

The ATR logo is displayed in white, italicized, sans-serif font on a solid red rectangular background.

Flight Safety Conference

29th – 30th November 2023

Runway Excursion prevention

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Accident Investigator

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HO Flight Test – Experimental Test Pilot

The ATR logo is displayed in red, italicized, sans-serif font in the bottom right corner of the slide.

Runway Excursion prevention

20%

Aircraft status

MEL items
System Failures
PL rigging

20%

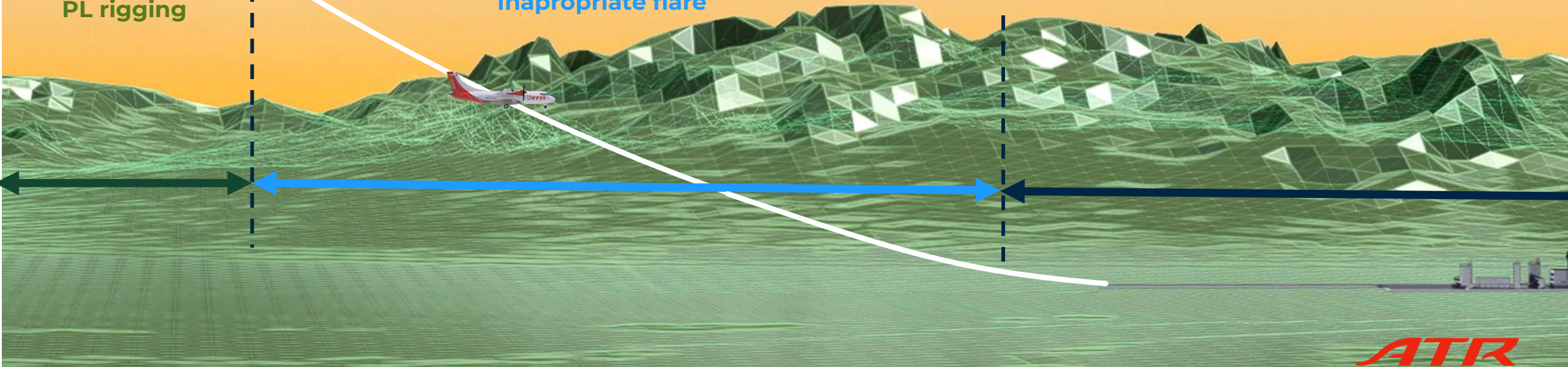
Approach phase

High IAS
Landing with power
Inappropriate flare

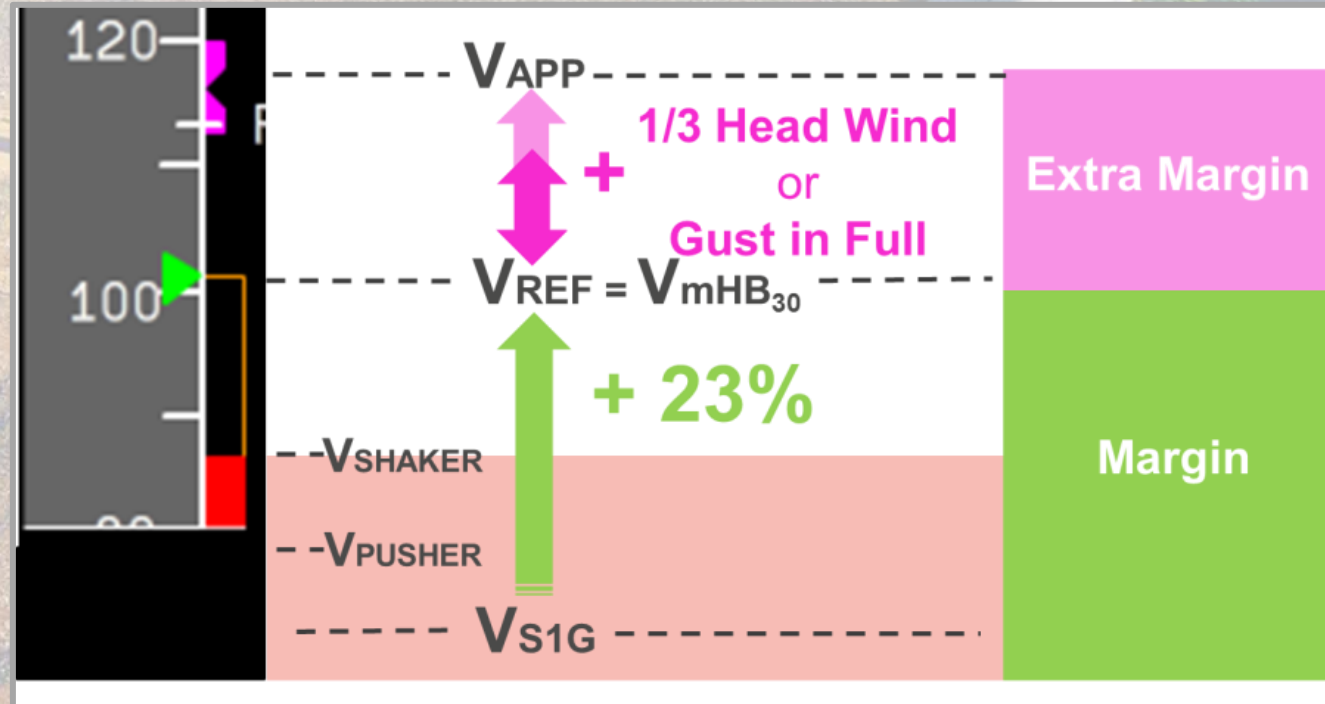
60%

Ground phase

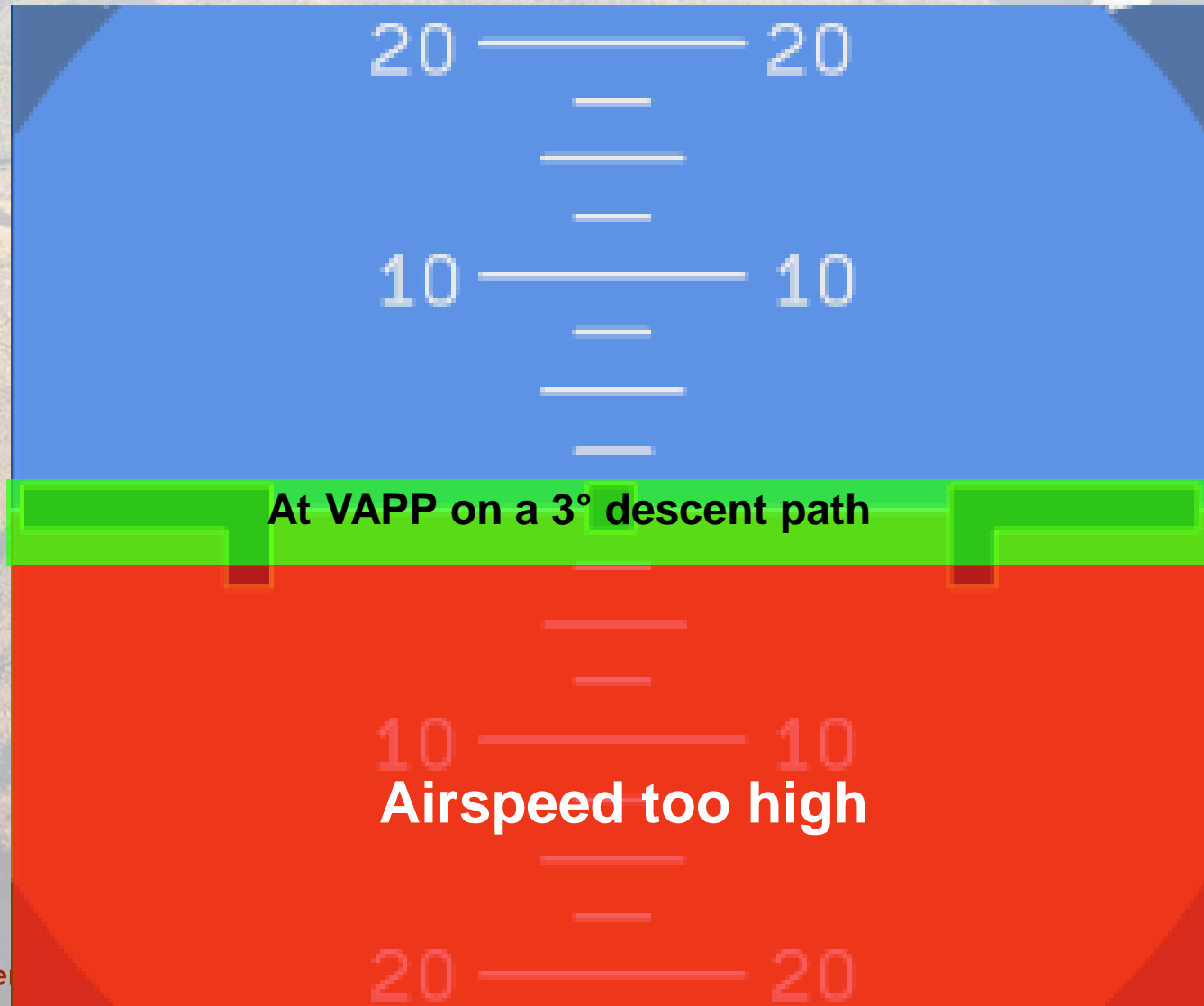
Excessive rudder input
Landing techniques



Runway Excursion prevention – in approach



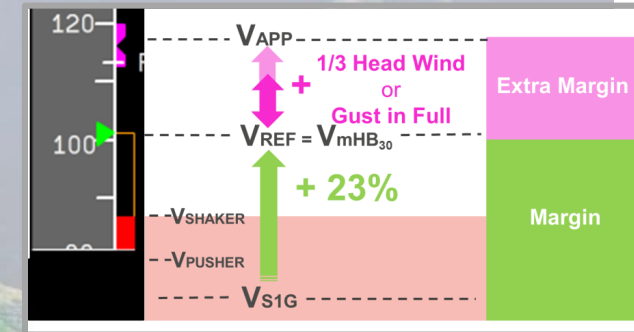
Runway Excursion prevention – in approach



+1°

-2.5°

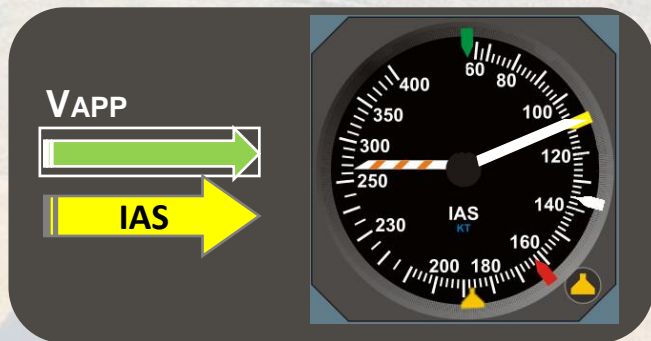
Runway Excursion prevention – in approach



+1°

-2.5°

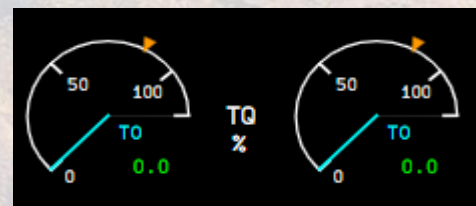
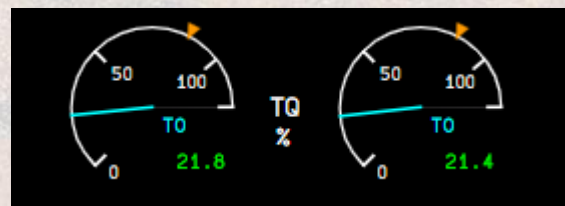
Runway Excursion prevention – flare



50ft

20ft

Flight



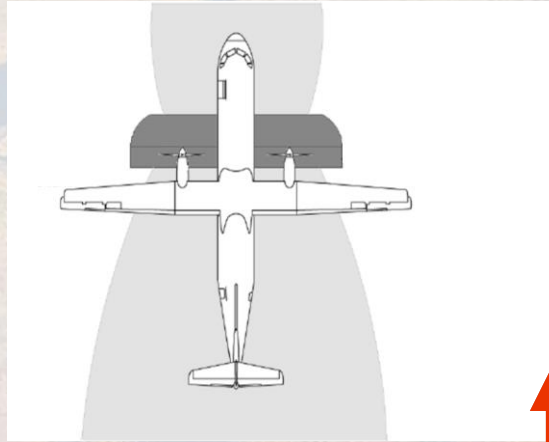
On Ground



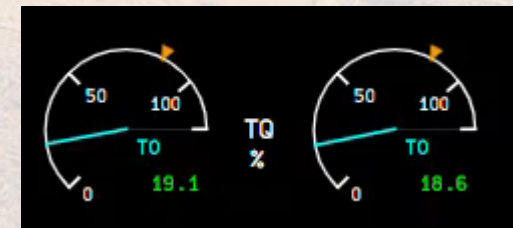
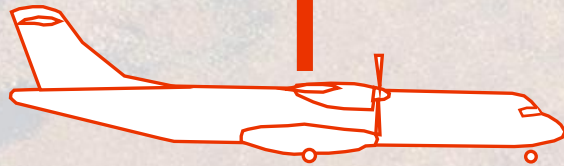
ATR

Runway Excursion prevention – flare

- Power reduction at landing
- Effect of power setting on lift



Lift
decrease



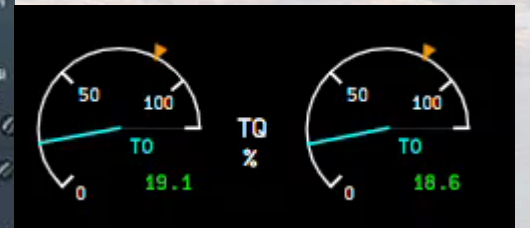
Runway Excursion prevention – flare

- Power reduction at landing
- Effect of power setting on lift
- Ground effect

Lift increase

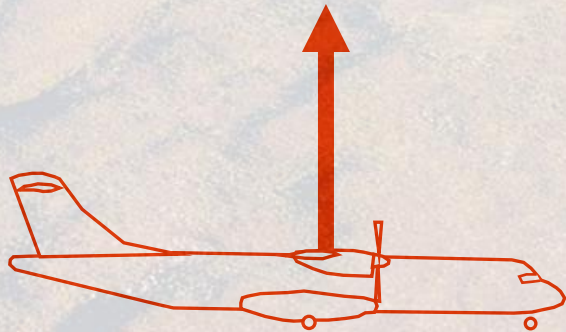


No PL reduction

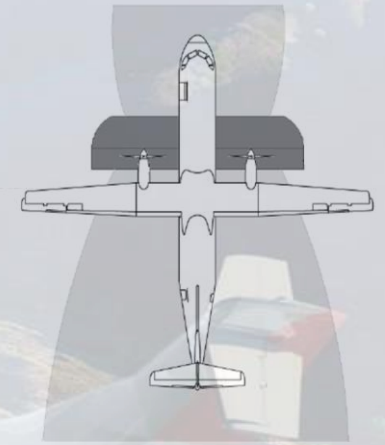


Runway Excursion prevention: Flare

- Power reduction at landing
- Effect of power setting on lift
- Ground effect

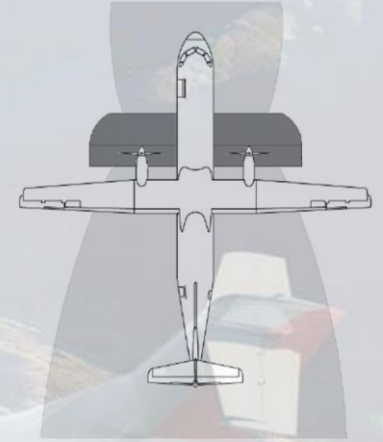


Constant Lift

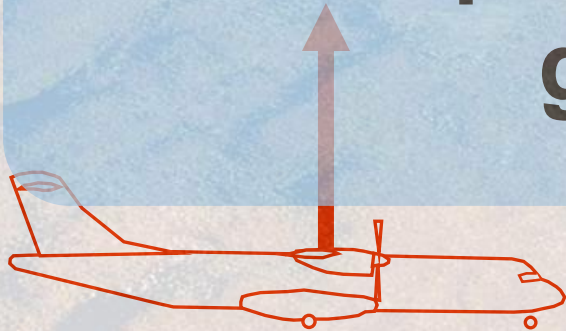


Runway Excursion prevention: Flare

- Power reduction at landing
- Effect of power setting on lift
- Ground effect

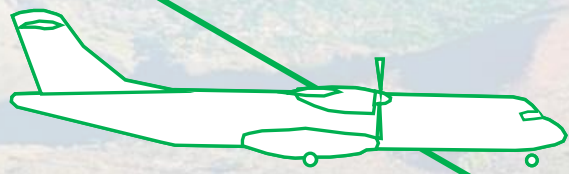


Reduce power to compensate the ground effect



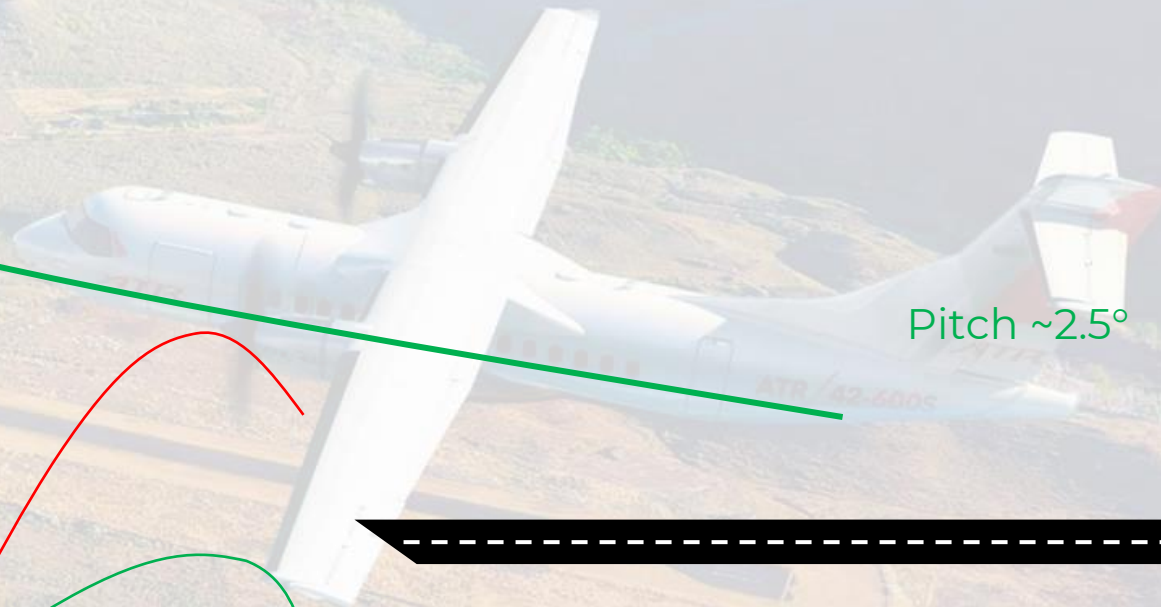
3° flight path

Touchdown

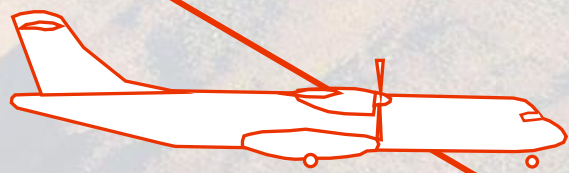


Pitch 0°

Power reduction



Pitch ~2.5°



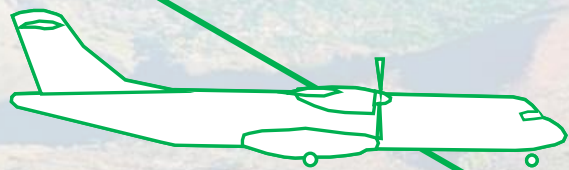
No power reduction

Pitch <math>< 0^\circ</math>



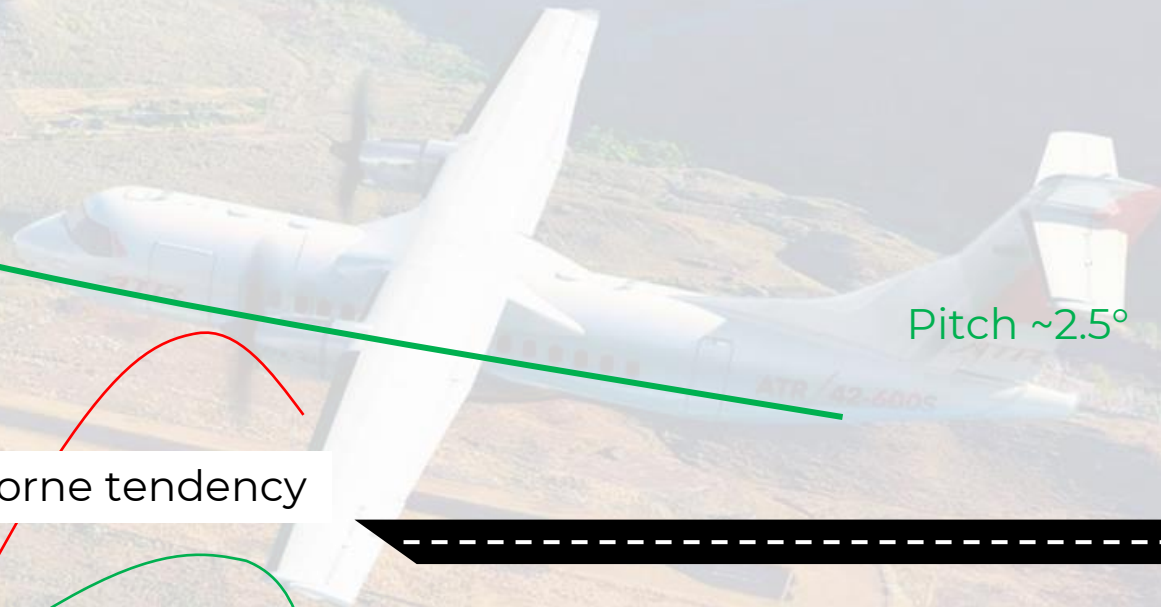
3° flight path

Touchdown



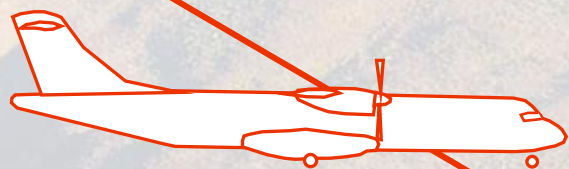
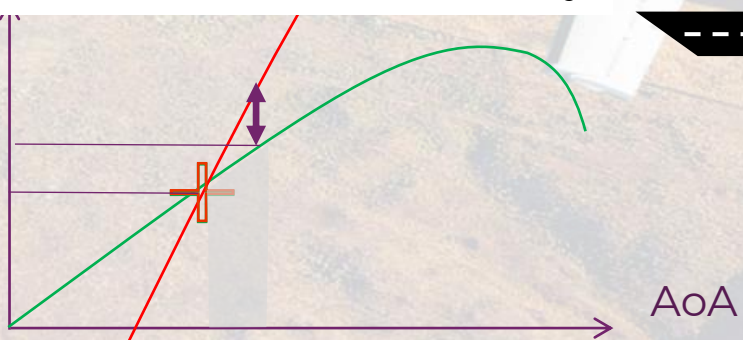
Pitch 0°

Power reduction



Pitch ~2.5°

C_L Greater Airborne tendency

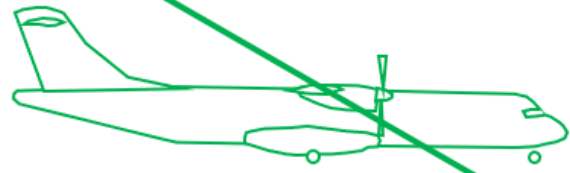


No power reduction

Pitch < 0°

3° flight path

Touchdown

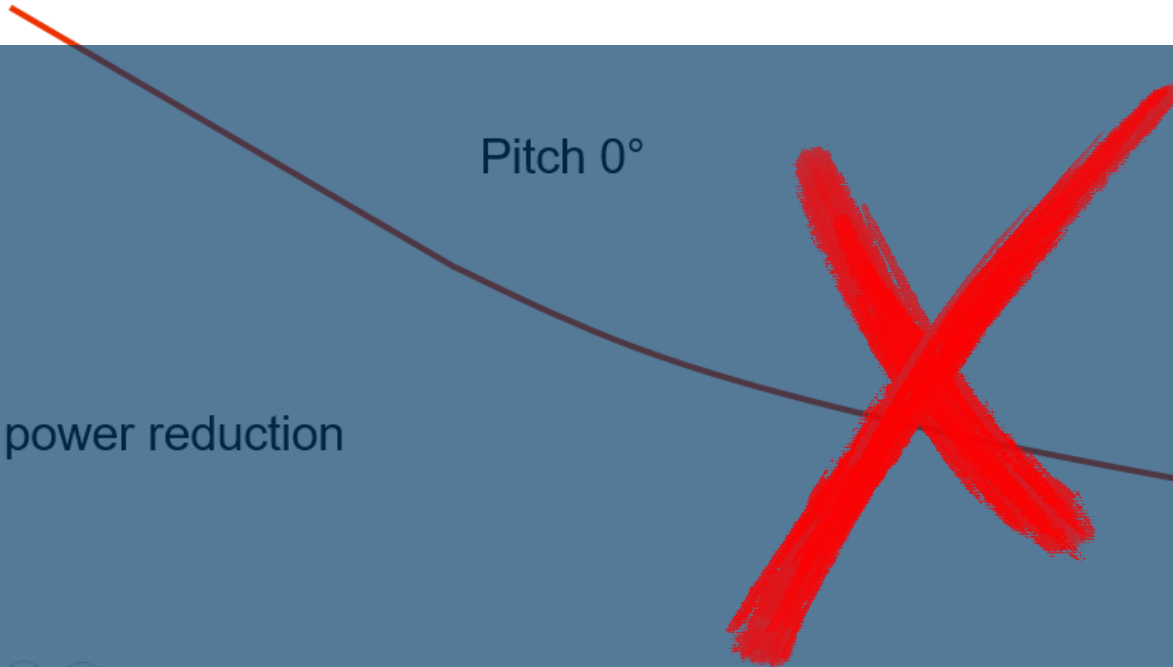


Pitch 0°

Power reduction



Pitch 2.5°



Pitch 0°

No power reduction

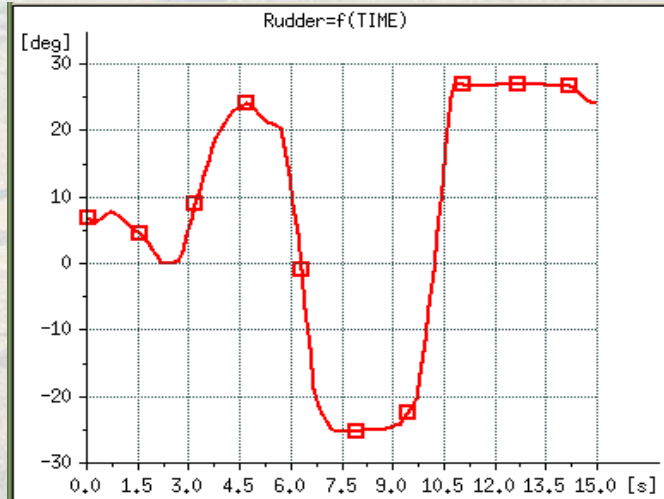


Pitch < 0°

ATR

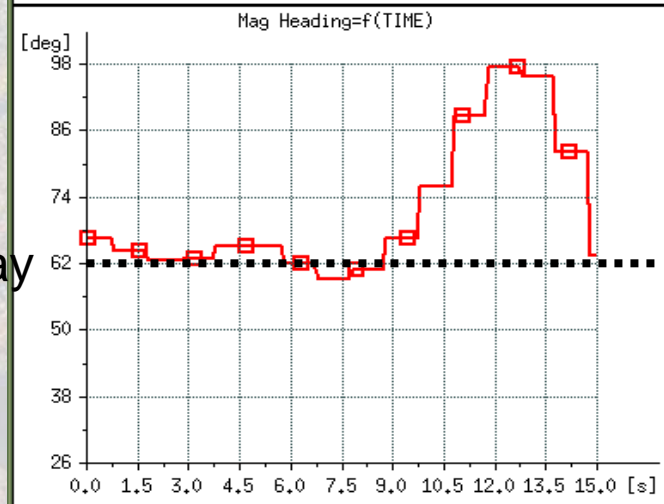
Runway Excursion prevention – on ground

RUDDER DEFLECTION



MAGNETIC HEADING

Runway



Be ready to use
brakes

Runway Excursion prevention – on ground

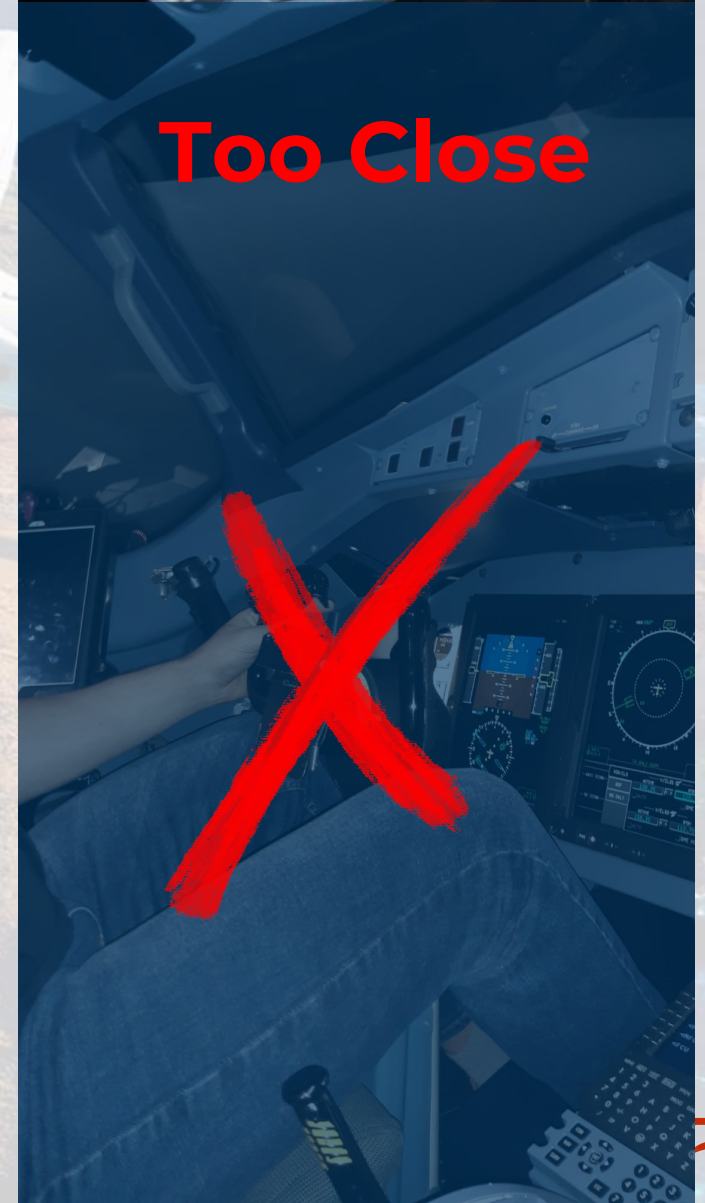


Runway Excursion prevention – on ground

Too Far



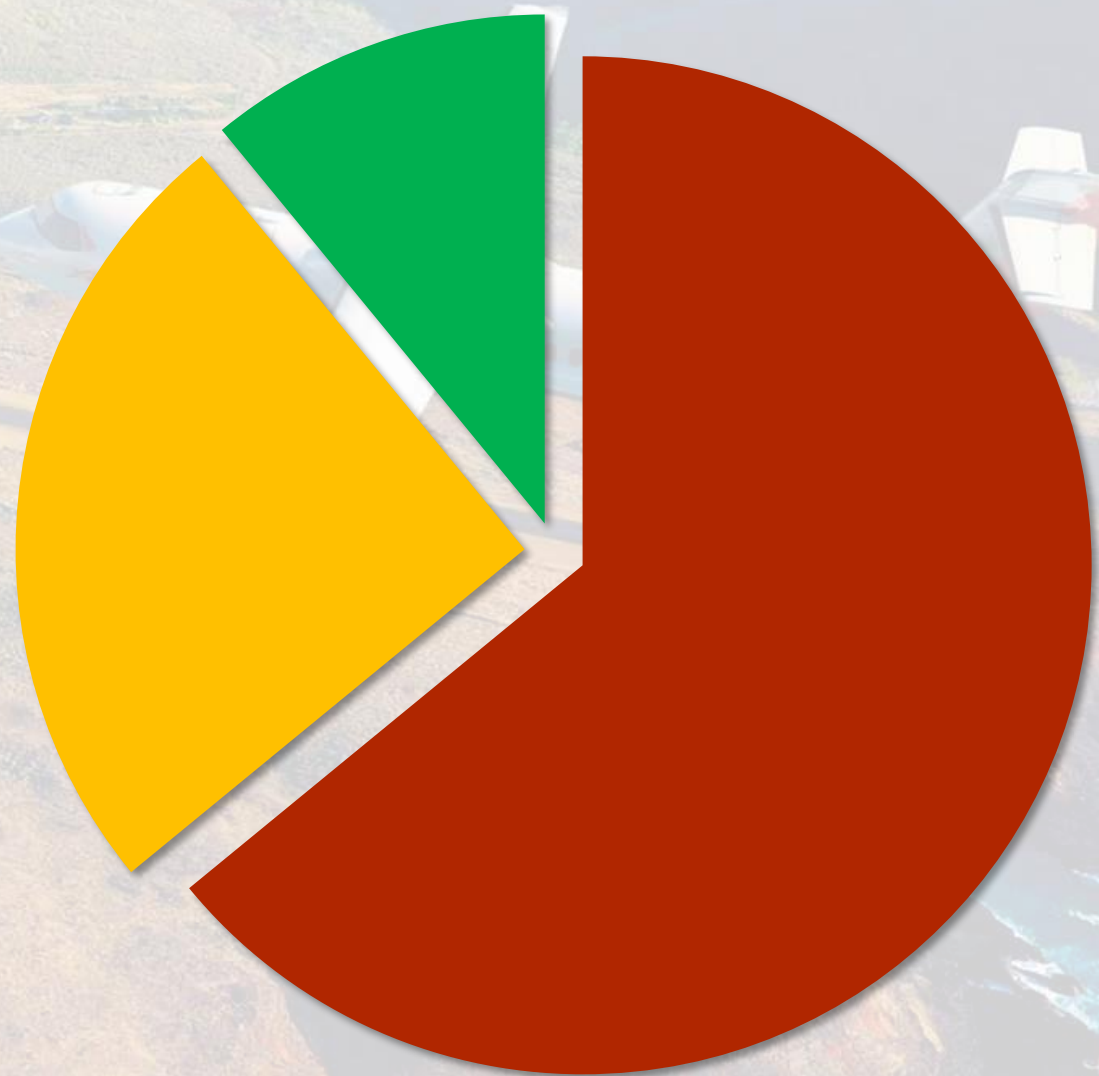
Too Close



Runway Excursion prevention – on ground

Braking devices:

- Aerodynamic (power reduction)
- Reverse
- Brakes



Runway Excursion prevention – on ground

Case 1: Control column pushed, reverse, no brake application

Weight

75 %

50 %

35 %

5 %

Reduce the exposure between touchdown and 50 kts



Vref



50 kts

Runway Excursion prevention – on ground

Case 1: Control column pushed, reverse, no brake application
Case 2: Control column pushed, reverse, brakes

Weight

75 %
50 %
35 %
5 %

Increased weight
on the NLG

Exposure
time divided
by 2

Vref

50 kts

Runway Excursion prevention – on ground

Case 1: Control column pushed, reverse, no brake application
Case 2: Control column pushed, reverse, brakes

Braking:
Increase the NLG loads by 3
Reduce the exposure time by 2

Weight

75 %
50 %
35 %
5 %



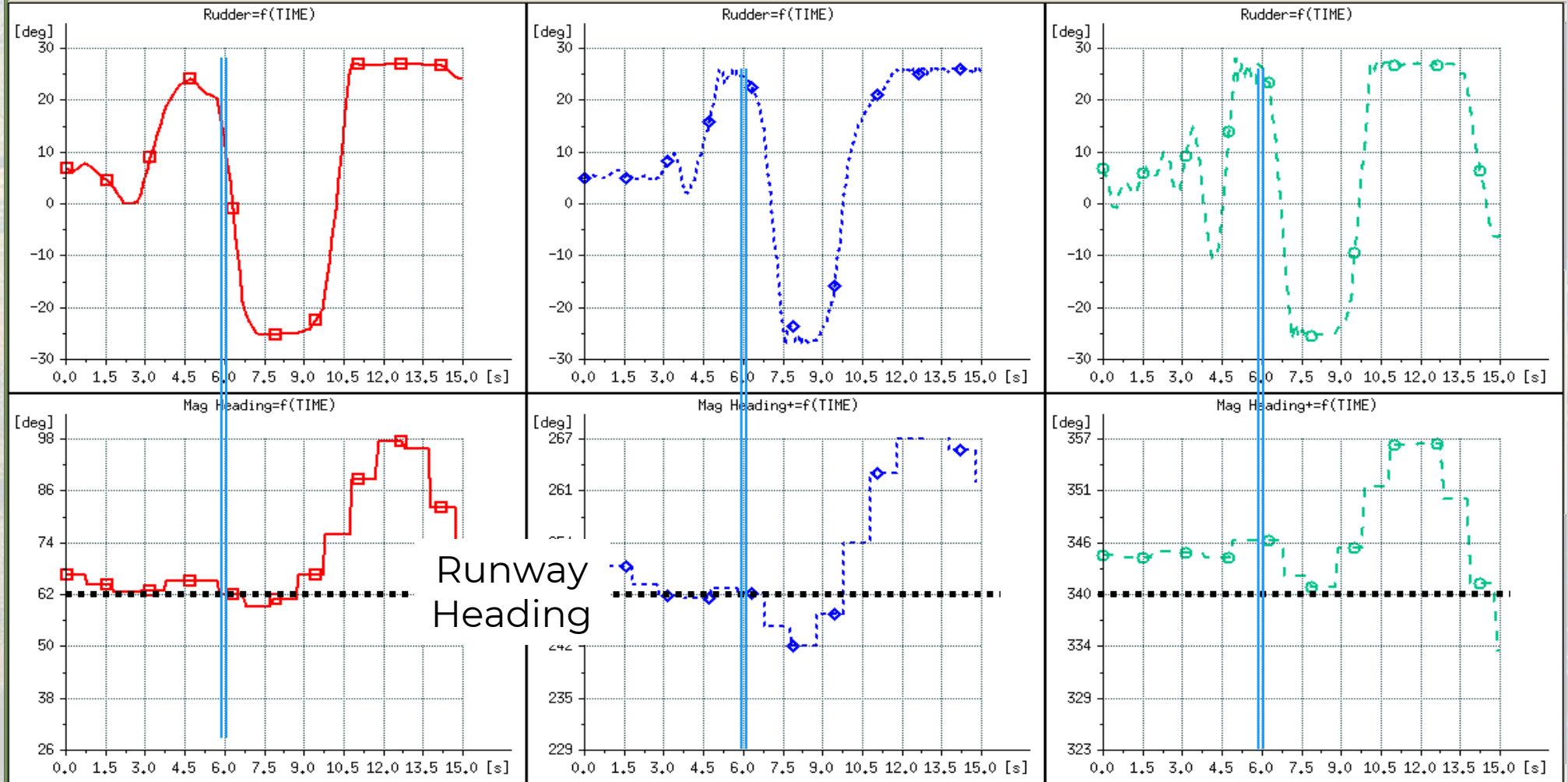
Vref



50 kts

Runway Excursion prevention – on ground

RUDDER DEFLECTION

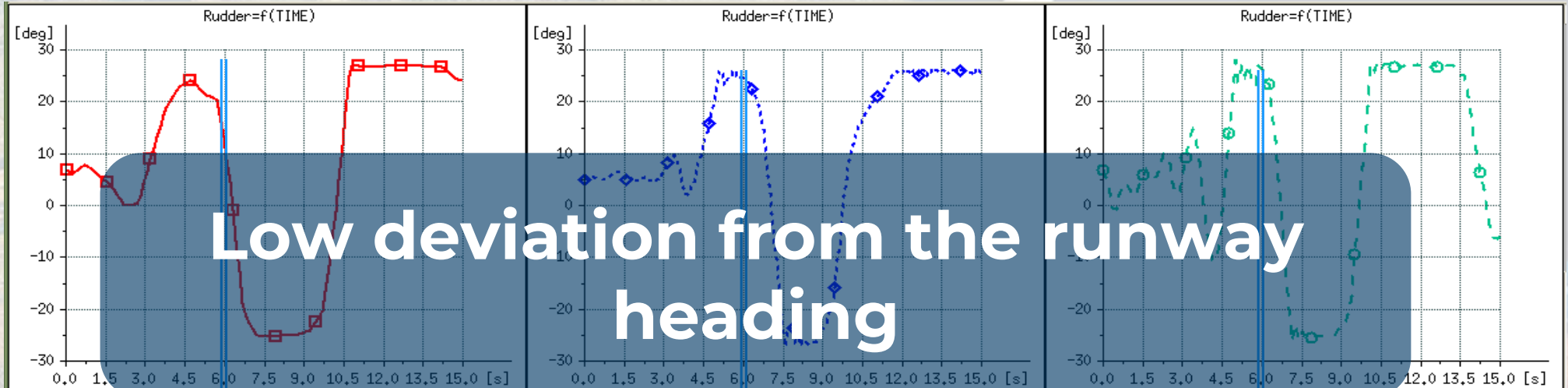


MAGNETIC HEADING

Runway Heading

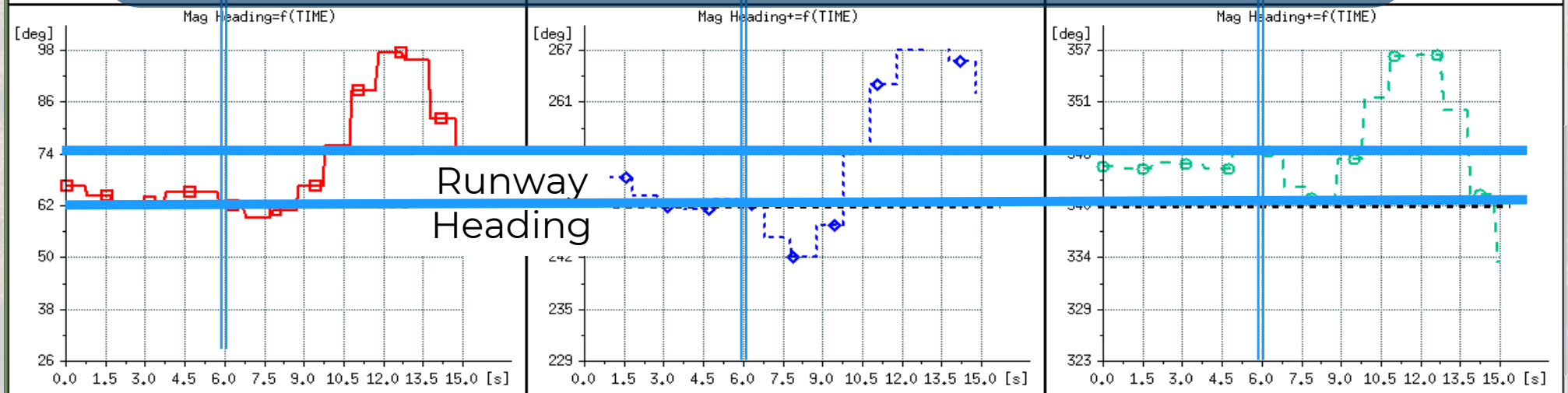
Runway Excursion prevention – on ground

RUDDER DEFLECTION



Low deviation from the runway heading

MAGNETIC HEADING



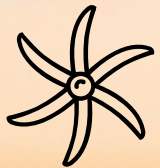
Conclusion



Trust VAPP



Touchdown at FI



Be ready to brake