



C Series

UPRT (Upset Prevention & Recovery Training)

Background Information

- Loss of Control Inflight (LOC-I) has been the number one cause for aircraft accidents during the last decade. Mitigating LOC-I occurrences has therefore become the highest priority in aviation agencies' rule making efforts. Aircraft manufacturers, airlines, aviation authorities, various safety boards and training organizations (including Lufthansa Aviation Training) have joined forces to develop appropriate documentation to support the implementation of respective training programs.
- On a worldwide level ICAO has recently amended Annex 1 addressing license- & type rating courses and Annex 6, which contains new training requirements for AOC holders. ICAO Doc 10011 "Manual on Aeroplane Upset Prevention and Recovery Training" is the main guidance material.
- To turn ICAO regulations into binding law, in 2015 EASA has issued an NPA (Notice of Proposed Amendment) regarding Part-FCL trainings to include UPRT in all pilot training courses as of April 2018. Furthermore an EASA ED (Executive Director) Decision was published in 2015 to include UPRT in all AOC holder trainings as of May 04, 2016.
- In June 2015 IATA published the first edition of its "Guidance Material and Best Practices for the Implementation of Upset Prevention and Recovery Training".

Objectives of UPRT Courses or Elements

General	The objective of the UPRT is to help flight crews to acquire the required competencies to prevent or recover from a developing or developed airplane upset. Prevention training prepares flight crews to avoid incidents whereas recovery training prepares flight crews to prevent an accident once an upset condition has occurred.
Human Factors	Threat and Error Management (TEM) and Crew Resource Management (CRM) principles will be integrated into the UPRT. In particular, the surprise and startle effect and the importance of resilience development will be emphasized.

FTA's Full-Flight Simulator is ready for UPRT



The level D Full Flight Simulator of FTA can be used for UPRT without the requirement of technical updates or additional certifications.

List of Aircraft Types

- C Series CS100 and CS300 (BD-500)

UPRT Courses

- UPRT-Trainer Course** Only available as “Wet training”, meaning theoretical training and practical training delivered by FTA’s local ATO.
- Theoretical Training Trainer Course and integrated in pilot training** A comprehensive self-learning WBT/CBT program covering all relevant academics. It is part of the **Trainer Course** combined with practical training, or can be purchased as “stand alone” product to **enhance practical UPRT pilot training**, e.g. for UPRT training modules in recurrent trainings.
- Practical Training Trainer Course** A 4 hours simulator sessions concludes the UPRT Trainer Course (2 trainers). This course enables customer’s instructors to act as UPRT trainers in (mandatory) UPRT modules of recurrent training.

 Compared with UPRT Trainer Courses UPRT pilot training is always integrated into other training courses (e.g. recurrent training or type rating courses) and in this format not available as “stand alone” product. If a customer wishes to perform UPRT pilot training as a “stand alone” training a customized training program has to be elaborated.

UPRT Trainer Course

- This course includes theoretical training and practical training in the full flight simulator. Theoretical training includes FTA’s local ATO UPRT WBT/CBT and an extended briefing before the FFS-mission, offering discussions regarding:
- FSTD limitations. Are there certification limits for an aircraft or an FSTD regarding pitch and bank?
 - The simulator’s “Validated Training Envelope” (VTE). Valid Alpha- and Beta-angles and combinations.
 - Stall: respect that the VTE is restricted to the critical Alpha. Consequently, no stall exercises beyond AOA crit.
 - Simulator’s motion fidelity. G-loads.
 - How to generate flight crew resilience.
 - Risk of negative training and negative transfer of training. How to avoid it.
 - “Standardized” exercises versus surprise and startle.

Practical training is performed in a 4 hours FFS-session for a team of maximum 3 instructors to be trained. It offers exercises in either pilot seat and includes hints for skillfully handling the simulator’s IOS (Instructor Operating Station) to achieve efficient UPRT.

Theoretical Training

The UPRT WBT/CBT program is accessible via FTA’s local ATO or customer’s LMS (learning management system). The program, which lasts about 90 minutes, will cover following topics, always including a final questionnaire:

Threats and errors causing upsets	<ul style="list-style-type: none"> The ever-present “rain of threats” Summary of causes and contributing factors: <ul style="list-style-type: none"> Environmental Pilot-induced Airplane and systems Combination TEM to prevent and recover from upsets Questions 	The airplane at work	<ul style="list-style-type: none"> Understanding the AOA The critical AOA – and understanding it – and where to see the margin to it Critical AOA and configuration Stall / stall speed Stall recovery; the magic “push to unload” The “powerful” rudder Certification limits Questions 	How the airplane talks to you	<ul style="list-style-type: none"> High AOA High-speed Mach-buffet Flight control responses Airplane stability Questions
Energy management	<ul style="list-style-type: none"> Energy management High altitude operation Cruising speeds Questions 	Recovering from upsets	<ul style="list-style-type: none"> Stall Recovering from nose-high upsets Recovering from nose-low upsets Questions 	Human factors	<ul style="list-style-type: none"> Flight-crew resilience Stress-response (surprise and startle) Counter-intuitive actions Deviation from 1G CRM Questions

Practical Training

- FTA's local ATO 4 hours simulator part of the UPRT Trainer Course includes these practical exercises

Lesson	Main Goal	Content	Typical Exercise & Training Objectives
①	Prevention	Advanced manual flying skills low ALT	<ul style="list-style-type: none"> Roll with full aileron to 60° bank; neutralize controls Experience roll-rate performance FBW: different control laws; point out differences Effects of AFT CG versus FWD CG Initiate turns with rudder only (15° bank); neutralize controls Experience magnitude of yaw and roll; compare effectiveness of rudder vs aileron
②	Prevention	Advanced manual flying skills high ALT AOA and G-awareness medium ALT	<ul style="list-style-type: none"> Optimum cruising speed versus turbulence penetration speed High- and low-speed buffet limits; what to see on PFD FBW: different control laws; point out differences Effects of AFT CG versus FWD CG Type-specific systems that use AOA inputs with emphasis on warning systems and their limitations Level turn with 45° bank; experience increase/decrease of V_S with varying G-load; G-load and not bank angle increases V_S; separate G-load from bank Load and unload the aircraft by elevator inputs; "Play" with V_S
③	Recovery	Recovering from Upsets different ALT	<ul style="list-style-type: none"> Typical exercises are: pitch +40°/-20°; bank +/-60° Apply the OEM recommendations, apply correct control inputs Deliberately separate "push/unload" from "roll" Control thrust at the correct time during recovery Develop ability to apply counter-intuitive control inputs in situations affected by surprise and start

- On request of the customer these three sets of exercises can be integrated into the standard three-years recurrent training and checking cycle (one lesson per year), or can be integrated in a customized UPRT pilot training. Studying UPRT WBT/CBT has to be integrated in such a training and is vital for successful training.