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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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?
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.
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: 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;
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’

Performance

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!