



NZ 60

Apia

29 July 2000

“A FREE LESSON”

This presentation is authorised by:

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Vice President Flight Operations

Structure of Presentation:

- **Brief Overview of Incident**
- **Video Presentation (ILS System Description)**
- **Significant Issues / Audience Discussion**
- **Summary**
- **Industry Response**



- Early on the morning of Sunday 30th July 2000 Air New Zealand was contacted by the Captain of NZ 60 and notified that an incident had occurred the previous evening, during an ILS approach to runway 08 at Faleolo International Airport, Apia, Western Samoa
- The crew reported that they had made a missed approach due to a suspected **FALSE GLIDESLOPE CAPTURE**
- It was subsequently established it was not a false glideslope capture, but an **ERRONEOUS GLIDESLOPE CAPTURE** (new industry terminology)



Airfield Environment:

- **Airfield works in progress at Faleolo**
- **9 NOTAMs affecting Faleolo issued to crew of NZ 60**
 - **2 NOTAMs issued regarding long-term equipment unserviceability:**
 - WDI threshold Rwy 08 unlit
 - Rwy 08 ILS G/P operating without standby transmitter
 - **4 NOTAMs issued regarding airfield works programme:**
 - Runway extension
 - Turning Node Rwy 08
 - Apron
 - **3 NOTAMs issued regarding “unmonitored” navigation aids:**
 - **FREQ 113.9MHZ IDENT “FA” VOR OPR, BUT CAUTION ADZD DUE TO UNMONITORED STATUS**
 - **DME ASSOCIATED WITH ILS RWY 08 OPS BUT CTN CTN [sic] ADVISED DUE UNMONITORED STATUS**
 - **ILS GP RWY 08 OPS BUT CTN ADZD DUE OPERATING IN AN UNMONITORED STATUS.**



Arrival:

- **ILS approach pre-briefed, using 'FA' (VOR) DME in lieu of 'IAP' (ILS) DME**
 - **VOR approach briefed as a back-up**
 - **Clear night, no moon**
 - **3 Pilots on flight deck for arrival**
 - **Captain - Pilot Flying**
 - **First Officer - Pilot Not Flying**
 - **Extra First Officer - Supplementary Pilot (duty length)**
 - **SP requested to continuously monitor ILS ident**
 - **Actual profile versus required profile monitored around the arc**
 - **Cleared for a FALE arrival - ILS runway 08**



Approach:

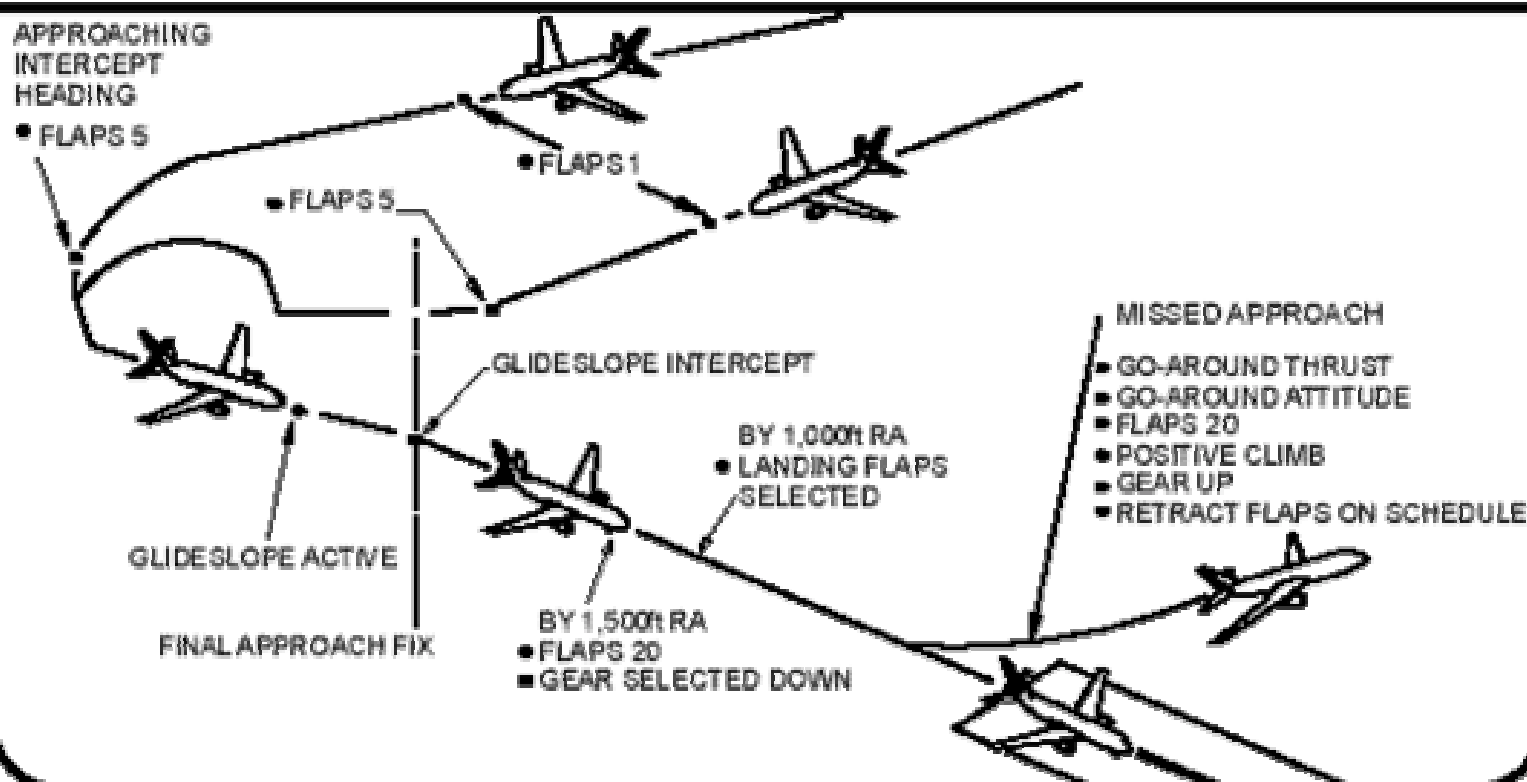
➤ Autocoupled ILS approach

- Runway sighted during turn onto localizer
- Both EHSIs selected to MAP mode
- Maximum landing weight
- Slight tailwind (approximately 10 knots at commencement altitude)
- Low Drag Approach



Low Drag Approach Profile

LOW DRAG APPROACH (Refer SOP 2.6)



The Event

NZ 60, inbound from the South, was cleared to Apia via the FALE arrival 15 mile arc for an ILS runway 08

From FALE, the aircraft established on the 15 mile arc

The Localizer 077° inbound course was captured at 14 miles, Flap 1 was selected, speed 220 KIAS

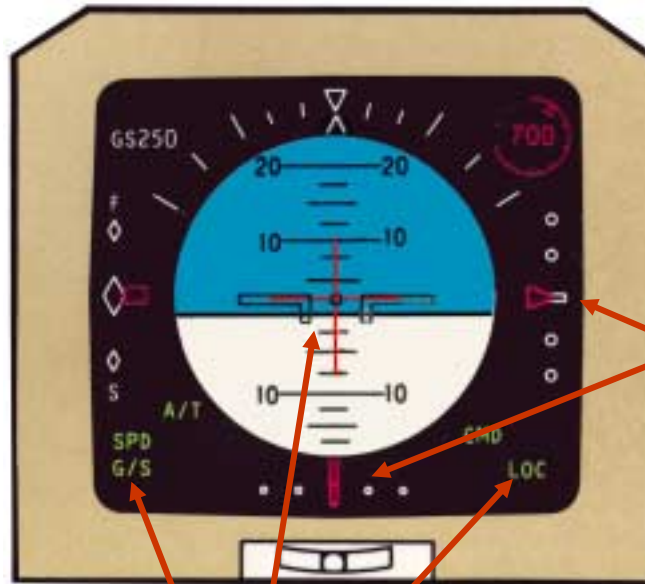
One second after APPROACH was armed the autoflight system captured the glideslope

Approximately 5 seconds after glideslope capture the rate of descent increased



The Event

Flight Deck instruments confirmed



the aircraft to be both
“on glideslope” and “on localiser”

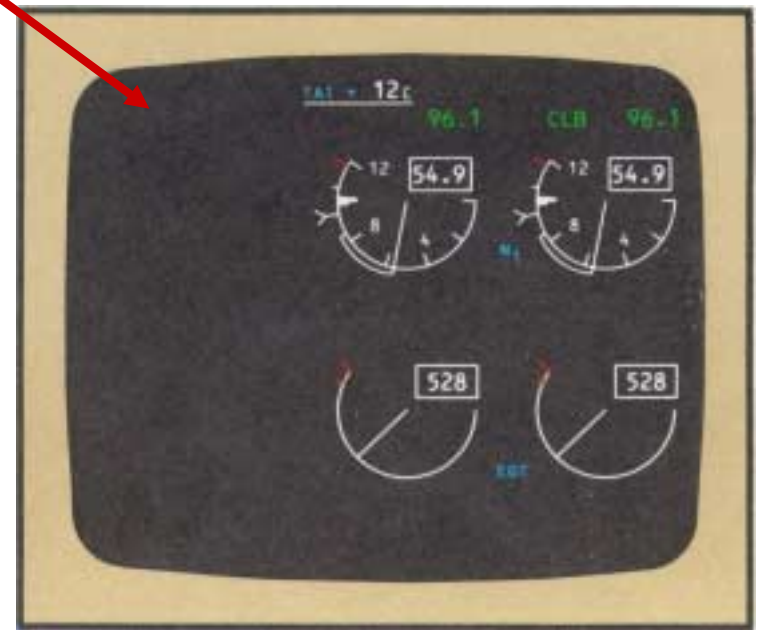
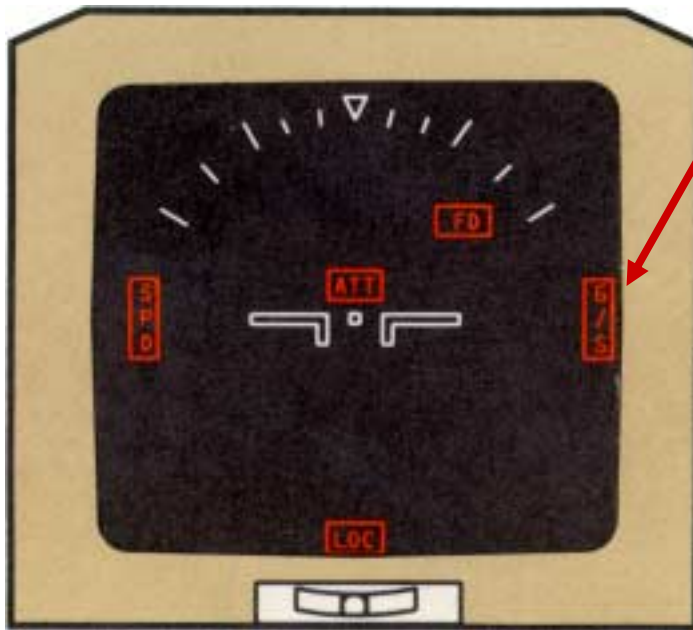
**The ILS was identifying correctly
throughout the approach**

the aircraft had captured both the glideslope and localiser



The Event

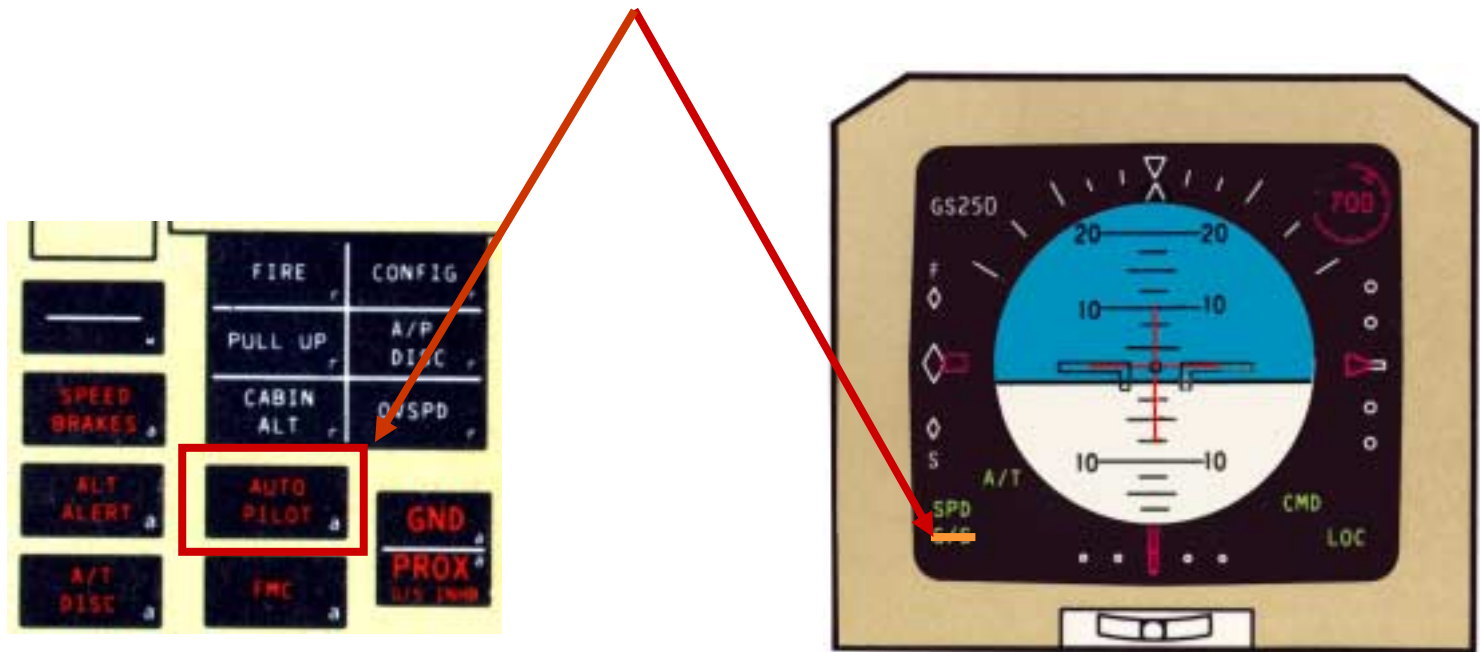
At no stage during the first approach, overshoot or second approach were any “flags” (boxes) or EICAS messages displayed.



The Event

Nor was there any autopilot warning,

or Flight Mode fault indicated (amber line appearing through G/S)



The Event

The crew concentrated on the subsequent energy management problem in order to achieve the low drag approach profile

Shortly after landing flap was selected, the PF (Pilot Flying) noted an anomaly in DME vs altitude

Around the same time the PNF (Pilot Not Flying), while trying to establish visual contact with the airfield and runway, became aware that visual cues did not correspond with what was expected

The SP (Supplementary Pilot) also became aware of an anomaly in aircraft position at approximately the same time as the two other crewmembers.

Note the terrain (558') approximately 1/2 mile to the left of the localizer course.



The Event

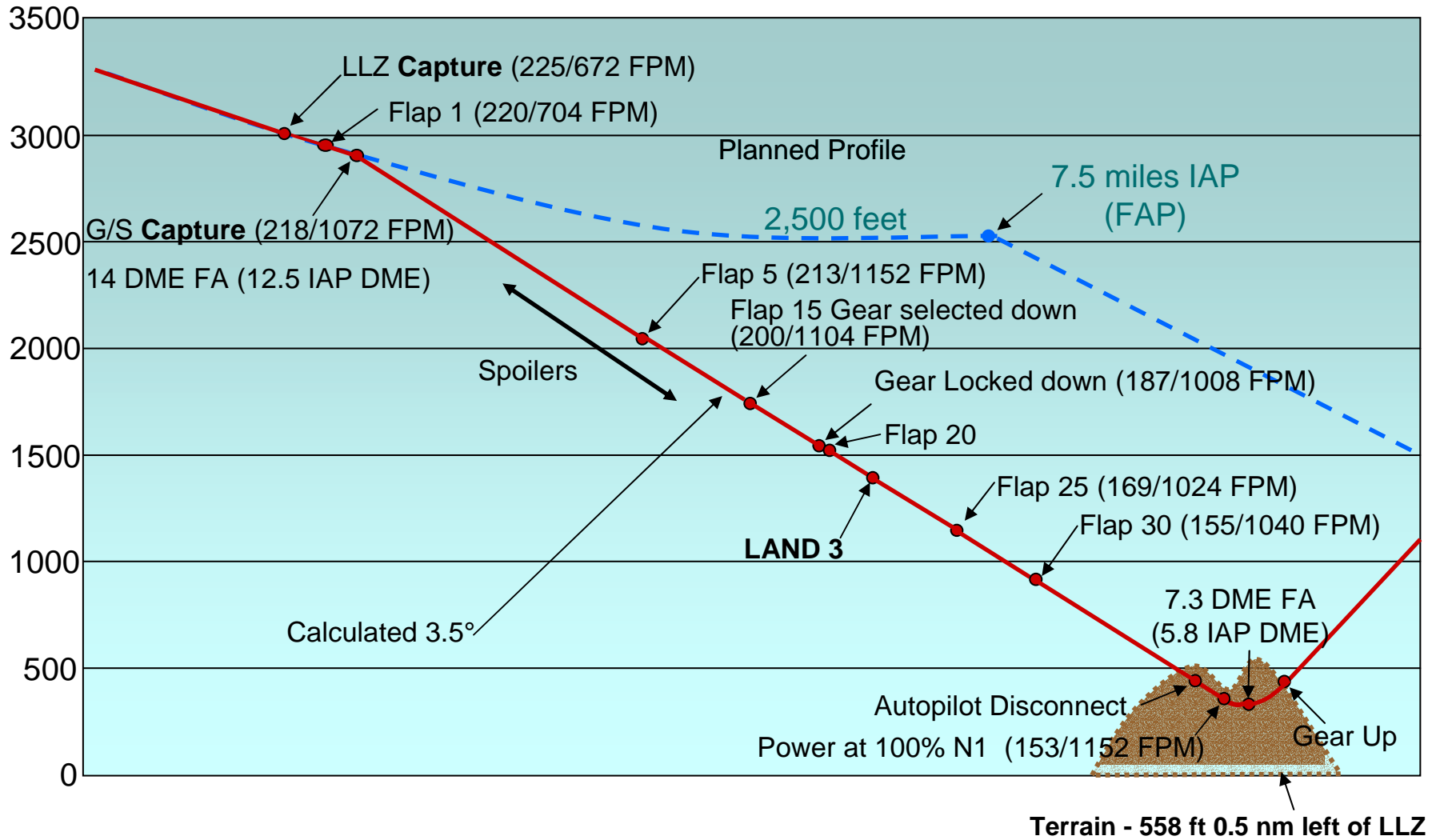
Approximately 6nm from the runway threshold a missed approach was carried out to join the 12 mile arc from the North.

The second approach was planned and flown as a localizer approach, using the DME / altitude profile for glidepath management.

The glideslope deviation indicator indicated "on glideslope" throughout both approaches.



Profile





Video Presentation

Discussion

- How is your Trust from;
- An individual perspective
 - A System perspective?
 - The Interdependence within the system?



AIR

GROUND



AIR NEW ZEALAND

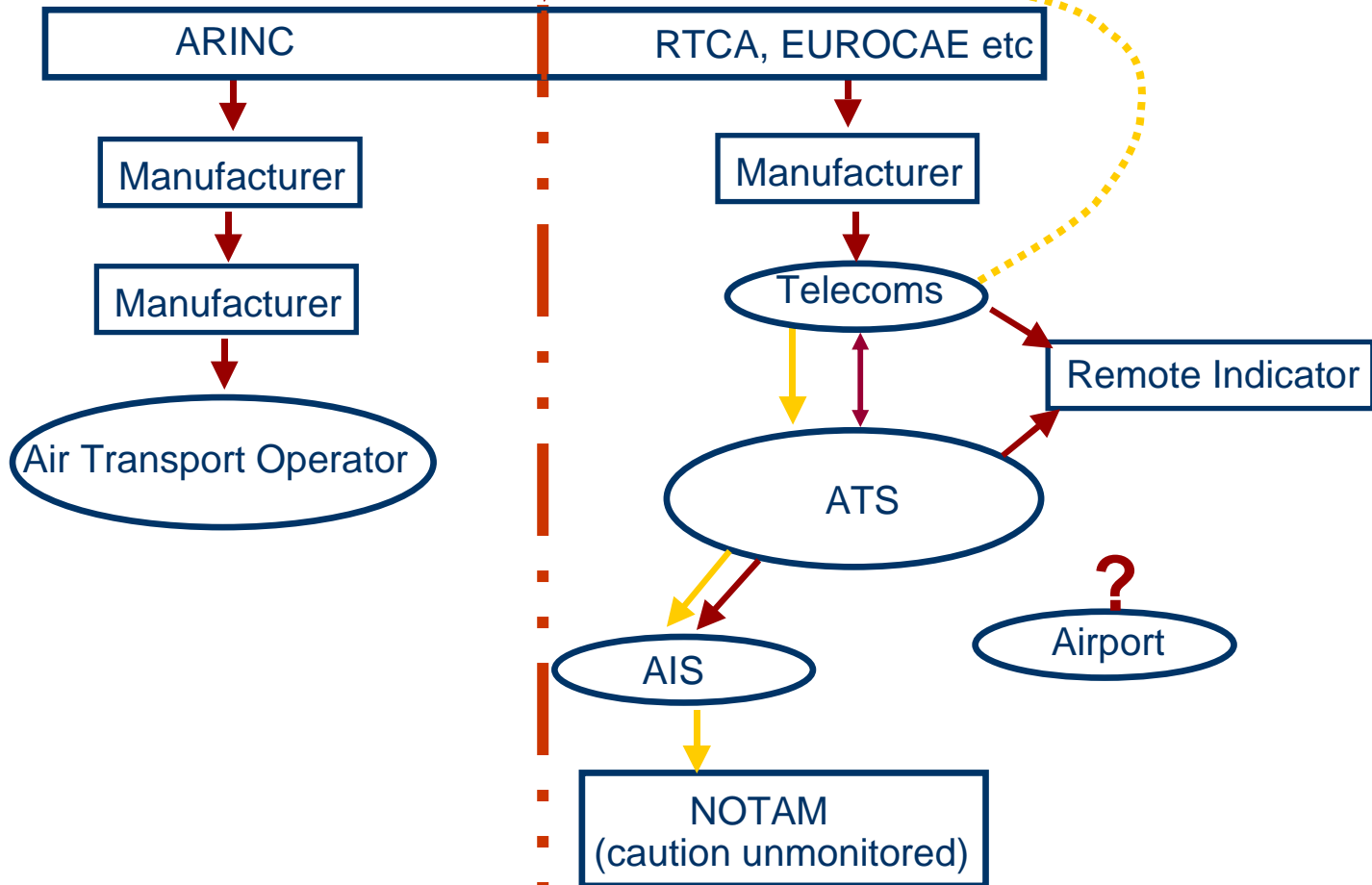
Should Alarm for:

- Modsum
- RF
- 90 or 150 reduction

Annex 10 Specification

Shall comprise:

- Transmitter
- Monitor
- Remote indicator



Discussion

- **Glide-slope check height:**
 - **Is it an Altimeter check?**
 - **A Glideslope check?**
 - **Or Both?**

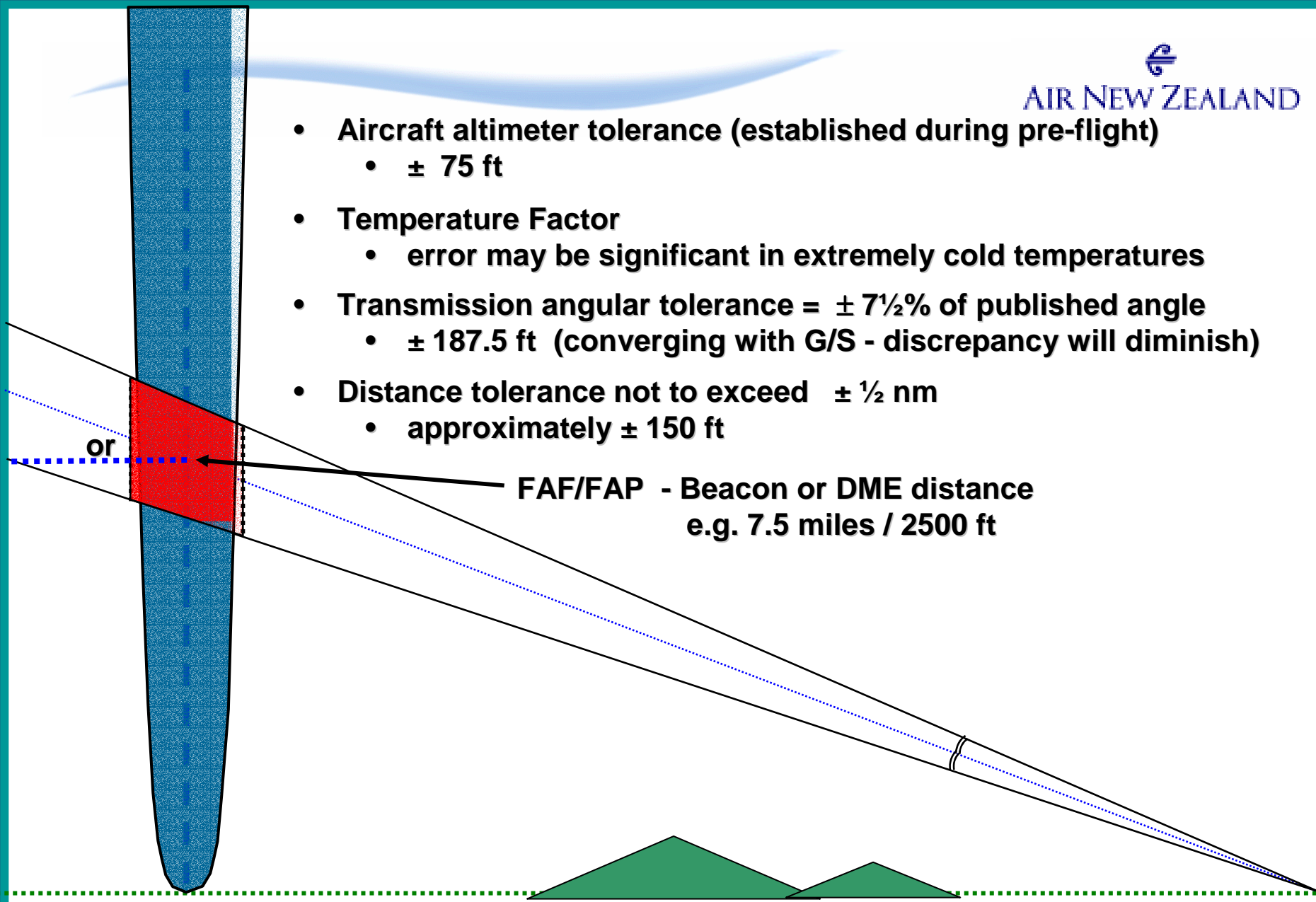




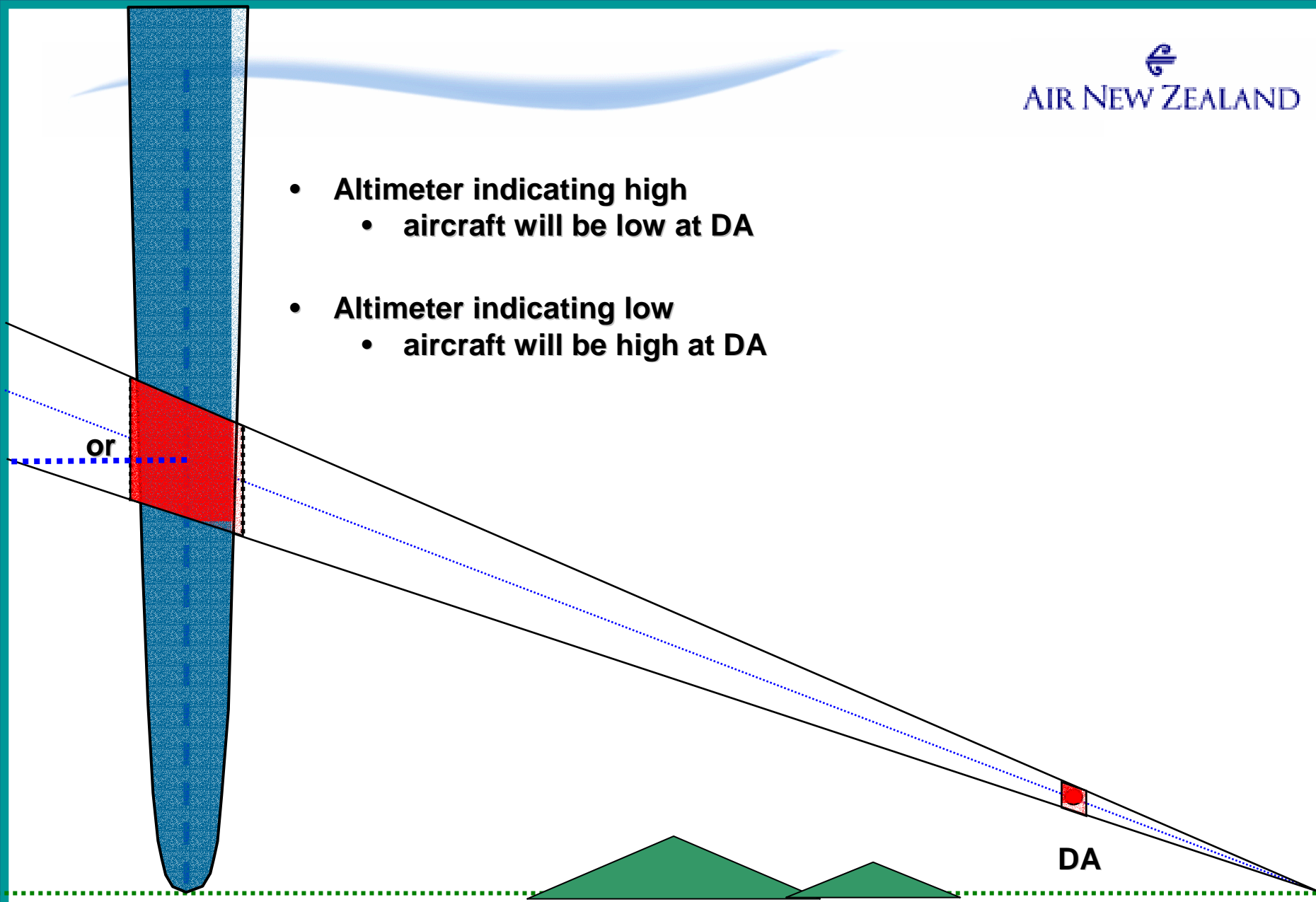
- Aircraft altimeter tolerance (established during pre-flight)
 - ± 75 ft
- Temperature Factor
 - error may be significant in extremely cold temperatures
- Transmission angular tolerance = $\pm 7\frac{1}{2}\%$ of published angle
 - ± 187.5 ft (converging with G/S - discrepancy will diminish)
- Distance tolerance not to exceed $\pm \frac{1}{2}$ nm
 - approximately ± 150 ft

or

FAF/FAP - Beacon or DME distance
e.g. 7.5 miles / 2500 ft



- Altimeter indicating high
 - aircraft will be low at DA
- Altimeter indicating low
 - aircraft will be high at DA



Discussion

- **What automation strategies should we now use?**
- **Would EGPWS have picked this up?**



Summary

➤ **Systems**

- Lack of knowledge of carrier wave (only) situation by most pilots
- Ident on localiser only
- “unmonitored” ramifications
- Annex 10

➤ **Crew decision at glideslope capture (forced choice)**

➤ **Importance of communications about potential or actual threats within the entire system and between systems**





END