17 May 2010

Trip Report
Department of Defense
Human Factors Engineering Technical Advisory Group
(DOD HFE TAG) Meeting #63 – Tempe, Arizona
03-06 May 2010

The 63rd meeting of the DoD HFE TAG was held in Tempe, Arizona and hosted by the Air Force Research Laboratory (Warfighter Readiness), Mesa, Arizona.. The meeting was chaired by Mr. Darren Cole, Edwards Air Force Base, CA. (darren.cole@edwards.af.mil). The theme of the meeting was ***Readiness for the Future.*** Approximately 100 people attended the meeting, representing Office of the Secretary of Defense (OSD), Army, Navy, Air Force, NASA, FAA, Coast Guard, Sandia National Laboratory, Dept of Homeland Security, National Research Council of Canada, academia, several human factors-related technical societies and industry associations Additional personnel representing industry and academia attended as invited speakers. Selected briefings from TAG-63 will be available on the DoD HFE Tag website: http://www.hfetag.com/.

Five items are attached:

- DoD HFE TAG Background, attachment (1)
- TAG-60 Theme, Attachment (2)
- Program Summary, attachment (3)
- DoD HFE TAG Operating Board, attachment (4),
- TAG attendees, attachment (5) <to be provided when available>
- DoD HFE TAG Policies, attachment (6)

Monday 3 May 2010 Plenary Session Presentations

The DoD HFE TAG Chair for the 63rd meeting, Mr. Darren Cole, welcomed attendees to the meeting and elaborated briefly on the meeting theme, Readiness for the Future. He mentioned that the next meeting (TAG-64) would be hosted by NASA and the theme would be "Perspectives on HSI in Space-Industry and Government." The keynote speaker was then introduced.

Dr. Dee Andrews, US Air Force, 711th Human Performance Wing, Mesa AZ.

Dr. Andrews spoke on "***Accelerated Learning and Long Term Retention of Expertise***." The Defense Science and Technology Group (DSTAG) is the highest policy maker for DOD. The question is: What is accelerated learning and should the DOD invest in it? The goals of accelerated learning are faster attainment of skills and knowledge, and, better retention. Currently, training is characterized by quick learning of simple content for low financial investment. The goal is quick learning of complex content for low financial investment, with periodic refreshers. COIN (counter-insurgency operations) was used as the focus for a study of accelerated learning. Training was provided for COIN irregular warfare and stabilization operations. Example tasks included dynamic planning & re-planning, interpersonal skills. Accelerated learning principles were developed. The goal was to train Army Captains to think like an O6 commander (full Colonel).

Generally, results of the study (three week duration) were positive. However, some paradoxes exist:

- accelerated learning may adversely affect retention
- accelerated learning in one area may be negative for other areas
- accelerated learning may result in lack of readiness for task performance

LT COL Joel Boswell, Chief-Warfighter Readiness Research Division and Commander-Mesa Research Site. Lt Col Boswell welcomed the TAG attendees to the greater Phoenix area and provided a "***Warfighter Readiness Research Division Overview Brief.***" Laboratory Directorates include:

- Space Vehicles
- Directed Energy
- AFOSR
- Propulsion
- Munitions
- Human Effectiveness
- Sensors
- Information
- Air Vehicles
- Materials and Manufacturing

Two hundred twenty people work in the Division, with half being contractors and half being civilians. The employees are in 28 different disciplines, including psychology, mechanical engineering, physics, electronics engineering, computer science, and aeronautical engineering. Employees have lots of interaction with other Air Force activities, DOD, international organizations and contractors. The Warfighter Readiness Research Division places emphasis on the decision environment and focuses on three areas:

- Immersive environments (focusing on the technologies)
- Cognitive modeling
- Continuous learning (focusing on automated performance tracking)

Future directions will emphasize tailored training – providing training only when and where it is needed. Because of BRAC, the laboratory programs will shut down on 11 May and relocate to a new 45,000 square foot facility in Dayton.

Dr. Cynthia Null, NASA Safety and Engineering Center and Technical Fellow for Human Factors. Dr. Null spoke on "***Human Factors Challenges for New Air Traffic Management***." The next generation air traffic management system is a cooperative project by DoD, FAA, NOA, DHS and NASA. Some of the ways that human factors can impact design:

- Human performance modeling
- Maintain safe operations with new technologies
- Define human information needs
- Measure design impacts on human performance
- Provide solutions without limiting system designs
- Leverage human capabilities while limiting human error

The next generation Air Traffic Control (ATM) system will have unprecedented automation, a mix of different equipment, be accomplished in a series of upgrades, present significant opportunities and challenges, and require constant training/re-training in a 24/7 environment. Terminal areas are recognized for their complexities and these areas will receive attention in the following areas: better weather prediction, more corridors, better flow management, separation assurance, continuous descent approaches and better traffic surveillance. Automation will focus on the following areas:

- Automated separation assurance
- Dynamic task reallocation

- Tailored arrivals
- Dynamic airspace configuration
- Off-nominal events and automation

A major challenge will be to integrate information into the Future Terminal Workstations (FTWS). In summary, the human factors emphasis areas will be on error reduction, automation WITH human involvement, and improving the performance of manned systems.

Dr. Ellen Haas, Chief-Translational Neuroscience Branch, US Army Research Laboratory-HRED, RDECOM. Dr. Haas spoke on "***Human Robotic Interaction: Preparing Ourselves for What Lies Ahead***." The Translational Neuroscience laboratory emphasizes moving technology from the laboratory to the battlefield. The current Soldier-to-Robot ratio is 2:1. A more semi-autonomous robotic capability may yield a Soldier-to-Robot ratio of 1:1. Two programs underway at HRED are: SOURCE (focusing on safe operations for unmanned reconnaissance systems) and IMOPAT focusing on improved mobility and operational performance through automation technology). Another area of current emphasis is on swarm control. It was mentioned that Boeing is currently flying 10 to 20 unmanned systems in swarms on the US west coast). HRED research is looking into how operators should interact with swarms and… at what level should operator interaction occur? HRED has developed a display for Soldier-swarm interface using a multi-modal workstation. Audio, spatial audio, tactile display and visual display is used. Topics being explored include:

- Geo-spatial maps for swarm behavior, heading, direction
- Swarm health information such as speed, dispersion, swarm strength and capability
- Status and warning information (e.g., swarm splits, blocks, loss of numbers)

An experiment was conducted using a secondary task to see how well Soldiers could perform in monitoring swarms. Conditions were: visual display only, visual plus audio, visual plus tactile and visual plus tactile plus audio. Soldier performance was better for all conditions when visual was combined with other display modalities. This is an area where more research is needed; joint service research is being planned as are studies examining heterogeneous swarms.

LCDR Henry Phillips, MSC, USN, Department Head - Operational Psychology, Naval Aerospace Medical Institute. LCDR Phillips spoke on "***The Future of Aviation Personnel Selection***," and addressed two issues: why personnel selection matters, and, how the US Navy uses it. The Navy Aerospace Experimental Psychologist community began with AEP #1 Dr. Alan D. Grinsted in December 1941. The Navy established its personnel selection project in Pensacola FL using an aviation classification test and flight aptitude rating. The Navy maintains a high level of selection performance by concentrating on selection measure validity, reliability, utility and fairness. The cost of doing a poor job of personnel selection becomes apparent through increased accession and training costs, increased job performance failure rates and increased rate of mishaps and lives lost. The military services currently use the following instruments:

US Navy:	ASTB, Aviation Selection Test Battery (Series E)
US Army:	AFAST, Alternate Flight Aptitude Selection Test
	SIFT, Selection Instrument for Flight Training
USAF:	Test of Basic Aviation Skills
	AFOQT, Air Force Officer Qualification Test
	PCSM, Pilot Candidate Selection Method

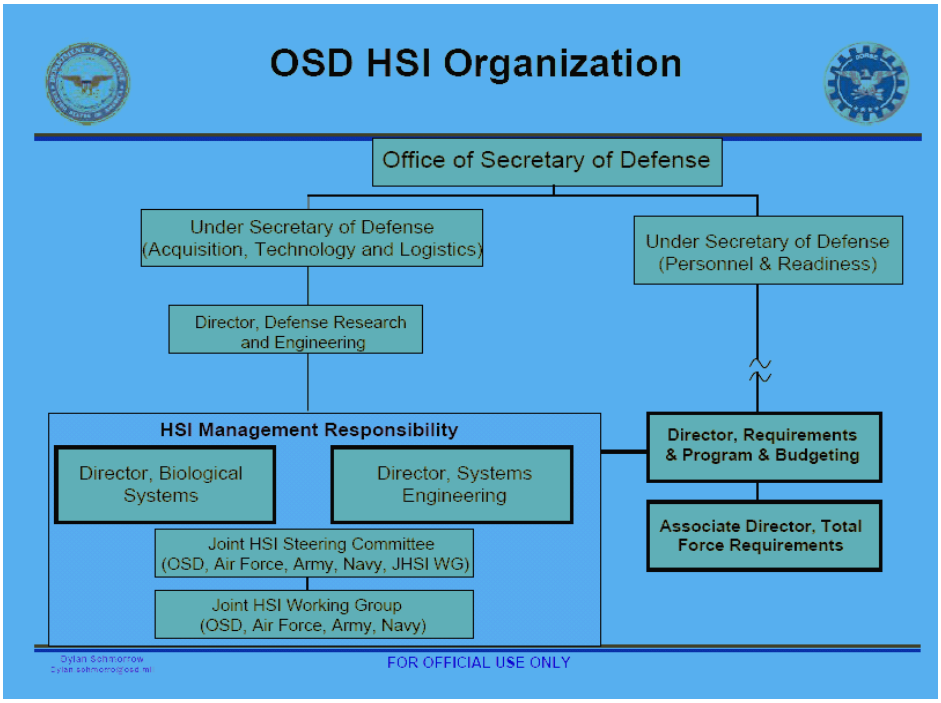
The following abilities are measured by selection tests: cognitive ability, mechanical comprehension, spatial ability, job knowledge, dexterity, divided attention, perceptual speed and accuracy. In the private sector, a variety of tools are used, ranging from personality tests (including the MMPI), clinical evaluations, and neurological psychological baselining. In foreign country military services (notably Israel and Germany), up to seven days are used for assessment, including multiple interviews and group exercises.

In the near future, testing will move towards web-based techniques, computer-based testing for reaction time and computer-adaptive testing. Emerging areas of concern include: standardization, testing security and control of content. APEX addresses these concerns. APEX is administered by a single office and anyone can use it if accepted. Existing problems with APEX include: web quality of connections can impact download speeds. Other issues include settling the issue of whether UAS operators must come from the aviator pool or not. Existing good predictors of UAS flying performance include grade point average and performance on video games. The current status is:

- Computer-based testing is the norm
- Web-based testing is becoming more popular
- Testing is moving beyond cognitive ability

CAPT Dylan Schmorrow, MSC, USN; Acting Director-Bio Systems, DDR&E.

CAPT Schmorrow (dylan.schmorrow@osd.mil) provided a current view of the Human Systems programs in the DoD. The Bio-Systems office fits into OSD as shown in the following figure.



A search has been launched for a replacement for Dr. Foster; it is estimated that the search will take about six months. The Bio Systems name may change to reflect more of the human performance aspects. Current key challenges include:

- **Shift in Technical talent base:** shift to foreign technology, shift from DOD to commercial

- **Increasing pace of innovation**
- **Small Business Innovation Research (SBIR) project sponsorship**
- **Cognitive readiness**
- **Human Social and cultural research**

CAPT Schmorrow is looking for assistance from military, civilian and industry TAG members.

Tuesday-Wednesday, 4-5 May 2010
SubTAG Meetings Attended at the DOD HFE TAG:

Technical Society/Industry SubTAG. The Technical Society/Industry (TS/I) Sub TAG met twice during the TAG meeting on Tuesday and Thursday morning. Ms Barbara Palmer (Booz Allen Hamilton, barbara_palmer@bah.com) served as the TS/I SubTAG chair. The first topic addressed build upon a topic raised at the last TS/I meeting in November 2009, "How to keep the TS/I SubTAG and the TAG relevant and visible." The discussion focused directly on how the TS/I could support the Acting Bio Systems Director. A list of proposals was developed (these were later discussed with CAPT Schmorrow by the TS/I chair).

* TS/I could participate in authoring the new DoD HFE TAG "memorandum for record." The original 1976 memo probably did not describe the support currently provided by the technical society and industry sub group.
* TS/I could increase its role vis-à-vis participation by academia in DOD HFE TAG meetings and activities. The TS/I could contact local universities in advance of TAG meetings to encourage participation by key faculty and students. The TS/I HFES representative has access to information regarding which colleges and universities have programs in human factors engineering; this would be helpful in targeting interested schools.
* The TS/I could continue its advocacy of increased DOD guidance to industry in the HSI area (a Dr. Foster initiative in 2005). With a Data Item Description (DID) approved and in use for HSI Program Plans and another DID for HSI Reports in preparation, the last remaining issue is development of a DOD HSI Handbook. The USAF effort to translate UK DEF STAN 00-250 to an Air Force Handbook provides an opportunity to encourage Army and Navy HSI proponents to expand the effort to include ships, ground vehicles and other systems. This DOD handbook would be much appreciated by industry at large.
* The TS/I could make DoD HFE TAG Plenary session presentations as requested by the Executive Committee and Operating Board.
* The TS/I could survey its member technical societies and industry organizations on topics of interest to the Executive Committee and Operating Board.
* The TS/I would appreciate the opportunity to participate as appropriate in DOD Joint HSI Working Group meetings (and present to HSI Steering Group) in order to provide a "voice" from industry representatives.
* TS/I members could also be available to participate as requested in international HE/HSI forums such as TTCP, NATO.

Mr. John Rice, representing the Society for Simulation in Healthcare, made a short presentation explaining the purpose of this society. The Society for Simulation in Healthcare (SSH) was established in January 2004 to represent the rapidly growing group of educators and researchers who utilize a variety of simulation techniques for education, testing, and research in health care.

The membership, now over 2,000, is united by its desire to improve performance and reduce errors in patient care using all types of simulation including task trainers, human patient simulators, virtual reality, and standardized patients. It is a broad-based, multi-disciplinary, multi-specialty, international society with ties to all medical specialties, nursing, allied health paramedical personnel, and industry. SSH promotes improvements in simulation technology, educational methods, practitioner assessment, and patient safety that promote better patient care and can improve patient outcome.

Human Factors Standardization (HFS) SubTAG: The Human Factors Standardization SubTAG meeting was chaired by Mr. Alan Poston (aposton86@comcast.net).

- MIL-STD-1472: The tri-service group completed efforts on MIL-STD-1472G. According to Mr. John Lockett (ARL-HRED), it was submitted to editing and publication about four months ago; it is expected to be complete with that process by July 2010, at which time it will be circulated for military service and industry association review and comment. This means that the final review should take place in late summer 2010.
- An approach to integrate HCI design criteria into MIL-STD-1472: Mr. Brian Shaw (The Aerospace Corp, brian.e.shaw@aero.org). A strong USAF policy statement was recently signed by a Lt. General for SMC to re-vitalize HSI standards, including MIL-STD-1472, MIL-STD-882, COE UIS 4.3, EIA HEB1-A. Ajoy Muralidhar (NSWC Dahlgren) mentioned that the US Navy has recently released a new standard on HCI.
- MIL-STD-2525D: The new revision is scheduled to be released in March 2011. The objective is to reorganize the document and significantly shorten it. Jake Wetzel at NAVSURWEPCEN Dahlgren is the primary point of contact.
- NASA Standard 3001: NASA Space Flight Human Systems Standard http://msis.jsc.nasa.gov
- FAA Standards: The FAA plans to update their Human Engineering standard by 2013.
- MIL-STD-46855: Interest has been expressed in resurrecting MIL-STD-46855. The plan is to roll anthropometry information in DOD-HDBK-763 into the Standard and then cancel the handbook. This must first be approved by the Defense Standardization Council. Al Poston has briefed the DEPSO on this and received a positive response.
- DIDs: The US Navy is currently custodian of the HEPP and HSIPP DIDs. Army is custodian for the remaining DIDs.
- Index of Government Standards: The latest update by Mr. Poston is now complete.
- UK Defence Standard DEF STAN 00 250 Conversion to USAF Reference Document: William Kosnic (711th HPW) reported that DEF STAN 00 250, released in May 2008 is being converted into a USAF reference document under contract to SURVIAC (Booz Allen Hamilton). Following publication, the USAF may pursue conversion to a DOD or international standard.
- DID for Human Systems Integration Report: Mr. Steve Merriman (The Boeing Company, stephen.c.merriman@boeing.com) updated the draft Data Item Description (DID) for a Human Systems Integration Report that was presented at TAG-62. Four comments were received and the draft DID was updated to incorporate them. Hard copies of the updated DID were distributed to attendees. Al Poston requested that Mr. Merriman circulate the updated draft DID to the Standardization SubTAG membership one more time.

Human Factors in Training SubTAG: The meeting was chaired by Peter Crane (AFRL) and Brooke Schaab (JFCOM). The first speaker was Dr. Bob Nullmeyer, Air Force Research Laboratory (Robert.nullmeyer@mesa.afmc.af.mil), who spoke on ***"Lessons Learned from Air Force Predator Training and Operations."*** We are at an "inflection point' now, moving from manned to unmanned aircraft. Predator and Reaper unmanned aircraft has accumulated over 200,000 flight hours. The biggest human factors issues with these systems are inadvertent operations and task mis-prioritization. Initially, UAS operators were experienced USAF pilots. Undergraduate pilots are now going to UAVs. And, the Air Force is currently exploring the use of candidates with no flying experience (in Beta test). The Air Force is also looking at the positives from taking civilian pilots and leveraging skills gained through playing computer games for sensor operators. The University of North Dakota received funding from Congress to stand up a UAS training center. The Air Force may use this facility as a research center to explore the efficacy of different training approaches.

The second speaker was David Keller (Naval Surface Warfare Center), who spoke on "***Can System-wide Trust in Multiple Automation Aids be Trained Out***?" In today's complex environments there are just too many tasks to accomplish within limited time so automation is employed; however, automation isn't perfect. Trust in automation can range from general to specific. Operators either evaluate each component of automated systems or they assign a system-wide reliability. An experiment was conducted to explore how operators assign trust. With two automated aids, one perfect and one 70% reliable, the whole system was judged to be 70% reliable. With both aids being 70% reliable, overall system reliability was judged to be even lower. When subjects were told the exact reliability of each aid, the tendency to assign low overall system reliability was reduced.

The third speaker in this session was Dr. John Stewart, US Army Research Institute (ARI) (john.e.stewart@us.army.mil), who spoke on "***US Army UAS Training Issues: Case of the RQ-B7 Shadow***." In the Army, UAS proponency was recently transferred from the Military Intelligence (MI) to the Aviation (AVN) branch. Although the shift is now complete, there is a training gap. The amount of training on military intelligence topics is still high. It is currently unclear to what degree UAS operators can execute tactical AVN missions. UAS operators need t be able to think like Scout helicopter pilots/aircrew. It is unclear if the Brigade Combat Team (BCT) leadership really knows how to optimally employ UAS. Although training is via AVN, the Shadow is flown by MI personnel in the BCTs (each BCT is composed of 3000 men and 100 air vehicles). Since 2004, UAS accidents have been treated as aviation mishaps. Previously, they were considered to be ground accidents (evidently because UAS operators work on the ground). As ground accidents, UAS mishaps were not investigated very thoroughly, so mishap causes were not well known and accident statistics were not normally kept. Performance benchmarks for UAS operators are nearly non-existent now. The Shadow is poorly integrated into the BCT and commander knowledge regarding optimal utilization is poor.

The next speaker was Chris Forsythe, Sandia National Laboratories (jcforsy@sandia.gov), who spoke on "***Enhanced Training Effectiveness Using Automated Student Assessment***." Interestingly, 50% of the work conducted at Sandia Laboratory is now funded by the DOD. Chris Forsythe discussed the Automated Expert Modeling and Student Evaluation (AEMASE) system. He described a situation wherein SMEs demonstrated desired behavior in a simulator or instrumented environment. Machine learning techniques are used to construct a model of expert

behavior. During training, the student is provided with feedback on how far his or her performance deviates from expert performance. AEMASE tracks details of student performance.

The next speaker was Dr. Wallace Wulfeck, Space and Naval Warfare Systems Center (wally.wulfeck@navy.mil), who spoke on "***Retention and Re-training of Complex Skill***." [Co-authors of this presentation were CDR Jack Thomas, USN – Commander, Patrol Squadron Four and others.] Since the 1970s, the P-3 has been the US Navy's primary Anti-Submarine Warfare (ASW) platform. The fleet is now down to only 55 aircraft and 12 squadrons. Radar and Electro-optical (EO) systems have been adapted to other missions. The P-3C is good at mast and periscope detection and it is also good at Intelligence, Surveillance Reconnaissance and Targeting (ISR&T). This has degraded skills on ASW tasks. Area commanders can task and re-task P-3 crews. IN ASW, acoustics and sonobuoys are used. Sonobuoys deploy hydrophones to various depths in patterns. Pattern shapes and numbers of sonobuoys are fully planned out before initiating missions. ASW is a tough job – Target properties and environments (water temperature, salinity, reflectivity, etc.) interact. P-3C crews usually have 11 members including Naval Flight Officers (NFO), Anti-submarine warfare specialists, Flight Engineer and pilots. A six-level difficulty index is used to categorize the different levels of complexities of submarines, environments, etc.

ASW tasks are complex because they are: abstract, multivariate, continuous, non-linear, dynamic, simultaneous, conditional, uncertain, and ambiguous. Training takes a very long time (about 2.5 years) to ensure proficiency, including initial training, individual and team training. Retention of complex task skill is difficult. The following statistics attest to how perishable this skill is:

Abilities:	Losses over time:
Recall of task knowledge:	21 % after four weeks
	50% after 52 weeks
Discrete skills:	50% after eight to 12 weeks
	70-80% after 52 weeks

Decision aids and support tools have been developed to assist operators in flight (ATAP). These are used after crews have been doing ISR&T missions for several weeks. These decision and job aids have reduced the time to train to criterion by six to nine months. In a controlled experiment against real submarines, performance was good (performance was at criterion level six months early). Very few people any more have had a chance to work against a real submarine.

The last speaker was Dr. Lisa Scott Holt, Lumir Research Institute, Air Force Research Lab, Mesa, AZ lisa.hold@lumirresearch.com), who spoke on "***FoCuS Windows: Evaluating the Impact of Dynamic Fidelity on Performance.***" The question being investigated was: Does more dynamic fidelity yield more effective combat training? Motion based simulator studies during the 1970s concluded that motion is not necessary to pilot training. But today, with a better understanding of motion and perception, possibly that conclusion was reached prematurely. Performance and subjective are being collected examining this area; data analysis is on-going at the current time.

Design Tools and Techniques SubTAG: Mr. Steve Merriman (The Boeing Company, stephen.c.merriman@boeing.com) chaired the DTT SubTAG meeting on 5 May 2010. The meeting was attended by 25 participants. During the business portion of the meeting, Steve solicited nominations for a DTT Co-chair. Dr Patty Jones (NASA, Ames) nominated Dr. Michael Feary (Aerospace Technologist at NASA Ames). The motion was seconded and the confirmatory

vote was unanimous. Dr. Feary will co-chair future meetings with Mr. Merriman. There were no changes made to the SubTAG charter. Four technical presentations were made, as follows:

Title: Rapid Prototyping Tools to Design Next Generation Military Rotorcraft Cockpit Displays and Controls. The presenter was Robert A. Faerber, The Boeing Company, Mesa, AZ (Robert.a.faerber@boeing.com). This briefing highlighted tools and processes used by The Boeing Company's Advanced Rotorcraft Systems and Apache Modernization Programs to research, design, and test alternative human-machine interface display and control concepts for next generation military rotorcraft. Key problem areas being addressed are:

- Increasing crew workload
- Aircrew information overload
- Establishing and maintaining Situation Awareness (SA)
- Cognitive decision making under stress
- Optimal integration of advanced human–computer interface technologies and control of unmanned systems

The presentation described Boeing crew station design philosophies and selected methods used to design and assess advanced interfaces, including:

- Advanced Rotorcraft-Rapid Prototyping Mission Simulation (AR-RPMS),
- Desktop simulations
- Portable simulation devices to capture design concept feedback from end users

Apache AH-64D Simulator

AH-64D Apache Aircraft

Title: Apache Longbow Lighting. The presenter was Dennis L. Schmickley, Technical Fellow, The Boeing Company, Mesa, AZ (dennis.l.schmickley@boeing.com). The AH-64D Apache Longbow represents a huge technological advance from previous versions of the rotorcraft. The AH-64D has an integrated interior lighting subsystem and an integrated glass cockpit design which includes color addressable-matrix liquid crystal display (AMLCD) multipurpose displays (MPD). All of the displays and the interior lighting subsystems have been designed to be night vision imaging system (NVIS) compatible to MIL-L-85762A. This was achieved by treating all light emitting devices as a total system controlled by a single design document for the interior lighting and consistent performance requirements in display procurement specifications. The AH-64D has a new exterior lighting system that will meet the visual requirements of Title 14, Code of Federal Regulations (CFR) Part 29. The presentation focused on describing AH-64D lighting systems, displays and challenges. Some of the outstanding features of AH-64D lighting systems including coordination and balance of instrument lighting, panel lighting, flood lighting, NVIS lighting and instrument-alerting system lighting. Other features that help to optimize lighting include selecting lettering fonts and stroke-

to-width ratio to optimize readability, implementation of log luminance dimming (as opposed to linear luminance). Challenges include optimal integration of new LED technology.

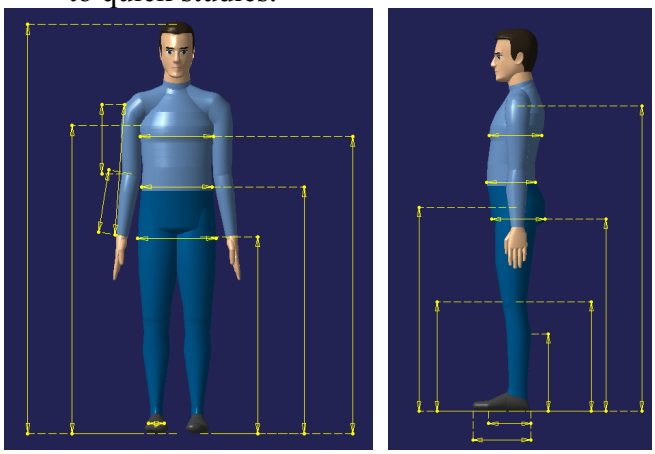
Title: Minimizing the Learning Curve: Using Parallel Workflows to Model C2 Systems. The presenter was Cadet Joseph Grimm, US Military Academy, West Point, NY. Advisor: Dr. Ericka Rovira (Ericka.rovira@usma.edu). Current command and control (C2) systems suffer from poor user interface designs; one reason is that the systems are not well matched to the operator's mental model. As a result, these systems:

- Are complicated and difficult to learn and use
- Limit overall user effectiveness
- Prevent the user from optimally using all system capabilities
- Lack interoperability

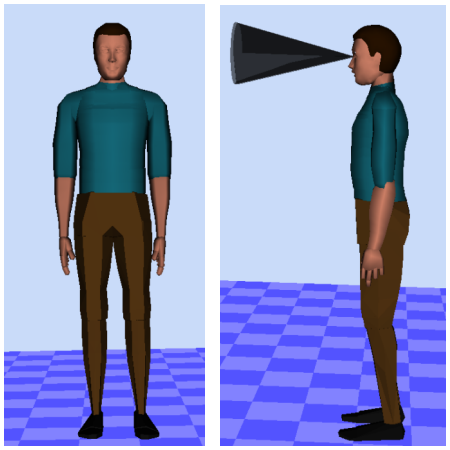
The Mitre Corp determined that the following thread is needed to satisfy an operator's objectives and priorities: **alert**, track, discuss, **sense-making** and report, with alert and sense-making being the most important. Non-government systems that accomplish alerting and sense-making were surveyed. Facebook and Weatherbug were identified as non C2, non-Government systems that perform alerting. MS Excel and Google Maps were identified as non C2, non-Government systems used for sense-making. Testing was performed to gather preference and objective performance data. It was determined that C2 software applications that are similar to programs used every day (e.g., MS Excel, Facebook) are learned more quickly and that more features of the C2 application are used.

Title: Human Modeling in Support of Operator/Maintainer Workspace Design. The authors were Christian J. Rossi and Stephen C. Merriman, The Boeing Company, Dallas TX. The presenter was Stephen C. Merriman (stephen.c.merriman@boeing.com). Human models are useful tools in assessing anthropometric compatibility between users and their work spaces. In conjunction with design standards, human models can help the human engineer evaluate physical and visual access, posture/strength/fatigue, tool envelopes, and impacts of gloves, clothing and equipment. The presentation:

- Reviewed high-end viewers (such as Catia-Delmia Human Model V5) for its capabilities to represent the wide variety of human sizes/shapes, analysis times, and ability to affix tools for maintainer manipulation.
- Contrasted low-end viewers (such as VisJack) that may be less capable but are well-suited to quick studies.



Catia-Delmia Human Model V5



VisJack Human Model

Human models vary considerably in capabilities and performance. They are extremely useful but can't do everything alone; use of standards (e.g., MIL-STD-1472F) is still essential. Human models can be very powerful tools in making a case for change with design teams and management. Human Models are most useful in conjunction with maintenance procedures; actually, model use often leads to procedure development.

Human Factors Test and Evaluation SubTAG. The first presentation was by Chris Parker, BMT Designers & Planners, Inc. (cparker@dandp.com), who spoke on "***Human Factors Engineering Survey and Risk Assessment for Operational Test and Evaluation of the USCG Response Boat, Medium (RB-M).***" The US Coast Guard is replacing its current 41ft. RB-M; the 142 current boats are capable of 25 knot speed. The acquisition process for replacing these boats began in 2005. There was little HFE done during design. USCG OT&E required that an HFE assessment be conducted and a total of six weeks was allocated for this assessment. The assessment covered safety, efficiency, maintainability and crew health. The method consisted of:

1. Familiarization. Documentation was reviewed, mostly on the boat being replaced. A heuristic assessment was also made against ASTM-1166. A usability assessment was done, observing missions to assess the crews' abilities to perform required tasks. The baseline boat is slow, loud, easily maintained, and smells of diesel fumes. The new boat is fast, drive-by-wire with a seat-mounted joystick, shock-mitigating seats, quiet and air conditioned. It was decided that the usability assessment would include man overboard, towing, boarding and anchoring.
2. Methodology: Developed Human Factors risk assessment criteria for human performance risk levels (based on MIL-STD-882 risk matrix)
3. Findings:
    a. Most areas for improvement:
        i. COTS equipment not in compliance with Human Engineering standards
        ii. Labeling problems
        iii. Alarms are not informative
        iv. Speed (speed awareness cues are absent)
    b. Highly rated areas:
        i. Habitability
        ii. Layout
        iii. Physical access
        iv. Speed (contributes to mission performance)
4. Results: Risks fall out as follows:
    a. High Values (1-5) = 1 item
    b. Serious Values (6-9) = 9 items
    c. Medium Values (10-17)= 18 items
    d. Low Values (18-20)= 8 items
5. Recommendations: (not presented)
6. Conclusions: Using both Heuristic and Usability assessments is a good approach. Human Performance risk assessment provided context for issues and priorities for the customer to determine where to put mitigation emphasis.

The second presentation was by Adrian Salinas, USAF 711th Human Performance Wing (Adrian.salinas@brooks.af.mil), who spoke on "***Investigations of HSI in Air Force Test and Evaluation***." Humans are still" at the heart" of complex systems. JCIDS documents must contain HFE/HSI requirements. The T&E community should ensure:

- Early involvement of the test community
- Requirements are called out and stated in a manner to ensure they are testable
- The right people are included on the Integrated Test Teams
- Requirements are capability-based (not specification-based)

On 28 January 2010, a Joint T&E/HSI Workshop was held. Recommendations included:

- There is a need to guide development of testable requirements
- HSI requirements should be inserted into T&E guidance documents
- HSI testing should be linked to other tests
- Measurement methods should be improved
- Approaches should be established that emphasize usability shortfalls

The next presentation was provided by Ms. Laura Strater, SA Technologies, Inc. (laura.strater@satechnologies.com), who spoke on "***Using Situation Awareness Requirements to Evaluate Systems Impact and Specify Systems Requirements***." This project was conducted for NASA and the FAA. The object was to examine the Optimized Profile Descent. "NextGen" goals are to increase capacity and throughput of the National Air Space (NAS) by two to three times by 2018, increase safety, reduce environmental impact (e.g., noise, emissions), and increase user access to the NAS. This represents a huge challenge:

- Increased use of automation and decision aids
- Extended terminal area separation standards
- 4-D aircraft trajectory management
- Dynamic airspace configuration

The goal of the work was to assess the impact of a few of the listed improvements. Nine goals were established for flow management. They examined the impact of new capabilities (e.g., flying precise routes with minimal level-offs during descent). The impact on each goal was determined for each of the people involved (e.g., pilot, tower operator). The implications of the new capabilities for information requirements were studies. A comprehensive approach was developed for the development and assessment of requirements, including SA principles and requirements.

The next presentation was by Ms. Lori Brattin, Naval Air Systems Command (Code 4.6.5.4) (lori.brattin@navy.mil), who spoke on "***NAVAIR Human Systems Digital Human Modeling Program***." The current process for determining aircrew accommodation is per NAVAIRINST 3710.9D. A FARO arm is used to map crew stations, with the main products being Anthropometric Restriction Codes (ARCs) that are used to help match aircrew to cockpits. Thirty aircraft crew station s have been mapped using this technique. Three technical reports have been published along with three internal technical memos. There are currently three areas of concentration:

- Update Anthropometry Data: ANSIR 1988 is the current database.
- Scanning, Modeling and Animation: The priority is on using models that can be updated easily.
- Digital Human Models: The goals are to save time, ease data collection, use boundary cases and increase safety.

Dr. Claire Gordon (US Army, Natick Soldier Systems Center), Greg Zehner (USAF) and Bruce Brattmiller (AnthroTech, Inc.) are consulting in this effort. Direct Dimensions Inc. will assist with selecting the scanning equipment to be used. The University of Iowa is participating with their SANTOS model. The following improvement areas are being investigated for SANTOS:

- Base SANTOS avatars on anthropometric data

- Restraint effects
- Positioning and Posture
- Validation
- Clothing and Equipment Impacts
- Cushion Effects

Other areas of investigation include Design for Maintainer (DFM), dynamic environments, emergency egress simulations and mockup/simulator design.

The last presentation in the session was by Robert Abbott, PhD, Sandia National Laboratories (rgabbot@sandia.gov), who spoke on "***Adaptive Systems for Human Factors Engineering.***" This effort is being conducted as a part of the ONR effort exploring "Trainable Automated Forces." The touch-and-go landing task was selected as an example. The goal was to teach the systems what behaviors "look like" and then to define those behaviors. The system could then examine all data looking for certain occurrences. The 'target' behaviors can then be refined and selection criteria can be "tightened up." [However, tightening up selection criteria increases the risk of not finding reasonably similar events]

Workload and Stress SubTAG. This meeting was co-chaired by Dr. Julie Stark and CAPT Dylan Schmorrow, MSC, USN and organized by LT Jeff Grubb. The first presentation was by Dr. Chris Forsythe, Sandia National Laboratories, who spoke on "***Physiological Indicators of Skill Acquisition.***" With simulation-based training, objective measures of student performance provide an observable means to assess competency. However, it would be beneficial to be able to look inside the student's head to determine whether a successful exercise was accomplished with relative ease, or required the student to muster every resource. Likewise, in comparing student to expert performance, physiological profiles provide a complementary measure to objective assessments. In particular, where experts exhibit low levels of arousal and students exhibit high levels while producing criterion levels of performance, it may be that the student has not truly mastered the required skills and their learning will be brittle when placed in a stressful situation. In contrast, where experts exhibit high levels of arousal and students low, it may be that the student does not appreciate critical facets of a task or they have been overwhelmed and have largely given up. The presentation summarized work by Str. Petersburg State University and funded through ONR-Global to investigate physiological indicators developed and deployed in Russia to address these issues. Results were presented from a recent study that found statistically significant better performance for students trained using arousal measures to target training to individual needs.

The second presentation was by LT Antonio Anglero, MSC, USN, Naval Aerospace Medical Institute, who spoke on "***Internal Process Strategies for Stress Mitigation***." Stress mitigation strategies are at the forefront of human performance research. A great deal of investigation is being done to find technological tools that can help the person achieve optimal levels of performance. However, there are cognitive strategies that should not be overlooked. The field of sport psychology has yielded strategies to enhance performance of athletes who are expected to compete with only protective gear and limited equipment. Military personnel, much like professional athletes, are constantly looking for an edge, something that will assist them in achieving their current mission objectives. This presentation discussed one concept of how stress affects performance, common strategies fused to obtain and maintain optimal performance, a measure used to quantify the effects of such techniques and the use of Visual Motor Behavior Rehearsal (VMBR) as a strategy. When cognitive approaches are combined with technological

advances, we will not only see a war-fighter who is consistently operating at optimal levels, but we can expect to see a shift up in the Yerkses-Dodson curve.

The third presentation was by LT Jeff Grubb, MSC, USN, Naval Aerospace Medical Institute, who spoke on "***Multi-tasking Performance and the Prediction of Flight Training Success."*** Naval Aviators and Naval Flight Officers are commonly required to perform multiple perceptual, cognitive, and psychomotor tasks simultaneously and under stressful conditions. As such, the ability to do so is a defining characteristic of a good aviator. In principle, a test that can measure how well and individual can simultaneously perform multiple tasks that mimic commons aviation tasks should be able to predict how likely that individual is to succeed in aviation training. The results from a validation study of the PBM test, a psychomotor and multitasking test that will be part of the next version of the Naval Aviation's Aviation Selection Test Battery. Although different metrics in the PBM predict flight school grades for Student Naval Aviators and Student Naval Flight Officers, interaction effects that were expected to specifically index multitasking ability in high workload situations were not significant. Results were discussed in terms of challenges for developing tests that predict how well candidates can cope with high workload situations.

The fourth presentation was made by Dr. Jennifer M. Riley, SA Technologies, Inc. (Jennifer@satechnologies.com), who spoke on "***SA-oriented Training in Virtual Reality and Games: Improving Cognitive Readiness Through SA Measurement and Feedback on Results.***" The increasing complexity of military systems requires that warfighters acquire more knowledge and complex skills and that training is implemented quickly, easily, and flexibly – anytime and anyplace. Virtual reality and game-based technologies facilitate practice in high fidelity simulated environments that engage trainees and promote a sense of virtual presence while they learn. While commonly accepted as valuable tools for learning, there are important research and design challenges that exist with regard to ensuring transfer of training from simulations to real operations. Researchers have highlighted specific limitations, for example, the failure to include instructional elements that relate to key skills of the training domain (Salas and Cannon bowers, 1997) and the lack of valid and objective measures of human performance (Wright, et al, 2004). SA Technologies has conducted ongoing research with ARI on training SA through feedback in after-action reviews following virtual and game-based military training exercises. This presentation introduced the Virtual Environment Situation Awareness Review System (WESARS), which is designed to promote situation awareness (SA), a core competency in many military and civilian operations, through comprehensive measurement of SA and meaningful feedback on SA results. Training of SA can help build key SA skills and abilities, making it easier for warfighters to develop and maintain SA in real operations, and as such reduce the cognitive load and stress associated with SA in complex and dynamic operations.

The last presentation was made by Dr. Robert S McCan, NASA Ames Research Center, who spoke on "***Linking Real-time Operator Behavior to Subjective Workload Ratings: Houston, We Have a Problem!"*** On next-generation deep space missions, astronauts are going to have to perform many more operations autonomously than they do in today's missions, where ground support is available virtually instantaneously. The workload associated with these operations will have to be carefully controlled in order to avoid overload and underload situations that can compromise crew performance. This presentation discussed issues relating to associating workload with real-time task performance measures, such as task accuracy, task latency, and

number of information acquisition activities, with the goal of being able to empirically measure workload in real time, as opposed to doing so with after-the-fact ratings.

Human Factors in Unmanned Systems Interest Group. Mr. Ajoy Muralidhar, Naval Surface Weapons Center, Dahlgren, VA (ajoy.muralidhar@navy.mil) chaired this session. The first presentation was by David Frye, Navy Explosive Ordnance Disposal Division, Naval Sea Systems Command (david.s.frye@navy.mil), spoke on "***Logistics Support Challenges for EOD Unmanned Systems***." Mr. Frye is a retired Navy Senior Master Chief. The US Navy funded efforts to identify new technologies to improve logistic support for the Joint Service EOD community. There are currently 2034 unmanned systems and 25,900 depot-level repair parts in 170 non-theater sites. The Catalog Ordering Logistics Tracking System (COLTS) was modified to manage inventory. The system is web-based and incorporates IUID (barcode) recognition. Failures are logged and charted. When failures are seen to be increasing, the responsible contractor is contacted and requested to investigate the problems, identify and implement corrective actions (design changes). Units returned to inventory after repair incorporate the re-designed parts. This approach has been effective in managing EODE logistics support. In theater, EOD robots are maintained at 95% operational availability. Each EOD team has two robots. In response to a question about UAS, Mr. Fry responded that it is more difficult to figure out what has failed since the UAS generally breaks up when failures occur.

The second presentation was by Sylvain Bruni, Aptima, Inc.(sponsored by ONR) who spoke on "***Mixed-initiative Machine for Instructed Computing (MIMIC)***." Mission planning depends on human decision making. Cognitive processing and capacity are limited. How do planners plan? How do we understand what planners do? MIMIC captures planning actins and infers planning goals and strategies. Experimental validation showed successful this to be a successful training protocol. Two modes of planning:

- Training Mode: Planners plan and algorithms learn, MIMIC fine-tunes the goal inference. This is based n a database of many past planning tasks.
- Real-time Mode: The client sends planning action data to MIMIC. Goal inference MIMIC forecasts (in real time) operator actions based on identified goals and strategies.

Three experiments were performed. The first focused on identifying planning constraints – weather, planning duration, matching UAS capabilities, duration of monitoring, mission start/end times and fuel use. The second experiment compared MIMIC-identified and operator-identified priorities. The finding was that there was a significant correlation with participant rating data. The third experiment served to determine if MIMIC could predict planning actions.

The next presenter was John A. Plaga, Human Performance Integration Directorate, (john.plaga@wpafb.af.mil), who spoke on "***711th HPW Human Performance Wing-Research, Analysis and Consultation for UAS.***" The 711th HPW contains three directorates: Human Effectiveness, USAF School of Medicine, and Human Performance Integration. The Human Performance Integration Directorate is concerned with the application of HIS principles to operational capabilities. It determines what is and isn't working and it ensures that adequate HIS requirements are inserted into acquisition documents such as the ICD and DCD. The UAS revolution coincided with the USAF "push" to integrate HIS into the acquisition process. There are currently lots of commands, groups, and agencies responding to UAS needs (e.g., Global Hawk, Sentinel Hawk, Predator, Reaper, MQ-X). The directorate is providing support in task analysis, front-end analysis, IMPRINT modeling and simulation. The directorate is also focusing

on the development of UAS workstation guidelines for accommodation. They have down-selected to eight multi-variate anthropometric cases based on overall size, torso height, limb length, thigh size and other measurements. If a workstation accommodates all eight anthropomorphic cases, 99% of users would be accommodated. Other areas of directorate focus include: fatigue/stress research, operator selection, head/eye tracking (to feed IMPRINT models), and training. Most current efforts are focused on ground station control, including: usability, accommodation, seat upgrades, improved displays, rudder pedals, automation and SA analysis.

At the end of the session, Ajoy Muralidhar reviewed some of the recent public laws dealing with unmanned systems. A few of these are listed below:

- Public Law 106-398 set goals: By 2010 1/3 of aircraft in the operational deep-strike force aircraft fleet shall be unmanned (Note: UAS hours are about 33% currently). By 2015, 1/3 of operational ground vehicles will be unmanned.
- Public Law 109-364 (from FY07): There is a requirement for the development of any manned system for "certification that an unmanned system is incapable of meeting program requirements."
- Public Law 111-84 (Fy-10) requires the DOD to develop a plan to expand UAS access to the National Airspace.

The point is that…momentum is building and HSI needs to be ready to meet the challenges!

User-Computer Interaction SubTAG: Not attended.
Controls and Displays SubTAG: Not attended.
Sustained/Continuous Operations (SUSOPS/CONOPS) SubTAG: Not attended.
Personnel Selection and Classification SubTAG: Not attended.
Human Modeling and Simulation SubTAG: Not attended
Human Factors in Extreme Environments SubTAG: No meeting was held.
System Safety/Health Hazards/Survivability SubTAG. No meeting was held.
Human Factors Engineering/Human Systems Integration: Management and Applications: Not attended.

Thursday, 06 May 2010
DOD HFE TAG Operating Board Meeting:

Discussions:

- The DHS, FAA and NASA were invited to host TAG meetings.
- DOD Techepedia needs more information in it.
- The goal should be to hold TAG meetings in the DC area every three to 5 years.
- Increased emphasis needs to be placed on helping new attendees to feel more welcome; mentorship should be encouraged.
- The November meeting date should be changed to de-conflict with elections and the change in the fiscal year.
- It was recommended that the meeting format be changed from a 3-track to a 2-track format in order to increase the attendance at each SubTAG meeting.
- A comment was made that too many contractors attend the meetings (no action taken).

- It was suggested that TAG SubTAG meetings be extended to Thursdays to afford more time.
- Major panel sessions (like held at the Key West TAG meeting) are very popular and should be encouraged.

Service caucuses and SubTAGs briefed their attendance numbers, charter changes, leadership changes and significant issues.

Caucus Reports:

DHS: DHS could possibly host TAG-67.
USAF: Bill Kosnick was elected as chair of the USAF.
USN: Suggested DC for the location of TAG-66. New caucus chair is LT Jeff Grubb.
Army: Discussed the theme for the TAG-65, possibly at Natick, MA.
FAA: Discussed bringing in a new Caucus lead.
NASA: Discussed the possibility of conducting training at the November 2010 meeting and tours at Ames Research Center. Tour participants at NASA Ames must be US citizens.

SubTAG Reports:

Controls and Displays: 5 speakers, new chair elected.
Design Tools and Techniques: 25 attendees, no changes in charter. Dr. Mike Feary elected as co-chair
HSI: 3 speakers and 21 attendees.
Extreme Environments: NASA presentations this meeting
Modeling and Simulation: 19 attendees, 5 speakers. Emphasis was on synthetic environments.
Standardization: Lots of documents in review.
T&E: 36 attendees, 5 presenters. Two issues discussed: HSI policy documentation involving T&E, and, writing verifiable requirements.
Training: 27 attendees and 6 papers.
Modeling and Simulation: 9 attendees; new chair elected
Personnel Selection: 16 attendees, 3 presentations. LT Pete Walker elected as the new chair.
Sustained/Continuous Ops: 12 attendees and 5 speakers.
Safety/Health Hazards/Survivability: Didn't meet. Faith Chandler (NASA) to chair.
UCI: John Taylor is the new chair.
Workload and Stress: 30 participants

Interest Group Reports:

Cognitive Readiness Interest Group: 31 participants
Mission Performance Interest Group: Attendance was poor at this meeting (too much competition from other groups)
Unmanned Systems Interest Group: There were two sessions, with 21 and 27 attendees. Four presentations were made and a new charter was drafted and distributed for comment.

Comments from CAPT Schmorrow (TAG Proponent):

1. The civilian billet issue has been addressed by Daniel Wallace.

2. STEM – A response has been drafted.
3. Service-Oriented Architecture: This had been assigned to Dr. Bob Smillie (retired)
4. Memo for Record: An update is needed for the MOR that established the TAG.

Other comments:

- HSI has blurred at DDR&E between Research and Systems Engineering. Nick Torrelli and Stuart Booth are the principal leads on the Systems Engineering side. The HSI oversight group is co-chaired by Nick Torrelli and CAPT Schmorrow.
- Themes are being solicited by CAPT Schmorrow for SBIRs

Submitted by:

Stephen C. Merriman
DOD HFE TAG, TS/I Credentialed Representative of EIA, SAFE and AsMA/HFA
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ATTACHMENT (1)

DOD HFE TAG Background

The DoD HFE TAG was begun via memorandum of agreement signed by the Service Secretaries in November 1976. Goals of the TAG were established as follows:

- Provide a mechanism for exchange of technical information in the development and application of human factors engineering.
- Enhance working level coordination among Government agencies involved in HFE technology research, development and application.
- Identify human factors engineering technical issues and technology gaps.
- Encourage and sponsor in-depth technical interaction, including subgroups as required in selected topical areas.
- Assist as required in the preparation and coordination of Tri-Service documents such as Technology Coordinating Papers and Topical Reviews.

The TAG addresses research and technologies designed to impact man-machine system development and operation throughout the complete system life cycle. Topics include:

- Procedures for use by HFE specialists, system analysts and design engineers in providing HFE support during system development and modification
- Methodologies to identify and solve operator/maintainer problems related to equipment design, operation and cost/effectiveness
- Mechanisms for applying HFE technologies, including formal and informal approaches to validation and implementation, and the determination of time windows for application.

The TAG comprises technical representatives from Government agencies with research and development responsibilities in the topical areas mentioned above. Additional representatives from activities with allied interests affiliate with the TAG as appropriate. Technical experts in special topic areas may augment attendance at specific meetings. Also participating in the TAG are official representatives of technical societies (e.g., Human Factors and Ergonomics Society, SAFE Association) and industrial associations (e.g., Government Electronics and Information Technology Association) with a stated interest in HFE. These representatives may attend subgroup and general plenary sessions and they must be credentialed by the TAG prior to attending any meetings.

To facilitate detailed technical information exchange, the TAG is composed of committees and subgroups, or "SubTAGs." Committees are established to address specific issues or problems and are disestablished upon completion of their tasks. SubTAGs address problems of a general or continuing nature within a specific field of HFE technology. Membership in SubTAGs and committees may include non-government personnel involved in research, development and application. Attendance by non-government individuals is possible if the person is either sponsored by a government agency or if accepted by the TAG chair prior to the meeting. Chairing of the various subgroups and committees is rotated among the Services, NASA, FAA, DHS and TS/I members, as provided in individual charters.

The current sub-groups typically meeting at the HFE TAG meeting were as follows.

Sub-TAGs:

- **Controls and Displays/Voice Interactive Systems**
- **Design: Tools and Techniques**
- **HFE/Human Systems Integration: Management and Applications**
- **Human Factors in Extreme Environments**
- **Human Factors in Training**
- **Human Factors Standardization**
- **Human Factors Test and Evaluation**
- **Human Modeling and Simulation**
- **Personnel Selection and Classification**
- **Sustained/Continuous Operations Core Competencies**
- **System Safety/Health Hazards/Survivability Core Competencies**
- **Technical Society/Industry**
- **User-Computer Interaction**
- **Workload and Stress**

Affiliated Groups:

- **Mission Centric Human Performance Measurement Interest Group**
- **Unmanned Systems Interest Group**
- **Cognitive Readiness Interest Group**

ATTACHMENT (2) Meeting Theme

Readiness for the Future

It is imperative that our nation be ready to respond to the future, whether it's planned or unexpected, special activities or major events. Human performance is vital to maintaining readiness and overall system performance. Ensuring our nation's responders are provided systems and equipment optimized for their use is the main purpose of HFE and HSI practitioners. Most all of us, in one way or another, are involved in the acquisition of systems with the purpose of making the systems better for the operator, maintainer, and system support personnel. Attending the TAG is a great way to learn and participate with working groups that are making these positive impacts. What have you or your organization done to prepare for the future, whether your efforts are for influencing current projects in acquisition, research, and development efforts, or assisting future projects through defining requirements? What can we do to prepare ourselves for what lies ahead concerning future technology, and leverage that technology to accommodate the operators and maintainers? Are you ready for the challenges? Are you ready for the future?

--Hosted by the US Air Force --

ATTACHMENT (3)

Department of Defense
Human Factors Engineering Technical Advisory Group
Meeting #63: 3-6 May 2010 Tempe, AZ

Monday, 3 May
0800 – 0930 Executive Committee Meeting
0930 – 1000 New Member Orientation
1000 – 1130 Unmanned Systems Interest Group
1130 – 1300 Luncheon break
1300 – 1700 Plenary Session
1500 – 1530 Networking, Coffee
1800 – 2000 Mixer

Tuesday, 4 May
0730 – 0830 Technical Society/Industry
0730 – 0830 Cognitive Readiness Interest Group
0730 – 0830 Mission Centric Human Performance Interest Group
0830 – 1100 Human Factors Test and Evaluation
0830 – 1100 Workload and Stress
0930 – 1000 Networking, Coffee
1100 – 1230 Luncheon Break
1230 – 1430 Human Factors Standardization
1230 – 1430 User-Computer Interaction
1430 – 1500 Networking, Coffee
1500 – 1700 Controls and Displays
1500 – 1700 Human Factors in Training
1500 – 1700 Human Factors Engineering/Human Systems Integration: Management and Applications
1715 – 1830 Service Caucuses

Wednesday, 5 May
0745 – 1100 Tour of Mesa Labs/AFRL
1100 – 1230 Luncheon Break
1230 – 1430 Design: Tools and Techniques
1230 – 1430 Personnel Selection
1430 – 1500 Networking, Coffee
1500 – 1700 Human Modeling and Simulation
1500 – 1700 Sustained/Continuous Operations
1500 – 1700 Unmanned Systems Interest Group
1830 – 2100 Social
1900 – 2000 Local HFES Chapter Meeting

Thursday, 6 May
0830 – 1000 Operating Board
1000 Adjourn

* The Human Factors in Extreme Environments and System Safety/Health Hazards/Survivability subTAGs are not meeting at TAG-63.

ATTACHMENT (4) **DOD HFE TAG Operating Board**

Executive Committee

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Controls and Displays

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Human Factors Engineering/Human Systems Integration: Management and Applications

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Workload and Stress

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ATTACHMENT (5) DoD HFE TAG Attendees

< Will be provided when available >

ATTACHMENT (6)

DoD HFE TAG Policies

1. Membership (General membership policies are outlined in the Operating Structure, under "Group Composition.")

1.1 Individuals who are not affiliated with Government agencies (but who are associated with technical societies or industrial associations with a stated interest in human factors engineering) wishing to affiliate with the TAG may contact the current Technical Society/Industry SubTAG Chair to ascertain eligibility under the TAG Operating Structure. Once eligibility has been ascertained, the individual should submit a letter on the organization's letterhead, confirming his/her status as the organization's representative, to the current Chair of the Technical Society/Industry SubTAG.

1.2 Emeritus Membership may be approved by the Executive Committee on a case-by-case basis for a former TAG member who is retired from government service or defense industry. Emeritus Membership is automatically deactivated during any period or re-employment with the government or defense industry.

2. Meeting Sites (Sites are recommended by the service caucus whose turn it is to host the TAG with a view toward a balance in geographic location and meeting facilities.)

2.1 TAG members are encouraged to recommend potential meeting sites.

2.2 Organizations who wish to host the TAG should contact their Service Representative or the current TAG Chair.

3. Agenda (The agenda is determined approximately three months before the scheduled meeting. The Chair Select selects the topics from those recommended by the Service Representatives, hosting agency and the TAG Coordinator.)

3.1 TAG members are encouraged to suggest potential agenda topics or topics suitable for tutorial sessions to their Service Representative, the current TAG Chair, or the TAG Coordinator.

4. Registration (Registration fees and the date of the close of registration are announced in an information letter sent approximately two months before the scheduled meeting.)

4.1 All attendees are expected to pre-register and prepay by the announced close of registration.

4.2 Only individuals receiving late travel approvals may pre-register on-site. Payments made at the meeting site must be in cash.

5. Minutes (The Minutes of each meeting serve as the principal mechanism for the reporting of TAG activities. The Minutes will be published as a draft document on the website.)

5.1 Individuals or agencies desiring to be included on the distribution list for a specific meeting should contact the TAG Coordinator.

6. SubTAGs and Committees (See the Operating Structure, section entitled "TAG SubTAGs," for specific information regarding the purposes and operating procedures of SubTAGs and committees.)

6.1 All SubTAGs and committees are encouraged to meet in conjunction with the TAG at least once each calendar year.

6.2 All SubTAGs and committees meeting in conjunction with the TAG are required to provide a chairperson for the specific meeting.

6.3 All SubTAG and committee chairpersons are to submit a brief report of each meeting to be included in the set of TAG Minutes covering the SubTAG/committee meeting time frame.

6.4 All SubTAGs and committees are required to provide the TAG Coordinator with an up-to-date list of their membership for use in the distribution of TAG announcements.

6.5 All SubTAGs are required to submit to the Executive Committee a Charter including, but not limited to, statements regarding:

- objectives
- scope
- membership policies
- chair selection/tenure
- meeting schedule

6.6 Committees are required to submit to the Executive Committee a document including, but not limited to, brief statements regarding:

- objectives
- membership policies
- chair selection/tenure

6.7 Rotation of the chair position is determined by SubTAG charter. If the position cannot be filled by the appropriate service at the election meeting, the SubTAG may progress to the next service willing to chair the SubTAG

7. SubTAG Establishment

7.1 Groups interested in addressing technical areas not covered by existing SubTAGs may request the TAG Chair to provide meeting time.

7.2 Formal SubTAGs and committees may be established by recommendation of the Executive Committee.

8. Chair/Representative Selection (General selection procedures are outlined in the Operating Structure under "Conduct of Business.")

8.1 A Service caucus may be called by the TAG Chair or the current Service Representative.

8.2 Methods of determining the Chair Select and Service Representatives are Service dependent.

8.3 Unexpired terms of office will be filled by appointment by the Executive Committee, until a caucus of the Service can be called at the next regularly scheduled TAG meeting.

9. Funding The funding required for the organization, conduct, franking, and documentation of all TAG meetings shall be done jointly by the three Services and other selected agencies. The specific mechanisms to obtain and allocate funding from the Services/agencies shall be arranged by the Current Chair, Chair Select, and Immediate Past Chair.

10. Policy Changes

10.1 Additions to or amendments of the above policies may be recommended by submitting the suggested change(s) in writing to the TAG Chair.

10.2 Policies may be amended by a majority vote of those Operating Board members in attendance at the Operating Board meeting at which amendments have been proposed.

Amended 14 November 1989 at TG-23, Killeen, Texas.

Amended 3 May 1994 at TAG-32, Oklahoma City, Oklahoma.

Amended 8 May 1996 at TAG-36, Houston, Texas.

Amended 7 November 2002 at TAG-48, Alexandria, Virginia.