SE 228

CAST Safety Enhancement (SE)

AIRCRAFT DESIGN FEATURES TO FACILITATE PROPER TAKEOFF CONFIGURATION

STUDY TOPIC
TOMC
TAKEOFF MISCONFIGURATION

CICTT RISK AREAS
LOC–I, RE

SECTION I

SECTION I: SE OVERVIEW

Study Topic Overview Summary	CAST became aware of the risk of zero-flap takeoff attempts through ASIAS and industry presentations at Aviation Safety InfoShare. CAST requested ASIAS perform a directed study, which confirmed several instances of aircraft lining up on the takeoff runway with flaps set to zero. CAST chartered the Takeoff Misconfiguration Joint Safety Analysis and Implementation Team (TOMC JSAIT) to more closely examine the risk and recommend mitigation strategies.
SE Objective	CAST recommends aircraft manufacturers develop and make available enhanced aircraft design features on new transport category aircraft that increase flightcrew awareness of system failures or incomplete/incorrect takeoff configuration before taking the active runway. Applicable new aircraft programs include— • New type certificate programs, and • Major derivative, amended type certificate programs involving redesign of flightdeck avionics.
Primary Risks Mitigated	Loss of Control-Inflight (LOC–I), Runway Excursion (RE)

Action	Organization(s)	Strategy	Description	Due Date
Action 1	Aircraft Manufacturers	Design	Develop enhanced aircraft design features that increase flightcrew awareness of system failures or an incomplete/incorrect takeoff configuration.	02/28/2018
	Comments: CAST closed this action based on manufacturers reporting features in new type designs met the intent of this SE.			

See section II of this SE for detailed action descriptions.

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

SE 228 Aircraft Design Features To Facilitate Proper Takeoff Configuration

Study Topic: TOMC Takeoff Misconfiguration

CICTT Risk Areas: LOC–I, RE

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Action 1: Develop enhanced aircraft design features

Primary Implementer	**Aircraft Manufacturers**
Action Objective	Manufacturers should develop and make available enhanced aircraft design features that increase flightcrew awareness of system failures or an incomplete/incorrect takeoff configuration.
Action Timeline	Flow Time: 16 months Due Date: 02/28/2018
Timeline/Flow for Future Adopters	N/A
CAST Lead	Aerospace Industries Association (AIA)

#	Organization(s)	Detailed Steps
1a	AIA	Communicate with CAST-represented manufacturers, providing results of the Takeoff Misconfiguration Joint Safety Analysis and Implementation Team (TOMC JSAIT) study and recommending they implement aircraft design enhancements, as feasible, that include at least the following: a. The takeoff configuration warning system (TCWS) should include self-check features that monitor all critical system components and alert the flightcrew if a system failure is detected. b. A technological means for the flightcrew to confirm proper configuration before taxiing onto the active runway, and provide an alert or message if improper takeoff configuration is detected. Examples of such means include— i. Electronic checklist, ii. A tactile check (such as a "push to test" button), and iii. A monitoring system that— • Checks aircraft configuration against performance data entered into the flight management system. • Checks aircraft position against the selected runway and provides information to the flightcrew regarding any positioning disagreement. • Verifies/validates aircraft performance data and crosschecks to confirm system programming and selected configuration are adequate for the selected runway.
	Complete.	
1b	Aircraft Manufacturers	Respond with intentions on providing these features on new type designs and future major derivatives programs, and incorporating these features, to the extent practical, on current in-production aircraft.
	Manufacturers reported features in new type designs met the intent of this subaction.	
1c	AIA	Track implementation and report to CAST and JIMDAT.
	Reported to CAST and JIMDAT in February 2018.	

Notes

Note: See Section III for detailed costs and resources.

SECTION III: SUPPLEMENTAL INFORMATION

Source Study	Takeoff Misconfiguration Joint Safety Analysis and Implementation Team (TOMC JSAIT).
Related Initiatives	

Total Cost	**$125,000**	*Note: For labor, 1 Full Time Equivalent (FTE) = $250,000*
Action 1	$125,000	0.5 FTE

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

	Organization	Resources Needed
Direct Resource Overview – Industry	AIA	• Action 1: 0.1 FTE for communication and tracking.
	Aircraft Manufacturers	• Action 1: 0.4 FTE for review and communication (0.1 per manufacturer).

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 III

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
1.1	09/09/2020	Administrative correction to SE and revision numbers in footer.
1.0	09/17/2018	New SE format. Content reorganized and terminology updated. No substantive changes.
0.2	04/05/2018	Action 1 closed.
0.1	10/05/2017	Action 1 due date extended from 10/31/2017 to 02/28/2018.
Original	10/06/2016	CAST adopted SE 228.