SAFE 360° - Safety in Aviation Forum for Europe 2022

FDM Breakout Session

Approach Path Management

EOFDM – WGB & Data4Safety

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15 September 2022

Your safety is our mission.

An Agency of the European Union

EOFDM WGB – Unstable Approach

- Unstable approaches are common contributors to accidents in the landing phase, such as **runway excursions**, **tail strikes**, **bounced and hard landings**.
- Typically the aircraft has to be stabilised **at and below 1 000 ft** when the flight is in IMC (at night, bad weather conditions, low visibility, etc.) and **at and below 500 ft** when the flight is in VMC (at day, good weather, good visibility, etc.).
- Unstable Approach precursor addressed on WGB document: **RE26**

EOFDM WGB – Unstable Approach

- RE26 was reviewed to:
  - Not to be specific for a fleet (apply to all fleets of EOFDM operators)
  - Be able accommodate specific requirements of operation or SOPs (Special approach procedures)
  - Not repeat the good practices of the industry already published
  - New version of WGB DOC is to be published on Q4 2022 (Rev 4)

EOFDM WGB – Unstable Approach

→ The conditions to meet should reflect the correct **flight path**, aircraft **energy** and **configuration**.

→ Too high / Too low?

→ Too fast / Too slow?

→ Out of configuration?

→ High Rate of Descent?

→ App path deviation?

→ Correct attitude?

→ Thrust power not stabilized?

EOFDM WGB – Unstable Approach

→ Measurements and Events – RE26

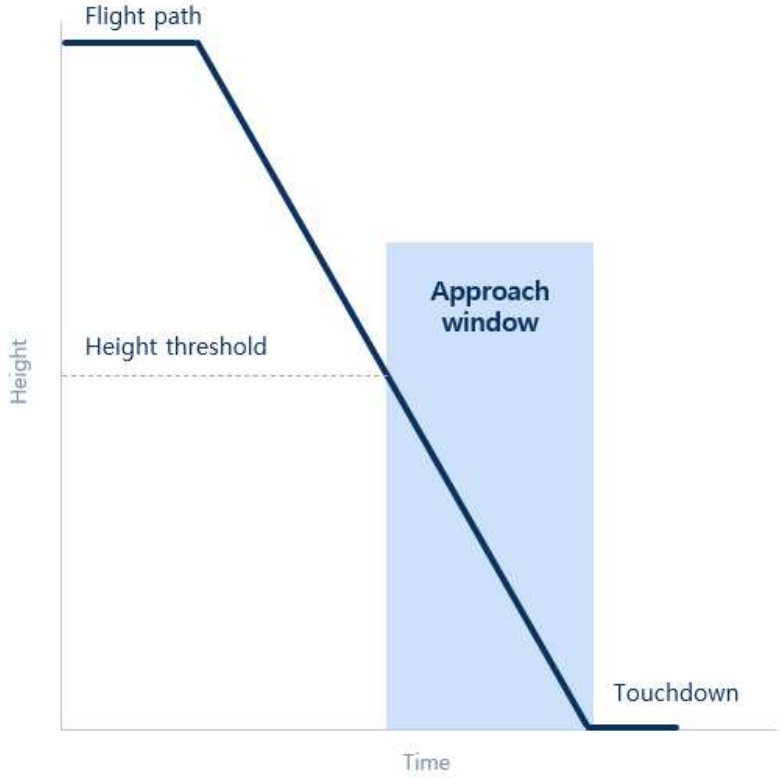
Search window	Measurements	Event	Event threshold
From the applicable SOP altitude to touchdown or a go-around is initiated	Maximum/Minimum values for applicable parameters (e.g. speeds, flaps, landing gear)	'Unstable approach'	Raise event if any monitoring condition is not met
From the applicable SOP altitude to touchdown or a go-around is initiated	Lowest altitude at which all the stable conditions remain satisfied		
From the applicable SOP altitude to touchdown or a go-around is initiated	Number of criteria not satisfied		

D4S APM Directed Study

→ Next steps

- → Integrate the know-how and data testing performed by D4S in the "**Approach Path Management**" directed study.
  - → 1.4 million flights analysed
  - → +1000 aircraft from 8 different fleet
- → **D4S** used different sources of guidance to find a common criteria for the analysis of data at industry-wide level
- → **EOFDM** provides guidance for the operators to implement the precursors at the organizational level

D4S APM Directed Study



– Within the approach window, the following set of **criteria** are evaluated:

High/Low airspeed	Fast descent	Low thrust
TAWS alerts	Late flap or gear extension	Unstable attitude (pitch, roll)
High/Low glideslope deviation	High/Low localizer deviation	

D4S APM Directed Study

Instability conditions		1st threshold	2nd threshold	Height range
Energy management	High airspeed	>(Vref + 20kt) [3s]	>(Vref + 35kt) [3s]	1000ft to 50ft
	Low airspeed	<(Vref – 5kt) [3s]	<(Vref – 10kt) [3s]	
	Fast descent (vertical speed)	<-1200fpm [5s]	<-1500fpm [3s]	
	Low thrust (N1)	Fleet specific (1st percentile) [10s]		
	TAWS alerts	Modes 1 (Alert & Warning), 2 (Alert & Warning), 4 (Terrain)		1000ft to 0ft
Aircraft handling and configuration	Late flap extension	Any change > 2 degrees or 1 notch		
	Late gear extension	Any deployment or not deployed		

Instability conditions		1st threshold	2nd threshold	Height range
Aircraft handling and configuration	High pitch attitude	>10° and <-3° [3s]	>15° and <-10° [3s]	1000ft to 50ft
	High roll attitude	>15° and <-15° [3s]	>30° and <-30° [3s]	
Aircraft path management	High glideslope deviation	>1 dot [5s]	>2 dots [5s]	1000ft to 500ft
	Low glideslope deviation	<-1 dot [5s]	<-2 dots [5s]	
	Excessive localizer deviation	>1 dot (left or right) [5s]	>1.5 dots (left or right) [5s]	

D4S APM Directed Study

→ The directed study from D4S is available in the link:

→ https://www.easa.europa.eu/downloads/136957/en

→ .. or through the D4S webpage:

→ https://www.easa.europa.eu/domains/safety-management/data4safety

EASA
European Union Aviation Safety Agency

Thank you for your attention

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