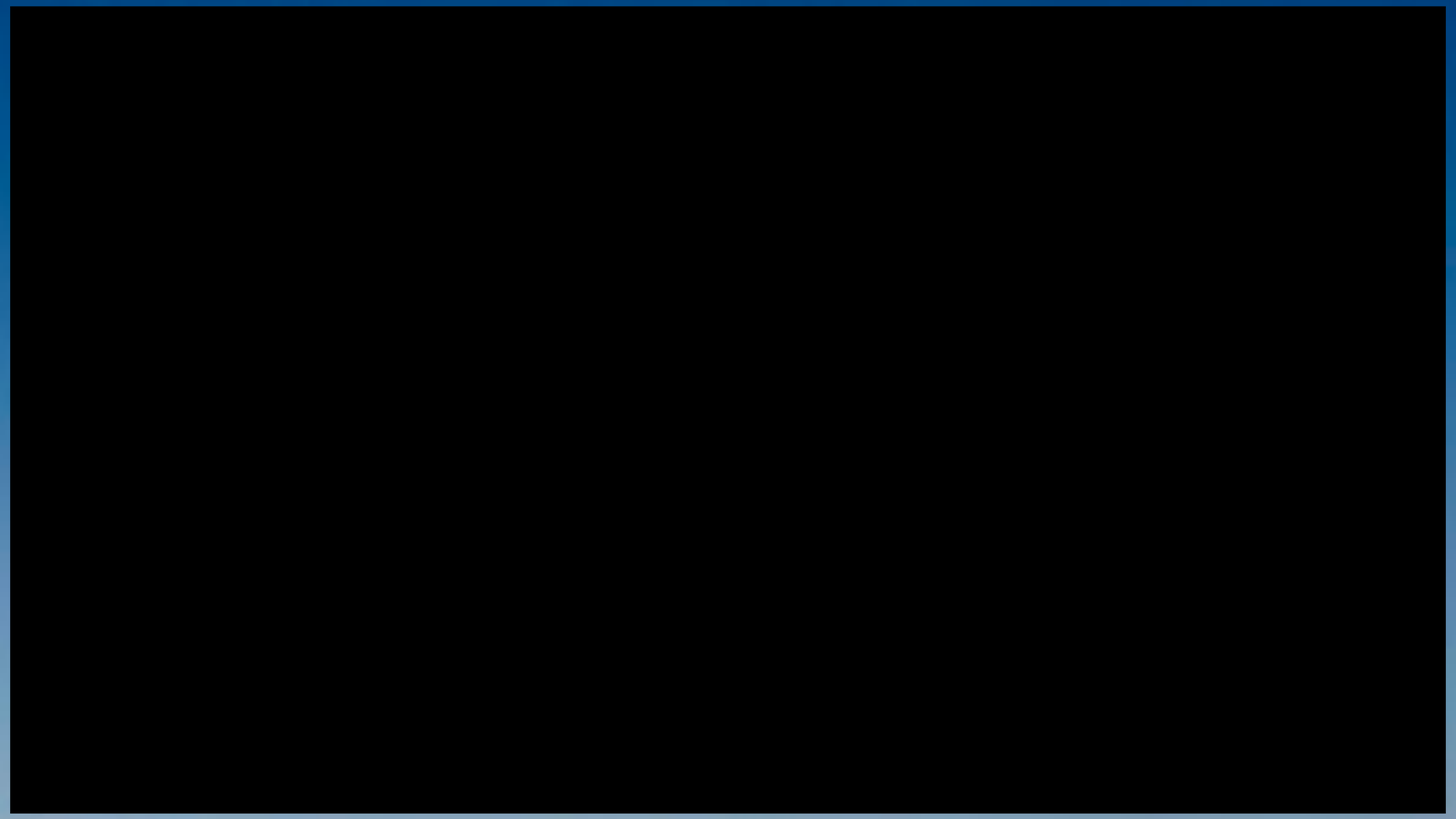

ICAO
UPRT Instructor Competencies
- what is most important?

Responsibilities of All Aviation Instructors

- Helping students learn
- Providing adequate instruction
- Demanding adequate standards of performance
- Emphasizing the positive
- Ensuring aviation safety

Unique Aspects of UPRT

- **Safety Critical**
- Combination of knowledge and skill - multiple competencies
- TEM: Recognition and intervention of upsets as early as possible
- Manage the human startle reflex
- Decision making: How to intervene effectively
- Risk of inadequate training or information transfer can be catastrophic
- **Conversely, properly structured and delivered training can have lasting impact**



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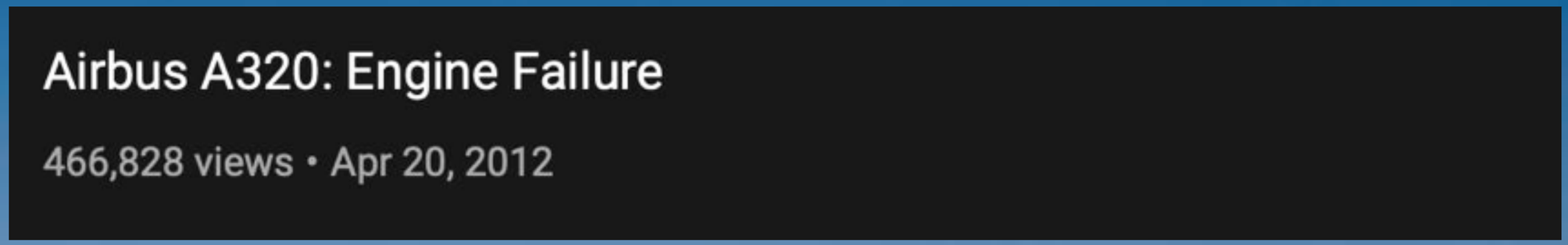
Why is correct information important?

- “I can barely keep the aircraft flying”
- “I have to use huge amounts of control inputs”
- Video has been viewed nearly 500,000 times!



Why is the source of information critical?

Analysis
Decision Making
Reaction

Training Program
& Instruction

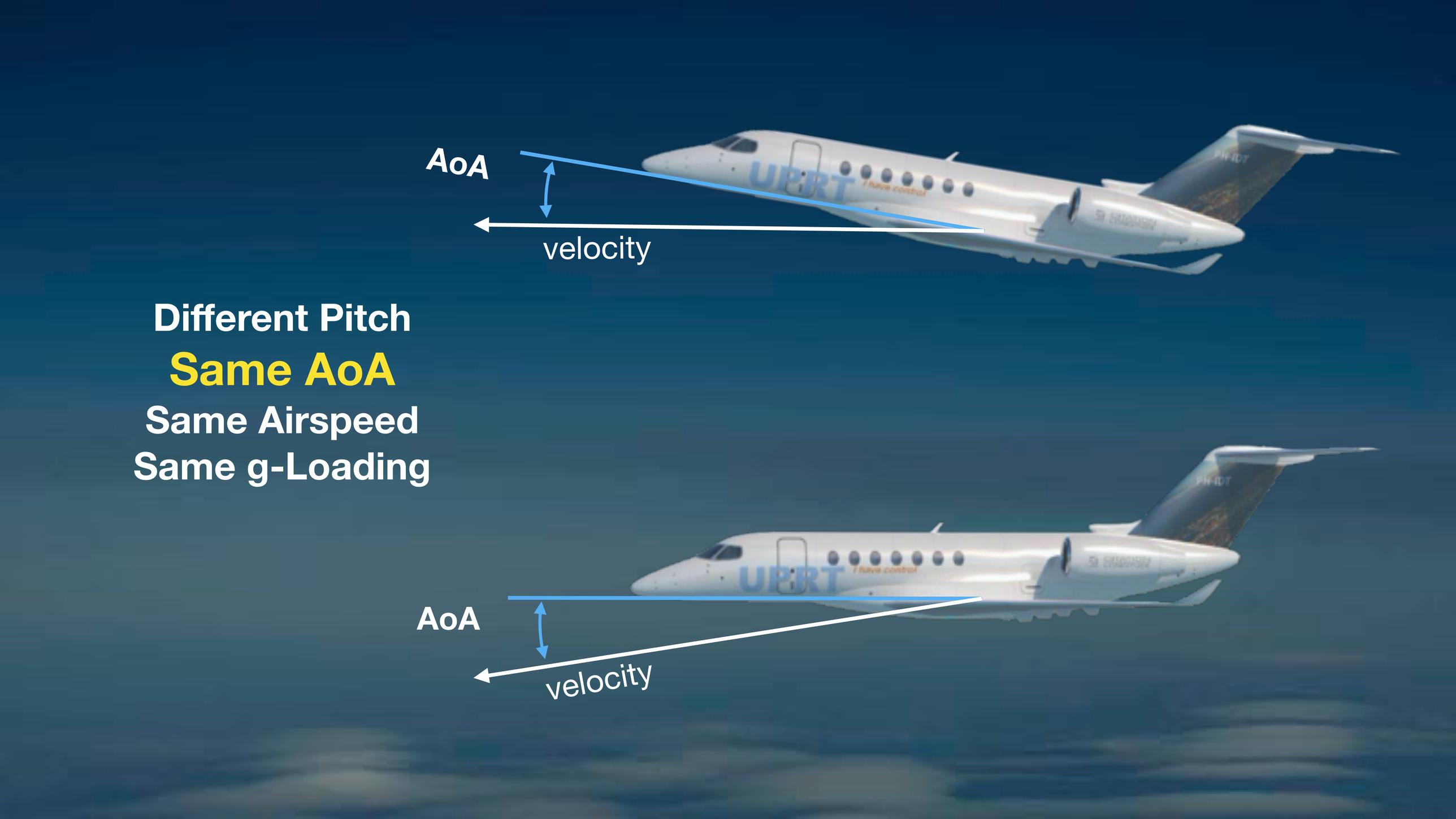
Information
Resources

Instructors should be aware that the safety and potential human factor implications of poor upset recovery instructional technique or misleading information are more significant than in any other areas of pilot training

- EASA

Stall is an Angle of Attack Phenomenon

When the critical angle of attack is exceeded, the wing stalls


AoA
velocity
Different Pitch
Same AoA
Same Airspeed
Same g-Loading
AoA
velocity

Angle of Attack in the Cockpit?

Stall Safety Margin

Top of the speed-tape barber pole

Angle of Attack
(and its rate of change)

Configuration

Mach Number

Low-Pitch, Low AoA

Angle of Attack is not the same as Pitch

Aircraft X-Axis

Flight Path

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High-Pitch, Low AoA

High Kinetic Energy

Aircraft X-Axis

Flight Path

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Low-Pitch, High AoA

Low Kinetic Energy

Aircraft X-Axis

Flight Path

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Reducing Angle of Attack

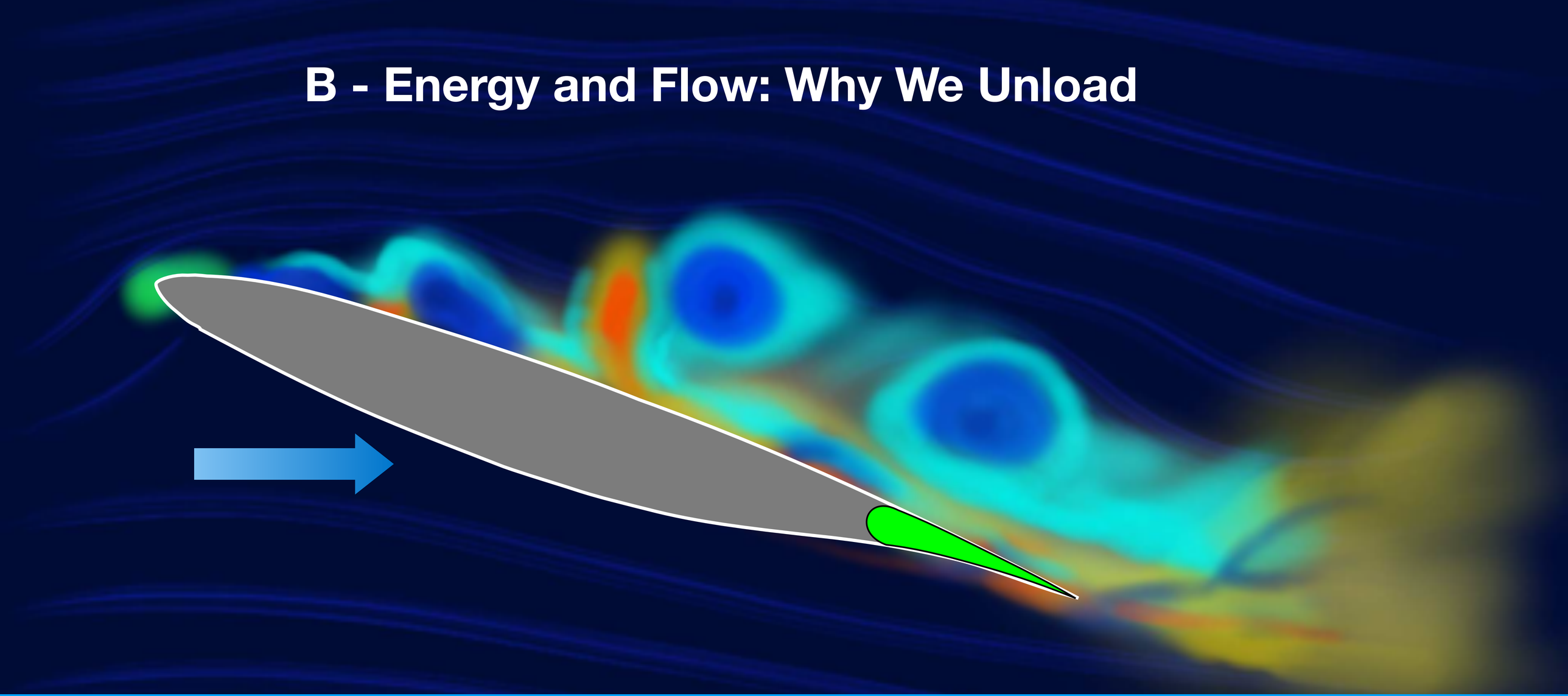
Why?

How?

How Much?

How Quickly?

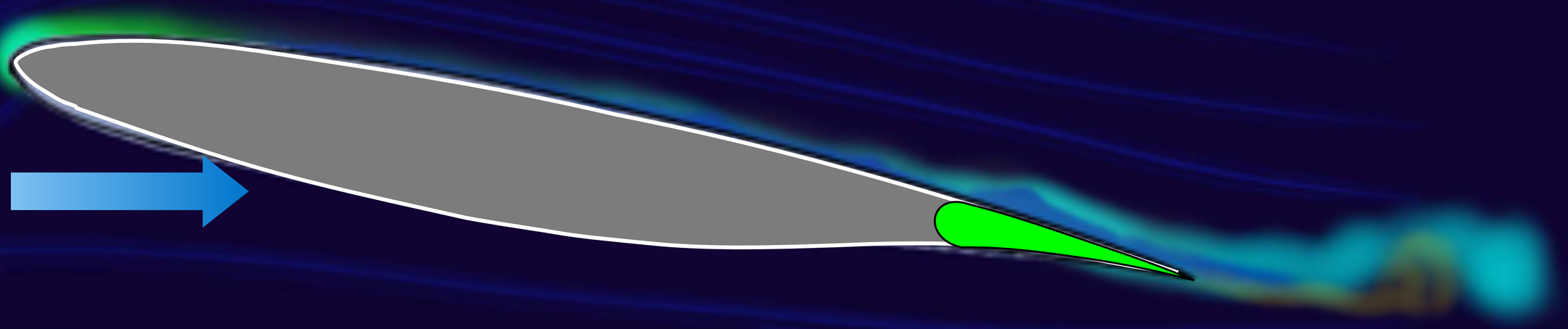
B - Energy and Flow: Why We Unload



Much energy on upper airflow is depleted due to lift

Aileron moving into the flow has little effectiveness

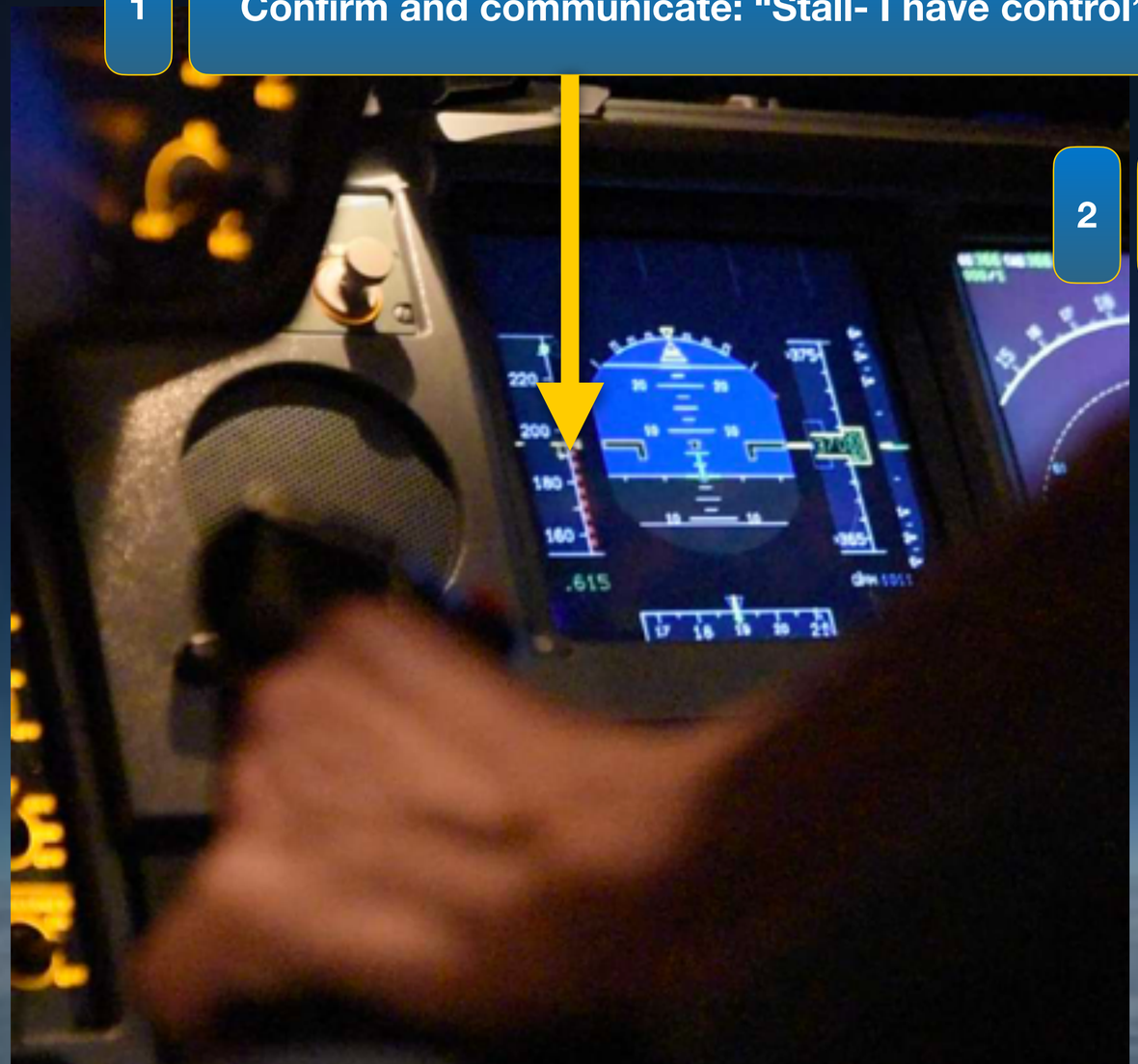
C - Wing with Reduced AoA



Energy on the upper airflow is less depleted due to lift
Aileron moving into the flow has greater effectiveness

Initial Actions Following Stall Event

1 **Confirm and communicate: “Stall- I have control”**



2 **Apply nose-down pitch control**

Requires forward <u>movement</u> of the stick or yoke

Apply until impending stall indications are eliminated

Reducing Angle of Attack

How Quickly?

Example

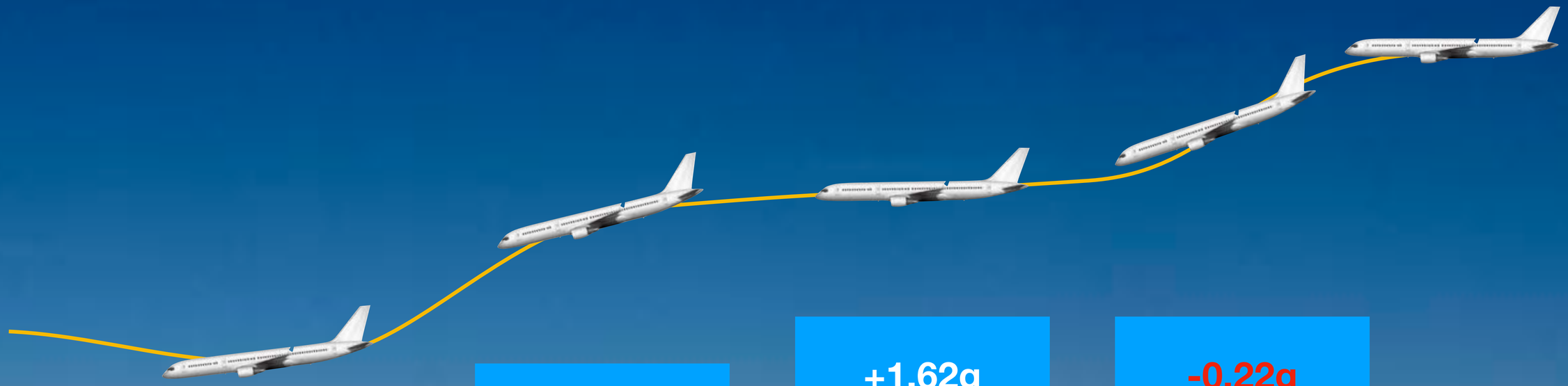
- Training Objective: recover at first indication of stall
- Primary trained reaction: **“PUSH”**
- Recognition interpreted by co-pilot through airspeed indication


90 KTS IAS
PUSH!

Upset Incident

- Push (without confirming, disengaging A/P or A/T)
- Aircraft applies full thrust
- Nose rises; PF notices airspeed dropping
- Repeats the procedure
- Captain sees PFD-L & PFD-C with normal speeds
- Captain recovers

Upset Incident



+1.72g
-12° Pitch

-0.36g
-16° Pitch

+1.62g
-8° Pitch

-0.22g
-9° Pitch

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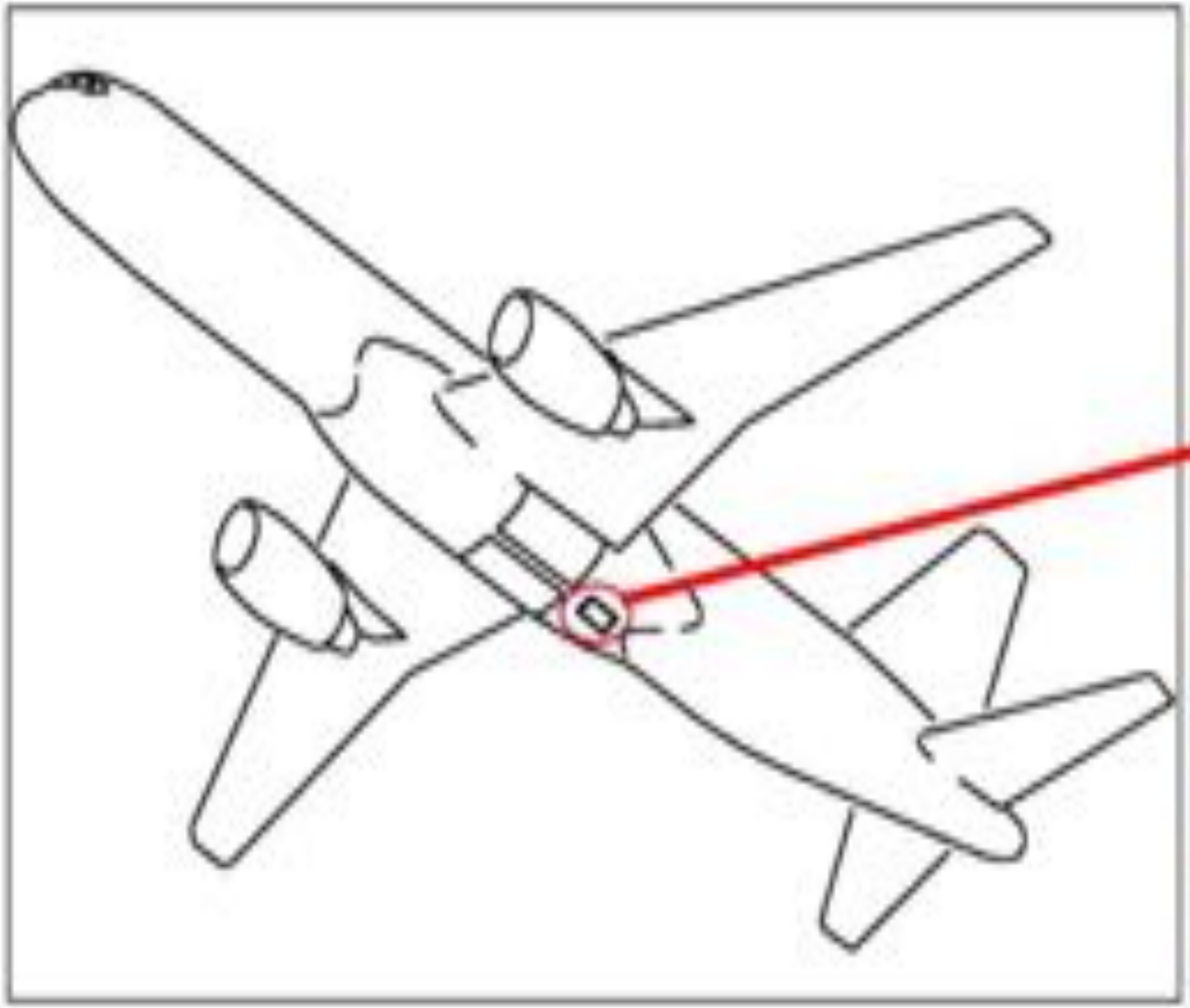

Instructor deficiencies contributed to UPRT requirement

- Pilot training -> automation management, procedures limited manual control
- Simulator training -> procedural training, less on manual flying skills
- Military pilot numbers -> shrinking
- Aerobatics training -> limited/discouraged due to safety concerns
- **Airline's instructors subject to these same deficiencies**
- Training under increasing time and financial pressure
- New initiatives with additional cost not welcome

Simulator Instructor Tasks

- Proper setup of exercises
- Follow a script (lesson plan) developed by the Operator
- Add deviations
- Activate scenario-based exercises
- Contact (hand-fly) maneuver-based exercises
- In-seat instruction and crew instruction

Lesson Plans

- Instructors guide students through each step
- Explaining rationale
- Refresh on aerodynamics, flight control principles
- Help trainees memorise and translate strategies to simple actions to manage during high stress

GPA UPRT | Boeing 787 Module 3 v1.6 | 05 Jun 2019

MOD 3	EXERCISE 1	TYPE	Pilot A & B

Changing Pitch, Constant AoA

Demonstrate that constant load factor can be achieved at different pitch angles

ZFW (T)	FUEL (T)	CG (%)	FLIGHT MODE
185	25	24	NORMAL MODE

ALT / FL	SPD / MACH	CONFIG	FMS Page	A/P	A/T
FL330	195	FLAPS 5	N/A	ON	ON

WEATHER CONDITIONS	DAY / NIGHT
CAVOK, CALM, QNH 1013, 15° C	DAY

GUIDANCE

In the first Module, we learned that the Angle of Attack and Pitch attitude are not identical. The AoA was allowed to vary while the pitch attitude was kept constant, and how AoA is connected to the load factor.

Now, in this brief exercise, we will maintain a constant AoA, airspeed and load factor while only the pitch changes. Thrust will be adjusted accordingly to maintain the same airspeed.

EXECUTION

- Using the A/P, establish level flight with an airspeed of 195 knots.
- Point out that the pitch is 4° above the horizon.
- **AOA = 4°; PITCH = 4°**
- **Airspeed is 195 knots**
- **Load Factor = 1.0**

- **Disengage A/P; Set THRUST to IDLE and hold 195 KIAS**
- Airplane should hold constant speed of 195 knots due to trim reference logic, which sets the new speed
- **AOA = 4°; PITCH = 0°**
- **Airspeed is 195 knots**
- **Load Factor = 1.0**

DISCUSSION

Even though the pitch attitude has changed, the airspeed is constant, and AoA are the same. Note also that the g-loading in both cases is 1.0.
AoA is again independent of the pitch attitude, as was shown in Module 1.

COMMON TRI ERRORS

Not maintaining 4° AoA, or allowing the speed to change significantly

COMMON PILOT ERRORS

N/A

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Instructional Flow

min 2 per fleet

10%

UPRT applicability under EASA - Pilots

PART	Level	What is it?	Objective	Pre-requisite for
Operator	Recurrent	36-month cycle of prevention and recovery exercises	Ongoing UPRT training for skills/ knowledge maintenance	
	Operator Initial	Training of all pilots to proficiency standards in upset prevention and recovery	UPRT skills/knowledge aligned with Operator's processes	Entering the airline
Licensing	Class/Type UPRT	UPRT related to class/type specificities	Airline training level UPRT skills & knowledge	• Mandatory for: • SP certified complex aeroplanes • MP certified aeroplanes
	Advanced UPRT*	Part of MPL and ATPL Integrated Course Additional theory & flight training in an aeroplane	Expose students to dynamic upsets, build pilot psychological, physiological resilience	• SP aeroplanes in MPO • SP HP complex aeroplanes • MP aeroplanes
	Basic UPRT*	Required for MPL, CPL and ATPL courses. Additional instructor requirements to deliver this are not required.	Theory (briefing) and flight exercises • Critically low airspeeds • Unusual attitudes • Spin avoidance	
		* on-aircraft UPRT		

UPRT applicability under EASA - Instructors

PART	Level	What is it?	Objective	Pre-requisite for
Operator	**Sim Instructor**	TRI/SFI trained for UPRT delivery	Proper delivery of FSTD training	FSTD training
Licensing	**Sim Instructor**	TRI/SFI trained for UPRT delivery	Proper delivery of FSTD training	FSTD training
	UPRT Instructor*	UPRT instructor training course. Prerequisite: 500 h total / 200 h as FI(A) • Continuous assessment • Course completion certificate + logbook entry Recency: 1 refresher training / year	Qualification for delivery of Advanced UPRT	Giving instruction in on-aircraft Advanced UPRT
		* on-aircraft UPRT		

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EASA UPRT Structure

- UPRT Instructor
- Operator UPRT
- Class/Type UPRT
- Advanced UPRT
- Basic UPRT

Combination of Aircraft & Simulators

Academic Knowledge

Qualified Instructors

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Basic UPRT

Pilot career

- UPRT Instructor
- Operator UPRT
- Class/Type UPRT
- Advanced UPRT
- **Basic UPRT**

- MPL, CPL and ATPL courses
- Theory (briefing) and flight exercises
  - Critically low airspeeds
  - Unusual attitudes
  - Spin avoidance

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EASA European Aviation Safety Agency

Advanced UPRT Course

Pilot career

- UPRT Instructor
- Operator UPRT
- Class/Type UPRT
- **Advanced UPRT**
- Basic UPRT

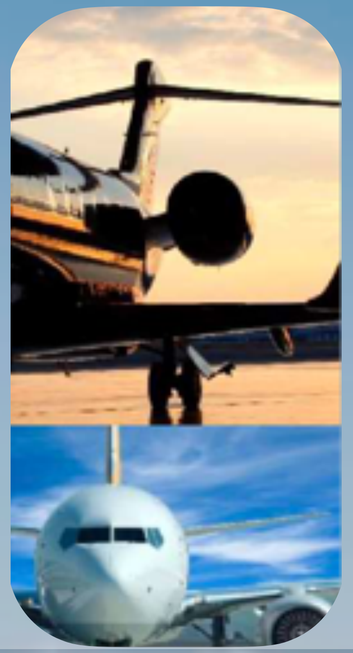
- Additional theory & flight training in aeroplane
- Objective: expose students to dynamic upsets, build pilot psychological and physiological resilience

Class/type-specific UPRT

Pilot career

- UPRT Instructor
- Operator UPRT
- **Class/Type UPRT**
- Advanced UPRT
- Basic UPRT

- UPRT related to class/type specificities
- Mandatory for:
  - SP certified complex aeroplanes
  - MP certified aeroplanes



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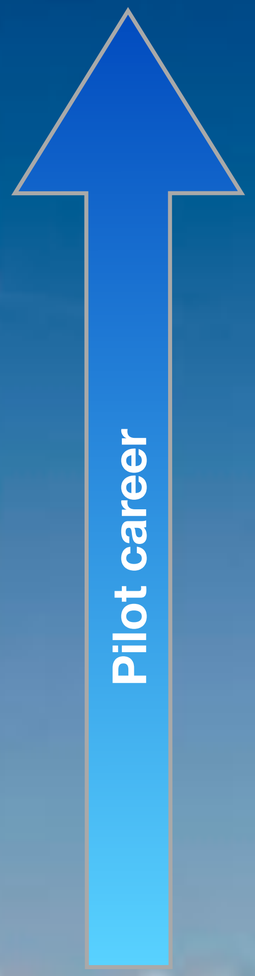
EASA European Aviation Safety Agency

CAT operator UPRT



UPRT Instructor

CAT Operator UPRT

Class/Type UPRT

Advanced UPRT

Basic UPRT

- UPRT during CAT operator recurrent training

UPRT instructor

Pilot career

UPRT Instructor

Operator UPRT

Class/Type UPRT	No additional instructor certification required
Advanced UPRT	Additional instructor training - FCL.915(e)
Basic UPRT	No additional instructor certification required

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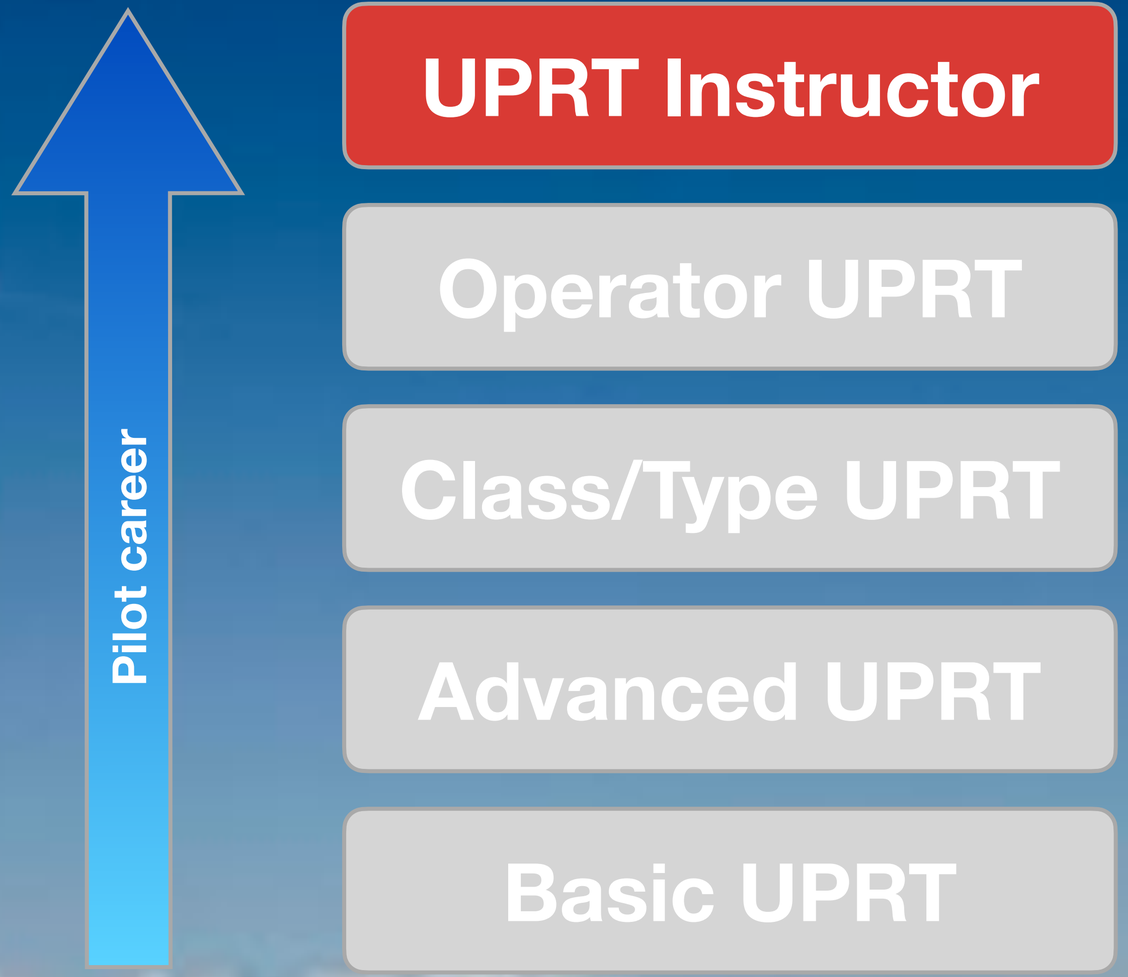
EASA European Aviation Safety Agency

AdvancedUPRT instructor



- UPRT Instructor training course
  - Prerequisite 500h total / 200h as FI(A)
  - Continuous assessment
  - Course completion certificate + logbook entry
- Recency: 1 refresher training/year

Airline-Level UPRT

- **Operator Initial UPRT**
  - Develop the basic skills and knowledge through a dedicated UPRT course
  - Can be conducted in single or multiple sessions, or
  - Can be part of recurrent training sessions (UPRT-dedicated blocks)
- **Recurrent UPRT**
  - Maintain knowledge and skills on recurring basis
  - EASA requires 3-year coverage of all required elements
  - Multiple learning elements can be integrated into single exercises

“Train-the-Trainer” and “Validate the Instruction”

TRAINING

Simulator UPRT

Instructor Ground School

All academics & lessons are integrated

VALIDATION

UPRT-trained Instructors

VALIDATION

Line Pilots

UPRT Instructor Guidance & Simulator Lesson Plans

UPRT academics

The Instructor Must Understand…

- importance of type-specific OEM procedures;
- how to distinguish between applicable SOPs & OEM recommendations
- capabilities and limitations of the FSTD used for UPRT
- the potential of negative transfer of training when outside capabilities;
- use of IOS of the FSTD for UPRT;
- use of FSTD instructor feedback tools;
- importance of adhering to valid scenarios;
- missing critical human factor aspects due to FSTD limitations.
- Instructor must be able to demonstrate correct recovery techniques for specific a/c type;

Unique Aspects of UPRT

- **Safety Critical**
- Combination of knowledge and skill - multiple competencies
- Risk of inadequate training or information transfer can be catastrophic
- **Conversely, properly structured and delivered training can have lasting impact**

The properly trained instructor is the most critical - and challenging - element of UPRT

UPRT is an Opportunity to Work Together!

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