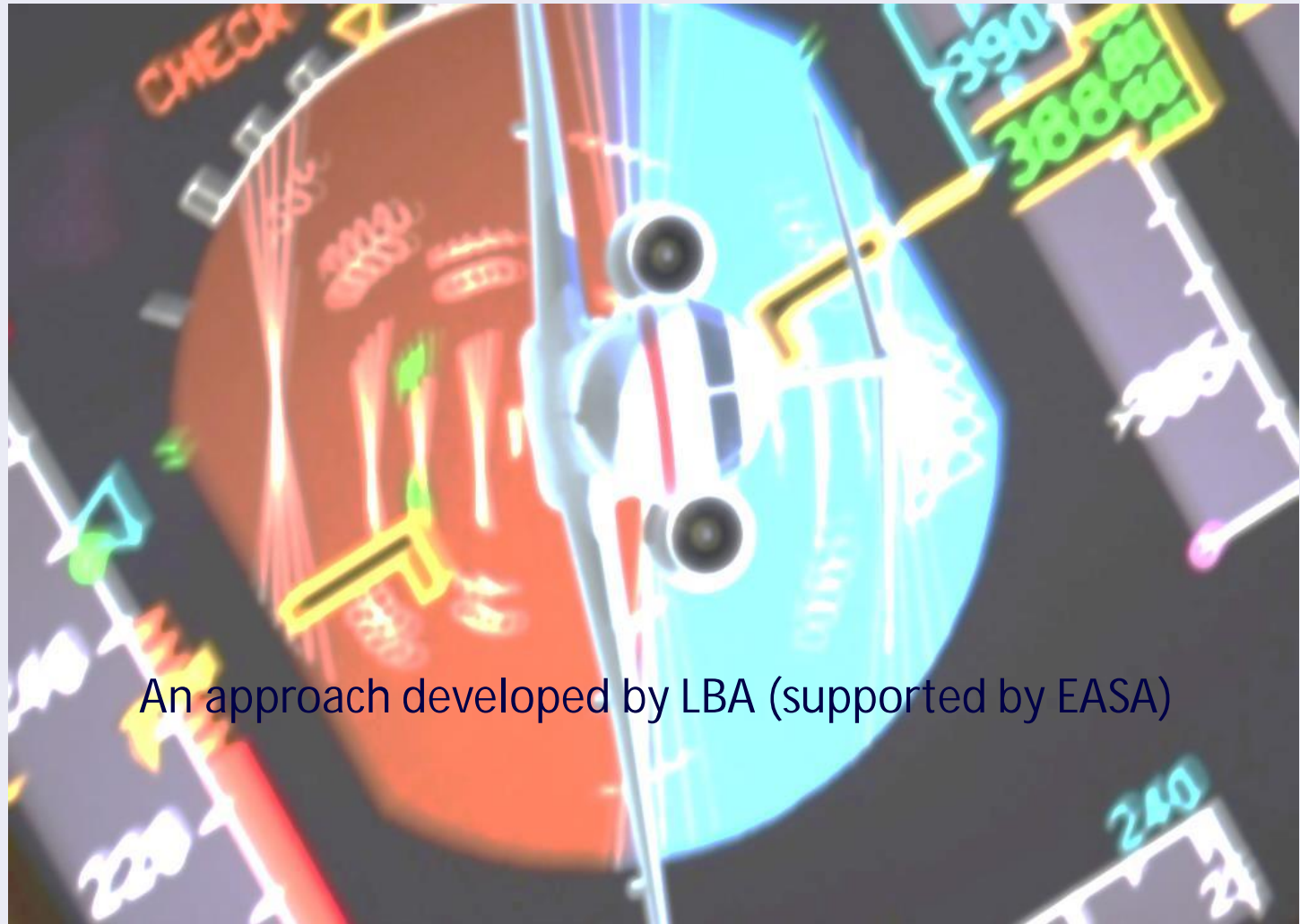




## FSTD Evaluation/Qualification of UPRT acc. to CS-FSTD(A) Issue 2



An approach developed by LBA (supported by EASA)

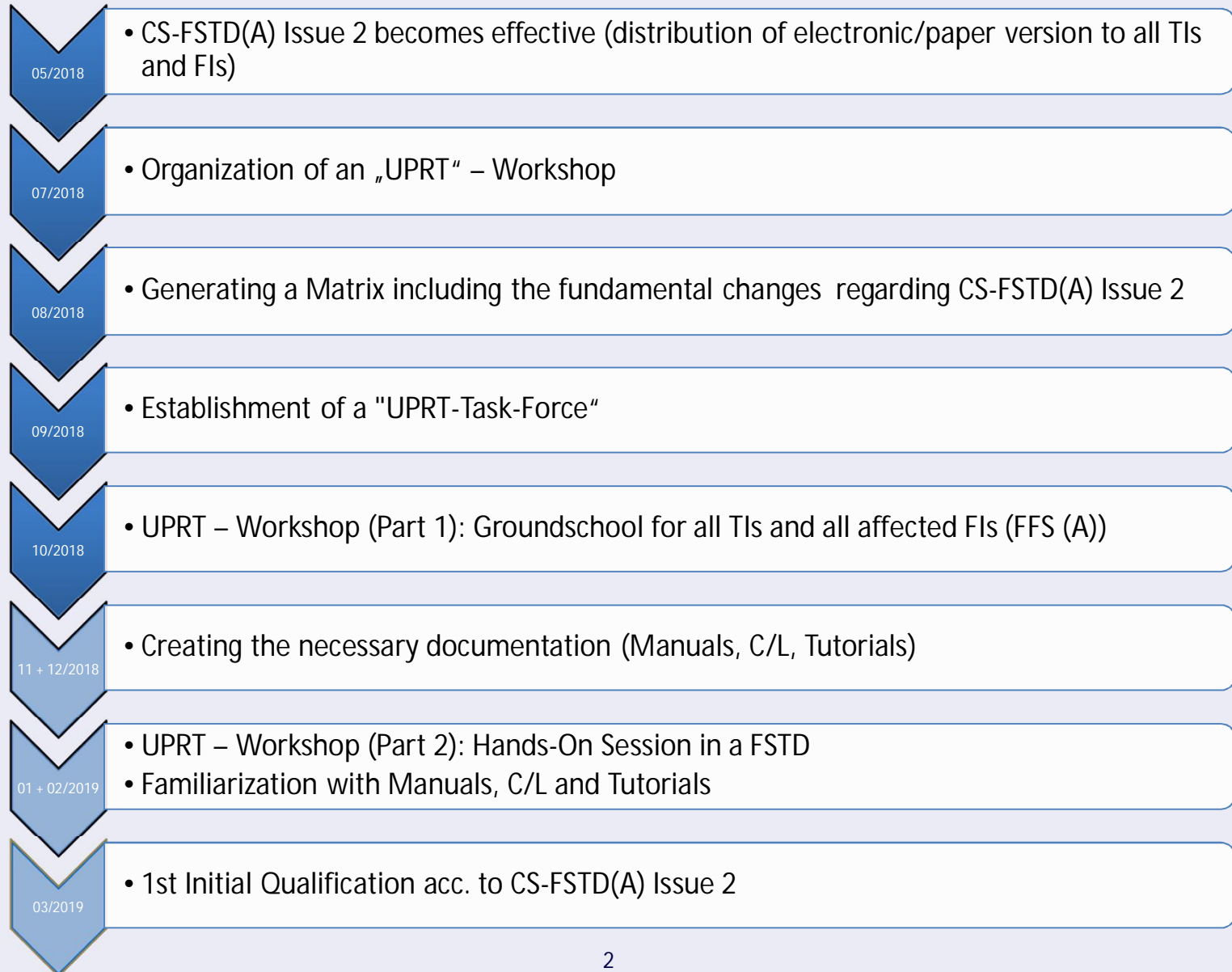


# General Action Items

General Action Items

Best Practices

Evaluation of FSTDs





# UPRT - Workshop

Workshop is separated into a theoretical and a practical part

General Action Items

Best Practices

Evaluation of FSTDs

## Theoretical Part

CS-FSTD(A) Issue 2 requirements regarding UPRT (IOS Feedback Tool, Upset Scenarios, aerodynamic model, engine and airframe icing)

Thorough background on UPRT and how it should be taught

Refresher on academics (V-n Diagram & Alpha-beta diagram) and correlation with regulatory requirements

## Practical Part

Concept and regulatory requirements will be demonstrated in a FSTD (hands-on experience)





# CS-FSTD(A) Issue 2 Matrix

- Identification of new provisions and requirements and clustering them in 4 different topics (Full Stall Training, IOS Feedback Tool & UPRT, Stall @high Altitudes, Eng & Airframe Icing)
- classification of requirements (subjectiv and functional, objectif)
- Defining the applicability (FFS Level C, FFS Level D, etc.)

General Action Items

Best Practices

Evaluation of FSTDs

Referenz	anwendbar für					Full Stall Training	IOS Feedback Tool & UPRT Training	Eng & Airframe Icing	Stall @ high Altitudes	Requirement			Weitere Bezüge
	FFS Level B	FFS Level C	FFS Level D	FNPT II	FNPT II MCC					Text	objektiv	subjektiv	
Appendix 1 to CS FSTD(A).300 Flight Simulation Training Device Standards													
1.d.3		x	x	x	x			x		instrumente müssen entsprechend Vereisung anzeigen		x	
1.g.2		x	x			x				Für Lfz. mit Stick Pusher müssen Kräfte Ruderausschläge und Ruderstellung mit dem Original übereinstimmen	x SoC &Test		
1.h.2		x	x				x			Real-time Feedback Tool um dem Instructor zu zeigen, ob sich Lfz innerhalb der Operating Limits bewegt Aufzeichnung kann ist aber kein MUSS	x SoC	x	<a href="#">AMC12 FSTD(A).300</a>

# Manuals, C/L and Tutorials 1/2

Resulting from the Matrix → Manual

„New requirements and provisions of CS-FSTD(A) Issue 2 –  
Evaluation of UPRT“

General Action Items

Best Practices

Evaluation of FSTDs

Content:

- General Information on UPRT
- Summary of the changes sorted by the different topics
- Compilation of all check items grouped by subjective + functional tests, validation tests and SoC
- still to include: „Previously qualified FSTD“ (AMC11) and „Impact of FAA Part 60“ (bounced Idgs. and gusty crosswinds)

**New requirements and provisions of  
CS-FSTD(A) Issue 2**

**Evaluation of UPRT**

Luftfahrt-Bundesamt  
(LBA)

November 2018

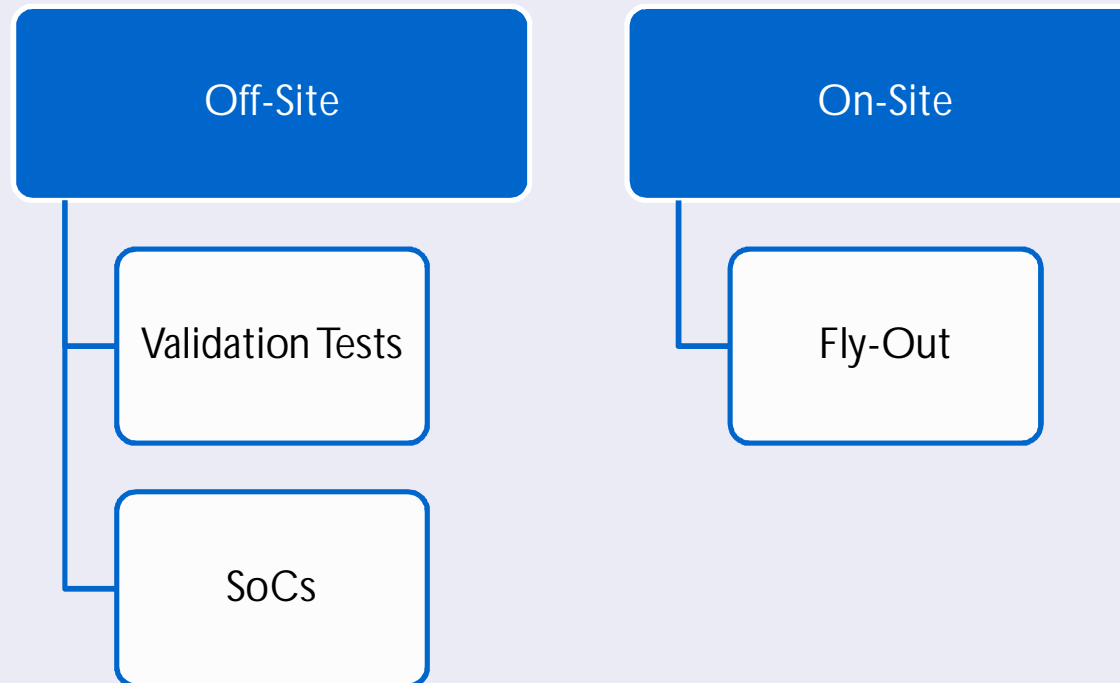
# Manuals, C/L and Tutorials 2/2

Implementation of 2 Checklists → „Off-Site“ and „On-Site“

General Action Items

Best Practices

Evaluation of FSTDs



Tutorial relevant for UPRT provisions → „Aerodynamic Tutorial/Crash-Course“

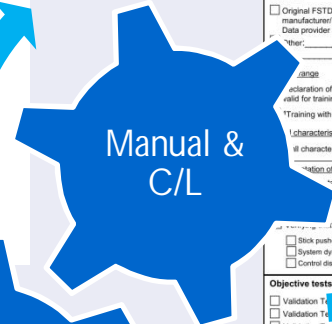
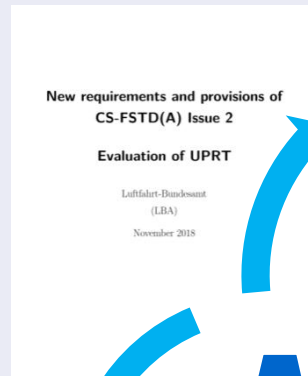


# Conclusion → Best Practices for a good Preparation

General Action Items

Best Practices

Evaluation of FSTDs



Checklist CS-FSTD(A) Issue 2 – Offsite #1	
Full stall training task	OR Approach-to-stall training task
<b>Statements of Compliance must identify:</b> <b>Aerodynamic Model</b> <input type="checkbox"/> Source data <input type="checkbox"/> OEM <input type="checkbox"/> Original FSTD manufacturer/ <input type="checkbox"/> Data provider <b>Modeling methods</b> <input type="checkbox"/> $\alpha$ - $\beta$ -envelope plot for flaps-up and flaps-down configuration <input type="checkbox"/> List of manoeuvre types used to define the aerodynamic model for: - Angle of attack ranges greater than first indication of stall - per flap setting <b>Stall</b> <input type="checkbox"/> Declaration of the range of angle of attack and sideslip where stall model remains valid for training <input type="checkbox"/> Training with stall-envelope-protection system disabled or degraded possible <b>Characteristics</b> <input type="checkbox"/> If characteristics are mentioned in SoC <input type="checkbox"/> If model has been evaluated by an SME-pilot for verification <input type="checkbox"/> Stall training tasks can be accomplished on the FSTD <input type="checkbox"/> Stick pusher system? <input type="checkbox"/> Stick pusher system modelled, programmed and validated <input type="checkbox"/> Stick pusher activation and cancellation logic <input type="checkbox"/> System dynamics <input type="checkbox"/> Control displacement and forces <b>Objective tests</b> <input type="checkbox"/> Validation Test 2.0.8.4.4.4 <input type="checkbox"/> Validation Test 3.g.5.7 <input type="checkbox"/> Validation Test 3.g.5.7	<b>Statements of Compliance must identify:</b> <b>Aerodynamic Model</b> <input type="checkbox"/> Source data and modeling methods <input type="checkbox"/> Angle of attack and sideslip range <input type="checkbox"/> Model remains usable beyond FSTD training envelope <input type="checkbox"/> In case of limitations: limitations should be declared in SoC <b>Motion response</b> <input type="checkbox"/> Motion response during approach-to-stall manoeuvre <input type="checkbox"/> In case of limitations of simulator motion: tuning out objectionable motion system response (where possible) <input type="checkbox"/> Stall buffet is included? <b>Objective tests</b> <input type="checkbox"/> Validation Test 2.0.8.4.4.4 <input type="checkbox"/> Validation Test 3.g.5.7 → only applicable for aeroplanes which exhibit stall buffet before the activation of the stall warning system <input type="checkbox"/> If applicable <input type="checkbox"/> This SoC is only required at the time the FSTD is initially qualified for stall training tasks as long as the FSTD's stall model remains unmodified compared to what was originally evaluated and qualified <input type="checkbox"/> If no flight test data: do NOT apply engineering tolerances <input type="checkbox"/> Numerical tolerances are not applicable past the stall angle of attack but must demonstrate correct trend through recovery <input type="checkbox"/> For aeroplanes with stall-envelope-protection system: normal and non-normal control state: normal control state only required for an angle of attack range necessary to demonstrate the correct operation of the system; non-normal control state: should be demonstrated through stall identification and recovery <input type="checkbox"/> High altitude cruise (near performance limited condition) not required for previously qualified FSTD <input type="checkbox"/> Post-stall characteristics are not required





# Evaluation of previously qualified FSTDs

## Special Evaluation after Major Change:

General Action Items

Best Practices

Evaluation of FSTDs

1. Retrieve necessary information from FSTD Operator
2. Review and evaluate (Off-Site Checklist)
3. On-Site Evaluation (On-Site Checklist)



# Beare in mind...

## GM4 ORO.FC.220&230 Operator conversion training and checking & recurrent training and checking

ED Decision 2018/006/R

### Article 2

This Decision shall enter into force on the day following that of its publication in the Official Publication of EASA.

It shall apply from the applicability date of the related Commission Regulation<sup>7</sup> (which has been prepared based on EASA Opinion No 06/2017) that introduces new requirements on loss of control prevention and recovery training (UPRT) into Commission Regulation (EU) No 1178/2011. Upon applicability, it shall also apply to FSTDs used for UPRT as per Commission Regulation (EU) No 965/2012.

associated FSTD validation tests.

FSTD operators may achieve such demonstration of equivalency through the conduct of a special evaluation by the competent authority. Once the level B FFS is deemed to be qualified, the competent authority should enter the additional capability on the certificate using the wording 'upset recovery training'. FSTD Operators are reminded that the individual FFS used must be approved for the training by the competent authority in accordance with ORO.FC.145(c).

Equivalency to at least level C for the specific features needed for the training task may be demonstrated using the following guidance and list in Table 1 of minimum objective and subjective functional test.

#### General

- Refer to Subpart C Aeroplane Flight Simulation Training Devices AMC1 FSTD(A).300(c)(1)(i) and (2)(ii) for the scope of the qualification criteria;
- A six-degrees-of-freedom motion system should be provided; and

GM4 ORO.FC.220&230 will be superseded as soon as CS-FSTD(A) Issue becomes applicable

No more UPRT related training allowed on FFS Level B!

