

UPRT & LOC-I SEMINAR

JOHANNESBURG, SOUTH AFRICA

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**CIVIL AVIATION
AUTHORITY**

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OVERVIEW

1. SACAA MANDATE / FUNCTIONS
2. UPRT SA CATS 2017
3. SAA UPRT TRAINING PROGRAMME
4. THE SIMULATOR EXERCISES
5. AURTA TRAINING EXERCISES
6. COMAIR UPRT PROGRAMME



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SACAA MANDATE

MANDATE (CONTEMPORARY TRANSLATION)

“Regulating the civil aviation industry to ensure security and safety by complying with the International Civil Aviation Organization (ICAO) SARPs, taking into consideration the local context.”

OBJECTIVES OF THE CIVIL AVIATION ACT NO 13, 2009

- a) Control, regulate and promote civil aviation safety and security;
- b) Oversee the implementation and compliance with the National Aviation Security Program;
- c) Oversee the functioning and development of the civil aviation industry;
- d) Develop any regulations that are required in terms of this Act; and
- e) Monitor and ensure compliance with this Act and the Convention.
- f) Promote civil aviation safety and security;

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UPRT SA CATS 2017

Upset prevention and recovery training (UPRT)

1. The UPRT is applicable to crew members, with the purpose being to assist in combating Loss of Control in Flight (LOC-I).
2. A UPRT training programme shall be structured in such a way that upon completion, the crew is able to demonstrate:
 - (a) Knowledge of UPRT concepts and procedures; and
 - (b) Skills necessary to properly respond to LOC-I situations.
3. There are no formal UPRT evaluation requirements for flight testing and examination. A UPRT instructor shall accomplish evaluation of UPRT objectives during training.

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UPRT SA CATS 2017 : continued

4. UPRT initial training may be provided as a stand-alone module of ground and flight training.
5. An operator may contract with another operator, or with an ATO approved to operate an aeroplane for instrument flight instruction, to provide the UPRT initial training to its flight crew.
6. An operator shall certify in the pilot's file that the UPRT training and checking has been accomplished to a satisfactory standard.

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UPRT SA CATS 2017 : continued

7. UPRT training shall be consist of:

- a) Initial training. This training shall comprise theoretical knowledge and flight instruction for the issuance of license shall include upset prevention and recovery training. The flight instruction shall include on-aeroplane training;
- b) Recurrent training. A UPRT refresher course must be provided at least once each 36 month period.
- c) Renewal training. A pilot completes UPRT renewal training when:
 - i. A UPRT instructor certifies in the pilot's logbook that the pilot has completed UPRT renewal training conducted by the operator as part of its approved training programme, or by an ATO approved to operate aircraft for instrument flying training; or

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UPRT SA CATS 2017 : continued

- ii. an authorised officer, inspector or authorised officer certifies in the pilot's logbook that the pilot has completed UPRT renewal training required by the Director;

d. UPRT cyclic training –

- i. A pilot completes a session of UPRT cyclic training when an instructor certifies in the pilot's logbook that the pilot has successfully completed such a training session.
- ii. A pilot is deemed to have completed –
 - (aa) UPRT initial training on the first occasion that the pilot completes a session of UPRT cyclic training; and
 - (bb) UPRT renewal training on the second or subsequent occasion that the pilot completes a session of UPRT cyclic training.

UPRT SA CATS 2017 : continued

A check pilot is deemed to have completed UPRT renewal training when the check pilot conducts UPRT cyclic training.

8. An air service operator shall comply with the following UPRT training programme requirements –
 - a) Each UPRT curriculum shall ensure the equipment manufacturer's recommended training and testing requirements are carried out in the manner prescribed by such manufacturer; and
 - b) A pilot's ability to demonstrate system and procedural concepts shall be included in the initial, recurrent and where applicable, the regaining competency testing.

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UPRT SA CATS 2017 : continued

9. Prior to providing instruction on UPRT, an instructor shall
 - a) Undergo specific UPRT instructor training prior to providing UPRT to crew members;
 - b) Be trained and qualified to conduct training in the FSTD or aircraft;
 - c) Understand the capabilities and limitations of the FSTD, to avoid negative transfer of training;
 - d) Hold a certificate and rating in the category, class and type of aircraft for which they are training; and
 - e) Have operational experience on type.

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UPRT SA CATS 2017 : continued

10. Simulator utilized for UPRT training. The motion limitations for each specific FSTD used for UPRT shall have the potential to introduce negative transfer of training. The simulator shall be –
- a) Approved by the Director to provide UPRT;
 - b) Updated to meet the latest industry simulator standards for UPRT;
 - c) Be able to provide proper cues; and
 - d) Only be used within the capabilities of the aerodynamic model.

UPRT SA CATS 2017 : continued

11. Aircraft used to deliver UPRT training shall meet the following requirements –

- (a) It shall provide a margin of safety for the manoeuvring to be performed;
- (b) It shall have an all-attitude or all-envelope capability.

[Section 15A inserted by the SA-CATS 3/2017 w.e.f. 17 June 2017.]

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SAA UPRT PROGRAMME



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THE STATUS OF SAA'S UPRT TRAINING PROGRAMME



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- Ten (10) SAA Instructors have received advanced UPRT from APS at their facilities in Arizona and The Netherlands in 2012-2014.
- All pilots at SAA have completed an Initial 6 hour UPRT training course in 2015.
- Recurrent training is now taking place once a year as part of a 4-hour simulator session in 2016 and 2017.

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THE STATUS OF SAA'S UPRT TRAINING PROGRAMME

The Pre-Simulator Briefing consists of a review of:

- Preparatory Considerations for Simulator Integration
- Defining the Loss of Control in-Flight Threat
- STARTLE
- Stall Tactics
- Simulator Stall Training Requirement
- High Altitude Aerodynamics
- L/D Max
- Crossover Altitude
- Optimum Altitude
- Optimum Climb Speed Deviations
- Thrust Limited Condition and Recovery



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THE STATUS OF SAA'S UPRT TRAINING PROGRAMME

- Maximum Altitude
- Manoeuvrings Stability
- V-n Envelope
- Summary of Airbus Flight Control Laws:
- Our UPRT Service Providers
- The APS All Attitude Upset Recovery Strategy



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THE SIMULATOR EXERCISES



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HANDLING EXERCISES – PERFORMANCE EVALUATION:

- Ex 1 - Roll rate with full aileron/spoiler input
- Ex 2 - Roll rate with rudder input
- Ex 3 - Pitch change using stabilizer trim only
- Ex 4 - Pitch change with the use of thrust adjustments
- Ex 5 - Pitch change with the use of speed brake
- Ex 6 – Yaw motion and resultant roll due to asymmetric thrust in normal law without AP
- Ex 7 – Yaw motion and resultant roll due to asymmetric thrust in direct law without AP
- Ex 8 – Approach to stall recovery using only pitch control

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SIMULATOR EXERCISES (continued)



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- These pre-exercise preparation events are flown with the pilot-in-training at the controls.
- The intent is to allow the pilots to gain confidence in their ability to fly the aircraft when it is outside of its normal flight regime.
- This preparation provides the opportunity for pilots to develop recovery decision-making skills and become familiar with the use of operator procedures.
- This in turn prepares the pilot for completing the nose-high and nose-low AURTA training exercises:

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AURTA TRAINING EXERCISES

Exercise 1: Nose High Characteristics

Iteration 1: Use of Nose-down Elevator

Iteration 2: Use of Bank Angle

Iteration 3: Thrust reduction on Underwing Mounted Engines

Review of the APS All Attitude Upset Recovery Strategy

Exercise 2: Nose – Low Characteristics

Exercise 2 – Iteration 1:
Nose low Recovery

Exercise 2 – Iteration 2:
Accelerated Stall Demonstration

Exercise 2 – Iteration 3:
Exercise Management

Exercise 3 – AC120-109

Recovery from Upset After Take Off

Exercise 4

Unreliable Airspeed after Take Off (LOFT)

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AURTA TRAINING EXERCISES

Exercise 5

Approach to Stall in Landing Configuration (LOFT)

Exercise 6: Inadvertent Alpha Floor Activation at LOC intercept

During recovery practice, the student will experience three nose-high and two nose-low aircraft upsets. Each of these manoeuvres requires the pilot to return the aircraft to a normal flight condition.

The expectation is that the student learns to manage the energy, arrest the flight path divergence, and recover to a stabilized flight path. A few random nose high and nose-low exercises may be given after the training manoeuvres

The nose-high recovery will be set up so that a 30-deg nose-up condition is reached. For the nose-low recovery, at least a 20-deg nose-low attitude will be reached. In all cases the instructor will attempt to maintain the aircraft within the fidelity of the simulator motion and capability.

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COMAIR UPRT PROGRAMME



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COMAIR UPRT ROADMAP 2017



- Unique Requirements
 - Dealing with Internal Needs
 - Dealing with Third Party Needs
 - Establishing a Common Baseline
- Challenges
 - Learner Knowledge of Aerodynamics
 - Varying Standards from Different CAA's/DGCA's
 - Time availability for Meaningful Training
 - Frequency of Training of Third Party Customers
 - Cost Drivers
- Opportunities
 - Simulator Facilities within South Africa
 - Collaborative Arrangements – CAA/SAA/Comair

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COMAIR UPRT ROADMAP 2017



- **Progress Report – Phase 1**
 - Establish a Baseline of High Altitude Aerodynamics ✓
 - High Altitude/Performance Aerodynamic Syllabus ✓
 - Development of Academic Element for UPRT ✓
 - Causes, Flight Fundamentals and Recovery

- **Progress Report – Phase 2**
 - Development of Training Material ✓
 - Development of Training Syllabus ✓
 - Training of Core Element of 4-5 Instructors – May 2018
 - Syllabus as proven and discussed above by SAA
 - Training of Simulator Instructors – Dec 2018

COMAIR UPRT ROADMAP 2017



- **Progress Report – Phase 3**
 - ❑ Aeroplane training – (impractical) ✓
 - ❑ Gathering OEM Recommendations for UPRT ✓
 - ❑ OEM FFS/FTD/FSTD Training Recommendations
 - ❑ Understanding FFS/FTD/FSTD Envelope Limitations
 - Valid Training Envelope (VTE) of the device in use
 - Specific UPRT-related functionality of the (IOS)
 - Distinguishing between generic UPRT strategies and OEM specific recommendations with respect to their relevance to the device capabilities and limitations
 - Understanding the importance of adhering to the UPRT scenarios that have been validated by the training programme developer during the lesson.

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COMAIR UPRT ROADMAP 2017



- Progress Report – Phase 4
 - Investigation into extracts from current FFS/FTDs
 - New Comair FFS's to feature IOS feedback to instructors

According to ICAO as per section 6: “...CAAs should view UPRT as purely a train-to-proficiency programme designed to achieve end-state objectives. Accordingly, CAAs should **not** invoke direct testing requirements on the trainee as part of their oversight process.”

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COMAIR UPRT ROADMAP 2017



3.1 Academic training development

3.2 Practical training

- 3.3.1 Aeroplane training
- 3.3.2 FSTD training
 - 3.3.2.1 Overview
 - 3.3.2.2 Non-type-specific FSTD training
 - 3.3.2.3 Type-specific FSTD training

3.3 OEM recommendations—FSTD training scenarios

- 3.4.1 Overview
- 3.4.2 Recommended training sequences

3.4 OEM recommendations —upset recovery techniques.

I will try and answer your question in terms of our “road map” in developing our training as best I can.

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COMAIR UPRT ROADMAP 2017 (continued)

First Step

- To identify what an Upset was.
- The definition according to ICAO is: ***Aeroplane upset***. *An airplane in flight unintentionally exceeding the parameters normally experienced in line operations or training.*

Second Step

- To build a power point presentation on the theory behind upset, based on the ICAO supplied comprehensive document on the theory.
- The ground school covers the following three main topics; they are **Causes, Flight fundamentals and Recovery**.

Third Step

- To develop a flying training syllabus. Firstly for dedicated instructors, namely academic and FSTD instructors

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COMAIR UPRT ROADMAP 2017 (continued)

Fourth Step

- To develop a syllabus for the UPRT.
- This syllabus, depending on what our specific needs are with Internal vs External in terms of aircraft specific or non-specific, would have to be developed with the fact in mind that we don't do "On Aircraft Training" but training on a FSTD.
- It is therefore important to train the Simulator Instructors to effectively deliver the course material and that this training should focus on the following:

A

Understanding the capabilities and limitations of the specific FSTDs used for UPRT;

B

Understanding the valid training envelope (VTE) of the device in use and the appreciation for the potential of negative training that may exist when training beyond the boundaries of this VTE;

C

Specific UPRT-related functionality of the Instructor Operating Station (IOS) and other tools;

D

Distinguishing between generic UPRT strategies and OEM specific recommendations with respect to their relevance to the device capabilities and limitations; and

E

Understanding the importance of adhering to the UPRT scenarios that have been validated by the training programme developer during the lesson.

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COMAIR UPRT ROADMAP 2017 (continued)

- There should not be any testing done on UPRT because that would be in contradiction with the UPRT training philosophy according to ICAO as per section 6: “...CAAs *should view UPRT as purely a train-to-proficiency programme designed to achieve end-state objectives. Accordingly, CAAs should **not** invoke direct testing requirements on the trainee as part of their oversight process.*”

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