

Welcome to the New ACTG E-Newsletter

By Dan Afergan

Welcome to another AC TG newsletter! We're looking forward to an exciting year with new opportunities and lots of growth. We're starting to mature as a TG and garner a lot more support and interest. Feel free to e-mail the AugCog listserv at hfes-actg@hfes.org with anything you want to share with the community-- job announcements, funding opportunities, scholarships, questions... Also, be sure to check out our updated website at <http://www.augmentedcognition.org/>. There are plenty of ways to get involved in the TG, so if you are interested in helping out the community please let me know! Also, mark your calendar for the 6th Augmented Cognition International Conference from July 9th to 14th, 2011 at the Hilton Orlando Bonnet Creek, Orlando, FL, held in conjunction with the 14th HCI International Conference, and the HFES 54th Annual Meeting at the Hyatt Regency San Francisco from September 27-Oct 1, 2010 with keynote speaker Chester "Sully" Sullenberger!

Very Respectfully,
Dan Afergan



Summary of ACTG Business Meeting and Award

By Dan Afergan and excerpt from <http://www.augmentedcognition.org/kollmorgen-past.htm>

During our 2009 ACTG Business Meeting, which was held during the 53rd Annual HFES meeting in San Antonio, we discussed ways to increase the size of the technical group, as well as how to make sure that people submitted papers to both HFES and ACI. Lauren Reinerman-Jones, Ph.D., presented ACTG's 3rd annual Spirit of Innovation Award to Glenn Wilson, Ph.D. The award was named in honor of Leland S. Kollmorgen, a legend

within the AugCog field, highly respected for his insights, energy, and dedication to his profession and his country. The award recognizes exceptional scientists and engineers who have made substantial and innovative contributions to AugCog. In RADM Kollmorgen's own words: "It is certainly a pleasure to see Glenn's significant contributions to AugCog being recognized by his peers. Glenn qualifies as an AugCog pioneer and

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APPLY FOR THE LELAND S. KOLLMORGEN
SPIRIT OF INNOVATION AWARD!

Cont. on p. 2

Summary of ACTG 2008 from p. 1

worthy contributor to the success of the program. His technical expertise was sought by several of the AugCoger's (if that is a word) as he made the first successful EEG "neuro-gauges" for measuring cognitive workload in real time. This was a significant contribution to the program. His work with fNIR made it possible for a Boeing to integrate that device into the Cognitive Helmet for the Boeing-AFRL Wright Pat Team. The streamlined helmet became a hallmark of sorts for the team. It was through Glenn's interest and support that this team was forged and successful... Glenn, Well Done!"

Know anyone who deserves this award? Please see the application for the Leland S. Kollmorgen "Spirit of Innovation Award" on p. 10

Complimentary Panel and Symposium at HFES

By Kimberly Sprouse and Lauren Reinerman-Jones
University of Central Florida, Institute for Simulation and Training

Dr. Lauren Reinerman-Jones organized a panel session for the Human Factors and Ergonomics Society meeting this year involving basic versus applied research. The researchers involved will discuss the similarities and differences between basic and applied research, suggest a potential way in which the two fields of research can be linked together, discuss the differences in lab and field experiments, and suggest solutions to the problems encountered working in controlled or real-world environments. The panelists include Joel Warm, Raja Parasuraman, Peter Hancock, Christopher Wickens, Robert Proctor, and Waldemar Karwowski. The panel will be held on Wednesday, September 29th from 10:30 to 12:00 pm. On Thursday, September 30th from 10:30 to 12:00

will occur. The symposium concerns transfer from the laboratory to the real-world. The authors presenting will cover topics such as different testing environments and how they are arranged, basic interfaces and high fidelity virtual environments, a study regarding high fidelity environments, and a discussion regarding how basic and applied researchers are generally the same but are put in two different categories. Gerald Matthews, Ernesto Bustamante, James Merlo, William Helton, and Kimberly Sprouse compose the symposium presenters. Together, the panel and symposium contributors will produce a two volume special edition of *Theoretical Issues in Ergonomics Science (TIES)*. Keep an eye out for that edition this fall.

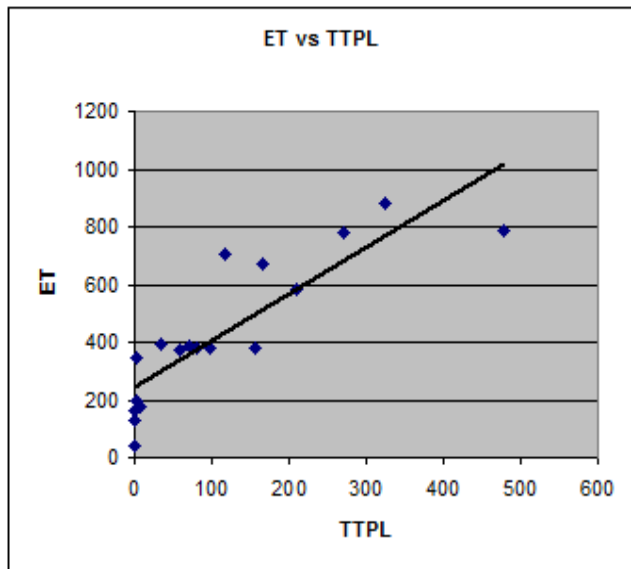
Two Relations of Randomness to Performance

By Thomas L. Clarke

Institute for Simulation and Training, University of Central Florida

Two aspects of the relation between noise or randomness and human performance will be briefly discussed. The first is the discovery that the Lyapunov exponent, a measure developed for chaotic systems, can be useful in quantifying the performance level of human-robot interaction. The Lyapunov exponent, however, measures performance in a surprising way: higher performance is associated with higher degrees of chaos or randomness, not with smooth motion as might be expected. The second aspect is the deliberate use of noise to augment human performance. This is primarily a theoretical idea based on analogy with the use of randomness in optimization techniques like simulated annealing to avoid becoming trapped in local non-optimal states. The human analog would be to avoid becoming trapped by preconceptions or expected

perceptions by deliberately adding noise to the data presented to the human. Some preliminary experiments with word games show that this idea has some merit.



In ARL-sponsored human-robot interaction experiments, a human guided a semi-autonomous robot through a maze (Clarke and Goldiez). The maze geometry matched the geometry of an earlier experiment (Goldiez) in which humans walked a maze. It was found that a positive Lyapunov exponent, a signature of chaos, was correlated with performance as measured by time to traverse the maze. The particular measure that worked best was the signal processing delay time at which the Lyapunov exponent turned positive (TTPL, time to positive Lyapunov) as shown in the upper part of the Figure. Similar results have been found in other fields. For example, research on laparoscopic surgery has shown that measures

similar to Lyapunov exponent are useful in assessing surgical skill.

The contrasting use of randomness to enhance human performance, adding random noise to the perceptual data presented to the human, has just begun to be experimentally explored. The added noise is intended to suggest, if only subconsciously, alternatives within the cognitive and perceptual spaces that are possibly better solutions to the problem at hand. Limited trials, using game-like software developed in-house at IST, do show promise. The subject is presented with synonyms drawn randomly from a 23562-entry puzzle dictionary and tries to identify the word with minimum keystrokes using a noise-augmented display. The lower part of the Figure shows the synonym, “above all”, with various forms of noise superimposed on the partial solution display “[CH]IEFLY”. The upper row’s noise is random letters with English-frequency distribution, the middle is random 16-segment-display strokes, and the lower is 15-pixel by 15-pixel random noise. The number of extra keystrokes beyond the minimum averaged 8.5 for random letters, 9.8 for strokes, 6.9 for pixel noise, and 8.6 for plain background. The average time to solve was 44, 46, 37, and 41 seconds respectively, so it appears simple noise has its charm. While none of the differences is statistically significant with the available data, it seems there is much to learn about the effect of deliberately structured noise on performance.

The author would be interested in exploring applications and implications of these ideas.

Clarke, T.L., and B. F. Goldiez, (2007) Collaboration on the edge of chaos. Proceedings International Symposium on Collaborative Technologies and Systems (CTS 2007), pp. 122-127.

Goldiez, B. F., Ahmad, A.M., & Hancock, P.A. (2007). Effects of augmented reality display settings on human wayfinding performance. *IEEE Transactions on Systems, Man, and Cybernetics: Part C: Applications and Reviews*, vol. 37, 5, pp. 839-845

Adaptive Training for Baggage Screeners

By Angela Carpenter, Kelly Hale, Stephen Whitlow, and Stephen Fiore

University of Central Florida, Institute for Simulation and Training

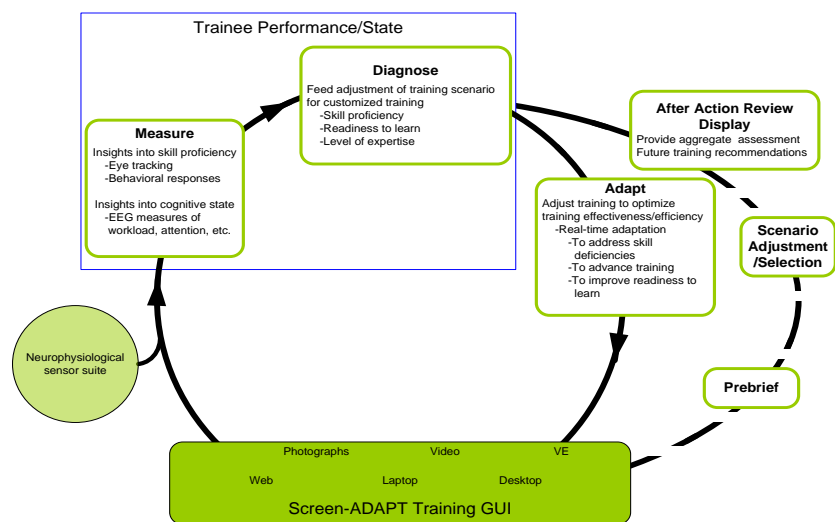
Transportation Safety Administration (TSA) Security Officers are tasked with, among other things, screening every bag boarding commercial aircraft within the United States within one of 7,000 baggage screening areas at over 700 security checkpoints. This involves human review of electronic images of bags in search of explosives and other dangerous items. Screening is a repetitive visual search task that often has a very low probability of encountering a threat, but extremely high consequences if a serious threat is missed. Due to the importance of screening accuracy, screeners are required to complete comprehensive training both before going on the job and while employed. Design Interactive, Inc., is incorporating AugCog technology to develop innovative training solutions that can diagnose trainee deficiencies and inefficiencies and adapt strategically in near real-time to enhance training effectiveness and efficiency.

Currently, training instructors base their assessments solely on performance outcomes and observation, such as percent of images correctly identified as containing a threat from a standard set of training and test images. Adding real-time neurophysiological measures can provide more detailed understanding of trainee state throughout a training scenario such as detailed understanding of visual attention via eye tracking. Further insights into cognitive state (e.g., workload, engagement, attention/inattention) can be captured using electroencephalography (EEG) measures, which can be used to identify times where learning may be negatively impacted by inattention or fatigue, for example. Utilizing these granular metrics of trainee state, a more detailed understanding of training


progression can be realized to improve the training experience and outcome.

Building on Design Interactive, Inc.'s Auto-Diagnostic Adaptive Precision Training (ADAPT) framework, a precision training system is being developed that adaptively adjusts to the changing needs of trainees. ADAPT was originally conceptualized under an Air Force Phase I SBIR and was developed into a full framework and working prototypes under ONR's VIRTE and HPT&E Programs. The Screen-ADAPT training system (Figure 1) is comprised of three components: measurement, diagnosis and adaptation. The *Measurement* component uses system events, behavioral responses, eye tracking, heart rate, and EEG to capture trainee state in real-time. The *Diagnosis* component determines trainee (a) readiness to learn, (i.e. cognitive states that indicate optimal or non-optimal learning state), (b) proficiency, (i.e. skill deficiencies in need of remediation), and (c) levels of expertise. Based on these diagnoses, the *Adaptation* component dynamically adjusts the training scenario through both content and instructional strategy manipulations in order to achieve customized training.

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Screen-ADAPT Conceptual Framework



As an important translation of AugCog research, Screen-ADAPT is being developed to improve the efficiency and effectiveness of simulation-based training for aviation security. By capturing otherwise unobservable behaviors like eye movements and neurophysiological data, in conjunction with standard performance metrics, it supports individualized training that is strategically adapted to the learning needs of the trainee. This is expected to optimize training time and costs via the development of more efficient and effective training delivery.

Acknowledgement:

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What Do Automation, Situation Awareness, and Physiological Measures Have in Common?

*By Kimberly Sprouse and Lauren Reinerman-Jones
University of Central Florida, Institute for Simulation and Training*

The Applied Cognition and Training in Immersive Virtual Environments (ACTIVE) Lab at the University of Central Florida's Institute for Simulation and Training worked in partnership with the U.S. Army's Research, Development and Engineering Command (RDECOM) to complete a three study project involving adaptive automation. The overall objective of the Human Agents for Training and Simulation (HATS) project was to study adaptive automation, the effects of workload and

stress, situation awareness, and automation invocation methods.

Each study included an evaluation of workload and performance using physiological measures such as Wearable Arousal Meter (WAM), Eye Tracking, Electrocardiogram (ECG), and Electroencephalogram (EEG). Each study varied scenarios of teloperation/manual control, autonomous/ static control, and adaptive control (only in studies 2 and 3) of an Unmanned Ground Vehicle (UGV). The three experiments involved a task of threat detection, change detection, radio communications, and situation awareness. Details for study one can be found in Chen, Drexler, Sciarini, Cosenzo, Barnes, and Nicholson (2008). Specifics for studies two and three will be presented at the upcoming HFES conference (Cosenzo, Chen, Reinerman-Jones, Barnes, & Nicholson, 2010; Taylor, Reinerman-Jones, Cosenzo, & Nicholson, 2010).

Overall findings suggest that EEG is the most promising physiological measure to use for invoking automation on or off. Additionally, results indicate that adaptive control conditions improve performance and situation awareness. Future research needs to focus on identifying the specific factors driving the enhancement of performance and situation awareness in adaptive systems. Further investigation should be given to implementing EEG response as a trigger for turning automation on and off instead of simply as an assessment to explain cognitive state.

Live Versus Virtual Environment Training

By Sherry Ogreten and Lauren Reinerman-Jones
University of Central Florida, Institute for Simulation and Training

The development of virtual environment training to assist with live training has been at the forefront of military research in recent years and numerous studies have been conducted to evaluate the value of virtual environment training. One recent study, conducted by IST's ACTIVE Lab in partnership with Advanced Brain Monitoring (ABM) and AnthroTronix, compared a virtual environment to the live environment for performance and physiological response for the purpose of developing better training modules. During this study, participants were presented with three objects, an AK-47 machine gun, an umbrella, and an M-16 machine gun. Participants were required to distinguish between the three stimuli during a live and virtual environment using a night vision goggle. Physiological response was assessed using an ABM 9-channel Electroencephalograph (EEG) unit and a Thought Technology Galvanic Skin Response (GSR) and Electrocardiograph (ECG) system. Analyses are still in progress, but an initial pass at the data appears to reveal some differences between the live and virtual environment. The long-term goal for this line of research is to improve virtual training modules to the point of being more representative of the real-world environment, whether that be in terms of one-to-one mapping of the physical environment or matching physiological response. Additional research is needed, but great strides have been made to realize the potential training benefits of the virtual environment.

Augmented Cognition Transition: From Research to Engineering – A view through a keyhole

By Richard Barker

Introduction

This article represents my view of technology transition through the keyhole of my experiences. I'll first say a few words about my background, to help you understand where I'm coming from. I got my degree (Ph.D., Cognitive Psychology, UCLA, 1979) long ago, and then went to Boeing. I worked for Boeing 25 years, with a few years off in the middle to work for an internet startup and some consulting. During my time at Boeing I was technical lead of laboratories doing research in Human-Computer Interface (HCI) and Augmented Cognition (AugCog). I spent the rest of my time as the Human Factors Engineer on engineering programs as an internal consultant. An important part of my job was to transition new technology from the research laboratory to engineering programs. I quickly made an important discovery: how well the new technology worked was the easiest part!

The key to successful transition is the industry program manager (PM). The PM orchestrates the creation of the new system. He is being hit by conflicting demands 24/7 – a very harassed individual. The crucible of his job tempers him hard and tough. His hat comes with a logo, "Get in my way and I'll kill you!" ☺

The PM may be the most risk-averse person on the planet – maybe in the universe. His *only* concerns are technical risks (not meeting customer requirements) and schedule risks (not meeting requirements in time) on a fixed budget. Technical risks include issues such as "Does it weigh too much?", "Is it too big to fit?", "Is it maintainable?" etc. A short story may illustrate this.

An engineer was presenting a new technology solution to the PM. The PM came early to the presentation and asked, before the start, "So, this is going to show me how to reduce my schedule risk, right?" The engineer said, "No, it won't, but it's a better technical solution!" The PM said, "So, this is going to show me how to reduce my technical risk, right?" The engineer said, "No, it won't, but it's a better technical solution!" The PM walked out of the room before the meeting began. He didn't even say goodbye!

The PM's risk management concerns will take precedence over any possible benefit of new technology. He wants technology that is tried and true, and just good enough to meet minimum requirements. "Better" is the enemy of "Good Enough"! Better technology, such as AugCog, won't make the grade on merit alone. Any new technology must prove that it can reduce the PM's risks if it is going to be accepted.

The benefits of AugCog are therefore not improved human-computer performance. Benefits are derivative of that, e.g., reduced number of workstations required, reduced weight, reduced space, reduced logistical support, reduced manpower, reduced personnel requirements, reduced training, etc. When we're trying to sell AugCog, we must keep this in mind.

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Can we minimize the technical and schedule risks for the PM? Let's focus on 3 broad areas – software risks, HCI engineering risk, and AugCog sensor risks. We'll center our discussion on schemata for risk management as well as what benefits these schemata may have for research.

Software Risks

Risk Management. The PM is going to see software as risky. It has always given him trouble in the past, and he expects it will always give him trouble in the future. Now, with all of this unfamiliar cognitive, wet-ware stuff, it will scare him even more. It is a deep-seated visceral reaction.

What kind of software scares him the least? Commercial off-the-shelf software, already tried and proven, that he can simply pick up and “plop” into his system with little or no need for modification. How can we do this when the field of AugCog is so new?

One solution is to create a commercial off-the-shelf testbed that can support research now but can transition to an engineering program in the future. Two important issues for a commercial off-the-shelf testbed for an AugCog system are, (1) the software be reusable/reconfigurable (hereinafter referred to as “reuse”, and (2) the software be sufficiently well documented that customers and users can be satisfied the software fulfills requirements. The solution is to reuse knowledge, not just software.

Engineers who try to reuse software written by other people have run into several problems. First, software often has assumptions or constraints on its use that are not clearly or explicitly stated. Second, even when these assumptions are clearly and explicitly stated, the assumptions that were applied when the software was originally written may turn out to be different than the assumptions that apply when someone else tries to reuse that software at some point in the future. Third, when this happens, it may be difficult to adapt the software to different requirements since the original software design rationale is often not stated clearly and explicitly. Generally, these problems arise from a lack of traceability of requirements, through the design process, to software.

A fundamental problem in this paradigm of reuse is that what we are trying to reuse is *software* – the end artifact in a long and complicated process that goes from requirements, through a process of design, to an implementation built on top of some virtual machine. Knowledge sharing and reuse cannot easily and uniformly occur at the software level alone.

There is an approach to software development and maintenance that appears to solve some of these problems. In essence, this paradigm for software development and maintenance is one that allows the capture and structuring of formal requirement specifications, design specifications, implementation software, and the refinement processes that

lead from requirements to software. What gets re-used then is knowledge, not just software.

Knowledge-reuse occurs at whatever level of abstraction is most appropriate. Sometimes that level is a domain theory that is involved in stating requirements. Sometimes it is a design pattern. Sometimes it is a software component. Often it is a combination of these. Even within these different levels – requirement, design, and implementation – knowledge can be teased apart, abstracted, and structured in such a way as to make knowledge components that can be more easily reused in other, related applications.

It is interesting to note that when knowledge-reuse is applied to software systems whose outputs are designs for airplane parts, the design rationale that is captured is not only software engineering design rationale, but also design rationale from other, more traditional, engineering disciplines (e.g., mechanical, material, manufacturing, etc.). This suggests that knowledge-reuse provides an approach to general systems engineering that enables one to structure and reuse engineering knowledge broadly.

Research Benefits

AugCog is a difficult and expensive field to work in. A complete AugCog system is a closed-loop system with several components. In addition to the basic system, there are components necessary for the experimenters to do their research. A reusable AugCog testbed may include components defined below.

Experimenter Interface Module. The operator interface module allows the operator to start, stop, record data, display data, and monitor the progress of experiments.

Sensor module. The sensor module includes sensing hardware and cognitive state classifications software. It is the only module requiring specialized hardware. Some hardware is commercially available and some may be made by the researcher.

Cognitive model module. An example of a cognitive model is 4CAPS. It can combine the expected response to overlapping tasks to predict cognitive workload. The cognitive model could control what state each mitigation is in.

Predictive module. The predictive module combines current workstation context with a task model to predict operator activity so that a mitigation for a task may be turned on before the initiation of a task. Predicted operator activity could be output to the cognitive model module to predict cognitive workload.

Adaptive module. The operator's physiological response to workload may vary over time and with changing environment. This module may recalibrate the actual and predicted cognitive workload for changing conditions.

Application domain simulation module. An application domain may be a command & control

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workstation, air traffic control, or dismounted infantry. The application domain cannot be predicted in advance. However, a battery of standard cognitive tests could simulate an application domain.

Consider the situation where researchers want to test new sensors and cognitive state algorithms for AugCog. They must also build all of the other components to test them as part of a closed loop AugCog system. A reusable AugCog testbed would enable researchers to conduct research faster and cheaper, and facilitate transition.

Human-Computer Interface Risks

Risk Management. The PM knows that HCI is usually a problem, but a tractable problem. He's been through it before. Now, we are proposing an HCI with something he doesn't understand: mitigations. This means more risk to him.

I served as an internal company consultant as part of my work in aerospace. I would go to troubled programs (those not meeting technical requirements on schedule) for a few days or weeks to help them. Not a single one of the troubled programs ever followed a HCI development process. When I asked them if they followed a process, every one said, "Well, we were an exception ..." The two most common excuses were:

- We didn't have the time/resources to do all that!
- We didn't need to do a task analysis because all of our team members are very familiar with the domain, and Fred here used to *be* a user!

My remedial actions involved re-doing the HCI process steps they had skipped over.

The PM will want some evidence that you know how to develop an AugCog system. "Trust me, I know" is not a good answer! He will also want to know how long it will take, how much budget and resources it will take, and how it fits into his system development process. A well-defined and repeatable HCI engineering process can be used to answer these questions for him.

An HCI engineering process should be used on every process, and the activity documented. For example, how many labor-hours were spent on each step in the HCI process on each previous program should be documented. The documented labor-hours on previous projects can then be used to support the estimated labor hours for the PM's current project. A documented HCI process demonstrates to the PM that you know how it's done, in detail, step by step. It's also nice to say, "And it's also SEI CMM (or ISO 9000) compliant!" This lets him know that you and AugCog are ready to "run with the big dogs"! There are dangers with any process, however.

A process is a good slave but a poor master. A process should save you work, not make extra work. No single program needs all the steps specified in a process, but each of the steps is needed for *some* program! The process should reflect your organization's unique approach to HCI analysis design and test.

Research Benefits. It is important to remember that you can look on the workstation operator as having 2 different kinds of cognitive workload. First is the cognitive workload necessary to perform the task. This is the cognitive workload that AugCog is designed to mitigate. Second is the workload necessary to operate the HCI. This is the cognitive workload that a good HCI design process is designed to mitigate. In my experience, the cognitive workload necessary to operate the HCI in most workstations is often much greater than the cognitive workload necessary to perform the task! Mitigations designed to respond to cognitive state driven by the task may respond inappropriately if the cognitive state is driven by the HCI cognitive workload.

What does HCI design have to do with mitigation design? Everything! In my view, there is no such thing as a mitigation, just an HCI that presents the optimal interaction technique for the current task parameters and operator cognitive state. AugCog sensors can tell you what the operator cognitive state is, but what tells you what the current and predicted task parameters are? This information comes from a detailed, valid, and reliable analysis of tasks, operators, operating conditions, rules of engagement, and many other factors. How can you be sure you have all of the information you need?

Either (1) you must rediscover what is needed every time, or (2) you can reuse the knowledge gleaned by others in previous research. An HCI development process can accumulate knowledge from the work of others to ensure that, if you make mistakes, they are at least new mistakes!

AugCog Sensor Risks

Risk Management. The sensors are the only AugCog unique hardware. For purposes of exposition and brevity, I'll be talking about head mounted sensors only. Sensors that don't mount on the operator, such as some eye trackers and facial thermography, won't be explicitly considered although the same guidelines will apply to all of them.

The PM has seen a million conceptual drawings. You are number 1,000,001. Don't even bother showing up with a drawing. The PM has seen a million laboratory prototypes. They look homemade, have wires hanging out, and only work if you hold it in place with your hands. Even then, you may have to jiggle it a little. Don't even bother showing up with a laboratory prototype.

The PM has seen some production prototypes. The design is ready to be mass produced. It has *prima facie* validity. The PM can "kick the tires", try it on, and begin to believe that this whole AugCog thing is more than "vaporware." When then-CDR Dylan Schmorrow was trying to get continuing funding for the IWIIUS program, the foundation for ACI today, he wore some AugCog headgear to the meeting. He was successful! We need to follow his example.

We should not standardize sensors. Sensor technology is diverse and rapidly evolving. Instead, let's try to standardize the

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interfaces and headgear necessary to mount them. If we are going to build a production-ready prototype to aid AugCog transition, what should it be like? That is, what are the requirements?

1. The headgear should integrate with the functionality of existing headgear, such as a helmet or communications headset, whenever possible.
2. It must be able to support a variety of sensors, including EEG and fNIR. This implies that the hardware that mounts the sensors on the headgear must be standardized.
3. My sense of the field in general is that sensors should not require anything sticky or gooey that could mess up one's hairdo.
4. The headgear must be able to be put on by the user without assistance, and have the sensors reliably return to the intended position on the scalp.
5. The headgear must be able to place sensors by the 10–20 coordinate system, or by stereotaxic coordinates (e.g., the Talairach coordinate systems).
6. The headgear should be comfortable enough to wear for at least an 8 hour work shift. Military requirements may be longer.
7. Other requirements? Let's hear your thoughts! ACI is the world's premier AugCog organization. Our collective thoughts should drive this design.

Research Benefits. Benefits are fast setup time, and reproducible sensor placement. When you setup to run an experiment, how long do you spend mounting sensors? When running experiments as an undergraduate or graduate student I had my test participants for only an hour! That gave me very little setup time. Testing in industry had different constraints, but time was still critical. Suppose you want to run exploratory tests on yourself? You are alone at night and wonder, "What if ...?" How do you place the sensors where you want them? We need methods and tools to precisely locate and describe sensor placement relative to standard 10–20 positions, and the sulci and gyri of the cortex. Neurosurgeons routinely image the cortex with MRI and use stereotaxic headgear to precisely position surgical instruments. Even a brief inspection of their headgear shows, however, that only an anesthetized person could wear it!

Summary

Technology transition is about reducing program risks. One approach for reducing risks is to create a transition-ready AugCog infrastructure now, and use it to support research until a research project is ready to transition into an engineering program.

Feel free to contact Dr. Barker directly at rich@endofthelane.net





Leland S. Kollmorgen Spirit of Innovation Award Nomination

The Leland S. Kollmorgen Spirit of Innovation Award was instituted in 2007 by the HFES AC-TG in honor of Leland S. Kollmorgen, Rear Admiral, U.S. Navy (Ret.). The award recognizes exceptional scientists and engineers who have made substantial and innovative contributions to the field of Augmented Cognition. The recipient will be someone whose extensive endeavors have pushed the frontiers of discovery, innovation, and design in Augmented Cognition transcending the boundaries of human-systems computing and is a true inspiration to the HSI field.

The Leland S. Kollmorgen Spirit of Innovation Award recipient is judged not only on accomplishments in the last year, but also on a career history of efforts contributing to the advancement of the Augmented Cognition field. Other criteria for selection include: resourcefulness and dedication in promoting and accomplishing innovative human-systems computing technologies, demonstrated leadership in forming and promoting teamwork among the various disciplines represented within the Augmented Cognition field, demonstrated professionalism and integrity, and the embodiment of the spirit of innovation and collaboration.

If you are interested in nominating an individual or nominating yourself, please complete the form below. The recipient will be honored at the 2010 HFES AC-TG Business Meeting in San Francisco, CA.

Nominator Information:

Your Name

Your Affiliation

Your Email

Years of Affiliation with HFES and Aug Cog

Nominee Information (If Different from Above):

Nominee Name

Nominee Affiliation

Nominee Email

Years of Affiliation with HFES and Aug Cog

Please summarize in 1-2 paragraphs why this person embodies the spirit of this award, including contributions, collaborations, and other honors received pertaining to the field of Augmented Cognition.