EASA Information Session

RYANAIR

Capt. Mark Dwyer, TRE, Ryanair

Overview

- History of UPRT in Ryanair
- Requirements of Part ORO for UPRT
- Instructor Training
- Recurrent Training
- Initial Training Courses
  - Theoretical Knowledge Course
  - Simulator Training Course, OCC, TR, TTR and CU
- TEM & CRM in UPRT
- Training Records
- Our Simulators
- IOS Pages

- Historically UPRT has been in our Recurrent Training Programme (not just prevention but also recovery)
- We have always trained the Boeing recommended stall recovery techniques as laid out in the FCTM
- RMT.0581 started in August 2013
- Mattias Dufva represented Ryanair

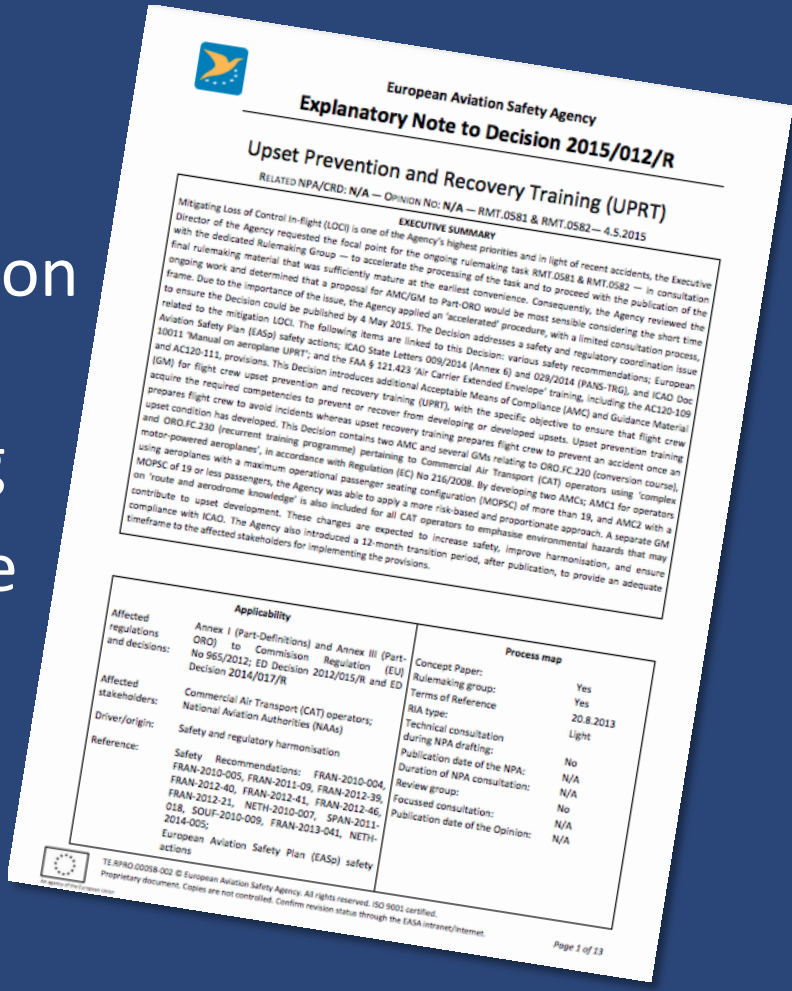
- Mark Dwyer joined the group in July 2016
- Decision published May 2015
- New UPRT course rolled out for OCC Courses in May 2016
- New UPRT course for Type Rating, Transition Type Rating and Command Upgrade in June 2016

All new entry pilots in Ryanair have completed the new UPRT Course since June 2016

EASA ED Decision 2015/12/R published in May 2015 changed:

- ORO.FC.220 Operator Conversion Course
- ORO.FC.230 Recurrent Training
- FSTD Instructor Training Course

Additionally, Type Rating, Transition Type Rating and Command Upgrade Courses also complete UPRT *(not currently a requirement)*



European Aviation Safety Agency

Explanatory Note to Decision 2015/012/R

Upset Prevention and Recovery Training (UPRT)

RELATED NPA/CRD: N/A — OPINION NO: N/A — RMT.0581 & RMT.0582— 4.5.2015

EXECUTIVE SUMMARY

Mitigating Loss of Control In-flight (LOCI) is one of the Agency's highest priorities and in light of recent accidents, the Executive Director of the Agency requested the focal point for the ongoing rulemaking task RMT.0581 & RMT.0582 — in consultation with the dedicated Rulemaking Group — to accelerate the processing of the task and to proceed with the publication of the final rulemaking material that was sufficiently mature at the earliest convenience. Consequently, the Agency reviewed the ongoing work and determined that a proposal for AMC/GM to Part-ORO would be most sensible considering the short time frame. Due to the importance of the issue, the Agency applied an 'accelerated' procedure, with a limited consultation process, to ensure the Decision could be published by 4 May 2015. The Decision addresses a safety and regulatory coordination issue related to the mitigation LOCI. The following items are linked to this Decision: various safety recommendations; European Aviation Safety Plan (EASp) safety actions; ICAO State Letters 009/2014 (Annex 6) and 029/2014 (PANS-TRG), and ICAO Doc 10011 'Manual on aeroplane UPRT'; and the FAA § 121.423 'Air Carrier Extended Envelope' training, including the AC120-109 and AC120-111, provisions. This Decision introduces additional Acceptable Means of Compliance (AMC) and Guidance Material (GM) for flight crew upset prevention and recovery training (UPRT), with the specific objective to ensure that flight crew acquire the required competencies to prevent or recover from developing or developed upsets. Upset prevention training prepares flight crew to avoid incidents whereas upset recovery training prepares flight crew to prevent an accident once an upset condition has developed. This Decision contains two AMC and several GMs relating to ORO.FC.220 (conversion course), and ORO.FC.230 (recurrent training programme) pertaining to Commercial Air Transport (CAT) operators using 'complex motor-powered aeroplanes', in accordance with Regulation (EC) No 216/2008. By developing two AMCs; AMC1 for operators using aeroplanes with a maximum operational passenger seating configuration (MOPSC) of more than 19, and AMC2 with a MOPSC of 19 or less passengers, the Agency was able to apply a more risk-based and proportionate approach. A separate GM on 'route and aerodrome knowledge' is also included for all CAT operators to emphasise environmental hazards that may contribute to upset development. These changes are expected to increase safety, improve harmonisation, and ensure compliance with ICAO. The Agency also introduced a 12-month transition period, after publication, to provide an adequate timeframe to the affected stakeholders for implementing the provisions.

Applicability

Affected regulations and decisions:	Annex I (Part-Definitions) and Annex III (Part-ORO) to Commission Regulation (EU) No 965/2012; ED Decision 2012/015/R and ED Decision 2014/017/R
Affected stakeholders:	Commercial Air Transport (CAT) operators; National Aviation Authorities (NAAs)
Driver/origin:	Safety and regulatory harmonisation
Reference:	Safety Recommendations: FRAN-2010-004, FRAN-2010-005, FRAN-2011-09, FRAN-2012-39, FRAN-2012-40, FRAN-2012-41, FRAN-2012-46, FRAN-2012-21, NETH-2010-007, SPAN-2011-018, SOUF-2010-009, FRAN-2013-041, NETH-2014-005; European Aviation Safety Plan (EASp) safety actions

Process map

Concept Paper:	Yes
Rulemaking group:	Yes
Terms of Reference	20.8.2013
RIA type:	Light
Technical consultation during NPA drafting:	No
Publication date of the NPA:	N/A
Duration of NPA consultation:	N/A
Review group:	No
Focussed consultation:	N/A
Publication date of the Opinion:	N/A

- New UPRT course rolled out for OCC Courses in May 2016
- New UPRT course rolled out to Command Upgrade in June 2016
- New UPRT course for Type Rating, Transition Type Rating and Airline Pilot Certificate Course in June 2016

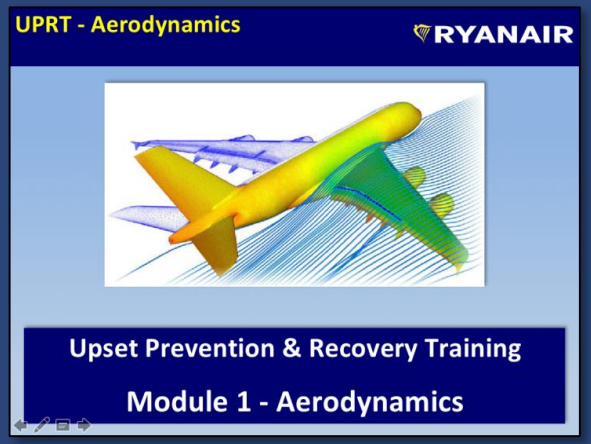
To coincide with the introduction of the new UPRT course:

- Existing Instructors received UPRT Instructor Training
- For new instructors UPRT Instructor Training was integrated into our initial in house TRI Course

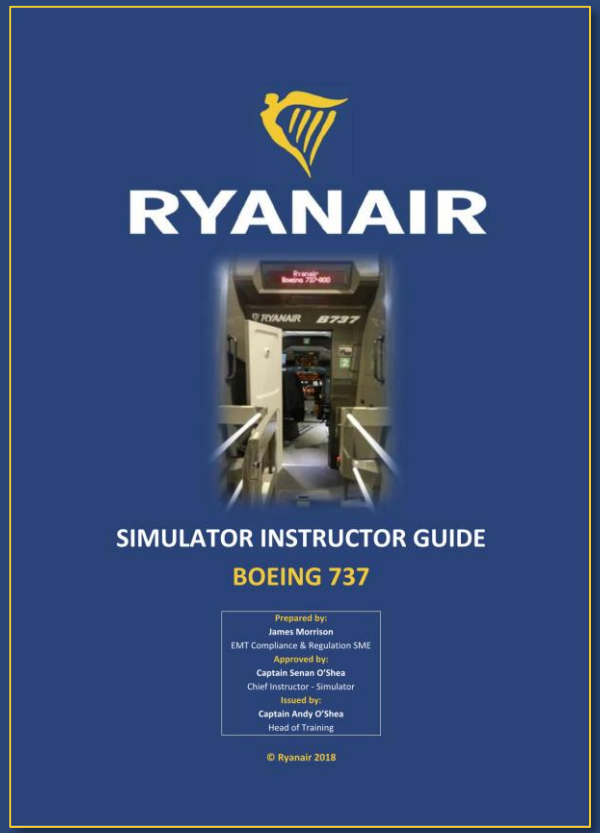
Instructor Training consists of:

- Completing the Student UPRT eLearning Course
- Specific Instructor UPRT eLearning Module
- Demonstration of UPRT Instructional Techniques during TRI training

- 3620 pilots have completed the initial UPRT eLearning Course
- This includes all new entry pilots, Command Upgrades & Instructors
- All pilots (5,000+) have completed elements of the recurrent training UPRT course



- Feedback has been very positive
- Students enjoy the Raw Data flying element of UPRT course
- Feedback has been used to improve the instructor notes, particularly for differences between simulators



Full UPRT eLearning Course comprises of 8 theoretical knowledge modules

- 8 Modules spread out over 6 Recurrent Simulator Training Periods over a period of 3 years
- UPRT Manoeuvres flown during RST 2, 4 and 6 training day.

Nose Low Recovery

Pilot Flying
• Recognize and confirm the situati
• Disconnect autopilot and autothro • Recover from stall, if required • * Roll in shortest direction to win level (unload and roll if bank ang more than 90 degrees) • Recover to level flight: - Apply nose up elevator - *Apply nose up trim, if required - Adjust thrust and drag as require

Nose High Recovery

Pilot Flying	Pilot Mo
• Recognize and confirm the situation	
• Disconnect autopilot and autothrottle • Apply as much as full nose-down elevator • * Apply appropriate nose down stabilizer trim • Reduce thrust • * Roll (adjust bank angle) to obtain a nose down pitch rate • Complete the recovery: - When approaching the horizon, roll to wings level - Check airspeed and adjust thrust - Establish pitch attitude.	• Call out atti airspeed and throughout recovery • Verify all re actions have completed a any omissio

UPRT Upset Recovery (where possible without FD):

1. Recovery from nose high and nose low at various bank angles.
2. Steep turns, less than 60 degrees.
3. Stall in Take Off Configuration
4. Stall in clean configuration
5. Stall in Landing Configuration
6. Use of Trim
7. Windshear on Takeoff
8. Windshear on Approach in landing configuration

UPRT High Alt Ops (where possible without FD):

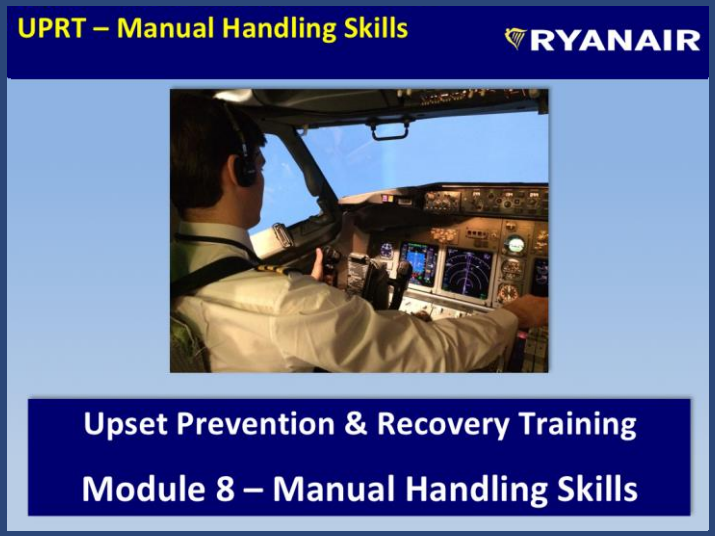
1. Angle of Attack and Stall awareness
2. Manoeuvre margins (PFD)
3. Thrust Limit and Engine Acceleration
4. Approach to stall indications
5. Approach to stall recovery. (With and without stick shaker)

UPRT Manual Flying skills (where possible without FD).

1. Takeoff
2. Go Arounds from various stages during the approach using reduced GA thrust.
3. Visual Approach. Flight Path/Energy Management
4. Energy exchange
5. The effect of loading/unloading on the maximum/minimum speed bars.
6. Aeroplane stability
7. Proper Use of Rudder

Theoretical Knowledge eLearning Course

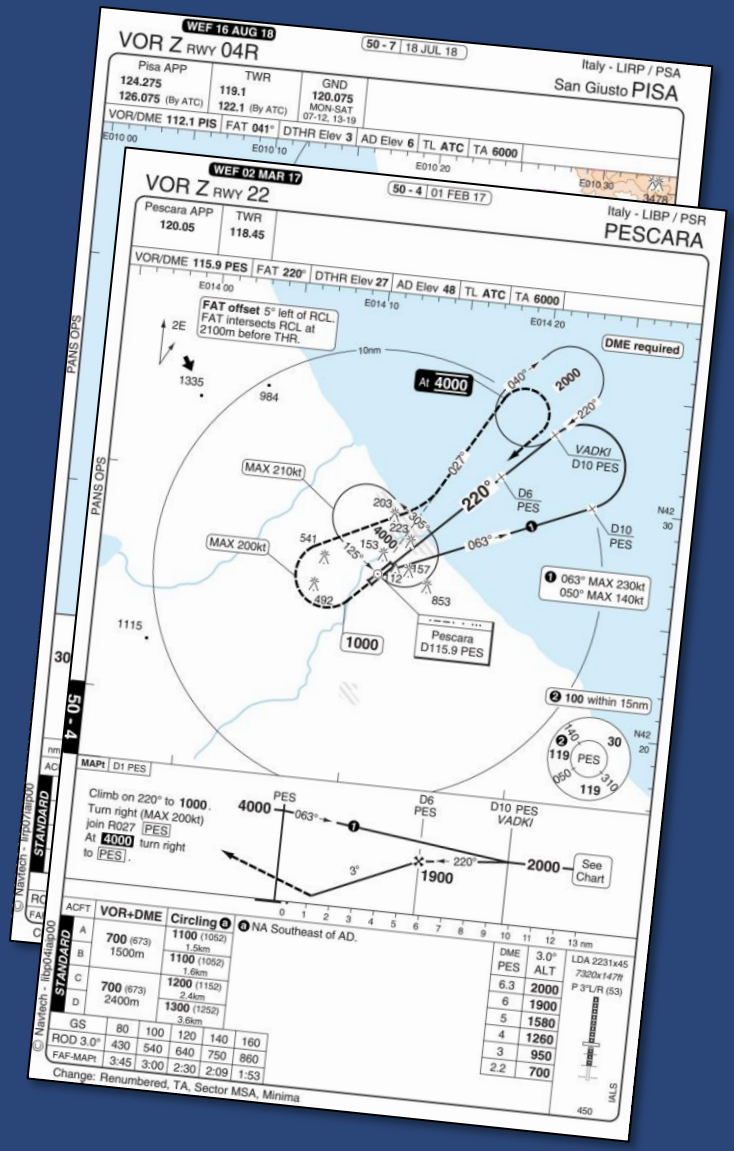
- Approximately 3 hours broken into 8 modules as laid out in AMC1 ORO.FC.220
  - Aerodynamics
  - Causes
  - G Awareness
  - Energy Management
  - Flight path Management
  - Recognition
  - System Malfunction
  - Manual Handling Skills



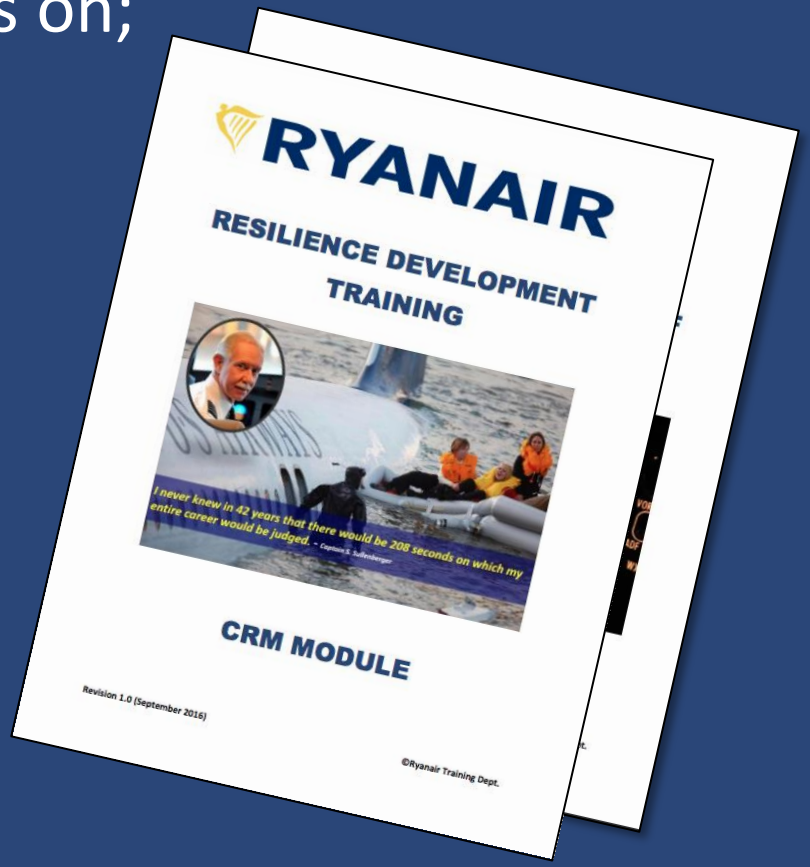
- Examples of incidents and accidents are included throughout all 8 modules

- We have a dedicated UPRT Simulator Session in each new entry course
- In seat instruction used for Nose High/Low Upsets
- Full Flight Level D Simulator
  - 4 Hour Session UPRT specific for Type Rating
  - 5 Hour Session for OCC / TTR / Command Upgrade

- The 5 hour sessions also include restricted base training for Captains. This includes additional exercise such as
  - Night circling approaches
  - Go Arounds from non landing configurations
  - Go Arounds after touch down
  - Visual Approaches
- This takes place at PSA, PSR, CIA or ACE



- Threat & Error Management is an integral part of our UPRT programme
- All relevant CRM topics are also integrated, specifically for UPRT we focus on;
  - Resilience
  - Automation Philosophy
  - Startle and Surprise
  - IP & SA
  - Monitoring and Intervention
  - Workload Management
  - Communication
  - Leadership & Teamwork



Training Records

Ryanair Training Department
EASA Information Session – November 2018
UPRT Type Rating Course

EXERCISE	*S/D/R LST MPA REF		EXERCISE	*S/D/R LST MPA REF	
TAKEOFF & CLIMB (Instructor Setup)			AEROPLANE STABILITY		
NO FD TAKEOFF LEVEL OFF AT 3000'			APPROACH TO STALL INDICATIONS	3.4.9	
MANEUVER MARGINS (PFD)			APPROACH TO STALL RECOVERY HIGH ALTITUDE (WITH AND WITHOUT STICK SHAKER)		
CONTROL SURFACE FUNDAMENTALS			**DESCENT**		
SLOW FLIGHT (F40 VREF)			DEMONSTRATE EFFECT OF G-LOAD ON MINIMUM AND MAXIMUM SPEED BARS (ONCE PER CREW)		
APPROACH TO STALL IN TAKE OFF CONFIG					
APPROACH TO STALL IN CLEAN CONFIG					
FL100 250KTS			DEMONSTRATE THE EXCHANGE OF ENERGY (KINETIC VS. POTENTIAL VS. CHEMICAL) (ONCE PER CREW)		
STEEP TURNS (45 DEGREES OF BANK)	3.7				
USE OF TRIMS			TCAS EVENT	3.6.9	
RECOVERY FROM NOSE HIGH UPSET (VARIOUS BANK ANGLES)			**APPROACH**		
RECOVERY FROM NOSE LOW UPSET (AT HIGH BANK ANGLE)			APPROACH TO STALL ON BASE	3.8.1	
			APPROACH TO STALL IN LANDING CONFIGURATION	3.8	
CRUISE (AT FMC OPT ALTITUDE)			GO-AROUND FROM F5 MAA -1000' USING REDUCED GA THRUST		
ANGLE OF ATTACK AND STALL AWARENESS					
MANEUVER MARGINS (PFD)			VISUAL APPROACH		
TURNS (EFFECT ON STALL SPEED) WITH AND WITHOUT SPOILERS	3.1		**WINDSHEAR**		
			PREDICTIVE WINDSHEAR (RTO)		
THRUST LIMIT & ENGINE ACCELERATION			WINDSHEAR ON TAKE OFF RECOVERY	3.6.5	
MACH BUFFET	3.2		WINDSHEAR ON APPROACH RECOVERY	4.2	

*** S = SATISFACTORY R = REPEAT D = DEFERRED**

CRM LEARNING OBJECTIVES:	**RESILIENCE, AUTOMATION PHILOSOPHY, LEADERSHIP AND TEAMWORK** (In accordance with Type Rating Workbook)

EXERCISE	* S / D / R	EXERCISE	* S / D / R
TAKEOFF & CLIMB (Instructor Setup)		**DESCENT (ONCE PER CREW)**	
NO FD TAKEOFF LEVEL OFF AT 3000'		DEMONSTRATE EFFECT OF G-LOAD ON MINIMUM AND MAXIMUM SPEED BARS	
MANEUVER MARGINS (PFD)		DEMONSTRATE THE EXCHANGE OF ENERGY (KINETIC VS POTENTIAL VS CHEMICAL)	
SLOW FLIGHT (F40 VREF)		TCAS RA	
APPROACH TO STALL IN TAKE OFF CONFIG		**APPROACH**	
APPROACH TO STALL IN CLEAN CONFIG		VISUAL APPROACH WITH WINDSHEAR ON APPROACH	
FL100 250KTS		GO-AROUND FROM F5 MAA -1000' USING REDUCED GA THRUST	
STEEP TURNS (45 DEGREES OF BANK)			
RECOVERY FROM NOSE HIGH UPSET		APPROACH TO STALL IN LANDING CONFIG	
RECOVERY FROM NOSE LOW UPSET		LANDING MAX CROSSWIND	
CRUISE (AT FMC OPT ALTITUDE)		TAKEOFF MAX CROSSWIND	
MANEUVER MARGINS (PFD)		WINDSHEAR ON TAKEOFF RECOVERY	
ENGINE ACCELERATION		**RESTRICTED HOME BASE APPROACH TRAINING**	
MACH BUFFET		NON-PRECISION APPROACH	
AEROPLANE STABILITY		CIRCLE-TO-LAND OR RESTRICTED APPROACH	
APPROACH TO STALL INDICATIONS		GO-AROUND FROM BASE LEG	
APPROACH TO STALL RECOVERY (WITH AND WITHOUT STICK SHAKER)		NON-PRECISION APPROACH	
SEVERE TURBULENCE PENETRATION		CIRCLE-TO-LAND OR RESTRICTED APPROACH	
		GO-AROUND AFTER TOUCHDOWN	
		NON-PRECISION APPROACH	
		CIRCLE-TO-LAND OR RESTRICTED APPROACH	
		LAND	

*** S = SATISFACTORY R = REPEAT D = DEFERRED**

CRM LEARNING OBJECTIVES:	**MONITORING AND INTERVENTION, COMMUNICATION, WORKLOAD MANAGEMENT**

EXERCISE	* S / D / R	EXERCISE	* S / D / R
TAKEOFF & CLIMB (Instructor Setup)		**DESCENT (ONCE PER CREW)**	
NO FD TAKEOFF LEVEL OFF AT 3000'		DEMONSTRATE EFFECT OF G-LOAD ON MINIMUM AND MAXIMUM SPEED BARS	
MANEUVER MARGINS (PFD)		DEMONSTRATE THE EXCHANGE OF ENERGY (KINETIC VS POTENTIAL VS CHEMICAL)	
SLOW FLIGHT (F40 VREF)		TCAS RA	
APPROACH TO STALL IN TAKE OFF CONFIG		**APPROACH**	
APPROACH TO STALL IN CLEAN CONFIG		VISUAL APPROACH WITH WINDSHEAR ON APPROACH	
FL100 250KTS		GO-AROUND FROM F5 MAA -1000' USING REDUCED GA THRUST	
STEEP TURNS (45 DEGREES OF BANK)			
RECOVERY FROM NOSE HIGH UPSET		APPROACH TO STALL IN LANDING CONFIG	
RECOVERY FROM NOSE LOW UPSET		LANDING MAX CROSSWIND	
CRUISE (AT FMC OPT ALTITUDE)		TAKEOFF MAX CROSSWIND	
MANEUVER MARGINS (PFD)		WINDSHEAR ON TAKEOFF RECOVERY	
ENGINE ACCELERATION		**RESTRICTED HOME BASE APPROACH TRAINING**	
MACH BUFFET		NON-PRECISION APPROACH	
AEROPLANE STABILITY		CIRCLE-TO-LAND OR RESTRICTED APPROACH	
APPROACH TO STALL INDICATIONS		GO-AROUND FROM BASE LEG	
APPROACH TO STALL RECOVERY (WITH AND WITHOUT STICK SHAKER)		NON-PRECISION APPROACH	
SEVERE TURBULENCE PENETRATION		CIRCLE-TO-LAND OR RESTRICTED APPROACH	
		GO-AROUND AFTER TOUCHDOWN	
		NON-PRECISION APPROACH	
		CIRCLE-TO-LAND OR RESTRICTED APPROACH	
		LAND	

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CRM LEARNING OBJECTIVES:	**STARTLE AND SURPRISE, INFORMATION PROCESSING AND SITUATION AWARENESS, COMMUNICATION**

EXERCISE	*S/D/R LST MPA REF		EXERCISE	*S/D/R LST MPA REF	
TAKEOFF & CLIMB (Instructor Setup)			TCAS EVENT	3.6.9	
NO FD TAKEOFF LEVEL OFF AT 3000'			**RESTRICTED HOME BASE APPROACH TRAINING***		
MANEUVER MARGINS (PFD)			NON-PRECISION APPROACH		
SLOW FLIGHT (F40 VREF)			CIRCLE-TO-LAND OR RESTRICTED APPROACH		
APPROACH TO STALL IN TAKE OFF CONFIG			GO-AROUND FROM BASE LEG		
APPROACH TO STALL IN CLEAN CONFIG			NON-PRECISION APPROACH		
			CIRCLE-TO-LAND OR RESTRICTED APPROACH		
FL100 250KTS			GO-AROUND AFTER TOUCHDOWN		
STEEP TURNS (LESS THAN 45 DEGREES)	3.7		NON-PRECISION APPROACH		
RECOVERY FROM NOSE HIGH UPSET			CIRCLE-TO-LAND OR RESTRICTED APPROACH		
RECOVERY FROM NOSE LOW UPSET			LAND		
CRUISE (AT FMC OPT ALTITUDE)			**APPROACH**		
MANEUVER MARGINS (PFD)			APPROACH TO STALL IN LANDING CONFIG	3.8 / 3.8.1	
ENGINE ACCELERATION			GO-AROUND FROM F5 MAA -1000' USING REDUCED GA THRUST		
MACH BUFFET	3.2				
AEROPLANE STABILITY			VISUAL APPROACH		
APPROACH TO STALL INDICATIONS	3.4.9		**WINDSHEAR**		
APPROACH TO STALL RECOVERY HIGH ALTITUDE (WITH AND WITHOUT STICK SHAKER)			PREDICTIVE WINDSHEAR (RTO)		
			WINDSHEAR ON TAKE OFF RECOVERY	3.6.5	
DESCENT (ONCE PER CREW)			WINDSHEAR ON APPROACH RECOVERY	4.2	
DEMONSTRATE EFFECT OF G-LOAD ON MINIMUM AND MAXIMUM SPEED BARS			*Restricted home base approach training is mandatory for Captains and optional for FO's. For FO's equivalent time may be used for evidence based training at the instructor's discretion.		
DEMONSTRATE THE EXCHANGE OF ENERGY (KINETIC VS. POTENTIAL VS. CHEMICAL)					

*** S = SATISFACTORY R = REPEAT D = DEFERRED**

CRM LEARNING OBJECTIVES:	**RESILIENCE, AUTOMATION PHILOSOPHY, LEADERSHIP AND TEAMWORK** (In accordance with Transition Type Rating Workbook)

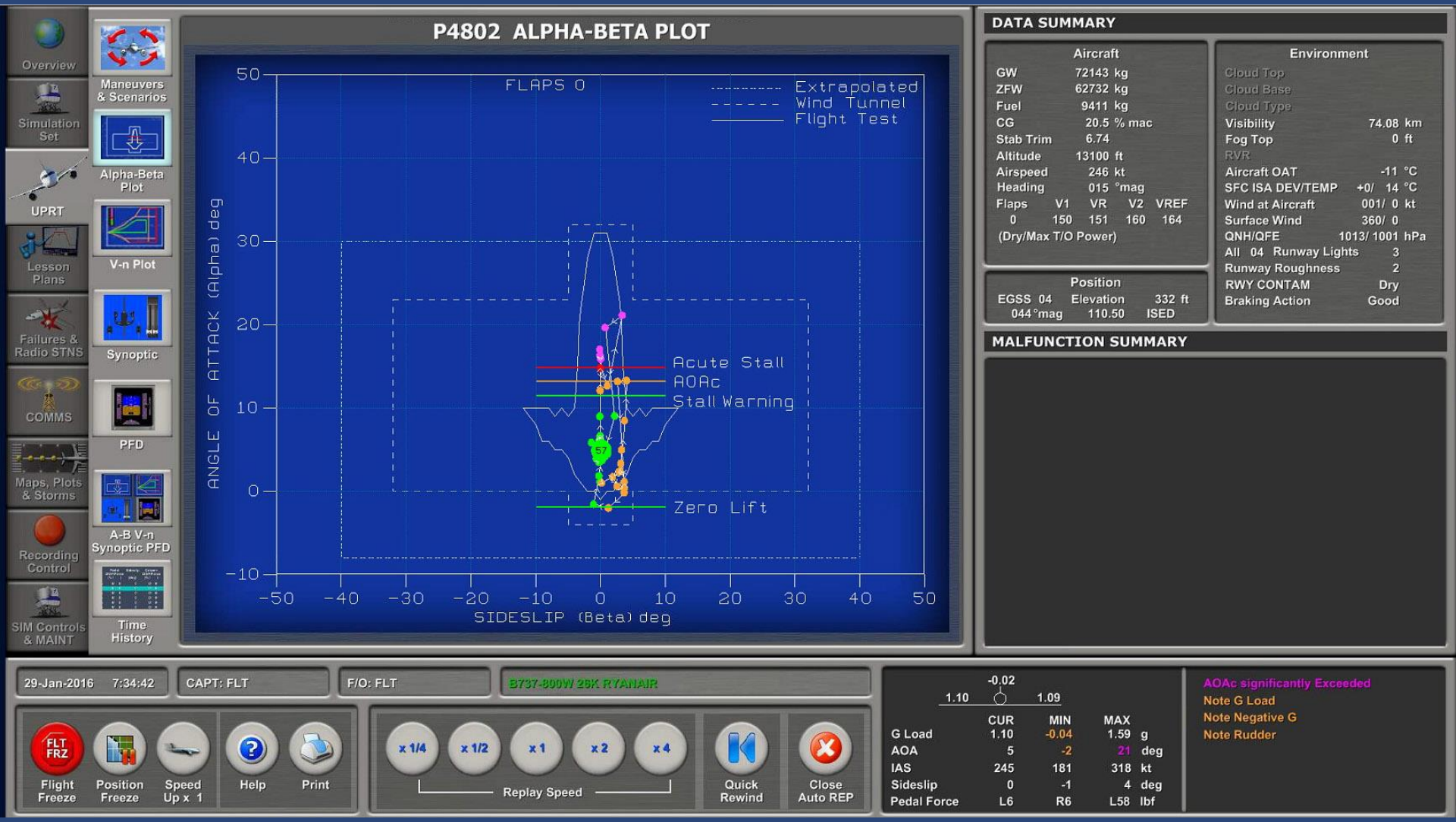
Our Simulators

- 2 Level B CAE5000 at Stansted
- These sims have been upgraded to Level C equivalency for the purpose of UPRT

- 3 Level D CAE Sim XXI's at East Midlands
- 3 Level D CAE7000 at Stansted
- 2 CAE Level D sims at Bergamo

IOS Pages

Ryanair Training Department
EASA Information Session – November 2018
Alpha-Beta Plot

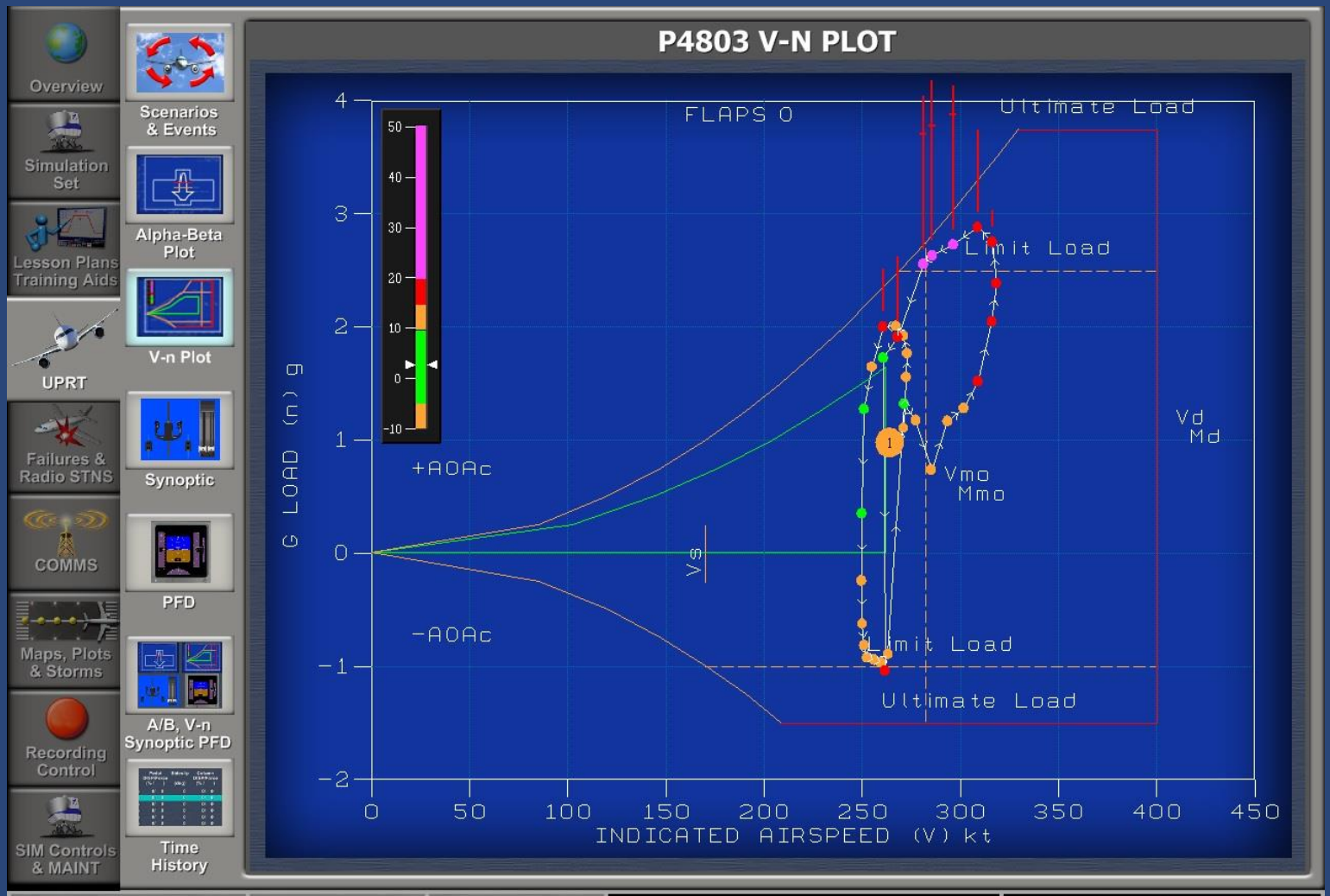


Primary Flight Display

Synoptic


Overview
Simulation Set
Lesson Plans Training Aids
UPRT
Failures & Radio STNS
COMMS
Maps, Plots & Storms
Recording Control
SIM Controls & MAINT
Scenarios & Events
Alpha-Beta Plot
V-n Plot
Synoptic
PFD
A/B, V-n Synoptic PFD
Time History
P4804 SYNOPTIC
SPEED TRIM OFF
AUTO-PILOT OFF
SHAKER OFF
AUTO-THROTTLE OFF
0.00
0.00
0.00
0.0
5.4
0
5
10
15
lbf
DOWN
ARMED
FLIGHT
UP
%N1
82
83
MAX
IDLE
1
2
0
FLAP UP
FLAP DOWN
FLAP
1
2
5
10
15
25
30
40
COLUMN
WHEEL
3% ANU(+)
GEAR
10-Mar-2014
18:50:46
FLT FRZ
Flight Freeze
Reset/ Record
Review Mode
300 sec
Time Range
Start Event
End Event
Mark Event
0.00
0.00
0.00
CUR
MIN
MAX
G load 0.00 0.00 0.00 g
AOA 0 0 0 deg
IAS 0 0 0 kt
Sideslip 0 0 0 deg
Pedal Position L0 L0 L0 %

V-N plot


P4803 V-N PLOT
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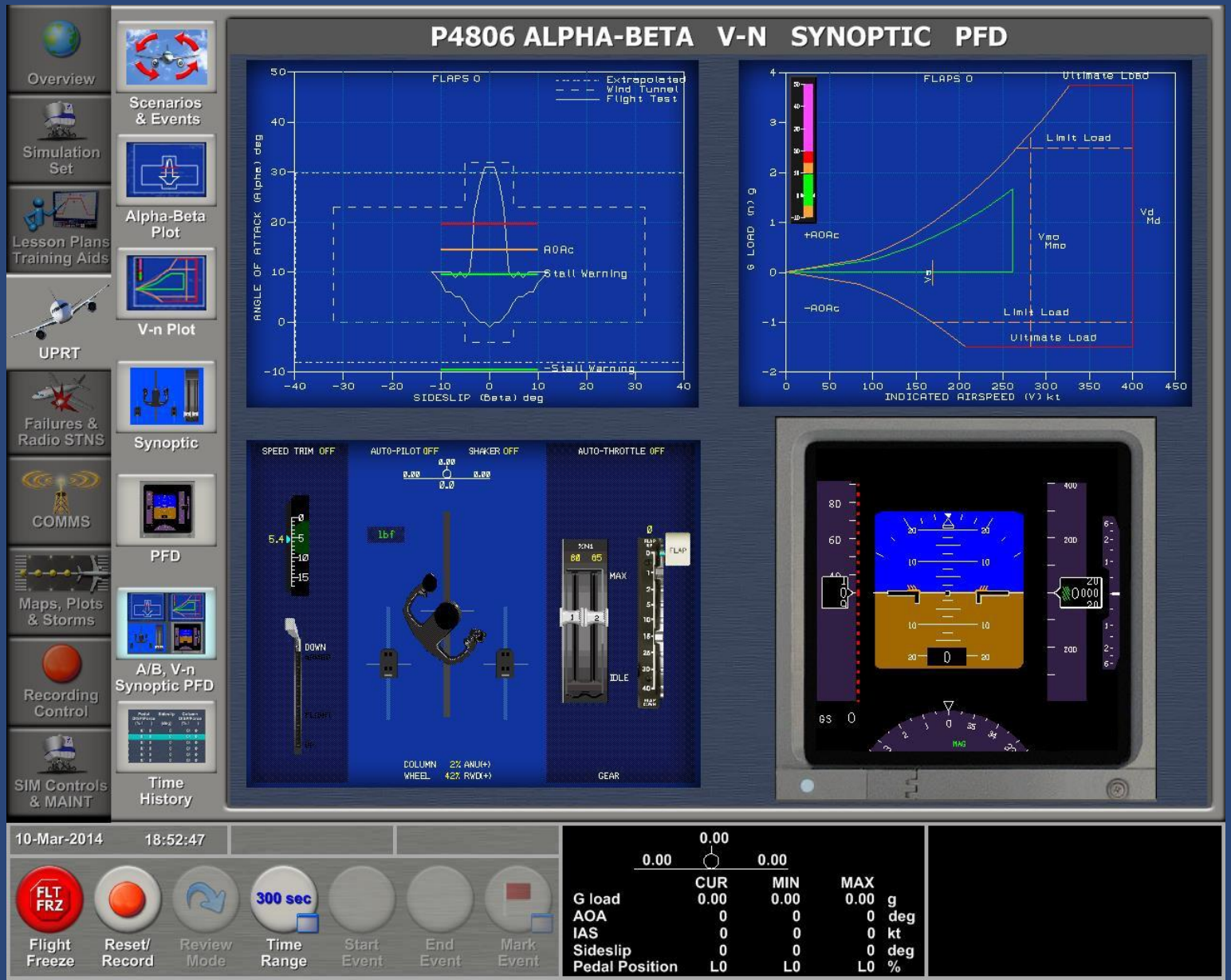
Scenarios & Events
Alpha-Beta Plot
V-n Plot
Synoptic
PFD
A/B, V-n Synoptic PFD
Time History
FLAPS 0
Ultimate Load
Limit Load
+AOAc
-AOAc
Vs
Vmo
Mmo
Vd
Md
G LOAD (n) g
INDICATED AIRSPEED (V) kt
10-Mar-2014
19:05:19
Flight Freeze
Reset/ Record
Review Mode
Manual Replay
Auto Replay
1/ 43 sec
Adjust Range
Print
-0.02
0.97
1.00
CUR
MIN
MAX
G load 0.98 -1.04 2.88 g
AOA 3 -8 21 deg
IAS 264 250 319 kt
Sideslip 0 -20 8 deg
Pedal Position L1 L0 L1 %
AOAc Substantially Exceeded
G Load Limit Exceeded
Vmo/Mmo Exceeded

Multi View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V-n Plot
Synoptic
PFD
A/B, V-n Synoptic PFD
Time History
P4806 ALPHA-BETA V-N SYNOPTIC PFD
FLAPS 0
Extrapolated
Wind Tunnel
Flight Test
ANGLE OF ATTACK (Alpha) deg
SIDESLIP (Beta) deg
AOAc
Stall Warning
-Stall Warning
FLAPS 0
Ultimate Load
Limit Load
+AOAc
-AOAc
Vmo Mmo
Vd Md
G LOAD (n) g
INDICATED AIRSPEED (V) kt
SPEED TRIM OFF
AUTO-PILOT OFF
SHAKER OFF
AUTO-THROTTLE OFF
lbf
DOWN
MAX
IDLE
FLAP
COLUMN 2% AND(+)
WHEEL 42% RWD(+)
GEAR
10-Mar-2014
18:52:47
FLT FRZ
Flight Freeze
Reset/ Record
Review Mode
300 sec
Time Range
Start Event
End Event
Mark Event
0.00
0.00
0.00
CUR
MIN
MAX
G load 0.00 0.00 0.00 g
AOA 0 0 0 deg
IAS 0 0 0 kt
Sideslip 0 0 0 deg
Pedal Position L0 L0 L0 %

Ryanair Training Department
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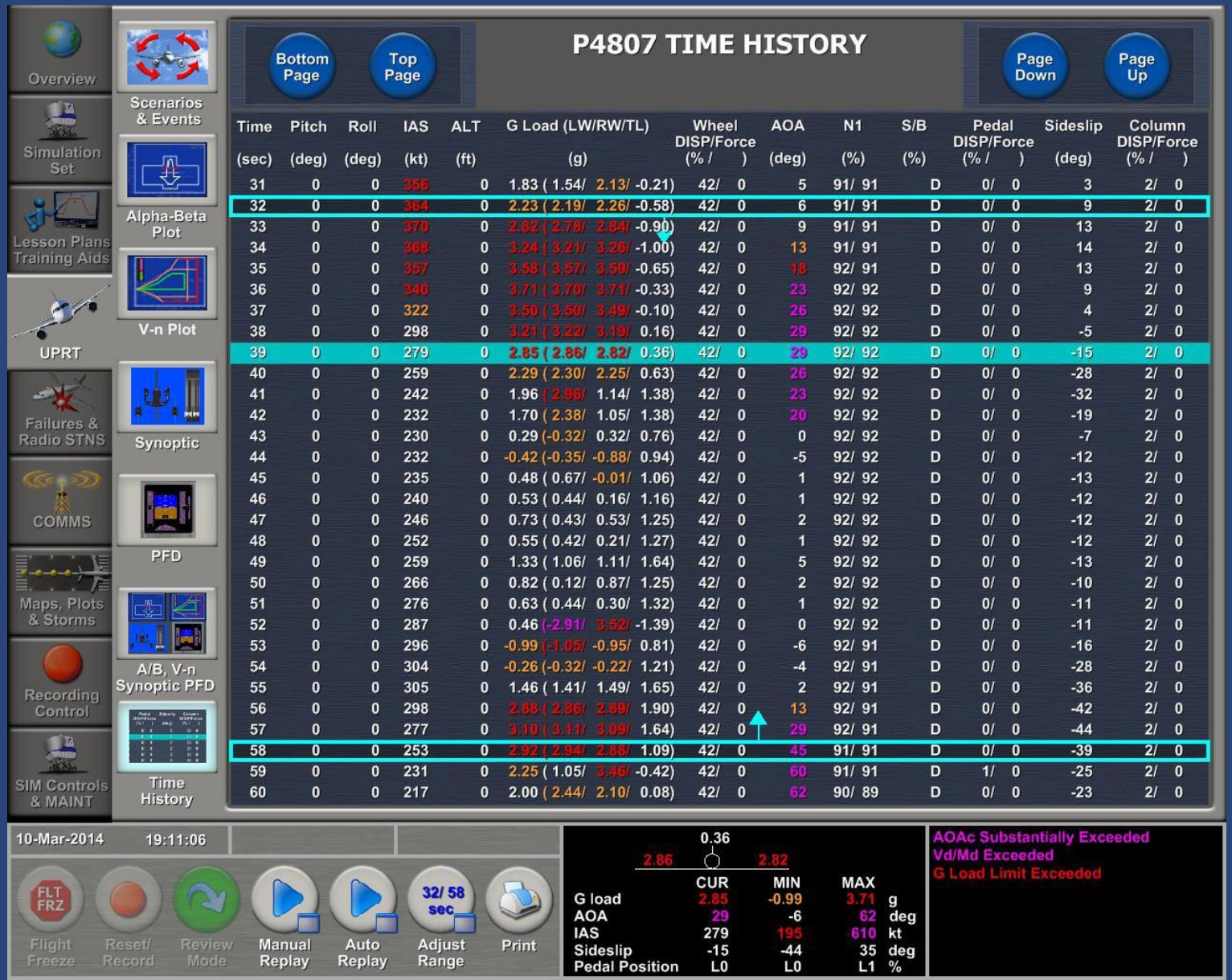
Time History Page



Thanks for Watching!

RYANAIR