Submission 3 by Colour Vision Aviators
Concern for PMO Bias

This document discusses material circulated by the CAA PMO in support of stricter testing and restriction regimes for CVD pilots. Examples of material are shown to be fabricated, factually inaccurate, unsupported and presented in such a manner as to cast CVD pilots in a negative light.

Promotion of stricter testing and restriction regimes by the PMO, as included within the GD, appear to be based not on evidence but rather the personal views of the PMO.

The continued suitability of the PMO for his role in regulating clinical test methods and medical restrictions for CVD pilots is questioned.
Introduction

In the course of researching and writing submissions for this General Directive (GD), material produced and actively circulated by the CAA Principal Medical Officer (PMO) has been obtained. The nature of the material demonstrates what may be described as either extremely poor judgement or an attitude of contempt by the PMO towards individuals with colour vision deficiency (CVD).

This submission discusses a public presentation and associated paper produced by the PMO. Given that testing and restrictions applied to CVD pilots have been significantly tightened under the authority of the current PMO, the view of the PMO is of relevance and is indeed concerning.

Noting the PMO is responsible for the development of the GD and indeed, provides advice to the Director and others on the GD, it is submitted that the advice and views of the PMO should be treated with caution.

Presentation to Australian Society of Aerospace Medicine Annual Scientific Meeting – Brisbane 2014

It is understood that the PMO travelled to the Australian Society of Aerospace Medicine Annual Scientific meeting in Brisbane in 2014 where he presented on International Variation in the Assessment of Colour Vision Deficient Pilots. While it is understood that the PMO travelled of his own volition and was not funded by the New Zealand government, the first two slides of his presentation do clearly identify him as the New Zealand Civil Aviation Authority Principal/Chief Medical Officer.

Opening slide of PMO presentation, clearly identifying the presentation as that of Dougal Watson, Chief Medical Officer, Civil Aviation Authority of New Zealand.
Second slide of PMO presentation, clearly identifying the presentation as that of Dougal Watson, Principal Medical Officer, Civil Aviation Authority of New Zealand

**Objectionable material**

The content of the presentation raises serious questions of bias by the PMO with regards his enforcement of strict restrictions and clinical testing regimes on CVD pilots in New Zealand, as contained in the GD. These are significantly more strict than those tests and restrictions which previous PMO have required and indeed waived from time to time.

Despite the reasonably benign title, *International Variation in the Assessment of Colour Vision Deficient Pilots*, the presentation included a number of most disturbing slides including a plagiarized front page of *The Times* newspaper with a fabricated story which appears to be deliberately tailored to cast CVD pilots in a negative light.

Other slides containing false and misleading material in cartoon format were also displayed by the PMO, reflecting negatively on individuals with CVD. The public
display of such humiliating and discriminatory material of this nature constitutes harassment of individuals with CVD.

The public display of similarly negative material about other minority groups would be unacceptable. It is particularly grave however that such material is being circulated publicly by the senior manager within CAA who is directly responsible for generating this GD, deciding the test and restrictions regimes that are applied to CVD pilots.

False suggestion that CVD individuals are unable to decipher Rubix cube colours

False suggestion that CVD individual are unable to distinguish yellow, red and blue
Highly offensive suggestion that CVD individuals are in some way akin to dogs

False suggestion that CVD individuals are unable to comprehend a rainbow

The use of such crude material not only suggests a prejudice against CVD pilots by the PMO but also indicates a clear lack of knowledge by the PMO on the nature of CVD and what an individual with CVD can in fact see. It is well known that most CVD individuals only learn of their CVD when undertaking clinical diagnosis tests. These individuals’ otherwise live perfectly normal lives, including the identification of colours on Rubix cubes, roads, tooth brushes, rainbows and traffic lights to name but a few. Indeed, thousands of CVD pilots safely operate across many countries, including New Zealand, without incident.

**Unbalanced content, factual inaccuracies and misquoted reference**

Aside from the use of misleading and falsified slides, the presentation contained factually incorrect text. It is not clear if this is due to a lack of knowledge on the part of the PMO or a deliberate intent to discredit CVD pilots. The following slide is an example.
The above slide states that all CVD individuals see fewer colours and have difficulty distinguishing colours which are easily distinguished by people with normal colour vision. A reference is provided, however this does not support the information in the slide. The actual reference does in fact read¹:

- Most of us see our world in color. We enjoy looking at a lush green lawn or a red rose in full bloom. If you have a color vision defect, you may see these colors differently than most people. There are three main kinds of color vision defects. Red-green color vision defects are the most common. This type occurs in men more than in women. The other major types are blue-yellow color vision defects and a complete absence of color vision. Most of the time, color blindness is genetic. There is no treatment, but most people adjust and the condition doesn’t limit their activities.
- Partial or total inability to distinguish one or more chromatic colors.
- The absence of or defect in the perception of colors.

Clearly the reference does not support the absolute difficulty implied by the PMO.

Another slide presented by the PMO references material by researchers which has been surpassed by the Australian Administration Appeals Tribunal and the research work of other regulatory authorities²³⁴⁵⁶⁷.

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2. Administrative Appeals Decision 5034, Denison and the Civil Aviation Authority.
4. UK CAA Paper 2006/04, Minimum Colour Vision Requirements for Professional Flight Crew – Part 1
5. UK CAA Paper 2006/04, Minimum Colour Vision Requirements for Professional Flight Crew – Part 2
7. FAA Report DOT/FAA/AM-14/6, Usability of Light Emitting Diodes in Precision Approach Path Indicator Systems by Individuals with Marginal Color Vision
The above slide suggests a need for colour vision standards without providing evidential support. The examples given of instruments, charts, documents and the external and terrestrial environment have all been shown to be inadequate justification for CVD restrictions by Administrative Appeals Tribunal and the research of other regulatory authorities in the references previously provided. Elsewhere the presentation also refers to work by Vingrys and Cole from 1988. The presentation fails to provide balance by noting the work of these authors was thoroughly tested in 1989 by the Administrative Appeals Tribunal and dismissed in favour of other evidence to the contrary\(^8\).

**Misleading analysis of relative conservatism in nations with respect to testing and restricting CVD pilots**

Graph of conservatism index for nations indicating most nations are more conservative than New Zealand and Australia

In the course of his presentation the PMO presented a graph intended to depict the relative conservatism of New Zealand and Australia regulators with regards CVD

\(^8\) Administrative Appeals Decision 5034, Denison and the Civil Aviation Authority.
pilots when compared to other nations. The graph indicates that the majority of countries are very conservative in their testing and restriction regimes. It implies New Zealand and particularly Australia are less conservative than the vast majority of nations. Before exploring this graph further, it is necessary to discuss the underlying research paper of the PMO, on which the graph is based.

The paper produced by the PMO, *Lack of International Uniformity in Assessing Color Vision Deficiency in Professional Pilots*, was published by Aviation, Space and Environmental Medicine in 2014. The paper was based on research by the PMO to identify the colour vision test methods and restriction regimes applied in various nations. This data was then converted into a conservatism index for each nation.

Full details for the calculation of the conservatism index has not been made public and so it is not available to critique, despite being fundamental to the paper and presentation. It is understood that a scoring system was applied for each clinical test with more conservative tests achieving a higher score. Similarly, those nations that enforced tighter restrictions on CVD pilots achieved a higher conservatism score. The exact scores used for each test and restriction however have not been revealed. It has also not been revealed whether a sensitivity analysis was performed on the scoring system itself. Given no such sensitivity analysis is discussed, it is assumed that it has not been done. It is therefore entirely possible, in the absence of sensitivity studies and independent critiquing that the conservatism index is an artefact of the relative scores applied by the PMO to each clinical test and restriction. The end results, as presented in the following graphs are therefore open to question.

The above graph presented by the PMO to the audience in Brisbane corresponds loosely to the first graph presented in his paper (reproduced on the next page) in which the number of states is graphed against the calculated conservatism index.

The nations surveyed by the PMO included many nations which have very little aviation activity. 36 of the 78 nations each represented less than 0.1% of world aviation activity. To provide context, New Zealand alone represents 0.7% of world aviation activity, so these are nations with very little aviation activity indeed. Unsurprisingly, such nations have little technical capacity to develop and support more flexible CVD testing and restriction regimes. This corresponds to the graph presented by the PMO in which we see that many nations have comparatively conservative CVD testing and restriction regimes. It is fair to say that the conservatism in this case is not necessarily due to anything other than an absence of demand for a more lenient system and an inability to explore and support more lenient testing and restriction regimes.
It is also well known that some of the most populous nations with a sizeable total GDP, afford less liberal personal freedoms. According to the PMO paper, four nations, accounting for 25% of the world population do not allow secondary screening of CVD. In these nations failure of the initial screening test is absolute.

Conservatism of nations with regards CVD clinical test methods and pilot restrictions

There is no recourse to even secondary clinical tests to confirm CVD or to evaluate the severity of CVD. This corresponds to the second graph from the PMO paper in which we see nations representing a large proportion of the world population having very conservative regimes. It also corresponds to the final graph in which we see relatively low GDP per head in those conservative nations.

Based on the PMO presentation, New Zealand is understood to sit mid-scale on the conservatism index. On the more conservative side we have many small nations, developing nations and a number of European nations, which have historically had strict CVD testing regimes.

It is well known that some advanced Western nations have more lenient testing and restrictions regimes for CVD pilots than New Zealand. This includes nations such as the United States, Canada and Australia. It also includes others such as Kenya, Brazil and Mexico. The United Kingdom is believed to sit at about the same level of conservatism as New Zealand, although this is no doubt influenced by proximity to Europe, with its relatively strict regulatory authorities.

The aviation activity of nations with more lenient CVD regimes than New Zealand (such as Canada, Australia, United States, Brazil plus other counties that accept the Farnsworth D15 test and Giles Archer tests, which were previously accepted in New Zealand) account for over 43% of world aviation activity. There may in fact be other countries that are also more lenient than New Zealand but this short list is considered adequate to demonstrate that the PMO presentation is potentially misleading.

While it is true that there are many countries that are more restrictive than New Zealand in terms of testing and restricting CVD pilots, these countries include a significant number of small nations with limited resources and aviation activity or nations with limited personal freedoms.

Close to half of all aviation activity occurs in developed nations that are comparatively more lenient than New Zealand when dealing with CVD pilots. As such a significant cohort of CVD pilots continue to operate around the world. Given the near absence of incidents and accidents associated with CVD along with a considerable and growing pool of research and review material which indicates that they can operate safely, evidence to support the stricter testing and restriction regimes espoused by the PMO is lacking.

**Summary**

The CAA PMO provided a presentation to the Australian Society of Aerospace Medicine Annual Scientific Meeting in Brisbane in 2014. The presentation contained material that was fabricated, factually inaccurate and presented in such a manner as to cast CVD pilots in a negative light.

Given this apparently biased presentation by the PMO, one must question whether the clinical testing and medical restrictions now enforced by the PMO, and included within the GD, are based on evidence or are the result of unfounded personal views.
The continued suitability of the PMO for his role in regulating clinical test methods and medical restrictions for CVD pilots must also be questioned.

Complete Presentation of PMO
This submission has been authored by Ryan Brookes.

The report has been reviewed and endorsed by:

- Phillip Maguire, ATPL holder and Airline Pilot
- John O’Brien, Dash 8 Captain and Instrument Rating Flight Examiner, Australia. John is also a CVD pilot.
- Dr. Arthur Pape, Designated Aviation Medical Examiner and founder of Colour Vision Defective Pilots Association of Australia. Arthur is also a CVD pilot and holder of a multi-engine instrument rating.
- Mr Tim Woods, founder of Colour Vision Aviators, New Zealand.
Contact details

E. info@colourvisionaviators.co.nz
P. (03) 528-5470
M. 021 978 939

P.O. Box 388 Motueka Nelson NZ 7142