



# The colour perception standard in aviation:

Some critical implications of the  
Administrative Appeals Tribunal (AAT)  
decisions regarding colour perception and aviation

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held in Vanuatu on 29 August 2009



# Overview of the presentation

- What does the colour perception standard say, and what does it mean?
- What did the AAT decide, and what were the bases of these decisions?
- What evidence would allow a definitive judgement to be made about the role of colour perception in aviation?

## Take-home message

- The AAT decisions made 20 years ago have allowed the development of a cohort of pilots with defective colour perception and with significant flying experience in sophisticated aircraft.
- This cohort of experienced pilots now enables the gathering of empirical evidence allowing definitive judgements to be made about the role of colour perception in aviation.

# ICAO colour perception standard

- The applicant shall be required to demonstrate the ability to perceive readily those colours the perception of which is necessary for the safe performance of duties.

(Annex 1 to the Convention on International Civil Aviation, July 2001)

# Implicit argument of ICAO standard

- First Premise: Pilots with defective colour perception have reduced ability to distinguish between, and recognise colours, and therefore to decipher colour coded information.
- Second Premise: In aviation there is extensive use of colour coding of information essential to safety.
- Conclusion: Pilots with defective colour perception are unsafe in the “performance of their duties”.

# First premise

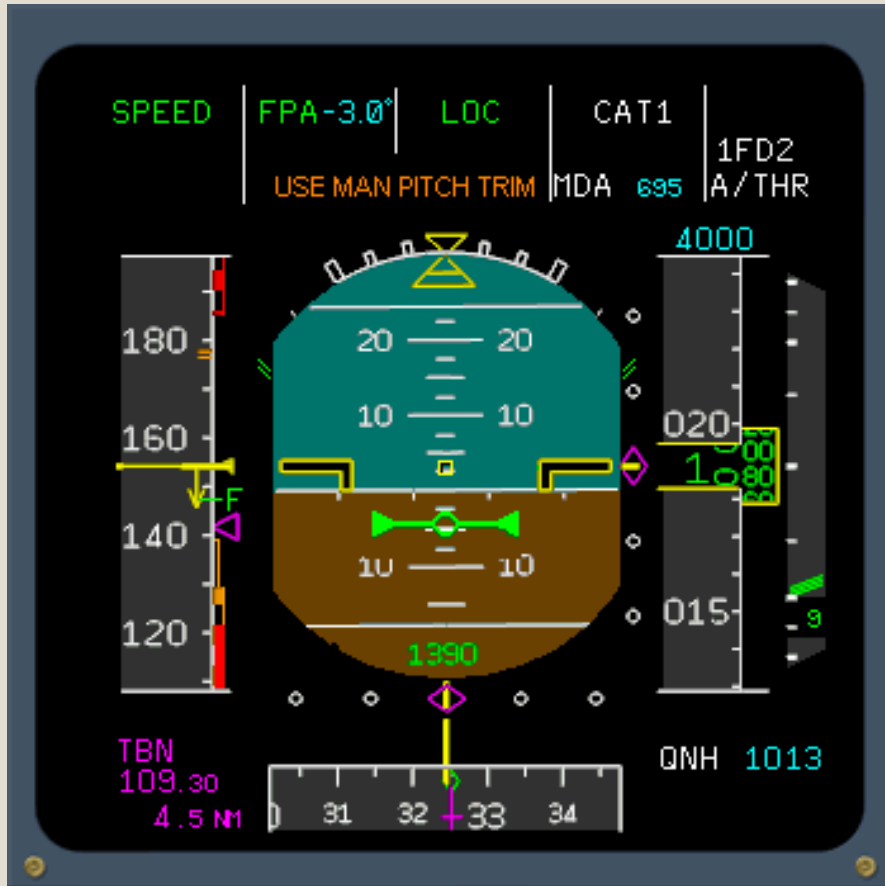
- Pilots with defective colour perception have reduced ability to distinguish between, and recognise colours, and therefore to decipher colour coded information.

## Second premise

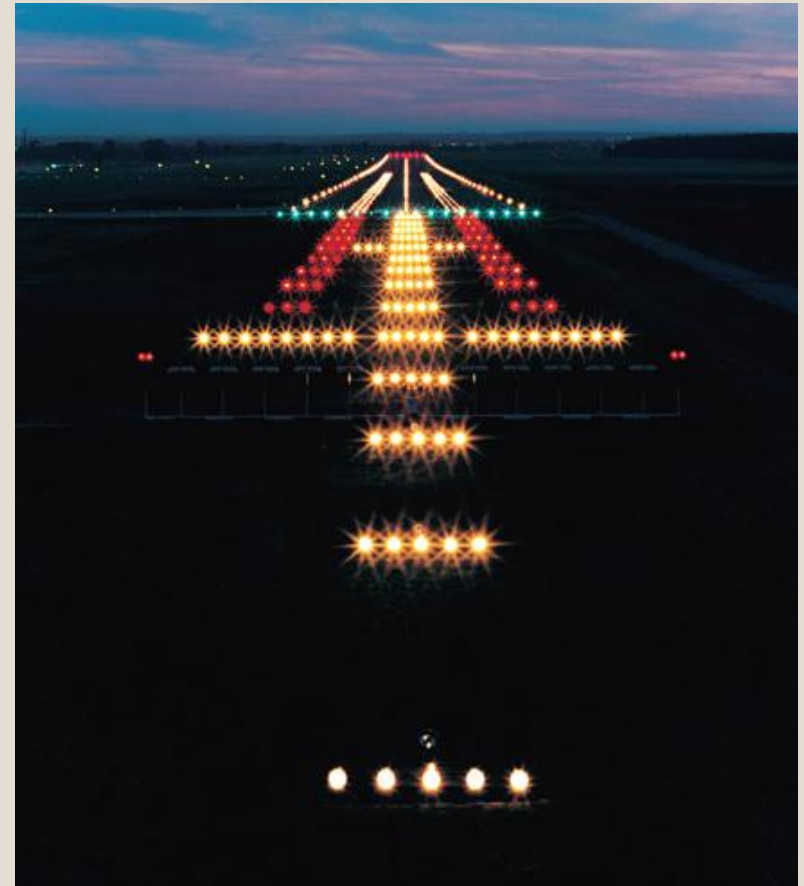
- Second Premise: In aviation there is extensive use of colour coding of information essential to safety.

# Use of colour in aviation, examples

## Colour in the cockpit



## Colour out of the cockpit





# ECAM Display from Airbus A330



# Is colour *sufficient* for 'seeing' information

Can you see  
this line is  
coloured blue?

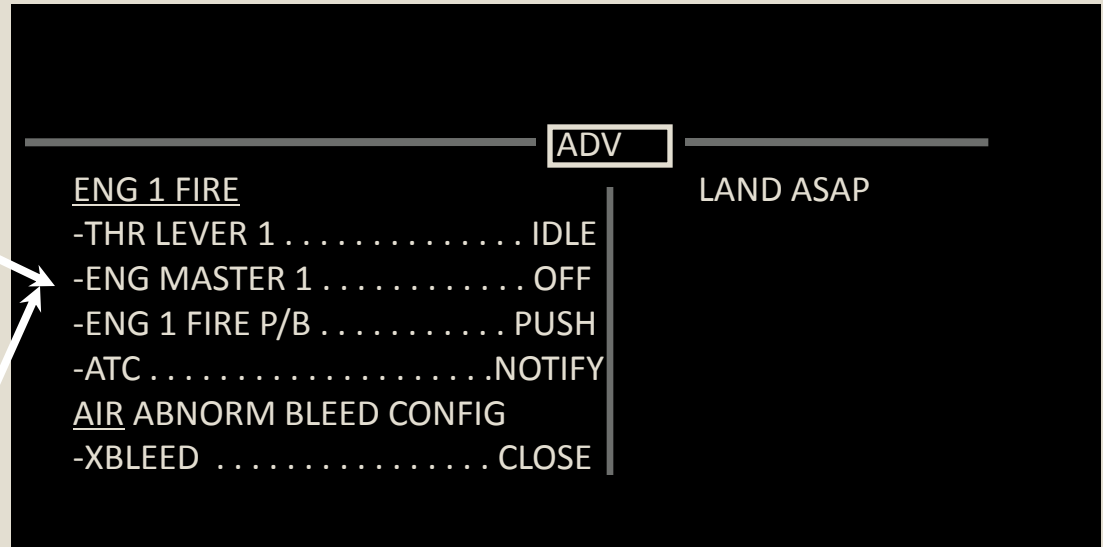
Can you see  
the information  
presented in  
this line?

```
###
### # #####
-### ##### # ..... #####
-### ##### # ..... ###
-### # ##### #/# ..... ####
-### ..... #####
### ##### ##### #####
-##### ..... #####
```

# Is colour *necessary* for 'seeing' information

Can you see  
this line is  
not coloured?

Can you see  
the information  
presented in  
this line?



# AAT decisions regarding colour perception

- Re: ARTHUR MARINUS PAPE  
And: SECRETARY, DEPARTMENT OF AVIATION  
No. V87/494
- Re: HUGH JONATHAN DENISON  
And: CIVIL AVIATION AUTHORITY  
No. V89/70

# Example 1: Pilot 'J'

- Age 42, CVD Diagnosis: “Severe Protan”.
- Flying experience: Total Flying Time: 8500 hrs
- Flying experience: Airbus A320/321; Embraer 170; Dash 8 100/200/300; CASA-212; PA-31-350; PA-44; C404, 310/320; Aero Commander 500S; Cresco 750; Beechcraft Duke
- Recent Employment:
  - '05- '07 Command Embraer 170;
  - 97 – present: FO on Airbus A320. Preparing for command training.

## Example 2: Pilot 'M'

- Age 32, CVD Diagnosis: “Severe Deutan”
- Flying experience: 8800 Hrs
- Flying experience: C310/320; Baron/Travelair; PA44; PA31; Command Metro3/23; Command Saab 340; Command Boeing 737-300/800
- Current Employment:
  - 2006 – present: Command Boeing 737 800

# Implicit argument of ICAO standard

- First Premise: Pilots with defective colour perception have reduced ability to distinguish between, and recognise colours, and therefore to decipher colour coded information.
- Second Premise: In aviation there is extensive use of colour coding of information essential to safety.
- Conclusion: Pilots with defective colour perception are unsafe in the “performance of their duties”.

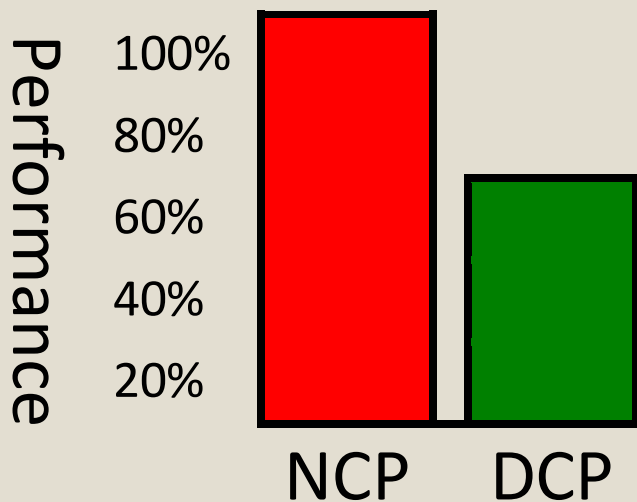
# The 'ideal' experiment

- Two representative samples of pilots, 'equal' in all possible ways except that the sample labelled NCP has normal colour perception, and the sample labelled DCP has defective colour perception.
- Both samples are exposed to the same set of experimental conditions in a flight simulator, and their performance is assessed using the same measurement tools.

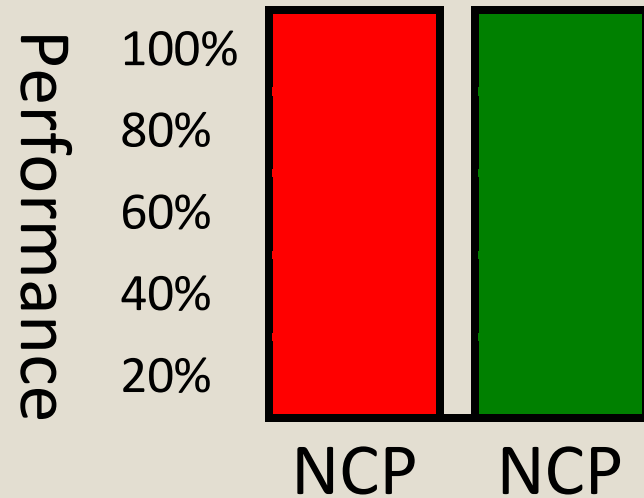


# Results of the 'ideal' experiment

Predicted results,  
if argument is 'true'



Predicted results,  
if argument is 'false'



Colour perception status of pilot groups

## Take-home message

- The AAT decisions made 20 years ago have allowed the development of a cohort of pilots with defective colour perception and with significant flying experience in sophisticated aircraft.
- This cohort of experienced pilots now enables the gathering of empirical evidence allowing definitive judgements to be made about the role of colour perception in aviation.



Hell of a name for a tub full of seamen !