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# Chinook 1994



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# 1994 Scotland RAF Chinook crash

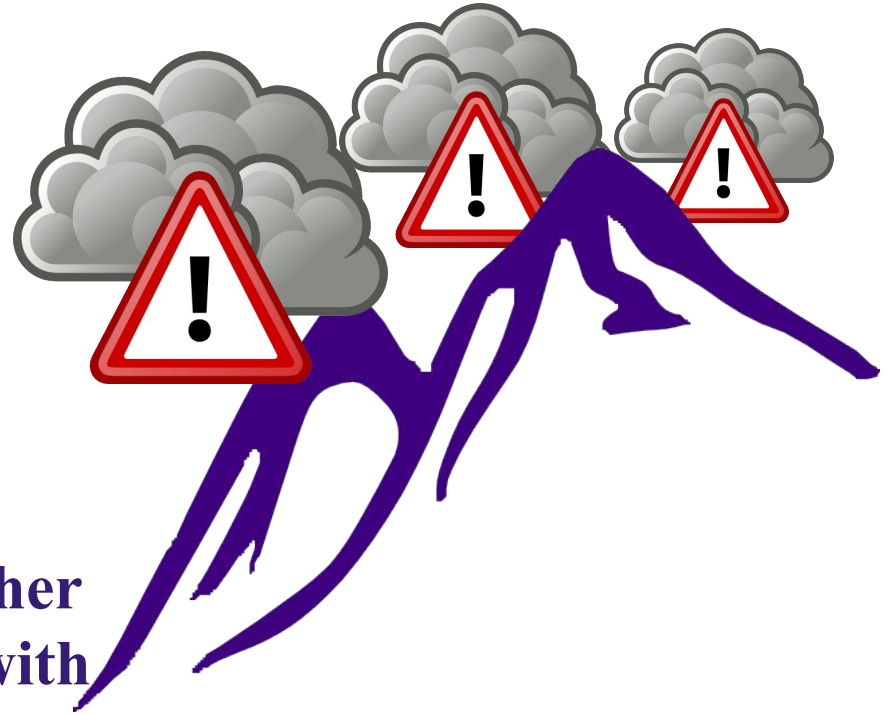
- 25 intelligence experts & 4 crew including 2 elite pilots of RAF
- June 2, one of most experienced crew in classified mission
- Weather forecast to be clear except in the Mull of Kintyre area
- VFR - Visual flight rules - waypoint - steered into fog - crash
- 1995 - no conclusive evidence - pilots guilty of gross negligence
- Why? They flew too fast and too low into thick fog
- They didn't stick to the flight plan after the waypoint
- These assumptions **could be** WRONG!!

# Background

- 14 service years - extensive refit - new computer nav. s/m
- FADEC - Full Authority Digital Engine Control
- Failed 5 times in six weeks, no more testing from June 1
- June 2, two elite RAF pilots operating the **‘positively dangerous’** aircraft - pilot Tampe expressed his concerns
- inconsistent nav. comp. readings on the first flight ignored
- No voice recorder, No flight recorder fitted yet!! **Prototype...??**

Clean Water + a pinch of dirt => makes it dirty

# What will two elite RAF pilots do?



steer straight into adverse weather  
in highlands at a **high velocity** with  
a **minimal rate of climb???**

## 2 mechanical fail cases

### 1. FADEC failure

- uncontrolled lift and roll
- pilots can easily lose track of their location
- a part of fadec replaced twice the previous week
- Fadec technology was **not perfect** at the time of the incident



## 2 mechanical fail cases

### 2. 'Control stick jam'

- uncontrolled speed
- pilots depressed left pedal 3/4
- highly unusual maneuver to perform at a greater speed
- rather than making a curve, it rotates the helicopter in its axis



# Present Status

- In 2011, the two pilots who were blamed for the crash had been cleared of gross negligence
- the entire navigation and communications systems used on the Chinook HC2 were not to be relied upon in any way by the aircrew, and therefore **it had no legitimate clearance to fly**
- 17-year fight for justice



# Ethical Issues Pre-Crash

Negligence:

- a) neglecting the safety measures like no voice recorder
- b) putting the whole terror fighting team together onboard



# The Road to Justice

**1994** (2 June) Chinook ZD576 crashed killing all on board. An RAF Board of Inquiry (BOI) is formed.

**1994** Unknown to crash investigators, the MoD draws up a legal case against the suppliers of the Chinook's Fadec software.

**1995** Two air marshals find that the pilots of Chinook ZD576 were grossly negligent - despite an inconclusive BOI report.

**1995** The MoD wins its legal case over the Fadec system after claiming it contained design flaws and was "not airworthy".

**1996** A Scottish Fatal Accident Inquiry says there is insufficient evidence to blame the pilots. The MoD stands by its air marshals.

**1997** An MoD report leaked to *Channel 4 News* says the Fadec software had 486 anomalies. Experts urged a software rewrite but the MoD refused.

**1997** A US Army Chinook flips over and rights itself at 250 feet. The cause remains a mystery.

**1998** The Commons Defence Committee accepts the MoD's assurance that the Chinook Mk2 had no serious software problems.

# The Road to Justice

**1999** *Computer Weekly* publishes *RAF Justice*, a 140-page report on a cover-up of the Chinook's software problems. MPs call for a new inquiry.

**1999** The MoD tells the Commons that *Computer Weekly's* findings are "nothing new".

**1999** In a handwritten note, Tony Blair says he has taken a personal interest in the crash. He supports the verdict against the pilots.

**1999** The House of Lords debates whether the issues raised in *RAF Justice* justify reopening the RAF Board of Inquiry into the crash. No vote is taken.

**2000** *Computer Weekly* asks Parliament's Public Accounts Committee (PAC) to investigate the airworthiness of the Chinook Mk2.

**2000** After an inquiry, the PAC accuses the MoD of "unwarrantable arrogance" and says the verdict against the pilots is unsustainable.

**2000** *The Times* calls for a new inquiry and points to the results of a three-year investigation by *Computer Weekly*.

**2001** Lord Chalfont wins a strongly-opposed fight for the House of Lords to form a committee to investigate the crash.

**2002** The Lords report.

# Ethical Issues Post-Crash

Fairness:

- a) equating lack of evidence to software error
  - i) both the software and operators could have been at fault
  - ii) equal consideration should have been given

# Applying the Ethical Tools

Ethical Tool:  $RISK = HARM \times PROBABILITY \sim HARM \times \text{"n \# of factors"} \times Prob$

The Chinook had known possible mechanical failures in its control system software, worn mechanical parts, and actions requiring vertical ascent. Another factor to the risk equation would be the “use of service”/“age”. For escorting 25 high profile intelligence agency members, quality control should have been observed by applying the above ethical tool.

Ethical Tool: Managing Ethics (See Lecture 7):

- Compliance: Does the vehicle meet safety standards, or follow minimum standards.
- Relying on Employee values: Employees are ethical, though cannot do anything on their own.
- Ethics Exhortation: Social vs Company Ethics, whistleblower consequences

# Applying the Ethical Tools: Part 2

## Ethical Tool: Am I Responsible? (Individual/Shared Responsibility)

- Severity of the Problem: Human lives and expensive military technology assets loss,
- Certainty of the Harm: Life-threatening for those traveling in the vehicle.
- Degree of involvement: Technicians/maintenance crew, supervisors bare responsibility in signing off/approving safety documents
- Cost of acting: maintenance costs, time to fix, acknowledging the (negative) problems/flaws of a system (as opposed to keeping quiet)
- Certainty of the solution: Uncertain, Dependent on the Individual/Group

# Solution to the Issue

## -Social Justice

-Involves the research of extracting information of other relevant Chinook incidents/reports over the course of history in an organized presentation/collage and releasing it to media/general public.

## -Better Safety/Escapes Practices Implemented

- Inclusion of the Flight/voice/black box into the cockpit, parachutes behind the passengers, more frequent maintenance procedures based on previous known mechanical failures/quirks of the Chinook Helicopter. Mechanical Backup for FADEC, instead of all digital controls

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