



**ADF AVIATION SAFETY
OCCURRENCES: LESSONS
LEARNT**

WGCDR PETER WOOD DDFS 1 JUN 03



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DEFENCE (DFS-ADF) MISSION

Preservation of human and material resources in all flying operations through continuous improvement in safety management.

THE GOALS

- *Achieve and maintain a sound (generative) aviation safety culture throughout the ADF*
- *Achieve zero accidents attributable to human factors*
- *Achieve zero accidents attributable to systemic and organisational factors*



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ADF AVIATION SAFETY PHILOSOPHY

- ✈ Preservation of combat power*
- ✈ Effective risk management policy*
- ✈ Requires proactive and reactive measures*





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DFS-ADF CAPABILITIES

PROACTIVE

- ✈ *Support to Commanders*
- ✈ *Policy / Procedures Development*
- ✈ *Safety Education and Awareness*
- ✈ *Safety Health Reviews*
- ✈ *Research*

REACTIVE

- ✈ *Accident Investigation*
- ✈ *Incident Investigation / Statistical Analysis*

DFS PRO-ACTIVE ACTIVITIES





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ADF RE-ACTIVE ACTIVITIES



ACCIDENT AND INCIDENT
INVESTIGATION



Directorate of

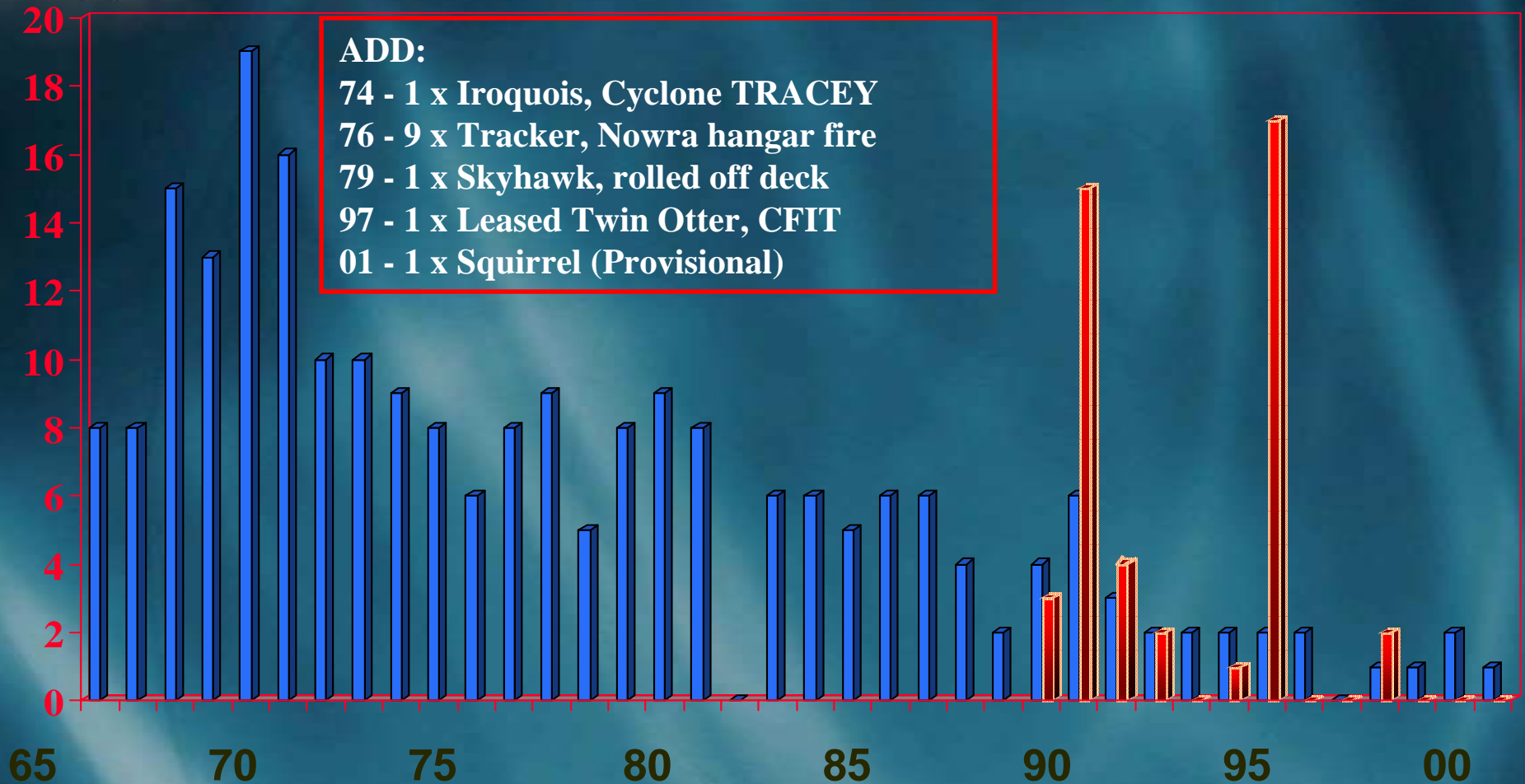
AIRCRAFT ACCIDENT INVESTIGATIONS





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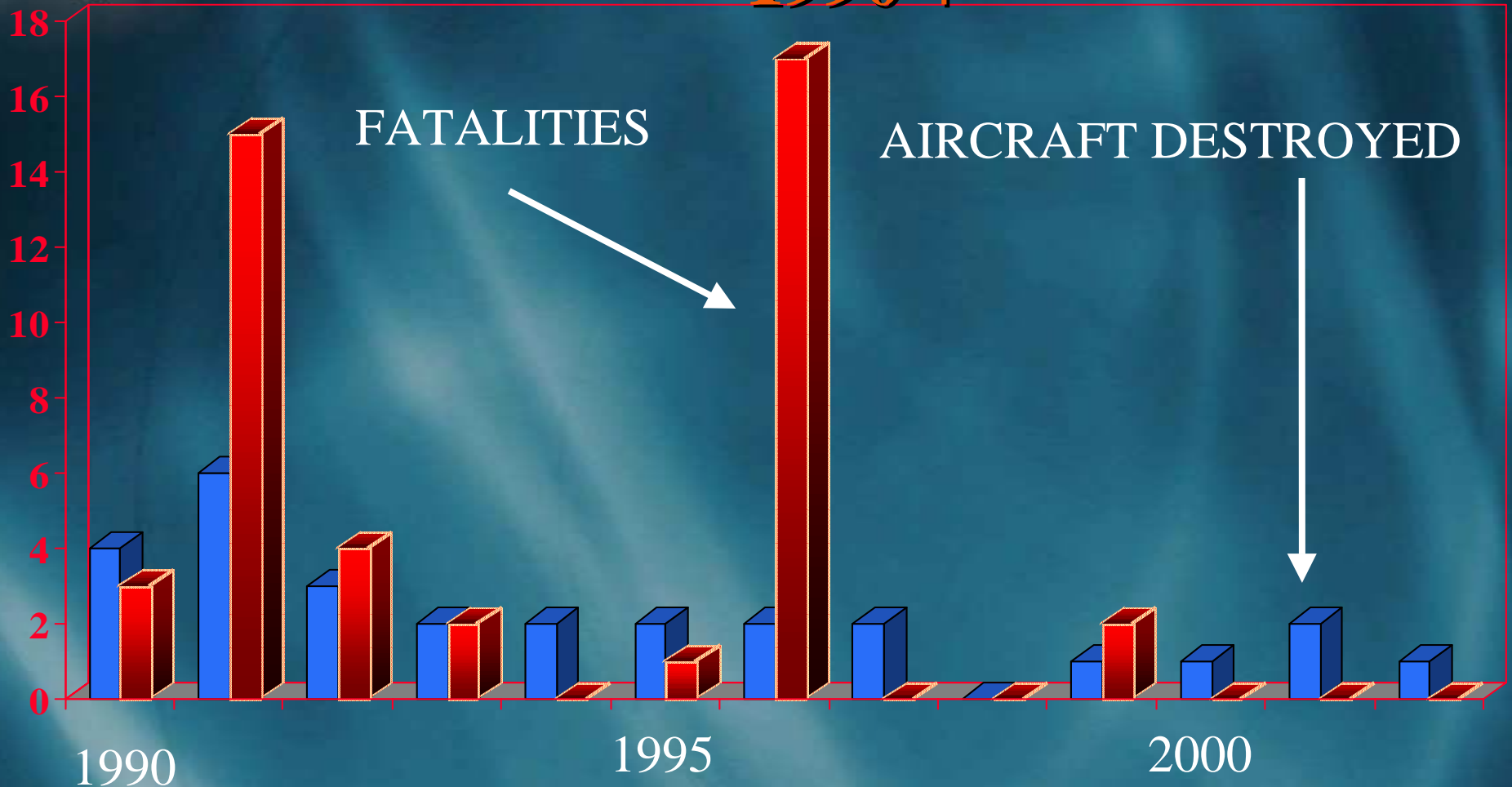
ADF AIRCRAFT DESTROYED - 229





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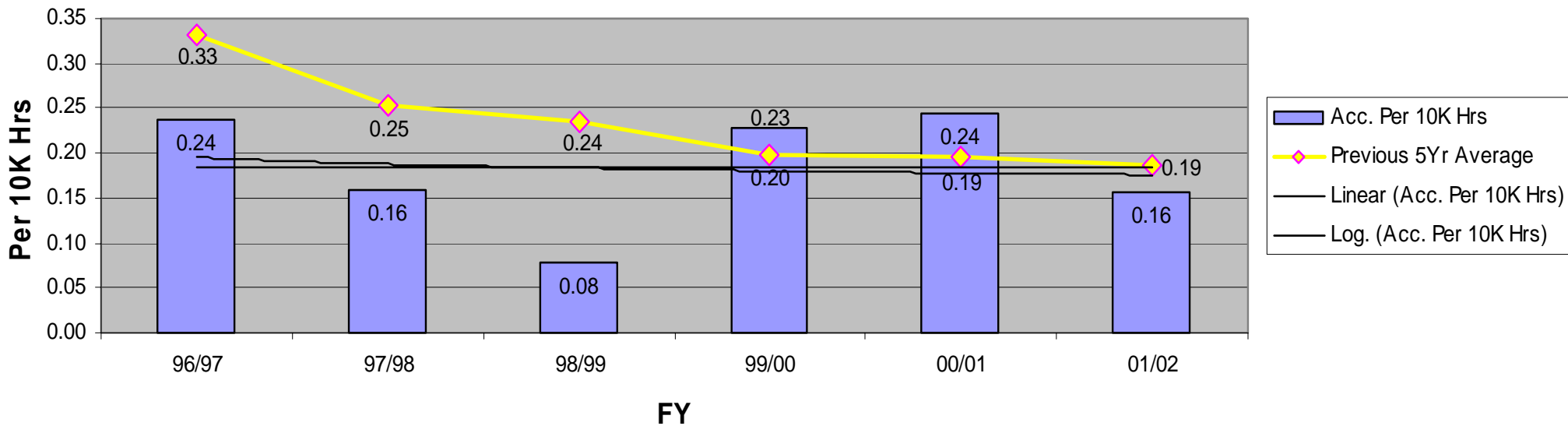
ADF ACCIDENT STATISTICS 1990 +





ADF ACCIDENTS PER 10K HOURS VS PREVIOUS 5YR AVERAGE

ADF Accidents per 10K Hours vs Previous 5yr Average

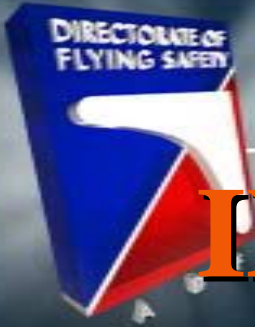




**THE FACT THAT YOU ARE NOT
HAVING ACCIDENTS DOES NOT BY
ITSELF MEAN YOUR SYSTEM IS SAFE....**

ADF AVIATION SAFETY OCCURRENCES

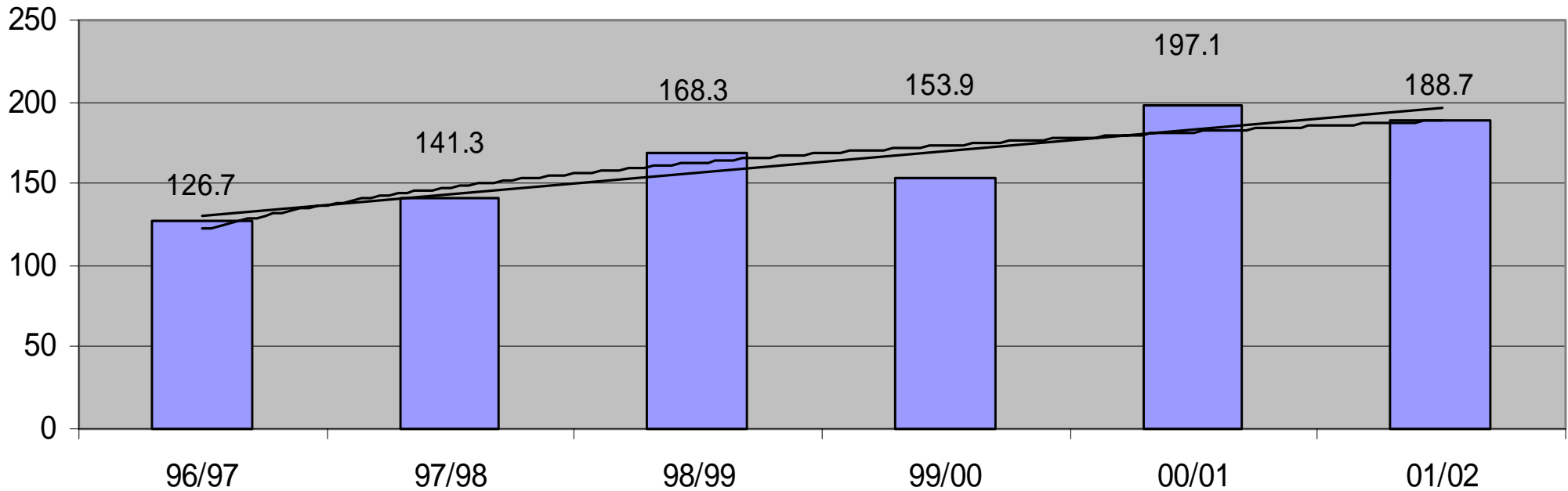




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INCIDENTS PER 10K HOURS

Incidents per 10K Hrs

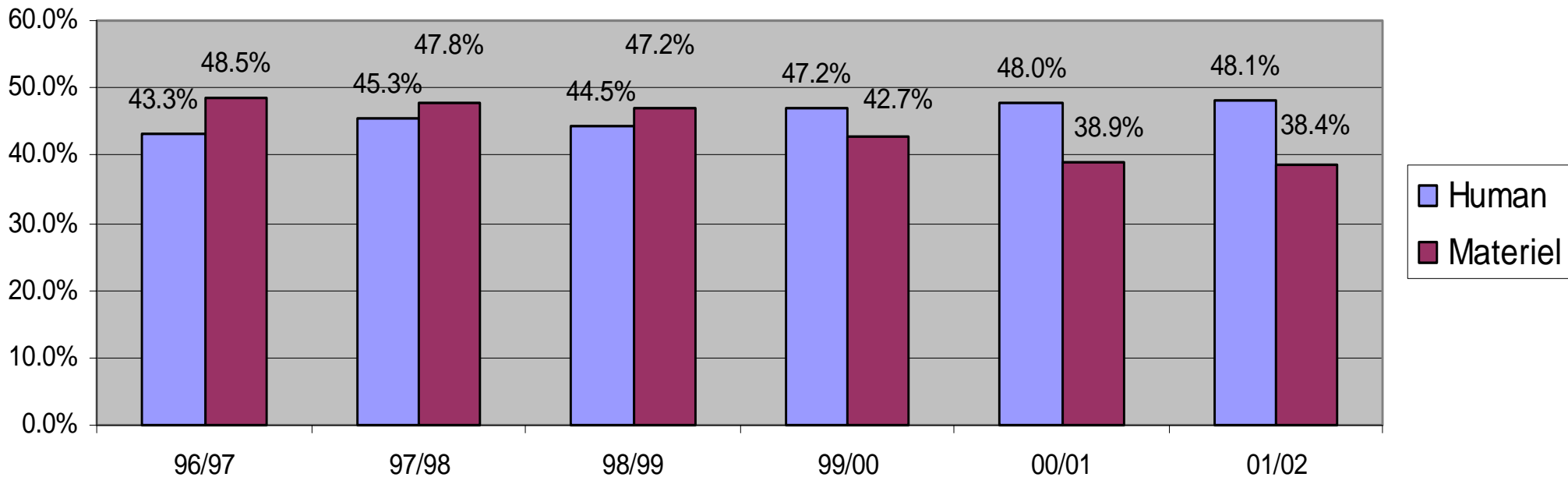




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PERCENTAGE OF HUMAN & MATERIEL INCIDENTS - ADF WIDE

Percentage of Human and Materiel Incidents - ADF Wide





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REVIEW OF 2002 ADF OCCURRENCES

✈ 2407 total (ADF) ASORs IN CY02

✈ 2275 in CY01

✈ 1174 Human 'Causes'

✈ 1148 in CY01

✈ @525 MASORs

✈ 149 Birdstrikes

✈ Zero Fatal Accidents

✈ 1 aircraft destroyed



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DFS-ADF INVESTIGATIONS

2000

3 Accidents/7 Incidents investigated by DFS

2001

7 Accidents/2 Incidents/ 1 Review

2002

EVENT

TEAM

→ 20 Feb 02

RNZN Seasprite FOCFT

Assisting NZHQ

→ 20 Mar 02

Kiowa Heavy Landing

AIIT

→ 6 Jun 02

Kiowa Taxiing Accident

AAIT

→ 26 Jun 02

F-111C Darwin

AAIT

→ 20 Oct 02

SK50 Hobart

AIIT for MCAUST

→ 28 Oct 02

Kiowa Heavy Landing

AAIT



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OTHER INVESTIGATIONS

2002

EVENT

TEAM

→ 16 Feb 02

Tiger Moth Williamtown

Support to ATSB

→ 26 Sep 02

Cherokee Hamilton Island

Support to ATSB

→ 13 Oct 02

Cessna 182 Bungendore

Support to ATSB



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ADF INVESTIGATIONS 2003

<i>DATE</i>	<i>EVENT</i>	<i>TEAM</i>
<i>→ 17 Jan 03</i>	<i>USN FA-18C Runway Overrun WA</i>	<i>Joint 85/2A</i>
<i>→ 23 Jan 03</i>	<i>Kiowa Heavy Landing</i>	<i>DFS AAIT</i>
<i>→ 31 Jan 03</i>	<i>Ilyushin IL-76TD Timor-Leste</i>	<i>Joint ATSB/DFS</i>
<i>→ 8 Feb 03</i>	<i>Caribou Runway Departure PNG</i>	<i>DFS AAIT</i>
<i>→ 19 Feb 03</i>	<i>Qantas B737 Incident Darwin</i>	<i>Joint ATSB/DFS</i>
<i>→ 23 Feb 03</i>	<i>BBJ Ground Incident Fairbairn</i>	<i>DFS AAIT</i>
<i>→ 26 Mar 03</i>	<i>Seahawk AFCS Coupler failure</i>	<i>FEG-based AAIT</i>
<i>→ 31 Mar 03</i>	<i>MBZ Incident Pearce</i>	<i>FEG-based AAIT</i>
<i>→ 7 May 03</i>	<i>CH47 Unplanned Load release</i>	<i>FEG-based AAIT</i>

**31 JAN 03 ILYUSHIN IL-76TD TIMOR-LESTE
JOINT ATSB/DFS-ADF TEAM**



**F111C A8-112 DARWIN 26 JUN 02 F2
FUEL TANK EXPLOSION**





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F111C A8-112 DARWIN

- ✦ Aircraft landed safely, crew uninjured, aircraft repairable*
- ✦ Over pressurisation of the F-2 fuel tank is the most plausible cause.*
- ✦ Most likely ignition source is the wiring loom between Boost Pump #3 and the aft wall of the F2 fuel tank.*
- ✦ Explosive build up of pressure due to the ignition of fuel vapours.*
- ✦ Investigation complete*
- ✦ Most recommendations accepted and being actioned*
- ✦ Report was as detailed and as complex as any recent DFS investigation*
- ✦ Recommendations far-reaching for ADF technical airworthiness regime*



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28 OCT 02 KIOWA HEAVY LANDING

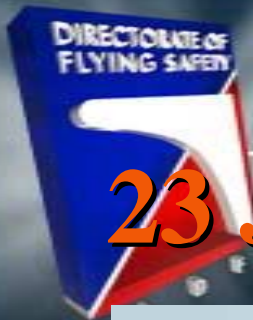




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28 OCT 02 KIOWA HEAVY LANDING

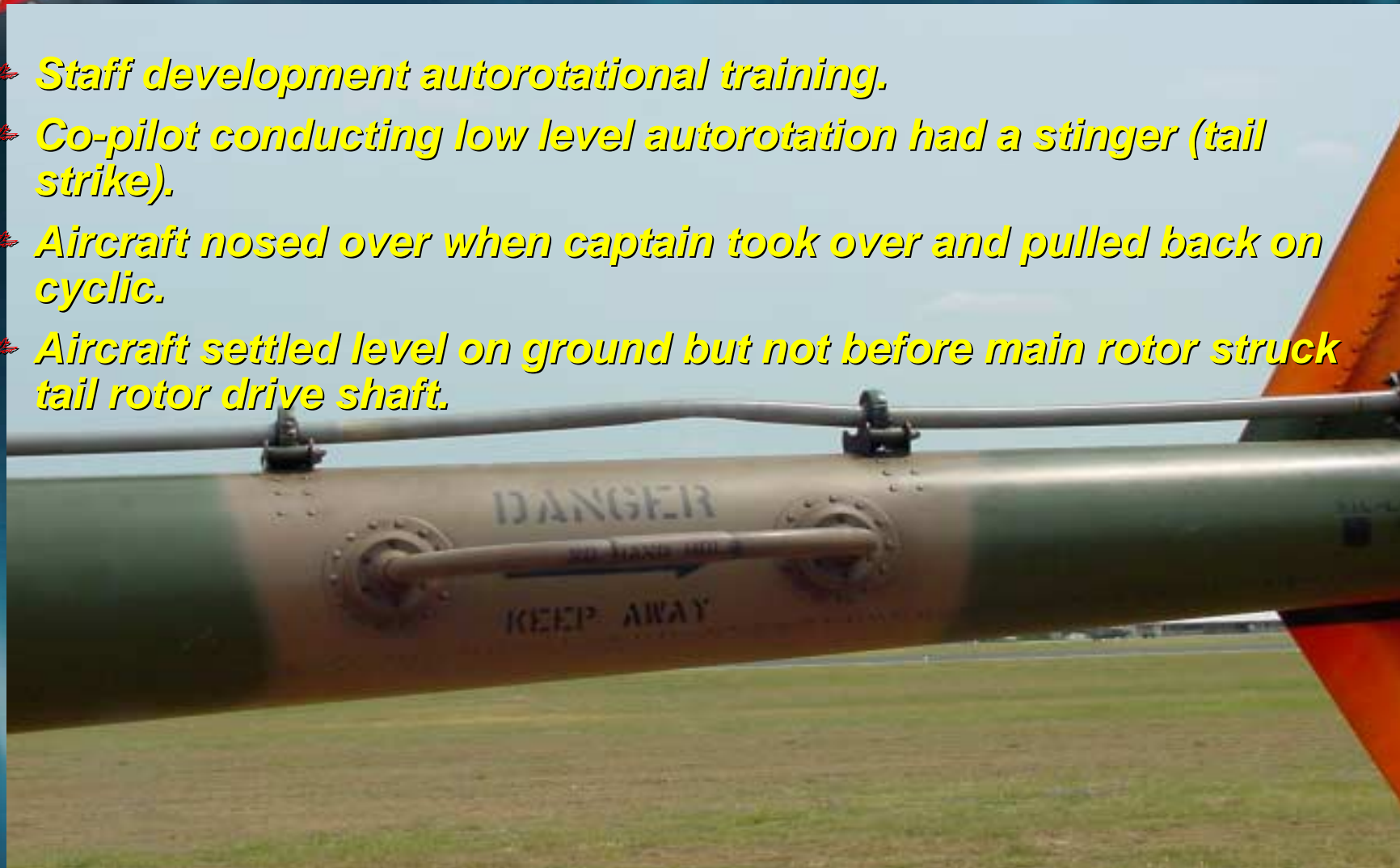
- QFI was conducting power terminated autorotational training.*
- Aircraft terminated high (25-30 ft) when rotor rpm started to decay.*
- As aircraft approached ground, QFI could not arrest ROD and landing gear failed.*
- One of three Kiowa autorotation incidents in past year: in all accidents crew were uninjured and aircraft repairable*
- Similar incidents with similar factors and recommendations*
- CULTURE!!***



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23 JAN 03 KIOWA HEAVY LANDING

- Staff development autorotational training.*
- Co-pilot conducting low level autorotation had a stinger (tail strike).*
- Aircraft nosed over when captain took over and pulled back on cyclic.*
- Aircraft settled level on ground but not before main rotor struck tail rotor drive shaft.*

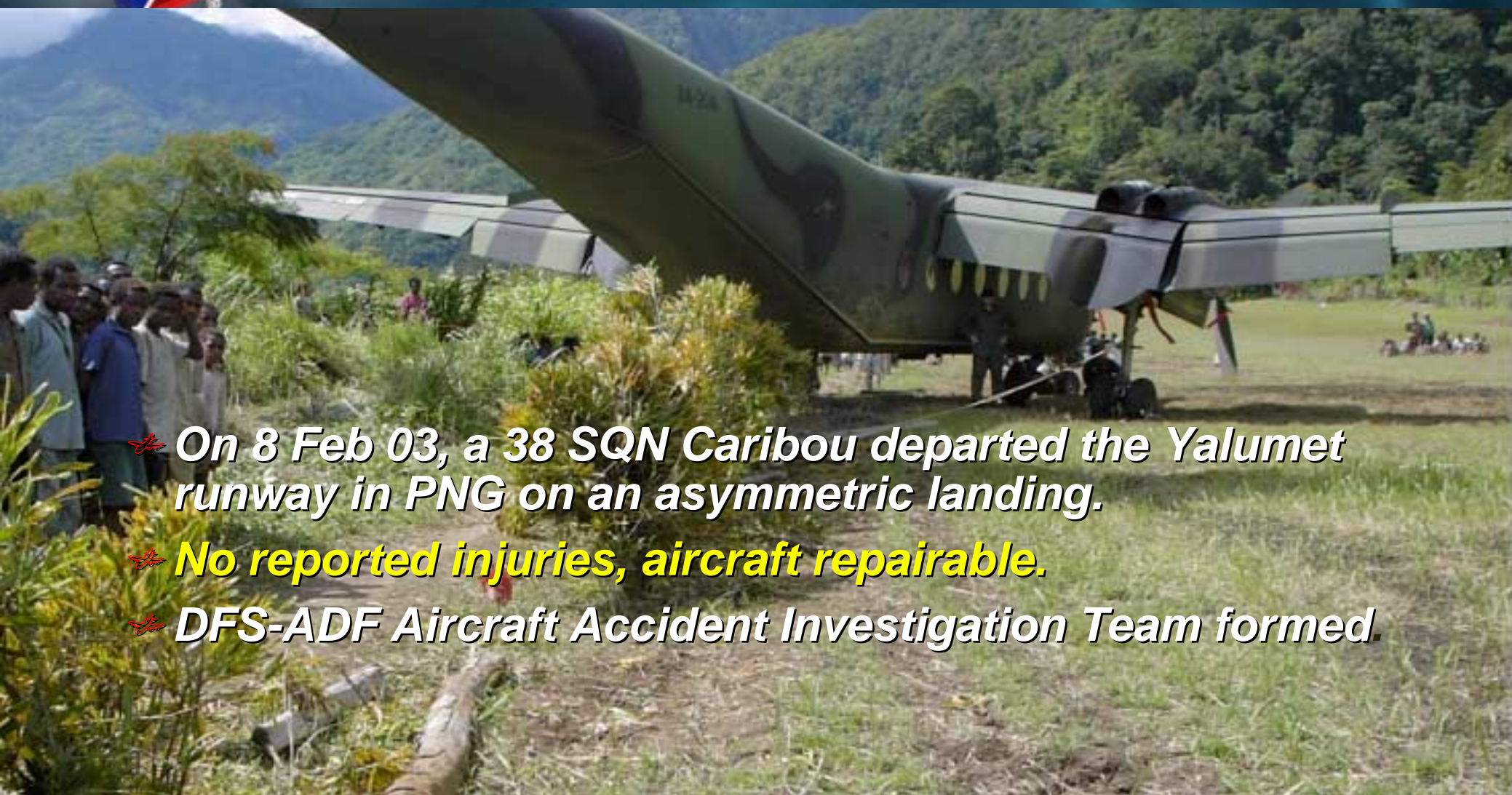




CARIBOU ACCIDENT

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YALUMET PNG 8 FEB 03



- ✈ On 8 Feb 03, a 38 SQN Caribou departed the Yalumet runway in PNG on an asymmetric landing.*
- ✈ **No reported injuries, aircraft repairable.***
- ✈ **DFS-ADF Aircraft Accident Investigation Team formed.***



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✦ DFS mainly investigates (since 99) accidents where the crew survived and the aircraft is repairable

✦ Same investigative training, procedures, equipment, techniques used as for major accidents with fatalities

✦ Just as many organisational lessons can be learnt and deficiencies identified



An aerial photograph of a forest. A large, prominent tree stump with a thick trunk is visible in the center-left. A dirt path or road winds through the trees. The forest is dense with green foliage, and some bare branches are visible. The text "WHAT ABOUT 'SIMPLER' INCIDENTS?" is overlaid in the center in a bold, yellow, serif font with a black outline.

**WHAT ABOUT 'SIMPLER'
INCIDENTS?**



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UNIT INVESTIGATIONS

- ✈ *Many of the CY2002 ADF ASORs detail occurrences with organisational deficiencies*
- ✈ *The only difference between an accident and a 'whew, that was lucky' is the **consequence***
- ✈ ***For example:***



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ADF ASOR EXAMPLES

✈ **VIKING WERE CONDUCTING 4 SHIP LOW LEVEL ATTACKS. VIKING 1 AND 2 WERE CONDUCTING THE FIRST 25/10 POP FROM A 10 NM INGRESS. VIKING 2 WAS BRIEFED TO BE 30 DEGREES SWEEP AT 1 MILE FROM VIKING 1. VIKING 2 ACCELERATED TO 540 KNOTS INSIDE 10 MILES **WHILST CONDUCTING COCKPIT CHECKS.** VIKING 1 ACCELERATED LATER **DUE TO THE OVERFLIGHT OF SOME FARM BUILDINGS,** RESULTING IN A **PURE SPREAD FORMATION BETWEEN VIKING 1 AND 2 AT THE OFFSET POINT OF 5 MILES.** VIKING 1 AND 2 NOTICED THE FORMATION DISPOSITION AT THE OFFSET **BUT CONTINUED WITH THE PASS.** VIKING 2 APEXED JUST UNDER AN OVERCAST LAYER AND CONTINUED THE PASS, **LOSING VISUAL WITH VIKING 1 WHILE FOCUSING ATTENTION ON THE WEATHER AND PASS PARAMETERS.** VIKING 2 CONTINUED FOR WEAPONS RELEASE (SIMULATED). AS VIKING 1 WAS IN THE DIVE HE **NOTICED THAT VIKING 2 WAS ON A CONVERGING FLIGHTPATH APPROXIMATELY 200 FEET BELOW AND DISPLACED ONE TO 2 ECHELON WIDTHS ABEAM .** **VIKING 1 PULLED UP AS VIKING 2 PASSED UNDERNEATH** AND COMMENCED A LATERAL BREAKAWAY TOWARDS THE POSITION JUST VACATED BY VIKING 1.**



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WHAT IF THEY HAD HIT?

✈ DFS Investigation

✈ BOI Report

So, why not.....

✈ Carry out an investigation and take corrective actions as if they had collided?

*✈ Detailed ASOR report disseminated to ADF aviation community in **Feedback***

*✈ **Issues included Operations tempo, currency, flight programming, standard profiles, training, airspace availability, briefings and SIs***



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✈ **AT APPROX 100 FT THE AIRCRAFT CAPTAIN DIRECTED THE RHS FLYING PILOT TO COME SLIGHTLY LEFT TO REGAIN RUNWAY CENTERLINE. DURING THIS CORRECTION A GUST FROM THE REAR RIGHT QUADRANT LIFTED THE RIGHT WING AND PUSHED THE AIRCRAFT THROUGH CENTERLINE. FULL RIGHT AILERON REQUIRED BOTH HANDS ON THE YOKE AND RUDDER WAS APPLIED. AT THIS STAGE THE AIRCRAFT BEGAN TO SINK RAPIDLY. THE RHS PILOT COMMENCED APPLYING POWER BUT THE AIRCRAFT CONTINUED TO SINK AND DEPART LEFT. THE AIRCRAFT CAPTAIN DIRECTED A GO AROUND WHEN AIRCRAFT WAS STABLE, PARALLEL TO AND ONE WINGSPAN LEFT OF THE RUNWAY AND APPROACHING THE LAST POINT OF SAFE TOUCH DOWN. THE LHS QFI THEN ASSISTED WITH THE THROTTLES AND APPLIED ADDITIONAL POWER AND A GO AROUND FROM BETWEEN 10 AND 20 FT WAS COMMENCED.**



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✈ **THE RHS PILOT ASSUMED THAT THE QFI HAD TAKEN OVER AND RELEASED THE YOKE WITH THE AIRCRAFT CLIMBING AWAY. THE LHS QFI THEN CALLED "YOUR YOKE MY THROTTLES ". THE RHS PILOT THEN TOOK DIRECTIONAL CONTROL** REQUIRING BOTH HANDS TO HOLD FULL RIGHT AILERON IN THROUGHOUT THE GO-AROUND. THE LHS QFI APPLIED AND MAINTAINED TAKE OFF POWER AND COMMENCED RETRACTING THE GEAR AND FLAP. THE AIRCRAFT WAS TRACKED VIA THE LOWEST DEPARTURE GRADIENT AND **CLEARED THE SURROUNDING TREES BY BETWEEN 20 AND 100 FT** WITH A NORMAL CLIMB GRADIENT. NO AIRCRAFT LIMITS WERE EXCEEDED IN THE GO AROUND. THE AIRCRAFT WAS CLEANED UP AND THE INCIDENT DEBRIEFED INCLUDING HANDOVER TAKEOVER DRILLS.



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WHAT IF THEY HIT THE TREES?

- DFS Investigation*
- BOI Report*

So, why not.....

- Carry out an investigation and take corrective actions as if they had impacted the ground?*
- Detailed ASOR report disseminated to ADF aviation community in **Feedback***
- Issues included **self-authorisation, ergonomics, supervision, HO/TO procedures, one-way strip operations, committal points.***



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*Investigate
the incident to
prevent the
accident*





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UNIT-LEVEL INCIDENT INVESTIGATION

- ✈ Can be just as powerful safety tool as full accident investigation*
- ✈ Unit commanders must support*
- ✈ Unit investigators require training and equipment*
- ✈ Units must be resourced*
- ✈ Time must be available*
- ✈ Investigation actions and recommendations must be actioned in a timely fashion: ie, system must be closed loop*

SO WHAT ARE WE (THE ADF) DOING?





Director

- Improved ASOR System*
- ASOR Review Boards*
- Training for Unit Aviation Safety Officers*
- Safety Program Guides for Commanders*





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FEATURES OF THE NEW SYSTEM

- ✈ *Defence Aviation Hazard Reporting and Tracking System (DAHRTS)*
- ✈ *Closed Loop Hazard/ASOR Review and Tracking System*
- ✈ *One occurrence investigation methodology*
 - ✈ *Guides for UASOs, Investigation Officers*
 - ✈ *Based on the Reason Model and current 'best practise'*
 - ✈ *Easy to use once trained*
- ✈ ***One 'contributing factor' taxonomy***
 - ✈ *Investigation must be completed first*
 - ✈ *Descriptors at all levels*
 - ✈ *Simple database entry*



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FEATURES OF THE NEW SYSTEM

✈ **Four Distinct classes of aviation safety occurrence (ICAO-compatible)**

✈ **Accident (DFS)**

✈ **Serious Incident (DFS/Group/Wing)**

✈ **Incident (Unit/Detachment/Flight)**

✈ **Event (None!)**

✈ **Intranet - based.....Oracle database.**

✈ **Visibility to commanders of:**

✈ **ASOR/Hazard action/recommendation resolution**

✈ **ASOR/Hazard Closure**

✈ **ASOR/Hazard Trends and Statistics**

An aerial photograph of a rural landscape featuring a winding river or stream that flows through a patchwork of green and brown fields. The river starts in the upper left and meanders towards the lower right. The surrounding land is divided into various plots, some with sparse trees and others appearing more barren. The overall scene is captured from a high angle, showing the natural curves of the waterway and the layout of the agricultural land.

THANK YOU!