FEDERAL AVIATION ADMINISTRATION
AAR-100 (Room 907)
800 Independence Avenue, S.W.
Washington, D.C. 20591

Tel: 202-267-8758
Fax: 202-267-5797
william.krebs@faa.gov

September 27th, 2002

From: Vertical Flight Human Factors Program Manager
To: Vertical Flight Human Factors TCRG (POC: Lorry Faber ASW-170)

Subj: Inexpensive Night Vision Imaging System Field Evaluation Methodology Execution Plan

Ref: Vertical Flight Human Factors TCRG 5/31/01 meeting - requirement entitled "Inexpensive Night Vision Imaging System Field Evaluation Methodology"

1) Per reference, the "Inexpensive Night Vision Imaging System Field Evaluation Methodology" was ranked second by the Vertical Flight Human Factors TCRG. The requirement's objective is to "develop a low cost field device that will allow a non-night vision goggle user to measure night vision goggle compatibility of a modified cockpit."

2) The currently accepted practice for making a final determination of the compatibility of a lighting system with a night vision goggle (NVG) is to compare visual acuity through the NVGs with and without the lighting activated. The configuration for this procedure was developed by the military and requires relatively expensive illumination sources and radiometric measurement equipment (costs in excess of $100K). In addition, the military method has not been validated for repeatability or reproducibility. The RTCA organized a special committee (SC-196) to address the area. This committee has described one method for determining NVIS acceptability that is very similar to the method employed by the military, which uses relatively expensive equipment. Although this procedure developed by the military and supported by the RTCA committee is the only one proven to be safely employed as an effective evaluation process, applicants applying for NVG certification have the right to not use this method if another method is appropriately documented and justified. As a result, the FAA and DOD are concerned that alternate means of compliance that are suggested from applicants may not be totally proven safe and the FAA will be confronted with unverified alternative methods by applicants who cannot afford the expensive equipment that is used in the evaluation process developed by the military. Benefits to the FAA and the aviation maintenance industry include the identification of an alternative method to measure NVG cockpit

lighting compatibility that is as valid and reliable as the accepted military methodology.

3) The one year project will be executed as follows:

   Tasks to be completed:

   i. Completion of verified, calibrated, "cockpit" simulator. Design and fabricate a "cockpit simulator" to test existing military methodology for repeatability and to assess new, inexpensive evaluation methodologies. This task also includes development of any inexpensive illuminators and light measuring devices.
   ii. Completion of theoretically acceptable alternative methods. Develop theoretically valid methodologies to assess NVG compatibility.
   iii. Completion of laboratory validation studies of alternative methods. Laboratory validation of inexpensive NVIS evaluation methodologies.

4) Quarterly (December, March, June, and September) research progress status reports
   - Informal e-mail reports from the AAR-100 vertical flight human factors program manager to Lorry Faber (ASW-170)

5) FY03 annual report summarizing year's activities by grantee. This annual report including other human factors vertical flight projects sponsored by vertical flight TCRG will be electronically submitted to the committee.
   - Grantee will submit an annual report using AAR-100's Productivity Report website (http://www.hf.faa.gov/report/) to the AAR-100 vertical flight human factors program manager.

6) Deliverables:
   - Brief report discussing the results of the cockpit simulator, illuminator(s), light measuring device(s), and resolution chart(s) to be used in the study will be delivered to the FAA no later than July 31, 2002.
   - Theoretically workable methodologies for determining: 1) that the light environment for the testing is sufficiently dark to achieve valid test results, 2) that the resolution target radiance is appropriate to provide optimum NVG operation, 3) that visual acuity assessment can be made as reliably as the military method. These will be written documents, which will be delivered to the FAA no later than August 31, 2002.
   - Final report detailing results of repeatability testing for military accepted methodology and describing the alternative, inexpensive methodologies that provide the same results, which will be delivered to the FAA no later than January 31, 2003.

William K. Krebs