

**Report of the
Colour Vision Deficiency General Direction
Assessment Panel**

Not CAA Policy

**Report of the
Colour Vision Deficiency General Direction
Assessment Panel**

Index	Page
Part 1 - Introduction	3
The Proposed General Direction	3
Part 2 - The Review Panel	5
Terms of Reference	5
Panel Membership	5
Conduct of the Review Panel	5
Presentation by the PMO	6
Part 3 - Submissions	7
Submission issues	7
Empirical evidence	7
Use of the CAD test	8
Proposed restrictions	8
Alternative CVD tests	9
Follow the Australian Approach	10
Other jurisdictions	11
Discrimination	11
Flexible Pathway	11
Part 4 - Assessment of Submissions	13
Does Colour Vision Status Need to be known?	13
Is CVD a Threat to Safety?	13
Why has colour vision been of importance to aviators?	15
Implications of the Advances in Aviation Technology and Safety	16
Reasons for Restrictions	17
Signal Lamps	18
Obstacle Lights	18
Aircraft Navigation Lights	18
Aerodrome lighting (including gate lights)	19
Flight Deck Displays	19
Maps and Charts	19
Precision Approach Position Indicators (PAPI)	20
Non-Routine Examinations	20
Proposed Restrictions	21
Carriage of Passengers on Air Operations	22
Flight at Night	22
Flight under Instrument Flight Rules	22
Flight in the Vicinity of a Controlled Aerodrome	23
Real World Practical Test	23
Follow the Australian Approach/Other Jurisdictions	25
Part 5 - Appropriateness of the General Direction	26
Is a General Direction Necessary?	26
Testing	26
Proposed Restrictions where CVD of Aeromedical Significance	28
Part 6 - Conclusions	29
Part 7 - Recommendations	31
Enclosures	

Part 1 – Introduction

1. In 2013 the CAA released a proposed general direction for consultation on the subject of Impaired Colour Vision - http://www.caa.govt.nz/medical/gd_colour_vision.pdf. After extensions the final closing date for submissions on the proposal was 1 July 2015.
2. As part of the consultation process required under s27G (2) of the Civil Aviation Act 1990 (the Act) and to inform his consideration of submissions received on the matter, the Director considered it appropriate to establish a review Panel comprising individuals with experience in aviation medicine, optometry and vision science, and flight operations - a composition that acknowledges the need for the Director's decision making on the matter to be informed by input from these various disciplines.
3. The proposed General Direction (GD) was issued pursuant to s27G (1) which states that the Director of Civil Aviation (the Director) may, by notice in the *Gazette*, issue general directions in relation to:
 - a. Conducting examinations of applicants and licence holders, and reporting the results of those examinations to the Director; and
 - b. Providing exceptions for temporary medical conditions to the reporting requirements set out in s27C; and
 - c. Specifying the requirements of examinations or other clinical matters, which must be reasonable, including, but not limited to:
 - i. The medical content of examinations;
 - ii. The interpretation and analysis of results of examinations;
 - iii. The significance of results of examinations for the purpose of determining whether or not an applicant is eligible for a medical certificate under s27B.
4. Pursuant to s27G(2) of the Act before issuing general directions the Director must consult with those persons, health professionals with aviation medical experience, representative groups within the aviation industry or elsewhere, government departments, and Crown agencies that he or she considers appropriate.

The Proposed General Direction

5. The proposed GD describes the requirements for the medical certification of applicants who are colour vision deficient (CVD). The GD specifies several options for the medical certification of such applicants and the certification outcomes that apply to each of those options. Of note is that the GD reflects the colour vision certification process that is currently employed, with the one exception or departure from current CAA policy, which is the introduction of the City University London Colour Assessment and Diagnostics (CAD) test as an additional examination option and which is anticipated to over time replace entirely the Farnsworth Lantern test. However, the panel understands that many submissions on the GD relate not just to the proposed changes, but to a wish to see a review of the entire process of handling colour vision.

6. In summary, certification entails a routine screening using Ishihara tests, additional non-routine examination options for those who fail the Ishihara test, and options and medical certificate restrictions if the deficiency is deemed to be of aeromedical significance. The proposed restrictions are certificate endorsements prohibiting the participant from air operations carrying fare paying passengers, night flying, flight under instrument flight rules (IFR) and flight within the vicinity of a controlled aerodrome without a radio. The GD is at Enclosure 1.

7. The Ishihara test is a screening examination for CVD, described in the GD as a routine examination. It is highly sensitive and specific for detecting red/green colour vision defects. Other examinations, including the CAD test, the Farnsworth Lantern (and other lanterns) and the Farnsworth D15 test are all occupational colour vision tests. Each has been designed to separate colour vision safe from unsafe individuals in a particular context. These tests have set administration conditions so that they are reproducible in different environments. They can be (and are) administered by any person trained in how to administer the test. Research has been undertaken to assess the performance of these tests so that organisations using the data can have confidence in the result provided. A practical in-flight or simulator test of colour vision is another form of occupational colour vision test.

8. An error was identified in the draft GD, with one pathway through the decision tree showing an internal inconsistency; this was clearly unintended and would need to be rectified.

Not CAA Policy

Part 2 – The Review Panel

Terms of Reference

9. The Terms of Reference (ToR) for the Assessment Panel are at Enclosure 2. The role of the Panel was to assess the content of submissions received on the proposed general direction and provide the Director with its opinion on the appropriateness or otherwise of the proposed general direction.

Panel Membership

10. The Panel comprised the following:

- Steve Moore, CAA General Manager General Aviation (Panel Chair)
- Captain Ross Crawford, external senior industry flight examiner with experience in airline and general aviation operations;
- Doctor David Powell, external aviation medical specialist;
- Associate Professor Rob Jacobs, external optometry and vision science specialist with experience in colour vision matters; and
- John Sneyd, CAA Chief Legal Counsel.

11. Declarations of Interest were received from the Panel members. Of note, one member declared that he contributed to a submission as that organisation's consulting Aviation Medical Examiner (AME). Also, the employing organisation of another currently holds the only CAD test currently available in New Zealand. This is of significance because the proposed GD recommends the addition of this test to non-routine examinations. In neither of these cases was there seen to be any potential for pecuniary benefit to the panel members consequent on its recommendations.

Conduct of the Review Panel

12. The Panel met for three days over the period 18 – 20 November 2015. In general, Day 1 included a background briefing by the Principal Medical Officer (PMO) on the proposed GD, and discussion on possible issues arising from the PMO's briefing and the submissions. Day 2 was reserved to hear verbal submissions and Day 3 was set aside to consider the issues arising from submissions, and to formulate the Panel's thinking towards recommendations.

Presentation by the PMO

13. The PMO provided a PowerPoint presentation intended to provide the Panel members with information concerning:
 - a. The legislative basis of the Civil Aviation GDs;
 - b. CAA's general approach and policy concerning the structure and inter-relationship between GDs;
 - c. The policy and intention behind the colour vision GD;
 - e. Regulatory history of pilot colour vision assessment in NZ;
 - f. Some international history and perspective on the regulatory assessment of colour vision deficient pilots;
 - g. The history behind the current colour vision GD
 - h. The intended roles and effects of the colour vision GD; and
 - i. The legislative details of the colour vision GD.
14. The PMO explained that the GD aims to put the decision regarding CVD applicants with the AME and to reduce the number of Accredited Medical Conclusions (AMCs) that the CAA Aviation Medicine Team deals with.
15. Central to the proposed GD is the concept of aeromedical significance. Civil Aviation Rule (CAR) Part 67 defines aeromedical significance as: *a medical condition is of aeromedical significance if, having regard to any relevant general direction, it interferes or is likely to interfere with the safe exercise of the privileges or the safe performance of the duties to which the relevant medical certificate relates.* While there is no issue with aeromedical significance being used as a standard, it would appear that there is little in the way of guidance for determining what exactly, in terms of a flight operation, is significant in relation to CVD. In answer to a question regarding the reasoning behind the flight restrictions for a pilot who is CVD, the PMO answered that the "restrictions are historical". This is a key issue for the Panel's deliberations particularly in relation to the risk posed by a pilot with CVD, the different operational environments pilots operate in, and who should be determining restrictions to which a pilot is to operate.
16. The PMO also commented that he thought practical flight tests are unreliable. In the Panel's opinion a flight examination has the same status as a medical examination in ensuring that a pilot is not a threat to the public and renewing their privilege to fly.

Part 3 - Submissions

17. Fifty nine written submissions were received in response to the consultation process. Of these 15 were from aviation groups and the remaining 44 from individuals. Claro Law was engaged to provide a summary of the submissions and to provide objective summaries of the issues that arose from those submissions. The full summary is at Enclosure 3.

18. Six verbal submissions were received by the Panel. Four of the six submissions were from pilots with CVD who were keen to share their experiences with the Panel. One shared his thoughts of having flown with CVD pilots. One submitter appeared primarily to wish to criticise the CAA, particularly the PMO and the process being followed for the GD.

19. A significant submission, both written and verbal of six hours duration, was from Colour Vision Aviators (CVA), a group who have amassed considerable documentation as evidence that the restrictions in the proposed GD are invalid. Presenters included Captain John O'Brien, a CVD pilot who successfully argued his situation through the Australian Administrative Appeals Tribunal (AAT) and is now a captain with an Australian domestic airline; Dr Robert Liddell who was CASA's PMO equivalent over the period 1988 – 1996 and was instrumental in relaxing CVD conditions in Australia; Dr Boris Crassini from Deakin University, Geelong, Melbourne; Prof Geoffrey Stuart from La Trobe University Melbourne; and Ryan Brookes from the Defence Technology Agency (who stated when questioned that he was appearing as an employee of the NZ Defence Force).

Submission Issues

20. The main issues raised by both written and verbal submissions are summarized in the following paragraphs. Analysis of the issues is contained in subsequent sections.

Empirical evidence

21. A major theme to emerge from the submissions was the perceived absence of empirical evidence to support the proposed restrictions on CVD pilots contained in the GD. It is argued by submitters that there is no evidence to show that CVD pilots pose a greater risk to safety than 'normal vision' pilots:

"...[the] body of empirical evidence built by CVD pilots operating in many nations, including New Zealand and Australia, indicates there is no basis to restrict the privileges of CVD pilots should they fail to achieve the prescribed pass mark in the CAD test".

"I see no evidence that justifies the CVD GD...No supporting statistics have been provided that prove the proposed changes are warranted".

22. It is also argued that the empirical evidence that is available supports the very opposite view – that CVD pilots pose no greater risk than 'normal vision' pilots. Submitters refer to the fact that there is an absence of CVD-related accidents and anecdotal claims by CVD pilots that they have had an accident or a near-miss caused by CVD.

23. There appears to be one accident where CVD was given as a contributing cause. This was Fed-Ex Flight 1478 that impacted the ground short of the runway. However it is noted in submissions that CVD was not considered a primary reason as to why one pilot was deceived by the Precision Approach Position Indicator (PAPI) cues; and that the two other pilots on the flight deck with normal colour vision also failed to respond appropriately to the PAPI indications.

24. The submissions from the CVA included a number of reports, decisions and studies that are relied on as support for the view that CVD pilots do not pose a greater risk than non-CVD pilots. The relevance of these documents is discussed and well-referenced in the main body of CVA's submissions.

Use of the CAD Test

25. The CAD test was a polarising issue within the body of submissions. It was generally accepted by submitters that *"despite some debate about how the CAD test cut-off values are derived, the CAD test is nonetheless the best clinical test currently available"*. On the other hand, it is argued that *"the proposed CAD test would introduce an unnecessarily restrictive regime on CVD pilots in NZ"*. The CVA acknowledges that the CAD test can identify the presence of a colour deficit, but argue that: it is too conservative; it is not representative of any aviation task; it is expensive and not widely available; and it cannot determine how CVD will affect the ability of a pilot to fly safely.

26. In addition, opposition to the CAD test stems from concern that it is based on PAPI. It is pointed out in the submissions that not all airfields have PAPI; it is a redundant aid that is prone to errors; and it is not a requirement for safe landing. Moreover, the CVA note that the City University PAPI simulator, used to calibrate the CAD test, deliberately removed the luminance between the red and white lights, which is a design feature of the real-world PAPI. Thus, the simulator is not reflective of pilot's actual experience. Moreover, the pass criteria for the CAD test appear to be arbitrarily raised when compared to the pass criteria for the PAPI simulator.

Proposed restrictions

27. Carriage of passengers on air operations – cl 10(3)(d)(i). It was argued that there is no evidence to support prohibition on the carriage of passengers by CVD pilots. The perfect safety records of CVD pilots in Australia, Canada and the United States show that restrictions on CVD pilots are not justified. One submitter notes the inconsistency that:

"...the proposed condition will allow me to fly with passengers on cost sharing flights or when instructing with an ab initio student bearing the entire cost. However, it will not let me fly when the cost is met entirely by the passenger. This condition therefore in no way enhances safety as the same flight may be flown with just a different funding arrangement. Rather the condition serves only to complicate aero club activities and administration."

28. Flight at night – cl 10(3)(d)(ii). It is noted in the submissions that CVD pilots are able to operate aircraft at night quite safely. It is argued that the limitation against night flying focuses on PAPI but that many airfields that accommodate night flying do not have PAPI.

Therefore “if the PAPI were reason for restricting CVD pilots from night flight then presumably they should be permitted to fly at locations with no PAPI”.

29. In addition, it is argued that colour vision is not necessary to prevent collisions at night. Another aircraft is more likely to be noticed from the mere sighting of the aircraft or its lights and their relative motion, as opposed to the colour of its lights. On this issue, it is pointed out that any concerns about CVD pilots flying at night could be alleviated by a flight test under night conditions.

30. Other submitters do agree that restrictions on night should remain for CVD pilots but without explanation or justification. The question remains; “what is the threat or risk?”

31. Flight under Instrument Flight Rules (IFR) – cl 10(3)(d)(iii). It is submitted when operating under IFR, there is greater redundancy provided for traditional visual aids such as PAPI and marker beacons. In fact, reliance on instrumentation will replace the need for reference to aids such as PAPI or beacons in IMC (noting that marker beacons are no longer used in modern instrumentation). One submitter, who is a pilot with CVD and has no IFR restriction on his FAA and EASA licences as a result of his condition, but has restrictions when using his NZ licence argued that he is safer operating under IFR than under VFR especially on marginal weather days when attempting to remain VFR below cloud.

32. Flight in the vicinity of a controlled aerodrome - cl 10(3)(d)(iv). A number of submitters expressly endorsed the restriction on CVD flight near controlled aerodromes unless the aircraft is in radio contact with aerodrome control.

Alternative CVD Tests

33. Three-Tiered Test. The CVA proposed a three-tiered CVD test, as follows:

- Primary screening: Ishihara plate test. If a pilot fails the plate test he or she will be required to undergo secondary screening;
- Secondary screening¹: use of any screening method currently employed by ICAO nations including those listed in the proposed GD, the Farnsworth D15 test, the Giles-Archer lantern test, the CAD test and the signal gun test;
- Practical Flight Test: if an applicant fails both primary and secondary screening, he or she will be required to undergo a PPL, CPL, IFR, and/or ATPL practical flight test.

34. Successful completion of a practical flight test would mean that restrictions would be reduced to:

- Not valid in the vicinity of a controlled aerodrome unless in radio contact with ATC;

¹ This report refers only to the initial routine examination using the Ishihara test as “screening”. All other tests are non-routine examinations in the form of occupational tests. This includes practical tests. However in this section the words used by the submitter have been retained.

- In the case of ATPL holders, valid for ATPL privileges only as or with a co-pilot.

35. It is submitted that the benefit of the three-tier test is that it gives CVD pilots an opportunity to prove he or she can fly safely, notwithstanding the inability to differentiate colours.

36. The proposed three-tier test received wide supported in other submissions.

37. Real World Practical Test. Noting CVA's submission recommending a three-tier test, a number of submitters have expressed support for a practical flight test being the only test that CVD pilots are required to pass as evidence of safe aviation capabilities. It is argued that the flight simulator test will be able to discern whether CVD is practically of aeromedical significance. It is also noted that practical flight tests have been endorsed in the past by the CAA to allow CVD pilots to demonstrate they can safely operate an aircraft.

38. Farnsworth. The Farnsworth D15 has been put forward as an acceptable and readily accessible alternative to the CAD test. No incident has been recorded for pilots assessed under this test; it is accepted for electrical registration; and it is more widely available throughout New Zealand.

Follow the Australian Approach

39. Many submitters called for the CAA to adopt an approach to regulating CVD pilots that is consistent with the approach taken in Australia.

40. The argument in favour of a consistent approach is that, currently, Australian CVD pilots are able to fly in and out of New Zealand airspace unimpeded by regulatory restrictions; whereas in New Zealand CVD pilots do not have the same freedom. It is argued that as a consequence New Zealand CVD pilots must re-locate to Australia to work as a commercial pilot:

"I find it unjust to deprive born and bred Kiwis the opportunity to work in their home country when Colour Vision Standard is something that does not need to be upheld".

41. On this point, the submissions have also referred to three decisions of the Australian Administrative Appeals Tribunal in 1987, 1989 and 2015, in which the topic of CVD and its effect on pilot performance was reviewed by an expert panel. In particular, the 2015 decision of the Tribunal involving John O'Brien (a CVD pilot) is relied on for the position that strict testing and restrictions on CVD pilots are not justified on the evidence. In that case, the Tribunal concluded O'Brien was perfectly fit to captain aircraft utilising privileges of his ATPL and not just those of his CPL.

42. Submitters suggest that CAA work with CASA to review the history and progress of CVD pilots in both Australia and New Zealand, with a view to recommending a more pragmatic competency based test regime for CVD pilots internationally.

Other Jurisdictions

43. The United States, Canada and South Africa are also noted in submissions as jurisdictions that allow greater leniency to pilots with CVD. In the United States CVD pilots can operate without limitation based on lenient pass marks in various Pseudo Isochromatic Plate tests or on the basis of demonstrated competency. In Canada, CVD pilots may operate without limitation based on the Farnsworth D15 test. Finally, the South African Civil Aviation Authority uses a “real world” test.

Discrimination

44. The argument that the restrictions on CVD pilots are discriminatory was raised by a substantial number of submitters. For example:

“The addition of conditions without any scientific or empirical evidence cannot be tolerated as it amounts to nothing more than discrimination”;

“The proposal would discriminate against perfectly safe pilots and students who are trying to make a career in aviation. To my knowledge there is no precedent for this...”;

“The New Zealand colour vision requirements have consistently discriminated against pilots wishing to enter our aviation industry and seek careers as professional pilots”.

45. There is concern that CVD pilots would lose their current employment as a result of the GD. It is also argued that it is discriminatory that Australian CVD commercial pilots can fly in and out of New Zealand airspace under trans-Tasman agreements, but New Zealand CVD pilots cannot do the same.

46. The General Aviation Advocacy Group (GAA) has stated there may be grounds for a case of discrimination by the CAA against CVD pilots under the Human Rights Act 1993. This belief is premised on the view that there is no sound evidential basis to put restrictions on CVD pilots.

Flexible Pathway

47. Section 27B of the Act has been noted in two submissions. It is argued that the provision provides the medical examiner with discretion to consider whether to issue a medical certificate on flexible grounds.

48. The New Zealand Air Line Pilots Association (ALPA) has raised concerns that the GD does not describe the manner by which the ‘alternate pathway’ for the issuance of a medical certificate is achieved under s 27B. It submits there needs to be a defined pathway for the applicant to show competency under the alternate pathway; and it argues that this could be carried out in either a flight simulator or aircraft. Upon successful completion of any one of these flight tests, restrictions will be reduced to:

- In the case of CPL, valid for CPL privileges only as or with a co-pilot;
- In the case of ATPL holders, valid for ATPL privileges only as or with a co-pilot;

- In both cases, the other operating crew members must be informed of this restriction;
- The practical operational test will only apply to the aircraft type, group or series upon which the test was conducted;
- No two such restricted licence holders shall operate as a crew.

49. Moreover, the Air NZ Aviation and Occupational Health Unit (AOHU) have requested clarification about assessment options for CVD applicants where the outcome of assessment from the proposed GD is significantly more restrictive than an outcome under a previous assessment. It is submitted that it would inequitable to deny pilots with established safety records the opportunity to demonstrate safety through a practical flight test. AOHU notes that if a practical flight test is introduced it must be made clear: what organisations are authorised to conduct such test; how the test is standardised; how the results are interpreted; and how restrictions or entitlements arising from the results are applied.

Not CAA Policy

Part 4 - Assessment of Submissions

50. In assessing the issues raised in the submissions, a number of questions and issues regarding CVD and aviation safety were considered by the Panel. These included:
- a. Does an applicant's colour vision status need to be known?
 - b. Is CVD a threat to safety?
 - c. Is it more important to be able to distinguish a colour, or to correctly interpret a light or signal regardless of what colour is seen?
 - d. Noting the lack of accidents where CVD is raised as a contributing cause, and the number of pilots flying with CVD around the world, including in New Zealand, are the restrictions placed on CVD pilots valid?
 - e. Is the absence of evidence that CVD pilots are unsafe sufficient to say they are safe?
 - f. Is there concrete evidence or analysis to suggest that CVD may pose a safety risk?
 - g. Is the reason for a lack of CVD related accidents because of the restrictions imposed?
 - h. What link is there between the office-based tests to determine an applicant's level of colour perception and real-world realities, particularly in light on developments in aviation technology to assist in flight safety?
51. Each of these questions is discussed below, either separately or in conjunction with other analysis

Does Colour Vision Status Need to be known?

52. It is accepted that the colour vision status of pilots must be known, just as other aspects of the physical status of pilots is known e.g. other aspects of vision, hearing and mental status. The Panel agreed that it is also important to know the nature and severity of any CVD condition which can only be ascertained from office based non-routine examination. In this respect the Panel agrees with the GD in that if routine screening or non-routine examination acceptable to the Director can be passed then the CVD is not of aeromedical significance.

Is CVD a Threat to Safety?

53. Another question that appears to have perplexed the entire aviation world over a number of decades is whether or not CVD was a threat to aviation safety at all, and when does it become of aeromedical significance? It is generally agreed that CVD is a potential safety threat although there is difficulty in establishing exactly what the threat is. The situation is not clarified by statements in the ICAO Manual of Civil Aviation Medical:

"The problem with colour vision standards for pilots and air traffic controllers is that there is very little information which shows the real, practical implications of colour vision defects on

aviation safety. Ideally one would select only applicants with normal colour vision as measured by the most discriminating tests. This policy would deny licences to a significant number of individuals who might be able to function safely in the aviation environment. The question is where to draw the line. Many Contracting States simply define as acceptable those applicants who obtain a certain score with an authorized set of pseudo-isochromatic test plates, others accept as “colour safe” colour-deficient applicants who pass certain additional tests.”²

“Despite all the work undertaken concerning colour vision, a challenge remains to determine exactly where the cut-off between “safe” and “unsafe” should be with respect to an initial applicant who chooses aviation as his career or hobby.”³

54. In this respect it is not helpful that the ICAO requirements for colour vision at Annex 1 have not been amended for 63 years, during which time significant advances in aviation safety have occurred. What complicates the issue is the variation by which various states apply the ICAO guidance, both in terms of the required pass/fail criteria and restrictions imposed on a pilot whose deficiency is deemed to be of aeromedical significance. In setting the boundaries there appears to be little consideration on the level of risk that is acceptable.

55. CVA has acknowledged CVD as a threat by including in their recommended three-tier test process that pilots will still need a radio in controlled airspace around an aerodrome, and for ATPL holders the restriction “as or with a co-pilot only”.

56. The Panel is concerned with apparent inconsistencies present in the regulations and inconsistencies with the application of rules over time. The case of a pilot who has a CVD condition but can exercise the privileges of a pilot licence to carry non-fare paying passengers or instruct is one example where the restriction, supposedly to ensure a third party is not exposed to additional risk, is inconsistent. What is more, these CVD pilots are able to operate in the same airspace at the same time as non-CVD pilots conducting operations which are off limits to their CVD counterparts.

57. Another example that heightens concerns over the appropriateness of restrictions is that of a former Mount Cook Airlines pilot who could not pass initial screening or subsequent additional non-routine examinations but was given an unrestricted medical based on a practical flight test. That pilot then left the industry after accumulating 5000 hours with the airline. After some years he decided to again take up a flying career, but with a changed application of the rule he could not gain the required medical. The question is what safety risk does this pilot pose? The Panel has also been made aware of a number of Air New Zealand pilots, currently flying who are in the same situation regarding their initial colour vision test. The Australian AAT rulings in favour of Captain John O’Brien gave considerable weight to the safety record Captain O’Brien had established during his time in aviation.

58. In discussing the issue of aeromedical significance, the Panel reached the conclusion that the degree of significance, and hence risk, was dependent on the operational context; the type and nature of the operation, type of aircraft and crew composition. What may be

² ICAO Manual of Civil Aviation Medicine (DOC 8984) 3rd Edition, para 11.8.29

³ Ibid Para 11.8.40

significant for one situation may not be for another. There is also concern that the variability is too great to be dealt with by generalised restrictions as proposed in the GD. Any restriction imposed as a consequence of the CVD must be applied on the basis of an identifiable threat or risk to safety and matched to the context of the condition and a candidate's operating environment.

Why has colour vision been of importance for aviators?

59. Pilots with a CVD are excluded from a number of areas in aviation based on their inability to differentiate between colours commonly used and traditionally important for the safe navigation and operation of aircraft. Examples are signal lamps from control towers (e.g. red for do not land, green for cleared to land); navigation lights which at night the red port and green starboard wing lights determine the aspect of another aircraft which assists in collision avoidance; obstacle lights which are normally red or white; and colours on an aviation chart. As aviation technology has developed, approach aid lighting such as PAPI, electronic flight instrumentation systems (EFIS) and for large airliners, gate parking lights have been added to the reasons that a pilot must have adequate colour vision.

60. Currently the ICAO requirement, which is unchanged since 1953, is for a pilot to have the ability to perceive readily those colours the perception of which is necessary for the safe performance of duties⁴. Should an applicant fail to obtain a satisfactory result as prescribed by a Licencing Authority they shall be assessed as unfit unless able to readily distinguish the colours used in air navigation and correctly identify aviation coloured lights. Applicants who fail to meet these criteria shall be assessed as unfit except for Class 2 assessment with the following restriction: valid daytime only⁵.

61. Perhaps the greatest issue with the ICAO guidance is that in the 63 years since the requirement was last changed, there have been some extraordinary developments in aviation technology which has changed the way an aircraft is operated, and arguably render colour perception as being far less important than what it was in 1953. In this respect the ICAO requirement and the lack of recognition of modern technology to assist safe flight is not helpful.

62. Various states have modified the ICAO wording to some degree, although they all meet the same intent. In New Zealand CAR Part 67 wording is: have no deficit of colour vision to an extent that is of aeromedical significance. Aeromedical significance is defined as: A medical condition is of aeromedical significance if, having regard to any relevant general direction, it interferes or is likely to interfere with the safe exercise of the privileges or the safe performance of the duties to which the relevant medical certificate relates. Given this definition, there appears to be no connection between the medical definition of aeromedical significance, and what actual duties or exercising of privileges that a CVD condition will cause to be unsafe. The assessment of *interferes with* or *likely to interfere with* is ascertained from office-based assessments only. As argued in submissions, only a flight examiner or flight instructor will be able to make this assessment through a practical

⁴ ICAO Annex 1, para 6.2.4.2

⁵ Ibid, para 6.2.4.4

test. In other words the effect that a CVD condition will have on the ability of a pilot to safely exercise the privileges of a licence is a flight operations issue, not a medical issue. The level of safety is dependent on the nature of the flight operation as well as aircraft type, is peculiar to an individual and should not be dealt with by generalised restrictions.

Implications of the Advances in Aviation Technology and Safety

63. Over the years advances in technology and safety has changed the face of aviation markedly and it is now possible that the traditional (historic) reasons for restricting CVD pilots need to be re-evaluated. The last time ICAO Annexes were amended with respect to CVD pre-dates many of the modern technologies such as Aircraft Collision Avoidance Systems (ACAS), Terrain Collision Avoidance Systems (TCAS), Enhanced Ground Proximity Warning Systems (EGPWS), strobes and radar altimeters, all of which make aviation safer. High intensity strobe lights are mandated (in NZ; type certificate 1971 and later) for all aircraft to assist in collision avoidance, which are far more effective than navigation lights given the speed of modern aircraft. Also, the advent of night vision equipment has shown that it is possible to conduct night flying safely when all internal and external flight reference (flight deck displays, charts and external lighting including airfield, navigation and obstacle lights) is monochrome; again suggesting that in modern aviation the reliance on colour can be and is being reduced.

64. It is the Panel's opinion that the advances in aviation mean greater emphasis can be placed on interpreting information rather than simply the recognition of colours. Importantly the Panel is swayed that the advances in technology, operating techniques, and human factors training such as crew resource management (CRM) and threat and error management (TEM) are likely to mitigate many of the safety risks that are inherent in aviation should restrictions on CVD pilots be relaxed.

65. It is not lost on the Panel that most regulatory bodies will allow the most severe CVD pilot to operate aircraft by day under a Class 2 medical certificate and as such carry passengers, interpret instrumentation (including colour EFIS and colour warning systems), read maps and charts, and approach a runway serviced by PAPI, with seemingly no issues attributable to their CVD. These pilots are using the same airspace as aircraft conducting operations which are off limits to CVD Class 1 pilots (air operations carrying passengers, controlled VFR mixed in with IFR traffic and flights in controlled airspace, particularly around aerodromes).

66. The opinion of the Panel, particularly given the submissions of witnesses to the Australian tribunals, is that the accumulation of hours flown by CVD pilots with no adverse safety implications is sufficient to say that there is no evidence that CVD pilots are likely to pose a greater safety risk than a non-CVD pilot. In other words the lack of evidence to suggest CVD pilots are unsafe means that they are likely to be safe. This is similar to an aircraft engine certification programme where accumulated flight or running time contributes to certification requirements. It has been suggested that some 3-400,000 flying hours have been accumulated by CVD pilots in Australia. As already mentioned the Australian AAT rulings in favour of Captain John O'Brien gave considerable weight to the safety record Captain O'Brien had established during his time in aviation. Similarly, no

evidence was provided or could be obtained to suggest the lack of accidents where CVD was attributed as a cause was because of the restrictions imposed.

67. The essential point agreed by the Panel, is that the technology to assist pilots has developed significantly to the point that historic reasons for requiring a pilot to have rigorous standards of colour perception are no longer valid. These technology developments have added additional safety layers such that relaxing CVD requirements will likely not impact on safety.

Reasons for Restrictions

68. As mentioned above, an issue highlighted by submitters was that the reasons for requiring colour perception in these areas is no longer valid, and that office-based test conducted to ascertain an applicant's level of colour perception had no link with real world realities. From the Panel's research there appear to be seven areas where the perception of specific colours is considered in conjunction with the current requirements of aeromedical significance. These are:

- a. Signal lamps
- b. Obstacle lights
- c. Aircraft navigation lights
- d. Aerodrome lighting (including gate lights)
- e. Flight deck displays
- f. Maps and Charts
- g. PAPI

69. A number of articles have been written about the significance of colour perception in these areas, which were discussed at length by the Panel. In general it would appear that commentators agree that many of the concerns have been alleviated due to advances in technology; and in most cases where it was once considered important for an aviator to perceive colour, these are no longer relevant in modern aviation. Previously a prime consideration was the recognition of a colour to determine the meaning of a visual cue, rather than the correct interpretation of the visual cue itself regardless of the colour perceived.

70. However it has to be acknowledged that not having colour cues to go with other cues may slow a CVD pilot's reaction to a situation, but the extent will vary depending on the situation. The advances in aviation technology and safety mean that in many cases a single cue is no longer relied upon. For example a master caution will accompany a warning light, and an illuminated warning light will not just be in a colour, but also have other cues as to what that light is, such as alpha-numeric text. This aspect does however vary between aircraft types and there may be an aircraft type where the recognition of a colour change with no accompanying indications is necessary.

71. A study commissioned by the UK CAA⁶ has determined that of the list above, PAPI and gate lights are the most colour critical elements in an airline pilot's environment. The other areas are of such little significance in modern aviation that it is argued that they in themselves are an insufficient reason to place restrictions on a pilot medical certificate. Submitters also point out that the inability to interpret PAPI or gate lights are also not a reason in themselves for placing restrictions on a licence, especially if a pilot is operating into an aerodrome where these aids are not in situ.

72. The Panel's assessment, informed by submissions (and the international research behind those submissions) regarding the significance of the list of areas above is as follows:

Signal Lamps

73. Signal lamps have traditionally been used by control towers to provide visual clearances to taxi, land and take-off. They can be presented to the pilot in red, green and white colour. The lights were primarily used for aircraft that did not carry a radio transceiver, or where radio failure occurred. Advances in technology, which ranges from the reliability of equipment, the prevalence of radios in aircraft, regulations that require the use of radio, and the availability of other methods of contacting ATC in the event of a radio failure, e.g. cell phones, have largely meant that signal guns have become redundant. While Civil Aviation Rules (CAR 172.57(b)(5)(ix) requires any aerodrome control tower or aerodrome flight information office to be provided with a signal lamp with green, red, and white functions, anecdotal evidence is that the lamps are rarely, if ever used. The conclusion is that the likelihood of having to revert to a signal lamp as a means of gaining ATC approval is diminished significantly to the point of being an unlikely occurrence. However, even though the likelihood is less than remote, submitters and the Panel agree that for single pilot operations the restriction not to operate near a controlled aerodrome without radio is still relevant. In reality this is little imposition as CARs require an aircraft to be fitted with radio to access and operate in controlled airspace.

Obstacle Lights

74. Obstacle lights placed on structures or high ground come in a number of guises. These lights are usually red or white, can flash or remain steady. They are relevant mainly for night VFR operations where a pilot is not under ATC direction which in itself ensures adequate obstacle clearance. Additionally the absence of a light does not indicate the absence of an obstruction and robust pre-flight planning is required to ensure adequate separation from structures or terrain – lighted or not. It is felt that the colour of an obstacle light is of secondary importance, as the existence of any colour indicates a potential hazard. Various reports have concluded that the ability to perceive the colour of obstacle lights is not sufficient to place restrictions on a medical certificate.

Aircraft Navigation Lights

75. The introduction of rotating beacons, strobe lights and high intensity landing and taxi lights, all of which are visible from far greater distances than the traditional wingtip and tail navigation lights, are far more effective in alerting a pilot to the presence of another aircraft,

⁶ UK CAA Paper 2006/04 Minimum Colour Vision Requirements for Professional Flight Crew – Part 2

and are not dependent on colour. These lighting systems, as well as advances in collision avoidance technology such as ACAS have made the reliance on the recognition of individual navigation lights largely irrelevant, and impractical for today's high speed air traffic.

Aerodrome Lighting (including gate lights)

76. Lighting is used extensively around aerodromes for various purposes. Again the operational argument is that it doesn't matter what colour is perceived, as long as the meaning of a light can be interpreted correctly. As noted above, the UK CAA study determined that PAPI and gate lights are the most colour critical elements in an airline pilot's environment. They did not include other airfield lighting in that consideration. Interestingly Captain Ross Crawford cannot recall any airline gate lighting of the type used in the UK study. Former airline pilots within CAA who have flown with Middle Eastern airlines have commented that the type of red/green gate lights referred to in the UK report are old technology that can still on occasion be seen at airports in developing nations. Modern docking systems use graphics or alpha- numerics in such a way that colour is incidental and most older systems use parallax for both azimuth and longitudinal guidance.

Flight Deck Displays

77. The topic of flight deck instrumentation has been examined at length in UK and US studies into CVD. In all cases it has been found that information displayed on instruments including electronic flight information systems (EFIS) is legible to CVD pilots and that there would be no disadvantage of note to CVD pilots in speed or accuracy of their response.⁷ Interestingly the current condition placed on a New Zealand pilot who has CVD does not limit them from flying using an EFIS only instrument panel during the day. During verbal submissions, one CVD pilot who has extensive experience on corporate aircraft in the USA and Europe demonstrated using screenshots that was able to describe exactly what he is seeing on an EFIS panel. While he saw displays in different colours, the key is that he is able to interpret the displays correctly. Warning lights are another example of where colour perception is perceived as important. It was submitted that the colour of a warning light is not important; what is important is whether the light is on or off, and whether a pilot can readily interpret what the light being on means. The ability to correctly interpret flight deck/cockpit displays is an area where testing can be conducted during routine training and competency flights.

Maps and Charts

78. The ability to pick a colour on a map or chart is another area quoted as being of aeromedical significance. The Panel is of the opinion that it is more important to be able to interpret a map or chart correctly rather than simplistically being able to tell a colour. Again CVD pilots are not restricted in the maps and charts they use to conduct day VFR flying, an area where they would likely use colour topographical maps of a variety of colours rather than IFR en-route charts used in airline operations which are limited in their use of colour, or an approach chart which is monochrome black and white only. As a simple experiment, a

⁷ Australian AAT decision regarding Hugh Jonathan Denison and Civil Aviation Authority [1989]

CAA staff member who is severely CVD (his words) was asked to describe what he saw on two aeronautical charts - an area chart and a topographical chart. From what could be ascertained he is able to detect all graphics and symbols on the two charts and correctly interpret all aeronautical information.

Precision Approach Position Indicators (PAPI)

79. The ability to interpret PAPI indications was a significant issue in both written and verbal submissions. This is possibly based on the UK CAA findings that the ability to determine colour indications on PAPI is one of two of the most colour critical elements in a pilot's environment. In their written submission, CVA provided a considerable number of reports and research regarding the use of PAPI by CVD pilots. In general their conclusions reached were that the ability to interpret PAPI indications is important, although PAPI is not the only cue used to indicate approach angle, and on occasion will not be used, even though it is available. The submission provided by Captain O'Brien suggests that while he cannot pass any of the colour vision tests that aim to simulate PAPI (CAD in particular) he can discriminate the differences on an actual PAPI and therefore is able to use PAPI to determine his approach angle. A recent FAA study⁸ found that protanopes scored well on a PAPI simulator when it used the intensities which are used in the actual fielded PAPI units – both incandescent and LED.

80. The Panel is of the opinion that the significance of the ability to interpret PAPI indications may be of less importance than has been claimed. Submitters also noted that approach aids such as PAPI or VASI are not present on some airfields used for night operations and therefore the inability to be able to correctly interpret the indications on a PAPI should not be used as a reason to place a general restriction on a pilot's certificate. Discussion with various airline pilots and in evidence submitted by CVA shows that PAPI is not used by major airlines as a primary cue. One major airline's policy is that pilots are to follow the electronic glide path cues over PAPI or VASI indications. PAPI is simply another approach aid, but they are not seen as a primary cue because of the advent of more accurate on-board indications, particularly in large airliners.

81. Probably the only true test as to whether a CVD pilot can correctly interpret PAPI indications, along with the other slope indications is an in-flight test. Essentially, a pilot who can recognise "on slope" indications, and can recognise and correct for above and below indications in a simulator or aircraft is safe. The inability to interpret PAPI does remove a safety layer for some operations, however this should be related to the context of the situation and the availability (or otherwise) of other layers of risk mitigation.

Non-Routine Examinations

82. On the matter of non-routine examinations, i.e. those following initial screening using the Ishihara plates, most submission comments were aimed at the proposal to introduce the CAD test. There is general agreement that although the CAD test is probably

⁸ DOT/FAA/AM-14/6 Office of Aerospace Medicine. Usability of Light-Emitting Diodes in Precision Approach Path Indicator Systems by Individuals With Marginal Color Vision

the best office-based test available, it still cannot determine how CVD will affect the ability of a pilot to fly safely.

83. Opposition to the CAD test stems mainly from concern that while it is based on PAPI it is not an accurate representation (because of intensity differences having been eliminated) compared with accurate PAPI simulation or use of actual devices in flight. Also, it is correctly pointed out in submissions that not all airfields have PAPI; it is a redundant aid that is prone to errors; and it is not a requirement for safe landing. Moreover, the CVA note that the City University assessment used to calibrate the CAD test, deliberately removed the luminance between the red and white lights, which is a design feature of the real-world PAPI. Thus, the study is not reflective of a pilot's actual experience.

84. Submitters also offered other non-routine examinations that they believe should be acceptable, such as the Farnsworth D15 which is claimed to be readily accessible in New Zealand.

85. There was also concern that the CAD test is expensive and not widely available. Information provided to the Panel suggests the concerns over expense are unfounded, although submitters may be considering travel costs. However it is a concern that the test is not yet widely available in New Zealand if it is to replace a test currently in use.

86. Overall the Panel is of the opinion that the CAD test should be added to the list of other non-routine examinations that can be used to determine CVD, but it should not be seen as a replacement for other tests given the controversy the test has generated.

Proposed Restrictions

87. The proposed medical certificate restrictions should a CVD condition be deemed to be of aeromedical significance drew extensive negative comment, particularly in regard to a perceived absence of empirical evidence to support such restrictions, that they are no longer appropriate in modern aviation. The link between the perceived areas where colour vision is of aeromedical significance and the proposed restrictions on CVD pilots to mitigate the perceived risk generated significant comment, the majority of which was negative.

88. The proposed restrictions should an applicant be deemed to have a CVD condition of aeromedical significance are:

- (Class 1) Not valid for air operations carrying passengers
- (Class 1 & 2) Not valid for night flying
- (Class 1 & 2) Not valid for flight under IFR
- (Class 1 & 2) Not valid for flight in the vicinity of a controlled aerodrome unless the aircraft is in radio contact with aerodrome control

89. However, as discussed in this report, the Panel is concerned that a safety case for these restrictions may not exist. A question that the Panel considered in this respect was

what risks are the proposed restrictions attempting to mitigate and what is the validity of those restrictions?

Carriage of Passengers on Air Operations

90. The Panel understands that this condition has been applied to ensure the public, when flying as passengers are not exposed to the perceived additional risk a CVD pilot poses. Submitters argue, and the Panel agrees, that there is no empirical evidence to support prohibition on the carriage of passengers by CVD pilots. International experience where regulatory requirements are less restrictive show no issues regarding CVD pilots carrying passengers. An air transport operator who is aware of a pilot's CVD condition has a number of risk mitigation tools available to them to ensure operations remain safe. This includes appropriate type rating training, route training, crew allocation to ensure no two CVD pilots are allocated to the same crew, and other flight deck crews are made aware of the condition.

91. As pointed out by submitters, currently a CVD pilot on a Class 1 or Class 2 medical certificate can carry non-fare paying passengers, but a Class 1 holder cannot carry fare paying passengers. However an instructor with a CVD condition deemed to be of aeromedical significance can carry a student. This raises an inconsistency with imposing this condition that applies to Class 1 medical certificate holders as an Instructor Rating is only issued to CPL or higher.

Flight at Night

92. This restriction prevents a pilot from flying at those times when the increased use of lights may most affect the ability of a CVD pilot to operate an aircraft, hence the ICAO requirement that a pilot with a CVD condition of aeromedical significance is to have a restriction of "Day only". Again there is a lack of evidence from operating experience that CVD pilots cannot operate safely at night. As argued above, signal lamps and navigation lights are no longer relevant in modern aviation. Obstacle lights, aerodrome lighting (including PAPI) and cockpit displays do take on greater importance at night, but with advances in technology making the perception of colour less important there are a number of methods by which to ensure safety of flight. There is concern that an office-based test is not a true assessment of a pilots ability to perceive colour and thus to operate an aircraft safely at night. There is also concern that perceiving a colour is less important than being able to interpret a light's meaning, and that an office-based test is too broad-brush given the importance and doubt regarding the assessment.

93. Again the Panel agrees that the only true assessment of a pilot's ability to operate an aircraft safely at night is through an in-flight assessment.

Flight under Instrument Flight Rules

94. The restriction of no flight under IFR appears to relate to a pilots ability to read flight instrumentation. This seemingly has taken on greater context with the advent of EFIS and other advances in flight deck technology. In 1953 a flight deck consisted of basic (compared to today's standards) instrumentation which was by and large black and white, and seemingly presented no issues for a CVD pilot. Perhaps this is why ICAO is silent on an IFR

restriction. However, as argued by submissions, the assumption that CVD pilots cannot conduct operations under modern instrument suites has no basis. The question has to be asked, if a pilot can interpret instrumentation correctly, what is the safety risk? Again the inconsistency arises where a CVD pilot is able to operate an aircraft with any type of instrument panel, EFIS or otherwise without restrictions, but cannot use that same panel for IFR operations.

95. During verbal submissions a CVD pilot (who cannot pass an Ishihara test but has an unrestricted EASA licence based on passing a lantern test, and an FAA licence with the only restriction of “no night” – which will be removed on passing a lantern test) presented photographs of the EFIS instrumentation on the twin turbine aircraft he flies IFR in Europe and the USA. The submitter described what he was seeing and despite questions from the panel, satisfied us that while he was not seeing the displays in the same colour as non-CVD pilots he was able to correctly interpret the displays. This pilot is frustrated that despite his CVD condition he is able to conduct IFR operations when exercising the privileges of his EASA and US licence, but cannot do so on his NZ licence. He is forced to operate VFR in what he sees is a far less safe environment.

96. With regard to a pilot’s ability to conduct safe operations under IFR, the panel is of the opinion that a general restriction on all CVD pilots is inappropriate, and that only an in-flight assessment conducted under appropriate controls and related to the context of an intended operation will determine an applicant’s ability to operate safely under IFR.

97. It is notable that Australia, Canada, Europe and the USA do not apply a “no IFR” restriction.

Flight in the Vicinity of a Controlled Aerodrome

98. The requirement not to fly in the vicinity of a controlled aerodrome without a radio is not a contentious issue. This is probably because the majority of aircraft are fitted with radio and so the requirement is not seen as an imposition. In NZ, CARs state that radio communication is a requirement for entry or operation in Class A, C, and D airspace, and when operating under IFR in Class G airspace. As such the restriction proposed is redundant. Also, the use of the term “vicinity” in the GD is meaningless given CAR requirements for radio in controlled airspace.

Real World Practical Test

99. The addition of a real-world practical test was by far the one aspect of the GD that submitters recommended the most. This stems from a concern that the ability of a pilot to operate an aircraft with a CVD condition is an operational issue, not a medical issue. Notable advocates of a practical flight test are CVA, ALPA, the Air NZ AOHU, as well as a number of individual submitters who have extensive knowledge and standing in the aviation community.

100. The Panel agrees with the submissions that an in-flight examination as part of the testing regime is appropriate. Our deliberations are based on agreement that the abilities of a pilot with regard to safe operations can only be determined by appropriately qualified

flight crew. The restrictions proposed in the GD are too generalised and do not recognise the variety of operations conducted in the aviation sector, the training regimes in place to ensure a pilot can operate an aircraft competently, and the technological advances in aviation that make many of the reasons to be cautious of a CVD condition invalid. In addition there is little acknowledgement that if a pilot can interpret a visual cue conveyed by a system that employs a colour code, no matter what colour they may perceive that cue, then that is more important than recognising a particular colour.

101. Any in-flight assessment introduced as part of the CVD testing process will need to be designed and controlled by appropriate aviation medicine and aircrew specialists. While both groups of specialists will need to be involved in the development of protocols for in-flight testing, only a flight examiner or flight instructor will be in a position to assess the ability of a pilot with a CVD condition to operate an aircraft safely. Should a flight test be included in the assessment regime, the office-based tests can be used to inform the conduct of the flight test in terms of where the deficiency is likely to interfere with the safe conduct of the flight. For example, the real world reality is that Protanopes have reduced visual range to red signals; that Protanomals have variably reduced visual range to red signals depending on severity, and as such the in-flight test can be specifically designed to assess such conditions.

102. A question with the practical flight test is how far to apply it. At the basic level it would be designed simply as a real world check to determine if an applicant can readily distinguish the colours used in air navigation and correctly identify aviation coloured lights, as required by ICAO. This would then be a one-time pass or fail check where a CVD condition would be deemed of aeromedical significance or not. However, the ICAO requirement that an applicant is able to perceive readily those colours the perception of which is necessary for the safe performance of duties, is somewhat inconsistent with the requirement to distinguish colours used in air navigation and to identify aviation coloured lights as, depending on the type of operation there may be no requirement to perceive colour to remain safe.

103. At the other end of the scale the context of the operation combined with the nature and severity of the CVD condition may result in a determination that on-going assessments are required and are aligned with activities such as competency assessments, type conversions, licence upgrades and the award of different ratings. It may be possible that an applicant cannot correctly identify the traditional red, green and white aviation colours, but in not being able to do so may not pose a significant increase in risk over a non-CVD pilot. In this case the medical and operational arms need to engage over mitigations and control measures for that particular pilot and move away from the one size fits all.

104. There is precedence in using a practical in-flight vision test to determine the ability of a pilot to operate an aircraft safely where a CVD exists. In-flight tests are also used to assess the effects of other medical conditions such as hearing or physical disabilities. One Panel member has been involved in all three – vision, hearing and disability in-flight tests at the request of the CAA. A CAA flight operations inspector was recently asked to evaluate an agricultural aviation pilot who had lost an eye in an accident, with a view to assessing his ability to safely operate an aircraft on agricultural aviation operations.

Follow the Australian Approach/Other Jurisdictions

105. It would appear that submitters desire for New Zealand to follow Australia's and other jurisdiction approaches is not so much in the testing (albeit there are differences) but in the restrictions placed on a pilot following test failure. Ishihara tests are universal for initial screening and there is a relatively similar range of follow-up non-routine tests. For example Australia requires a Farnsworth lantern; EASA allows anomaloscopy (Nagel or equivalent), lantern testing with a Spectrolux, Beynes or Holmes-Wright lantern, or the CAD test; Canada uses the Canadian Forces or Civil Aeronautics colour perception lantern test or a Farnsworth D-15 test. Canada used to have a provision for a practical test, but this has recently been removed.

106. Where other states differ from the proposed GD is in the restrictions placed on a certificate in the event of failure. EASA, Canada and the USA include only an endorsement of *day only* for all types of pilot medicals if initial screening and subsequent examinations are failed. Canada also states a radio must be required for flight at controlled airports. The restrictions of *no passengers on air operations* and *no IFR operations* are not applied in these jurisdictions.

107. Australia would appear to have one of the more lenient approaches to CVD. The difference is not so much in the testing for CVD, but the conditions applied to a certificate if the tests are failed. Testing comprises primary screening using Ishihara (maximum 2 errors in a 24 plate test), non-routine examination using a Farnsworth lantern test and, if both of these are failed, a practical test consisting of a signal gun test or a practical lantern test designed to simulate a PAPI. The practical test is a result of an Australian AAT finding in which it recommended to CASA that a practical test for CVD's which simulates an operational situation be introduced. Should all of these tests be failed the applicant's medical certificate will be endorsed as *not valid for ATPL operations and holder does not fully meet the requirements of ICAO Convention Chapter 6 of Annex 1*. This limits the holder to fly in Australian airspace only (but can exercise the privilege in New Zealand under ANZA). This allows a CVD pilot to operate using full CPL privileges day or night, VFR or IFR. The result is that a CVD pilot in Australia can operate any single pilot aircraft as pilot in command, including on air operations; and can progress to first officer on any air transport operation as only a CPL is required to be a co-pilot. If any of the tests are passed a full unrestricted Class 1 medical is granted.

108. The USA is different from most other states in that the acceptable failure rate in Ishihara tests is significantly higher. While Australia, Canada, EASA, and the proposed GD are consistent with a maximum of two errors in a 24 plate Ishihara test, the USA allows six. The USA also allows for a greater number of primary tests than other states.

109. The Panel agrees that consistency with other countries is desirable, but believes it is more appropriate to direct any initiatives in this respect to ICAO to progress. There is a concern however that should the Civil Aviation Act be changed, as is intended, and foreign medical certificates are accepted in order to exercise the privileges of a New Zealand licence, pilots with a CVD condition will simply choose to operate under a certificate that carries with it the most lenient medical requirements.

Part 5 - Appropriateness of the General Direction

Is a General Direction Necessary?

110. The panel considered whether a GD (process) for CVD was necessary. The conclusion was that it provides certainty, clarity and consistency. If there was no GD, policy could drift without bedding down principles. It is noted however that no other clinical GDs have been introduced (only two procedural ones relating to the conduct of routine examinations). Also noted is that that all formal assessment and evaluation in aviation is criterion referenced (as opposed to norm-referenced). This ensures that to the greatest extent possible, examinations (flight and medical) are objective. The reason examiners in both disciplines are experienced and trained is that where subjective judgement is necessary, it is well founded. In flight, exceeding a specified tolerance in various phases of flight results in demonstrable consequences and threats to safety; loss of control usually. In medical examination, blood pressure, cholesterol, visual acuity, hearing, BMI etc. are measurable, can be applied to specified parameters and are supported by volumes of research and evidence. CVD appears to be an orphan in that the restrictions consequent of a CVD of aeromedical significance are not founded in empirical evidence and indeed appear to be somewhat of a historical artifact. Historical significance is not of itself sufficient to justify the imposition associated with CVD. Any threats appear to be based on supposition and some of it, obsolete reasoning. As a panel we saw substantial evidence to indicate that there is little (or minimal) threat to safety. Any potential threat can be determined on an in-flight test, and if necessary mitigations put in place specific to the situation.

111. In line with this comment, the submissions exposed two main areas of contention with the GD;

- a. Testing; including the types of testing, especially for post initial screening, the pass/fail criteria; and the addition of a practical flight test; and
- b. Restrictions imposed on an applicant who is found to have CVD of aeromedical significance.

Testing

112. In general none of the submitters have any issue with the Ishihara test being used as the initial screening method, although some believe the pass criterion of no more than two errors in the first 15 plates of a 24 plate set should aligned with countries that have a more lenient requirement. This is in reference to the USA where six errors are allowed – although it does vary depending on the test edition. The panel agrees that there is no justification to change the pass criteria for initial screening or the use of the Ishihara as a means of simply detecting the presence of a Red/Green colour vision defect. The proposed threshold is consistent with the majority of other states' requirements and further non-routine examinations following a failure in the Ishihara test will establish the nature and severity of a candidate's condition and establish whether they can operate an aircraft safely or not.

113. The main issue submitters raised with post-initial screening was the stated intention of introducing the CAD test to eventually replace the Farnsworth lantern test. While the CAD test appears to be accepted as the best office-based occupational test available, submitters were concerned that it does not truly represent the real world and was therefore not appropriate for being the final deciding factor. The Panel feels that the CAD test should be added to the list of acceptable post-initial non-routine examinations, but not given preference over others currently accepted. It is also noted that the GD does not discount any test as a non-routine examination given the statement “acceptable to the Director”. However the proposed changes to AC67-1 on this matter suggests otherwise. Only the CAD is recognised in the AC as acceptable and all other colour vision test are not acceptable. Given the world-wide variation in tests accepted by regulating authorities the Panel feels greater flexibility should be shown in allowing other tests, such as the Farnsworth D15 to be considered.

114. There was significant support for a third tier of testing; namely a practical test. This support came from not only the CVA, but from ALPA, the Air NZ AOHU, and a number of highly experienced pilots within the industry who have experience of flying with CVD pilots. The use of a practical test in other states was noted, as was the fact that the NZ CAA has in the past allowed for flight tests to establish whether an applicant can perceive aviation coloured lights. The ability to do so has led to these pilots having unrestricted medical certificates (with respect to colour vision) and these pilots are still operating in the New Zealand system.

115. The Panel was in agreement that a third tier practical test or assessment is appropriate. This ensures there is a connection between the office-based assessment and the real world, and that only a real world test can truly indicate a condition which is of “aeromedical significance”. It was also agreed that a practical assessment process would be best dealt with through the AMC process, but the GD needs to ensure formal recognition of the availability of such an assessment. An avenue also needs to be available for retaining conditions on an applicant’s medical certificate if an applicant chooses not to proceed to an AMC and is happy to operate with restrictions.

116. Needless to say, the conduct of any practical test developed will need to ensure those assessing the candidate are an approved assessor, having received appropriate training in administering such a test so that they understand how the test should be applied to be valid, how such a test could be “gamed” and how to avoid that possibility. Given the interpretation of PAPI is a significant issue with CVD, any test using PAPI would need to include both an assessment of whether the candidate can interpret PAPI without use of other cues, as well as their ability to accurately ascertain approach angle using all available cues.

117. The Panel feels that given the level of doubt over what is of aeromedical significance, every effort should be extended to afford an applicant the opportunity to show that they can operate an aircraft safely for their environment with their particular CVD condition.

Proposed Restrictions where CVD of Aeromedical Significance

118. The proposed restrictions to be placed on a pilot should a CVD condition be deemed to be of aeromedical significance is of greater severity than many other states; in particular the restrictions of no air operations carrying passengers and no IFR flight.

119. As discussed in this report, there appears to be no basis upon which these restrictions are placed. With appropriate controls through a practical test followed up if necessary by appropriate assessment at all stages of a pilot's career, e.g. type ratings and competency assessments, there is no reason why a CVD pilot cannot operate in air transport operations, under IFR conditions, or at night. The risk however is on an individual's career aspirations. It may well be that they progress through their career, but then are confronted with an aircraft type which does create an issue of significance because of their CVD condition. For example a particular type of EFIS installed on a particular aircraft fleet may be incompatible with having a particular CVD condition. In this respect the situation is seen as no different from that pilot failing the type rating course for other reasons, e.g. failing to attain required performance levels.

120. As also highlighted above, the reasons for restricting a CVD pilot as proposed in the GD may never be encountered during a career. For example a pilot who chooses a career as a helicopter pilot on Part 135 operations may never encounter any requirement to be guided by PAPI. Their ability to conduct safe operations in their environment, on their aircraft type, which includes the ability to interpret maps and charts, and read instruments and cockpit systems, can only be assessed on appropriate check flights.

121. An issue for the panel is that there were no submissions relating to Class 3 medical requirements for ATC. CVA has since provided material relating to ATC although they did not raise ATC medical issues in either their written or verbal submission. The panel has decided that in light of a lack of submissions no recommendations would be made regarding the appropriateness of the GD for the issue of a Class 3 medical.

Part 6 – Conclusions

122. The colour vision status of those holding a medical certificate issued under CAR Part 67 needs to be known, just as other aspects of the physical status of pilots is known e.g. other aspects of vision, hearing and mental health status. If routine screening or non-routine examination (including a practical test) acceptable to the Director can be passed then the CVD is not of aeromedical significance.

123. The promulgation of a GD for colour vision is appropriate to provide certainty, clarity and consistency.

124. CVD is a potential safety threat although there is difficulty in establishing exactly what the threat is. In this respect the guidance provided by ICAO is not helpful. The ICAO Manual of Civil Aviation Medicine admits that there is very little information which shows the real, practical implications of colour vision defects on aviation safety. ICAO standards for colour vision pre-dates many advances in aviation technology and flight safety, which raised doubt over the validity of many of the traditional reasons for imposing restrictions on a CVD pilot and calls into question what is and is not of aeromedical significance. The situation is compounded by inconsistent standards being applied by different states and by the same state over time.

125. Advances in aviation, in both technology and training means greater emphasis can be placed on interpreting information rather than simply the recognition of colours if this is not essential to the operation. These advances, and the additional safety they bring to aviation in general, are such that relaxing CVD requirements will likely not impact on safety. No evidence or compelling argument was presented to the panel that related perceived aeromedical significance of CVD to known or proven threats to flight safety. On the contrary, much evidence was presented to support the view that most CVD in pilots is not likely to be of aeromedical significance. Similarly, the accumulated hours flown by pilots around the world, especially in Australia, suggests CVD pilots are likely to pose no greater safety risk than a non-CVD pilot.

126. There is a lack of evidence to support the proposed medical certificate restrictions, and the proposed restrictions do not reflect risks posed by CVD in the context of modern aviation.

127. Any restrictions imposed on a pilot with a CVD condition must be applied on the basis of an identifiable threat to safety or risk. The question as to whether or not a condition is of aeromedical significance, and hence the level of risk, is dependent on the operational context; the type and nature of the operation, type of aircraft and crew composition. What may be significant for one situation may not be for another. The variability is too great to be dealt with by generalised restrictions as proposed in the GD.

128. There is no strong link between the office-based examination of CVD and real world realities. Under the proposed GD, the assessment of *interferes with or likely to interfere with* is ascertained from office-based assessments only. This assessment cannot be made from office-based tests only and can only be determined by an in-flight practical test. While both aviation medicine and flight operations specialists will need to be involved in the development of protocols for in-flight testing, only a flight examiner or flight instructor will

be in a position to assess the ability of a pilot with a CVD condition to operate an aircraft safely. Thus the effect that a CVD condition will have on the ability of a pilot to safely exercise the privileges of a licence is a flight operations issue, not a medical issue.

129. The CAD test appears to be the best office-based occupational test available and it is appropriate that it is added to the list of acceptable non-routine examinations. Overall though the GD appears to be too limited in acceptable non-routine tests and while the GD suggests other tests may be acceptable to the Director, AC67-1 does not reflect this.

130. Consistency in standards and restrictions with other states, particularly Australia, is desirable; however it is more appropriate to direct any initiatives in this respect to ICAO to progress.

131. A three-tier testing regime which includes an in-flight test is a more appropriate method than the proposed GD to assess colour vision and to determine the ability of a candidate to safely exercise the privileges or the safe performance of the duties to which the relevant medical certificate relates. Such a regime would maintain New Zealand's compliance with ICAO requirements in this respect and will identify the operational risks of CVD. The three tiers are:

- Stage 1 – Initial Routine Screening. The current screening proposed by the GD using the Ishihara test using the pass criteria as proposed in the GD.
- Stage 2 – Non-routine office-based examination. Should an applicant not pass routine screening, non-routine office based examinations are conducted to establish the nature and severity of the condition. If any test is passed then the condition can be deemed as not of aeromedical significance.
- Stage 3 – Practical test. Should it be necessary, a specifically tailored flight assessment or simulator exercise is conducted to determine the ability of the candidate to safely operate an aircraft.

132. It is appropriate that Stage 2 and 3 testing is conducted through the AMC process, including the ability for a candidate to forego non-routine examinations and accept restrictions based on the initial screening results.

133. Any restrictions placed on a candidate's certificate must be based on the context of the individual's circumstances; the nature and severity of the condition, and the intended operation.

Part 7 - Recommendations

134. The CVD GD Review Panel recommends that the Director proceeds with the General Direction - Impaired Colour Vision with the following changes:

- a. **Review** the GD with respect to acceptable non-routine office based examinations to ensure other tests currently in use by other ICAO regulatory authorities are included as acceptable tests.
- b. **Introduce** the CAD test as proposed.
- c. **Include** a practical flight test to the examination procedure as a third stage following initial screening and non-routine examination so that a candidate may demonstrate their ability to operate an aircraft safely.
- d. **Ensure** certificate endorsements, including the need for any on-going tests, should a CVD condition be deemed to be of aeromedical significance are based on input from both medical and operational staff and are related to the individual's particular situation with respect to condition and operational context, and noting that only an in-flight test can assess the ability of a pilot with a CVD condition to operate an aircraft safely.
- e. **Develop** appropriate protocols, procedures and guidance to ensure the practical test is appropriate to the nature and severity of an applicant's CVD condition and the context of the candidate's intended operation and the identifiable risk that the candidate poses.

135. The Review Panel further recommends that the Director **conducts** further evaluation into the colour perception needs of air traffic controllers.



Steve Moore
Review Panel Chair

Enclosures:

1. GD
2. Review Panel ToR
3. Claro Law summary

Description of the proposed General Directions: *Impaired Colour Vision.*

This introductory information is not part of the proposed General Directions (GD) proper but is intended as support and explanation to assist with the public consultation process of that GD. The proposed GD itself is those pages with “Proposed Impaired Colour Vision GD” in the page footer.

Contents of this GD

This proposed GD (*Impaired Colour Vision*) is a revision of the similarly named draft GD that underwent public consultation during 2004, 2006, and 2009. The purpose of the revision is to incorporate previous consultation feedback and to update the provisions of the proposed general directions. Changes from the previous versions of this draft GD, are:

- The use of the standard (H53.5 ICD-10) term Colour Vision Deficiency where appropriate;
- Simplification of the screening and workup of applicants with impaired colour vision;
- Inclusion of an option for restricted certification in the absence of further colour vision testing;
- Revision of the conditions applied to those Colour Vision Deficient applicants who are issued restricted medical certificates – removal of the proposed “NZ airspace only” condition and updating of terminology (formerly *air transport operations* and *special operations*);
- Inclusion of an ‘or otherwise as acceptable to Director’ secondary screening option for all Colour Vision Deficient applicants, to provide a degree of future-proofing, accommodate the planned use of the CAD test (via AC67-1), and provide for the likely future phasing out of Farnsworth Lantern based options;
- A similar approach to screening and workup of applicants with impaired colour vision is applied for each of the three classes of medical certificate. This has allowed the “Decision flow-diagram” for each class to be incorporated into a single flow-diagram.

Other material

Also included in this consultation bundle are:

- An introductory section titled “Proposed Impaired colour Vision GD” containing explanatory material. The pages of this section have “Description of the proposed Impaired Colour Vision GD” in the page footer.
- Proposed consequential amendments to other General Directions – The Examination procedures GD. The pages of this section have “Proposed consequential amendments to other documents” in the page footer.

- Proposed consequential amendments to CAA Advisory Circular AC67-1. The pages of this section have “Proposed consequential amendments to other documents” in the page footer.
- A schematic flow diagram intended as an aid in support of the proposed Impaired Colour Vision GD. This flow diagram is not a part of the GD itself but is enclosed to provide additional guidance and information. The pages of this section have “Flow diagrams for proposed Impaired Colour Vision GD” in the page footer.

How this GD works as an element of the medical certification system

Section 27G of the Civil Aviation Act 1990 provides for the Director to issue general directions in relation to (a) “conducting examination of applicants and licence holders, and reporting the results of those examinations to the Director” and (c) “specifying the requirements of examinations or other clinical matters, which must be reasonable, including, but not limited to, - (i) the medical content of examinations; (ii) the interpretation and analysis of results of examinations; (iii) the significance of results of examinations for the purpose of determining whether or not an applicant is eligible for a medical certificate under section 27B.”

Rule 67.3, from Rule Part 67 Medical Standards and Certification, includes the definition of the term ‘aeromedical significance’: “A medical condition is of aeromedical significance if, having regard to any relevant general direction, it interferes or is likely to interfere with the safe exercise of the privileges or the safe performance of the duties to which the relevant medical certificate relates”.

Most of the medical standards in Rule Part 67 Medical Standards and Certification (67.103, 67.105, and 67.107) refer, directly or indirectly, to a requirement that an applicant have no medical condition that is of aeromedical significance.

This statutory construct allows for general directions (GDs) to be used to describe requirements relating to the ‘examinations and other clinical matters’ necessary for determining whether an applicant is eligible for the issue of a medical certificate. The Part 67 reference, in the medical standards, to the GDs also allows GDs to be used to define how such ‘examinations and other clinical matters’ can be interpreted (etc) for the purpose of determining whether an applicant meets the medical standards published in the Rules.

This particular GD describes the requirements for the medical certification of applicants who are colour vision deficient. This GD specifies several options for the medical certification of such applicants, and the certification outcomes that apply to each of those options.

With one exception this GD is no different to the colour vision certification policy that has been in operation at CAA for some years. By formalising this policy as a GD the administrative processing of most colour vision deficient applicants will reside under s27B(1) of the Act and, as such, will be able to be undertaken directly by a delegated Medical Examiner rather than requiring direct CAA involvement and an ‘AMC’ (Accredited Medical Conclusion and the application of statutory flexibility under s27B(2) of the Act.

The one departure from current CAA policy is the introduction of the City of London (CAD) colour vision test as a secondary screening option. It is likely that the introduction of the CAD alternative will allow, in time, the Farnsworth Lantern (FALANT) secondary screening option to be dropped entirely.

Civil Aviation (Impaired Colour Vision) General Directions Notice 2013

Pursuant to section 27G of the Civil Aviation Act 1990, the Director, after having consulted the persons, health professionals with aviation medical experience, representative groups within the aviation industry or elsewhere, government departments, and Crown agencies that the Director considers appropriate, gives the following notice.

Contents

[INSERT CONTENTS SECTION HERE]

General Directions

1. Title

These general directions are the Civil Aviation (Impaired Colour Vision) General Directions 2013

2. Commencement

These general directions come into force on [DATE].

3. Purpose

The purpose of these general directions is to specify the requirements for examinations or other clinical matters, for applicants who have, or may have, any colour vision deficiency, including, but not limited to,—

- (a) the medical content of examinations:
- (b) the interpretation and analysis of results of examinations:
- (c) the significance of results of examinations for the purpose of determining whether or not an applicant is eligible for a medical certificate under section 27B of the Act.

4. Interpretation

- (1) In these general directions, unless the context otherwise requires,—

Act means the Civil Aviation Act 1990

applicant means, depending on context, either an applicant for a class 1 medical certificate, or an applicant for a class 2 medical certificate, or an applicant for a class 3 medical certificate

impaired colour vision, in relation to an applicant, means a colour vision deficiency (or deficit of colour vision) that results in the applicant —

failing the colour vision screening examination (Ishihara).

- (2) A term or expression that is defined in the Act, the rules, or the Civil Aviation (Examination Procedures) General Directions Notice and used, but not defined, in these general directions has the same meaning as in the Act, the rules, or the Civil Aviation (Examination Procedures) General Directions Notice, as the case may require.

5. Status of examples and notes

- (1) An example or note used in this notice is only illustrative of the provision to which it relates. It does not limit the provision.
- (2) If an example, or a note, and the provisions to which it relates are inconsistent, the provision prevails.

Part 1 Class 1, 2, and 3 medical certificates

Subpart 1 - Impaired colour vision

6. Interpretation of discrepant results

- (1) If there is a significant discrepancy between the results of a recent vision examination and any past colour vision examinations then the medical examiner should resolve the discrepancy by either —
- (a) Consulting the applicant's CAA medical file to assist in determining which results should be relied upon; or
- (b) Seeking further colour vision examination to assist in determining which results should be relied upon.
- (2) If the medical examiner is unable to resolve the discrepancy between the results of colour vision examinations then the medical examiner should—
- (a) Conclude that the applicant's colour vision deficiency is of aeromedical significance and consider the application of statutory flexibility (refer sections 27B(2) and (3) of the Act).

7. Screening an applicant with a colour vision deficiency that has become apparent since applicant's last colour vision screening examination (Ishihara)

- (1) If, since the applicant's last colour vision screening examination (Ishihara), an applicant's medical condition has changed in any way that suggests the presence of a colour vision deficiency that may be of aeromedical significance, then the medical examiner —
- (a) Must consider the results of a colour vision screening examination (Ishihara) undertaken since the change in the applicant's medical condition.

Note

It is relatively rare for colour vision status to change. However medical conditions such as diabetic (or other) retinopathy, the use of some medications, or the implantation of intraocular lenses can lead to a change in colour vision status.

- (2) Subclause (1) applies despite anything to the contrary in the—
- (a) Civil Aviation (Timing for Routine Examinations) General Directions Notice; or
- (b) Civil Aviation (Examination Procedures) General Directions Notice.

8. Relevant colour vision screening examination (Ishihara) results to interpret and analyse

For the purpose of these general directions the determination of whether an applicant has impaired colour vision relies on the interpretation and analysis of the results of a colour vision screening examination (Ishihara) undertaken by the applicant. The medical examiner must consider the most recent colour vision screening examination (Ishihara), but should not ignore or discount any previous colour vision examinations undertaken by the applicant.

9. Relevant non-routine examination results to interpret and analyse

If an applicant has impaired colour vision, the medical examiner must either assess the applicant as described in section 10(3), or analyse and interpret the results from the most recent —

- (a) Holmes-Wright lantern colour vision test (refer *Examination Procedures* GD for test details) undertaken by the applicant; or
- (b) Farnsworth lantern (FALANT) colour vision test and Anomaloscope (Nagel or Neitz) colour vision test (refer *Examination Procedures* GD for test details) undertaken by the applicant; or
- (c) Other equivalent colour vision test acceptable to the Director (refer CAA Advisory Circular AC 67-1).

Note

The Holmes-Wright lantern Type A or Type B is acceptable for performance of the Holmes-Wright lantern colour vision test.

10. Significance of examination results

(1) If the applicant has impaired colour vision and:

- (a) Passes the Holmes-Wright lantern colour vision test; or
- (b) Passes the Farnsworth lantern (FALANT) colour vision test and has no result indicating a colour vision deficiency that is either protanopic or protanomalous in nature; or
- (c) Passes another equivalent colour vision test acceptable to the Director (refer CAA Advisory Circular AC 67-1),

the medical examiner may assess the applicant as having a colour vision deficiency that is not of aeromedical significance.

(2) If the applicant has impaired colour vision and:

- (a) Fails the Holmes-Wright lantern colour vision test; or
- (b) Fails the Farnsworth lantern (FALANT) colour vision test; or
- (c) Passes the Farnsworth lantern (FALANT) colour vision test and has any result indicating a colour vision deficiency that is either protanopic or protanomalous in nature; or
- (d) Fails another equivalent colour vision test acceptable to the Director (refer CAA Advisory Circular AC 67-1),

the medical examiner must assess the applicant as described below in section 10(3).

(3) An applicant who either:

- (a) Does not undertake the further colour vision testing described above in section 9(a) or 9(b); or
- (b) Fails the further colour vision testing as described above in section 10(2);

must be assessed as follows —

Class 1

- (c) assess the applicant for a class 1 medical certificate as having a colour vision deficiency that is of aeromedical significance, or

- (d) assess the applicant for a class 1 medical certificate as having a colour vision deficiency that is not of aeromedical significance only if the medical certificate that is issued is endorsed with the following restrictions —
 - (i) Not valid for air operations carrying passengers; and
 - (ii) Not valid for night flying; and
 - (iii) Not valid for flight under Instrument Flight Rules; and
 - (iv) Not valid for flight in the vicinity of a controlled aerodrome unless the aircraft is in radio contact with aerodrome control; and

Class 2

- (e) assess the applicant for a class 2 medical certificate as having a colour vision deficiency that is of aeromedical significance, or
- (f) assess the applicant for a class 2 medical certificate as having a colour vision deficiency that is not of aeromedical significance only if the medical certificate that is issued is endorsed with the following restrictions —
 - (i) Not valid for night flying; and
 - (ii) Not valid for flight under Instrument Flight Rules; and
 - (iii) Not valid for flight in the vicinity of a controlled aerodrome unless the aircraft is in radio contact with aerodrome control; and

Class 3

- (g) assess the applicant for a class 3 medical certificate as having a colour vision deficiency that is of aeromedical significance.

Subpart 2 - Information required for AMC

11. Information to be made available for AMC

If the medical examiner assesses the applicant as not meeting the medical standard prescribed in rule 67.103(m)(5), 67.105(m)(5), or 67.107(m)(5) of the rules and the medical examiner elects to consider the application further under the flexibility provisions of section 27B of the Act, the medical examiner:

- (a) must ensure that the results of all of the colour vision examinations considered by the medical examiner are made available for the purposes of reaching an accredited medical conclusion (AMC);
- (b) should consider providing the results of the following, or other similar, additional colour vision tests undertaken by the applicant are made available for the purposes of reaching an accredited medical conclusion (AMC);

- (i) Holmes-Wright lantern colour vision test; and
- (ii) Farnsworth lantern (FALANT) colour vision test and anomaloscope (Nagel or Neitz) colour vision test.

Note

Detailed information concerning the various colour vision tests mentioned above can be found in the Civil Aviation (Examination Procedures) General Directions Notice.

Not CAA Policy

Consequential amendments to other General Directions

Civil Aviation (Examination Procedures) General Directions Notice

The following provisions are intended for insertion into:

- (1) Part 1 Purpose and interpretation, Section 5, of the of the Civil Aviation (Examination Procedures) General Directions Notice.
- (2) Part 2, Schedules 1 and 13, of the Civil Aviation (Examination Procedures) General Directions Notice.

Not CAA Policy

The following provisions are intended for insertion into the Civil Aviation (Examination Procedures) General Directions Notice.

Part 1 Purpose and interpretation

Replace section 5 of Part 1 with the following text.

5 Applicant proof of identity

- (1) For the purpose of the routine examinations and non-routine examinations described by these General Directions, and where an applicant is required to produce evidence of his or her identity, the following photographic identity documents are acceptable for that purpose:
 - (a) a current New Zealand passport;
 - (b) a current New Zealand driver licence;
 - (c) a current photographic identity card issued by the New Zealand Defence Force, New Zealand Police or the New Zealand Fire Service;
 - (d) a current CAA Airport Identity Card;
 - (e) a valid and current passport or national identity document issued by another country.
- (2) An equivalent alternative form of photographic identification, not listed above, may also be acceptable to the Director (Refer AC 67-1).

Part 2 Examination procedures

Schedule 1 Routine examinations

Section 11: Colour vision screening examination (Ishihara)

Replace section 11 of Schedule 1 with the following text.

11.1 Definition

- 11.1.1 The Colour vision screening examination (Ishihara) is a screening examination of colour vision function.
- 11.1.2 The Colour vision screening examination (Ishihara) employs the Ishihara pseudo-isochromatic plate set. A variety of plate sets may be used: 14 or 16 –plate edition; 24 or 26 –plate edition; 32 or 36 or 38 –plate edition. Each plate set comprises:
 - (a) An introductory numerical plate that both normal and colour defective individuals are able to read;

- (b) A number of adult test plates that require the reader to identify a numeral from amongst the differently coloured and sized circles;
- (c) A number of plates where the reader is asked to trace a winding line, between two points, from amongst the differently coloured and sized circles.

11.1.3 There are different pass-fail criteria for the different plate sets.

11.2 Conduct of examination

11.2.1 An applicant who undertakes a Colour vision screening examination (Ishihara) must produce evidence of their identity as outlined in Part 1, paragraph 5 (Applicant proof of identity) of these General Directions.

11.2.2 A medical examiner must ensure that the colour vision screening examination (Ishihara) is conducted in accordance with —

- (a) the manufacturer's instructions for the Ishihara plate set used; or
- (b) any other equivalent published standard that is acceptable to the Director.

11.2.3 Unless specified otherwise in the manufacturer's instructions the medical examiner must ensure that the colour vision screening examination (Ishihara) is conducted —

- (a) In daylight conditions or under illuminate D65 conditions (as provided by a Philips 96 fluorescent tube light);
- (b) With each plate presented perpendicular to the applicant's line of sight, and at a distance of greater than 75 cm from the applicant's eyes (beyond the applicant's fingertips);
- (c) With the plates presented to the applicant in random order.

11.2.4 The medical examiner must test the applicant with all of the adult numerical test plates contained within the plate set used.

11.3 Interpretation of results

11.3.1 The results of the colour vision screening examination (Ishihara) are interpreted as a pass when:

- (a) the applicant makes no errors on the adult numerical test plates of a 14 or 16 –plate Ishihara plate set.
- (b) the applicant makes 2 or less errors on the adult numerical test plates of a 24 or 26 –plate Ishihara plate set.
- (c) the applicant makes 3 or less errors on the adult numerical test plates of a 32 or 36 or 38 –plate Ishihara plate set.

Note

For the post-1980 versions of the 24-plate Ishihara test the adult numerical test plates are plates number 2 – 15, and plate number 1 is the introductory or demonstration numerical plate.

11.3.2 Otherwise the results of the colour vision screening examination (Ishihara) are interpreted as a fail.

11.4 Reporting requirements

11.4.1 The medical examiner must ensure that any plate numbers that the applicant has identified incorrectly are recorded in the appropriate place in the report required under section 27D of the Act (form CAA 24067/002).

11.4.2 The document produced by an applicant as evidence of his or her identity must be recorded on the report that under section 27D(1) of the Act records the results of the colour vision screening examination (Ishihara).

11.5 Period of validity of results

11.5.1 The results of a colour vision screening examination (Ishihara) are valid for a period of one year from the date of the examination.

Schedule 13 Non-routine examinations: Vision

Replace the contents of Schedule 13 with the following text.

Section 1: Anomaloscope (Nagel or Neitz) colour vision test

3.1 Definition

3.1.1 The Anomaloscope (Nagel or Neitz) colour vision test is an examination of colour vision function.

3.1.2 These are colour matching tests that require the subject to adjust the amount of red and green light required to match a static yellow light. Anomaloscopes are the gold standard for diagnosis of protan and deutan colour vision deficiencies.

3.2 Conduct of examination

3.2.1 An applicant who undertakes an anomaloscope (Nagel or Neitz) colour vision test must produce evidence of their identity as outlined in Part 1, paragraph 5 (Applicant proof of identity) of these General Directions.

3.2.2 A medical examiner must ensure that the anomaloscope (Nagel or Neitz) colour vision test is conducted in accordance with —

- (a) the manufacturer's instructions for the anomaloscope (Nagel or Neitz) colour vision test; or
- (b) any other equivalent published standard that is acceptable to the Director.

3.3 Interpretation of results

- 3.3.1 There are no pass or fail criteria for interpretation of the results of an anomaloscope (Nagel or Neitz) colour vision test. The results of the anomaloscope (Nagel or Neitz) colour vision test are to be interpreted as to the nature (*protan* or *deutan* etc) and severity of the subject's colour vision deficiency.

3.4 Reporting requirements

- 3.4.1 The results of the anomaloscope (Nagel or Neitz) colour vision test must be reported in a manner that clearly indicates the severity and nature (e.g. +3 deutan) of the subject's colour vision deficiency.

3.5 Period of validity of results

- 3.5.1 The results of an anomaloscope (Nagel or Neitz) colour vision test are valid for an indefinite period unless there is any clinical suggestion that the applicant's colour vision deficiency may have changed.

Section 2: Farnsworth lantern (FALANT) colour vision test

6.1 Definition

- 6.1.1 The Farnsworth lantern (FALANT) colour vision test is an examination of colour vision function.
- 6.1.2 The Farnsworth lantern (FALANT) colour vision test is a two-light colour naming test employing red, green, and white lamps. The subject is asked to identify the colour of each of the two lights (using only the colour names "red", "green", and "white") as they are presented.

Note

The use of the Stereo Optical OPTEC 900 lantern is an acceptable alternative to the Farnsworth lantern for the purposes of the Farnsworth lantern (FALANT) colour vision test.

6.2 Conduct of examination

- 6.2.1 An applicant who undertakes a Farnsworth lantern (FALANT) colour vision test must produce evidence of their identity as outlined in Part 1, paragraph 5 (Applicant proof of identity) of these General Directions.
- 6.2.2 A medical examiner must ensure that a Farnsworth lantern (FALANT) colour vision test is conducted in accordance with —
- (a) the manufacturer's instructions for the Farnsworth lantern (FALANT) colour vision test device; or
 - (b) any other equivalent published standard that is acceptable to the Director.

6.3 Interpretation of results

- 6.3.1 An error is recorded in the Farnsworth lantern (FALANT) colour vision test if there is a mistake in naming either or both of the colours in the pair that is presented. A second and third run of nine presentation is only required if the subject makes one or more errors on the initial run. The average error score is the mean of the error scores made during the second and third run of nine presentations.
- 6.3.2 The results of the Farnsworth lantern (FALANT) colour vision test are interpreted as a pass if:
- (a) there are no errors during the initial run of nine presentations; or
 - (b) there are errors during the initial run of nine presentations, and there is an average error score of 1.0 or less during the second and third run of nine presentations.
- 6.3.3 Otherwise the results of the Farnsworth lantern (FALANT) colour vision test are interpreted as a fail.

6.4 Reporting requirements

- 6.4.1 The results of the Farnsworth lantern (FALANT) colour vision test must be reported in a manner that clearly indicates whether the subject passed or failed the test. The results should also specify the nature and number of any errors made.

6.5 Period of validity of results

- 6.5.1 The results of a Farnsworth lantern (FALANT) colour vision test are valid for an indefinite period unless there is any clinical suggestion that the applicant's colour vision deficiency may have changed.

Section 3: Holmes-Wright lantern colour vision test

7.1 Definition

- 7.1.1 The Holmes-Wright lantern colour vision test is an examination of colour vision function.
- 7.1.2 The Holmes-Wright lantern colour vision test is either a two-light or three-light colour naming test employing red, green, and white lamps. The subject is asked to identify the colour of each of the lights (using only the colour names "red", "green", and "white") as they are presented.

Note

The Holmes-Wright lantern Type A or Type B is acceptable for performance of the Holmes-Wright lantern colour vision test.

7.2 Conduct of examination

- 7.2.1 An applicant who undertakes a Holmes-Wright lantern colour vision test must produce evidence of their identity as outlined in Part 1, paragraph 5 (Applicant proof of identity) of these General Directions.
- 7.2.2 A medical examiner must ensure that a Holmes-Wright lantern colour vision test is conducted in accordance with —
- (a) the manufacturer's instructions for the Holmes-Wright lantern colour vision test device; or
 - (b) any other equivalent published standard that is acceptable to the Director.

7.3 Interpretation of results

- 7.3.1 An error is recorded in the Holmes-Wright lantern colour vision test if there is a mistake in naming any of the colours that is presented. A second run of nine presentations is only required if the subject makes one or more errors on the initial run.
- 7.3.2 The results of the Holmes-Wright lantern colour vision test are interpreted as a pass if:
- (a) there are no errors during the initial run of nine presentations; or
 - (b) there are errors during the initial run of nine presentations, and there are no errors during the second run of nine presentations.
- 7.3.3 Otherwise the results of the Holmes-Wright lantern colour vision test are interpreted as a fail.

7.4 Reporting requirements

- 7.4.1 The results of the Holmes-Wright lantern colour vision test must be reported in a manner that clearly indicates whether the subject passed or failed the test. The results should also specify the nature and number of any errors made.

7.5 Period of validity of results

- 7.5.1 The results of a Holmes-Wright lantern colour vision test are valid for an indefinite period unless there is any clinical suggestion that the applicant's colour vision deficiency may have changed.

Section 4: Colour Assessment and Diagnosis (CAD) (City of London) colour vision test

8.1 Definition

8.1.1 The *Colour Assessment and Diagnosis (CAD)*(City of London) colour vision test is an examination of colour vision function that provides detailed assessment of red / green and yellow / blue colour perception.

8.1.2 The CAD test isolates the use of colour signals and requires the applicant to report the direction of moving colour-defined pattern displayed on a calibrated visual screen. The moving test pattern changes randomly in colour, saturation and motion direction. The test cannot be learnt.

8.2 Conduct of examination

8.2.1 An applicant who undertakes a CAD colour vision test must produce evidence of their identity as outlined in Part 1, paragraph 5 (Applicant proof of identity) of these General Directions.

8.2.2 A medical examiner must ensure that a CAD colour vision test is conducted in accordance with —

- (a) the manufacturer's instructions for the CAD colour vision test device; or
- (b) any other equivalent published standard that is acceptable to the Director.

8.2.3 The CAD test may be undertaken including any of the options and settings available (e.g. 'screen', 'environment', or 'certification'), but must include the Full (Definitive) option which identifies the class of colour vision involved (i.e., normal trichromacy, deutan or protan-like deficiency or acquired deficiency) and quantifies the severity of red / green and yellow / blue loss.

8.2.4 If the RG threshold result falls in the range of 4.8 – 7.2SN (inclusive) for deutan deficiency and 9.6 – 14.4SN (inclusive) for protan deficiency, then the definitive CAD test must be repeated three more times. This option is offered automatically by the program. If the RG threshold result is outside those ranges no repeats are necessary.

8.3 Interpretation of results

8.3.2 The results of the definitive CAD colour vision test are interpreted as a pass if and only if:

- (a) the final 'definitive' result is less than 6SN (Standard Normal CAD units) for a deutan type defect; or
- (b) the final 'definitive' result is less than 12SN (Standard Normal CAD units) for a protan type defect.

8.3.3 Otherwise the results of the CAD colour vision test are interpreted as a fail.

8.4 Reporting requirements

- 8.4.1 The results of the CAD colour vision test must be reported in a manner that clearly indicates whether the subject passed or failed the test. The results should also specify the number of test runs performed in the event that repeats were undertaken.

8.5 Period of validity of results

- 8.5.1 The results of a CAD colour vision test are valid for an indefinite period unless there is any suggestion that the applicant's colour vision deficiency may have changed, or the results of the CAD test may be otherwise invalid.

Not CAA Policy

Consequential amendments to other Documents

Civil Aviation Advisory Circular AC 67-1

The following provisions are intended for insertion into:

- (1) Subpart B, Medical certification, of the Civil Aviation Advisory Circular AC 67-1.

Not CAA Policy

Subpart B – Medical certification

General Directions – Impaired Colour Vision

Part 1 - Class 1, 2, and 3 medical certificates

The Impaired Colour Vision General Direction (Part 1 - Class 1, 2, and 3 medical certificates, Relevant non-routine examination results to interpret and analyse) provides for an “other equivalent colour vision test acceptable to the Director” for the purpose of further investigating Colour Vision deficient applicants.

The other equivalent methods that are acceptable to the Director are:

- The City of London CAD test.

Other methods that are not acceptable to the Director are:

- All other colour vision tests not specified as being acceptable under the General Direction.

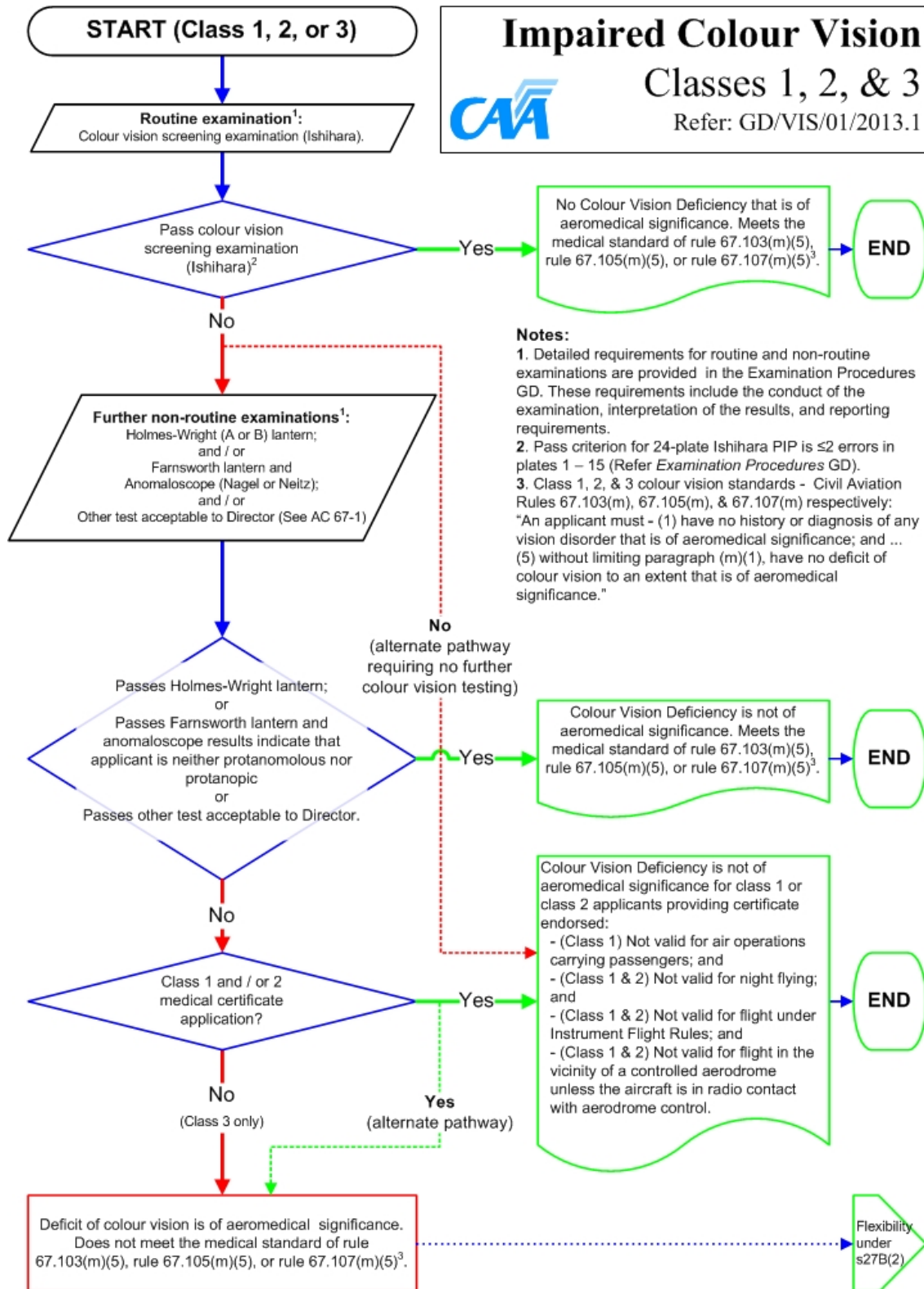
Not CAA Policy

Flow diagrams

The following flow diagrams are not a part of the Civil Aviation (Impaired Colour Vision) General Directions but are intended as guidance material to assist Medical Examiners in their utilisation of the General Directions.

Not CAA Policy

Classes 1, 2, & 3 Impaired Colour Vision flow diagram



This flow diagram is intended to provide Medical Examiners with support and guidance in their utilisation of the General Directions. This flow diagram should never be interpreted in isolation and should always be used with reference to the appropriate General Directions. Nothing in this flow diagram should be interpreted in any way that is contrary to the provisions of the General Directions, the Civil Aviation Rules, or the Civil Aviation Act 1990.

Decision flow-diagram: GD/VIS/01/2013.1 Classes 1, 2, & 3 of [DATE] 2013

Terms of Reference for Colour Vision Deficiency Assessment Panel

Background

Pursuant to s27G (1) of the Civil Aviation Act 1990 (the Act) the Director of Civil Aviation (the Director) may, by notice in the *Gazette*, issue general directions in relation to—

- (a) conducting examinations of applicants and licence holders, and reporting the results of those examinations to the Director; and
- (b) providing exceptions for temporary medical conditions to the reporting requirements set out in s27C; and
- (c) specifying the requirements of examinations or other clinical matters, which must be reasonable, including, but not limited to:
 - (i) the medical content of examinations;
 - (ii) the interpretation and analysis of results of examinations;
 - (iii) the significance of results of examinations for the purpose of determining whether or not an applicant is eligible for a medical certificate under s27B.

Pursuant to s27G(2) of the Act before issuing general directions the Director must consult with those persons, health professionals with aviation medical experience, representative groups within the aviation industry or elsewhere, government departments, and Crown agencies that he or she considers appropriate.

In 2013 the CAA released a proposed general direction for consultation on the subject of Impaired Colour Vision - http://www.caa.govt.nz/medical/gd_colour_vision.pdf. After numerous extensions the final closing date for submissions on the proposal was 1 July 2015.

As part of the consultation process required under s27G (2), and to inform his or her consideration of any submissions that may be received on the matter, the Director considers it appropriate to establish a review Panel comprising individuals with experience in aviation medicine, optometry and vision science, and flight operations. This acknowledges the need for the Director's decision making on the matter to be informed by input from these various disciplines.

The Panel shall be provided with a copy of the proposed general direction and copies of all submissions received on the matter to inform its considerations.

Role of Panel

To assesses the content of submissions received on the proposed general direction and provide the Director with its opinion on the appropriateness or otherwise of the proposed general direction.

Any such opinion shall be provided in a written report submitted by the Panel Chair to the Director by a date to be mutually agreed between the Director and the Panel Chair.

If a consensus opinion cannot be reached by the Panel on the appropriateness or otherwise of the proposed general direction this shall be recorded in the report to be provided to the Director with any dissenting opinion(s) clearly identified and articulated.

The role of the Panel does not distract from the ability of the CAA Principal Medical Officer to provide direct advice to the Director on the appropriateness or otherwise of the proposed

general direction and the contents of any submissions received as the Principal Medical Officer may consider appropriate.

Panel membership

The Panel shall comprise the following:

- CAA General Manager General Aviation (Panel Chair)
- External senior industry Flight Examiner with experience in airline and general aviation operations
- External Medical Examiner
- External optometry and vision science specialist with experience in colour vision matters
- CAA Chief Legal Counsel

Reimbursement

The CAA will reimburse external Panel members for identifiable real and actual expenses incurred by them in their role as Panel members. This includes:

- Any travel associated with Panel activity and any related accommodation associated with Panel activity
- Any incidental expenses incurred as a result of Panel activity e.g. taxi travel, meals etc

All expense claims submitted to the CAA will need to be accompanied by a receipt for the expense uncured.

Any fees for time spent by external Panel member on Panel activity will be negotiated individually with external Panel members ahead of such activity being entered into.

Administrative Support


Administrative support for the Panel's activity, including that necessary for report writing purposes, shall be provided by the CAA Manager Personnel and Flight Training.

Privacy and confidentiality

As part of its review of the submissions, the Panel may encounter sensitive personal information, particularly of a medical nature.

The Panel agrees that any information it reviews as part of the submission review process will be kept confidential and will not be released to any third party outside of the CAA.

All requests for information contained in the submissions will be referred to the Authority's Official Information and Privacy Officer at oiia@caa.govt.nz.


Chris Ford
General Manager Aviation Infrastructure and Personnel

Date 7 September 2015

John Sneyd, Chief Legal Counsel
Civil Aviation Authority of New Zealand

By email only: john.sneyd@caa.govt.nz

21 October 2015

Submissions for Proposed General Directions: Impaired Colour Vision

1. This letter summarises the body of submissions that was received by the Civil Aviation Authority (“CAA”) in response to its proposed general directions on impaired colour vision (“GD”). The information contained in this letter is limited to objective summaries of the issues that arose from the submissions. We have not provided any analysis or advice on the substantive merits of the submissions.
2. This letter is divided into four parts:
 - A. Overview – a summary of the proposed GD and a brief analysis of the submissions that were received;
 - B. Issues – a brief discussion of each of the issues raised in the body of submissions;
 - C. Notable submissions – we have identified five submissions that we consider would be particularly beneficial for the panel members to read;
 - D. Submissions table – annexed to this letter is a table setting out a brief summary of each of the submissions.
3. We have referenced individual submissions throughout this letter – for example, (5) refers to submission 5, using the numbers allocated to each submission by the CAA. This has been done to identify, for the benefit of the panel members, the submissions (or a sample of the submissions) that have discussed a particular issue.
4. Please do not hesitate to contact us if you would like any further assistance with respect to the submissions or the proposed GD.

PART A: Overview

Proposed GD

5. The proposed GD has been developed by the CAA pursuant to s 27G of the Civil Aviation Act 1990 (“**the Act**”), which provides that the Director may issue general directions in relation to “*the requirements of examinations or other clinical matters*”. The requirements are used to determine whether an applicant is eligible for medical certification; and, if so, what restrictions (if any) apply to certification.
6. The proposed GD describes the requirements for medical certification of applicants who are colour vision deficient (“**CVD**”). It sets out the examination regime for screening CVD; the interpretation and analysis of the results of the examinations; and the significance of the results for the purposes of determining whether a CVD pilot is eligible for medical certification.
7. It is our understanding that the proposed GD substantially reflects the colour vision certification process that is currently employed by the CAA. One significant departure from the current CAA policy is the introduction of the City of London (“**CAD**”) colour vision test as a secondary screening option; which is anticipated to replace entirely the Farnworth Lantern screening option over time.
8. Section 27G of the Act requires that before issuing general directions the CAA must consult with appropriate persons and organisations, including representative groups within the aviation industry. The CAA issued a Notice of Proposed General Directions: Impaired Colour Vision (“**Notice**”) and invited the public to make submissions on the proposal (deadline 1 June 2015).
9. The Notice includes:
 - (a) The proposed GD;
 - (b) Proposed amendments to the Civil Aviation (Examination Procedures) General Directions Notice;
 - (c) Proposed amendments to the Civil Aviation Circular AC 67-1; and
 - (d) Classes 1, 2, and 3 Impaired Colour Vision flow diagram.

Submissions on the GD

10. In total, 59 submissions were received in response to the CAA's call for submissions on its proposed GD. Fifteen submissions were received from aviation groups, and 44 were received from individuals. The submissions varied in length from just a few lines to over 50 pages.
11. A handful of the submissions are identical (or nearly identical) to each other, namely:
 - 1 and 12;
 - 51, 52, 53, and 59;
 - 4 and 40;
 - 19 and 22;
 - 25 and 35.
12. Generally, the responses from individuals were short – one to two pages – and contained a few succinct arguments. In the individual responses, many aviators admitted to having CVD of varying degrees of severity.
13. The more lengthy and detailed submissions are from aviation groups. The aviation groups that provided responses are as follows:
 - Southern Alps Air (2);
 - Royal New Zealand Aero Club (8);
 - New Zealand Association of Women in Aviation (30);
 - Milford Helicopters Ltd (34);
 - Colour Vision Aviators (“CVA”) (25, 35);
 - New Zealand Aviation Federation Inc. (38);

- Sports Aircraft Association of NZ (41);
- Air New Zealand Flying Club Inc. (42);
- Canterbury Aero Club (43);
- General Aviation Advocacy Group (“GAA”) (50);
- Air Rarotonga (54);
- Aviation and Occupational Health Unit, Air NZ Ltd (55) (“AOHU”);
- New Zealand Air Lines Pilot’s Association (56);
- Aviation New Zealand (57).

PART B: Issues

Empirical evidence

14. A major theme to emerge from the submissions was the perceived absence of empirical evidence to support the proposed restrictions on CVD pilots contained in the GD (e.g. 12, 6, 15, 16, 25, 48, 50). It is argued that there is no evidence to show that CVD pilots pose a greater risk to safety than ‘normal vision’ pilots:
- *“...[the] body of empirical evidence built by CVD pilots operating in many nations, including New Zealand and Australia, indicates there is no basis to restrict the privileges of CVD pilots should they fail to achieve the prescribed pass mark in the CAD test” (25).*
 - *“I see no evidence that justifies the CVD GD...No supporting statistics have been provided that prove the proposed changes are warranted” (26).*
15. It is also argued that the empirical evidence that is available supports the very opposite view – that CVD pilots pose no greater risk than ‘normal vision’ pilots (e.g. 1, 23, 53). Submitters refer to the fact that there is an absence of CVD-related accidents and anecdotal claims by CVD pilots that they have had an accident or a near-miss caused by CVD.

16. With respect to the Fed-Ex 1478 case it is noted in the submissions that CVD was not considered a primary reason why one pilot was deceived by the PAPI indications; and that the two pilots with normal colour vision were just as unable to decipher the PAPI indications as the one CVD pilot (e.g. 2, 51). Another submitter stated that that accident was more likely due to fatigue (12).
17. The submissions from the CVA attaches a number of reports, decisions and studies that are relied on as support for the view that CVD pilots do not pose a greater risk (25). The relevance of these documents is discussed and well-referenced in the main body of CVA's submissions.

Use of the CAD test

18. The CAD test is a polarising issue within the body of submissions. On the one hand, it is accepted that *"despite some debate about how the CAD test cut-off values are derived, the CAD test is nonetheless the best clinical test currently available"* (55, 12). However, it is submitted that the CAD test should be expressly named in the GD, as it is potentially confusing for the medical examiner to have to cross-reference other documents to confirm that the CAD test may be used (55).
19. On the other hand, it is argued that *"the proposed CAD test would introduce an unnecessarily restrictive regime on CVD pilots in NZ"* (41). The CVA acknowledges that the CAD test can identify the presence of a colour deficit, but argue that: it is too conservative; it is not representative of any aviation task; it is expensive and not widely available; and it cannot determine how CVD will affect the ability of a pilot to fly safely (25).
20. In addition, opposition to the CAD test stems from concern that it is based on PAPI. It is pointed out in the submissions that not all airfields have PAPI; it is a redundant aid that is prone to errors; and it is not a requirement for safe landing (e.g. 12, 25, 28, 51). Moreover, the CVA note that the City University PAPI simulator, used to calibrate the CAD test, deliberately removed the luminance between the red and white lights, which is a design feature of the real-world PAPI. Thus, the simulator is not reflective of pilot's actual experience. Moreover, the pass criteria for the CAD test appear to be arbitrarily raised when compared to the pass criteria for the PAPI simulator (25).

Proposed restriction

Carriage of passengers on air operations – cl 10(3)(d)(i)

21. It is argued that there is no evidence to support prohibition on the carriage of passengers by CVD pilots (e.g. 12, 6, 51). The perfect safety records of CVD pilots in Australia, Canada and the United States show that restrictions on CVD pilots are not justified. One submitter notes the inconsistency that:
- *...the proposed condition will allow me to fly with passengers on cost sharing flights or when instructing with an ab initio student bearing the entire cost. However, it will not let me fly when the cost is met entirely by the passenger. This condition therefore in no way enhances safety as the same flight may be flown with just a different funding arrangement. Rather the condition serves only to complicate aero club activities and administration (12).*

Flight at night – cl 10(3)(d)(ii)

22. It is noted in the submissions that CVD pilots are able to operate aircraft at night quite safely (e.g. 12, 13, 51). It is argued that the limitation against night flying focuses on the PAPI aid but that many airfields that accommodate night flying do not have PAPI. Therefore “*if the PAPI were reason for restricting CVD pilots from night flight then presumably they should be permitted to fly at locations with no PAPI*” (51).
23. In addition, it is argued that colour vision is not necessary to prevent collisions at night. Another aircraft is more likely to be noticed from the mere sighting of the aircraft or its lights and their relative motion, as opposed to the colour of its lights (51). On this issue, it is pointed out that any concerns about CVD pilots flying at night could be alleviated by a series of flight tests under night conditions (13).
24. Other submitters do agree that restrictions on night should remain for CVD pilots (3, 7).

Flight under instrument flight rules – cl 10(3)(d)(iii)

25. It is submitted when operating under IFR, there is greater redundancy provided for traditional visual aids such as PAPI and marker beacons. In fact, reliance on

instrumentation will replace the need for reference to aids such as PAPI or beacons in IMC (12, 51).

Flight in controlled air space - cl 10(3)(d)(iv)

26. Some submitters have expressly endorsed the restriction on CVD flight in controlled air space unless the aircraft is in radio contact with aerodrome control (e.g. 6, 12, 20, 25, 51, 57). It is said also that this requirement rules out the need for the other restrictions as the presence of a radio rules out having to rely on lights to gain clearance (6).
27. Another submitter is unwilling to accept a restriction on not being allowed near controlled aerodromes without radio contact on the basis that it will put increased pressure on controllers without reducing the risk of an accident (18).

Alternative CVD tests

Three tiered test

28. The CVA has proposed a three-tiered CVD test, as follows (25):

Primary screening: Ishihara plate test. If a pilot fails the plate test he or she will be required to undergo secondary screening;

Secondary screening: use of any screening method currently employed by ICAO nations including those listed in the proposed GD, the Farnsworth D15 test, the Giles-Archer lantern test, the CAD test and the signal gun test;

Tertiary screening: if a candidate fails both primary and secondary screening, he or she will be required to undergo a PPL, CPL, IFR, and/or ATPL practical flight test.

29. Successful completion of a practical flight test would mean that restrictions would be reduced to:
 - Not valid in the vicinity of a controlled aerodrome unless in radio contact with ATC;

- In the case of ATPL holders, valid for ATPL privileges only as or with a co-pilot.

30. It is submitted that the benefit of the three-tier test is that it gives CVD pilots an opportunity to prove he or she can fly safely, notwithstanding the inability to differentiate colours.
31. The proposed three-tier test is supported in other submissions (e.g. 41, 51, 57). The CVA has included in its submissions a flowchart setting out the structure of the three-tiered test.

Real world practical test

32. A number of submitters have expressed support for a practical flight test being the only test that CVD pilots are required to pass as evidence of safe aviation capabilities (2, 5, 8, 10, 13, 20, 24, 26, 27, 31, 39, 42). It is argued that the flight simulator test will be able to discern whether CVD is *practically* of aeromedical significance (8). It is also noted that practical flight tests have been endorsed in the past by the CAA to allow CVD pilots to demonstrate they can safely fly a plane (26, 51, 54).
33. It is suggested that CAA work with CASA to review the history and progress of CVD pilots in both Australia and New Zealand, with a view to recommending a more pragmatic competency based test regime for CVD pilots internationally (51).

Single light gun

34. One submitter suggested that the Signal Light Gun test is the only test that needs to be undertaken; and if a candidate passes this test then a full and unrestricted medical certificate should be issued (4).

Farnsworth

35. The Farnsworth D15 has been put forward by one submitter as an acceptable and readily accessible alternative to the CAD test. No incident has been recorded for pilots screened under this test; it is accepted for electrical registration; and it is more widely available throughout New Zealand (12).

Radio

36. One submitter argued that the potential problems caused by CVD pilots would be remedied if all aircraft operating in controlled airspace are fitted with radio communication equipment (12).

Follow the Australian approach

37. Many submitters called for the CAA to adopt an approach to regulating CVD pilots that is consistent with the approach taken in Australia (e.g. 12, 2, 4, 21, 28, 42, 49, 50, 54).
38. The argument in favour of a consistent approach is that, currently, Australian CVD pilots are able to fly in and out of New Zealand airspace unimpeded by regulatory restrictions; whereas in New Zealand CVD pilots do not have the same freedom (50). It is argued that as a consequence New Zealand CVD pilots must re-locate to Australia to work as a commercial pilot (4):
- *“I find it unjust to deprive born and bred Kiwis the opportunity to work in their home country when Colour Vision Standard is something that does not need to be upheld”.*
39. On this point, the submissions have also referred to three decisions of the Australian Administrative Appeals Tribunal in 1987, 1989 and 2015, in which the topic of CVD and its effect on pilot performance was reviewed by an expert panel. In particular, the 2015 decision of the Tribunal involving John O’Brien (a CVD pilot) is relied on for the position that strict testing and restrictions on CVD pilots are not justified on the evidence (e.g. 28, 50, 51). In that case, the Tribunal concluded O’Brien was perfectly fit to captain aircraft utilising privileges of his ATPL and not just those of his CPL.

Other jurisdictions

40. The United States, Canada and South Africa are also noted in submissions as jurisdictions that allow greater leniency to pilots with CVD (e.g. 12, 5, 25, 41, 51). In the United States CVD pilots can operate without limitation based on lenient pass marks in various Pseudo Ischromatic Plate clinical tests or on the basis of demonstrated competency. In Canada, CVD pilots may operate without limitation

based on the Farnsworth D15 clinical test. Finally, the South African Civil Aviation Authority uses a “real world” test.

Global consensus

41. Two submitters have urged that there is a need for global commonality regarding the restrictions on CVD pilots (7, 51).

Discrimination

42. The argument that the restrictions on CVD pilots are discriminatory was raised by a substantial number of submitters (9, 12, 18, 23, 25, 29, 31, 50). For example:
- *“The addition of conditions without any scientific or empirical evidence cannot be tolerated as it amounts to nothing more than discrimination”* (12);
 - *“The proposal would discriminate against perfectly safe pilots and students who are trying to make a career in aviation. To my knowledge there is no precedent for this...”* (29);
 - *“The New Zealand colour vision requirements have consistently discriminated against pilots wishing to enter our aviation industry and seek careers as professional pilots”* (50).
43. There is concern that CVD pilots would lose their current employment as a result of the GD (e.g. 21, 26, 27, 55). It is also argued that it is discriminatory that Australian CVD commercial pilots can fly in and out of New Zealand airspace under trans-Tasman agreements, but New Zealand CVD pilots cannot do the same (e.g. 50).
44. The GAA have stated there may be grounds for a case of discrimination by the CAA against CVD pilots under the Human Rights Act 1993 (50). This belief is premised on the view that there is no sound evidential basis to put restrictions on CVD pilots. Oddly, the GAA have also proposed that a judicial review should be convened that is composed of *“members skilled in sifting through evidence and weighing up opposing points of view.”* The way the GAA has phased this proposal suggests a misunderstanding about the nature of a judicial review.

Time period for Ishihara test

45. The period of validity of the Ishihara test was raised in several submissions (21, 51, 52, 55). This submission is premised on the misunderstanding that repeat Ishihara tests will be required at each annual medical assessment. It is argued that such repeat testing is not required given CVD is a static condition.
46. The submission from the AOHU acknowledges the confusion with respect to the period of validity and suggest that this confusion could be overcome by:

Including a paragraph in the Impaired Colour Vision GD, subpart 1, prior to current paragraph 6, which states that the timing of routine screening tests for colour vision are outlined in the relevant schedules of the Timetable for Routine Examinations GD. A similar reference should also be included in the Examination Procedures GD, Part 2, current paragraph 6. A clear definition for 'Period of Validity of Results' would make all of these documents easier to interpret (55).

Flexible pathway

47. Section 27B of the Act has been noted in two submissions (55, 56). It is argued that the provision provides the medical examiner with discretion to consider whether to issue a medical certificate on flexible grounds.
48. The New Zealand Air Line Pilots Association has raised concerns that the GD does not describe the manner by which the 'alternate pathway' for the issuance of a medical certificate is achieved under s 27B (56). It submits there needs to be a defined pathway for the applicant to show competency under the alternate pathway; and it argues that this could be carried out in either a flight simulator or aircraft. Upon successful completion of any one of these flight tests, restrictions will be reduced to:
- In the case of CPL, valid for CPL privileges only as or with a co-pilot;
 - In the case of ATPL holders, valid for ATPL privileges only as or with a co-pilot;
 - In both cases, the other operating crew members must be informed of this restriction;

- The practical operational test will only apply to the aircraft type, group or series upon which the test was conducted;
- No two such restricted licence holders shall operate as a crew.

49. Moreover, AOHA have requested clarification about assessment options for CVD applicants where the outcome of assessment from the proposed GD is significantly more restrictive than an outcome under a previous assessment (55). It is submitted that it would inequitable to deny pilots with established safety records the opportunity to demonstrate safety through a practical flight test. AOHA notes that if a practical flight test is introduced it must be made clear: what organisations are authorised to conduct such test; how the test is standardised; how the results are interpreted; and how restrictions or entitlements arising from the results are applied.

Cost and accessibility

50. The cost and accessibility of the new CVD testing regime proposed in the GD is a common theme raised in the body of submissions (19, 21, 25, 26, 27, 30, 32, 41, 48, 25). For example:

- *“The proposal will just add another layer of cost and complexity to the already expensive medical certification process” (26);*
- *“Given the extraordinarily high cost of medicals in New Zealand, the proposal must be rejected as an unnecessary abuse to be suffered by the medical applicant with no tangible benefit to the pilot population” (27);*
- *“...in my view another revenue grabbing exercise within the NZ aviation community” (32).*

Primary Medical Officer

51. A substantial theme to emerge from the body of submissions is that the current PMO is biased and prejudiced against CVD pilots (25, 50, 41, 51, 54). The GAA, in particular, is vehement in its opposition to the current PMO and his views:

- “[The PMO] appears to be mounting a crusade for global bureaucratic conformity from his office in New Zealand, while conveniently overlooking his previously published, strong desire for evidence-based decisions in aeromedical matters” (50).

52. The GAA have also argued that “the professional qualifications of any CAA employee should be open to public scrutiny when their actions may lead to regulatory change, and we may seek an opinion on this from the Privacy Commissioner.”
53. The CVA likewise state that the stricter testing and restrictions appear to be based on the personal views of the PMO, rather than on evidence. It notes “the continued suitability of the PMO for his role in regulating clinical test methods and medical restrictions for CVD pilots is questioned” (25). It is also argued by the CVA that the PMO’s presentation at the Australian Society of Aerospace Medical Annual Scientific meeting in Brisbane in 2014 was prejudicial, unbalanced, objectionable, and factually inaccurate.
54. In addition, one submitter notes that professional flight crew, as opposed to medical professionals, should be responsible for making decisions regarding CVD pilots capabilities (2).

Errors, improvements and miscellaneous

Marker Beacon

55. It is argued that marker beacons do not justify restrictions on CVD pilots because not all obstacles use marker beacons and those that are present vary in colour (25, 51).

Diagram

56. One submitted has noted (11):

It would appear that there is an error in your class 3 diagram as its outcome is to decline a class 1 medical certificate in the bottom box, should this not be class 3.

Paragraph 9b

57. Submitter (44) suggests that, with regards to paragraph 9b of the proposed GD, both the FALANT and Anomaloscope (Nagel or Neitz) colour vision tests must be undertaken by the applicant. It is submitted that the wording of this paragraph should be changed so an applicant only has to undertake the FALANT or Anomaloscope colour vision test.

False fails

58. It is argued that the tests proposed in the GD may generate false fails, which may, in turn, ground perfectly healthy pilots (30, 33).

Confusion

59. One submitter argued it is difficult to make sense of the GD (23).

Light aircraft

60. One submitter asserts that the proposed restrictions are particularly unnecessary in relation to pilots flying light aircrafts because PAPI cues are not used to land light aircrafts (28).

Request to meet with panel

61. Two submitters have asked to make submissions before the panel in person (8, 25). Along the same vein, the GAA has requested that the GD consultation process be put on hold pending a full inquiry into the need for a GD and the motive behind the proposal (50).

Glass cockpit

62. It is submitted that the presence of glass cockpits is not a justification for restrictions on CVD pilots. One submitter states "*The notion that there are things that we cannot see in a 'Glass Cockpit' is incorrect and just details the depth of misunderstanding even in the medical profession as to the role colour plays in an aviation environment*" (4). Another submitter indicates the problem of glass

panels may be resolved “*by the manufacturer providing operator controlled colour options*” (39).

Co-pilot restriction

63. It is submitted that one of two restrictions to remain in place for pilots with CVD is that “*operations requiring an ATPL may only be conducted only as or with a co-pilot*” (20, 25, 56, 57).¹ Similarly, one submitter has stated that all IFR and night flights, involving a CVD pilot, should be two pilot operations only (3).

Modern technology

64. It is argued restrictions on CVD pilots are redundant given modern flight technology. It is accepted that historically colour vision was a pre-requisite for safe aviation, but that this is no longer true (e.g. 51).

Submission process

65. The GAA cited the submission form as a “*major obstacle to genuine consultation*”, on the basis it requires a submitter to attach a name and CAA client number and, therefore, it would be unlikely that pilots working in air transport operations in New Zealand with CVD would make submissions (50).
66. Another submitter has argued that “*there is not enough time before cut off date for possible effected [sic] parties to discuss this change and make proper submission. This law change is being rammed through without consultation with all parties concerned*” (19). Submitter 9 argued that he “*finds it completely unacceptable to only hear of this GD on impaired colour vision through word of mouth. Should CAA have not contacted all colourvision deficient CPL holders and invited them to make submissions.*”

¹ The other restriction is “*not valid in the vicinity of a controlled aerodrome unless in radio contact with ATC*”, discussed above at [26]-[27].

PART C: Suggested submissions to read

67. We do not consider that it is necessary for the panel members to read every submission individually. The summaries of the themes raised in the submissions, set out above, should contain sufficient detail to inform the panel members of the issues contained in the body of submissions.
68. Nonetheless, we do consider that the panel members would benefit from reading the following submissions, which, between them, largely canvass the issues summarised above:
- Submission 12
 - Submission 25
 - Submission 50
 - Submission 51
 - Submission 55.
69. Please feel free to contact us if you have any questions arising from this summary of the submissions.

Yours sincerely



Catherine Deans

Solicitor

(03) 550 0453 / (027) 358 8005

catherine.deans@clarolaw.co.nz

PART D: Table of submissions received by the CAA in response to Notice of Proposed General Directions: Impaired Colour Vision

Submission	Is proposed GD acceptable?	GD paragraph	Discussion
1/12 Ryan Brookes	No, but would be with changes	10(3)(d)(i)	<ul style="list-style-type: none"> • This condition is absolutely unacceptable and opposed as it prohibits the carriage of passengers on air operations by CVD pilots. • Other jurisdictions (e.g. Canada, US and Australia) allow CVD pilots to fly by day without issue. Refer to the ruling by the Administrative Appeals Tribunal in regards to Mr O'Brien where it was found the ability to safely operate an aircraft is not compromised by CVD. • Under VFR conditions in light aircraft there is no conceivable risk to passengers from pilots with abnormal colour vision. • The condition can be undermined depending on the funding arrangement for the particular flight.
		10(3)(d)(ii)	<ul style="list-style-type: none"> • This condition is absolutely unacceptable and opposed as there is no empirical evidence to show CVD pilots cannot operate at night. • The total absence of CVD as a factor in any accident in Australia indicates that safe night operations may be readily accomplished by CVD pilots (the Fed-Ex case is an example of pilot fatigue) • Research from City of London University indicates that colour vision generally serves only as an aid to other cues and is not critical. • Not all airfields have PAPI, which is the basis for the CAD test. The CAD test is therefore not relevant to all flight situations.
		10(3)(d)(iii)	<ul style="list-style-type: none"> • Given the reliance of the pilot on internal instrumentation during IFR operations and the perfect safety record demonstrated by CVD pilots worldwide under such conditions, this condition is unacceptable and opposed.
		10(3)(d)(iv)	<ul style="list-style-type: none"> • Accept this condition and contend that radios should be mandatory for all aircraft at all times and not just those flown by CVD pilots at controlled aerodromes.
		10(3)(f)(i)/(ii)	<ul style="list-style-type: none"> • Opposed on the same grounds as commercial operations at night or under instrument flight rules.
		AC67-1 Subpart B	<ul style="list-style-type: none"> • Submitted that the Farnsworth D15 test be added as an acceptable and readily accessible alternative to City of London CAD. No incident has been recorded for pilots screen under this test; it is accepted for electrical registration; and it is more widely available throughout NZ.

Submission	Is proposed GD acceptable?	GD paragraph	Discussion
			<ul style="list-style-type: none"> • Alternatively all aircraft operating in controlled airspace could be fitted with radio communication equipment.
		General	<ul style="list-style-type: none"> • Technology has evolved such that restrictions on CVD pilots are not required. The addition of conditions without any scientific or empirical evidence cannot be tolerated as it amounts to nothing more than discrimination. The evidence from Australia shows that pilots with impair colour vision can fly under VFR and IFR by day or night without compromising safety.
2 Paul Cooper	No, but would be with changes	Non-specific	<ul style="list-style-type: none"> • “A flight test should be conducted to ascertain if in practical situations the pilot is able to identify the appropriate colours as is the case in Australia which appears to be working extremely well.” • If the candidate passes the inflight test they should be allowed to fly on all classes of pilot licences by day, and, if found safe and competent, at night also. • Professional flight crew and not doctors should make any decision regarding capability of CVD pilots. • The Fed-Ex case does not explain why the two pilots with normal colour vision did not identify the problem.
3 Melissa Ward	No, but would be with changes	Non-specific	<ul style="list-style-type: none"> • General restrictions for CVD pilots should only relate to solo night flying and IFR flying. There is no safety risk for VFR operations during the day. Night and IFR flying should be two pilot operations only for pilots who have CVD.
4/40 Jeremy Iles	No, but would be with changes	Non-specific	<ul style="list-style-type: none"> • NZ should be on par with Australia (i.e. no colour vision test is required up to an ATPL level). “I find it unjust to deprive born and bred Kiwis the opportunity to working their home country when the Colour Vision Standard is something that does not need to be upheld.” • Signal Light Gun test should be used to assess colour vision as it is easier to pass and provides a far more realistic setting. • The notion that there are things CVD pilots cannot see in a Glass Cockpit is incorrect and the medical profession misunderstand the role colour vision plays in an aviation environment.
5 Christopher Hutchings	No, but would be with changes	Non-specific	<ul style="list-style-type: none"> • “I agree that phasing out the Farnsworth Lantern tests in favour of the CAD test is a great step in the right direction”; but in conjunction with a CAD test, a “real world” test would be a much fairer way to properly assess applicants in terms of flight safety (e.g. like the test used by the South African Civil Aviation Authority see: http://www.caa.co.za/resource%20center/ASO/AVmed/Docs/colourVision.pdf).
6	No, but would be with changes	Non-specific	<ul style="list-style-type: none"> • The restriction ‘not valid for air operations carrying passengers’ should be removed from the restrictions

Submission	Is proposed GD acceptable?	GD paragraph	Discussion
Andrew Craig			<p>altogether as there is no evidence to support that it would increase safety.</p> <ul style="list-style-type: none"> • Accepts there are reasons behind the restriction on night flying. • The restriction 'not valid for flight in the vicinity of a controlled aerodrome unless the aircraft is in radio contact with aerodrome control' already rules out the possibility of having to rely on lights to gain a clearance.
7 Dr David Doyle	Not specified	Not-specified	<ul style="list-style-type: none"> • There is a need for commonality in the method of CVD globally.
8 R Cruickshank - Royal NZ Aero Club	Not specified	Not specified	<ul style="list-style-type: none"> • Endorses the changes to the GD that improve or simplify the administration and testing of pilots with CVD; and the streamlining of endorsements for pilots with non-aero medically significant CVD. • Requests further amendment that: <i>"before the pilot is assessed as having an aeromedical significant colour vision deficiency requiring endorsement on their licence, allows [sic] the pilot a flight test by a suitably qualified examiner to determine if the colour vision deficiency is 'practically' of aeromedical significance"</i>. • Would like to be heard if public hearings are scheduled.
9 Graeme Barr	Not acceptable under any circumstances	Not-specified	<ul style="list-style-type: none"> • <i>"It is widely known and accepted internationally that a pilot with impaired colour vision does not in any way compromise the safe operation of aircraft he/she is flying"</i>. • Submitter argues that conditions on his medical certificate have changed over the years and he is excluded from any type of commercial helicopter operations. <i>"I do feel completely discriminated against"</i>. • Finds it unacceptable to only hear of this GD on impaired colour vision through word of mouth.
10 Dr Oliver Brook	No, but would be with changes	Subpart B, Part 1	<ul style="list-style-type: none"> • <i>"Subpart B, Part 1, acceptable non-routine tests: As in continental Europe there are no lantern tests available, and there is only one known CAD in Amsterdam, extending the acceptable non-routine tests by the Nagel would not decrease aviation safety significantly, but allow more testing sites outside the UK and Amsterdam. Also EASA-FCL Part Med is allowing the Nagel in the AMC1 Med B.075, whereas EASA is currently not allowing the CAD"</i>
11 Robert Feasey	Not specified	Error	<ul style="list-style-type: none"> • <i>"It would appear there is an error in your class 3 diagram as its outcome is to decline a class 1 medical certificate in the bottom box, should this not be class 3"</i>.

Submission	Is proposed GD acceptable?	GD paragraph	Discussion
13 Chris Dixon	No, but would be with changes	Not specified	<ul style="list-style-type: none"> Propose that a series of flight tests be conducted by nominated persons (e.g. B Cat, A Cat or Flight Examiner), under day or night conditions, to consider whether CVD candidate should have restrictions lifted or increased as the nominated person thinks fit.
14 Dr Toga Potoi	No, but would be with changes	Not specified	<ul style="list-style-type: none"> Some of the non-routine tests may not be available in some practices e.g. in Samoa. Referral of candidate who has failed Ishihara to ophthalmologist or optometrist for non-routine test where facilities are available is a good option.
15 Bill Daly	Not acceptable	Not specified	<ul style="list-style-type: none"> No evidence that the GD is required and “<i>other countries are not taking such a harsh approach</i>”.
16 Jon Ludgater	Not acceptable	Not specified	<ul style="list-style-type: none"> CVD pilots have been operating for a long time without problems and the GD adds another layer of bureaucracy for no worthwhile gain.
17 Fred Bain	Not acceptable	Not specified	<ul style="list-style-type: none"> Other jurisdictions have let CVD pilots fly without issue and the GD is totally unnecessary. “<i>Indeed, there is a virtual absence of accidents and incidents attributable to CVD.</i>”
18 Chris Hutchings	Not acceptable	Not specified	<ul style="list-style-type: none"> Restrictions are not based on actual medical proof that CVD pilots pose a danger. CAA is restricting pilots from doing something they are capable of doing. How is CVD going to affect flying near, not in, controlled airspace without radio contact with the tower? This is a waste for traffic controllers, who have to deal with traffic in their zone and traffic that is near their zone. The restrictions are discriminatory.
19/22 Warren Brown	Not acceptable	Not specified	<ul style="list-style-type: none"> No evidence to support expensive changes. Just a way of ensuring CAA doctors can increase revenue from charging fees to carry out more tests.
20 Brian Michel	No, but would be with changes	Not specified	<ul style="list-style-type: none"> Practical flight testing should be reintroduced and be accepted, as it has in the past, as a method by which a pilot may demonstrate his or her ability to safely pilot an aircraft. The only restrictions that should remain for pilots with CVD are: <ul style="list-style-type: none"> Not valid in the vicinity of a controlled aerodrome unless in radio contact with ATC;

Submission	Is proposed GD acceptable?	GD paragraph	Discussion
			<ul style="list-style-type: none"> ○ Operations requiring an ATPL may only be conducted as or with a co-pilot.
21 Tim Ward	No, but would be with changes	Not specified	<ul style="list-style-type: none"> • Annexes and supports a GAA document, which states: <ul style="list-style-type: none"> ○ Australia, Canada, and the US allow CVD pilots to fly without issue; and there is a virtual absence of accidents and incidents attributable to CVD; ○ New Zealand has previously allowed entry of CVD pilots into the industry upon passing a practical flight test; ○ The GD will require all pilots to be screened by the Ishihara plates annually; ○ The Farnsworth and Holmes Wright Lantern tests are difficult tests to pass; ○ The CAD test is also difficult and will only be available in the main centres; ○ The proposed restrictions are severe and will effectively end the career of any CVD pilot; except for day VFR flight instructors and agricultural operations; ○ The CVA practical flight testing proposal is reasonable and entirely consistent with those imposed in Australia.
23 Les Vincent	Not acceptable	Not specified	<ul style="list-style-type: none"> • Changes are unnecessary and discriminatory. It is difficult to make sense of the GD. • <i>“In the case of RPL holders where a DL9 standard in general is acceptable, surely the fact road users interpret traffic signals every day without problems is evidence enough that CVD needn’t be regarded any differently with respect to aviation”.</i>
24 Dominic Eller	No, but would be with changes	Not specified	<ul style="list-style-type: none"> • Practical flight test is clearly a more accurate way to assess if a pilot’s vision is a safety risk. The use of tests with large amounts of variables is bizarre and unacceptable.
25/35 Colour Vision Aviators	Not but would be with changes		<ul style="list-style-type: none"> • Provides an overview of the physiology of colour vision deficit and the history of colour vision in aviation. • Four key submissions: <ol style="list-style-type: none"> 1. CAD test: CAD test is not the appropriate final determination of restrictions on pilots as it is too

Submission	Is proposed GD acceptable?	GD paragraph	Discussion
			<p>conservative. There is no empirical evidence to show that the privileges of CVD pilots should be restricted because of a failure to pass the CAD test. The CAD test can identify the presence of a colour deficit but cannot determine how CVD will affect the ability of a person to safely pilot a plane. It does not add to the pre-existing methods for testing colour vision already available in New Zealand. CAD test will be expensive to introduce and not readily accessible throughout New Zealand.</p> <p>The City University PAPI simulator, used to calibrate the CAD test, deliberately removed the brightness difference between the red and white lights, which is a design feature of real PAPI; and so the simulator was entirely unrealistic of what is expected of a pilot on approach in day or night. By contrast, the FAA PAPI simulator only reduced the white light to being 20% brighter than the red light and employed LEDs. Using this simulator colour deficit pilots achieved perfect scores.</p> <p>The CAD pass marks were overly conservative when compared to the pass marks for the already conservative City University PAPI simulator. The pass marks assigned for the CAD test appears to have been arbitrarily raised when compared to the PAPI simulator.</p> <p>City University contradict themselves in suggesting those candidates who pass the simulator but who cannot achieve the prescribed pass mark for the CAD test will be unable to adequately complete other tasks required of a pilot. Documentation clearly indicates that PAPI interpretation was viewed as the single most difficult task involved colour interpretation for pilots.</p> <p>2. Alternative restrictions and test regime: an alternative three tier test regime is proposed (consistent with the most recent ruling of the AAT in Australia):</p> <ul style="list-style-type: none"> (a) Ishihara plates; (b) Other screening methods in use with other ICAO nations; and (c) A practical flight test. <p>For pilots who satisfactorily pass the practical flight test (but fail at the first two tiers) restrictions will be reduced to:</p> <ul style="list-style-type: none"> (1) Not valid for flight in the vicinity of a controlled aerodrome unless in radio contact with ATC; (2) Valid for ATPL privileges only as or with a co-pilot. <p>In addition it is noted:</p>

Submission	Is proposed GD acceptable?	GD paragraph	Discussion
			<ul style="list-style-type: none"> ➤ New Zealand has previously facilitated the entry of pilots with CVD using practical flight tests, which afforded pilots the opportunity to demonstrate they could safely pilot aircraft; ➤ CVD pilots have a number of significant cues available, apart from the colour of a light, to navigate properly. The presence of a light, more than its colour, is the best navigation aid. Pilots are also beginning to use night vision equipment; ➤ CVD pilots are able to read PAPI as well as any other pilot. In any event, PAPI is not used in all situations; ➤ Hazard marker beacons are not used to mark all high ground or hazards. There is no consistency in the colour of the light used. A pilot is expected to note any hazards in a pre-flight plan; ➤ The signal gun is used extremely rarely given the proliferation of aircraft radios; ➤ Reliance on the recognition of the colour of individual navigation lights is now largely irrelevant for the prevention of collisions; ➤ The geometric appearance of light arrangements combined with the saturation of colour they provide mean that CVD pilots will have little issue in interpreting airfield lighting; ➤ Colour is a redundant cue in flight deck displays; ➤ Many countries have relaxed conditions for CVD pilots e.g. Australia, Canada and the United States; ➤ There is a near absence of incidents or accidents in which CVD has been noted as a contributing factor; ➤ The 26 years of commercial operations by CVD pilots in Australia, day and night, VFR and IFR provide a massive pool of empirical evidence to support this conclusion; ➤ The current restrictions on CVD pilots as proposed under the GD are unnecessary and discriminatory. Only the final condition, requiring radio communications when operating in the vicinity of a controlled aerodrome, should be maintained for both private and commercial pilots. ➤ The CAA should also work with the CASA to review the data that exists on colour vision pilots and use the next five years of experience with colour vision pilots in NZ to inform the review. The review may be used to bring about positive change in the best test methods and restrictions applied to all

Submission	Is proposed GD acceptable?	GD paragraph	Discussion
			<p>colour vision deficient pilots internationally.</p> <p>3. Concern for PMO bias: promotion of stricter testing and restrictions 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 is questioned.</p> <p>4. Request to discuss submissions: it would be a significant undertaking for the review panel to read and/or view all supporting materials. It is therefore requested that CVA be permitted to verbally discuss the submission with the Director and other panel members as appropriate.</p> <p>Key documents cited:</p> <ul style="list-style-type: none"> ➤ UK CAA, “<i>Minimum Colour Vision Requirements for Professional Flight Crew</i>” (April 2009); ➤ FAA, “<i>Precision Approach Path Indicator (PAPI) Systems</i>” 150-5345-28; ➤ <i>Denison v Civil Aviation Authority</i> [1989] AATA 84; 10 AAR 242 (7 April 1988); ➤ <i>Pape v Department of Aviation</i> (3821:9, October 1987); ➤ <i>O’Brien v the Civil Aviation Safety Authority</i> [2015] AATA 93; ➤ FAA, “<i>Usability of Light Emitting Diodes in Precision Approach Path Indicator Systems by Individuals with Marginal Color Vision</i>” (DOT/FAA/AM-14/6); ➤ DSTO Systems Report 25, “<i>Hazards of Colour Coding in Visual Approach Slope Indicators</i>” (1981); ➤ FAA, “<i>Evaluation of Precision Approach Path Indicator (PAPI)</i>”, (DOT/FAA/CT-82/153); ➤ FAA, “<i>The 1976 Accident Experience of Civilian Pilots with Static Physical Defects</i> (FAA-AM-79-19); ➤ CAA, Medical Manual Ophthalmology, (accessed 13 May 2015).
26 Iain Weir	No, but would be with changes	Not specified	<ul style="list-style-type: none"> • No reason to justify GD – just adds more cost and complexity to the expensive certification process, and will put some pilots out of work. There is no evidence to substantiate the proposals. • The proposed tests are too sensitive and are likely to trap people with only mild red/green sensitivity problems.

Submission	Is proposed GD acceptable?	GD paragraph	Discussion
			<ul style="list-style-type: none"> • Would only support if: <ul style="list-style-type: none"> ○ New rules only apply to new licence applicants only; ○ Practical test alternatives are available in the event of failure; ○ Level of sensitivity that represents failure is more lenient. More than 45% of people with perfect colour vision make at least one error on the Ishihara test.
27 Brooke Mackey	Not acceptable	Not specified	<ul style="list-style-type: none"> • <i>“The need for repetitive annual or biennial [sic] colour vision testing at the time of medical certificate renewal is not supported by the medical evidence that colour vision changes occur randomly.”</i> Any justification for additional colour vision screening must have a sound medical basis. • The cost of the tests is an unnecessary abuse to be suffered where there is no tangible benefit to the pilot population. Another course of revenue gathering. • The FAA deals with many more pilots in NZ, yet it takes a far more simple and pragmatic approach to colour vision screening.
28 Greg Bishop	Unclear	Not specified	<ul style="list-style-type: none"> • As a principle submission, the Australian experience provides conclusive proof that CVD is not of aeromedical significance. I have CVD and have no difficulty in distinguishing airport lighting in night flying assessment. • As a secondary submission, CVD is not of aeromedical significance to pilots operating light aircraft and GD should be amended accordingly. The FAA found that colour coding of lighting at airports is either redundant or not a safety issue. <i>“Given PAPI lights are not necessary to land a light aircraft safely at night, are not present at all lighted aerodromes, and result in light aircraft arriving at the threshold of the runway above the optimal glideslope, it seems difficult to draw any conclusion that the ability (or inability) to correctly interpret those lights is a safety issue for pilots of light aircraft.”</i>
29 Trish and John Crawford	Not acceptable	Not specified	<ul style="list-style-type: none"> • GD would <i>“discriminate against perfectly safe pilots and students who are trying to make a career in aviation.”</i> It is contrary to the requirements in other countries including Australia. • Unlikely to ever have a total radio failure anyway.
30	Not acceptable	Not specified	<ul style="list-style-type: none"> • Another revenue grabbing exercise and will ground perfectly healthy pilots.

Submission	Is proposed GD acceptable?	GD paragraph	Discussion
Sue Telford – NZ Association of Women in Aviation			<ul style="list-style-type: none"> • There is a risk the IPI plates will be misread and used to ground a perfectly healthy pilot.
31 Fred Bull	Not acceptable	Not specified	<ul style="list-style-type: none"> • No evidence impaired colour vision causes accidents. • It is discriminatory and totally unfair in the absence of evidence. • Pilots should be able to prove ability in a practical flight test or simulator. • Further rules and regulations will not eliminate human error.
32 Kevin Langford	Not acceptable	Not specified	<ul style="list-style-type: none"> • Administrative nonsense that is not imposed in countries such as Australia and US. We are already being extorted with medical fees without adding all this rubbish.
33 Mike Hayman	Not acceptable	Not specified	<ul style="list-style-type: none"> • Not based on evidence and aspects of the proposed testing is not relevant to the aeronautical environment and would generate false fails of aeromedical significance.
34 Jeff Shanks – Milford Helicopters Ltd	Not acceptable	Not specified	<ul style="list-style-type: none"> • Submitter has never had problem flying with slight CVD (passed a lantern test for licence issue) • Australia has not had a problem with CVD pilots. • <i>“This proposed rule change is trying to fix something that is not broken.”</i>
36 Vincent D’Ath	Not acceptable	Not specified	<ul style="list-style-type: none"> • <i>“It is well known that there are many pilots operating safely with various levels of CVD in NZ and internationally. NZ CAA have (as far as we know) provided no evidence of any actual issues”.</i> • CAA is losing the trust between the industry and the regulator.
37 Ken McKee	Unclear	Not specified	<ul style="list-style-type: none"> • <i>“Why is CAA wasting valuable resources pursuing this matter when aviation authorities in other countries have considered and rejected colour vision restrictions such as proposed by this GD?”</i>

Submission	Is proposed GD acceptable?	GD paragraph	Discussion
38 Ian Andrews – NZ Aviation Federation Inc	No, but would be with changes	Not specified	<ul style="list-style-type: none"> • Support the submissions made by the CVA.
39 Ian Sowman	No, but would be with changes	Not specified	<ul style="list-style-type: none"> • CVD pilots should be tested under normal operational conditions and any problems caused by glass panels could be resolved by the “<i>manufacturer providing operator controlled colour options</i>” and then a practical operation test could be taken.
41 Bill Sisley – Sports Aircraft Association of NZ	No, but would be with changes	Not specified	<ul style="list-style-type: none"> • Support the submissions made by CVA as submitted by Ryan Brookes, briefly: <ul style="list-style-type: none"> ○ CAD test would introduce an unnecessarily restrictive regime on CVD pilots and there is no basis for this; ○ Three tier testing regime proposed by the CVA would “<i>be more closely aligned with current testing practices in use by other ICAO nations</i>”; ○ Concern about the objectivity of the current PMO and would like to raise concerns about his apparent divergence from recognised best practice.
42 Errol Smart – Air New Zealand Flying Club Inc	Not acceptable	Not specified	<ul style="list-style-type: none"> • Proposed GD is “<i>a galactic and unnecessary step away from the standards and procedures used safely and successfully by the USA and Australia.</i>” No statistical evidence to support proposal and proposal is arbitrary. • Flight operations in New Zealand are long past the infrequent use of NORDO operations at controlled aerodromes with the advent of numerous MBZ’s virtually all communication is achieved via radio. In the case of radio failure there are procedures and alternative means of communication. • Support the submission by the GAA.
43 Jeremy Ford – Canterbury Aero Club	Not acceptable	Not specified	<ul style="list-style-type: none"> • There is no evidence GD would improve safety and more evidence of this fact is required. • The GD should be put on hold until further evidence on the issue is gathered.
44	No, but would be with changes	Paragraph 9b	<ul style="list-style-type: none"> • FALANT AND NAGEL anomaloscope suggests that only a combination of these two methods is acceptable

Submission	Is proposed GD acceptable?	GD paragraph	Discussion
Dr Oliver Brock			as a non-routine testing. In continental Europe the FALANT is almost non-existent but the NAGEL can be widely found. The new wording should be FALANT <u>OR</u> NAGEL or NAGEL could be put in its own paragraph.
45 Josh Shotton	Not acceptable	Not specified	<ul style="list-style-type: none"> • <i>"I don't see why CAA believe this is necessary when we're already adequately tested for colour blindness at our medical examinations".</i>
46 David Wright	Not specified	Not specified	<ul style="list-style-type: none"> • My grandsons and I are unable to invest in a flying career because of the CAA's restrictions on CVD pilots: <i>"please allow me and future grandsons to pursue flying as a career".</i> • There are no known accidents from this condition.
47 Gavin Craig	No, but would be with changes	Not specified	<ul style="list-style-type: none"> • Objects to restrictions on CVD pilots generally and proposes the only licence restriction required to cover all CVD issues is for the aircraft to be fitted with a serviceable radio when operating within a control zone. • There is no evidence that the restrictions will improve safety.
47A Gavin Craig	No, but would be with changes	Not specified	<ul style="list-style-type: none"> • <i>"All restrictions expect that relating to having radio contact when operating within CTR's should be removed as this limitation covers all other issues";</i> • <i>"Historically, dispensation has been granted for CVD but in more recent times the conditions imposed on initial issue and medical renewals have become more restrictive".</i> • Prior to implementing these more restrictive conditions there needed to have been statistical evidence that CVD pilots are less safe. • Restrictions should be removed or pilots holding a medical with a CVD waiver have their medical endorsed in the same way as initial issue medicals. • There is at least one pilot holding a NZ medical with one eye. Individuals learn to mitigate physical limitations such that it has no effect on activities such as driving and flying.
48 Pat Scooter	Not acceptable	Not specified	<ul style="list-style-type: none"> • No empirical evidence that proposed changes will reduce accidents but will undoubtedly cause inconvenience and increase costs.
49	Not acceptable	Not specified	<ul style="list-style-type: none"> • Questions why New Zealand pilots are being disadvantaged by having restrictions on CVD compared to

Submission	Is proposed GD acceptable?	GD paragraph	Discussion
Andrew Schooler			<p>Australian pilots.</p> <ul style="list-style-type: none"> • There is no medical evidence to indicate CVD is an issue or that the standards are backed by evidence.
<p>50</p> <p>Des Lines – General Aviation Advocacy Group of NZ</p>	Not acceptable		<ul style="list-style-type: none"> • Request a moratorium on the proposed GD, pending outcome of an independent inquiry into the need for a GD and the motive behind this proposal. The submission process itself is flawed as it does not provide for confidentiality of submissions. • GD is a retrograde, discriminatory measure unsupported by evidence. It is denying career opportunities to aspiring pilots. • New Zealand should harmonise regulations on colour vision with Australia. • The IACO Manual of Civil Aviation states there is very little information that colour vision has any practical implications on aviation safety. The GD is not supported by any evidence that improves on the statement in the IACO Manual. The GD must be based on evidence-based reasoning. • PMO Dougal Watson has not disclosed what qualifications he has to justify his conclusion that CVD pilots pose a threat. Mr Watson should disclose his qualifications and we may seek an opinion from the Privacy Commissioner on the issue. • Following the outcome of the AAT’s O’Brien decision, it is submitted that CVD pilots must disclose to his employer “any person lawfully training, assessing, endorsing or re-endorsing him on an aircraft in respect of his Air Transport Pilot Licence, and other assigned flight crew members of his colour vision deficiency”. • Discusses the options for challenge of the GD: <ul style="list-style-type: none"> ○ MoT Aviation Medical Convener Review ○ Human Rights Commissioner ○ Judicial Review ○ Regulations Review Committee
51- Andrew King	Acceptable but would be improved if the following changes were made	11.5.1	<ul style="list-style-type: none"> • Validity of results for the Ishihara test should be indefinite and not valid only for one year.
		General	<ul style="list-style-type: none"> • Re-introduction of practical flight tests:

Submission	Is proposed GD acceptable?	GD paragraph	Discussion
52 - Cliff Marchant 53 - Steve Templeman 59 - Nick Withell			<ol style="list-style-type: none"> 1. Primary screening – failure of Ishihara test will require secondary screening; 2. Secondary screening – pass a screening method employed by ICAO nations will provide unrestricted medical certificate; 3. Practical flight test – satisfactory performance in a practical flight test, conducted by an authorised person or organisation approved to do so by the Director (typically the PPL or CPL flight test), will provide a medical certificate carrying the following pragmatic restriction: not valid for flight in the vicinity of a controlled aerodrome unless in radio contact with ATC. <ul style="list-style-type: none"> • Night or IFR privileges would still also require the appropriate flight test to be passed. • Advances in technology have rendered the requirement for normal colour vision to be outdated and unnecessary. • Previously New Zealand regulatory staff have accepted that the use of colour is largely superfluous and have allowed pilots to demonstrated competency by various means including practical flight test. • Current PMO is discriminating against individuals with impaired colour vision.
		10(3)(d)(i)	<ul style="list-style-type: none"> • Experience in Australia, South, US and NZ clearly shows that CVD pilots can operate aircraft safely.
		10(3)(d)(ii)	<ul style="list-style-type: none"> • Empirical evidence shows that pilots with CVD may operate aircraft at night quite safely. • PAPI is the basis for the CAD testing but not all night airfields have PAPI. It is a redundant aid that can be prone to errors. These errors contributed to the Fed Ex 1478 case. • The argument that CVD pilots cannot detect markers beacons is weak because marker beacons vary in colour and CVD does not impair the actual detection of the beakers. • Perception of air craft at night to avoid collisions does not require colour vision at all.
		10(3)(d)(iii)	<ul style="list-style-type: none"> • CVD pilots operate aircrafts perfectly safely whether VFR or IFR, day or night, Under IFR there is greater redundancy provided for traditional visual aids such as PAPI and marker beacons. On board instrumentation will replace the need for reference to aids such as PAPI or beacons in IMC.

Submission	Is proposed GD acceptable?	GD paragraph	Discussion
54 Munro Hockin – Air Rarotonga	No, but would be with changes	Not specified	<ul style="list-style-type: none"> • Supports the re-introduction of practical flight tests. The Director has in the past allowed CVD pilots to fly having successfully passed practical flight tests. • “<i>The proposed introduction of annual or further colour vision testing bears little relation to the current aviation environment</i>”. • Gives examples of two Rarotongan pilots who have CVD but are competent pilots.
55 Ben Johnson – Aviation and Occupational Health Unit, Air NZ Ltd	Acceptable but would be improved with changes	Subpart 1 at [10], [9]; subpart 2 at [11]; and Flowchart	<ul style="list-style-type: none"> • The CAD test is not named specifically in the Impaired Colour Vision GD and in the proposed amendments to the Flow Diagram. This is inconsistent and potentially confusing and requires the medical examiner to cross-reference other documents to confirm that the CAD test may be used. If the CAD test is acceptable to the director then this should be clearly stated.
			<ul style="list-style-type: none"> • Clarify required timing of routine colour vision screening examination in the GD and the Civil Aviation (Examination Procedures) GD Notice. Some readers have mis-interpreted the ‘Period of Validity’ for an Ishihara test as being the required frequency of colour vision screening. Clarity could be achieved by including a paragraph in the GD, subpart 1, prior to [6] stating that “<i>the time of routine screening tests for colour vision are outlined in the relevant schedules of the Timetable for Routine Examinations GD.</i>” A similar reference should also be included in the Examination Procedures GD, Part 2 at [6].
			<ul style="list-style-type: none"> • Clarify additional assessment options for CVD applicants where the outcome of assessment as a result of this GD is significantly more restrictive than an outcome under previous assessment. It would seem inequitable to deny pilots with an established safety record the opportunity of sitting some form of functional assessment to demonstrate they are able to safely operate an aircraft at the standard required by their applicable licence. • Noted that s 27B of the Act already provides the medical examiner with discretion to consider whether to issue a medical certificate on flexible grounds. • In the interests of fair, consistent and transparent treatment of applicants it is recommended that the question of practical flight testing be formally addressed through some parallel process. No objection, in principle, to the concept of practical flight testing. However if such testing is to be permitted all stakeholders will need to clearly understand: <ul style="list-style-type: none"> ○ Which individuals or organisations are authorised to conduct such tests;

Submission	Is proposed GD acceptable?	GD paragraph	Discussion
			<ul style="list-style-type: none"> ○ The standardisation of the content and conduct of the test; ○ The interpretation of the results; ○ The application of restrictions, or conversely entitlement to exercise privileges, arising from the test results. <ul style="list-style-type: none"> ● No opinion on the use of practical flight testing for assessing initial applicants, only current pilots.
<p>56</p> <p>Chris Adams – New Zealand Air Line Pilot’s Association</p>	<p>No, but would be with changes</p>	<p>Not specified</p>	<ul style="list-style-type: none"> ● Propose a competency based colour vision assessment. It relies on the opinion of Professor Barbur, from the City of London University, who gave evidence in the Administrative Appeals Tribunal hearing for John O’Brien that CVD pilots with experience of flying will likely have lots of cues to cope with problems from CVD. ● Concerned that the GD does not describe the manner by which the ‘alternate pathway’ for the issuance of a medical certificate is achieved under s 27B. There needs to be a defined pathway for the applicant to show competency under the alternate pathway. It is expected that this could be carried out in either a flight simulator or an aircraft with the ability to test both normal and abnormal flight procedures. Upon successful completion of any one of these flight tests, restrictions will be reduced to: <ul style="list-style-type: none"> ○ In the case of CPL, valid for CPL privileges only as or with a co-pilot; ○ In the case of ATPL holders. Valid for ATPL privileges only as or with a co-pilot; ○ In both cases, the other operating crew members must be informed of this restriction; ○ The practical operational test will only apply to the aircraft type, group or series upon which the test was conducted; ○ No two such restricted licence holders shall operate as a crew. ● <i>“It is expected that the description of this test should sit under CAA medical Manual 4.2 ‘Civil Aviation (Examination Procedures) General Direction”.</i> ● <i>“The use of these clinical and operational tests are in line with current CAA medical procedures”.</i>
<p>57</p>	<p>Not acceptable</p>	<p>Not specified</p>	<ul style="list-style-type: none"> ● We believe:

Submission	Is proposed GD acceptable?	GD paragraph	Discussion
John Nicholson – Aviation New Zealand			<ul style="list-style-type: none"> ○ <i>“The proposed CAD test is not warranted, and there is insufficient evidence of it representing an operational situation i.e. PAPP”;</i> ○ <i>“The use of a colour impaired test regime, in three parts, should be implemented”:</i> <ul style="list-style-type: none"> (1) Clinical Primary - Ishihara plate test. A failed test will result in secondary screening. (2) Clinical-Operational Secondary - all secondary screening methods used by ICAO nations shall be accepted for secondary screening. A pass will result in an unrestricted medical certificate. A fail will result in a third stage operational test. (3) Operational Thirdly - candidates who fail primary and secondary screening may demonstrate their ability to safely operate during a PPL, CPL, IFR or ATPL practical flight test conducted by an authorised individual or organisation approved to do so the Director. Upon successful completion of any one of these flight tests, restrictions will be reduced to: <ul style="list-style-type: none"> ➤ Not valid in the vicinity of a controlled aerodrome unless in radio contact with ATC; ➤ In the case of ATPL holders, valid for ATPL privileges only as or with a co-pilot. • Pilots will still need to pass a night flying test or an IFR flight test before flying in those conditions. • <i>“The proposed conditions are entirely consistent with those imposed in Australia in a recent Administrative Appeals Tribunal ruling and are considered to provide a satisfactory level of assurance to the CASA Director that a pilot will be able to safely pilot an aircraft at a given level of operation.”</i>
58 Stuart Clumpas	Not acceptable	Not specified	<ul style="list-style-type: none"> • <i>“I am firmly of the belief that a mild colour red/green colour deficiency makes absolutely no difference whatsoever to recognition of instruments in the cockpit, be it day time or night time.”</i> • Submitter states he has mild CVD and although he did fail a lantern test, he has not had problems flying.