



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

January 14, 2003

From: Vertical Flight Human Factors Program Manager, AAR-100

To: Vertical Flight TCRG

Subj: VERTICAL FLIGHT HUMAN FACTORS FIRST QUARTER '03 REPORT

1) First quarter report for each project is listed below.

- a) NVG lighting requirement. The researchers have completed review of alternative visual acuity chart irradiance sources. Data collection is approximately 50% complete for methodology determining acceptability of darkness level of NVIS lighting evaluation facility. Data collection is approximately 80% complete for verifying alternative visual acuity chart. Data collection for pilot study of objective NVIS compatibility assessment is complete. So far, alternative charts and irradiance sources have been used in a field evaluation of NVIS lighting compatibility of an F-15 aircraft at St. Louis with positive results supporting validity of methodology.

The researchers are currently working on the following:

- Major NVIS lighting compatibility study using alternative methods has been planned, pilot study in progress, formal data collection to occur in December and January.
- Data collection for verifying darkness determination should be complete by end of December.
- Data collection for verifying alternative visual acuity chart should be complete by end of December.
- Report sections on alternative irradiance source in progress.

Indications are that there are minor risks to the activity being completed as planned, due to the holiday schedule the final report will be 30 to 60 days delayed.

- b) NVG resolution requirement. The researcher started the night vision device literature review as a first step towards detailing a contrast sensitivity function (in retinal terms) for various image intensifier devices. Next quarter, software will be written to allow implementation of device contrast sensitivity function and gamma characteristics.

All indications indicate that this project is on track to complete year 1 milestones.

- c) Simultaneous Non-interfering Operations - Quantify VFR Navigation Performance. The researchers progress for each task is listed below.

Task 1. Initial construction of simulation environment: As of the kick-off meeting the researchers had not yet determined the exact location for the test flights. STI reported at the 12/9 meeting that they had initiated discussions with UTSI about using the Tullahoma, Tennessee area. It appears at this time as though this be the likely venue for experimentation. The researchers have begun collecting raw digital data of the area. Only DTED level 1 is readily available. The researchers will now look at USGS about possibly obtaining better resolution through them. This will also likely apply to the satellite imagery. They should have an early prototype model available by March 1. They have identified a simplified rotary wing aircraft motion model that is freely available that we expect will be able to plug into our simulation architecture. Work on this integration will begin this month.

Task 2. Coordinate with TBD group who will be responsible for developing test plan and collecting helicopter flight data. We will provide eye tracker requirements and obtain information about the test location: The TBD group is STI. It appears at this time that eye tracking data collection in the aircraft will be much more problematic than it will be in our simulation. Therefore, it makes sense that design constraints on the eye tracker come from the aircraft and not the simulator. The researchers will monitor this issue to be sure that they do not make design decisions that will cause problems later.

Task 3. Build eye tracker for helicopter data collection: has not been reached as of the end of FY03Q1, although progress has been made. This delay is in part due to the fact that, for a variety of administrative reasons, no funds were available until very late in calendar year 2002. The current status of this project is as follows: all of the major mechanical, optical and electronic components have been selected, purchased, and received. These consist of a polycarbonate eyeshield frame, a thin glass "hot mirror", miniature cameras, a video "quad processor," a video time code generator with GPS input, and a miniature video recorder. The major work elements remaining to meet this milestone are: 1) mechanical integration of the head-mount; and 2) packaging the electronic components. Completion of these tasks is expected to occur in 3-4 months.

In order to complete task 3, the researcher needs to know the following answers to the below questions.

- Will the pilot subjects wear a helmet or headset? If so, does it interfere with proper placement of the eye-tracker headset?

- It is anticipated that a GPS receiver will be the best source from which to initialize the video time code generator. Will it be feasible to use the aircraft's built-in receiver? If so, what sort of cable/jack will be required? If not, can an additional receiver be integrated into the aircraft?

Indications are that there are minor risks to the activity being completed as planned, however these delays are attributed to the parallel contract not awarded and the inability to move the funds from government agency to government agency. I anticipate the program will be on track with the revised schedule (see attachment).

- d) Rotocraft Precision Visual Flight Rules Simultaneous Non-Interfering Human Factors Project. STI contractor completed preliminary coordination for agreement with University of Tennessee Space Institute (UTSI) to be used as a test site, and for the use of their aircraft and facilities (OH58 military surplus test aircraft). Initial coordination with Navy Postgraduate School in regards to simulation requirements and issues. Reviewed two recent Helicopter FAATC test plans for content, format, and style for application to PVFR/SNI Test Plan. Reviewed STI Market Survey and Technical Proposal for application to PVFR/SNI Test Plan.

STI is working on outline of Draft PVFR/SNI Flight Test Plan and background section of Draft PVFR/SNI Flight Test Plan. The contractor is on schedule to deliver the draft test plan by January 15, 2003 and the draft PVFR/SNI Flight Test Plan by January 31, 2003.

Status of Phase One Tasks (reference: Schedule(rev1).pdf): Tasks 3.1.1 through 3.1.5

- Task 3.1.1 through 3.1.5: *(No Change)*
- Task 3.1.6 - Test aircraft, subject pilots, test site coordination, and test equipment - 01Jan03 to 31Mar03 – *(Changed to extend 2 months – to 21 May 03. Explanation: Since we don't start Systems Installation and Integration until 01Jul03, this task can be extended for 2 months until 31May03 to allow coordination of high-end aircraft participants.)*
- Task 3.1.9: *(No change.)*

All indications indicate that this project is on track to complete year 1 milestones.

William K. Krebs