



ICAO LOC-I SYMPOSIUM STALL & UPRT IMPLEMENTATION

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➤ STALL & UPRT IMPLEMENTATION



- Regulatory Requirements – ICAO, FAA & EASA
- UPRT Training Programs & Objectives
- FSTD Updates & Limitations



FAA GUIDANCE & REGULATIONS ON UPRT



➤ **FAA Final Rule RIN 2120-AJ00**
Qualification, Service, and Use of Crewmembers and Aircraft Dispatchers



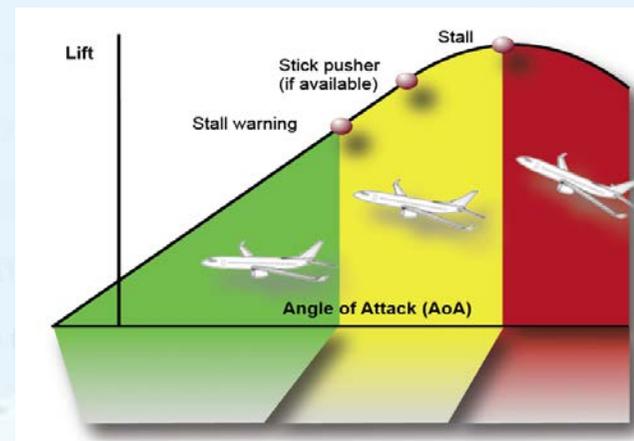
✈ **Requires Part 121 Air Carriers to provide UPRT**

✈ **SNPRM May 2011**

✈ **Public Comment Period 120 Days**

✈ **Final Rule Published November 2013**

✈ **Effective January 2019**



➤ FAA Part 60 Change 2 NPRM



- ✈ Initiated to address FSTD Fidelity
 - ✈ Addresses:
 - ✈ Full Stall Simulator Evaluation Criteria
 - ✈ Upset Prevention & Recovery Training
 - ✈ Enhanced Airborne Icing Modeling
 - ✈ Published Latter part of 2014
 - ✈ Change 2 rule to be published in time to allow operators to modify and evaluate FSTDs to comply to Final Rule compliance date.

Expected publication of final rule 1st Qtr. 2016

➤ FAA Guidance & Regulatory References



- ✈ 2009 FAA / Industry Stall / Stick Pusher Working Group
- ✈ 2010 Public Law 111-216
- ✈ 2011 FAA Aviation Rulemaking Committee on Stick Pusher & Adverse Weather Event Training (208 ARC)
- ✈ 2011 AC 120-109, Stall and Stick Pusher Training
- ✈ 2012 FAA/EASA/ICAO LOCART (208 ARC)
- ✈ 2014 AC 120-109 Rev-1, AC 120-UPRT
- ✈ 2015 AC 120-111 Upset Prevention & Recovery Training

 **FSTD Guidance Bulletin 11-05**

 Evaluation Recommendations for UPRT

 Effective December 2011.

 **FSTD Guidance Bulletin 14-01**

 Evaluation Guidelines for Full Stall Training

 Effective January 2014

ICAO GUIDANCE



➤ New ICAO Guidelines for UPRT



- FAA + EASA + OEMs and others involved
- ICAO Doc. 10011 AN/506, October 2014
 - ◆ Available on ICAO web site
 - ◆ Requires on-aircraft UPRT prior to phase 4 MPL
 - ◆ Recommends on-aircraft UPRT during CPL
 - ◆ FSTD UPRT: initial Type Rating + recurrent training
 - ◆ FSTD UPRT: new IOS tools required
 - ◆ National CAAs have to implement



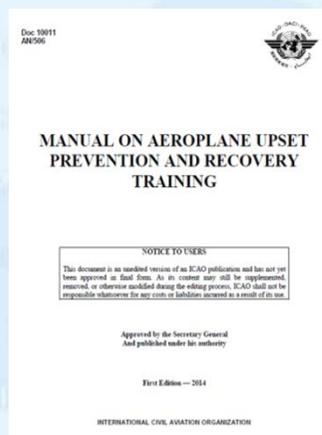
➤ Key ICAO UPRT Publications



➤ Manual on Upset Prevention and Recovery Training (ICAO Doc. 10011 AN/506, October 2014)

➤ Triggered updates on:

- ◆ ICAO Annex 1, Personnel Licensing (UP&RT, Amendment 172)
- ◆ ICAO Annex 6, Operation of Aircraft (UP&RT, Part I, Amendment 38)
- ◆ PANS-Training (ICAO Doc. 9868)



➤ EASA REQUIREMENTS



EASA

European Aviation Safety Agency

➤ EASA AMC1 ORO.FC.220 & 230



Operator **conversion** training and checking, & **recurrent** training and checking



UPSET PREVENTION AND RECOVERY TRAINING (UPRT) FOR COMPLEX MOTOR-POWERED AEROPLANES WITH A MAXIMUM OPERATIONAL PASSENGER SEATING CONFIGURATION (MOPSC) OF MORE THAN 19.

Upset prevention training should:

- (1) consist of ground training and flight training in an FSTD or an aeroplane;
- (2) include upset prevention elements for the conversion training course; and
- (3) include upset prevention elements for the recurrent training programme at least every 12 calendar months, such that all the elements are covered over a period not exceeding 3 years.

**GUIDANCE
AND
REGULATION**



➤ UPRT Training Principles



✈ An effective **UPRT** curriculum provides pilots with the knowledge and skills to **prevent** an upset, or if not prevented, to **RECOVER** from an upset.

✈ Training Focus On **PREVENTION**

➤ UPRT Training Goals / Methodology



Training Goal:

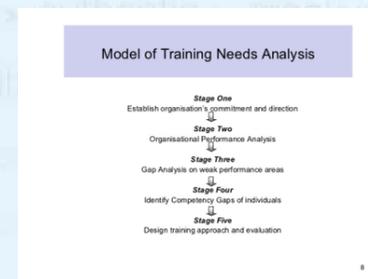
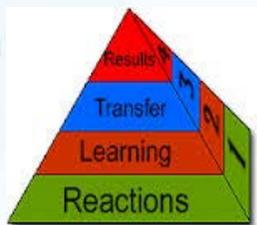
A pilot who has successfully completed UPRT will demonstrate **knowledge and skill** in **preventing**, **recognizing**, and, if necessary, **recovering** from an upset.

Training Methodology:

UPRT is to be conducted as train-to-proficiency, i.e., training will continue until completion criteria are met.

NOTE: UPRT is NOT to be evaluated in proficiency checks, line-oriented evaluation (LOE), or by other jeopardy events.

➤ The Training Cycle



Stage 1
Identifying the Training Needs

Stage 2
Design The Training

Stage 3
Deliver The Training

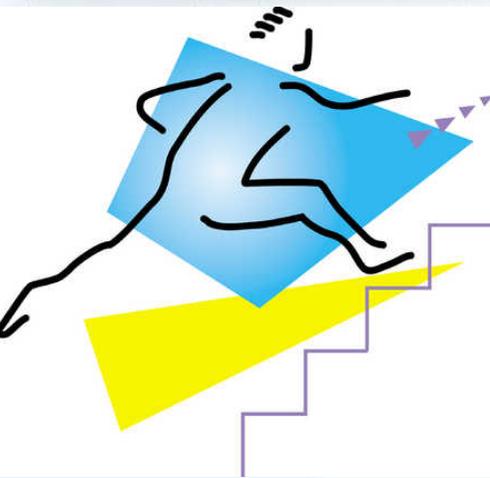
Stage 4
Evaluate The Training



CFIT Scud Running

- Get complete weather information, understand the significance of the weather information, and be able to correlate your skills and training, aircraft capabilities, and operating environment with an accurate forecast
- Continued flight in reduced visual conditions compounded by night operations and/or overwater flight poses risks
 - VFR pilots in reduced visual conditions may develop spatial disorientation and lose control, possibly going into a graveyard spiral, or descend to an unsafe altitude while trying to maintain visual contact with the surface

TRAINING CYCLE & LEARNING OBJECTIVES



Training Need Analysis

What are the training needs for pilots

Training Objectives

Measurable & Observable

Training Delivery

Using UPRT Training Methodology

Training Evaluation

Observe Pilot Response To Upsets & Recovery



➤ Evaluation of training course efficiency

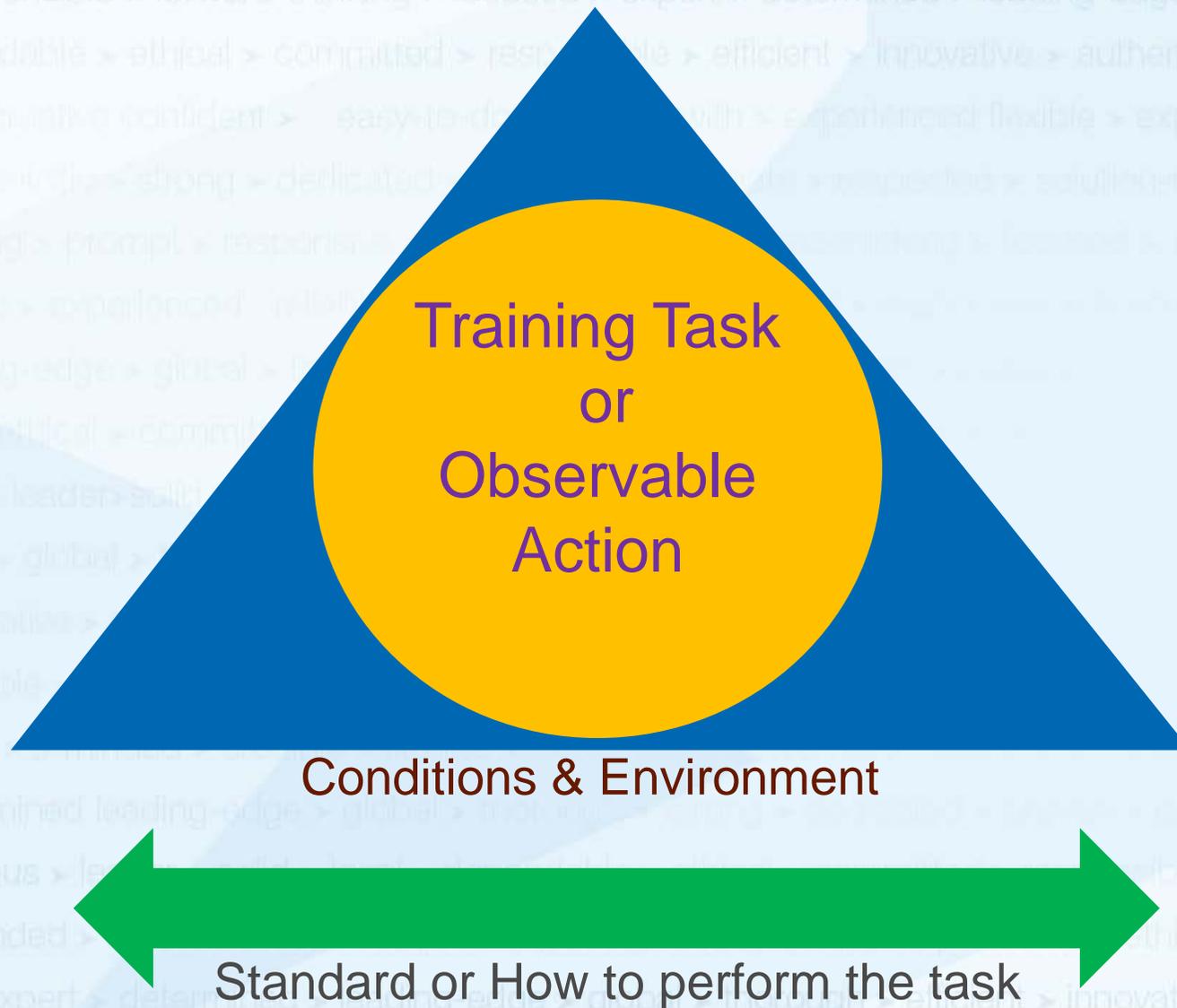


Training Evaluation

Observe
Pilot Response
To Upsets &
Recovery

- Data from FOQA
- Data from crew performance during UPRT
- Post training course evaluation

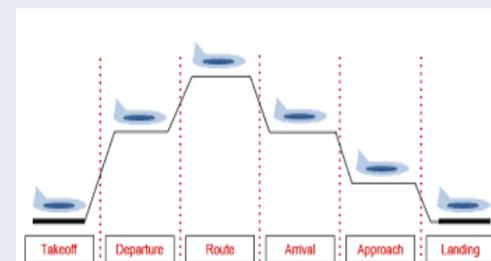
UPRT TRAINING METHODOLOGY



UPRT Summary of Training Requirements



STALL	UPSET
<p>Prevention</p> <ul style="list-style-type: none"> • Maneuvers based (initial) • Takeoff • Clean • Landing • Incorporate Scenarios in Recurrent • Checking/Testing 	<p>Prevention</p> <ul style="list-style-type: none"> • Manually controlled slow flight; • Manually controlled loss of reliable airspeed; • Manually controlled instrument departure and arrival
<p>Recovery</p> <ul style="list-style-type: none"> • Only maneuvers based • Instructor led • Hands on pilot experience through recovery 	<p>Recovery</p> <ul style="list-style-type: none"> • Nose High • Nose Low



FROM CADET TO CAPTAIN TRAINING



UPRT TRAINING PROGRAM



Academic Computer-Based Training

- Recognized Industry Standard for Upset Training
 - Airplane Upset Recovery Training Aid – Revision 2
- Online Continuity Self-Paced Academics
 - Preparing for Practical Upset Recovery Training

Aircraft Upset Training

- Commercially Certified Aerobatic Training Aircraft
 - Extra 300L – Piston Trainer

Simulator Upset Training

- Full-Motion (Level D Preferred)
- Train-the-Trainers
- Manual Flying
- Automation Systems & Flight Laws
- Pilot Monitoring Training
- CRM

Combined CBT, Simulator & On-Aircraft Programs

- 3 – 5 Day Integrated Courses



UPRT TRAINING PROGRAM



Upset Prevention and Recovery Training

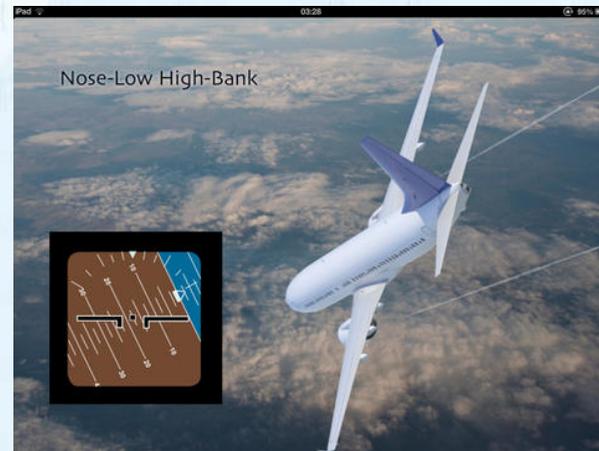
- ◆ Compliant with FAA, ICAO & (EASA)
- ◆ Training for recovery methods
- ◆ Validation of pilots abilities and competencies
- ◆ Easy to invoke, repeatable scenarios
- ◆ Performance graphics for pilot debriefing:
 - V-N & Alpha Beta Plot
 - Controls Synoptic
 - PFD Repeater
 - Historical Data



➤ FSTDs & UPRT



“The use of FSTDs....complements the application of knowledge and techniques introduced through on-airplane UPRT at the CPL or MPL licensing level..”



“...FSTDs allow for practical skill development in upset prevention and recovery in a crew environment and with airplane-specific systems, instrument indications, control response and procedures”.



➤ Instructor Training



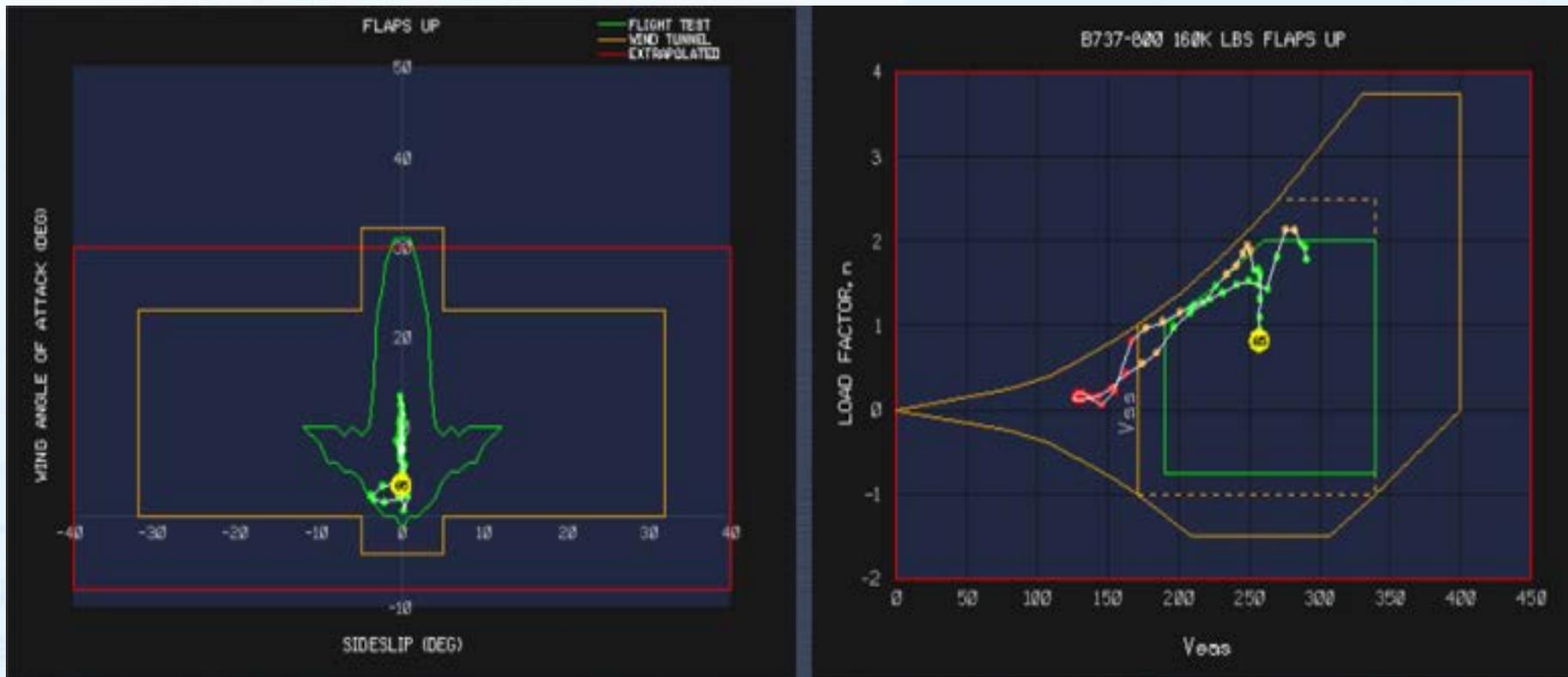
- Training to be provided by a trained and qualified instructor
 - Understand the special FSTD tools for UPRT (IOS, scenarios)
 - Understand FSTD limitations for UPRT
 - Bridge knowledge, between FSTD and airplane
- Dedicated section on UPRT Human Factors, CRM and TEM



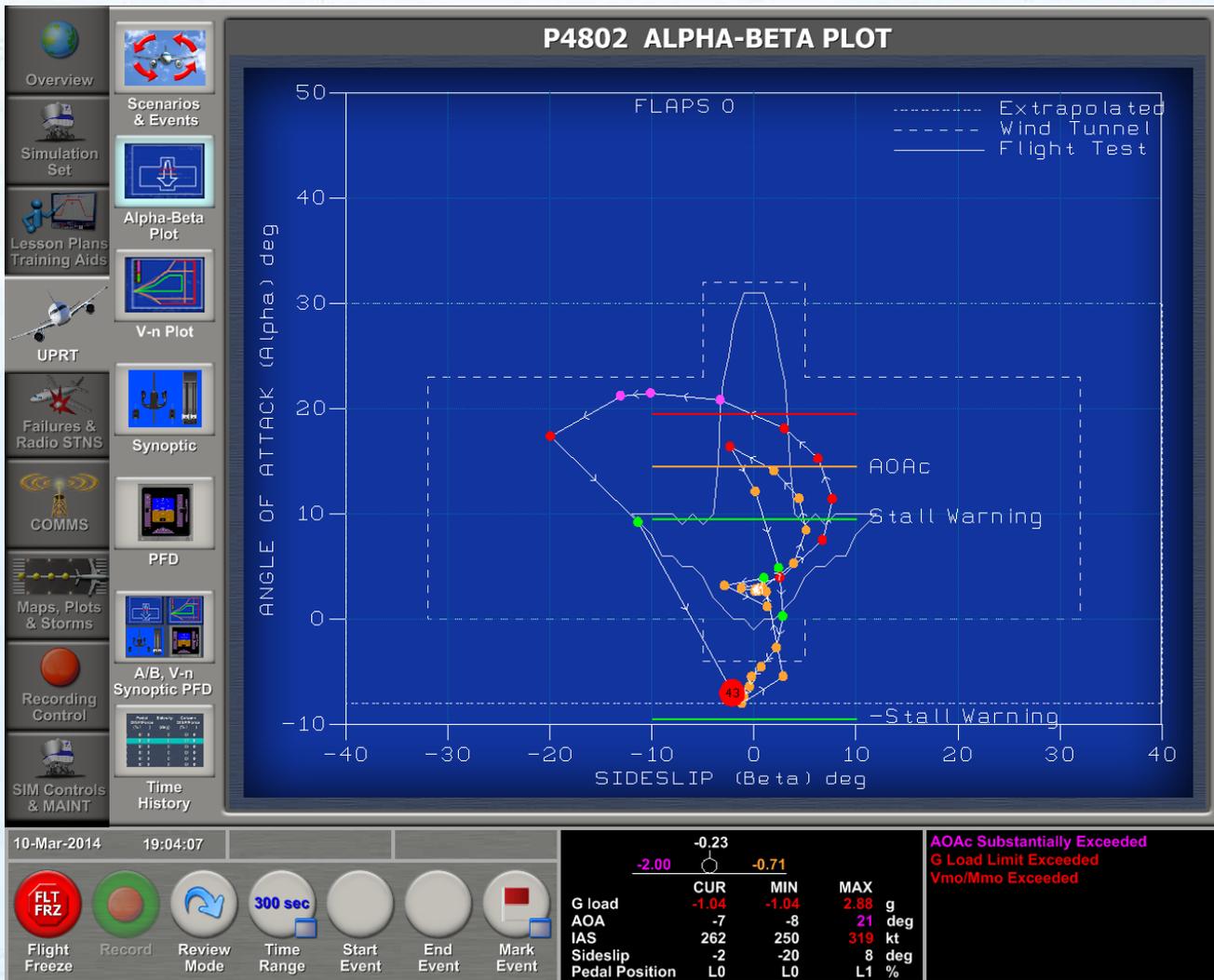
Instructor Tools



For the delivery of UPRT in FSTDs, it is key to respect the valid training envelope (VTE) for a particular device.

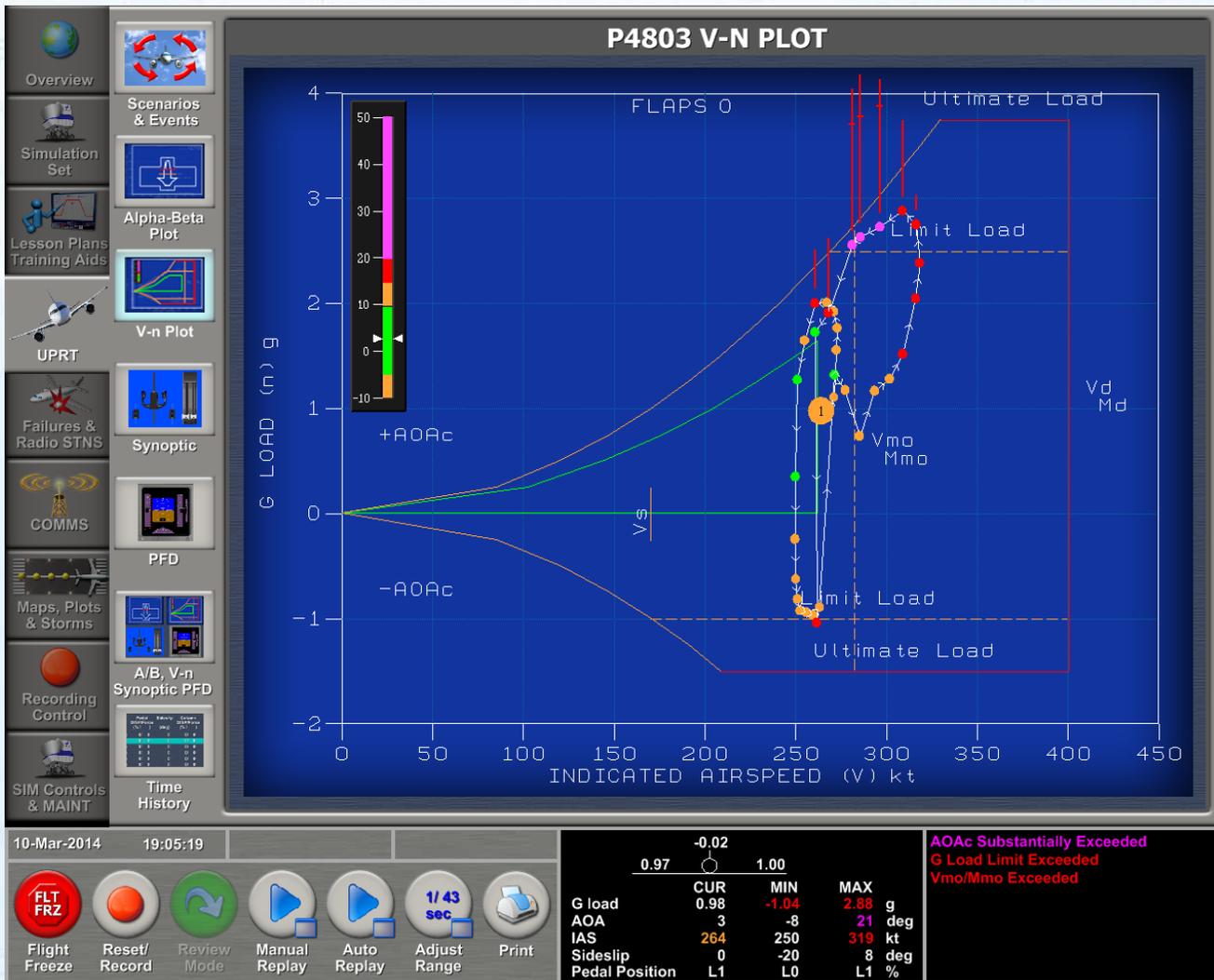


Alpha/Beta Plot Page



- Alpha Beta plot provides the area of confidence where-in the maneuver is performed.
- Allows instructors to establish a level of confidence of the observed simulator behavior.
- Model accuracy falls within 3 categories:
 - Flight Test verified model
 - Wind Tunnel verified model
 - Extrapolated model
- Up to 300 seconds of data is recorded for immediate in-cockpit debrief.
- Data points are color coded based on the approach to exceeding a limit.

V-N Plot Page

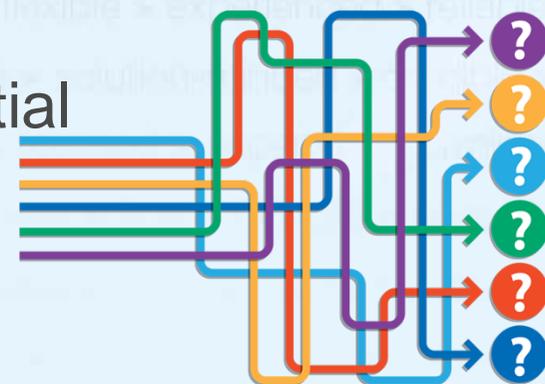


- Page where V-N graph is displayed along with upset recording
- Allows instructors to monitor how the recovery was performed in terms in nearing various a/c performance limits
- Such performance limits are:
 - Stall Speed (Vs)
 - Vmo
 - Mmo
 - G loading limits
- Both V-N and Alpha-Beta will change based on flap settings.
- Note that exceeding various limits will also be flagged in bottom footer in IOS. These are also color-coded in severity

➤ CONCLUSION



- UPRT Training well defined by ICAO, FAA & EASA
- FSTDs MUST be updated to for UPRT
- Instructor Training on FSTD limitations Essential
 - ◆ To prevent negative training
- FSTDs Essential for Optimal UPRT Program



UPRT PRINCIPLES



UPSET PREVENTION AND RECOVERY TRAINING (UPRT) PRINCIPLES

Training Philosophy

- ◆ Importance of the UPRT Instructor
- ◆ Instructor Requirements
- ◆ Instructor Training
- ◆ Instructor Standardization

TRAINING METHODOLOGY

Comprehensive Stall & UPRT Program.

Key UPRT Considerations

Methodology

Upset Recovery

Nose High Recovery

Nose Low Recovery

UPRT TRAINING OBJECTIVE



Training is



IT'S NOT
WHAT
BUT WHY
YOU DO IT