

SECTION I: SE OVERVIEW

**Study Topic
Overview
Summary**

Throughout the National Airspace System (NAS), the risk for approach and landing misalignment (ALM) has been identified. This risk includes aircraft approaching or landing on a surface other than what they were cleared for. These other surfaces include the wrong runway, taxiway, or airport. While these events have typically been caught soon enough to prevent an adverse outcome, there have been high-profile events, including an event involving an approach to a taxiway on July 7, 2017, in San Francisco, California. This ultimately led CAST to charter the ALM Joint Safety Analysis and Implementation Team (JSAIT) to analyze misalignments and determine mitigations based on Aviation Safety Information Analysis and Sharing (ASIAS) data from sources such as Aviation Safety Action Program (ASAP) reports, Air Traffic Safety Action Program (ATSAP) reports, and Mandatory Occurrence Reports (MOR). CAST adopted four SEs as a result of the study, two of which are directed toward aircraft operators and original equipment manufacturers (OEM), while the remaining two are directed toward air traffic control (ATC). CAST also adopted one research and development (R&D) SE, which is directed toward aircraft operators and OEMs.

SE Objective

CAST recommends air carriers examine their own safety data to determine if they are at increased risk of ALMs, and, if so, consider implementing actions outlined in this SE to decrease and mitigate the risk. Specifically, air carriers should assess current standard operating procedures (SOP) related to approach briefings and runway approach selection in the flight management system (FMS). While some air carriers may have already implemented portions of these policies and procedures in the context of unstable approaches, CAST recommends air carriers enhance the training or application of these initiatives in the interest of preventing runway misalignments.

**Primary Risks
Mitigated**

Ground Collision (GCOL) and Runway Incursion (RI)

Action	Organization(s)	Strategy	Description	Due Date
Action 1	FAA Flight Standards Service (AFX)	Guidance	FAA AFX should publish guidance on flightcrew best practices to prevent a misalignment. CAST should communicate findings of the ALM JSAIT to air carriers.	5/31/2022
<i>Comments: CAST closed this action based on mitigations and guidance already issued and previous and ongoing outreach.</i>				
Action 2	Air Carriers	Policy	Air carriers should evaluate existing approach and landing procedures against recommended misalignment prevention best practices.	5/31/2023
<i>Comments: CAST closed this action based on air carrier assessments of related guidance.</i>				
Action 3	Air Carriers	Policy	Air carriers should assess and revise air carrier policies and procedures based on the results from the evaluation of Action 2.	11/30/2024
<i>Comments: None</i>				

See section II of this SE for detailed action descriptions.

References: The detailed analysis in the ALM JSAIT Final Report is available through CAST.



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SE 233 consists of three actions, which this section lays out in detail.

- **Action 1 (FAA AFX)** **PAGE 3**
Publish guidance on flightcrew best practices to prevent a misalignment and communicate findings of the ALM JSAIT to air carriers
- **Action 2 (Air Carriers, Air Carrier Industry Associations)** **PAGE 4**
Evaluate existing approach and landing procedures against recommended misalignment prevention best practices
- **Action 3 (Air Carriers, Air Carrier Industry Associations)** **PAGE 5**
Assess and revise air carrier policies and procedures based on the results from the evaluation of Action 2

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: Publish guidance on flightcrew best practices to prevent a misalignment and communicate findings of the ALM JSAIT to air carriers*Primary
Implementer***FAA Flight Standards Service (AFX)***Action Objective*

FAA AFX should publish guidance on flightcrew best practices to prevent a misalignment. CAST should communicate findings of the Approach and Landing Misalignment (ALM) Joint Safety Analysis and Implementation Team (JSAIT) to air carriers.

Action Timeline

Flow Time: 6 months

Due Date: 5/31/2022

*Timeline/Flow for
Future Adopters*

N/A

CAST Lead

FAA AFX

#	Organization(s)	Detailed Steps
1a	FAA AFX	<p>Develop and publish guidance on best practices for flightcrew to follow to reduce the risk of misalignments, including but not limited to—</p> <ol style="list-style-type: none"> Loading and preparing for an instrument approach when on a visual approach. Coordinating between flightcrew members when executing changes related to arrival and approach in the flight management system (FMS).
		<i>Complete.</i>
1b	CAST	<p>Communicate with air carrier members, providing results of the ALM JSAIT study. Specifically, the ALM JSAIT identified several attributes frequently present in misalignment events:</p> <ol style="list-style-type: none"> When a runway assigned is different from what is expected by the flightcrew members during the approach briefing. When a runway is changed by air traffic control (ATC) after initial assignment. When operations are conducted under visual meteorological conditions. When flightcrew members execute changes in the FMS without coordinating with the other flightcrew members.
		<i>Complete.</i>

Notes

SECTION II: DETAILED ACTION INFORMATION

Action 2: Evaluate existing approach and landing procedures against recommended misalignment prevention best practices

Primary
Implementer

Air Carriers

Action Objective

Air carriers should evaluate existing approach and landing procedures against recommended misalignment prevention best practices.

Action Timeline

Flow Time: 12 months

Due Date: 5/31/2023

Timeline/Flow for
Future Adopters

N/A

CAST Lead

Airlines for America (A4A)

#	Organization(s)	Detailed Steps
2a	Air Carriers	<p>Assess standard operating procedures (SOP) related to misalignment events and evaluate against the following recommendations—</p> <ol style="list-style-type: none"> Back up visual approaches with instrument approach procedures that contain at least lateral guidance to the runway of intended landing. Have policies in place related to flightcrew communication and coordination for any time a runway assignment is briefed, expected, assigned, or changed. <p><i>[While some air carriers may have already implemented portions of these policies and procedures in the context of unstable approaches, CAST recommends air carriers enhance the training or application of these initiatives in the interest of preventing runway misalignments.]</i></p>

Complete.

2b

Air Carriers

Provide assessment feedback to CAST.

Complete.

Notes



SECTION II: DETAILED ACTION INFORMATION

Action 3: Assess and revise air carrier policies and procedures based on the results from the evaluation of Action 2*Primary
Implementer***Air Carriers***Action Objective*

Air carriers should assess and revise air carrier policies and procedures based on the results from the evaluation of Action 2.

Action Timeline

Flow Time: 18 months

Due Date: 11/30/2024

*Timeline/Flow for
Future Adopters*

N/A

CAST Lead

Airlines for America (A4A)

#	Organization(s)	Detailed Steps
3a	Air Carriers	If an air carrier determines its standard operating procedure (SOP) is not aligned with the recommendations, the air carrier should perform a safety risk assessment under their Safety Management System (SMS) to assess what modifications are needed and/or what alternative mitigations would be required to accomplish the intended reduction in risk. Air carrier actions are complete when the air carrier has— <ol style="list-style-type: none"> Reviewed existing SOPs for approach and landing misalignments (ALM) events and Determined it meets the recommendations, has alternative risk mitigations in place, or has developed an implementation plan to modify SOPs as necessary.
3b	Air Carriers	Provide implementation feedback via the CAST Portal.

Notes

SECTION III: SUPPLEMENTAL INFORMATION

Source Study Approach and Landing Misalignment (ALM) Joint Safety Analysis and Implementation Team (JSAIT)

Related Initiatives SE 194, Airplane State Awareness—Standard Operating Procedures Effectiveness and Adherence

Total Cost for 70 Percent Implementation \$9,125,000

(based on 45 of 64 air carriers implementing this SE)

Note: For labor, one Full Time Equivalent (FTE) = \$250,000

Action 1	\$125,000	0.5 FTE	
Action 2	\$75,000	0.3 FTE	[add 0.3 FTE for each air carrier over one]
Action 3	\$125,000	0.5 FTE	[add 0.5 FTE for each air carrier over one]

	Organization	Resources Needed
<i>Direct Resource Overview—Government</i>	FAA Flight Standards Service (AFX)	<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 2: 0.3 FTE, per air carrier Action 3: 0.5 FTE, per air carrier

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 AFX	Inspector resources required for normal review and approval of air carrier training programs associated with Action 2 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
0.3	04/06/2023	Action 2 completed and closed.
0.2	04/07/2022	Action 1 completed and closed.
0.1	03/24/2022	Administrative change to correct Strategy field in Action 1 in Section 1.
Original	12/02/2021	<i>Start date based on CAST adoption.</i>

