SE 219

CAST Safety Enhancement (SE)

AIR TRAFFIC OPERATIONS – POLICIES, PROCEDURES, AND TRAINING TO PREVENT RUNWAY EXCURSIONS

STUDY TOPIC
RE
RUNWAY EXCURSION

CICTT RISK AREAS
RE

SECTION I

SECTION I: SE OVERVIEW

Study Topic Overview Summary	CAST chartered the Runway Excursion (RE) Joint Safety Analysis and Implementation Team (JSAIT) in 2012 to review the findings and recommendations from 15 industry reports by 11 different organizations and authorities on the issue of RE. From those reports, the team identified 155 contributing factors and 274 recommendations that it eventually consolidated into 45 Standard Problem Statements (SPS) and 75 Intervention Strategies (IS). The RE JSAIT grouped, analyzed, and consolidated the ISs into 7 SEs for industry implementation and 1 research and development (R&D) SE. CAST approved the SEs the RE JSAIT recommended in June 2014.
SE Objective	CAST recommends the FAA Air Traffic Organization (ATO) modify air traffic control (ATC) and air carrier policies, procedures, and training related to factors that contribute to the risk of runway excursions.
Primary Risks Mitigated	Runway Excursion (RE)

Action	Organization(s)	Strategy	Description	Due Date
Action 1	FAA ATO	Policy	Revise procedures for changing airport arrival configuration based on wind conditions.	06/30/2022
	Comments: CAST closed this action based on current ATO policies for measuring and reporting winds.			
Action 2	FAA ATO, FAA ARP	Policy/Data	Revise procedures for air traffic controller reporting of wind conditions, and capture airport wind measurement analysis in a national database.	06/30/2024
	Comments: CAST closed this action based on current ATO policies for measuring and reporting winds.			
Action 3	FAA ATO	Training	Provide training to air traffic controllers on the contribution of adverse winds, runway surface conditions, and unstable approach to the risk of REs.	12/31/2016
	Comments: CAST closed this action based on updated ATO training.			
Action 4	Air Carriers	Procedures	Ensure air carrier policies reinforce a culture for flightcrews to declare "unable" to ATC clearances that could lead to an unstable approach.	03/31/2016
	Comments: CAST closed this action based on information from air carrier industry associations. *CAST encourages air carriers that have not performed the assessment requested in this action to do so.*			

See section II of this SE for detailed action descriptions.

References: The detailed analysis in the Runway Excursion Joint Safety Analysis and Implementation Team (RE JSAIT) Final Report (February 12, 2015) is available through CAST.

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SECTION II: DETAILED ACTION INFORMATION

Action 1: Revise ATC procedures for changing airport arrival configuration based on wind conditions

Primary Implementer	**FAA Air Traffic Organization (ATO)**
Action Objective	FAA ATO should revise its procedures for changing airport arrival configuration based on wind conditions.
Action Timeline	Flow Time: 42 months (extended to 54 months) o 12 months for a Document Change Proposal (DCP) for FAA Order 7210.3 and/or 7110.65 upon completion of revision to FAA Order 8400.9. Due Date: 06/30/2022
Timeline/Flow for Future Adopters	N/A
CAST Lead	FAA ATO

#	Organization(s)	Detailed Steps
1a	FAA AFS–400, FAA ATO	Establish a required process for towered part 139 airports to use for determining each runway's tailwind and crosswind maximums by revising FAA Order 8400.9, National Safety and Operational Criteria for Runway Use Programs. An Operational Safety Assessment (OSA) is currently in work that considers the impact of procedural changes that would require air traffic controllers to change an airport's configuration when tailwind conditions exceed the maximum value established locally for each runway. The order contains the following tailwind maximums: a. Less than three (3) knots (including gusts) if the runway is contaminated and the available runway length is less than 8,000 feet long, b. Five (5) knots (including gusts) if the runway is contaminated and the available runway length is greater than 8,000 feet long, and c. Ten (10) knots (including gusts) if the runway is not contaminated (that is, is wet or dry).
	Complete.	
1b	FAA ATO Office of Terminal Services (AJT)	Upon completion of the OSA, develop procedural changes for all towered air traffic facilities either through— a. Revised procedures within FAA Order 7210.3, Facility Operation and Administration, and/or FAA Order 7110.65, Air Traffic Control, establishing a local team of aviation stakeholders to develop a runway use program using the guidance set forth in Subaction 1a above; or b. Approved waivers with documented safety assessments for airports where implementing the maximums outlined in Subaction 1a may result in an adverse impact.
	Complete.	
1c	FAA ATO	Track implementation and report progress and completion to the JIMDAT and CAST.
	Complete.	

Notes

SECTION II

Note: See Section III for detailed costs and resources.

Action 2: Revise procedures for wind condition reporting when multiple wind sensors are available, leverage wind sensor analysis to guide future airport improvements, and capture airport wind measurement analysis

Primary Implementer	**FAA Air Traffic Organization (ATO)**
Action Objective	FAA ATO should revise its procedures for air traffic controller reporting of wind conditions when multiple wind sensors are available, leverage wind sensor analysis to guide future airport improvements, and capture airport wind measurement analysis.
Action Timeline	Flow Time: 36 months (extended to 72 months) o 12 months to make determination whether to proceed with revisions in Subaction 1a. o 12 months to perform a Safety Risk Management Panel (SRMP), a Safety Risk Management Document (SRMD), and a Document Change Proposal (DCP) from decision to proceed with revisions. o 6 months to ensure all applicable air traffic controllers are trained. o 6 months for gap analysis and develop implementation plan for Subaction 2b. Due Date: 06/30/2024
Timeline/Flow for Future Adopters	N/A
CAST Lead	FAA ATO

#	Organization(s)	Detailed Steps
2a	FAA ATO Mission Support Services (AJV)	Consider revising FAA Order 7110.65, Air Traffic Control, and/or FAA Order 7210.3, Facility Operation and Administration, to clarify that air traffic controllers should report the most adverse wind information available from wind sensors specifically associated with the intended arrival/departure runway, when multiple wind sources are available. FAA ATO should review current wind reporting procedures and practices and available wind sensor information to make a determination of the feasibility of the revision.
	Complete.	
2b	FAA ATO, FAA Office of the Associate Administrator for Airports (ARP)	If revisions are implemented, coordinate with FAA Office of the Associate Administrator for Airports (ARP), National Air Traffic Controllers Association (NATCA), and Airports Council International-North America (ACI–NA) to perform a gap analysis of airport wind measurement and reporting instrumentation for capability to support wind reporting in Subaction 2a and develop an implementation plan to close gaps. FAA ARP should track the analysis of airport wind measurement and reporting in a national database to guide future improvements based on airport development plans.
	Complete.	
2c	FAA ATO	Track implementation and report progress and completion to the JIMDAT and CAST.
	Complete.	

Notes

- Effective June 24, 2013, the FAA ATO Office of Terminal Services (AJT) issued FAA Notice JO 7110.619, Numbers Usage, establishing clear guidance to report gusts when

Note: See Section III for detailed costs and resources.

issuing the surface wind. The accuracy either meets or exceeds the specifications found in International Civil Aviation Organization (ICAO) Annex 3, appendix 3.

- Content, format, type, and frequency of training subject to change by FAA ATO based on internal scoping of requirements and resource availability.

Note: See Section III for detailed costs and resources.

Action 3: Train air traffic controllers on risk factors for REs

Primary Implementer	**FAA Air Traffic Organization (ATO)**
Action Objective	FAA ATO should provide training to air traffic controllers on the contribution of adverse winds, runway surface conditions, and unstable approach to the risk of REs.
Action Timeline	Flow Time: 30 months o 6 months to coordinate the material. o 12 months to develop the training after coordination is complete. o 12 months to ensure all applicable air traffic control specialists (ATCS) are trained once training is developed. Due Date: 12/31/2016
Timeline/Flow for Future Adopters	TBD
CAST Lead	FAA ATO

#	Organization(s)	Detailed Steps
3a	FAA ATO Office of Safety and Technical Training (AJI)	In cooperation with the National Air Traffic Controllers Association (NATCA) and in consultation with FAA Flight Standards Service, Safety Standards (AFS), the FAA Aircraft Certification Service (AIR), and industry, develop and implement training for air traffic controllers on the following significant factors that that can contribute to the risk of REs: a. Adverse winds effects, including but not limited to— i. Tailwind effects on aircraft ground speed at touchdown and associated stopping distance, ii. Tailwind effects on aircraft handling characteristics and contribution to float and long landing, and iii. Crosswind effects on aircraft lateral control in the air and directional control on the runway, particularly when combined with wet or contaminated runway conditions. b. Runway surface conditions, including but not limited to— i. The effect of wet and contaminated runway conditions on aircraft braking capabilities and the nonlinear increase in stopping distance associated with decreasing friction tailwind effects on aircraft handling characteristics and contribution to float and long landing, and ii. The importance of providing pilot reports of runway surface condition to departing or approaching aircraft from aircraft of similar size, weight, and configuration. c. Unstable approach factors, including but not limited to— i. Air traffic controller understanding of generally applicable approach gates that facilitate stable approaches (such as "10,000 ft. and 250 kts. @ 30 nmi from the airport"), ii. Holding aircraft high or fast until late in the approach to facilitate air traffic flow into airports, iii. Arrivals with multiple speed and altitude crossing restrictions and their impact on flightdeck workload and aircraft performance, and

Note: See Section III for detailed costs and resources.

		iv. Late clearances or runway changes and their impact on flightcrew planning and use of automation in executing approaches.
	ATO training updated (electronic Learning Management System (eLMS) Runway Safety Series 6).	
3b	FAA ATO	Track implementation and report completion to JIMDAT and CAST.
	Reported to JIMDAT and CAST in April 2016.	

Notes

- Content, format, type, and frequency of training subject to change by FAA ATO based on internal scoping of requirements and resource availability.
- Some of the training, particularly on unstable approaches, could possibly be combined with the training in SE 213 for Standard Terminal Arrival Route (STAR) arrivals.

Note: See Section III for detailed costs and resources.

Action 4: Reinforce flightcrew culture to declare "unable" to ATC when necessary

Primary Implementer	**Air Carriers**
Action Objective	Air carriers should revise their policies to reinforce a culture for flightcrews to declare "unable" to air traffic control (ATC) clearances that, in the opinion of the flightcrew, could lead to an unstable approach.
Action Timeline	Flow Time: 12 months Due Date: 03/31/2016
Timeline/Flow for Future Adopters	TBD
CAST Lead	Airlines for America (A4A)

#	Organization(s)	Detailed Steps
4a	Air Carrier Industry Assns.	Communicate with 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.
	Complete.	
4b	Air Carriers, FAA Air Traffic Organization (ATO), Labor Organizations	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.
	As of June 2016, a significant number of air carriers have reported to their respective industry associations they meet the intent of this subaction.	
4c	Air Carrier Industry Assns.	Track implementation and report completion to JIMDAT and CAST.
	Reported to JIMDAT and CAST in June 2016.	

Notes

SECTION III: SUPPLEMENTAL INFORMATION

Source Study	Runway Excursion Joint Safety Analysis and Implementation Team (RE JSAIT) Final Report (February 12, 2015)
Related Initiatives	• FAA Order 8400.9, National Safety and Operational Criteria for Runway Use Programs • FAA Order 7110.65, Air Traffic Control • FAA Order 7210.3, Facility Operation and Administration • Vertical Path Navigation (VNAV) Action Team

Total Cost	**$2,275,000**	*Note: For labor, 1 Full Time Equivalent (FTE) = $250,000*	
Action 1[1]	$125,000	0.5 FTE	
Action 2	$600,000	1.85 FTE	Includes $20,000 in travel and $125,000 in training.
Action 3[2]	$1,100,000	1.25 FTE	Includes $775,000 in training course development and training of controller.
Action 4	$450,000	1.80 FTE	

	Organization	Resources Needed
Direct Resource Overview – Government	FAA AFS	• Action 3: 0.25 FTE to support development of training material.
	FAA AIR	• Action 3: 0.25 FTE to support development of training material.
	FAA ARP	• Action 2: 0.25 FTE for gap analysis in Subaction 2b.[3] • Action 3: 0.25 FTE to support development of training material.

SECTION III

[1] Action 1 costs are only for the revision of procedures and do not include potential operational cost impacts from changed procedures.
[2] All Action 3 costs are estimated and do not include taxes, any necessary travel fees, changes to contracted rates, or additional costs incurred if facility simulation development is required. Development costs are for a 1-hour level 3 Web Based Training (WBT). A level 3 WBT would most likely be on the higher end of developmental costs. FAA ATO will make a final determination whether this is the appropriate vehicle and length to deliver the training.
[3] Subaction 2b costs only include the development of an implementation plan, not the actual implementation.

	Organization	Resources Needed
	FAA ATO	• Action 1: 0.5 FTE for Document Change Proposal (DCP) coordination for order changes and publication. • Action 2: o 0.2 FTE to perform Safety Risk Management Panel (SRMP): 10 individuals working 40 hours each, + $20,000 for travel. o 0.15 FTE for Safety Risk Management Document (SRMD) production (2 individuals working 120 hours each). o 0.5 FTE for a Document Change Proposal (DCP). o $125,000 for training tower controllers on the procedural change with a 30-minute verbal brief. (Note: It is assumed the briefing is given once per controller. The estimate above does not include costs for training future air traffic controllers, and does not include additional costs incurred if facility simulation development is required.) o 0.25 FTE for gap analysis in Subaction 2b.[4] • Action 3: o 0.25 FTE to support development of training material. o $29,000 for cost of course development. o $750,000 costs for training of controllers. *Notes: Air traffic controller costs for taking the training are based on a 1-hour level 3 WBT that would be required for all ATCSs in all operational environments (Terminal and En Route).* *It is assumed the course is taken once and passed by all current ATCSs.* *The estimate above does not include costs for training future ATCSs.* *No additional FAA ATO labor costs are included for interactions with NATCA, FAA AFS, FAA AIR, and FAA ARP, as it is assumed to be a part of normal responsibilities.* • Action 4: 0.1 to support encouragement of reporting.

	Organization	Resources Needed
Direct Resource Overview – Industry	ACI–NA	• Action 2: 0.25 FTE for gap analysis in Subaction 2b.[4]
	Air Carriers	• Action 4: 1.1 FTE (0.02 FTE or 40 hours at each carrier to review policies and procedures and modify as necessary).
	Air Carrier Industry Assns.	• Action 4: 0.3 for communication and tracking (0.1 FTE per association).
	Labor Organizations	• Action 4: 0.3 FTE (0.1 per labor organization to identify practices and develop joint campaign).
	NATCA	• Action 2: 0.25 FTE for gap analysis in Subaction 2b.[4] • Action 3: 0.25 FTE to support development of training material.

[4] Subaction 2b costs only include the development of an implementation plan, not the actual implementation.

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
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
2.4	06/02/2022	Action 1 closed. Action 2 closed.
2.3	06/03/2021	Action 2 modified to reflect additional FAA ARP task.
2.2	06/03/2021	Action 1 due date extended from 06/30/2021 to 06/30/2022. Action 2 due date extended from 06/30/2021 to 06/30/2024.
2.1	07/01/2020	Action 1 reopened. Action 2 reopened.
2.0	09/17/2018	New SE format. Content reorganized and terminology updated. No substantive changes.
1.5	12/07/2017	Action 1 closed. Action 2 closed.
1.4	06/01/2017	Action 1 due date extended from 06/30/2017 to 12/31/2017. Action 2 due date extended from 06/30/2017 to 12/31/2017.
1.3	02/02/2017	Action 1 due date extended from 12/31/2016 to 06/30/2017.
1.2	06/02/2016	Action 1 due date extended from 06/30/2016 to 12/31/2016. Action 3 closed at April 2016 CAST meeting. Action 4 closed.
1.1	02/04/2016	Action 4 due date extended from 12/31/2015 to 03/31/2016.
1.0	10/01/2015	Action 4 language revised.
0.2	08/06/2015	Action 4 due date extended from 06/30/2015 to 12/31/2015.
0.1	06/05/2015	Action 1 due date extended from 06/30/2015 to 06/30/2016.
Original	06/05/2014	CAST adopted SE 219.