AMC1 ORO.FC.231

EBT BASELINE PROGRAMME — GENERATION 4 (JET)

1. GENERAL

1.1 This Appendix provides the recurrent assessment and training matrix for turbo-jet aeroplanes of the fourth generation.

1.2 Using the data in the matrix, operators can develop recurrent training programmes based on the EBT concept.

	Assessment and training topic (Indicates as applicable)*	*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Knowledge*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
Generation 4 Jet — Recurrent Assessment and Training Matrix							*Competency map*								
Section 1															
	LVO Take off *	C	TO	Take off in the lowest applicable RVR	Demonstrate manual aircraft control during take-off in the lowest applicable RVR.	A take off at the lowest applicable RVR to established in the climb.	x			x	x				
Manouvrees Training Phase	Rejected Take off	A	TO	Engine failure after the application of take-off thrust and before reaching V1 in the lowest applicable RVR	Demonstrate manual aircraft control skills with smoothness and accuracy as appropriate to the situation. Detect deviations through instrument scanning. Maintain spare mental capacity during aircraft manual control. Maintain the aircraft within the flight envelope. Apply knowledge of the relationship between aircraft attitude, speed and thrust	From initiation of take off to complete stop (or as applicable to procedure)	x			x	x				
	Failure of critical engine between V1 & V2	B	TO	Failure of a critical engine from V1 and before reaching V2 in lowest CAT I visibility conditions		The manoeuvre is complete at a point when aircraft is stabilised in a clean configuration with engine-out procedures completed	x			x	x				
	Emergency descent	C	CRZ	Initiation of emergency descent from normal cruise altitude		The manoeuvre is completed once the aircraft is stabilised in emergency descent configuration (and profile)	x		x	x	x				
	Engine-out approach & go-around	B	APP	With a critical engine failed, manually flown normal precision approach to DA, followed by manually flown go-around, the whole manoeuvre to be flown without visual reference		This manoeuvre should be flown from intercept to centreline until acceleration after go-around. The manoeuvre is complete at a point when aircraft is stabilised at normal engine-out climb speed with the correct pitch and lateral control, in trim condition and, as applicable, autopilot engagement* (describe generally critical part of manoeuvre)	x			x	x				
	Go-around	A	APP	Go-around, all engines operative		High energy, initiation during the approach at 150 to 300 m (500 to 1000 ft) below the missed approach level off altitude	x		x	x	x				
	Go-around	A	APP	Go-around, all engines operative followed by visual circuit, manually flown		Initiation of go-around from DA followed by visual circuit and landing	x		x	x	x				
	Go-around	A	APP	Go-around, all engines operative		During flare/rejected landing	x		x	x	x				
	Engine-out landing	B	LDG	With a critical engine failed, normal landing		Initiation in a stabilized engine-out configuration from not less than 3 NM final approach, until completion of roll-out	x			x	x				
	Type A 2D Approach	C	APP	Type A 2D Approach and landing		Approach from the outside the final approach fix to landing and rollout and full stop on the runway.	x		x		x				

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Generation 4 Jet — Recurrent Assessment and Training Matrix						*Competency map*								
Section 2 – Approaches requiring specifc approval														
CAT IIIB Landing*	C	APP	Approach and landing lowest applicable CAT III B minima	Demonstrate the applicable procedures and appropriate management of automation.	Approach from outside the final approach fix to landing and rollout and full stop on the runway	x		x		x				
CAT IIIA Landing*	C	APP	Approach and landing lowest applicable CAT III A minima	Demonstrate the applicable procedures and appropriate management of automation.	Approach from outside the final approach fix to landing and rollout and full stop on the runway	x		x		x				
CAT II Landing*	C	APP	Approach and landing lowest applicable CAT II minima	Demonstrate the applicable procedures and appropriate management of automation.	Approach from outside the final approach fix to landing and rollout and full stop on the runway	x		x		x				
CAT II OTS Landing*	C	APP	Approach and landing lowest applicable CAT II OTS minima this may be combined with CAT II approach above	Demonstrate the applicable procedures and appropriate management of automation. This may be combined with CAT II approach above	Approach from outside the final approach fix to landing and rollout and full stop on the runway	x		x		x				
RNP AR*	C	APP	Approach and landing lowest applicable RNPAR minima	Demonstrate the applicable procedures and appropriate management of automation. Demonstrate accuracy of manual aircraft control in the visual manoeuvre	Approach from outside the final approach fix to landing and rollout and full stop on the runway	x		x	x	x				
CAT I LTS*	C	APP	Approach and landing lowest applicable CAT I LTS minima	Demonstrate the applicable procedures and appropriate management of automation. And aircraft manual control	Approach from outside the final approach fix to landing and rollout and full stop on the runway	x		x		x				
HUD*	C	APP	Approach and landing lowest applicable minima utilising HUD	Demonstrate the applicable procedures and appropriate management of automation and aircraft manual control.	Approach from outside the final approach fix to landing and rollout and full stop on the runway	x		x		x				
EVS/SVS*	C	APP	Approach and landing lowest applicable minima utilising EVS/SVS This may be combined with the HUD MT above.	Demonstrate the applicable procedures and appropriate management of automation and aircraft manual control.	Approach from outside the final approach fix to landing and rollout and full stop on the runway	x		x		x				

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Generation 4 Jet — Recurrent Assessment and Training Matrix							*Competency map*								
Approach Characteristics															
Evaluation and scenario-based training phases	Non-standard vertical path	B	APP	An approach greater or less than 3 degrees due to temperature greater or less than standard conditions or procedure design	Demonstrate the applicable procedures and appropriate management of automation and aircraft manual control	Non-precision approach and landing with greater than standard temperature with resultant increase in approach angle	x		x	x	x		x		
	Non-standard lateral path	B	APP	An approach offset from the centreline of the runway that requires visual manoeuvring to align the aircraft	Demonstrate the applicable procedures and appropriate management of automation and aircraft manual control	Approach off set from the runway centreline that requires visual manoeuvring below the minima	x		x	x	x		x		
	Manoeuvring in visual segment	B	APP	A visual approach or circling approach that requires visual manoeuvring without reference to instruments or ground guidance	Demonstrate the applicable procedures and appropriate management of automation and aircraft manual control	An approach with reduced or no navigational facilities requiring visual manoeuvring such as a visual approach or circling approach	x		x	x	x		x		
	Levels of automation	B	APP	Approach where different levels of automation are required due to variations in aircraft automation availability or external factors	Demonstrate the applicable procedures and appropriate management of automation and aircraft manual control	A loss of managed vertical or lateral automation requiring reversion to a lower level of automation to complete the approach. This may for example include a loss of glideslope signal during the approach or a failure of the localiser during an ILS approach causing reversion to another approach	x		x	x	x		x		
	Reduced approach/visual guidance	B	APP	Approach with reduced ground approach guidance such as PAPIS or approach/runway lighting	Demonstrate the applicable procedures and appropriate management of automation and aircraft manual control	Failure of the approach lights and/or PAPIS during visual manoeuvring	x			x	x		x		

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Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Knowledge*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
Generation 4 Jet — Recurrent Assessment and Training Matrix							*Competency map*								
Evaluation and scenario-based training phases	Adverse Weather	A	GND	Thunderstorm, heavy rain, turbulence, ice build-up to include de-icing issues, as well as high temperature conditions. The proper use of use of anti-ice and de-icing systems should be included generally in appropriate scenarios.	• Anticipate adverse weather • Prepare for suspected adverse weather • Recognize adverse weather • Take appropriate action • Apply appropriate procedure correctly • Assure aircraft control	Predictive wind shear warning before take-off, as applicable	x	x			x		x		
			TO			Adverse weather scenario, e.g. thunderstorm activity, precipitation, icing		x			x	x	x		x
			TO			Wind shear encounter during take-off, not predictive	x			x	x			x	
			TO			Predictive wind shear warning during take-off	x	x			x		x	x	
			TO			Crosswinds with or without strong gusts on take-off	x			x	x				
			CRZ			Wind shear encounter scenario during cruise	x		x		x		x	x	x
			APP			Reactive wind shear warning during approach or go-around	x		x	x	x			x	
			APP			Predictive wind shear warning during approach or go-around	x	x			x		x	x	
			APP			Thunderstorm encounter during approach or on missed approach	x				x		x	x	
			APP			Increasing tailwind on final (not reported)	x	x			x		x	x	
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				x			x	x	
			APP			Non-precision approach in cold temperature conditions, requiring altitude compensation for temperature, as applicable to type	x	x			x			x	
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x	x		x		
			APP			Reduced visibility even after acquiring the necessary visual reference during approach, due to rain or fog	x	x			x		x		

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Generation 4 Jet — Recurrent Assessment and Training Matrix							*Competency map*								
Evaluation and scenario-based training phases	Automation management	A	ALL	The purpose of this topic is to encourage and develop effective flight path management through proficient and appropriate use of flight management system(s), guidance and automation including transitions between modes, monitoring, mode awareness, vigilance and flexibility needed to change from one mode to another. Included in this topic is the means of mitigating errors described as: mishandled auto flight systems, inappropriate mode selection, flight management system(s) and autopilot usage.	Know how and when to use flight management system(s), guidance and automation Demonstrate correct methods for engagement and disengagement of auto flight system(s) Demonstrate appropriate use of flight guidance, auto thrust and other automation systems Maintain mode awareness of auto flight system(s), including engagement and automatic transitions Revert to different modes when appropriate Detect deviations from the desired aircraft state (flight path, speed, attitude, thrust, etc.) and take appropriate action. • Anticipate mishandled auto flight system • Recognize mishandled auto flight system. • Take appropriate action if necessary • Restore correct auto flight state • Identify and manage consequences. Anticipate effects on RVSM compliance with degradation of automation.	ACAS warning, recovery and subsequent engagement of automation	x		x		x				
			ALL			FMS tactical programming issues, e.g. step climb, runway changes, late clearances, destination re-programming, executing diversion	x		x		x				
			ALL			Recoveries from TAWS, management of energy state to restore automated flight	x		x	x	x				
			ALL			Amendments to ATC cleared levels during altitude capture modes, to force mode awareness and intervention	x		x		x			x	
			TO			Late ATC clearance to an altitude below acceleration altitude	x		x		x			x	
			TO APP			Engine-out special terrain procedures	x		x		x			x	
			CRZ			Forcing AP disconnect followed by re-engagement, recovery from low or high speed events in cruise	x		x	x	x			x	
			CRZ			Engine failure in cruise to onset of descent using automation	x		x		x				
			CRZ			Emergency descent	x		x		x				
			DES APP			Managing high energy descent capturing descent path from above (correlation with unstable approach training)	x		x		x			x	
			APP			No ATC clearance received prior to commencement of approach or final descent	x		x		x	x		x	
			APP			Reactive wind shear and recovery from the consequent high energy state	x		x		x			x	
			APP			Non-precision or infrequently flown approaches using the maximum available level of automation	x		x		x				
			APP			Gear malfunction during approach		x			x		x		x
			APP			ATC clearances to waypoints beyond programmed descent point for a coded final descent point during an approach utilising a final descent that is commanded by the flight management system.	x		x		x			x	

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Generation 4 Jet — Recurrent Assessment and Training Matrix							*Competency map*								
Evaluation and scenario-based training phases	Competencies non-technical (CRM)	A	APP	This encapsulates communication; leadership and teamwork; problem solving and decision making; situation awareness; workload management. Emphasis should be placed on the development of leadership, shown by EBT data sources to be a highly effective competency in mitigating risk and improving safety through pilot performance	<u>Communication:</u> Demonstrate effective use of language, responsiveness to feedback and that plans are stated and ambiguities resolved. <u>Leadership and teamwork:</u> Use appropriate authority to ensure focus on the task. Support others in completing tasks. <u>Problem solving and decision making:</u> Detect deviations from the desired state, evaluate problems, identify risk, consider alternatives and select the best course of action. Continuously review progress and adjust plans. <u>Situation awareness:</u> Have an awareness of the aircraft state in its environment; project and anticipate changes. <u>Workload management:</u> Prioritize, delegate and receive assistance to maximize focus on the task. Continuously monitor the flight progress	GPS failure prior to commencement of approach associated with position drift and a terrain alert					x	x	x	
			DES			Cabin crew report of water noise below the forward galley indicating a possible toilet pipe leak, with consequent avionics failures						x	x	x	
			CRZ			Smoke removal but combined with a diversion until landing completed.		x				x	x	x	x
			CRZ			ACAS warning immediately following a go-around, with a descent manoeuvre required.		x				x	x	x	x
	Compliance	A	ALL	Compliance failure. Consequences of not complying with operating instructions (e.g. SOP). This is not intended to list scenarios, but instructors should ensure that observed non-compliances are taken as learning opportunities throughout the programme. In all modules of the programme, the FSTD should as far as possible be treated like an aircraft, and non-compliances should not be accepted simply for expediency.	• Recognize that a compliance failure has occurred • Make a verbal announcement • Take appropriate action if necessary • Restore safe flight path if necessary • Manage consequences	The following are examples of potential compliance failures, and not intended to be developed as scenarios as part of an EBT Module: 1. Requesting flap beyond limit speed 2. Flaps or slats in the wrong position for phase of flight or approach 3. Omitting an action as part of a procedure 4. Failing to initiate or complete a checklist 5. Using the wrong checklist for the situation		Intentionally blank							

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Generation 4 Jet — Recurrent Assessment and Training Matrix							*Competency map*								
Evaluation and scenario-based training phases	Go-around management	A	APP	Any threat or error which can result in circumstances which require a decision to go-around, in addition to the execution of the go-around. Go-around scenarios should be fully developed to encourage effective leadership and teamwork, in addition to problem solving and decision making, plus execution using manual aircraft control or flight management system(s) and automation as applicable. Design should include the element of surprise and scenario-based go-arounds should not be predictable and anticipated. This topic is completely distinct from the go-around manoeuvre listed in the manoeuvres training section that is intended only to practice psychomotor skill and a simple application of the procedures		Adverse weather scenario leading to a reactive wind shear warning during approach	x	x			x			x	x
			APP			Adverse weather scenario leading to a predictive wind shear warning during approach or go-around	x	x			x			x	x
			APP			Adverse weather scenario, e.g. thunderstorm activity, heavy precipitation or icing forcing decision at or close to DA/MDA	x				x		x	x	x
			APP			DA with visual reference in heavy precipitation with doubt about runway surface braking capability	x				x		x	x	x
			APP			Adverse wind scenario resulting in increasing tailwind below DA (not reported)		x		x			x		
			APP			Adverse wind scenario including strong gusts and/or crosswind out of limits below DA (not reported)		x		x			x		
			APP			Adverse wind scenario including strong gusts and/or crosswind out of limits below 15 m (50 ft) (not reported)		x		x			x		
			APP			Lost or difficult communications resulting in no approach clearance prior to commencement of approach or final descent	x		x		x			x	
			APP			Birds: large flocks of birds below DA once visual reference has been established				x			x	x	
			APP			System malfunction, landing gear malfunction during the approach									

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Generation 4 Jet — Recurrent Assessment and Training Matrix							*Competency map*								
Evaluation and scenario-based training phases	Manual aircraft control	A	ALL	The competency description is "Maintains control of the aircraft in order to assure the successful outcome of a procedure or manoeuvre"	• Desired competency outcome: • Demonstrates manual aircraft control skills with smoothness and accuracy as appropriate to the situation • Detects deviations through instrument scanning • Maintains spare mental capacity during manual aircraft control • Maintains the aircraft within the normal flight envelope • Applies knowledge of the relationship between aircraft attitude, speed and thrust	Flight with unreliable airspeed, which may be recoverable or not recoverable	x			x	x			x	
			ALL			Alternate flight control modes according to malfunction characteristics	x			x	x				x
			ALL			ACAS RA to descend or ATC immediate descent	x	x		x	x				
			DES			TAWS warning when deviating from planned descent routing, requiring immediate response	x			x	x	x			
			TO			Scenario immediately after take-off which requires an immediate and overweight landing			x	x		x	x		
			TO			Adverse wind, crosswinds with or without strong gusts on take-off	x			x	x				
			TO			Adverse weather, wind shear, wind shear encounter during take-off, with or without reactive warnings	x			x	x			x	
			TO			Engine failure during initial climb, typically 30-60 m (100-200 .ft)	x	x		x	x				x
			CRZ			Wind shear encounter scenario during cruise, significant and rapid change in windspeed or down/updrafts, without wind shear warning	x		x		x		x	x	x
			APP			Adverse weather, wind shear, wind shear encounter with or without warning during approach	x		x	x	x			x	
			APP			Adverse weather, deterioration in visibility or cloud base, or adverse wind, requiring a go-around from visual circling approach, during the visual segment	x	x	x	x	x		x	x	x
			APP LDG			Adverse wind, crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x	x		x		
			APP LDG			Adverse weather, adverse wind, approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				x			x	x	
			APP LDG			Circling approach at night in minimum in-flight visibility to ensure ground reference, minimum environmental lighting and no glide slope guidance lights									
			APP LDG			Runway incursion during approach, which can be triggered by ATC at various altitudes or by visual contact during the landing phase	x			x	x			x	

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			LDG			Adverse wind, visibility, type specific, special consideration for long bodied aircraft, landing in minimum visibility for visual reference, with crosswind	x	x		x	x			x	
			LDG			System malfunction, auto flight failure at DA during a low visibility approach requiring a go-around flown manually	x		x	x	x			x	
Evaluation and scenario-based training phases	**ISI** Monitoring, cross checking, error management, mismanaged aircraft state	A	ALL	Developed scripted role-play scenarios encompassing the need to monitor flight path excursions from the instructor pilot (PF), detect errors and make appropriate interventions, either verbally or by taking control as applicable. The scenarios should be realistic and relevant, and are for the purpose of demonstration and reinforcement of effective flight path monitoring. Demonstrated role-play should contain realistic and not gross errors, leading at times to a mismanaged aircraft state, which can also be combined with upset management training	• Recognize mismanaged aircraft state. • Take appropriate action if necessary • Restore desired aircraft state • Identify and manage consequences	In-seat instruction: Deviations from the flight path, in pitch attitude, speed, altitude, bank angle		x						x	
			ALL			In-seat instruction: Simple automation errors (e.g. incorrect mode selection, attempted engagement without the necessary conditions, entering wrong altitude or speed, failure to execute the desired mode) culminating in a need for direct intervention from the PM, and where necessary taking control.		x						x	
			APP			In-seat instruction: Unstable approach or speed/path/vertical rate not congruent with required state for given flight condition	x	x			x			x	x
						Recover from poorly executed go around.	x		x		x			x	
			LDG			In-seat instruction: Demonstration exercise — recovery from bounced landing, adverse wind, strong gusts during landing phase, resulting in a bounce and necessitating recovery action from the PM	x			x	x			x	
	Unstable approach	A	DES APP	Reinforce stabilised approach philosophy and adherence to defined parameters. Encourage go-arounds when crews are outside these parameters. Develop and sustain competencies related to the management of high energy situations		ATC or terrain related environment creating a high energy descent with the need to capture the optimum profile to complete the approach in a stabilised configuration	x		x		x			x	
			DES APP			ATC or terrain related environment creating a high energy descent leading to unstable conditions and requiring a go-around	x		x		x			x	
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswinds including shifting wind directions				x			x	x	
			APP			Increasing tailwind on final (not reported)	x	x			x		x	x	
			APP LDG			Crosswinds with or without strong gusts on approach, final and landing (within and beyond limits)	x			x	x		x		

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Evaluation and scenario-based training phases	Adverse wind	B	TO	Adverse wind/crosswind. This includes tailwind but not ATC mis-reporting of the actual wind	• Recognize adverse wind conditions • Observe limitations • Apply appropriate procedures • Maintain directional control and safe flight path	Take-off with different crosswind/tailwind/gust conditions							x		x
			TO			Take-off with unreported tailwind		x				x			
			TO			Crosswinds with or without strong gusts on take-off	x			x	x				
			APP			Increasing tailwind on final (not reported)	x	x			x		x	x	
			APP			Approach and landing in demanding weather conditions, e.g. turbulence, up and downdrafts, gusts and crosswind including shifting wind directions				x			x	x	
			APP			Adverse wind scenario resulting in increasing tailwind below DA (not reported)		x		x			x		
			APP			Adverse wind scenario including strong gusts and/or crosswind out of limits below DA (not reported)		x		x			x		
			APP			Adverse wind scenario including strong gusts and/or crosswind out of limits below 15 m (50 ft) (not reported)		x		x			x		
			APP LDG			Crosswind with or without strong gusts on approach, final and landing (within and beyond limits)	x			x	x		x		

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Evaluation and scenario-based training phases	Aircraft system malfunctions, including operations under MEL	B	ALL	Any internal failure(s) apparent or not apparent to the crew Any item cleared by the MEL but having an impact upon flight operations. E.g. thrust reverser locked Malfunctions to be considered should have one or more of the following characteristics: Immediacy Complexity Degradation of aircraft control Loss of primary instrumentation Management of consequences	• Recognize system malfunction • Take appropriate action including correct stop/go decision • Apply appropriate procedure correctly • Maintain aircraft control • Manage consequences • Apply crew operating procedure where necessary. • Respond appropriately to additional system abnormals associated with MEL dispatch	Aircraft system malfunctions that place a significant demand on a crew shall be organised by reference to the following characteristics and underlying elements of performance required to manage them: At least one malfunction for each characteristic should be included in every 12-month period. Characteristics of Degraded Control and Loss of Instrumentation require exposure in the role of pilot flying.	Intentionally blank								
			TO			MEL items with crew operating procedures applicable during take-off							x		
			TO			Response to an additional factor that is affected by MEL item (e.g. system failure, runway state)		x		x			x		
			GRD			Malfunction during pre-flight preparation and prior to departure	x				x		x	x	
			GRD			Malfunction after departure	x				x		x	x	
			GRD			Malfunctions requiring immediate attention (e.g. bleed fault during engine start, hydraulic failure during taxi)									
			TO			Take-off high speed below V1	x				x	x	x		
			TO			Take-off high speed above V1	x				x		x		
			TO			Initial climb	x				x		x		
			APP			On approach	x				x		x		x
			APP			Go-around	x				x		x		x
			LDG			During landing	x	x		x	x		x	x	

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	Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Knowledge*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
	Generation 4 Jet — Recurrent Assessment and Training Matrix						*Competency map*								
Evaluation and scenario-based training phases	Aircraft system management	B		Normal system operation according to defined instructions	This is not considered as a stand-alone topic. It links with the topic "compliance" Where a system is not managed according to normal or defined procedures, this is determined as a non-compliance	See "compliance" topic above. There are no defined scenarios, but the instructor should focus on learning opportunities when system management non-compliances manifest themselves during other scenarios. Underpinning knowledge of systems and their interactions should be developed and challenged, and not merely the application of normal procedures	Intentionally blank								
	Approach, visibility close to minimum	B	APP	Any situation where visibility becomes a threat	• Recognize actual conditions • Observe aircraft and/or procedural limitations • Apply appropriate procedure if applicable • Maintain directional control and safe flight path	Approach in poor visibility	x		x	x	x				x
			APP			Approach in poor visibility with deteriorations necessitating a decision to go-around	x		x	x	x				
			LDG			Landing in poor visibility				x			x	x	
	Landing	B	LDG	Pilots should have opportunities to practice landings in demanding situations at the defined frequency. Data indicates that landing problems have their roots in a variety of factors, including appropriate decision making, in addition to manual aircraft control skills if difficult environmental conditions exist. The purpose of this item is to ensure that pilots are exposed to this during the programme	Landing in demanding environmental conditions, with malfunctions as appropriate	This topic should be combined with the adverse weather topic, aircraft system malfunctions topic or any topic that can provide exposure to a landing in demanding conditions		Intentionally blank							
	Runway or taxiway condition	B	TO	Contamination or surface quality of the runway, taxiway, or tarmac including foreign objects	• Recognize hazardous runway condition • Observe limitations • Take appropriate action • Apply appropriate procedure correctly • Assure aircraft control	Planned anticipated hazardous conditions with dispatch information provided to facilitate planning and execution of appropriate procedures					x		x		
			TO			Unanticipated hazardous conditions, e.g. unexpected heavy rain resulting in flooded runway surface		x			x	x	x		
			TO			Stop / go decision in hazardous conditions						x	x		x

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Generation 4 Jet — Recurrent Assessment and Training Matrix							*Competency map*								
Evaluation and scenario-based training phases	Surprise	B	ALL	The data analysed during the development of this manual and of the EBT concept indicated substantial difficulties encountered by crews when faced with a threat or error, which was a surprise, or an unexpected event. The element of surprise should be distinguished from what is sometimes referred to as the "startle factor", the latter being a physiological reaction. Wherever possible, consideration should be given towards variations in the types of scenario, times of occurrences and types of occurrence, so that pilots do not become overly familiar with repetitions of the same scenarios. Variations should be the focus of EBT programme design, and not left to the discretion of individual instructors, in order to preserve programme integrity and fairness	Exposure to an unexpected event or sequence of events at the defined frequency	Intentionally blank	Intentionally blank								
	Terrain	B	ALL	• Alert, warning, or conflict	• Anticipate terrain threats • Prepare for terrain threats • Recognize unsafe terrain clearance • Take appropriate action • Apply appropriate procedure correctly • Maintain aircraft control • Restore safe flight path • Manage consequences	ATC clearance giving insufficient terrain clearance	x	x			x	x			
			ALL			Demonstration of terrain avoidance warning systems							x	x	x
			TO CLB			Engine failure where performance is marginal leading to TAWS warning		x		x					x
			DES			"Virtual mountain" meaning the surprise element of an unexpected warning. Care should be exercised in creating a level of realism, so this can best be achieved by an unusual and unexpected change of route during the descent							x	x	x
Evaluation and scenario-based training phases	Workload, distraction, pressure	B	ALL	This is not considered a topic for specific attention on its own, but more as a reminder to programme developers to ensure that pilots are exposed to immersive training scenarios which expose them to manageable high workload and distractions during the course of the EBT programme, at the defined frequency	• Manage available resources efficiently to prioritize and perform tasks in a timely manner under all circumstances	Intentionally blank	Intentionally blank								
	ATC	C	ALL	ATC error. Omission, miscommunication, garbled, poor quality transmission. All of	• Respond to communications appropriately • Recognize, clarify and resolve any ambiguities.		x	x			x	x			

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Assessment and training topic	*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Knowledge*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
Generation 4 Jet — Recurrent Assessment and Training Matrix						*Competency map*								
			these act as distractions to be managed by the crew. The scenarios should be combined where possible with others of the same or higher weighting, the principle reason being to create distractions.	• Refuse or question unsafe instructions. • Use standard phraseology whenever possible		x	x			x		x	x	
							x							
					Poor quality transmissions		x							
	Engine failure	C	TO	Any engine failure or malfunction, which causes loss or degradation of thrust that impacts performance. This is distinct from the engine-out manoeuvres described in the manoeuvres training section above, which are intended only for the practice of psychomotor skill and reinforcement of procedures in managing engine failures	• Recognize engine failure • Take appropriate action • Apply appropriate procedure correctly • Maintain aircraft control • Manage consequences	Take-off low speed	x		x		x		x		x
			TO			Take-off high speed below V1	x		x		x		x		x
			TO			Take-off above V1	x				x		x	x	x
			TO			Initial climb	x				x		x	x	
			APP			Engine malfunction	x				x		x		x
			CRZ			Engine failure in cruise									
			LDG			On landing				x					

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Generation 4 Jet — Recurrent Assessment and Training Matrix							*Competency map*								
Evaluation and scenario-based training phases	Fire and smoke management	C	GRD	This includes engine, electric, pneumatic, cargo fire, smoke or fumes	• Recognize fire, smoke or fumes • Take appropriate action • Apply appropriate procedure correctly • Maintain aircraft control • Manage consequences	Fire in cargo or cabin/cockpit at gate	x	x			x		x		x
			GRD			Fire during taxi	x	x			x		x		x
			GRD			Fire with no cockpit indication	x	x			x		x		x
			TO			Take-off low speed	x		x		x	x	x		
			TO			Take-off high speed below V1	x		x		x	x	x		
			TO			Take-off high speed above V1	x				x	x	x		
			TO			Initial climb	x				x	x	x		
			CRZ			Cargo fire							x	x	x
			APP			Engine fire in approach (extinguishable)		x					x		
			APP			Engine fire in approach (non-extinguishable)		x				x	x		
			APP			Flight deck or cabin fire		x				x	x		
	Loss of communications	C	GRD	Lost or difficult communications. Either through pilot mis-selection or a failure external to the aircraft. This could be for a few seconds or a total loss	• Recognize loss of communications • Take appropriate action • Execute appropriate procedure as applicable • Use alternative ways of communications • Manage consequences	Loss of communications during ground manoeuvring	x	x			x				
			TO			Loss of communications after take-off	x				x		x		
			APP			Loss of communications during approach phase, including go-around	x	x			x		x	x	
	Managing loading, fuel, performance errors	C	ALL	A calculation error by one or more pilots, or someone involved with the process, or the process itself, e.g. incorrect information on the load sheet	• Anticipate the potential for errors in load/fuel/performance data • Recognize inconsistencies • Manage/avoid distractions • Make changes to paperwork/aircraft system(s) to eliminate error • Identify and manage consequences	This can be a demonstrated error, in that the crew may be instructed to deliberately insert incorrect data, for example to take-off from an intersection with full length performance information. The crew will be asked to intervene when acceleration is sensed to be lower than normal, and this may be part of the operator procedures, especially when operating mixed fleets with considerable variations in MTOM	x	x			x				x

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Assessment and training topic		*Frequency*	*Flight phase for activation*	*Description (include type of topic, being threat, error or focus)*	*Desired outcome (includes performance criteria OR training outcome)*	*Example scenario elements*	*Application of procedures*	*Communication*	*Flight path management, automation*	*Flight path management, manual control*	*Knowledge*	*Leadership and teamwork*	*Problem solving and decision making*	*Situation awareness*	*Workload management*
Generation 4 Jet — Recurrent Assessment and Training Matrix							*Competency map*								
Evaluation and scenario-based training phases	Navigation	C	GRD	External NAV failure. Loss of GPS satellite, ANP exceeding RNP, loss of external NAV source(s)	• Recognize a NAV degradation. • Take appropriate action • Execute appropriate procedure as applicable • Use alternative NAV guidance • Manage consequences	External failure or a combination of external failures degrading aircraft navigation performance	x		x		x		x	x	
			TO CLB APP LDG			External failure or a combination of external failures degrading aircraft navigation performance		x				x	x	x	
	Operations or type specific			Intentionally blank	Intentionally blank	Intentionally blank	Intentionally blank								
	Pilot incapacitation	C	TO	Consequences for the non-incapacitated pilot	• Recognize incapacitation • Take appropriate action including correct stop/go decision • Apply appropriate procedure correctly • Maintain aircraft control • Manage consequences	During take-off	x	x			x	x	x		
			APP			During approach	x			x	x				x
	Traffic	C	CLB CRZ DES	Traffic conflict. ACAS RA or TA, or visual observation of conflict, which requires evasive manoeuvring	• Anticipate potential loss of separation • Recognize loss of separation • Take appropriate action • Apply appropriate procedure correctly • Maintain aircraft control • Manage consequence Implications in RVSM airspace	ACAS warning requiring crew intervention		x					x	x	x

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Generation 4 Jet — Recurrent Assessment and Training Matrix							*Competency map*								
Evaluation and scenario-based training phases	**ISI** Upset recovery Work in progress, training topic to be completed	C	ALL	An airplane upset is an undesired airplane state characterized by unintentional divergences from parameters normally experienced during operations. An airplane upset may involve pitch and/or bank angle divergences as well as inappropriate airspeeds for the conditions. All topics indicated with an asterisk * should be included within the 3-year programme.	• Recognize upset condition • Take appropriate action • Assure aircraft control • Maintain or restore a safe flight path • Assess consequential issues • Manage outcomes	Upset recognition: Demonstration of the defined normal flight envelope and any associated changes in flight instruments, flight director systems, and protection systems. This should take the form of an instructor-led exercise to show the crew the points beyond which an upset condition could exist Recovery: Demonstration, in-seat instruction: the instructor should position the aircraft within but close to the edge of the normal flight envelope before handing control to the trainee to demonstrate the restoration of normal flight. Careful consideration should be given to flying within the normal flight envelope Timely and appropriate intervention			x	x				x	x
				Recovery from stall events *		Take-off configuration Upset recognition and recovery — demonstration at an intermediate altitude during early stages of the approach, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions				x				x	
				Recovery from stall events *		Clean configuration low altitude Upset recognition and recovery — demonstration at an intermediate altitude during early stages of the approach, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions				x				x	
				Recovery from stall events *		Clean configuration near maximum operating altitude Upset recognition and recovery — demonstration at a normal cruising altitude, set conditions and disable aircraft systems as necessary to enable trainee to complete stall recovery according to OEM instructions				x				x	
				Recovery from stall events *		Landing configuration during the approach phase				x				x	
				Recovery from upsets *		Recovery from nose high at various bank angles				x				x	
				Recovery from upsets *		Recovery from nose low at various bank angles				x				x	
				Steep turns *		As applicable and relevant to aircraft type, demonstration at a suitable intermediate level, with turbulence as appropriate; practice steep turns and note the relationship between bank angle, pitch and stalling speed				x				x	

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Generation 4 Jet — Recurrent Assessment and Training Matrix							*Competency map*								
Evaluation and Scenario Based Training Phases	Wind shear recovery	C	TO	With or without warnings including predictive A wind shear scenario is ideally combined into an adverse weather scenario containing other elements.	Anticipate potential for wind shear Avoid known wind shear or prepare for suspected wind shear Recognize wind shear encounter Take appropriate action Apply appropriate procedure correctly Assure aircraft control Recognize out of wind shear condition Maintain or restore a safe flight path Assess consequential issues and manage outcomes	Predictive wind shear warning during take-off	x			x	x			x	
			TO			Wind shear encounter during take-off	x				x	x	x		
			TO			Wind shear encounter after rotation							x		x
			TO			Predictive wind shear after rotation						x	x		
			APP			Predictive wind shear during approach	x				x	x	x		
			APP			Wind shear encounter during approach	x				x	x	x		
			TO APP			Upset recognition and recovery — Severe wind shear or wake turbulence during take-off or approach			x	x			x	x	
			CRZ			Upset recognition and recovery — at the maximum cruise flight level for current aircraft weight, turbulence to trigger overspeed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)			x	x			x	x	
			CRZ			Upset recognition and recovery — at the maximum cruise flight level for current aircraft weight, turbulence and significant temperature rise to trigger low speed conditions (if FSTD capability exists, consider use of vertical wind component to add realism)	x			x	x			x	