Operational and Training Considerations for Safe Go-Around Procedures

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Flight Safety Foundation
International Air Safety Summit
November 16, 2016
DUBAI, UAE

November 14–16 Dubai
IASS 2016
69th annual International Air Safety Summit

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The Go-Around Maneuver:

Is it a normal, safe maneuver….in practice?

A strong pilot bias to avoid a G-A:

Why?

Are there threats to the G-A?

Is it trained properly?

How can it be mitigated?

How do Pilots regard the G-A maneuver?

Pilots do consider the G-A maneuver as a threat
(only 3% of un-stable approaches result in a G/A)

The G-A maneuver is relatively rare. At Alaska Airlines our rate:

34 Go Arounds per 10,000 flights over the past 5 years

OBJECTIVE:

Train the G-A maneuver to a level that pilots gain confidence in their ability to conduct one safely

Operational Challenges to the G-A

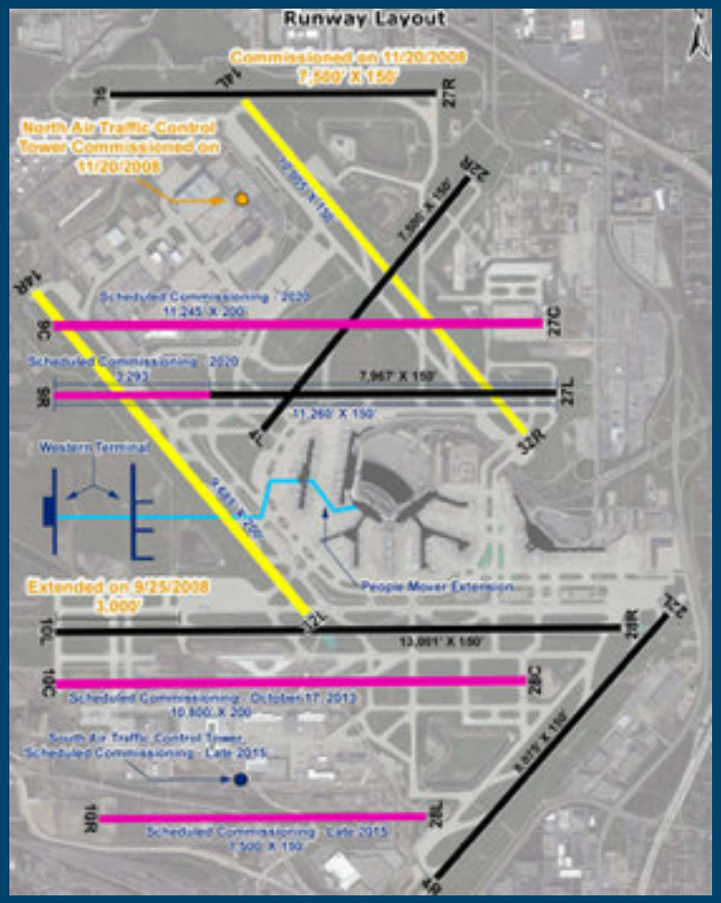
- G-A procedure: High Work-Load
  - configuration change
  - Navigation
  - Interface with Automation
  - Communication/coordination with ATC

No two G/A events are the same !

- Physical sensations to overcome (TBD)
  - lack of horizon
  - fatigue
  - flight crew coordination/ monitoring capability

ATC has independent plans for the G-A

Chicago:
9 runways



Each runway has it's own ATC G-A plan

Complicated G/A navigational procedures (ATC):

- low altitude level-offs
- where the G/A maneuver begins

Many Variations of the Go-Around

Instrument Approach:

- A defined Missed Approach Procedure
- Can include a low altitude level-off
- If initiated prior to the Missed Approach Point, could be more difficult

Many Variations of the Go-Around

Visual Approach:

- ATC will have a runway specific separation plan

- This plan can change depending on where the G-A is initiated

Many Variations of the Go-Around

Interface with Automation:

- Some TOGA features are altitude dependent

- You may or may not have F/D guidance

- Pilots must be able to back-up with Manual Skills… **Pitch and Power**

Many Variations of the Go-Around

Crew Directed G-A:

- Un-stable approach criteria
- Wind-shear warning
- Loss of visual reference with runway
- Landing/Approach abnormal
- Environmental event (wake vortex, tailwind, gust)

ATC Directed G-A

Adopt Surprise G-A events into Training

The G-A manuever at the DA has been over-trained..

much like the V-1 cut on take-off.

Accident/Incident data indicates that the un-expected G-A event is where we need to focus our training

Surprise G-A: loss of visual reference

De-graded visibility after minimums

American Airlines 331, Jamaica

Reduced visibility and heavy rain contributed to long landing and de-graded braking

Air France 358, Toronto

Training Objective for the G-A:

Pilot Confidence that the G-A is a useful tool

In a variety of likely scenarios:

weather minimums

un-stable approach

Surprise Events:

ATC directed Go-Arounds

wind-shear, loss of visual reference

other “abnormals”

Training Solutions for the G/A

Solid Maneuvers Based Training (to build pilots SKA)

Validate SKA's with Scenario Based Training
(to ensure fluency)

HOWEVER

Simulator time
is precious and
finite

Fluency versus Proficiency…..Critical Maneuvers

Critical Maneuvers:

- High Speed RTO
- Upset/Stall
- Wind-shear
- GPWS

Performance Standard:
Aircraft Control

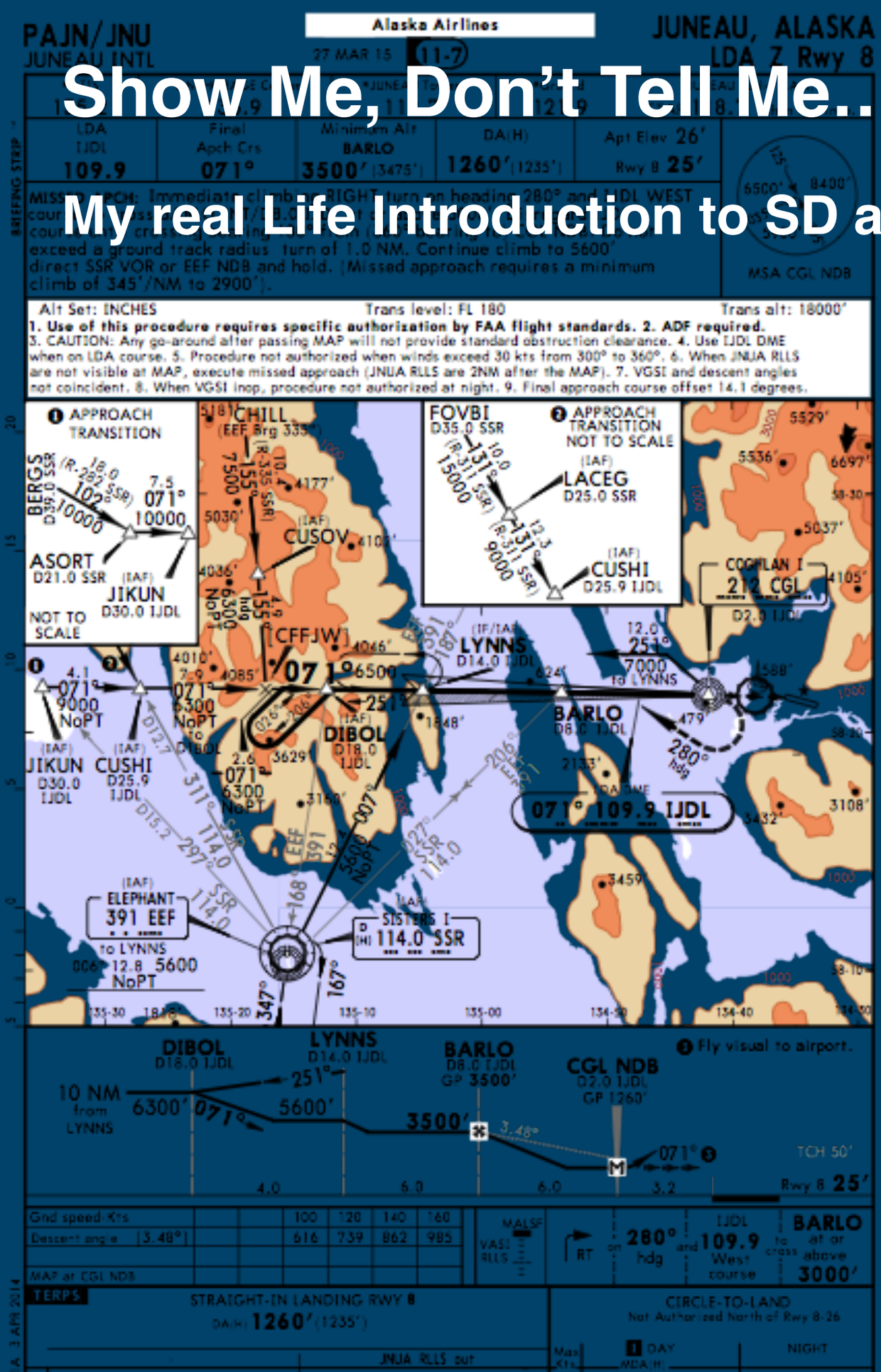
Pitch
Power

Physiological Threat of a Go-Around

Not just a complex, dynamic procedure but also subject to **Somatogravic Illusion**

Show Me, Don’t Tell Me…..

My real Life Introduction to SD and Somatogravic Illusion



MISSED APCH: Immediate climbing RIGHT turn on heading 280 and IJDL WEST course to cross BARLO INT/ D8.0 IJDL at or above 3000'. Disregard IJDL course until crossing bearing 180 from (360 bearing to) CGL NDB.

Do not exceed a ground track radius turn of 1.0 NM.

Continue climb to 5600’ direct SSR VOR or EEF NDB and hold. (Missed approach requires a minimum climb of 345'/NM to 2900').

Juneau, Alaska LDA/DME

Threat and Error Management adopted into Line Operations

Why incorporate TEM: LOSA Results

Greater crew integration/interaction. The significant role of the PM…starting the **"threats"** discussion

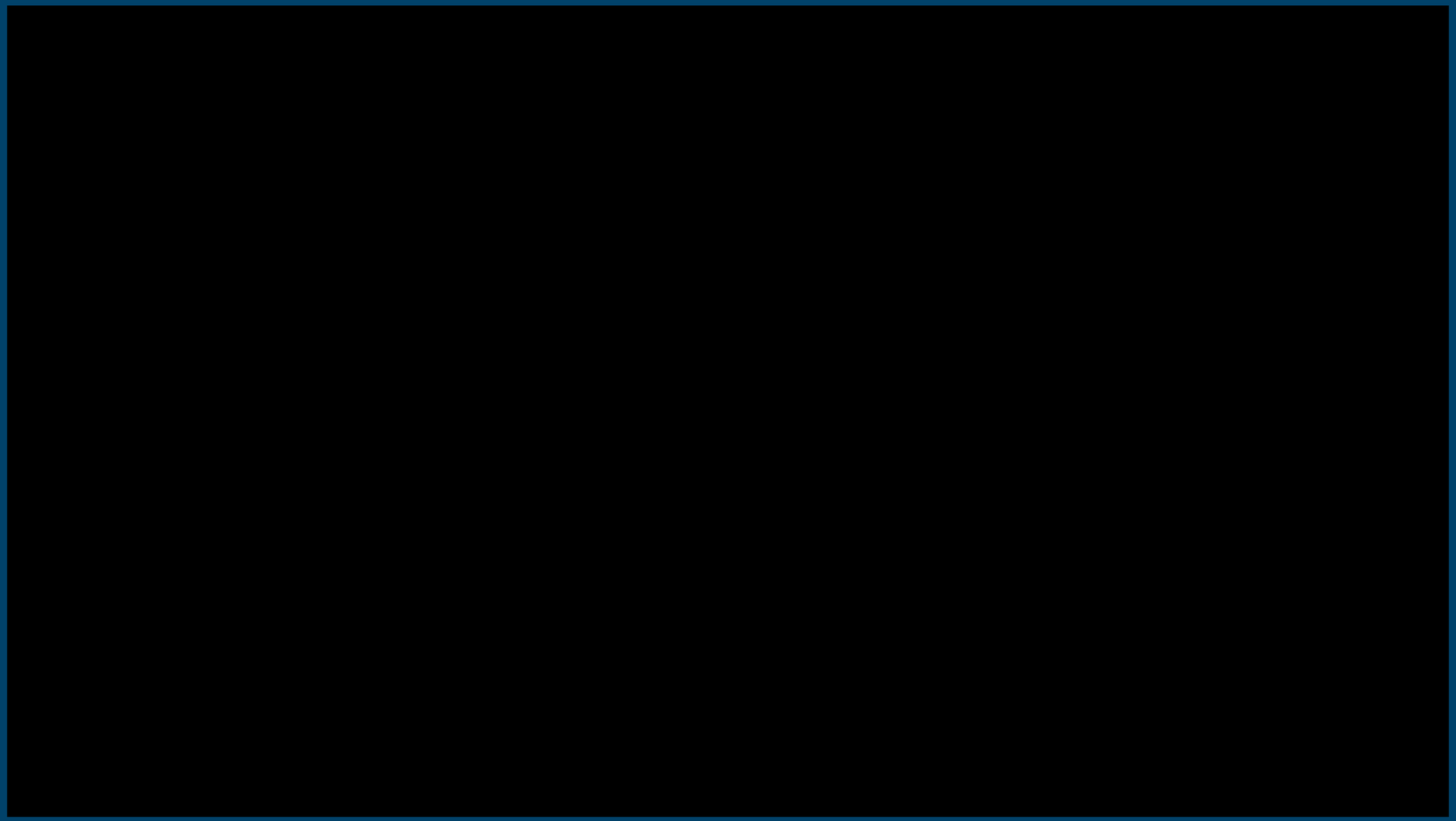
One Team Outcome

Crew is primed for action….mutual agreement on **"a plan"** and what to do if plan changes

Considerations for what may likely change

Threats, Plan and Considerations….
Example…..

TEM: How we Plan and Brief for Threats



G-A threats: Loss of Control & SD

How can we protect ourselves?

Manual Flying Skills

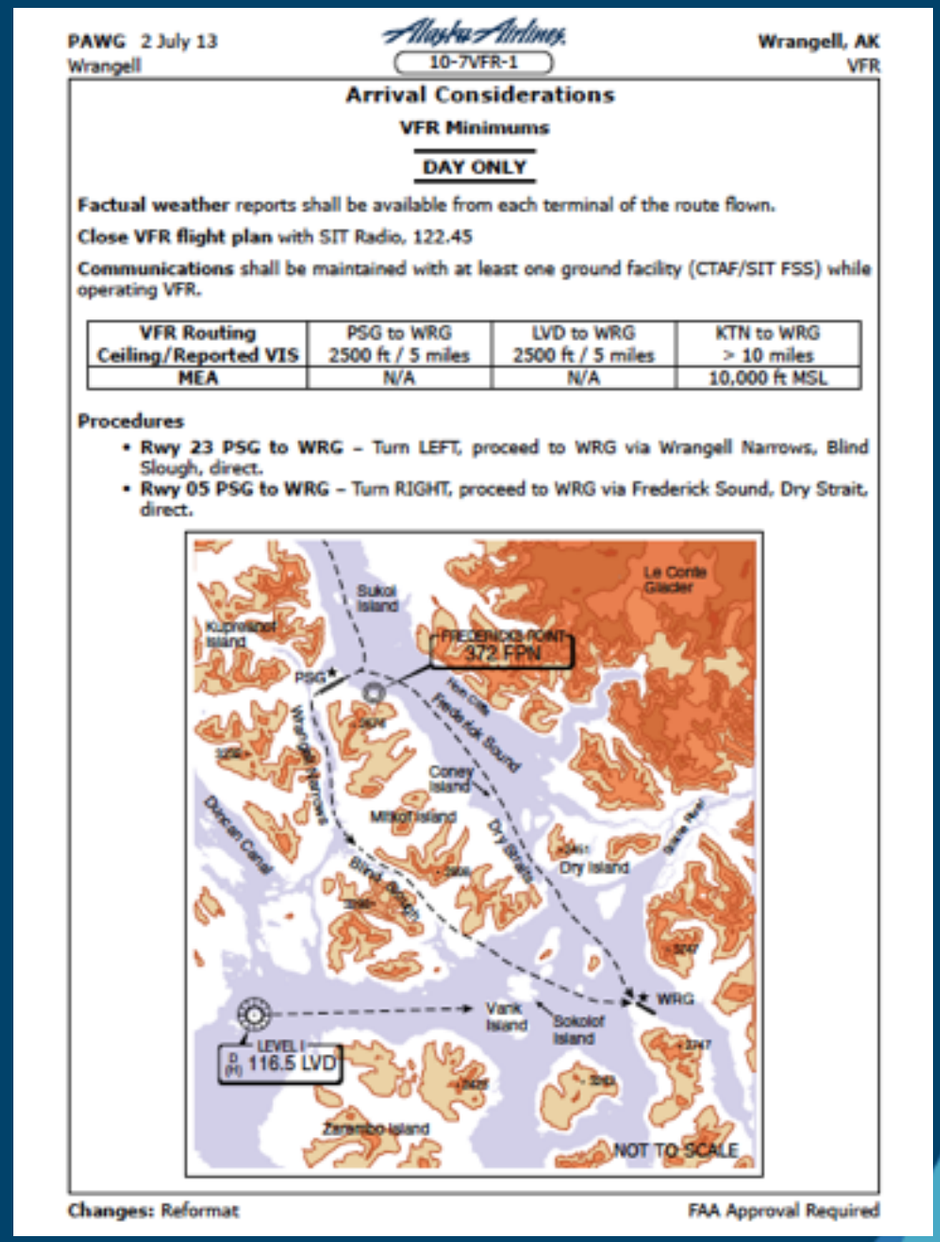
Manual Flying Skills… a layer of protection

- When Automation fails, is too complex or is confusing:
- Step it down and have confidence in Manual Flying
- Monitoring Skills also improve…..

- Solid Instrument Scan
- Basic Pitch and Power

Alaska Airlines: Advantages for Manual Flying

- Short-Haul route
- Single Fleet 737
- Small Airports
- Non-Radar/Non-Tower Airports
- Culture of Manual Flying
- Ops Manuals support M.F.
- Pilot Flying chooses auto. level



PAWG 2 July 13 — Alaska Airlines — Wrangell, AK
Wrangell — 10-7VFR-1 — VFR

Arrival Considerations

VFR Minimums

DAY ONLY

Factual weather reports shall be available from each terminal of the route flown.

Close VFR flight plan with SIT Radio, 122.45

Communications shall be maintained with at least one ground facility (CTAF/SIT FSS) while operating VFR.

VFR Routing Ceiling/Reported VIS	PSG to WRG 2500 ft / 5 miles	LVD to WRG 2500 ft / 5 miles	KTN to WRG > 10 miles
MEA	N/A	N/A	10,000 ft MSL

Procedures

- **Rwy 23 PSG to WRG** – Turn LEFT, proceed to WRG via Wrangell Narrows, Blind Slough, direct.
- **Rwy 05 PSG to WRG** – Turn RIGHT, proceed to WRG via Frederick Sound, Dry Strait, direct.

Changes: Reformat — FAA Approval Required

Developing Manual Flying Skills:
Flying the Jet and Validate in Simulator

UPRT (Upset Prevention Recovery Training):

2011 Intro to Enhanced Academics and Practical Simulator Maneuvers

Focus on PFD (Primary Flight Display)

Leverage Primary Flight Display (PFD)

Then

Now

A rich source of aerodynamic info

Developing Manual Flying Skills: Flying the Jet and Validate in Simulator

Pitch, Power, Trim (PPT) Exercise

- Raw data/ no flight directors
- Monitoring opportunities
- Pitch and power settings

The “Nickerator”

Exercise Profile: Flight Directors Off

DCA Takeoff Rwy 19 – Fly runway heading,
climb 3000’

@3000’, turn left heading 130, intercept the
DCA 160 radial outbound

Accelerate to 235, climb to 4000’

At 16 DME, turn right heading 280 (base leg)

Descend and maintain 2500 feet.

Crossing the DCA 175 radial,
turn right heading 330

Intercept DCA LOC Rwy 01

Maintain 2500 until established,
cleared ILS Rwy 01

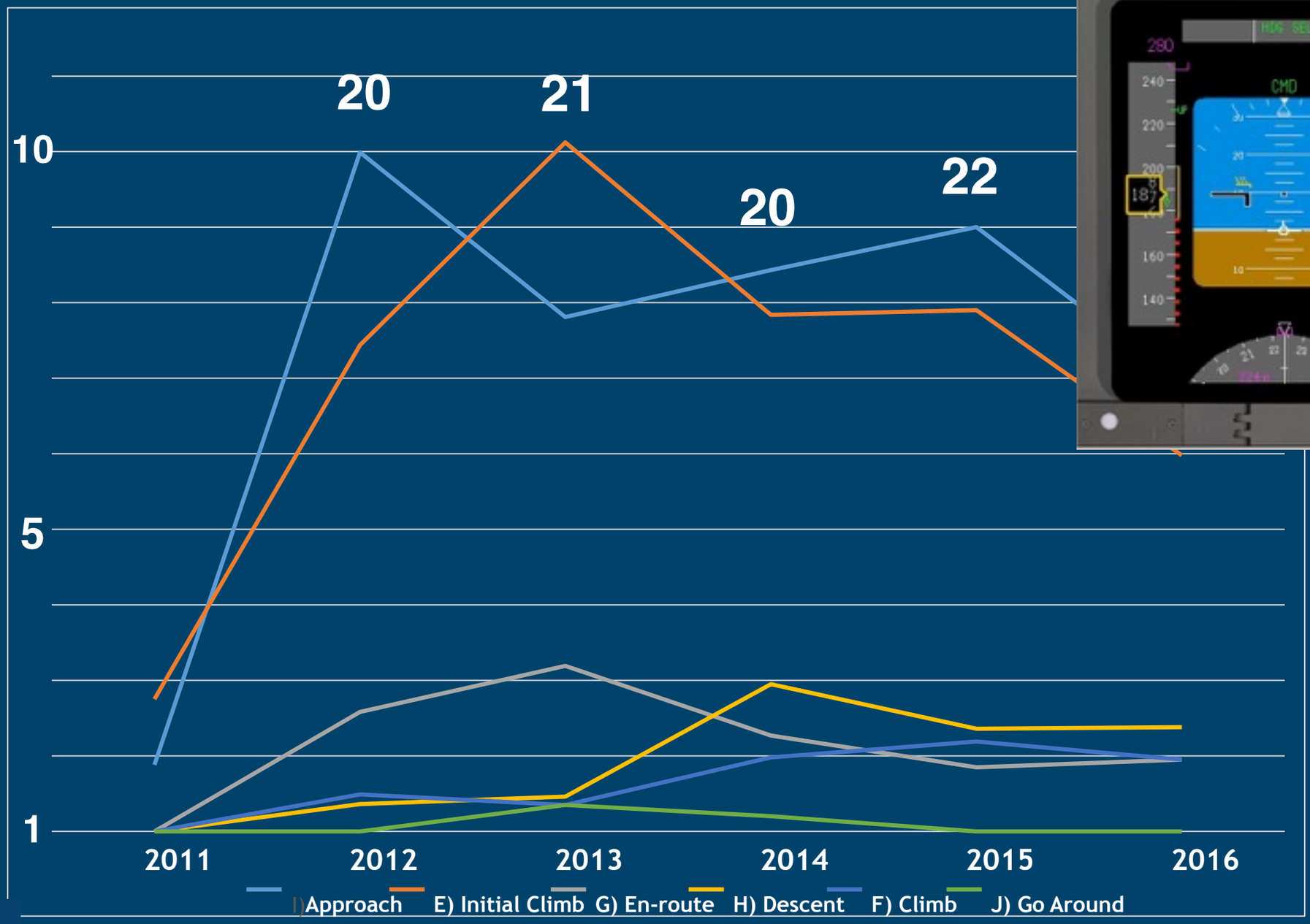
Ceiling 500’ and 1 mile visibility

Positive Pilot Feedback

Low-Speed Precursor Rate

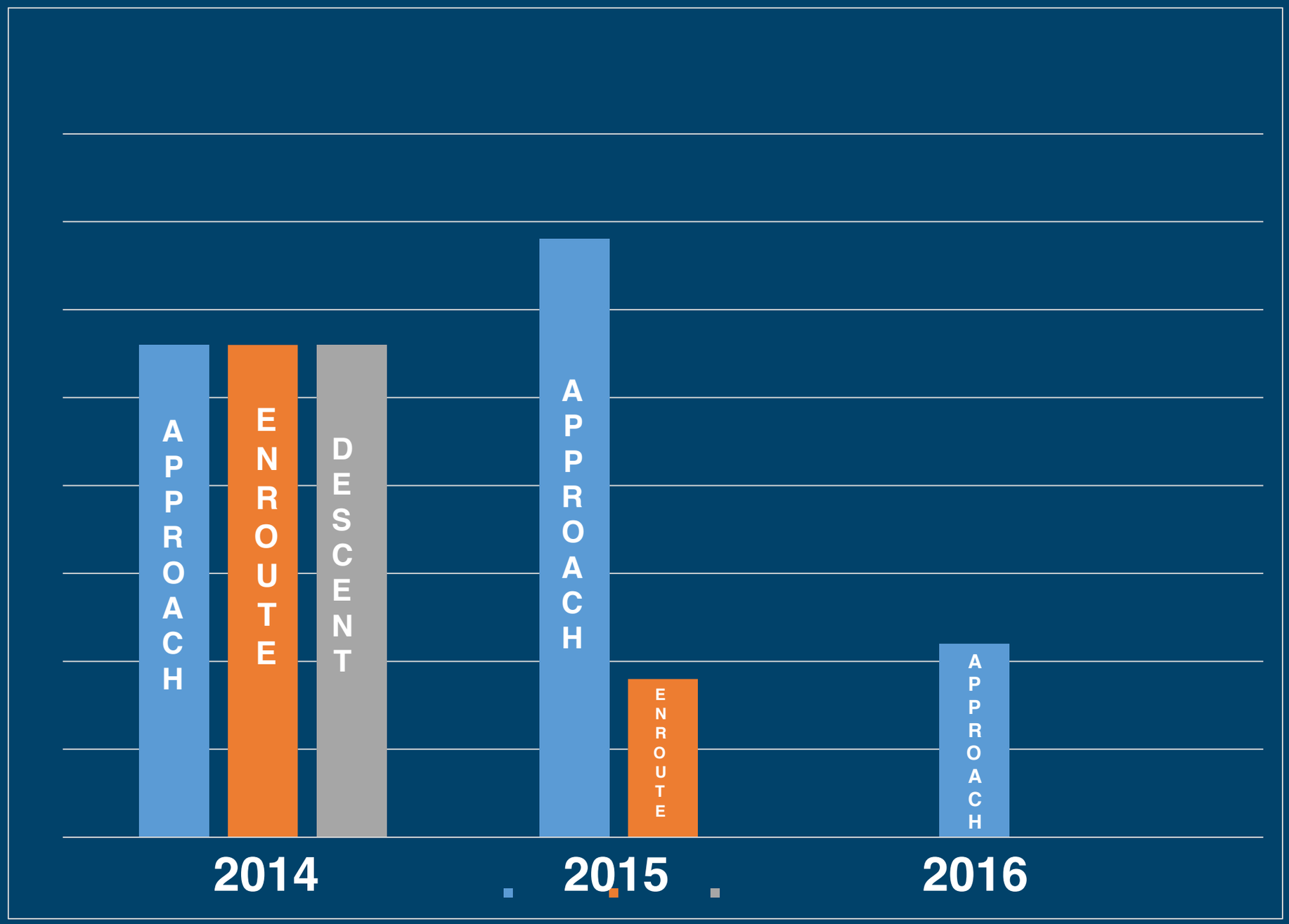
Low Speed Event VS 1.1 rate per 10,000 flights (Avg. = 21)

Example Minimum safe speed equals 120 knots,
low speed precursor triggers at 132 knots



Stick Shaker activation rate per 10,000 flights
(9 events / 247,914 flights 2014-2016)

Recovery Results:



2 Good

3 OK

3 N.C.

1 Bad

G-A Summary:

- The G-A maneuver is an essential safety tool

- There are threats and variables in the G-A

- Realistic Training (MBT and SBT) can improve G-A

- Simulator Time is a precious and finite resource

-Manual Handling Skills (Instrument Scan..Pitch/Power) provides a foundation

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Thank You!

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