Airbus China Safety Conference

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CFIT

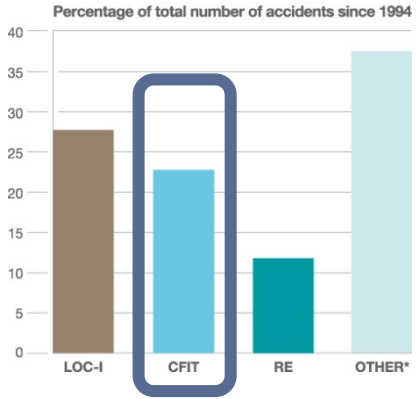
The right things to do to avoid it

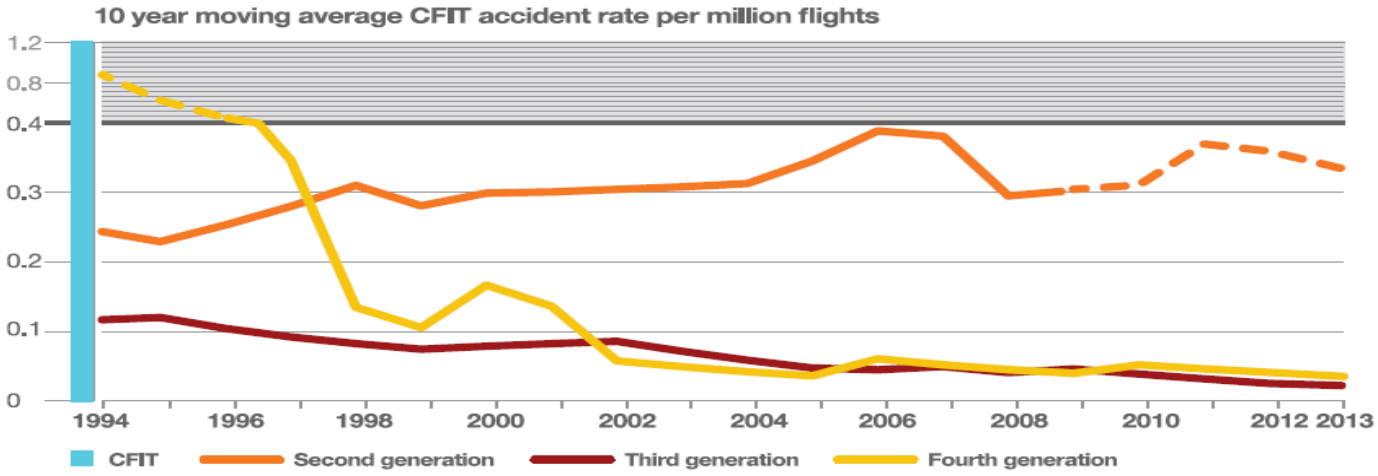
Presented by Alan CHEUNG

CFIT – The right things to do to avoid it

- Context
- Case studies
- Conclusions

Technology as an efficient safety net





Technology contribution in addressing Controlled Flight Into Terrain:

☑ combination of TAWS, Improved Navigation performance, Glass Cockpit/FMS equipped a/c
(mainly 3rd and 4th generations of a/c)

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Context

- Controlled Flight Into Terrain

"In flight collision or near collision with terrain, water, or obstacle without indication of loss of control."

- 33% of fatal accidents (2009-2013)
- 31 accidents in the last 5 years (western built)
- 85% occurred during approach & landing phase (incl. go around)

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CFIT – The right things to do to avoid it

- Context
- Case studies
- Lessons learnt

Case study 1

- "*On August, 14, 2013, at about 0447 central daylight time (CDT), United Parcel Service flight 1354, an Airbus A300-600, N155UP, crashed short of runway 18 while on approach to Birmingham-Shuttlesworth International Airport (KBHM), Birmingham, Alabama.*"

- *"The two flight crew members were fatally injured and the airplane was destroyed."*

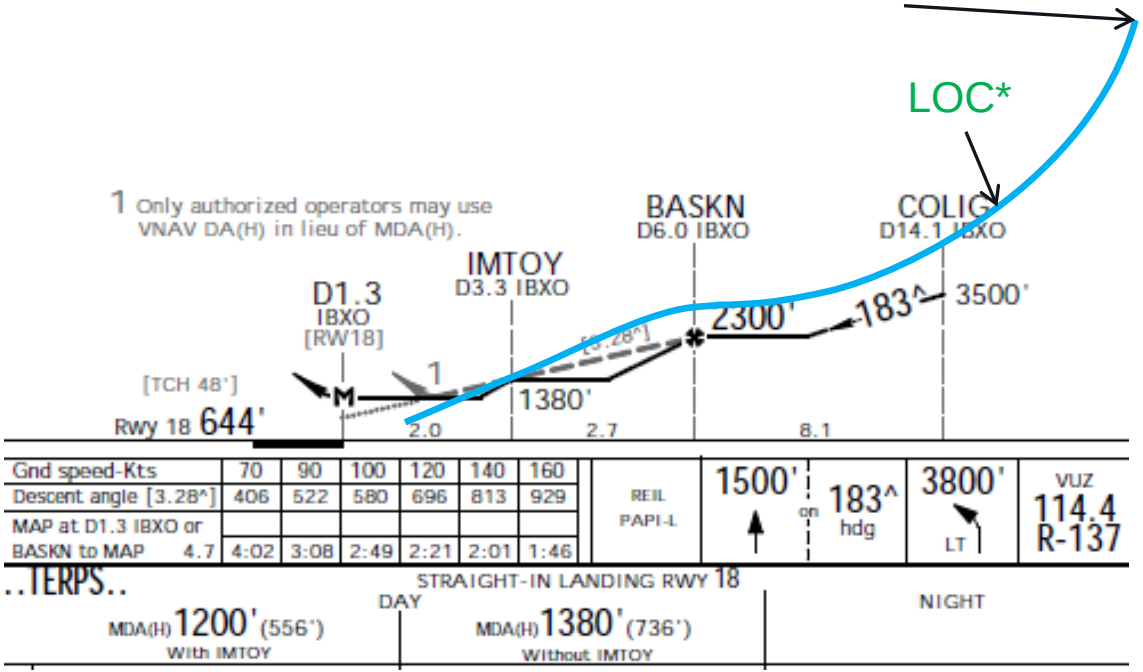
- *"The cargo flight was operating under 14 Code of Federal Regulation Part 121 supplemental and originated from Louisville International Airport, Louisville, Kentucky.*"

Extract from NTSB report Ref. NTSB/AAR-14/02

Event description

- Non Precision Approach
  - “Profile” approach initially briefed.
  - Changed later to V/S
- Crew/Tower misunderstanding
  - Procedure not followed
  - A/C levelled off at 2500ft
  - FAF overflown by +200ft

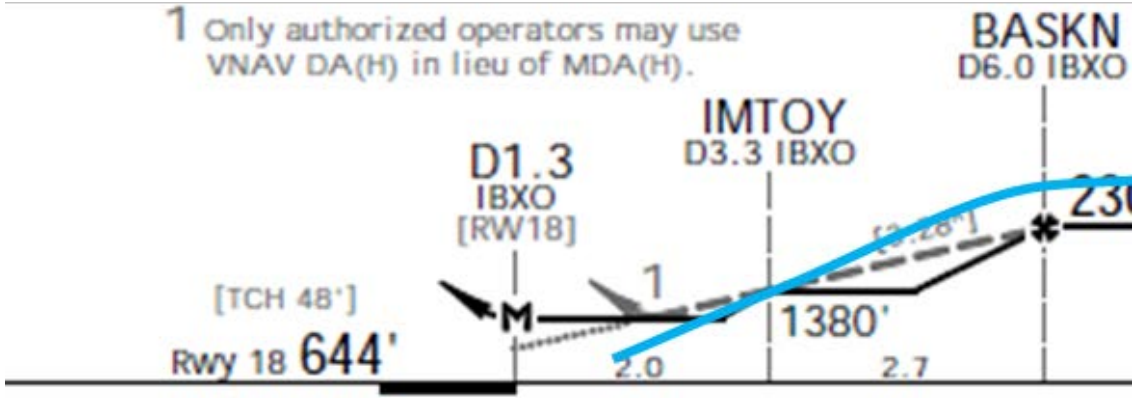
“UPS 1354 heavy is 11 miles from BASKIN maintain 2500 till established on localizer. Cleared LOC 18 approach.”



Event description

- Weather
  - Reported weather: Ceiling BKN010, OVC075, Vis 10SM
  - Weather worse than expected: RMK CIG 006V013 (not available to the crew)

- Descended below MDA (1200ft)
  - No callout from Pilot Monitoring



Event description

- TAWS caution **SINK RATE** (262ft AGL, 1015ft QNH)
  - Rate of descent reduced
  - 2 seconds after "*There it is*"

- TAWS caution **TOO LOW TERRAIN**
  - After trees impact
  - A/C fitted with EGPWS

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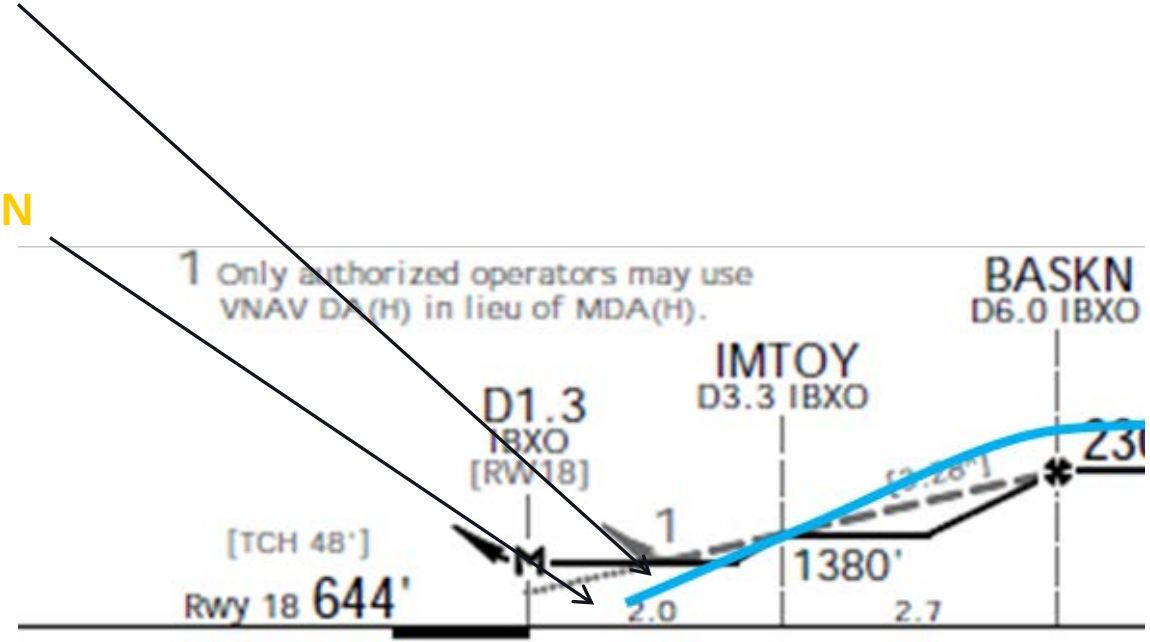

Summary

- Non Precision Approach
  - Late & un-briefed change of approach strategy
  - Addressed by NTSB recommendation A-14-74
- Tower/Crew misunderstanding
  - FAF overflown by +200ft
- Descent through 500ft and below MDA without callout
  - Auto callouts not activated
  - Addressed by NTSB recommendation A-14-83 & A-14-84

Summary

- Reaction to TAWS alerts below MDA
  - No Go Around performed
  - Addressed by NTSB recommendation A-14-75 & A-14-81

- GPS position was not connected to TAWS
- TAWS software was not the latest version
  - Too low terrain caution would have been triggered earlier
  - Addressed by NTSB recommendation A-14-80

Further NTSB recommendations

- Means to provide cues for a non-cleaned F-PLN
  - NTSB recommendation A-14-91
  - FCOM will be enhanced (all programs)

- Additional Airbus action
  - TAWS / EGPWS ALERTS are being globally reviewed.

Please read NTSB report NTSB/AAR-14/02 for complete list of recommendations.

Case study 2

- In April 2014, A320 performed a PAR (Precision Approach Radar) to runway 18
- After a level off at 1000ft with autopilot engaged, the descent was initiated at about 5NM from runway.
- At about 350ft and 3NM from runway, the EGPWS caution “TOO LOW TERRAIN” triggered, immediately followed by the EGPWS warning “TERRAIN TERRAIN PULL-UP”.
- A Go Around was initiated by setting TOGA with autopilot engaged.

Summary

- Immediate reaction to TAWS
- However, only a go around was performed, autopilot ON.
- Airbus FCOM requires a pull up manoeuvre.
  - Full backstick provides best climb performance.
  - “Go around AP/FD mode” will not engage, in clean configuration.

■ **“PULL UP” - “TERRAIN TERRAIN PULL UP” - “OBSTACLE OBSTACLE PULL UP”**

Simultaneously:

AP.....OFF

PITCH..... PULL UP

Pull to full backstick and maintain in that position.

THRUST LEVERS..... TOGA

SPEED BRAKES lever.....CHECK RETRACTED

BANK..... WINGS LEVEL or ADJUST

Best climb performance is obtained when close to wings level. Then, for “TERRAIN TERRAIN PULL UP” or for “OBSTACLE OBSTACLE PULL UP”, and if the crew concludes that turning is the safest way of action, a turning maneuver can be initiated.

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CFIT – The right things to do to avoid it

- Context
- Case studies
- Lessons learnt

CFIT - Lessons learnt

- CFIT occurs mostly in approach & landing phase.
- Typically when "*what was flown*" differed from "*what was briefed*"
  - Descent before the FAF
  - Required visual references were not obtained and not maintained below minima.

Prevention

- Perform a full and complete briefing and then fly it
- Be go around minded "*WE WILL LAND IF EVERYTHING GOES RIGHT*"

- Implement FWC altitude and minima auto callouts.
- Maintain TAWS software and databases up-to-date and use GPS position.