Proposed Changes in U.S. Naval Aviation Color Vision Standards

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Conflict of Interest & Disclosures

• No financial interests or promises thereof in any products mentioned in this lecture

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• Opinions are the author’s, and not those of the US Gov’t, Dept of Defense, or US Navy

• No guarantee of accuracy in future approved aviation policies

• No off-label uses discussed or advocated
Color Vision in Naval Aviation

F-14A circa 1980

Proposed Boeing Upgrade F/A-18E/F
Color Vision in Naval Aviation

- Modern Aircrew color displays more complex (ex. P-8A Poseidon sonobuoy stations)
FALANT History

- Designed to pass mild color vision defectives to make up for manpower shortfalls in submarine duty (late 1940’s)

- Adopted for screening in Naval Aviation in 1950’s to supplement Pseudo-Isochromatic Plates (PIP)

- Optec-900: replacement for Farnsworth Lantern
FALANT / Optec 900
Problems

• FALANT insensitivity: allows moderate to severe CVD to pass occasionally\(^2,3\) (defined as “Color Unsafe” in USN)\(^1\)

• 35% of recorded FALANT scores in the fleet are incorrect\(^1\)
  – Improper timing, lighting, distance, recording
  – Coaching, cheating, easy memorization, not randomized

• 55% of CVD who were a true FALANT failure, had a “FALANT Pass” in their medical record\(^1\)

• Majority of Flight Surgeons are unaware that many CVD can pass FALANT – implications for SNA training failures & mishap investigations
DoDMERB: FALANT Phase out plan

- Dept of Defense Medical Examination Review Board – officer accession screenings for academies, ROTC, USUHS

- DoDMERB is phasing out FALANT completely
  - High Cost ($7000 each)
  - Difficulty training staff how to use properly
  - Change effects ALL services that utilize FALANT for screening new enlisted and officers (USN, USA, USCG)
  - Note: USAF has discontinued use of FALANT & PIP completely
CVD: Aviation Concerns

- Modern displays engineered only for “Color Normal” pilots and crew.\(^4\)
- CVD pilots react slower to aviation color signals, and make more mistakes than color normals \(^5\)
- CVD pilots: higher failure rate recognizing signal lights: 25\%, 68\%, 85\% (mild, moderate, severe)\(^{12}\)
- CVD pilots without restrictions have \(\sim 2.0x\) higher mishap rate than normals\(^{7,8,9}\) especially during night flights, approach and landing phases.
- Many published reports of military aviation near-misses and training failures due to CVD\(^{10,11}\) (incl those passing the FALANT but failing the PIP)
Color Vision: Proposed Changes

- Discontinue the use of the FALANT as an alternate means of evaluating color vision in aviation personnel. (Effective date to be determined)

- PIP to be the only authorized method of screening color vision in aviation personnel.

- Future applicants will still require passing PIP at 12 correct of 14 test plates
New Color Vision Standards: Policy Implementation

• Current students and designated aviation personnel who fail the PIP, but pass a properly performed FALANT, will be medically screened and recommended for color vision deficiency waivers with Flight Surgeon and C.O. concurrence.

• Waivered aviation personnel will continue to be monitored annually using the PIP.

• Significant changes in PIP performance will be referred to NAMI for further evaluation and computerized color vision testing.
Color Vision Policy: Future Trends?

- Continue research on what level of CVD is acceptable for military pilots and crew positions, with regard to multi-color displays.

- 1948, Sloan\textsuperscript{12} -- Different qualifying color vision standards should be selected to match the degrees of color discrimination required in military aviation.

- Someday begin the transition to computerized tests for aviation screening: objective, random, sensitive, long-term savings vice physical plates.
Vision fit for the rigors of battle, not just safety of flight...

- CAPT Philip Briska, NAMI Ophthalmology, 1985
References


2) Rings, Picken, NAMI research; CCVT validation study vs. PIP vs. FALANT vs. Nagel. (2013).


4) NATO WG-24, Operational Colour Vision in the Modern Aviation Environment


11) Ivan, D.J., Yates, J.T., (1994) In Search of the Abominable Coneman, Clinical Sciences Division, Brooks AFB

12) Sloan, LL, Comparison of Tests for Red-Green Color Deficiency, Aviation Medicine, Dec 1948