

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.

The ASA JSAT’s study of 18 LOC events identified 1 accident in which flightcrew members were not adequately prepared for a high-risk test maneuver performed during a functional check flight.

SE Objective CAST recommends air carriers reduce accidents and incidents due to loss of ASA during high-risk maneuvers in functional check flights by improving the safety of non-standard flight, non-revenue operations (functional check flights, ferry flights, demonstration flights, etc.).

Primary Risks Mitigated Loss of Control-Inflight (LOC-I)

Action	Organization(s)	Strategy	Description	Due Date
Action 1	FAA AFS, Air Carriers	Procedures	Develop guidance material providing best practices on the conduct of non-standard, non-revenue flights.	04/30/2016
<i>Comments: CAST closed this action based on the publication of Information for Operators (InFO) 16006.</i>				
Action 2	Air Carriers	Procedures	Develop operational risk assessment guidelines and training standards that mitigate risk associated with non-standard, non-revenue flights.	11/30/2016
<i>Comments: CAST closed this action based on air carrier industry association member implementation surveys.</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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- **Action 2 (Air Carriers, Air Carrier Industry Associations).....PAGE 5**
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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: Develop guidance material providing best practices on non-standard, non-revenue flights

Primary Implementer FAA Flight Standards Service, Safety Standards (AFS); Air Carriers

Action Objective FAA AFS should develop guidance material providing best practices on the conduct of non-standard, non-revenue flights (such as functional check flights, ferry flights, and demonstration flights).

Action Timeline
Flow Time: 32 months
Due Date: 04/30/2016

Timeline/Flow for Future Adopters N/A

CAST Lead FAA AFS

#	Organization(s)	Detailed Steps
1a	Air Carrier Industry Assns.	Communicate with member air carriers, explaining the analysis undertaken by CAST regarding loss of ASA and the issues noted with non-standard, non-revenue flights. <i>Complete.</i>
1b	Air Carriers	Review the types of non-standard, non-revenue flights desired to perform and communicate with their industry associations and FAA AFS. Examples include— a. Operational check flights: Flights to check for a proper operational functioning after service or repair. b. Maintenance check flights: Flights to check continuing airworthiness after maintenance. c. General check of aircraft systems. d. Ferry flights of aircraft with degraded capability or systems. e. Demonstration flights. f. Display flights. <i>Complete.</i>
1c	FAA AFS	Develop appropriate guidance material addressing the following for the non-standard, non-revenue flights listed in Subaction 1a: a. Define a minimum level of flight preparation including safety criteria (such as risk assessment). b. Define the flightcrew qualification requirements for this type of flight, including— i. High-level knowledge of aircraft to be checked; ii. Specific training dedicated to the non-standard flights identified above and the anticipated test maneuvers to be performed; iii. Emphasizing importance of conducting a thorough pre-flight after maintenance; iv. Flightcrew with the skills to observe, interpret, analyze, and communicate; v. Consider the added value of a third observer trained for the specifics of the flight (for example, maintenance personnel, flight test engineer, etc.); and vi. Guidance to air carriers on potentially hazardous maneuvers. <i>Complete.</i>

Note: See Section III for detailed costs and resources.



SECTION II: DETAILED ACTION INFORMATION

1d	FAA AFS	Publish the appropriate guidance material and communicate completion of this action to CAST.
<i>Information for Operators (InFO) 16006, Non-Revenue Flight Procedures, published May 29, 2016.</i>		
Notes	FAA to determine appropriate format of guidance after review with air carriers.	

Note: See Section III for detailed costs and resources.



SECTION II: DETAILED ACTION INFORMATION

Action 2: Develop risk assessment guidelines/training standards for non-standard, non-revenue flights

Primary
Implementer

Air Carriers

Action Objective

Air carriers should update operational risk assessment guidelines and training standards that mitigate risk associated with non-standard, non-revenue flights (for example, functional check flights, demonstration flights, etc.).

Action Timeline

Flow Time: 12 months (upon completion of [Action 1](#))

Due Date: 11/30/2016

Timeline/Flow for
Future Adopters

TBD

CAST Lead

National Air Carrier Association (NACA)

#	Organization(s)	Detailed Steps
2a	Air Carrier Industry Assns.	Communicate with members the analysis undertaken by CAST regarding the risk associated with non-standard, non-revenue flights, and highlight the importance of following the guidance developed in Action 1.
<i>Complete.</i>		
2b	Air Carriers	<p>Implement the guidance in Action 1 to develop non-standard, non-revenue flight operation guidelines that take into account the following, as a minimum:</p> <ol style="list-style-type: none"> The exact purpose of the flight; Risk assessment performed before each flight; The identification of the specific equipment and systems whose functional operation must be verified in flight, or that is degraded/inoperative; Mandatory review by the flightcrew of any maintenance operations that have been performed; The defined procedure to be used to ensure the validity of the results of any functional checks performed; Awareness of non-normal procedures to follow in the event of system/equipment failure or malfunction during the flight; Weather conditions needed for the purpose of the flight; Minimum required levels of flightcrew experience and qualification; The importance to have an accurate pre-flight briefing, including task sharing definition and taking into account possible air traffic control constraints; Warnings and associated limits not to be exceeded during non-standard, non-revenue flights; Emphasizing the strict adherence to the flight plan without unnecessary improvisation; and Consultation with manufacturers concerning best practices and potentially hazardous maneuvers related to non-normal flight operations (such as production test flights).
<i>Complete.</i>		

Note: See Section III for detailed costs and resources.



SECTION II: DETAILED ACTION INFORMATION

2c	Air Carriers	Incorporate these practices into standard operating procedures (SOP), policies, and Safety Management Systems.
<i>Complete.</i>		
2d	Air Carriers	Air carrier actions are complete when the air carrier has— a. Reviewed the guidance from Action 1. b. Revised SOPs and policies regarding conduct of non-standard, non-revenue flight operations to reflect the guidance, as applicable.
<i>Complete.</i>		
2e	Air Carrier Industry Assns.	Track implementation and report progress to JIMDAT and CAST.
<i>Reported to JIMDAT and CAST in February 2017.</i>		

Notes

SECTION II

Note: See Section III for detailed costs and resources.



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**
- Flight Safety Foundation (FSF) Functional Check Flight Symposium, 2011
 - European Aviation Safety Agency (EASA) Safety Information Bulletin on functional check flights

Total Cost **\$4,700,000** Note: For labor, 1 Full Time Equivalent (FTE) = \$250,000

Action 1 \$1,200,000 4.8 FTE

Action 2 \$3,500,000 14.0 FTE

	Organization	Resources Needed
<i>Direct Resource Overview – Government</i>	FAA AFS	<ul style="list-style-type: none"> • Action 1: 1.5 FTE.
	FAA AIR	<ul style="list-style-type: none"> • Action 1: 0.5 FTE.

	Organization	Resources Needed
<i>Direct Resource Overview – Industry</i>	Air Carriers	<ul style="list-style-type: none"> • Action 1: 2.8 FTE (assumes 55 air carriers @ ~0.05 FTE per carrier for support). • Action 2: 13.75 FTE (assumes 55 carriers @ ~0.25 FTE per carrier).
	Air Carrier Industry Assns.	<ul style="list-style-type: none"> • Action 2: 0.25 FTE (assumes ~0.05 – 0.1 FTE per association to track implementation and coordinate with CAST). <p><i>Note: 55 air carriers are represented by three CAST-member air carrier industry associations:</i></p> <ul style="list-style-type: none"> ○ Airlines for America (A4A), ○ Regional Airline Association (RAA), and ○ National Air Carrier Association (NACA).

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
N/A	N/A



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
1.0	09/17/2018	New SE format. Content reorganized and terminology updated. No substantive changes.
0.2	02/02/2017	Action 2 closed. Action 1 closed at June 2016 CAST meeting.
0.1	02/04/2016	Action 1 due date extended from 11/30/2015 to 02/29/2016.
Original	08/01/2013	CAST adopted SE 193.

