoring and evaluation based on relevance of the SOPs to the highest areas of fatality risk in Title 14, Code of Federal Regulations (14 CFR) part 121 air carrier operations (such as controlled flight into terrain (CFIT), loss of control (LOC), runway excursion (RE), runway incursion (RI), midair, abnormal runway contact (ARC), and undershoot/overshoot (USOS)).
		<i>Complete.</i>
2b	Air Carriers	Determine level of adherence to current SOPs through data and operational monitoring programs (such as Line Operations Safety Audits (LOSA), flight evaluations, flightcrew surveys, and ASIAs), prioritizing assessment and evaluation based upon the relevance of the SOPs to highest areas of fatality risk in part 121 air travel (such as CFIT, LOC, RE, RI, midair, ARC, and USOS)).
		<i>Complete.</i>
2c	Air Carriers	Determine which of the prioritized SOPs have lower adherence rates and identify possible reasons.
		<i>Complete.</i>
2d	Air Carriers	Air carrier actions are complete when the air carrier has completed this assessment and communicated completion to industry associations.
		<i>Complete.</i>
2e	Air Carrier Industry Assns.	Track implementation of member air carriers and report progress to JIMDAT and CAST.
		<i>Reported to JIMDAT and CAST in February 2017.</i>

Notes



SECTION II: DETAILED ACTION INFORMATION

Action 3: Augment training/safety programs that address causes for noncompliance with SOPs

Primary
Implementer

Air Carriers

Action Objective

Air carriers should augment their training and safety programs (such as ground school, safety meetings, safety newsletters, and recurrent training) that address causes for noncompliance with SOPs, focusing on those with lower adherence rates.

Action Timeline

Flow Time: 24 months (upon completion of [Action 2](#))

- 4 months to have new training programs in place
- 20 months to have all pilots through revised training

Due Date: 10/31/2018

Timeline/Flow for
Future Adopters

TBD when CAST closes this action.

CAST Lead

Airlines for America (A4A)

#	Organization(s)	Detailed Steps
3a	Air Carriers	Based on the results of Action 2, improve or clarify SOPs that have high correlation to highest areas of fatality risk in Title 14, Code of Federal Regulations (14 CFR) part 121 air travel (such as controlled flight into terrain (CFIT), loss of control (LOC), runway excursion (RE), runway incursion (RI), midair, abnormal runway contact (ARC), and undershoot/overshoot (USOS)) and low adherence rates, and develop suitable training to address causes for noncompliance.
		Complete.
3b	Air Carriers	Implement training, revising syllabuses as appropriate.
		Complete.
3c	Air Carriers	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 Action 2 for SOP adherence.
		Complete.
3d	Air Carriers	Periodically review and reprioritize SOPs that have high correlation to highest areas of fatality risk in part 121 air travel and additional CAST or manufacturer recommendations as they become available.
		Complete.
3e	Air Carriers	Air carrier actions are complete when— <ol style="list-style-type: none"> The air carrier has incorporated processes to periodically review and update SOPs, other policies, and training based on results of monitoring programs; The air carrier has used these processes to revise its procedures and training program as necessary based on the first round of SOP reviews and revisions; and All pilots employed by the carrier have received the first round of training.
		Complete.

Note: See Section III for detailed costs and resources.



SECTION II: DETAILED ACTION INFORMATION

3f	Air Carrier Industry Assns.	Track implementation of member carriers and report progress to JIMDAT and CAST.
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*Complete.**Notes*

- Assumes amended training does not add time to current flightcrew training footprint; rather, current training is revised and improved.
- Assumes revised concepts will be included in initial and recurrent training.
- Assumes training revisions will occur as part of normal air carrier training program update cycle.



SECTION III: SUPPLEMENTAL INFORMATION

Source Study ASA Joint Safety Analysis Team (JSAT) Final Report (June 5, 2014)
ASA Joint Safety Implementation Team (JSIT) Final Report (December 31, 2014)

Related Initiatives

- FAA Advisory Circular 120–71A, Standard Operating Procedures for Flight Deck Crewmembers
- CAST Plan (located on Skybrary: http://www.skybrary.aero/index.php/Portal:CAST_SE_Plan)
- CAST SE 2, Standard Operating Procedures
- CAST SE 11, Crew Resource Management Training
- CAST SE 26, Policies and Procedures – Standard Operating Procedures (SOPs)
- CAST SE 60, Pilot Training – One Project: SOPs, CRM
- FAA Order 7110.65, Air Traffic Control

Total Cost **\$18,700,000** Note: For labor, 1 Full Time Equivalent (FTE) = \$250,000

Action 1 \$3,500,000 14 FTE

Action 2 \$8,300,000 33.2 FTE

Action 3 \$6,900,000 27.75 FTE

	Organization	Resources Needed
Direct Resource Overview – Government	N/A	N/A

	Organization	Resources Needed
Direct Resource Overview – Industry	Air Carriers	<ul style="list-style-type: none"> • Action 1: 13.75 FTE (assumes ~55 air carriers @ 0.25 FTE per carrier). • Action 2: 33.0 FTE (assumes 55 carriers @ 0.6 FTE to set up program and review for 1 year). • Action 3: 27.5 FTE (assumes 55 carriers @ 0.5 FTE per carrier distributed over 10 years, with most of the efforts in the first three years followed by minimal sustaining work afterwards).
	Air Carrier Industry Assns.	<ul style="list-style-type: none"> • Action 1: 0.25 FTE (assumes ~0.05–0.1 FTE per association to track implementation and coordinate with CAST). • Action 2: 0.2 FTE (assumes ~ 0.1 FTE per association to track implementation and coordinate with CAST). • Action 3: 0.25 FTE (assumes ~ 0.05–0.1 FTE per association to track implementation and coordinate with CAST). <p>Note: 55 air carriers are represented by three CAST-member air carrier industry associations:</p> <ul style="list-style-type: none"> ○ Airlines for America (A4A), ○ Regional Airline Association (RAA), and ○ National Air Carrier Association (NACA).



SECTION III: SUPPLEMENTAL INFORMATION

*Indirect
Resource
Overview*

The organizations identified in this section are not expected to incur direct costs associated with implementing this SE, but they may incur indirect costs within their normal line of work.

Organization	Description
FAA AFS	Inspector resources required for normal review and approval of air carrier training programs as part of duties performed.



SECTION IV: REVISION LOG

Major revisions (whole numbers) represent CAST-approved changes to SE language. Minor revisions (decimals) represent minor changes to target dates or completion notes that do not affect implementer actions.

Revision	Date	Description
2.3	04/07/2022	Action 3 closed.
2.2	08/15/2019	Administrative revision to Action 3 due date; flow time not affected.
2.1	12/06/2018	Action 3 due date extended.
2.0	09/17/2018	New SE format. Content reorganized and terminology updated. No substantive changes.
1.2	02/02/2017	Action 2 closed.
1.1	08/06/2015	Action 2 due date extended from 10/31/2015 to 10/31/2016. Action 3 due date extended from 06/30/2017 to 10/31/2018.
1.0	12/04/2014	Action 1 closed.
Original	08/01/2013	CAST adopted SE 194.

