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From: General Aviation Human Factors Program Manager, AAR-100  
To: General Aviation Human Factors TCRG, (POC: Michael Henry, AFS-800)

Subj: "Comparison of the effectiveness of a Personal Computer Aviation Training Device, a Flight Training Device, and an airplane in conducting instrument proficiency checks" execution plan

Ref: (a) General Aviation Human Factors third quarter '02 report (08/12/02)  
(b) General Aviation Human Factors first quarter '03 report (01/10/03)  
(c) General Aviation Human Factors TCRG meeting (01/16/03)

1. Per references (a) – (c), an execution plan was drafted to meet the General Aviation Human Factors TCRG requirement. The project entitled "Comparison of the effectiveness of a Personal Computer Aviation Training Device, a Flight Training Device, and an airplane in conducting instrument proficiency checks" lacks a General Aviation Human Factors TCRG sponsored requirement even though it was co-funded by the Civil Aeromedical Institute (CAMI) and the Office of the Chief Scientist for Human Factors (AAR-100). Due to the 30% reduction in the FY04 Federal Aviation Administration research budget, the General Aviation Human Factors TCRG recommended that this project be reduced in scope in FY03-FY04 and completed in FY04 (reference c).
2. Although the project will be completed (reduced in scope from original proposal) next fiscal year, the General Aviation Human Factors TCRG requested the General Aviation Human Factors Program Manager to submit an execution plan. The purpose of the plan will allow the TCRG members to understand the purpose of the project, what research questions were addressed, and what will be the expected products and deliverables from the project.
3. The objective of this project is to "compare the performance of an instrument proficiency check (IPC) performed in a PC-based Aviation Training Device (PCATD), an Flight Training Device (FTD) and an airplane (IPC #1) with a second IPC in an airplane (IPC #2) to evaluate the effectiveness of the PCATD and the FTD in conducting an IPC flight. Parallel to these efforts, we propose to further develop and analyze performance measures derived from an airborne FDR as well as from

output data from the PCATD and FTD. These measures will allow us to examine in detail various aspects of pilot performance and identify particular strengths and weaknesses associated with the particular training devices (FAA Cooperative Agreement 2001-G-037).”

4. “Taylor, Lintern, Hulin, Talleur, Emanuel, and Phillips (1996) conducted a study to determine the extent to which a Personal Computer Aviation Training Device (PCATD) can be used to develop specific instrument skills that are taught in instrument flight training and to determine the transfer of these skills to the aircraft. A commercially available PCATD was used to teach instrument tasks to students enrolled in instrument training at the Institute of Aviation, University of Illinois. In order to evaluate transfer of training, the performance of a group of subjects trained in a PCATD (PCATD Group) and later trained to criterion on the instrument tasks in an airplane was compared to the performance of a control group of subjects trained only in the airplane (Airplane Group). For the PCATD Group, all new maneuvers and procedures were introduced and trained to proficiency in a PCATD prior to training to proficiency in the airplane. For the Airplane Group, all new maneuvers were introduced and trained to proficiency in the airplane. Comparisons of trials to criterion in the airplane for the two groups, their times to complete each flight lesson in the airplane, and their course completion times were used to assess the training effectiveness of the PCATD. The data from this study indicated that the PCATD was an effective training device for teaching instrument tasks. Transfer savings were generally positive and statistically significant when new tasks were introduced (FAA Cooperative Agreement 2001-G-037).”
5. The original proposal planned for a total of 105 subjects (35 subjects in each group; FTD, PCATD and airplane) to be used in the study. Due to the General Aviation TCRG recommendation (ref c), the project will be reduced to 25 per group and the elimination of front-end remedial training.
  - a. Brief Description of Technical Approach: A total of 75 instrument pilots will participate; 25 pilots will be assigned to each of the three groups, the FTD (Frasca), PCATD, and airplane groups. Each participant will receive a familiarization flight in each of the FTD, the PCATD and the airplane prior to assignment to one of the three experimental groups, and will be assigned among experimental groups to maintain balance between the three currency categories (current, within 1 year of currency; greater than 1 year from currency). Participants will be given an initial IPC in the device to which they have been assigned, and subsequently they will receive a second IPC in the airplane (Beech Sundowner). Participants will be required to refrain from instrument flight following the first IPC until they have completed the second IPC, and will also agree not to use a PCATD or FTD for instrument flight during this period. It was anticipated that some participants who were more than 2 years out of currency might require additional training to prepare them for the IPC, and to this end 6 hours of training was to be equally distributed between the FTD, PCATD, and airplane. However, this training has been eliminated

in response to the significant reduction in the budgets for FY '03 and '04, and, as such, the use of participants greater than 2 years out of currency will be greatly restricted or eliminated.

- b. Quarterly (December, March, July, and September) research progress status reports: Informal e-mail reports from the general aviation human factors program manager to General Aviation TCRG.
- c. Interim six-month reports: interim report will be distributed to the General Aviation TCRG.
- d. Annual Report: Grantee will submit an annual report using AAR-100's Productivity Report website <http://www.hf.faa.gov/report/>

6. Deliverables:

- i. Report on findings of the of an instrument proficiency check performed in a PC-based Aviation Training Device, an Flight Training Device, and an airplane (IPC #1) with a second IPC in an airplane (IPC #2) to evaluate the effectiveness of the PCATD and the FTD in conducting an IPC flight.
- ii. Recommendations on the strengths and weaknesses associated with the particular training devices in conducting an IPC flight.

7. Schedule:

<u>Task</u>	<u>Date</u>
Identify Subject Pool	FY 2002, Q1
Complete Check Pilot Standardization	FY 2002, Q2
Begin Experimental Testing	FY 2002, Q2
Interim six-month report	FY 2002, Q2
Interim six-month report	FY 2002, Q4
Interim six-month report	FY 2003, Q2
Interim six-month report	FY 2003, Q4
Complete experimental testing	FY 2004, Q1
Prepare data file	FY 2004, Q2
Complete analyses	FY 2004, Q2
Interim six-month report	FY 2004, Q2
Final Report	FY 2004, Q3