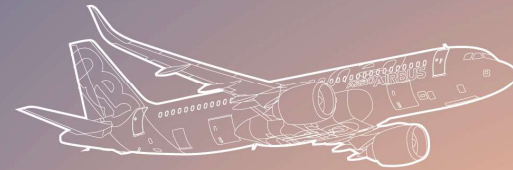


ICAO EUR/NAT UPRT Webinar

Supporting UPRT Implementation



AIRBUS



International Standards
and Recommended Practices

Annex 1 to the Convention on International Civil Aviation

Personnel Licensing

Fourteenth Edition, July 2022



This edition supersedes, on 3 November 2022, all previous editions of Annex 1.
For information regarding the applicability of the Standards and Recommended Practices, see the Foreword.

INTERNATIONAL CIVIL AVIATION ORGANIZATION



International Standards
and Recommended Practices

Annex 6 to the Convention on International Civil Aviation

Operation of Aircraft

Part I — International Commercial Air Transport — Aeroplanes
Twelfth Edition, July 2022



This edition supersedes, on 3 November 2022, all previous editions of Part I of Annex 6.
For information regarding the applicability of the Standards and Recommended Practices, see the Foreword.

INTERNATIONAL CIVIL AVIATION ORGANIZATION

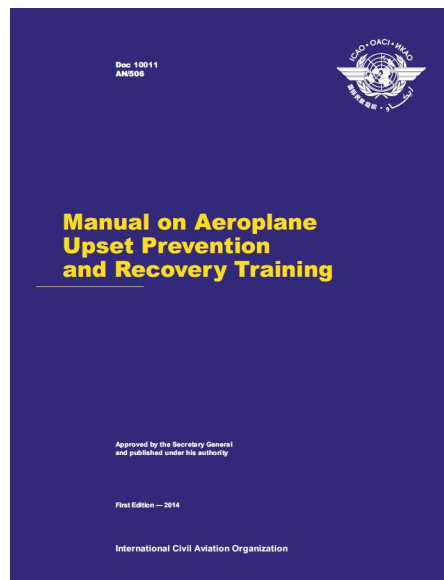
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ICAO

UPRT is not an Option



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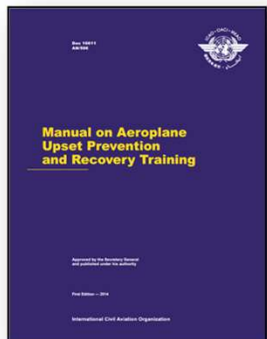


ICAO

Into Practice



AIRBUS



IATA and OEMs

The Voice of the
OEMs and
Operators

AIRBUS

A320

FLIGHT CREW TRAINING

STANDARDS



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Airbus Recommendations

Flight Crew Training Standards

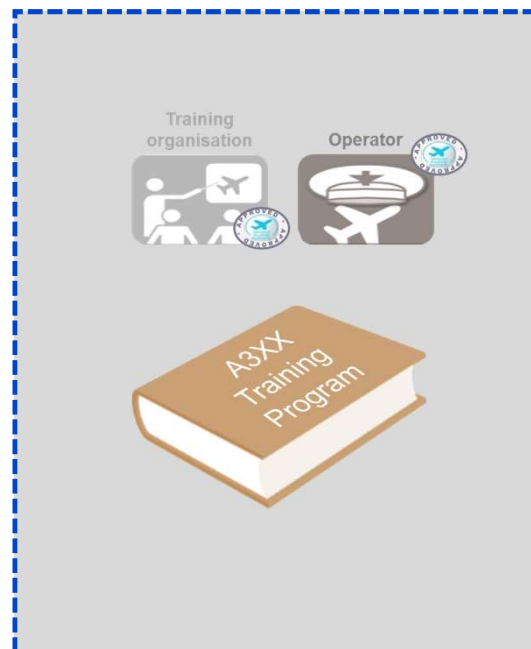
AIRBUS



A3XX
Operational Suitability Data
(OSD)
Flight Crew

SA01RP1536744
January 2018

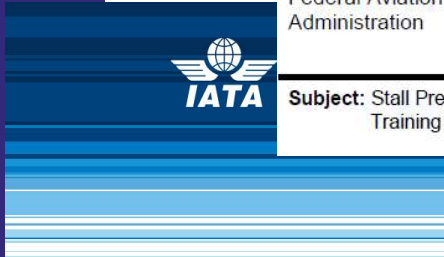
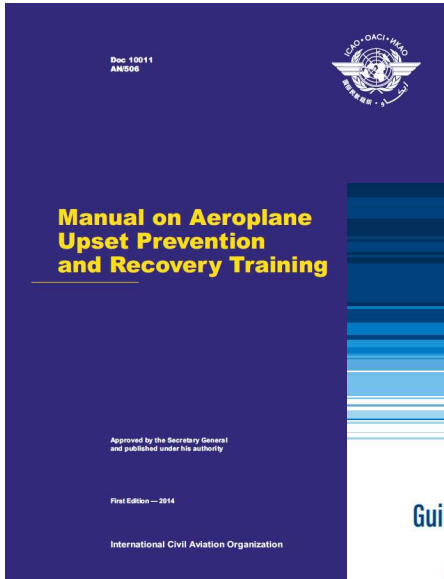
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FCTS

Flight Crew
Training Standards

AIRBUS



**Guidance Material and Best Practices
for the Implementation of Upset
Prevention and Recovery Training**



**U.S. Department
of Transportation**
Federal Aviation
Administration

Subject: Stall Prevention and Recovery
Training

Advisory Circular

Date: 1/4/17 **AC No:** 120-109A
Initiated by: AFS-200 **Change:** 1



**U.S. Department
of Transportation**
Federal Aviation
Administration












Subject: Upset Prevention and Recovery
Training

Advisory Circular

Date: 1/4/17 **AC No:** 120-111
Initiated by: AFS-200 **Change:** 1

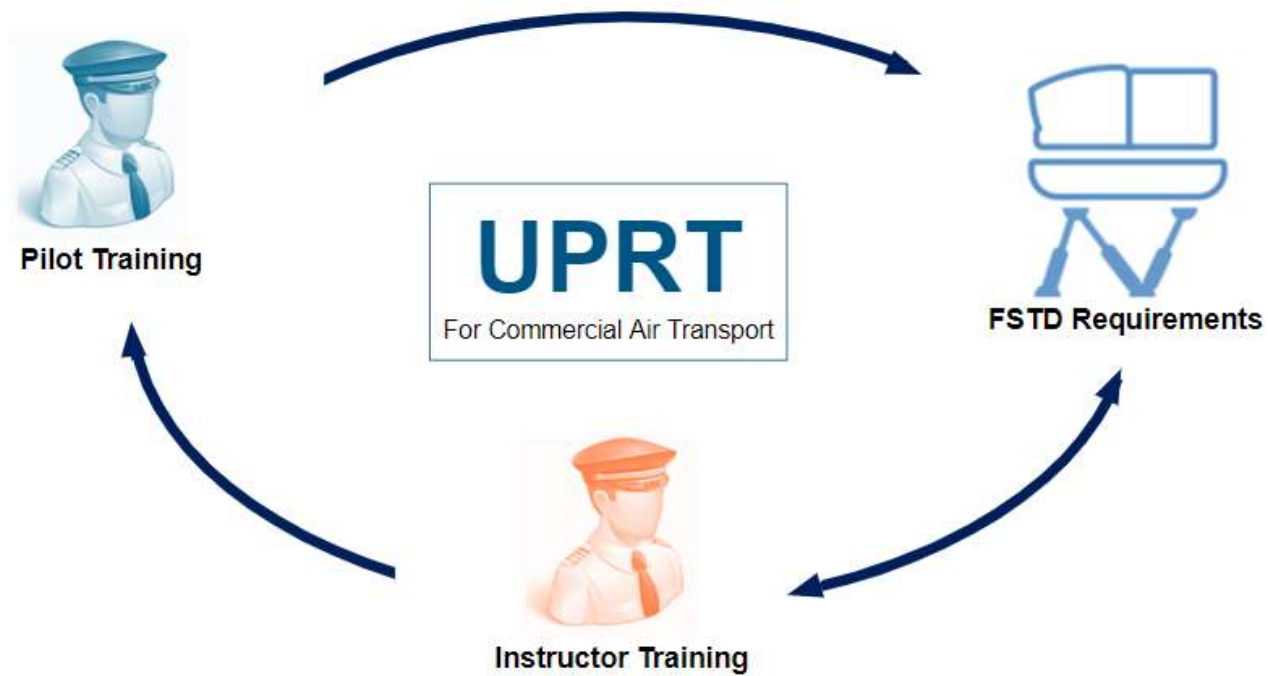
FCTS Reference

AIRBUS

- ✓  7 APPENDIX 3: SPECIFIC TRAINING EXERCISES
 -  7.1 INTRODUCTION
 - ✓  7.2 UNDESIREED AIRCRAFT STATES
 -  7.2.1 Introduction
 - >  7.2.2 General Information
 - >  7.2.3 Training Concept
 -  7.2.4 Training Items
 - >  7.2.5 Training Media
 -  7.2.6 Training Conditions
 - >  7.2.7 Training Exercises
 - >  7.2.8 Educational Approach

FCTS

Chapter 7



Training Aspects

Upset = Undesired
Aircraft State

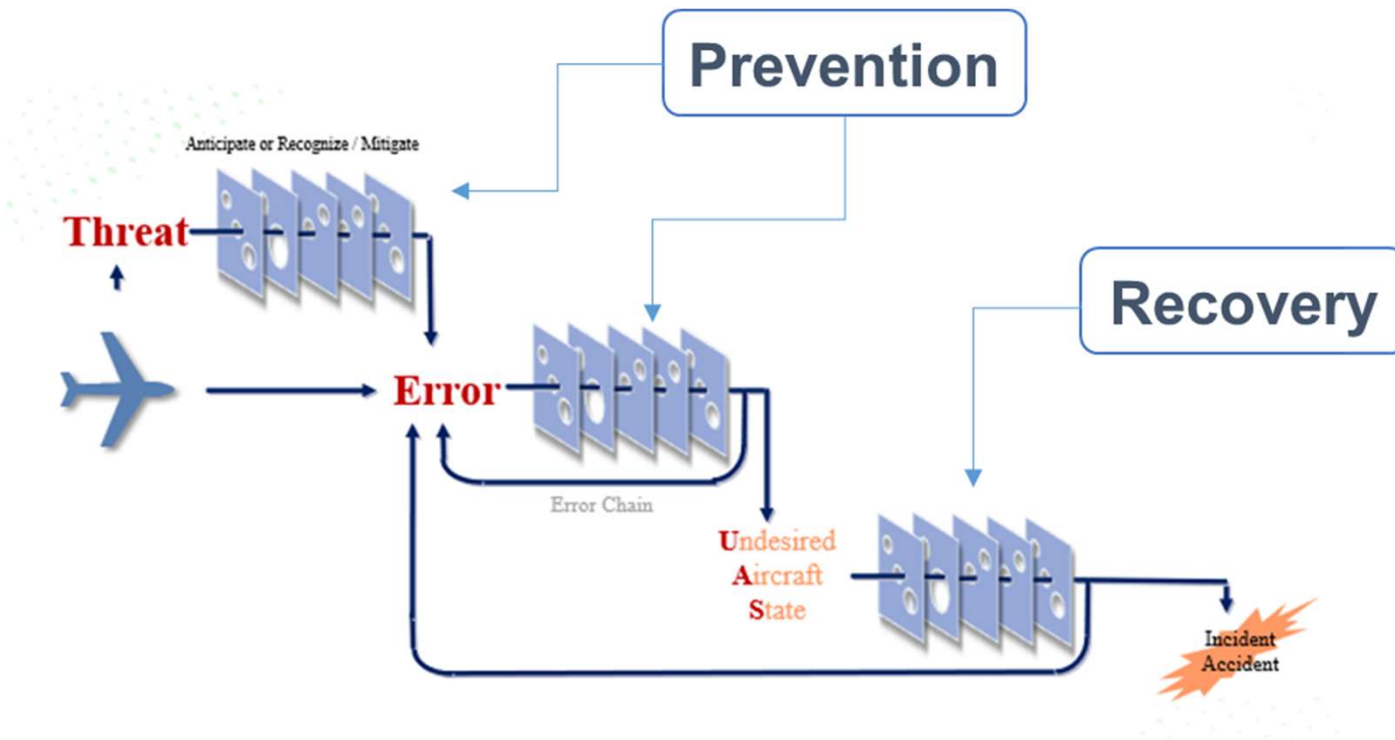


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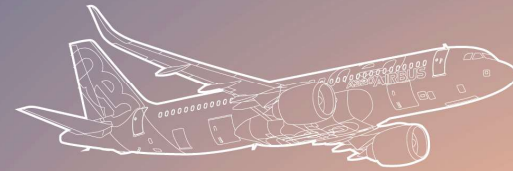
UPRT Definition

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Undesired Aircraft State



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1 – Pilot Training



AIRBUS

Aerodynamics

Causes of
Upsets

Accidents or
Incidents

G-load
Management

Energy
Management

Flight Path
Management

Active
Monitoring

Stall
Recovery

Upset
Recovery

Pilot Training

Theory



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Pilot Training

Theory

To Which Extend ?

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Flight Control
Laws

High Speeds

Low Speeds

Angle of
Attack

Energy
Management

Manual
Handling

Use of
Automation

Pilot Training

FSTD Training

- Prevention -

Nose High

Nose Low

Approach to
Stall

Full Stall*

Pilot Training

FSTD Training

- Recovery -

AIRBUS

Prevention

Recovery

Covered in a 3-Year Cycle

UPRT

Training

Frequency

AIRBUS



UPRT

Cross-Credits for
A3XX FBW

Initial (Conversion) Training



ACADEMIC TRAINING

05h00

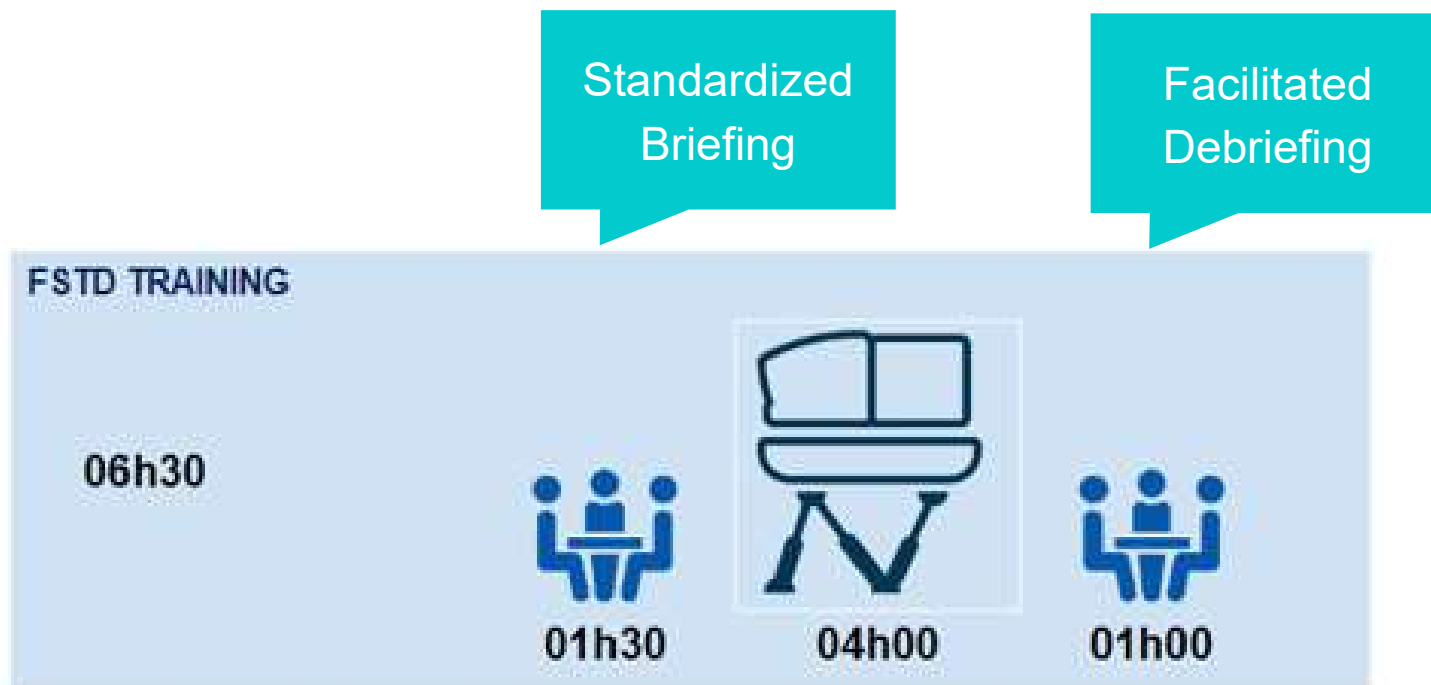


FSTD TRAINING

06h30



Initial (Conversion) Training



Standardized Briefing



FSTD TRAINING

06h30



01h30



04h00



01h00



UPRT

Training Items for
Pilots










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FLIGHT CREW TRAINING STANDARDS

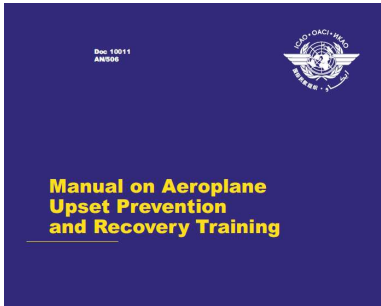


- ✓  7.2 UNDESIRED AIRCRAFT STATES
 -  7.2.1 Introduction
 - >  7.2.2 General Information
 - >  7.2.3 Training Concept
 -  7.2.4 Training Items
 - >  7.2.5 Training Media
 -  7.2.6 Training Conditions
 - >  7.2.7 Training Exercises
 - >  7.2.8 Educational Approach

FCTS

Training Items

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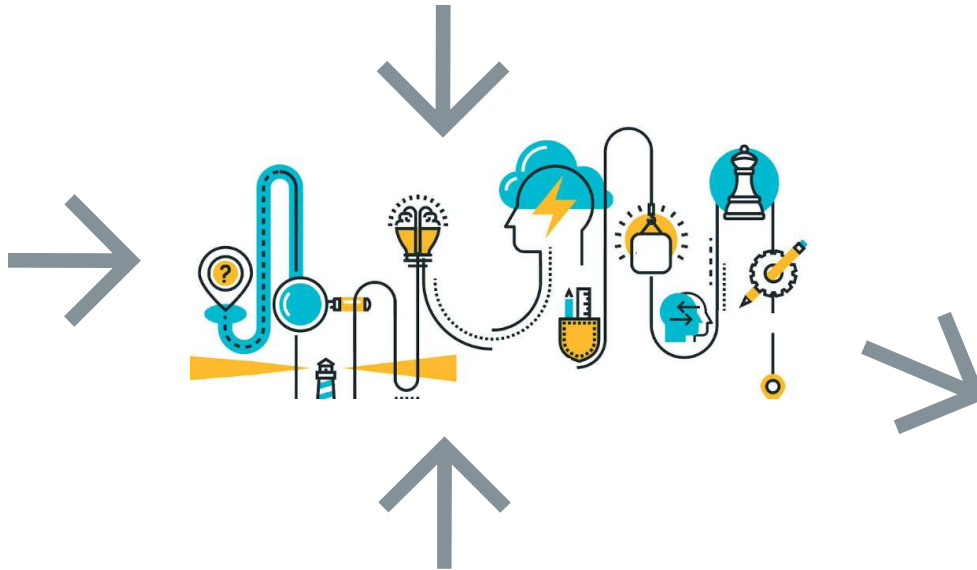


Advisory Circular

Subject: Stall Prevention and Recovery Training

Date: 1/4/17
Initiated by: AFS-200

AC No: 120-109A
Change: 1



Advisory Circular

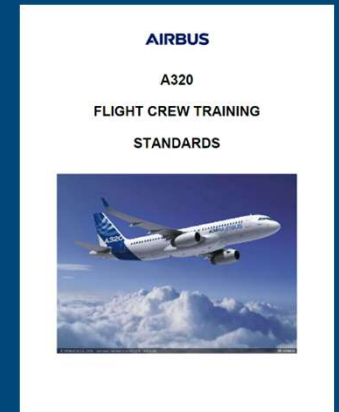
Subject: Upset Prevention and Recovery Training

Date: 1/4/17
Initiated by: AFS-200

AC No: 120-111
Change: 1

FCTS

Training Items



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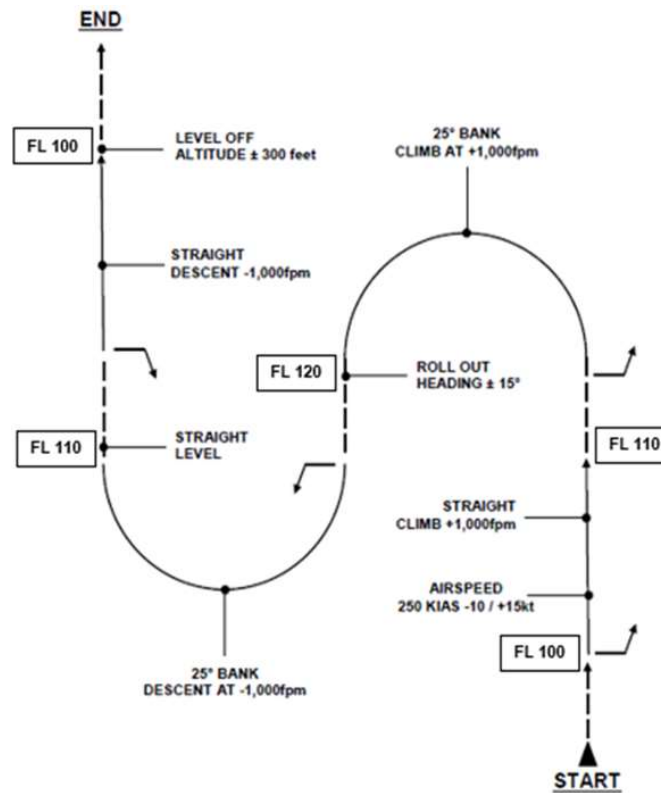
Training Objectives



UNDERSTANDS	DEVELOPS EXPERTISE	IS PROFICIENT
	<ul style="list-style-type: none">- Aerodynamic characteristics at high altitude- Aerodynamic characteristics at low altitude	<ul style="list-style-type: none">- Pitch/Thrust flying technics- Handling in all control laws- Stall recovery- Upset prevention and recovery

Sierra Pattern

- Warm-up
- Basic pitch / Thrust
- Normal Law reinforcement



Training Items

Typical Session

Items and Objectives

Steep Turns

- Basic pitch / Thrust
- Normal Law reinforcement
- G-load Effects



Training Items

Typical Session

Items and Objectives

AIRBUS

Flight Envelope Exploration

- High Speeds
- Low Speeds
- Flight Control Protections



Training Items

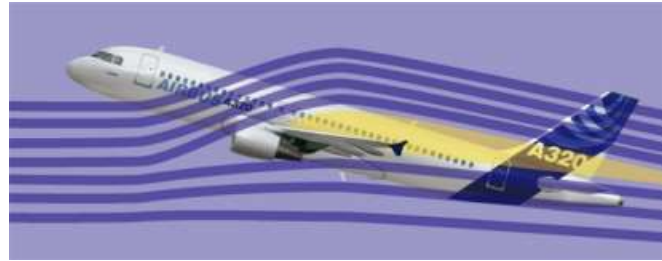
Typical Session

Items and Objectives

AIRBUS

Stall Recovery Low Altitude

- Approach to Stall
- Full Stall*



Training Items

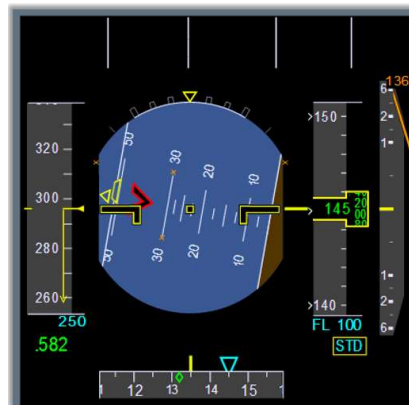
Typical Session

Items and Objectives

* Use of the IOS Automatic Stall Entry Function

Upset Recovery Low Altitude

- Visualization*
- Nose High Recovery*
- Nose Low Recovery*



* Motion OFF

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Training Items

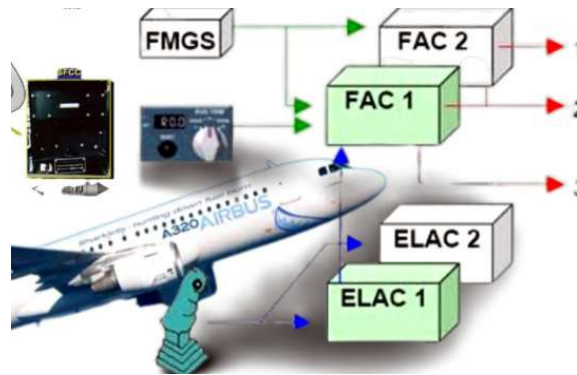
Typical Session

Items and Objectives

AIRBUS

Auto Flight System

- Engagement
- Disengagement
- Take-Over Technique



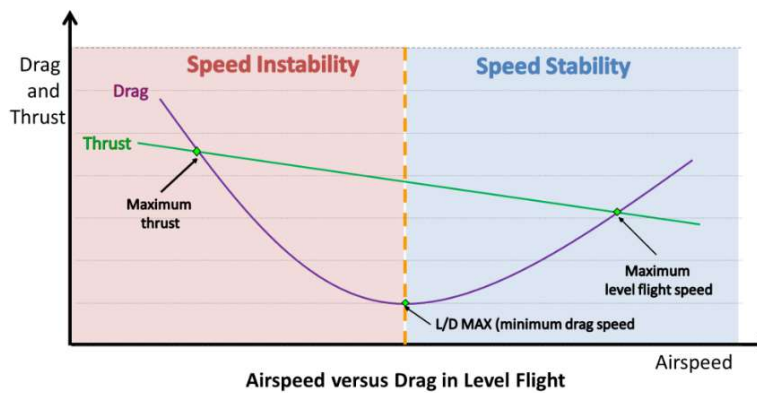
Training Items

Typical Session

Items and Objectives

High Altitude Aerodynamics

- Aircraft Manual Handling
- Energy Management
- TCAS Climb at REC MAX



Training Items

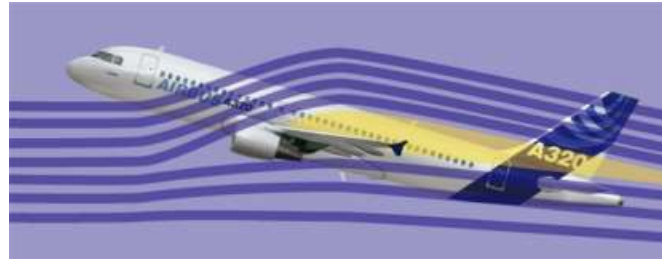
Typical Session

Items and Objectives

AIRBUS

Stall Recovery High Altitude

- Approach to Stall
- Full Stall*
- Loss of Altitude Awareness



* Use of the IOS Automatic Stall Entry Function

Training Items

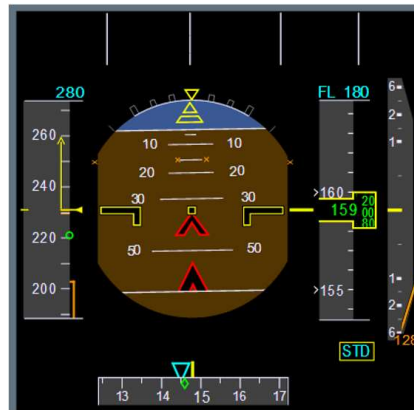
Typical Session

Items and Objectives

AIRBUS

Upset Recovery High Altitude

- Visualization*
- Nose High Recovery*
- Nose Low Recovery*



Training Items

Typical Session

Items and Objectives

* Motion OFF Except for Nose Low Recovery

Auto Flight System

- Flight Guidance Misuse
- Mode Reversions



Training Items

Typical Session

Items and Objectives

Take-off & Landing Without Automation

- Basic Pitch / Thrust Flying
- Instrument Scanning
- Active Monitoring



Training Items

Typical Session

Items and Objectives

00:15	00:06	4	NORMAL LAW: HIGH SPEED FLIGHT	HUD	FPV	AP	FD	A/THR
<p>Objective: To explore flight envelope in Normal law</p> <ul style="list-style-type: none"> ■ 1: Acceleration to VMO ■ 2: High speed protection demo <p>-----</p> <ul style="list-style-type: none"> ■ 1: At FL100 - IAS: 250 kt <ul style="list-style-type: none"> □ AP ON - FD ON - A/THR ON □ Acceleration to VMO □ Highlight that no high speed buffet is to be expected at VMO ■ 2: PF disconnects A/THR, sets CLB thrust and accelerates: <ul style="list-style-type: none"> □ High speed protection activation with AP disconnection, and frozen pitch trim □ If necessary, silent the aural warning by pressing the EMER CANC pb (Does not affect the ECAM message display) □ PF counteracts the pitch up effect with up to a full forward sidestick deflection □ Observe that the aircraft will not accelerate beyond a given speed that is below VD □ PF applies a full lateral sidestick input and observe the new bank angle limitation □ Request sidestick back to neutral position and highlight: <ul style="list-style-type: none"> ● Wings level (positive spiral stability) ● Nose up command ● Overspeed exit. ■ Return to 250 kt. 								

Training Items

Typical Session

Instructor Guidance

Pilot Assessment in UPRT

Prevention

Pilot Competencies



Recovery

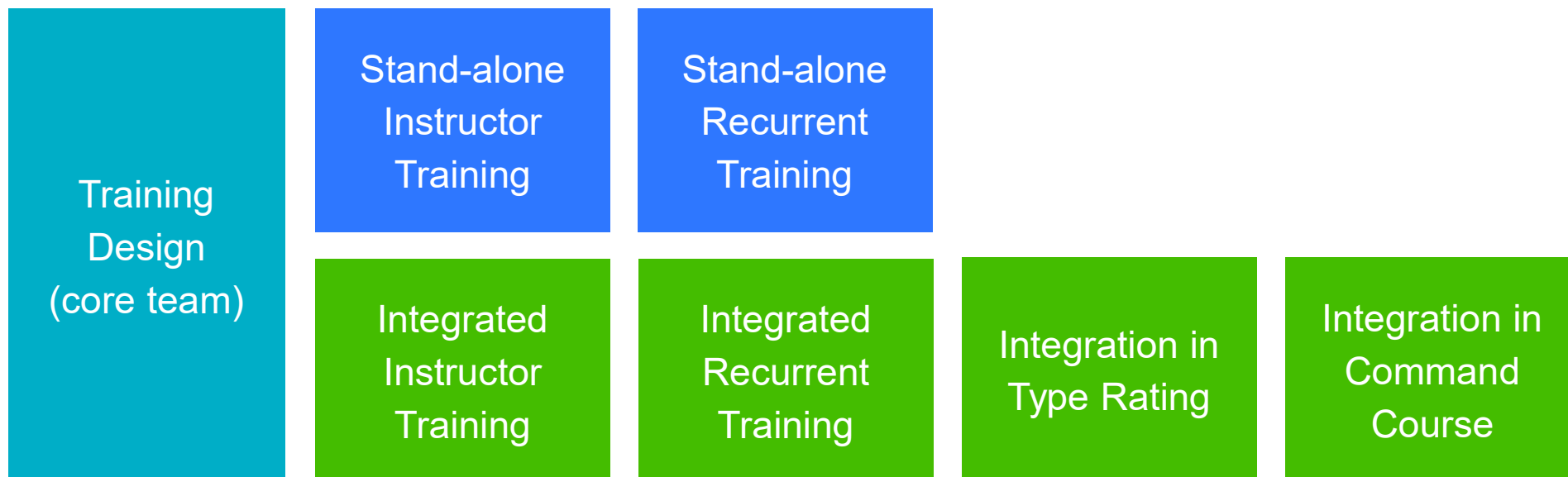
Proficiency Criteria

Recovery Techniques

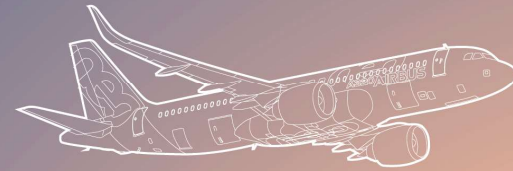
Stall

Unusual Attitudes

UPRT Implementation Strategy



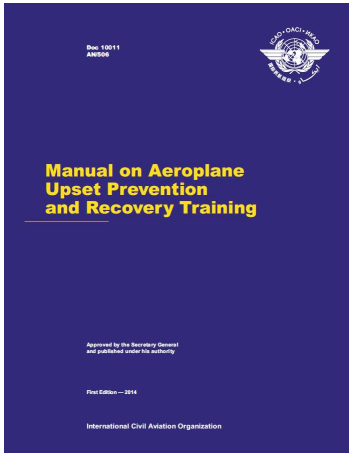
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2 – Use of FSTD



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Chapter 4
FSTD FIDELITY REQUIREMENTS FOR UPRT



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FSTDs

Avoiding Negative
Training

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CUSTOMER SERVICES DIRECTORATE
1 Rond Point Maurice Bellonte
31707 Blagnac Cedex France
Telephone + 33 (0)5 61 93 33 33

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SIMULATION PRODUCT OPERATORS TRANSMISSION - SPOT

TO: All Flight Simulation Training Device (FSTD) Operators and Training Device Manufacturers (TDMs)

SUBJECT: SimPack for Upset Prevention and Recovery Training (UPRT) and Stall Training

OUR REF: S00500102 dated 15 OCT-2019.

APPLICABLE SIMULATED AIRCRAFT/STANDARD SIMPACK: This SPOT is applicable to SimPack for the A300-600, A320 CEO and NEO, A330-200, A340-300, A340-600, A380, A350-900

Notice: This SPOT provides Flight Simulation Training Device (FSTD) operators and Training Device Manufacturers (TDMs) with recommendations on the Data Package / Simulation Software Package / Parts / Equipment, i.e. Airbus "Aircraft Simulation Products" (SimPack) used by TDMs and FSTD Operators to design/build/qualify/operate/maintain their FSTDs.

These recommendations aim to enhance the efficiency and/or safety of FSTD operations. It is each FSTD Operator's and each TDM's responsibility to use and distribute the information contained in this SPOT and to ensure application of the recommendations.

SPOT

Airbus Simulation
Product

AIRBUS



FSTD Data Package

- Compliant with FAA /EASA
- Free play capabilities
- Enhanced aerodynamic model
- Stall buffet
- Roll off

IOS Functions

- UPRT and Stall functions
- Feed-back tools

SPOT

Airbus Simulation
Product

AIRBUS










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A320

FLIGHT CREW TRAINING

STANDARDS

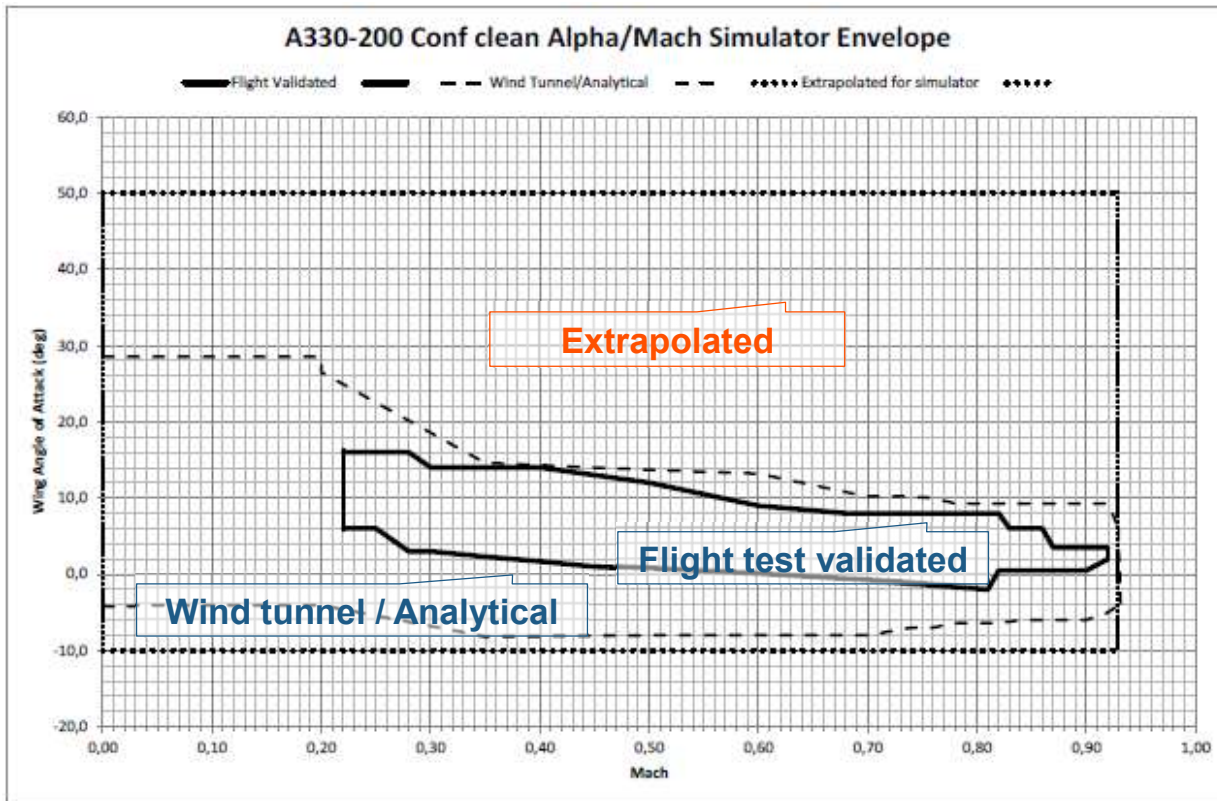


- ∨  7.2 UNDESIRED AIRCRAFT STATES
 -  7.2.1 Introduction
 - >  7.2.2 General Information
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 -  7.2.4 Training Items
 - >  7.2.5 Training Media
 -  7.2.6 Training Conditions
 - >  7.2.7 Training Exercises
 - >  7.2.8 Educational Approach

Airbus

FSTD

Recommendations

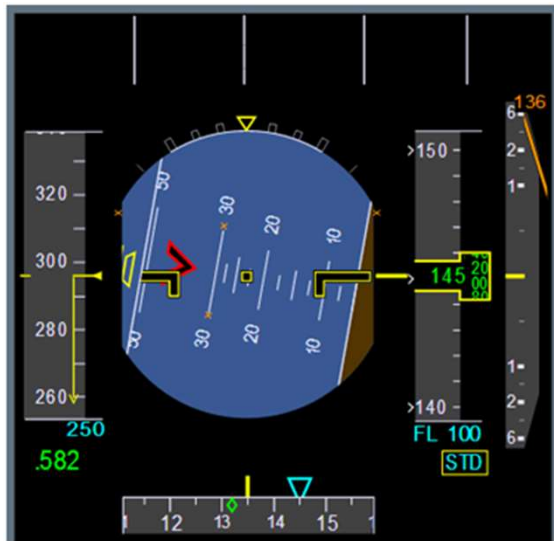


FSTD

Airbus

Recommendations

Training Envelope



Use of IOS
functions



In Seat
Instruction



Self-
Induction

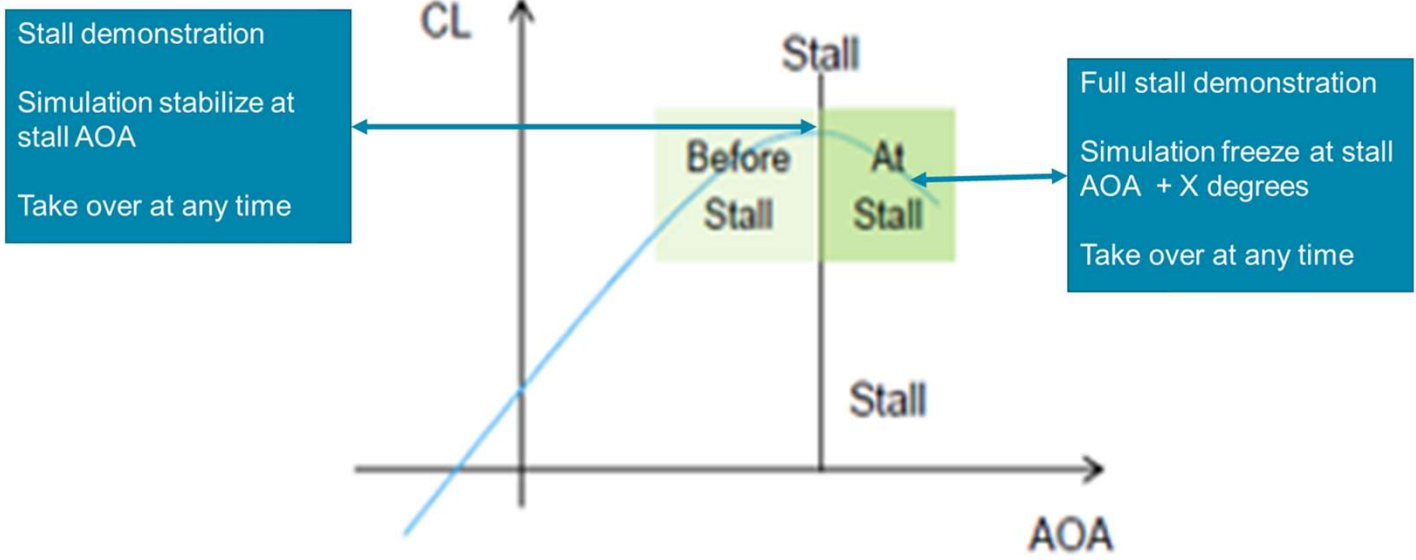


FSTD

Airbus
Recommendations

Avoiding Negative
Training - Upset

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FSTD

Airbus
Recommendations

Avoid Negative
Training - Stall

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**Use of
Motion**

Prevention



**Stall
recovery**



**Upset
Recovery**



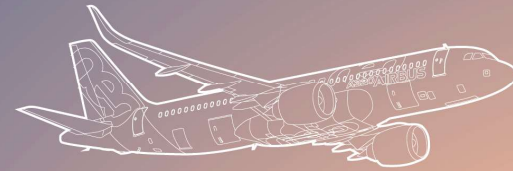
FSTD

Airbus
Recommendations

Use of Motion

AIRBUS

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3 – Instructor Training

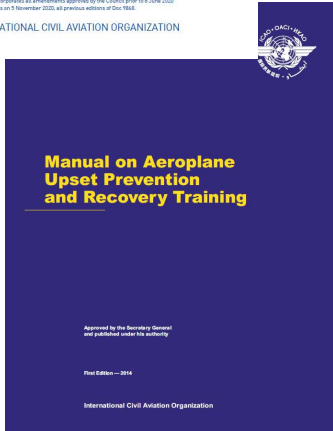


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Chapter 4.5.8



INTERNATIONAL CIVIL AVIATION ORGANIZATION



Chapter 5.2



Successful completion of an approved instructor training course

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Approved Instructor Course

AIRBUS

Table 5-1. Instructor training elements

<i>UPRT instructor training elements</i>	<i>UPRT academic instructor</i>	<i>UPRT aeroplane instructor</i>	<i>UPRT FSTD instructor</i>
Comprehensive knowledge of all applicable training elements (refer to Table 2-1)*	•	•	•
Training platforms (aeroplanes and devices)			
1) limitations of training platform		•	•
2) operation of IOS and debriefing tools			•
Review of LOC-I accidents/incidents	•		
Energy management factors*	•		

<i>UPRT instructor training elements</i>	<i>UPRT academic instructor</i>	<i>UPRT FSTD instructor</i>
Comprehensive knowledge of all applicable training elements (refer to Table 2-1)*	•	•
Training platforms (aeroplanes and devices)		
1) limitations of training platform		•
2) operation of IOS and debriefing tools		•
Review of LOC-I accidents/incidents	•	•
Energy management factors*	•	•
Disorientation	•	•
Workload management	•	•
Distraction	•	•
OEM recommendations*	•	•*
UPRT recognition and recovery strategies*	•	•
Recognition of trainee errors	•	•
Intervention strategies		
Aeroplane type- specific characteristics*	•	•
Operating environment	•	•
How to induce the startle factor		•
Value and benefits of demonstration	•	•
How to assess pilot performance using core competencies if conducting CBT (refer to the appendix)	•	•

*CEA may at its sole point develop differing guidance regarding procedures to address these areas of training which may deviate from the material provided herein. In all cases, whenever type-specific UPRT is being conducted, training organizations should provide procedural training which conforms to the appropriate aeroplane flight manual.





Training
Objectives

EASA

Instructor Course

Training Objectives

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GM5 ORO.FC.220&230 Operator conversion training and checking & recurrent training and checking

ED Decision 2019/005/R

PERSONNEL PROVIDING FSTD UPSET PREVENTION AND RECOVERY TRAINING (UPRT)

- (1) are able to demonstrate the correct upset recovery techniques for the specific aeroplane type;
- (2) understand the importance of applying type-specific Original Equipment Manufacturers (OEMs) procedures for recovery manoeuvres;
- (3) are able to distinguish between the applicable SOPs and the OEMs recommendations (if available);
- (4) understand the capabilities and limitations of the FSTD used for UPRT, FSTD training envelope;

GM5 ORO.FC.220&230 Operator conversion training and checking & recurrent training and checking

ED Decision 2019/005/R

PERSONNEL PROVIDING FSTD UPSET PREVENTION AND RECOVERY TRAINING (UPRT)

It is of paramount importance that personnel providing UPRT in FSTDs have the specific competence to deliver such training, which may not have been demonstrated during previous instructor qualification training. Operators should, therefore, have a comprehensive training and standardisation programme in place, and may need to provide FSTD instructors with additional training to ensure such instructors have and maintain complete knowledge and understanding of the UPRT operating environment, and skill sets.

Standardisation and training should ensure that personnel providing FSTD UPRT:

- (1) are able to demonstrate the correct upset recovery techniques for the specific aeroplane type;
- (2) understand the importance of applying type-specific Original Equipment Manufacturers (OEMs) procedures for recovery manoeuvres;
- (3) are able to distinguish between the applicable SOPs and the OEMs recommendations (if available);
- (4) understand the capabilities and limitations of the FSTD used for UPRT, based on the applicable FSTD training envelope;
- (5) are aware of the potential of negative transfer of training that may exist when training outside the capabilities of the FSTD;
- (6) understand and are able to use the IOS of the FSTD in the context of effective UPRT delivery;
- (7) understand and are able to use the FSTD instructor tools available for providing accurate feedback on flight crew performance;
- (8) understand the importance of adhering to the FSTD UPRT scenarios that have been validated by the training programme developer; and
- (9) understand the missing critical human factor aspects due to the limitations of the FSTD and convey this to the flight crew receiving the training.

EASA

Instructor Course Training Objectives










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FLIGHT CREW TRAINING STANDARDS



- ∨  7.2 UNDESIRED AIRCRAFT STATES
 -  7.2.1 Introduction
 - >  7.2.2 General Information
 - >  7.2.3 Training Concept
 -  7.2.4 Training Items
 - >  7.2.5 Training Media
 -  7.2.6 Training Conditions
 - >  7.2.7 Training Exercises
 - >  7.2.8 Educational Approach

Airbus

Instructor Training Recommendations

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AIRBUS
A320
FLIGHT CREW TRAINING
STANDARDS



**Principles of
Flights**

**Use and
Limitations of
FSTDs**

Human Factors

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Instructor Training
Recommendations

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FLIGHT CREW TRAINING

STANDARDS



Principles of Flights

- AOA – Critical AOA
- Mach effect on AOA
- Lift/drag curve
- Stability – PIO
- High speed flight

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Instructor Training
Recommendations

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**FLIGHT CREW TRAINING
STANDARDS**



Human Factors

- Situational Awareness
- Visual Illusions
- TEM
- Pilot Competencies

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Instructor Training
Recommendations

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Airbus UPRT – Stand-Alone Instructor Course

Pre-requisites:

- UPRT theoretical training for pilots successfully completed
- UPRT FFS session for pilots successfully completed



Ground phase:

1 day ground training:

- ✓ ½ day e-training
- ✓ ½ day classroom training

The ground training is a combination of a self-study course, classroom lecture & facilitator-led discussions.



Simulator phase:

1 day practical training:

- ✓ 1 FFS session: conduct a UPRT FFS session under supervision

Session briefing under supervision, with tutorials, followed by the FFS session under supervision & supervised debriefing.

Airbus UPRT – Stand-Alone Instructor Course

Distance Learning

- Applicable Regulations
- OEM Recommendations
- Type Specific Characteristics
- Human Factors



On-site Learning

- LOC-I review
- Pilot Assessment in UPRT
- Pilot Errors
- Benefits of Demonstration
- Limitations of FSTDs
- Surprise and Startle



Airbus UPRT – Stand-Alone Instructor Course

Practical Training: UPRT Customer Training Under Supervision

Introduction
–
UPRT Tutor

30 minutes

Session
Briefing
–
Instructor
Applicant 1

60 minutes

FFS part 1
–
Instructor
Applicant 1

2 HR

FFS part 2
–
Instructor
Applicant 2

2 HR

Session
debriefing*
–
Instructor
Applicant 2

60 minutes

Conclusion
–
UPRT Tutor

30 minutes

Take-Away for Pilots

UPRT - Key elements for **Pilots**

Application of Airbus Golden Rules strongly contributes to upset prevention.

Active monitoring is an effective countermeasure against the startle effect.

At high altitude, proceed with small control inputs.

The Primary Flight Display (PFD) is the primary instrument to recover from upset and from stall.

For stall recovery, reduce the angle of attack.

In case of upset, become aware of the situation before taking appropriate actions.



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Take-Away for Instructors



UPRT - Key elements for **Instructors**

Always deliver UPRT in a spirit of collaborative learning so that success is possible.

Do not assume the knowledge of trainees on UPRT. Check it out!

Do not use an FSTD beyond its capabilities. Remain in its training envelope.

Always adhere to validated UPRT scenarios.

In maneuver training, always train up to proficiency.

Always avoid negative training and do not induce unnecessary startle.

Fear-potentiated startle may induce a full stress reaction in operations.



Thank You

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