CAMiGUiN AViATiON

On-Airplane UPRT

For Pilots

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INTRODUCTION

The Camiguin Aviation On-Airplane Upset Prevention and Recovery Training program (CamAv OA UPRT) emulates established training scenarios presented in the following industry publications while at the same time introducing physiological (G-forces) and psychological (startle) elements:

- ICAO (2008). *Manual on Aeroplane Upset Prevention and Recovery Training (Doc 10011).*
- Upset Recovery Industry Team (2008). *Aeroplane Upset Recovery Training Aid Rev. 2 (AURTA).*
- ICAO, Airbus, ATR, Boeing, Bombardier, Embraer (2017). *Aeroplane Upset Prevention and Recovery Training Aid, Rev. 3 (AUPRTA).*
- CAA Philippines (2018). *Philippine Civil Aviation Regulations, Parts 2, 3 and 8.*

ON-AIRPLANE UPRT PROGRAM

CamAv OA UPRT follows a *Training-to-Proficiency* approach (ICAO Doc 10011, Sec. 1.3.6, 2.1.3) in lieu of the traditional 'checkbox-done-that' testing approach (ICAO Doc 10011, Sec. 2.2.3). The goal is to produce pilots that can deal with upset scenarios under the potentially incapacitating effects of startle and G-forces.

Training Aircraft

CamAv OA UPRT utilizes the aerobatic-certified American Champion Super Decathlon 8KCAB and Cessna Aerobat A150K. Using aerobatic aircraft is required by regulation, ensures safety and opens up a greater range of training manoeuvres (ICAO Doc 10011, Sec. 3.3.1.2).

Startle and G-Forces

Startle is minimized by teaching students to engage and be aware of the airplane's energy state and flightpath (AUPRTA, Rev. 3, Sec. 7.2.1). Startle can further be minimized by removing *fear-of-the-unknown*. For that purpose, students will be exposed to specific flight-envelope extremities that build confidence and trust in an airplane's aerodynamic capabilities. In addition to +G forces, pilots will experience the uncomforting sense of 'being negative' and the physiological/psychological aspects that come with it.

Minimizing Negative Transfer of Training

Emphasis is placed on training within the extended flight envelope of commercial airliners. However, this flight envelope might, at the discretion of the OA UPRT instructor, be exceeded to emphasize specific training elements. To minimize negative transfer of training at such times (CAAP, PCAR 2, Sec. IS 2.3.3.3, App. C) the OA UPRT instructor will discuss with students relevant points, for example:

- Most aerobatic airplanes initiate stall recovery by simply 'unloading' the controls; commercial jet airliners, however, require an additional 'forward nudge' on the stick (nose-down input) to recover.
- Aerobatic airplanes withstand G-loads such as (+6G to -5G) or higher, while commercial airliners operate within (+2.5G to -1G).
- Aerobatic airplanes are flown with more aggressive rudder inputs than commercial airliners.
- The initial procedure during upset recovery in a commercial airliner is to turn OFF the auto-throttle and auto-pilot, both of which aerobatic airplanes do not have.
- In aerobatic airplanes, pilots use their index finger to 'fly or feel' the angle of attack (AoA). In airliners, pilots utilize the digital AoA meter in conjunction with the index finger.

ACADEMIC TRAINING

CamAv OA UPRT Academic Training focuses on the elements that are important to preventing an airplane from being upset and recovery techniques available for returning an airplane to the normal flight regime.

Core Elements
A. Causes of Airplane Upsets
Environmentally-Induced Airplane Upsets
Systems-Anomalies-Induced Airplane Upsets
Pilot -Induced Airplane Upsets
Misuse of Airplane Automation
B. Flight Fundamentals for Pilots
Flight Dynamics
Energy States
Aerodynamic Flight Envelope
Aerodynamics
Airplane Performance
Icing
Automation
Engine Flameout
C. Recovery from Airplane Upsets
Situational Awareness of an Airplane Upset
Miscellaneous Issues Associated with Upset Recovery
Airplane Upset Recovery Techniques
- End -

The following academic training modules provide classroom instructors various means to teach the previously mentioned core elements.

Training Module	*Method of Presentation*
Training Guide to On-Airplane UPRT	*Student Self-study and/or Classroom Discussion*
UPRT Classroom Session	*Instructor Briefing*
Videos	*Classroom Activity*
Test Questions	*Written Examination for the students*
- End -	

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ON-AIRPLANE UPRT EXERCISES FOR PILOTS

Aircraft Handling Characteristics *(Objective: to introduce the aircraft and the concept of 'flying by feel')*	
	Trainee Mistakes
Exercise 1: **Rolling, yawing, pitching**	Control inputs not decisive enough or too abrupt. No UP rudder causing nose to drop and an increase in airspeed.
Exercise 2: **60° banking turn**	No nose-up nudge prior to roll. Abrupt/no application of rudder.
Exercise 3: **Rolling hands-off using rudder**	Rudder inputs too strong. **Startles** during steep nose-up attitudes anticipating a stall.
Exercise 4: **Experience - Simple Aileron Roll**	Looks only ahead instead of outside in all directions.
Nose-High Recovery Exercises ***(Objective: to teach recovery from upsets that cause the aircraft to pitch up)***	
	Trainee Mistakes
Exercise 1: **Lowering nose using PITCH**	Does not announce 'Nose High' or 'Auto-Pilot/Throttle OFF'. Weak, delayed control inputs. Does not realize nose is pitching up until airplane is pitched 90°.
Exercise 2: **Lowering nose using ROLL**	Too much roll entering Spiral Dive. Too little roll into stall.
Exercise 3: **Lowering nose using YAW**	Abrupt rudder application, stressing vertical stabilizer and leading to Spiral Dive. Indecisive rudder application loosing airspeed (not really a problem).
Exercise 4: **Stall Recovery**	Due to prior training, trainee is tense before/during recovery, focuses too much on **altitude loss** and possibly **startles**. Does not RELEASE, NUDGE, LEVEL, PULL. Exit speed too low, entering a **secondary stall**. Does not recognize spin onset.
Exercise 5: **Stall with late recovery into high G**	Pulls early into **secondary stall**.
Exercise 6: **Stall with early recovery into Secondary Stall**	Pulls too late having to bleed-off too much airspeed.
Exercise 7: **Stall with Incipient Spin**	Trainee **startles** and does not release resulting in developed spin.
Exercise 8: **Wing-Over**	Pilot does not trust airplane's aerodynamic capabilities and heavily controls it at the top without **unloading**.
Nose-Low Recovery Exercises ***(Objective: to teach recovery from upsets that cause the aircraft to pitch down)***	
	Trainee Mistakes
Exercise 1: **Lifting nose using PITCH**	Does not announce 'Nose Low' or 'Auto-Pilot/Throttle OFF'. Control inputs not decisive or too abrupt. Wings not level prior to pull-up. Slow recovery and airspeed approaching V_{ne}.
Exercise 2: **Banking past 60°**	**Startle.** Wings not rolled to level before pulling nose up. Failure to roll back the shortest route. Student 'pulls through' into a Split-S approaching V_{ne}.
Exercise 3: **Spiral Dive Recovery**	**Startle**. Wings not rolled to level prior to pulling nose up.

- End -