

NVIS Mods

Lessons Learned: Old and New



John Butler
ATI Engineering Services

Stir in some Navy



USS Wasp



HMS Rotterdam

Viper on goggles



Lessons Learned

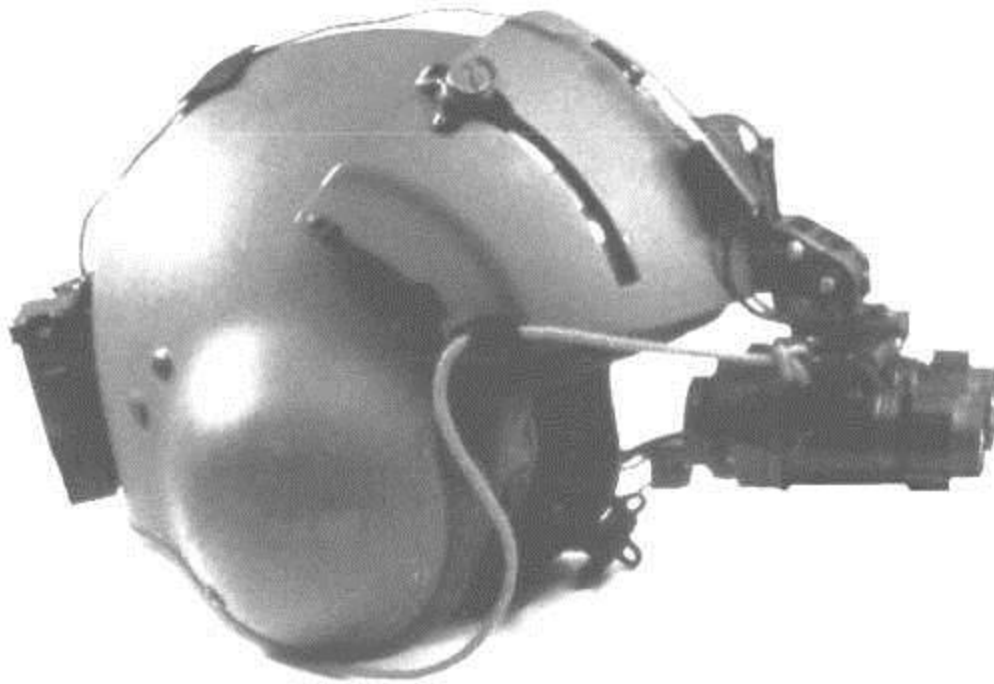
- We have come a long way from black tape and glow sticks.
- We have learned a lot along the way
- These lessons need to be applied to any good lighting mod
- This presentation is on those lessons learned
- But, first some basics. The Foot Stompers!

Foot Stompers



- 1. NVIS modification is mature technology.
BUT, it has to be done right**

Foot Stompers



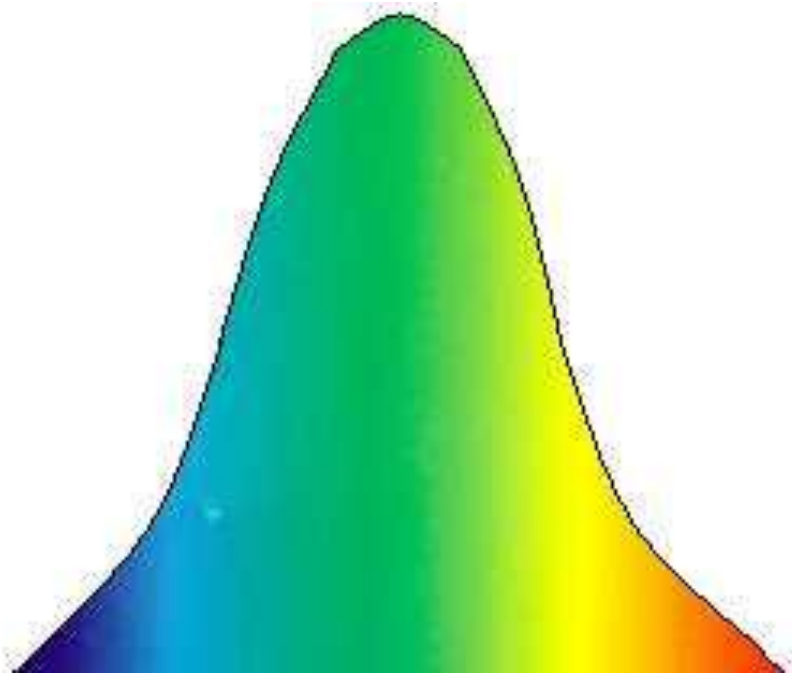
2. You look outside **THROUGH** the goggles
3. You look inside **UNDER** and **AROUND** the goggles

Foot Stompers



4. You have to have SOME illumination

Foot Stompers



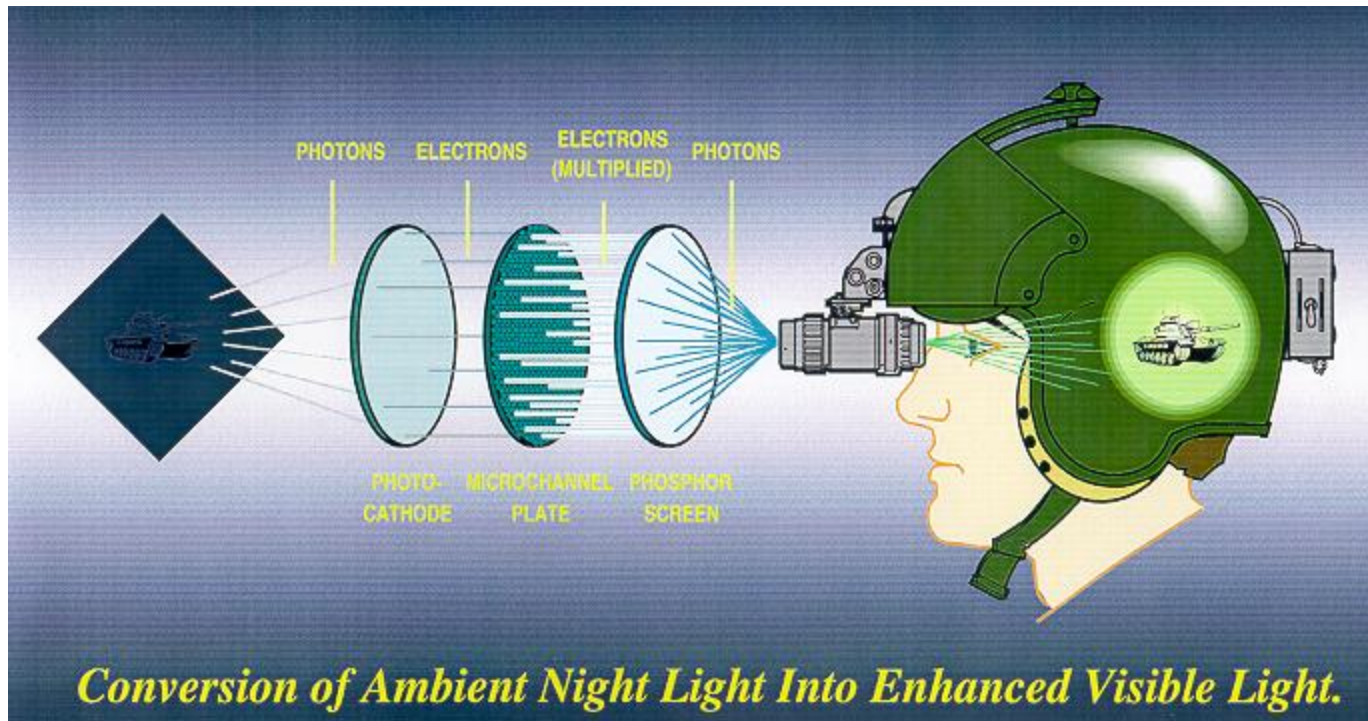
5. Green is your eyes' favorite color

Foot Stompers



5. Chem sticks and black tape can be hazardous to your health

Foot Stompers



6. When on goggles, your eyes are NOT night adapted

Foot stompers



7. Flying on goggles lets you use daytime tactics at night.

The Lessons



1. You have to treat **EVERY** light source

The Lessons



2. Daylight readability – this can be a real challenge. These instruments have to work in the bright sunlight as well as night.

The Lessons



3. Watch the Shadows

The Lessons



4. Watch the colors – especially the Reds.

The Lessons



5. No glare or cockpit reflections. Usually not a problem when wearing goggles, but more of a concern for unaided aircrew.

The Lessons



6. Cross cockpit viewing can be a problem

The image shows the instrument panel of a Cessna 441 Conquest II. At the top, there are two multifunction displays (MFDs) showing flight data. Below the MFDs are two rows of toggle switches and a central control knob. A large, curved metal handle is positioned below the switches. The bottom section of the panel includes a 'CABIN ALT' gauge with a 'RATE' indicator, a 'WARNING' light, and a 'COCKPIT VOICE RECORDER' section with 'TEST' and 'ERASE' buttons. The entire panel is mounted in a black frame with various labels and indicators.

7. Need to think thru follow-on support - how to replace that failed NVIS component

The Lessons

United States Of America
Department of Transportation - Federal Aviation Administration
Supplemental Type Certificate
Number SA00294BO

This Certificate issued to: ATI Engineering Services, LLC.
11 White Oak Lane
Woodbridge, CT 06525

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified herein meets the airworthiness requirements of Part 25 of the Federal Aviation Regulations.

Original Product Type Certificate Number: A24CE
Made by: Hawker Beechcraft Corporation
Model: B200GT, B200CGT, B360, B300C

Description of Type Design Change:
Installation of a Night Vision Goggle (NVG) compatible Lighting System in accordance with ATI Engineering Services Installation/Manufacturing Drawing List, Document No. IDL-090126, Revision 4, dated December 16, 2009, or later FAA-approved revision.

Limitations and Conditions:

1. Flight with NVGs is not approved by this STC. NVG operational approval must be secured by other means.
2. Operation must be in accordance with ATI Engineering Services Flight Manual Supplement (FMS) Document No. FMS-090126, Revision 1, approved December 16, 2009, or later FAA approved revision. The FMS must be carried in the aircraft during all flights.
3. Maintenance must be in accordance with ATI Engineering Services Instructions for Continued Airworthiness (ICA) Document No. ICA-090126, Revision 1, dated November 5, 2009, or later FAA approved revision. The ICA must be made available to the operator at the time of installation.
4. Compatibility of this design with previously approved modifications must be determined by the installer.

This certificate and the supporting data which is the basis for approval shall remain in effect until superseded, suspended, revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: April 08, 2009
Date of issuance: December 16, 2009

Date received: December 21, 2009
Date amended:

By direction of the Administrator

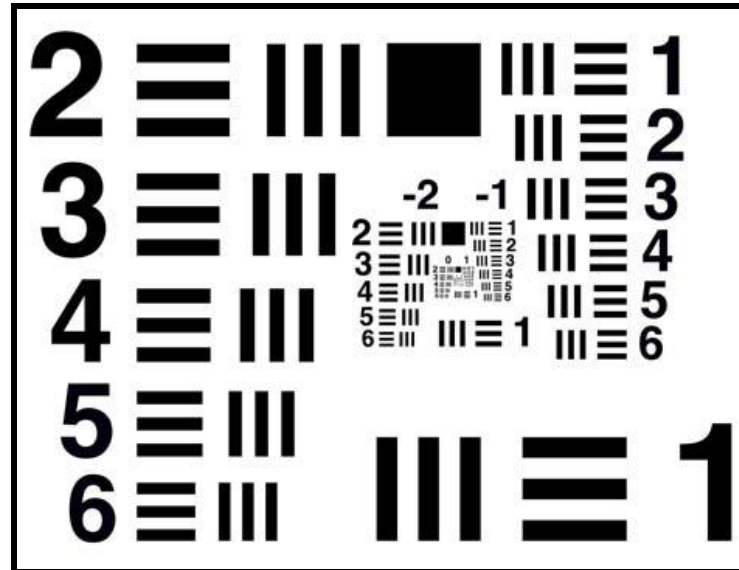
Robert G. Mann
Manager
Boston Aircraft Certification Office
(746)

Any extension of this certificate is payable by a fee of not exceeding \$2,500, or equivalent not exceeding 3 years, at such time as the certificate holder shall be notified by the Administrator of the Department of Transportation.

NVIS
Lighting
STC

8. Airworthiness is a big deal and bigger all the time.

The Lessons



9. The Goal is No goggle degradation – evaluate this aspect with the darkened hanger visual acuity chart evaluation

The Lessons



10. Covert exterior lights keep you from getting run over

**NVIS modification is mature
technology.**

BUT, it has to be done right.

Do it right - Enjoy the Night!



John Butler
ATI Engineering Services

