

CALL SIGNS



Volume 6, Issue 2
Fall, 2015

**EMERGING & DISRUPTIVE
TECHNOLOGIES
TRANSFORMING THE WAY WE DO BUSINESS**

Featuring:

**Cyber Security
Insider Threat Detection
Electronic Kneeboard
And much more!**



*A Publication of the United States Naval
Aerospace Experimental Psychology Society*

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About the USN ★ AEP Society

As military transformation continues to affect today's and tomorrow's Department of Defense and the Navy Medical Service Corps, the need to promote the role of Aerospace Experimental Psychologists as leaders and innovators in aerospace psychology continues.

Naval Aerospace Experimental Psychologists offer a unique combination of education, knowledge, skills, and experiences to address current and emerging challenges facing the Navy, joint, and coalition environments.

The U.S. Naval Aerospace Experimental Psychology Society (USNAEPS) is an organization intent on:

- Integrating science and practice to advance the operational effectiveness and safety of Naval aviation fleet operators, maintainers, and programs
- Fostering the professional development of its members and enhancing the practice of Aerospace Experimental Psychology in the Navy
- Strengthening professional relationships within the community

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Message From The President

LCDR TATANA OLSON, AEP #126

Happy Holidays! It is hard to believe that 2016 is right around the corner. I guess the old adage is true – “time flies when you’re having fun,” and I have definitely enjoyed my time as your President.

As we prepare to say goodbye to 2015, it is also time to say goodbye to the current members of the Executive Committee (EXCOM). Although you will likely see a few of them return (like I said, it’s a lot of fun!), unfortunately, I will not be one of them. I have reached my term limits, and in the interest of not overstaying my welcome, I recognize the importance of getting a new, fresh perspective in the President’s seat.

I would like to express my sincere gratitude and appreciation to the Executive Committee members for their support and dedication. It has been an incredible privilege to serve USNAEPS and its members, and I am excited to witness its continued growth and development, albeit from the peanut gallery this time. The new EXCOM officers will be announced at the annual USNAEPS meeting to be held in conjunction with the annual AEP meeting in Pensacola, Florida in January. I have no doubt they will continue to build on the progress we have made over the past few years to better serve you, our members, the AEP community, and the field of aviation psychology as a whole.

So, for the last time in my role as USNAEPS President, it is with great pleasure that I present our 12th (Winter, 2015) issue of Call Signs. In this issue, we focus on the domain of disruptive technologies. The term, *disruptive technology*, was coined by Harvard Business Professor

Clayton Christensen in his 1997 book, *The Innovator’s Dilemma*. It refers to technologies that have the potential to disrupt the status quo, transform an industry, or alter the way people live and work. Although these technological

advances are all around us (think Uber, 3-D printing, social networking, and cloud computing for just a few examples), and maybe because they have so seamlessly been integrated into our lives, it can be difficult to fully grasp the magnitude of their impact.

Over the years, many members of the AEP community have served as catalysts for advances such as these in the aviation domain, whether it was with regard to selecting the best and brightest for naval aviation, reshaping the way we think about and measure aviation safety, or enhancing how training is delivered. This issue highlights recent efforts to transform the status quo in the areas of cyber security training, the detection of insider threats, and the application of tablet technology to the aviator kneeboard. As you read these articles, I encourage you to think about the ways in which your research could fundamentally alter the cur-

rent landscape and shape how the future unfolds.

In closing, I would like to thank all of you once again for your support of the Society and strongly encourage you to remain active and engaged. This has truly been a labor of love for me. On behalf of the entire USNAEPS Executive Committee, happy New Year and see you in 2016!



CyberCIEGE: A Video Game for Constructive Cyber Security Education

MICHAEL F. THOMPSON & CYNTHIA E. IRVINE, NAVAL POSTGRADUATE SCHOOL

Knowledge must come through action; you have no test which is not fanciful, save by trial.

--Sophocles, Women of Trachis, 450 B.C.

Estimates of the demand for cyber security professionals are as high as 1,000,000 new personnel needed in the global cyber workforce (Cisco, 2014), yet there are insufficient qualified personnel to fill the new positions. Like other organizations, the Navy is also feeling this demand signal. Unless more young people become interested in pursuing cyber security careers, there will be a woeful shortfall of talent.

Can a video game help?

Great technology transitions have changed the way information is conveyed and the way we learn. Just as the printing press transformed information transfer, literacy, and education, thus allowing a student to be absorbed in a book, so has digital technology revolutionized the way we interact with the world and learn. Now, it is common to be absorbed in digital activities.

For decades, educators have suggested that students' attention spans are considerably shorter than the duration of a typical high school or university lecture; and, for decades, creative teachers have used active learning techniques to engage students (e.g. Bonwell and Eison, 1991). Actually, the value of experiential learning has been recognized for millennia.

Role playing, simulations and games are now widely accepted vehicles for active learning (Davison, 1984). Simulations, for example the table-top exercises used at the Naval War College, provide focus to role playing activities and enhance critical thinking. Constructive computer games combine role playing, simulation and gaming to create virtual worlds in which each player can experiment with various methods to achieve focused objectives.

Whereas other constructive video games might have the player build the infrastructure and elements of a town, city, farm, or an amusement park, CyberCIEGE presents a

virtual world where computers and networks are required to achieve game objectives. The player's role is to provide a secure infrastructure for that enabling digital technology. Driven by the objectives of the virtual enterprise and its policy for access to and protection of information, the player can choose from a combination of physical, personnel and technical methods to prevent cyber attacks and achieve those goals. The choices available can range from guards at the door and background checks for the virtual world's personnel, to network configuration and monitoring devices.

Although packaged as a video game, CyberCIEGE is a technologically sophisticated network security simulation. It contains many distinct scenarios, each designed to teach selected computer and network security concepts (Irvine, Thompson, & Allen, 2005). The high level objective of CyberCIEGE is to teach students how to build systems less vulnerable to and more resilient to attacks. While cyber exercises, e.g., "capture the flag", have been successfully employed to test operational and exploitation skills, the challenge for CyberCIEGE was to create a game that

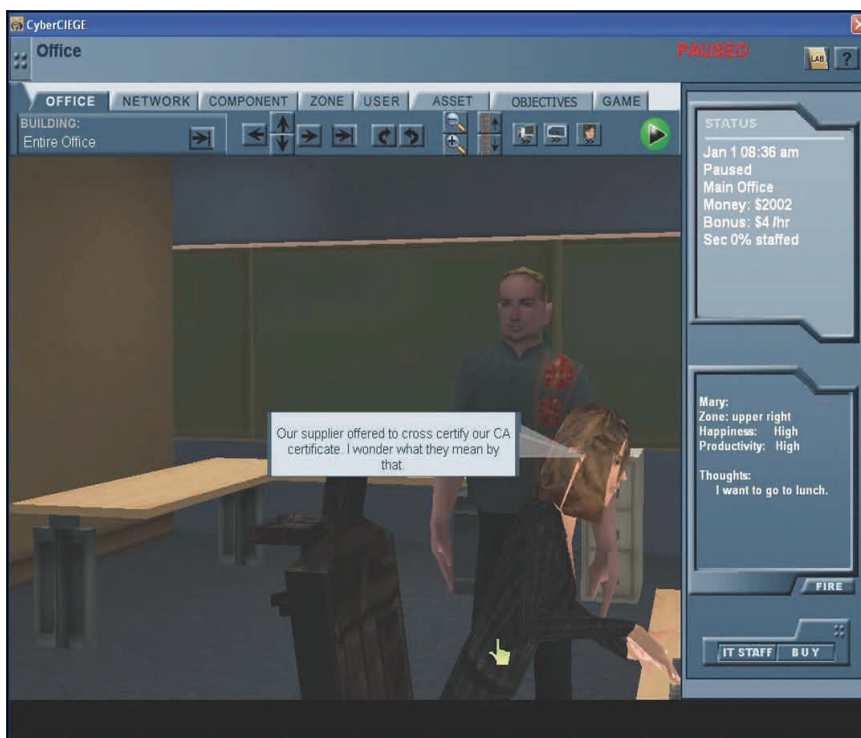


Figure 1: Screen shot of 3D CyberCIEGE environment

could help teach constructive security concepts, some of which can be rather subtle. We have found that, when the game provides a compelling environment in which students can explore, experiment, fail, reflect, and succeed, students do learn these challenging concepts. To build CyberCIEGE, we utilized modern 3D computer gaming graphics, created a network security simulation engine, and developed a suite of tools to design and build game scenarios and monitor student achievement.

Approach to Education

CyberCIEGE uses a variety of constructive resource management techniques (Thompson and Irvine, 2011). Students spend virtual money to build, operate and defend networks, and can watch the consequences of their choices while under cyber-attack. They purchase and configure workstations, servers, operating systems, applications, and network devices. Students make decisions within a three-dimensional environment populated by game characters (AKA *users*) who need to access enterprise assets to achieve goals and thus advance the student through the scenario. An example screen shot of a game underway is shown in Figure 1. An in-game economy rewards the stu-

dent when game characters achieve goals. Conversely, the economy suffers when characters fail to meet their goals. The virtual assets have associated multi-factored values that motivate and drive the game's attacks, the vectors for which may include Trojan horses, trap doors, insiders, configuration errors, un-patched software flaws, weak procedural policies and poorly trained users. Students identify vulnerabilities and mitigate them by deployment and configuration of simulated protection mechanisms including firewalls, user authentication mechanisms, operating system access controls, biometric devices, VPNs and PKI-based application security, such as email encryption. Some scenarios also require choices related to physical security (e.g., hiring guards), procedural policies and user training.

CyberCIEGE's custom game engine uses a scenario definition language for the creation of new scenarios and for tailoring of existing scenarios (Thompson, 2012). Detailed in-game condition assessment and player feedback mechanisms let scenario designers integrate formative assessments into the instructional modules. The Scenario Development Kit (SDK) includes a forms-based integrated development environment (IDE) with which scenario designers express the initial game state, enterprise users and assets, and game phases and objectives. The game engine uses the resulting scenario definition to create the interactive environment. Scenario designers can deploy multiple choice and true/false questions to both test student understanding and help ensure that students remain focused on the scenario's learning objectives (Thompson and Irvine, 2014.) Student choices are logged and these logs are input to a student assessment tool that allows instructors and learning science researchers to monitor student progress.

CyberCIEGE scenarios can consist of multiple phases, where each phase requires the student to achieve one or more specific objectives. Students see their progress in terms of completed objectives and phases. Other feedback includes monetary bonuses and penalties, suggestions from the game characters, pop-up messages and message tickers. Lab manuals accompany the scenarios, which are organized into *campaigns* that address different computer security topics, e.g., an "encryption" campaign that includes scenarios that cover VPNs, email encryption and SSL. A CyberCIEGE tool lets instructors organize scenarios into campaigns of their choosing.

The game includes an on-line encyclopedia that explains cyber security concepts

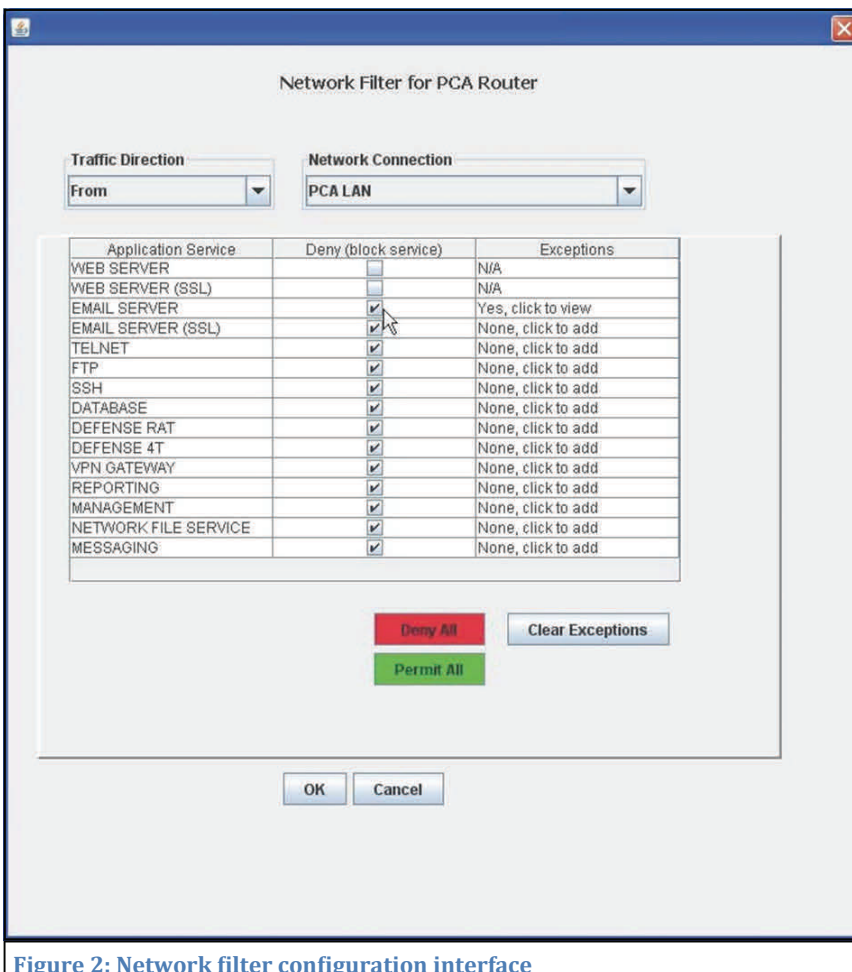


Figure 2: Network filter configuration interface

from the perspective of the simulation. Animated tutorial videos that explore various cyber security topics (e.g., policy, malicious software, assurance, etc.) supplement both the encyclopedia and the scenarios, and can be used separately for classroom instruction.

Relative to traditional hands-on computer security education, CyberCIEGE is more abstract in its representations of computing and protection mechanisms and less abstract in depicting the environments in which those elements operate. The fidelity of computing and protection mechanisms is sufficiently high to require students to make decisions that have observable consequences, while not overwhelming them with syntax and interface details. The virtual worlds presented in the scenarios, are typical of those students might encounter in the workplace or at home. Student observation and appreciation of cause and effect is enhanced through the use of concrete (but often fanciful) scenarios the outcomes of which depend on student decisions. The game brings context to computer security concepts by creating a personalized learning environment where an engaging virtual world helps the player bridge the gap between terminology (e.g., “firewall”) and abstract functions and effects. For example, while a simple lab can illustrate the mechanics and effects of an Access Control List (ACL) associated with a file containing personally identifiable information, the experience is heightened when authorized users within CyberCIEGE’s virtual world bitterly complain about lack of access, or when an attacker compromises assets due to loose ACLs, with consequent loss of protected information and virtual money that the student worked to earn for the enterprise.

The context provided by scenarios helps students understand how abstract information security policies might be implemented through a combination of logical protection mechanisms, physical security and procedural policies. Furthermore, the scenarios help students understand how security decisions might affect a user’s ability to achieve goals. The game does not purport to identify the best solutions to security problems nor does it strive to faithfully represent the security of specific networks. Rather, it gives students an environment in which they can learn about the security and productivity issues that may arise in various circumstances. CyberCIEGE is an example of an epistemic game (Shaffer et al., 2013) in which stu-

dents are immersed in environments that matter to them and are encouraged to think like subject matter experts.

CyberCIEGE is designed to encourage each student to play the role of and think like a network security analyst. The immersive simulation allows the player to explore sophisticated networks and attack strategies without requiring access to elaborate configurations of lab equipment. Students use domain-specific knowledge to achieve objectives. Playing CyberCIEGE promotes active thinking by requiring students to apply concepts learned in one context (e.g., the risks of malicious software in an application) to achieve objectives within some other context (e.g., strategies to address the problem of malicious software within a protection mechanism.) Experimentation is encouraged and not penalized.

A student’s prospects for actively learning from the environment presented by CyberCIEGE scenarios depends, in part, on maintaining game “flow” (Sweetser and Wyeth, 2005) as the student progresses through the scenarios. Maintaining flow requires that the student have a general understanding of what is going on in the virtual environment with just enough lurking threat and problem solving to keep it challenging. If the configuration of security mechanisms requires too much syntax and training, the flow may be interrupted. Hence the level of abstraction presented to the student must be sufficient to convey the concepts, but not so complex that it would bog the student down with details best learned in product-specific activities. Figure 2 shows a CyberCIEGE network filter configuration screen: this illustrates the typical level of abstraction implemented in the simulation. A network filter might be a firewall or part of a router. The objective of CyberCIEGE is to teach students why network filters are important and the types of choices that may be made when configuring such filters: not all connections into the enterprise network should be permitted, neither should all possible outgoing connections be allowed. The arcane details of firewall or router configuration syntax are absent.

Discussion

CyberCIEGE’s simplicity can be a boon to instructors beleaguered with many demands in the classroom. First, many schools today, whether K-12 or at the university level, offer little or no cyber security instruction. This is



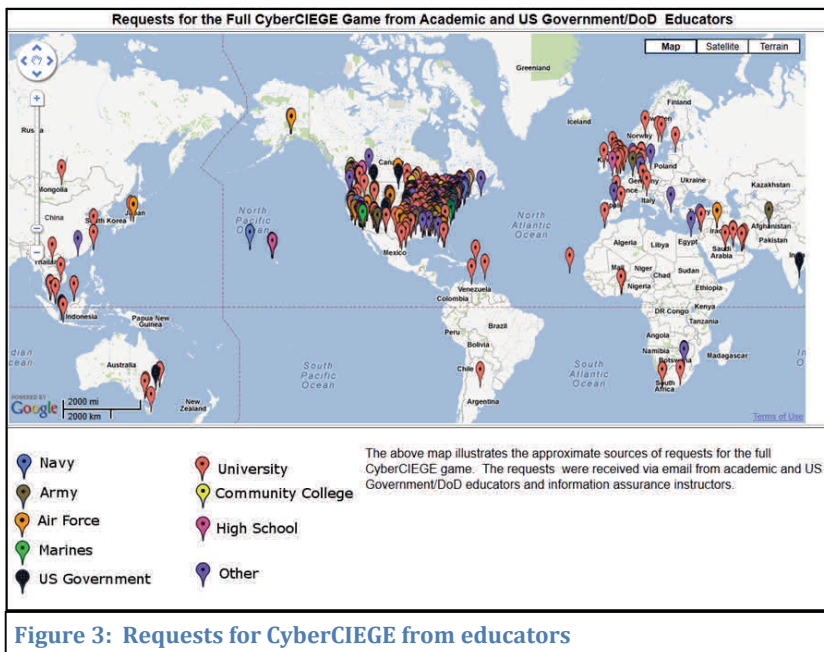


Figure 3: Requests for CyberCIEGE from educators

especially the case when instructors have limited experience in digital technology and cyber security, and lack resources to construct and utilize elaborate infrastructures. Second, because it does not require special laboratory resources, CyberCIEGE affords students an independent study tool. Often instructors use the evaluation version of the game with an entire class and then obtain the full version for students who want to explore more. In addition, many active duty military who wish to improve their knowledge and skills use CyberCIEGE for independent study. Finally, in-game formative assessment shortens and improves the typical cycle required for an instructor to detect and mitigate student confusion; more timely intervention guides the student back toward the intended learning objectives.

Although CyberCIEGE has been very popular, it would be naïve to expect it to be embraced by all students; some enjoy games and are fully engaged, whereas others do not like games and consider it drudgery. As is the case for most video games, the overwhelming majority of CyberCIEGE's development has been by males, thus the game may reflect unintended gender biases. We do not know if the game is equally appealing to both male and female players, or how subtle gender-related issues could be addressed through changes to scenarios, artwork, and other elements of the overall CyberCIEGE package.

The success of CyberCIEGE is reflected in its broad and growing use by educational institutions worldwide. The game has been informally evaluated by a variety of educators, with many integrating the no-cost educational tool into their cyber security curricula (Jones, Yuan, Carr, & Yu, 2010). With the participation of fourteen Naval

Postgraduate School students, CyberCIEGE has evolved considerably since its initial release in 2005, growing from a handful of proof-of-concept scenarios to over twenty full scenarios. Through years of informal student and instructor feedback, the NPS game developers have gained considerable knowledge of strategies for immersing students into a simulated environment where they experience consequences of their choices (Thompson & Irvine, 2011).

Future Work

Over ten years after its initial release, educators worldwide continue to contact NPS several times a week to request CyberCIEGE, resulting in broad distribution of the game as illustrated in Figure 3. While this word-of-mouth marketing suggests some level of educational success, there has not yet been a formal study of the game's effectiveness. Future work to improve Cyber-

CIEGE would greatly benefit from collaboration with experts in learning metrics and formative assessment to demonstrate its educational value and to identify strategies for improved learning outcomes.

CyberCIEGE currently requires a PC platform (or Windows in a virtual environment). Porting it to a ubiquitous gaming platform such as Unity would further broaden its potential audience, making it available on tablets and other computing platforms. Additionally, the growing proliferation of mobile computing platforms and wireless networks increases the need for innovative tools to help teach fundamental wireless security concepts. This need could be addressed by a project to extend the CyberCIEGE simulation to include wireless devices such as smartphones, tablets, laptops, and wireless access points. Such an effort would create new scenarios to illustrate wireless security risks and tradeoffs, and could also introduce wireless devices into existing scenarios. Furthermore, new scenarios reflecting emerging cyber security issues, for example in social networking and privacy, would help extend cyber security awareness to additional populations.

Summary

Games can offer great opportunities for experiential learning both in the classroom and for independent learners. With over ten years of use by the Navy, DoD, US Government, and educational institutions, CyberCIEGE offers a tool to support cyber security awareness, training and education. It is available at no cost to the Navy and can be accessed through the CyberCIEGE website at <http://cistr.nps.edu/cyberciege/>.

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Research Methods and Technology Transition in an Insider Threat Research Program

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Across the national security enterprise there are certain well-known names; such as Edward Snowden, Aldrich Ames, and Robert Hanssen; that engender a sense of outrage and betrayal. Whether they released classified information to the public or sold it to our adversaries, they violated the trust they were given to protect information deemed critical to safeguarding the nation – to protecting us all. These and others like them are called *insider threats* – individuals with *privileged access* within an organization who are, or intend to be, engaged in malicious behaviors such as data theft, espionage, sabotage or violence.

Across government and industry there are various programs designed to detect *potential threats* – individuals who are likely to be engaged in insider threat activities. The search for potential threats is often simultaneously pursued in two different venues: Insider Threat Detection Programs (ITDP) and Continuous Evaluation (CE). ITDPs focus on monitoring user behavior on internal information infrastructures for evidence of malicious use, such as downloading and printing substantial amounts of data unrelated to a person's work assignments. CE refers to efforts to monitor continuously, after employment, the same external data sources (e.g., credit records, legal transactions,

criminal records, etc.) that were initially checked before privileged access was granted.

Although the data sources differ, both ITDP and CE employ a similar strategy. Broadly characterized, both rely on a *passive monitoring* strategy where insider threat analysts enumerate profiles of potential threats along with behaviors that are indicative of each profile, deploy an insider threat detection system (ITDS) that applies automated detectors to monitor data sources for evidence of the indicative behaviors, employ automated fusion to aggregate the output of multiple detectors to assess whether the indicative behaviors have actually occurred, apply risk assessment algorithms to identify the highest priority risks, and then rely on insider threat analysts to evaluate the purported high risk insiders listed by the ITDS.

However, both ITDP and CE suffer from similar technical challenges. While true instances of potential threats are actually quite rare, many insiders may exhibit the indicative behaviors, thus creating a number of false-positives within detection systems. It should not be surprising then, that the vast majority of those on the ITDS high risk list are not, in fact, potential threats while many true potential threats are never identified.



To illustrate the magnitude of this problem, consider the fact that one behavioral indicator of a potential threat of data theft is ‘financial distress.’ Insiders in serious financial straits stand to profit from data theft. However, financial distress is not uncommon among the US population - approximately one third of the US population has a debt in debt collection (Ratcliffe et. al. 2014) and one fifth have errors on their credit reports (FTC, 2013).

A review of current research into insider threat detection shows that most research efforts are focused on enhancing passive monitoring capabilities. This includes research to discover new indicators (e.g., Band et al. 2006, Lang, E. & Schechter, O. 2011), new data sources and detectors (e.g., Tsur et al. 2010, Kandias et al. 2013), and new fusion algorithms to process the massive number of new, often faulty alerts that will be generated by these new indicators, data sources and detectors (e.g. Maloof and Stevens, 2007, Eldadiry et al 2013). Although research efforts are vigorous, there is no guarantee these efforts will ultimately succeed in generating narrowly targeted lists of potential threats.

Recognizing these shortfalls, the Intelligence Advanced Research Projects Activity (IARPA) recently sponsored the Scientific Advances to Continuous Insider Threat Evaluation (SCITE) program in an effort to develop alternative models for enhancing insider threat detection.

Scientific Advances to Continuous Insider Threat Evaluation (SCITE)

The SCITE program is currently exploring two separate research tracks: the identification of *active indicators*, and *inference enterprise models* (IEM).

The first research track is focused on the development of *active indicators*. In contrast to passive monitoring, active indicators involve automatically-generated stimuli that are introduced into an insider’s user environment where those stimuli are designed to evoke differential responses from normal users and potential threats. For example, in the case of a user engaging in unusual and excessive printing behavior, that user might receive an automated

email that (a) notes the extensive printing behavior and (b) recommends an application that would facilitate such printing. It’s reasonable to hypothesize that a normal user would likely either ignore the message or download the application, whereas a malicious user would likely respond by changing his or her printing behavior.

The second track, IEM, will develop a class of models that will estimate the *inference performance* of an existing or hypothesized future ITDS; where “inference performance” means the proportion of potential threats that are correctly identified by the ITDS (True Positives, TP) and the proportion of individuals who are not potential threats that are incorrectly identified (False Positives, FP). For example, an insider threat analyst may be interested in finding individuals who are both financially distressed and disgruntled at work. An IEM should estimate the TP and FP proportions of a current ITDS and also forecast how performance would change if new indicators (including active indicators), detectors, and/or fusion algorithms are introduced into the system.

Essentially, IEMs would help decision-makers determine how to best engineer their insider threat detection capabilities.

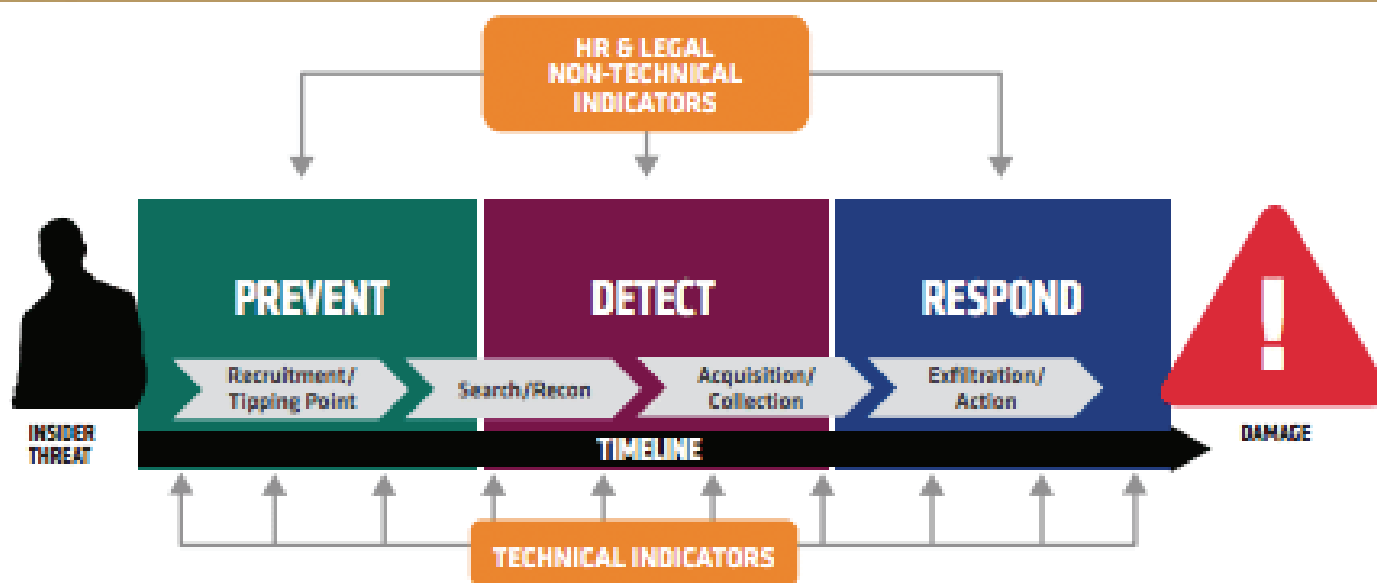
Research Approaches: How innovative research methods can facilitate transition.

If successful, both active indicators and IEMs represent an important opportunity to substantially improve the ability to detect potential threats. The SCITE research program is focused on empirically testing the hypotheses that these approaches can be successful. In particular, the SCITE program is pursuing research that will test these concepts and will do so in a way that facilitates transition into practice. This requires some innovation in research methods. The remainder of this paper is focused on describing some of the innovations in the SCITE research approach, why these innovations facilitate transition, and how these innovations can generalize to research in other application areas.

Active Indicators Research

The objective of this research track is to develop a collection of active indicators that reliably work in detecting espionage behavior in operational practice. Often when research is focused on operational applications importance is placed on ecological validity – testing in experimental





settings that are as similar to the operational setting as possible. As described below, SCITE adopts a very different strategy.

Battlefield intelligence operations are a very different organizational setting than operations focused on highly technical signals intelligence, which are very different than operational settings focused on strategic analysis, settings for nonoperational functions (e.g. acquisition, research), and contractor environments where employees become privileged insiders as part of their support for government activities.

These settings are so diverse that it would be hard to justify a claim that one of these settings is ecologically valid for the others. Positive results for an active indicator in one of these settings would not be strong evidence that the same result would be obtained in the others. This would be the case even if an active indicator were tested within a completely operational setting, with individuals actually engaged in espionage.

So, to find active indicators that are *generally applicable* in practice, the research must test whether the indicators are robustly effective *across* settings. Further, if the experimental objective is to test the robustness of effect, then the diversity of experimental settings is far more important than the ecological realism of any one setting. Indeed, to ensure experimental diversity it may be best to ensure that some of the experimental settings are not ecologically valid, as long as they are different.

Some experimental infrastructures, for example, game playing infrastructures, make it feasible to test for the same behavior in very diverse settings. The fact that an active indicator may work in one game is not particularly informative of whether or not it will work in practice. But

the fact that the indicative response occurred across very different games, and other settings, is a solid basis for claiming that the response is robust and will continue to manifest in diverse practical settings.

Another issue that often surfaces is insider knowledge. A possible weakness of any approach to insider threat detection, or any counter intelligence activity, is the extent to which a target is aware of the detection approach and can modify their behavior to avoid detection. Since SCITE is an unclassified program, information about active indicators will certainly be available to potential threats. So how is this vulnerability offset in SCITE? To address this issue, SCITE provides some boundary conditions in the following areas:

Limit insider knowledge. Not all testing will be open-sourced. All results of confirmatory testing by the government team will remain close hold. Potential threats may know about active indicators in general, but only to a limited extent in detail.

Knowledge is an aspect of robustness. It is safe to assume that in the real world application, potential threats would be aware of the general concept and types of active indicators. They will have read the open source research. Thus, in an experimental setting, participants need to have this same knowledge. If a proposed active indicator does not work under a circumstance where individuals expect them to be employed, then that proposed active indicator would not be deemed “robust” and would not be recommended for transition.

Exploit insider knowledge. It is possible to devise active indicators that take advantage of deception tactics (e.g., the “correct response” is one that normal users are unlikely to execute). For example, when requested to complete obviously low priority security paperwork, it may be malicious users who complete the paperwork while normal users are more likely to procrastinate.

Reflexive indicators. Some responses are not under conscious control (i.e., Jack-in-the-box). Even though you know it’s coming, it’s hard to not react. Some active indicators will fall into this category.

Overall, the transition strategy is straightforward: rigorously test a diverse set of active indicators, identify those indicators that robustly manifest across diverse settings, maintain a repository of open source and closely-held test results, and allow organizations to select which indicators they want to incorporate into their operations. Implementation of an active indicator is straightforward. The objective of the SCITE program is to perform the research needed to ensure that implementation is worth it.

Inference Enterprise Modeling

The IEM research has a focused objective - to develop practical modeling approaches to enable an organization to estimate the extent to which current and future processes are finding potential threats. If successful, the resulting model(s) should be able to reasonably answer a question such as, “What are the chances that our system will flag an insider who is engaged in data theft for ideological reasons?” and “By how much do the chances increase if we invest in ...?”

The general research strategy will be to provide researchers with a series of *redacted challenge problems* (RCPs), which provide statistical descriptions of an existing or proposed ITDS that includes a characterization of the potential threat, behavioral indicators, detectors, fusion and risk prioritization algorithms, along with information on how each of the statistical data items was acquired (e.g., detailed experimental testing of detectors, survey data on employee attitudes, frequency counts drawn from infrastructure monitoring, subject expert guesses, subjective non-expert guesses, etc.).

Researchers will apply their modeling methods to convert this information into inference performance estimates, estimating the proportion of potential threats that the existing or proposed ITDS will find and how many it will miss. Researchers then submit their estimates to the government team for independent assessment. For example, an

IEM model may return an estimate that “the ITDS as described will find 80% (and miss 20%) of insiders who satisfy the description ‘financially distressed and disgruntled’.” Researchers will also submit certainty intervals for their estimates. For example, the IEM model estimates with 60% certainty that the ITDS will find $80\% \pm 10\%$ of the ‘financially distressed and disgruntled’ insiders.

Key to success of this research approach is providing researchers with feedback on the accuracy of their estimates to enable them to improve their modeling approach with each iteration. Providing this feedback is where innovation is required because each RCP is drawn from an operational ITDS. There is no a priori knowledge of who in the insider population is actually ‘financially distressed and disgruntled.’ So, the government team has to provide accuracy feedback without knowing ground truth.

To provide accuracy feedback, the government team will employ a method called *stratified sampling on the inference*. To illustrate, imagine that an analyst asks the ITDS to identify individuals who are ‘financially distressed and disgruntled.’ Imagine that out of an organization of 10,400 individuals, the ITDS flagged 400 insiders as meeting this description. Now apply stratified sampling and randomly select 100 of the 400 alerted individuals (25%) and another 100 of the 10,000 non-alerted individuals (1%). Analysts review these 200 randomly selected individuals and make a determination as to whether or not they satisfy the criteria of financially distressed and disgruntled. Assume that after reviewing these 200 cases, 55 are judged to be distressed and disgruntled - 50 from the alerted sample (50% of the 100) and 5 from the non-alerted sample (5% of the 100).

Now it becomes straightforward to extrapolate the stratified sample results to the entire population - 50% of the alerted cases (200 of 400) and 5% of the non-alerted cases (500 out of 10,000). This yields an overall estimate of 700 individuals in the population who are financially distressed and disgruntled, and of those, the estimate is that the ITDS is alerting 29% (200/700). Furthermore, since stratified sampling is a mature statistical method, it is feasible to calculate statistical confidence intervals for these independent estimates. So, if the model estimates that the ITDS will find 80% of individuals who are FD&D and the 90% confidence interval from the stratified sampling estimate is $29\% \pm 10\%$, then the model-based estimate of 80% is both statistically and substantially wrong.

Using stratified sampling, the government team can provide strong feedback regarding the accuracy of research estimates without knowing a priori ground truth.

Technical transition of IEM capabilities is straightforward. Since an IEM is a model of an insider threat de-

tection system, and not part of the system, it stands on a separate platform. No integration is required. But, effective transition requires that users trust the model estimates, so the focus of IEM T&E is to gauge the extent to which model outputs and associated certainty intervals are calibrated. In effect, the research will test whether or not 60% of the true values are within the 60% certainty intervals.

Summary

If successful, the SCITE research program could fundamentally alter the insider threat detection domain. Active indicators are a potential game-changer. Unlike current passive monitoring approaches that struggle against overwhelming false alarms, active indicators represent an opportunity to develop systems that are proactive and innovative in creating targeted situations where potential threats reveal themselves. Inference enterprise models also represent a disruptive technology, but in a very different way. IEMs are an approach to evaluating whether a claimed “potential game changer” with regard to insider threat indicators is warranted or just hyperbole. With IEMs, it will be feasible to evaluate the enterprise level impact of new tools long before there is an investment in those tools, by answering the question, “How much difference will it actually make?” with empirical data. No doubt this would be disruptive to those who are trying to market their latest and greatest tools without empirical evidence of their value!

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The Electronic Kneeboard: An advancement in tablet technology

LT JOSEPH GEESEMAN, AEP #148

Rocketing to the forefront of computing technology over the past decade, tablet technology is now ubiquitous at home and school with millions of applications across dozens of devices to solve problems as simple as using your GPS location to let you know if it is dark outside to translating and providing speech recognition across almost all spoken languages. One application area that has gained a lot of traction over recent years is in civil aviation.

Existing flight applications for tablet technology cover almost all components of flight from pre-flight registering and filing of flight plans (FltPlan.com Mobile) to post-flight analysis for training and self-evaluation (CloudAhoy). Other applications provide FAA approved weather forecasts (AeroWeather Pro); checklists (ForeFlight Checklists Pro); weight and balance calculations (WnB Pro); and the ability to customize manuals, charts, and calculations (AeroPad). Nearly all of these applications have utility in Naval Aviation, but have been historically dismissed out of a variety of concerns. These concerns include arguments against an overreliance of pilots on electronic sources, security vulnerabilities, and other usability issues. The nature of the conversation is changing, however, due to the continued advancement of tablet

technology and a new generation of tech-savvy pilots, and it appears that resistance to this new technology is beginning to subside. In anticipation of the shift towards the use of tablets in the cockpit, NAVAIR is embarking on an ambitious project to develop the Electronic Kneeboard (EKB).

The Navy currently uses paper manuals, instructions, and documentation, as well as hand calculations, during flight to ensure mission success. Completing such tasks manually can be time consuming and, in some instances, may even hinder mission success. By porting these tasks from analog to digital on a tablet-based kneeboard, it is conceivable that pilots would be better equipped to manage these tasks with a robust suite of tools at their fingertips. As GPS and satellite-based communications technologies continue to propagate, they represent potential integrations with EKB that could significantly change the way pilots plan, navigate, and communicate before and during a flight. This new approach to storing and presenting data to the pilot will likely occur on the Apple iPad, a user-friendly hardware with which many pilots have familiarity.

(It should be noted that there are recent developments that suggest that other EKB tablet hardware choices are being considered).

Moving mission planning, emergency procedures, charts, and other relevant mission tools is not, however, as simple as loading a word document or spreadsheet onto the iPad. As with any system, there are significant usability issues that must first be identified and then mitigated. These efforts are ideal targets of opportunity for human factors scientists, such as Aerospace Experimental Psychologists, to lead the effort to ensure that the EKB will, in fact, be a safer and more efficient solution to the current paper methods [1]. Although the current financial success of the previously listed applications would suggest fantastic graphical user interfaces (GUI), we must ensure considerations for human-machine interfacing, cognitive capabilities, and situational awareness are fully scrutinized prior to operational mil-



Figure 1: Electronic Kneeboard mockup and conceptual models

itary flight.

As human factors scientists, AEPs have a unique ability to evaluate and inform the design and implementation of the EKB and its associate apps. Usability, or the formal evaluation of an object or system by means of learnability and ease of use, is a subset of many disciplines from which AEPs are typically recruited, including Human Factors, Cognitive Psychology, and Human-Computer Interaction scientists. Many of these usability factors

can be addressed via current cognitive psychology research which has greatly overlapped with GUI design in recent years – including research areas of perception, attention, memory, learning, and decision making [2]. Therefore, the AEP community should consider areas such as the EKB, and its inherent human factors challenges, as a target-rich environment in which to inform and lead research and development efforts.

In considering the goal of each app, critical information will need to be available in the most efficient and use-friendly manner (e.g., the number of “swipes” or “taps” that are required to access relevant information for the pilot) [1,2]. For example, when searching for an emergency procedure, a pilot should be able to easily access the appropriate information very quickly and accurately, or else risk losing situational awareness. The EKB and its associated apps will need to adhere to the same human factors design specifications and standards of other similar technologies already employed in the cockpit (e.g., multi-function devices, radios) in order to be successful. AEPs with skill sets and experience in the areas are ideally suited to lead these efforts.

Another consideration in the development of the EKB is the cost reduction benefit of incorporating electronic tools and documents in the cockpit rather than current paper status quo. The reduction of paper in the cockpit will reduce clutter and weight. The reduction of clutter will contribute to flight safety and mission effectiveness, while the reduction in weight (20-30 lb) from reams of documents will ultimately reduce fuel consumption and cost. This would be a very small cost reduction per flight, but



Figure 2: Possible electronic kneeboard application options

over the course of a year, savings could range from \$2.72M - \$4.09M (FY14 fuel prices) in fuel costs for the F/A-18 platform alone. Implementing this technology across multiple platforms would further increase fuel cost savings. Furthermore, the cost of printing and distributing NATOPS every four years and biannual printing and distribution of approach plates would save over \$500K/yr (not to mention hundreds of thousands of pages of paper!).

Currently across the Navy, there are several disparate efforts to develop and incorporate the EKB. The development of individualistic plans for platform-specific applications and interfaces will not only “stovepipe” efforts and cause software engineers to redouble their programming efforts, but training implications are ignored with this approach as well. If applications are developed for each platform, but achieve the same goals (e.g., flight planning, approach plates, weight and balance), would it not be advantageous for both the Navy and the user to have a platform-agnostic, standardized application suite that can be introduced early in the training pipeline?

NAVAIR 4.6 would argue that it is, indeed, in the Navy’s best interest to consolidate the disparate development efforts across the program management offices. NAVAIR will be developing “in-house” programming capability for iOS (Apple) software over the current fiscal year and a Small Business Innovative Research (SBIR) call for submissions to develop an application framework for the Navy was posted in mid-December 2015. Over the next two years, it is expected that considerable advancement in EKB technology will be realized across the Fleet.

Shedding light on the Shadow

LT BRENNAN COX, AEP #142

As the tumbleweed rolled by, a coyote howled in the distance, and a dark Shadow appeared in the sky. It grew closer, steady and silent, slowly taking shape as it descended toward our position. We had been spotted...it was coming!

So the scene was set in mid-November when members of the Office of Naval Research (ONR) Unmanned Aerial Systems Interface, Selection, and Training Technologies (UASISTT) Selection of Unmanned Personnel (SUPER) program team visited Marine Detachment (MARDET) Fort Huachuca, AZ, to learn firsthand how the Marines train their Unmanned Aircraft System (UAS) operators and aircraft commanders for the RQ-7B, or “Shadow” platform.

Located 15 miles north of the Mexican border, at over 4,600 feet elevation, Fort Huachuca was established in 1913 as a base for the “Buffalo Soldiers,” the original all-Black regiment of the U.S. Army’s 10th Cavalry. The Post is now home to the Army’s Network Enterprise Technology Command, Army Intelligence Center, and Military Auxiliary Radio System. As it turns out, our MARDET hosts were also guests on station, as they were effectively borrowing Army facilities in exchange for USMC instructors.

Their shared service curriculum includes instruction of enlisted UAS operators, mechanics, and technicians, as well as training of officers for the position of UAS Commander.

Our two-day trip began with an overview of USMC UAS enlisted and officer training pipelines and career paths, provided by Maj James Hale, CO of the MARDET. As the cadre explained, it takes about one year to train an enlisted UAS operator, to include 12 weeks in boot camp and 3 weeks of Marine Combat Training – leaving only 6 months of UAS-specific coursework at Fort Huachuca before the student operators transition to their first Marine Unmanned Aerial Vehicle Squadron, or VMU. The officer-grade UAS commander course, by comparison, is only 3 weeks long, but that is after students have already completed The Basic School (TBS), Initial Flight Training (IFT, Pueblo, CO), and Remote Pilot Aircraft training (RPA, Randolph AFB).

Next on the agenda, Dr. Rick Arnold discussed the purpose and status of the UASISTT SUPER program, the goal of which is to identify, develop, and validate selection



LT Brennan Cox poses next to a RQ-7B “Shadow” at Ft. Huachuca, AZ.

measures for UAS operators assigned to Group 3, 4, and 5 platforms (the RQ-7B classifies as Group 3). With several candidate selection tests in development (or already available), the SUPER program is currently seeking cohorts of existing UAS operators for conducting test validation work.

As it turns out, the student pool and database of graduate UAS operators that pass through MARDET Fort Huachuca provides the optimal conditions for meeting this need. Eager to learn more about the 7314s (the Military Occupational Specialty, or MOS code for UAV operators), we next took a tour of the classroom and simulator training facilities. The UAS operator curriculum includes components of the Federal Aviation Administration ground school (through the private pilots' knowledge test) in addition to UAS and Shadow-specific coursework. Students learn to conduct mission planning, launching, remote piloting, and recovering the aircraft. They are taught how to prepare and conduct air reconnaissance and surveillance missions, operate sensors for target detection, and plan and analyze flight missions. Simulated and hands-on training allows them to deploy UAS ground and air systems and operate and perform operator level maintenance on system components, including assembling and disassembling the Shadow itself. The ability to multi-task and maintain situational awareness were deemed critical for students to successfully complete this program.

Day two of the trip included a visit to the flight line, a small runway next to which sat a Humvee equipped with a UAV control station in the back. Inside, student operators were engaged in a live training exercise. Nearby, in the aircraft commander's station, a monitor displayed video footage from the Shadow's camera as it surveyed the ground below. It was not long before the aircraft began its descent, and we were privileged to witness its automated landing only a few feet from where we stood. Flawless execution – a testament to the advanced state and remarkable potential of this platform.

Our meeting concluded on a positive note: Maj Hale graciously offered MARDET Fort Huachuca as a SU-Per test validation site, and we laid out plans to revisit in early 2016 for data collection. As we said our goodbyes and congratulated each other on a job well done, Dr. Arnold summarized the UASISTT team's thoughts appropriately: "Every time I have the opportunity, I always come away with the same impression. Nothing comes close to working with the Marines!"



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An adventure in Brussels: How I found NATO, and (eventually) got in!

LT ERIC VORM, AEP #149

I was raised under somewhat modest circumstances. The son of a school teacher and general contractor, my family's idea of a vacation was to pile in our Chevy station wagon and head to Grandma's house for the holidays—where I slept on the floor. As a high school student I remember hearing about exotic careers that would take people around the world, but I never imagined such things were in the cards for my future.

Fast forward a few decades and imagine my surprise when I was told that I had been invited to participate in a NATO working group on unmanned aerial systems, and that their next meeting would be at NATO headquarters in Brussels, Belgium! This, I decided, was going to be an epic trip!

Soon after I arrived in Belgium and became acclimated to the time change, I decided to prioritize. Task #1: figure out how to get from my hotel to NATO HQ. (okay, in reality my real task #1 was to find a café and order a cup of Belgian coffee).

Having accomplished that task, I set about planning my route for my first day of international meetings. My hotel was several miles away from where we would be meeting, so I would have to take some form of public transportation to get there. After a few hours of looking at maps and reading bus and train schedules, I was set.

Well, I thought I was set. Once I got to the station, I discovered that the ticket machine for the busses wasn't working. I went to the ticket window, and after some efforts at conversation with the man behind the window, he confirmed that the machine was, indeed, not working. The only way to purchase a ticket was on the bus itself. So I went to wait for the bus. Once it came, I sheepishly approached the driver, hoping he would be able to speak English. I have dabbled with the French language for many years now, but after being humbled by recent trips to French-speaking countries, I now resort instead to what I call the "I am an American that doesn't speak your language, but I sure hope you speak mine" routine.

I approached the driver and asked for one ticket, and slid over a 20 Euro note. It was the smallest bill I had. He looked at me and shook his head from side to side, then said, "impossible." I asked why, and he said that 10 Euros was the smallest they could take on the bus. So, somewhat dejectedly, I exited the bus (with everyone on board staring at me awkwardly), and proceeded back into the bus station to find a Starbucks—the best place I could think of to exchange money. Once found, I promptly ordered a small coffee. I stood in line like everyone else, paid my money, and received the much coveted small change needed for the bus trip. I began to notice, however, that one after another, people after me received their expensive, custom-made drinks, while my plain coffee never arrived. I was again faced with a dilemma— I could either embarrass myself by attempting to speak French, thereby calling attention to my failed use of an extremely expensive language software package I purchased years ago, or accept my small loss and carry on my way. After a few minutes of waiting, I decided ego was worth more than coffee, so I left my coffee behind and went back to wait for the next bus.

This time I had the proper amount of money and after an uneventful exchange with the driver, I was on my way towards NATO. I rode on in silence, and observed a great deal of the city of Brussels, which is a beautiful European city. It was the height of autumn, and the leaves were in full color. My bus arrived at NATO headquarters without incident, and I felt proud of myself for having conquered what would probably be the biggest challenge of the day. Little did I know, my day was just getting started.

I met my colleague Joe Geeseman, a United States Naval Experimental Psychology Society (USN AEPS) member, at the front gate of NATO, and together we joined the line to get our visitor passes. I had remarked to Joe the night before that I had never heard back from the woman who was in charge of processing visitor passes for DoD service members coming to NATO. In fact, I had sent multiple follow-up emails over the past month leading up to this trip, checking to make sure that I had done everything I

was supposed to do. Joe shrugged his shoulders and said, “well, if you don’t have a pass, they won’t let you in, no matter what. You would be pretty much screwed...”

I didn’t like the sound of that, so I tried to put my fears behind me as I walked up to the window, slid my passport into the tray, and watched as the lady searched through an alphabetical listing of people who had approved passes to NATO. Almost predictably she turned around with a frown on her face and said,

“Sorry. No pass.”

I asked what I should do, and she pointed to a payphone next to the window, and gave me the extension to the US military delegation to NATO. I will spare you the details of the many, many conversations I had with several low-level enlisted troops who really had no clue what to do with me over the phone, and simply tell you that I knew right then and there that I was indeed screwed.

My colleague Joe politely excused himself in order to start the meeting (he is the Chair, after all), and so I was left to stand outside in hopes that somehow my credentials would appear.

After nearly 30 minutes in the freezing cold I finally managed to speak with someone with some authority on the phone. I told her the situation, and mentioned Joe’s name many times. She was able to look up the person responsible for authorizing Joe’s visitor pass. It turned out she was the same person I had sent my NATO visitor request to, along with several other emails over the past several months. The lady on the phone said that she would give this person (let’s call her “Elaine”) a call, and tell her that I was standing outside, and that I would need an escort to get inside NATO HQ. I thanked this lady on the phone, and proceeded to wait... and wait... and wait... After an hour and a half of waiting outside in 45 degree weather with no jacket, I decided to call the number back. I finally managed to find the same person I had spoken to earlier. She apologized for my abandonment, and said that she had contacted Elaine, who promptly said that she didn’t know who I was, had never heard of me, and refused to come out and try to help. Well, merci beaucoup pour rien, Elaine! (I



don’t think that needs a translation).

With no other options in sight, I decided to grovel to the lady on the phone and ask if there was anything she could do to help. With my most pathetic and persuasive “you’re my only hope” line, she agreed to come out and escort me in. Within a few minutes, and a few pieces of a paper, Voila! Suddenly I had a badge that allowed me to go anywhere in NATO without an escort!

I quietly joined the meeting already in progress, and spent the rest of the day engaging in some of the most interesting and intellectually satisfying conversations of my life. It was a truly amazing experience to speak with scientists and engineers from all over the world. At the conclusion of the day, which was around 4:30pm, we agreed to meet at a restaurant downtown around 7:30pm. I found out it was only a short walk from my hotel. I left NATO feeling like I was back in command. I walked back to the bus stop I arrived from, found the bus I rode in on, and promptly boarded it.

20 minutes later, I began to notice that we were

moving further and further away from the area I expected us to be going. I soon realized that I had boarded the same bus I arrived on... which meant I was going in the same direction from which I had come.

No worries, I thought to myself. Most bus routes are a simple loop, right? Since I was in no hurry, I decided to sit back and enjoy the view of the city until we eventually arrived back at the station downtown where I could walk a few blocks to my hotel.

Ten minutes later, we pulled to a stop, and every single person exited the bus all at once.

Uh oh, I thought to myself. This is either a tremendous coincidence, or I should probably get up and exit the bus, too.

As I was contemplating the meaning of this mass exodus from the bus, the driver closed the door and the bus departed the station.

Okay, I think to myself. Either we are on the return trip of the loop, or I am screwed.

10 minutes later, the city streets began to diminish from view, and were replaced by scenes of industrial areas. No new riders boarded the bus. I felt my hopes rapidly diminish. Finally, the bus came to a full stop, and then began to back into a large garage. As it finally came to a stop, I heard the driver let out a huge sigh, and then he turned the bus off completely.

I am screwed...again.

The whole time I had been sitting directly behind the driver, separated by a wall. Only now do I realize that he did not know I was still on the bus. I gently clear my throat, so as not to alarm him, and then slowly approach the front- again, hoping that he speaks English.



“You’re still here!?!?” he says with alarm.

“Yes. I am sorry. I did not realize I should have left the bus” I say in return.

“You’re screwed.” He doesn’t actually say this, but his face conveys the message clearly enough.

Through his broken English and my broken French, and a flurry of hand gestures, we finally come to understand each other. The situation is that I am several miles from the nearest bus stop. I will have to walk back into the village (to the station where everyone got off the bus) in order to catch a ride back into Brussels.

The walk was about 3 miles, and took close to an hour. It was a pleasant walk. The neighborhoods were somewhat downtrodden, but still charming. A few small children pointed at me and called me names from behind a corner, then promptly ran for their lives, laughing hysterically. An old man walking his dog tipped his hat to me. I stepped in the pile his dog probably left minutes before. Okay, it was a mostly pleasant walk.

Once I arrived back at the station, I examined the bus schedules closely. From what I could tell, there were no direct bus routes from this station to my hotel, but there did appear to be a train. So I bought a ticket and headed to the platform, only to discover that there were six platforms for trains, and my ticket said nothing about which platform I should use.

I looked at my watch. It was now 6:20pm. According to the schedule, the train should arrive at my station around 7pm. On the monitor, next to my train, instead of a track number, there were simply three asterisks (***) . Below it, in Dutch (which I cannot read), said a few sentences that seemed to me to be either completely irrelevant to my situation, or may have meant “you, Eric, are indeed screwed.”

I waited and waited for the track information to be updated. Minute, by minute, as the arrival time grew closer and closer, I waited. The arrival time came and went, and soon my train information disappeared from the screen. No train had come to any of the six platforms.

I couldn’t figure it out. I had done everything right, but somehow I was still lost in the city, unable to get home, and completely out of my element. I decided to investigate a certain Dutch word I saw on almost every screen at the train station. The word was “strejke.” I figured that it probably meant something like “we’re sorry for the inconvenience, Eric. But all of these trains are incomprehensibly unavailable to you today.” In fact, and to my great amazement, it actually meant something very, very similar.

Dutch word: strejke

English translation: Strike

As it turns out, there was a train strike in Brussels, and the train I had counted on to bring me back to my nice,

warm hotel room was not running “indtil videre.” Translation – “until further notice.”

Lacking a bus route, and a working train route, I began to think that I might have to either walk the 5+ miles back to my hotel, or pay an exorbitant amount on a taxi ride and try to explain the whole story to my travel administrator when I tried to put in a travel voucher back at work next week. I quickly decided against both of those alternatives, and chose instead to notice a small feature on the screens above me. A few of the trains had the letter “L” next to them. Having frequented several large American cities with mass transit, I have come to recognize that often several different train lines will share the same track and stop at the same stations on a certain stretch of track. If you happen to need to stop at one of those stops, it doesn’t matter which of those trains you get on- so long as you get off before they branch off and head in the completely opposite direction.



With very little hope or pride left to lose, I decided to take the next train with an “L” next to it. With my best “fake it till you make it” attitude, I confidently walked on to the train, sat down, displayed my ticket to the conductor, and nodded my head and grunted dismissively at whatever he said in some-language-other-than-English-or-French. It seemed the thing to do based on my many observations of my newfound European travel companions on this hours-long trip home. Each of them grunted and nodded excessively, whether to the conductor or themselves- it didn’t seem to matter.

As the train began to move forward, I again checked my watch. 7pm on the dot. I may still make it just in time, I murmured to myself with only a hint of sarcasm and spite.

A few minutes later, I decided to check my progress. I pulled out my phone and checked the GPS map. Much to my surprise (though, given the day’s events so far, I should have expected it), I was not on the track I expected to be on. In fact, our train was now moving at an incremental rate away from the city center towards the extreme sub-

urbs. I quickly discerned that every second I stayed on this train would only bring me further from my goal. Screwed again!

I promptly exited at the next stop, and received what I can only interpret as a sarcastic and knowing look from the conductor. He may have even grunted and nodded at me... It seems I may have been overly confident in my navigation abilities once again.

Having exhausted my mind and body, and fresh out of original ideas, I now found myself in a completely distant and strange part of town, in the dark, with no jacket and no frame of reference or sense of direction. I figured there was only one thing left to do- ask for directions.

“What’s the nearest hotel?” I asked a local patron standing by a convenience store. They pointed across the street. I quickly crossed the street and made my way into the lobby. Just as I was about to ask the hotel steward to call for a taxi, I turned around and watched my colleague Joe exit an elevator.

Moments later, in what can only be described as an Oscar-worthy reunion scene, Joe and I shook hands. He found me, still dressed in my work clothes; briefcase in hand, slightly disheveled with a persistent eye twitch, standing in the lobby of his hotel... which turns out is exactly two blocks from NATO HQ, where I started my journey more than three hours earlier.

Glad to have this whole ordeal behind me, and certain that my luck had finally turned a corner, I joined Joe in a taxi and we made our way downtown to join the others for dinner. We arrived in time to order food and drinks.

Looking back, it wasn’t so bad, I told myself. It is all part of the thrill and adventure of international travel, right?

“I’ll have the Mussels with white wine sauce” I asked politely of the waitress as she approached. “And a glass of Merlot, please.”

And just as I began to settle in and relax, content that nothing else could possibly go wrong, the waitress returned and said, “I am sorry, monsieur, but we are all out of Merlot.”

Shipmates

AEPs Underway on the USS Truman... almost

LT STEPHAN EGGAN, AEP #143

LT MIKE NATALI, AEP #150

The United States Navy is best known for one thing: big, bad, powerful warships. Possibly the most formidable ships in our fleet are ten Nimitz-class aircraft supercarriers. These ships measure over 1,000 feet in length, over 250 feet wide, and reach heights the size of twenty-four-story buildings. Powered by two nuclear A4W pressurized water reactors, they can reach a maximum speed of 30 knots (56 km/h). A 4.5 acre flight deck and expansive cargo hold are capable of housing an entire air wing of 90 aircraft. NATO RIM-7 Sea Sparrow missile launchers and 20mm Phalanx CIWS cannons provide defense. These man-made beasts of the sea work as mobile airbases and command centers projecting US air power and military support worldwide.

The importance of supercarriers to US Navy aviation cannot be overstated and it is imperative we as Aerospace Experimental Psychologists (AEPs) understand the conditions aviators experience aboard supercarriers. Recently, a team of four AEPs developed a research study to be conducted aboard a supercarrier – an analysis of ship movement, work spaces, and individual disorientation on psychomotor task performance to determine optimal locations for ground control stations (GCS's) of unmanned vehicles (UVs). This is their story.

It all started with a mention from AEP Specialty Leader, CDR Jim Patrey. During a TELCON one day, he mentioned how beneficial operational experience can be to AEPs, especially those who are junior and have yet to experience much of what the Navy does while protecting our country's freedom.

This sparked ideas and raised questions. Where can AEPs be most beneficial? Where are areas for research? What questions and problems can AEPs solve in the current or future operational environment?

A research idea formed. What impact on performance, if any, is there from operating a remote vehicle while onboard a moving, seagoing vessel? As mobile bases, supercarriers were the logical choice to begin such a project.

Armed with a research idea, the weapon of science, it now became a question of how to get aboard an underway ship for a sufficient period of time to conduct a research protocol and gain exposure to ship board operations. Carriers provided the likeliest opportunity as they periodically go underway for short periods (approximately two weeks) for aviators to get carrier qualifications – carrier take-offs and landings. This would potentially provide us with the chance to earn flight hours as well.

Enter LT Eric “SLAB” Vorm, the first member of the AEP Carrier Team. LT Vorm took the lead and explored options for a small, tactical group of AEPs to board a supercarrier. He flipped through his rolodex to find long-time friend and now Force Surgeon for Naval Air Forces Atlantic, CAPT Chris Lucas. By going through the force surgeon, it provided support and “top cover” for the project. Through telephone conversations, emails, and a meeting at the Aerospace Medicine Association (AsMA) Conference, it was determined there were two possibilities and CAPT Lucas forwarded the names and number of the ships' Senior Medical Officers (SMOs).

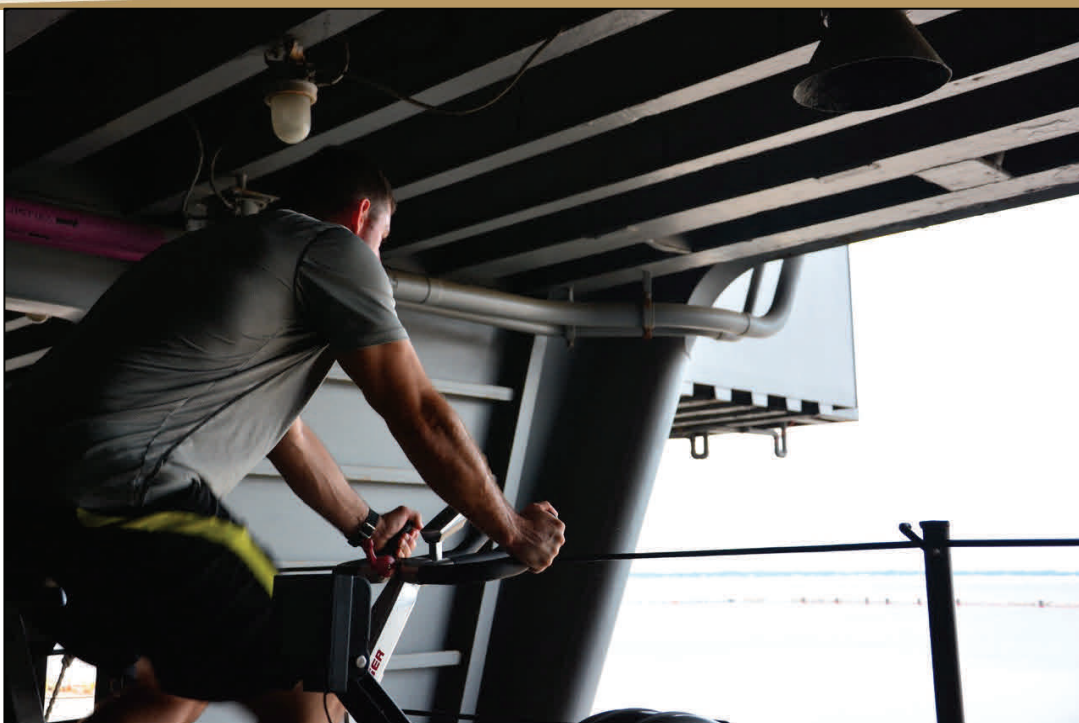
The first to respond was the SMO, CDR Gomez-Sanchez, from the USS Harry S. Truman docked in Norfolk, VA. Having previously met when CDR Gomez-Sanchez went through the Residency of Aerospace Medicine (RAM) program, frequent communication between he and LT Vorm was essential to secure berthing and for coordinating dates and times. This is a sensitive area due to Operational Security and only a range of dates, times, and duration could be provided until a few weeks out from the actual date.

Once finalized, the rest of the AEP team needed to be assembled.

LT Stephen “Bacon” Eggan, LT Joseph “MOBO” Geeseman, and LT Mike “Tinder” Natali joined LT Vorm for the USS Truman visit scheduled to go underway at the end of July for ten days. A team of All-Stars to be sure though fish out of water



USS Harry S. Truman, CVN 75



LT Stephan Eggan exercises in one of the USS Truman port-side gyms overlooking Norfolk harbor

when it comes to shipboard operations and protocol.

With scheduling complete and the team selected, we planned out the study. First we would select potential locations for a GCS by exploring various parts of the ship. At these spots we would collect several pieces of information while underway: the pitch, roll, and yaw of the ship; noise level; location relative to the main command centers; performance on a psychomotor task simulating operating a UAV; and self-reported feelings of disorientation or motion sickness. The study was modeled after a similar experiment conducted by LT Geeseman examining disorientation while operating UAV's from an airborne aircraft: the P-3 Orion.

We arrived a couple days before the Truman was scheduled to disembark in order to familiarize ourselves with the ship, identify locations, and collect baseline data for the project. Unfortunately, we received word that the Truman's departure was being pushed back a day. Extending our stay on base through the next night, we took our extra day to prepare and good thing we did. Upon retesting the equipment that evening, LT Geeseman found it was no longer working. Hours of troubleshooting issues proved ineffective and we were left with the question: How do we conduct this experiment or do we have to head home?

Well, four brilliant AEP minds tackling any problem are going to produce results (for better or worse). Our combined intellect created a way to keep the same experiment, but with slightly different tasks and equipment. We leveraged our phones, downloading apps that could collect the ship motion and noise level data. We also found two performance tasks to be completed on an iPad to help induce potential motion sickness or disorientation. Though not an exact replica of operating a UAV, the tasks would serve as an adequate proxy to measure the effect of any

induced motion sickness/disorientation on psychomotor performance. LT Geeseman continued to troubleshoot the original equipment but was unable to find a fix. We would be moving forward with our revised study.

The following day saw us excited to get underway. We reported to the ship and quickly became aware of how little we knew of ship procedures. Trying to recall our days at Officer Development School, we pieced together what we remembered as the appropriate way to board and approached the quarterdeck confidently. It did not go as smoothly as we hoped. After some fumbling of bags, mix-up of words, and a team member indicating they were distressed with their ID (presented upside down), we made it onboard and

were greeted by LT Jonathan Oaks who would help us get settled. This turned out to be something of a miniature reunion as LT Oaks actually served with LT Vorm as a fellow corpsman years before in Newport, Rhode Island.

Our first stop was medical to meet with CDR Gomez-Sanchez. Here we were introduced to the medical staff and explained our goals for the trip. CDR Gomez-Sanchez was very interested in the project and set up a meeting for us to tour ship spaces with the Strike Commander to help identify prime locations to conduct the research. He also had informed the other department heads of our project and all were excited to have us onboard and to hear the results. We were then taken to our rooms with the reminder that muster was 0600 in the medical department.

We were given rooms right beneath the flight deck, two to a room. Though not large, the rooms were reminiscent of college dormitory rooms with a bunk bed, two desks, and two closets. After settling in, we explored the ship, first finding the closest heads and showers and next the galley for some needed chow. We promptly got lost and found ourselves meandering around the ship for the next few hours peeking into random cubby holes, climbing up and down ladders (with one or two bumps on the head), and walking down P-ways. While looking for our way back to the Galley for dinner, we ran into another familiar face, this time one of LT Natali's friends from ODS. He gladly took us to the galley and joined us for dinner, explaining the best ways to get around the ship.

After arriving back at our rooms for the night, LT Vorm found a passage to get to the flight deck. Grabbing us all quickly, we watch the sun set over the USS Truman sitting in port. We are excited to get underway and collect data. It was Friday night

and it could be a week before we would be able to talk with family again so we all made a few calls before heading back inside to bed.

Early next morning, the ship was already bustling as we make our way down to medical for muster. While getting briefed on the day, we were informed that the ship may not be departing as planned and more information would follow later in the morning. Hurry up and wait became the motto of the trip as we got to know some of the doctors stationed on the ship, waiting to hear if we'll be getting underway. A few hours later the Captain of the ship informed everyone that the ship was delayed until Monday at the earliest. We were disheartened, but decided to return ashore and see what the weekend had to offer.

Over the weekend we continued to tweak our study, finding parts to improve or better define. We were all disappointed we weren't underway and our discussion turned to scenarios if the ship was delayed further. We evaluated how long we needed to conduct the study and what timeframe we required for staying to be worthwhile. With set travel dates to be back at our respective commands, we determined if we did not get underway Monday, we'd have to "pull chalks" and head home. As the weekend came to a close, we were hoping to get underway, but were apprehensive about our chances.

Staying the night on the ship yet again, we arrived at 0600 muster in the medical department to a similar situation – uncertainty about departure. We were however, able to tour ship spaces with the Strike Commander and were shown several of the information and command centers of the ship – very restricted areas due to the sensitive information passing through them. He was skeptical of our presence at first, but upon hearing the explanation of our intention and research project, he quickly became excited about our intentions and came up with several ideas of where the optimal places for a GCS location would be.

As we returned to medical, LT Natali ran into his friend from ODS and was able to learn that the ship wouldn't be leaving for at least another day and more likely two days. Disappointed, we returned to medical and informed CDR Gomez-Sanchez we had to leave. He explained this was a common occurrence with ship board operations and expressed hope we would be able to return at some point to complete the research.

Though our trip ultimately was not the success we hoped for, there are several lessons to be learned.

Lessons Learned:

Build Relationships. The relationships you build through your career will have an important impact on what you



LT Mike Natali in his stateroom aboard USS Truman

accomplish. Work hard to make new connections and maintain old ones. Be respectful and kind to those you meet along the way. These people may very well be the ones who are able to assist you later. We ran into several people over the course of the trip and through our relationships they were able to help make this trip happen as well as provide important information and unique opportunities.

Be Adaptable and Keep Improving.

Things often go in unexpected directions. Find ways to adapt, alter course, and improve – you may ultimately find a better solution than what you originally planned. When our equipment failed, we were able to build a commensurate if not more robust study. The delays in our trip allowed us to get to know fellow sailors and ship protocols we may never have been exposed to otherwise.

Take Advantage. Look for, make, and take advantage of unique opportunities. Find ways to accomplish what you want to accomplish. Don't take an initial "No" as the definitive answer. Rather, look for what the reason is behind it and address those issues or reframe your idea to eliminate the issue. We wanted a chance to gain more operational experience then figured out a way to conduct a study in such an environment when the opportunity arose.

Coordination. Good coordination is a key to success. You cannot succeed alone and will need others to help. Not only do you need others, but you need them in the right places and to be able to communicate effectively. Coordinating takes time, effort, and good communication. We were able to visit the USS Truman through excellent efforts by multiple people and the coordination between several parties. Work to ensure quality coordination.



Left to Right: LT Stephan "Bacon" Eggan; LT Joe "MOBO" Geeseman; LT Mike "Tinder" Natali; LT Eric "SLAB" Vorm



Shipmates

Where are they now: Captain (ret) John Schmidt

BY LT ERIC VORM, AEP #149

Attending the retirement of a close colleague and friend can be a bittersweet affair. In a community as small as ours, co-workers become ever so much more than mere acquaintances—they become extended family; members of “the tribe” of AEPs.

But as is often the case, retirement from active duty service seldom means retirement from life. In some cases, former Commanders and Captains return to work once more with the AEP community, only this time in shirt and tie. In other cases, we inevitably lose touch.

This series seeks to maintain connection with the largest contingency of AEPs—those who have separated or retired from active service. We reach out to former colleagues, both recent and distant, and give them an opportunity to share more about themselves, share with us lessons learned from their careers (both in uniform and without), and tell us about where they are now.

In this edition, we talk with Captain (ret) John Schmidt, AEP #93, who recently retired in December, 2014.

What is your academic background? PhD in Human Factors Psychology with additional concentrations in Industrial Psychology, Industrial Engineering, and Exercise Physiology.

Where did you train? University of Houston at the Central Campus

What made you interested in pursuing a doctoral degree in your background? I took a course in Industrial Psychology my Junior Year in college, and then took a sequence of management classes in organizational theory, behavior, and personnel management. Later I did my senior thesis on situational leadership in the factory where I worked summer manufacturing parking lot lights. It was at that point I decided to pursue training in applied psychology to focus on industrial problems.

How did you learn about the AEP program? I was al-

ready on active duty in the Army, having completed the Army Flight Surgeon Course (including flight training in a TH55 Hughes Osage and UH-1 Iroquois), and was actively supporting the human factors engineering of a digital map display for the OH-58D Battle Captain Crew Station when I went to a Human Factors and Ergonomics Society to present our work on developing a night vision system compat-



LCDR John Schmidt, NAWC AD, Warminster, PA



CDR John Schmidt, Kennedy Space Center, NASA

ible display format for the map display. I met CAPT Bill Moroney and CDR Tom Mitchell who filled me in on the AEP community and the career path it offered.

When did you first join the Navy? After talking with my Commanding Officer and Community Manager, I applied for an inter-service transfer in 1988. It took almost a year after I applied and being interviewed by two General Officers to receive approval from the Secretary of the Army to transition on 12 DEC 89 from being an Army Captain to a Navy Lieutenant.

What was the most challenging point of your training?

As with most of us the challenge in flight training is to effectively multi-task in real time, Aviate - Navigate - Communicate.

What was your most memorable (or embarrassing) moment during training? My most memorable moment was going out early with my on-wing before helping with a run-

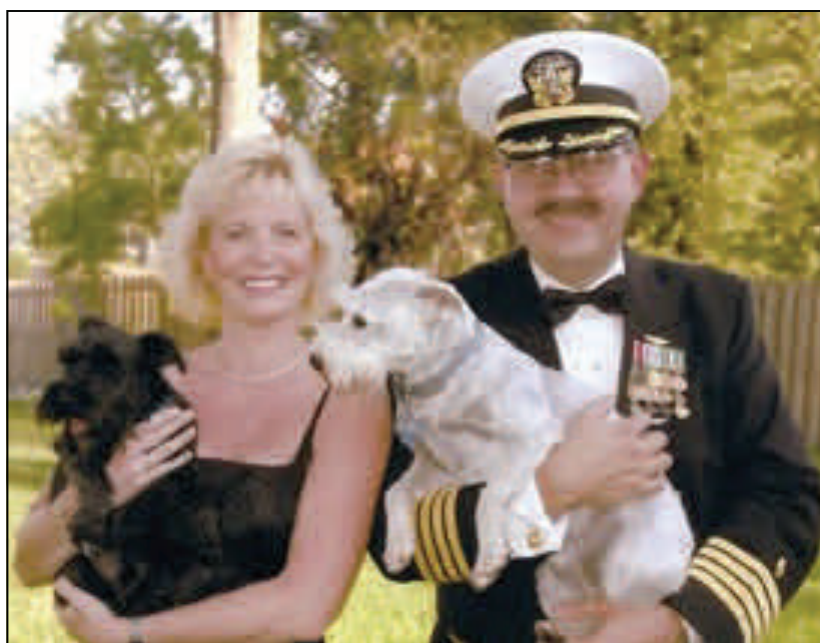
way duty officer watch at an outlying field and doing aerobatics. He would perform a maneuver, guided me on the controls the second time, talked me through the third, and I did it on the fourth. My most embarrassing was during water survival training, we had the burning ship drill where you had to jump from a platform into the water and swim underwater for 50 feet. I kept breaking the water surface with my back. It was pretty comical until the instructor told me I would have to repeat the training evolution. He gave me one last try and told me to swim to the bottom of the pool and crawl until I touched the wall, it worked and I passed.

What billets did you hold during your service? Given I was in for 33+ years, if you include my Army reserve and active duty time, the list is long. Here are those for my 25 years in the Navy:

- *Deputy, Warfighter Performance Science & Technology Department*
- *Director, Warfighter Protection & Applications Divi-*

sion

- Acting Director, Human Research Protection Division-Office of Naval Research, Arlington, VA
- Associate Professor, Operations Research Department, Operational & Information Sciences
- Chair, Institutional Review Board, Research & Sponsored Programs Office, Naval Postgraduate School, Monterey, CA
- Military Director, Human Systems Department, Research & Engineering Group, Naval Air Systems Command, NAS Patuxent River, MD
- Head, Operational Psychology Department, Aeromedical Qualifications Division, Naval Aerospace Medical Institute, NAS Pensacola, FL (Detailed as Director, Operational Readiness & Training Division)
- Specialty Leader, Naval Aerospace Experimental Psychology, Medical Service Corps, Bureau of Medicine & Surgery, Washington, DC (Navy Surgeon General Appointment)
- Staff Psychologist, Aeromedical Division, Aviation Directorate, Naval Safety Center, NAS Norfolk, VA (Detailed to support Columbia Accident Investigation Board 3/03-7/03)
- Assistant Professor, School of Aviation Safety & Operations Research Department, Naval Postgraduate School, Monterey, CA
- Head, Human Factors Branch, Aeromedical Division, Aviation Directorate, Naval Safety Center, NAS Norfolk, VA
- Student, Aviation Safety Officer Course, School of Aviation Safety, Naval Postgraduate School, Monterey, CA
- Head, Human Factors Technology Development Branch, Crew Systems Division, Naval Air Warfare Center - Aircraft Division, Warminster, PA
- Project Officer, Crew Systems Development Branch, Crew Systems Division, Naval Air Development Center, Warminster, PA



Captain John Schmidt and his wife, Mary in 2005

- Naval Aerospace Experimental Psychology Course, Academics Division, Naval Aerospace Medical Institute, NAS Pensacola, FL

What was the most memorable/rewarding/challenging billet experience during your service? As much as I enjoyed worked safety issues in three of my billets, by favorite billet was my four years as the Military Director of the Human Systems Department at NAVAIR and the Technical Warrant Holder for the Human System Competency. It was a demanding job often requiring 10-12 hour days and a significant amount of travel for program and milestone reviews. I felt it served as the culmination of all of my past education, work experience, previous training, etc. and that

the work we did made a difference on a daily basis in the fleet and in providing for its future. Being a voting member to determine if a major acquisition program has met all of the requirements to pass a milestone review is a pretty heady responsibility as is leading a team of over 800 government, contractor, and military personnel, with \$140M budget, and \$20M in facilities. What I liked best is working with my leadership team to address problems, learning from their knowledge and experience, and develop a successful solution to

move forward.

What work are you involved in now? At my retirement ceremony last December, I told those in attendance that I wanted to pursue two immediate career objectives. The first was to complete training and become certified as an executive coach, which has morphed a bit into my pursuing an organizational development master degree with an executive coaching track. Going back to school has been challenging at times (and somewhat humbling), but I successfully finished my first term and am on my way. The second goal was to become a full-time faculty somewhere, and experience the academic life. Given my age and seniority it is not that easy to break into a typical academic role. CAPT Moroney, who was a mentor when I first came on active

duty, was successful in securing such an appointment. I made some initial inquiries, but decided to stick to teaching part-time until I started my coaching program. As luck would have it the institution I have been teaching for had a full-time opening and I was approached by my program director to apply. I was selected and just started as full-time Core Faculty with Walden University in the Industrial/Organizational Psychology Program. I will be teaching bit more than I have in the past, be more engaged in program support/development efforts, continuing doing academic residencies, and chair dissertation work.

How do you see your service as an AEP contributing to your career today and in the future? For me I had an opportunity to work in all facets of applied psychology as an AEP, which gave me a firm foundation to work from in pursuing a second career. I could have sought work in civil service, as a government contractor, or in academia. My having been an AEP would have made me very competitive for an array of positions in each arena. However, restricting my location to Pensacola, wanting to work outside of de-

fense acquisition, etc. made it a bit more challenging at first. I elected to pursue these interest to see another side of work life, grow professionally, and leverage my KSAs in an entirely new arena. Besides teaching I hope within a year to start a research program and begin consulting with Gulf Coast (Tampa to Houston) area industries, focused on both risk management and operational safety.

Final thoughts? After stepping down as the AEP Specialty Leader several years ago, I have marveled at how the community has continually pressed the envelope to be such a vital part of system acquisition, science & technology, selection & training, and operational safety on all levels. What has made this possible is the collective leadership and talent in the community. I wish you continued success and look forward to reading about your achievements in *Call Signs*.



Captain (ret) John Schmidt and his wife, Mary enjoying the retired life

Shipmates

Meet an AEP: LT Joe Geeseman, AEP #148

BY LT ERIC VORM, AEP #149

Naval Aerospace Experimental Psychologists are a small, but diverse group of professionals who come from a wide variety of backgrounds and experiences. While our community enjoys the many benefits of being so selective a group, with few exceptions our billets are geographically disparate, and members can sometimes go years before meeting one another. In this series, we give individuals an opportunity to share more about themselves in a one-on-one interview format in order to narrow that gap, and foster relationships and collaboration across our community.

In this issue we will meet LT Joseph Geeseman. He was winged in May 2013, and currently works at Naval Air Systems Command, 4.6, Human Systems Department, where he sat down to answer these questions about himself and his current and future interests.

What is your academic background?

Against the advice of colleagues and mentors, I was one of those people that received all three degrees from the same institute. After receiving my B.A. in Psychology in 2005 from Southern Illinois University - Carbondale, I spent a year working in a lab for free during the day and working a part-time job at night to make sure an advanced degree was something I wanted to pursue. After only about 6 months, I knew I wanted to attend graduate school and started preparing for my GRE and rounding up my letters of recommendation. In the fall of 2006, I began graduate school in the Brain and Cognitive Sciences program in the Department of Psychology at Southern Illinois University – Carbondale. Six short years later, I finished my Ph.D. with a riveting dissertation on how sound stimuli can influence peripheral visual localization.

What made you interested in pursuing a doctoral degree in your background?

Serendipity. I began undergraduate as a music performance major. After two years of study, I began to realize that job prospects in the field were slim, so I changed majors to psychology -

mostly due to a fantastic professor, Dr. Meera Komarraju, who lit a fire in my interest for psychology. I had grandiose plans of becoming a counseling psychologist that would incorporate music into my therapy somehow (I was still performing music all the time!).

At my university, psychology courses were divided into three categories that loosely broke down into clinical/counseling courses, fun psychology courses (abnormal psychology), and difficult psychology courses (stats, neuroscience). Unbeknownst to me, the university required courses from all three categories for graduation, and I was avoiding the “hard” courses as best that I could. When I thought I had enough credits for graduation, I received the bad news that I actually had one more semester worth of the hard psychology courses to complete. This is where serendipity comes into play.

Just before my last semester began, I broke my leg, and instead of my usual weeknight social engagements, I spent the semester studying far more diligently than I had previously. It turned out that I really enjoyed in-depth



LT Joe Geeseman bagging some hours

study and learning the science “behind the scenes” of psychology. I was hooked, and it’s all history from there.

How did you learn about the AEP program?

My mother was an Army Officer as a physical therapist, and my original plan was to follow her footsteps and become a research psychologist in the Army (MOS : 71F). I finished all the paperwork, MEPS, and interviews, but after a year, the Army was still unsure when they would be able to get my paperwork in front of Congress for my commission – and I was graduating soon with a substantial amount of student loans. I decided to check out the other services and found that the Navy had Aerospace Experimental Psychologists. I watched the video of our community online, and thought that although my chances of being selected were slim, I would give it a try. I contacted CDR Patrey and the Navy recruiter at the same time to start the application process, and we were off to the races. The Navy recruiter went across the hall; took all my information from the Army recruiter; and within a couple months, I found myself at ODS.

ment during training?

It’s hard to pinpoint one memorable or embarrassing moment from training. In all honesty, I think I probably did something stupid or embarrassing almost every day during training in Pensacola. I can remember saluting several Chiefs, on several separate occasions, and them just shaking their heads at me, and I don’t think a day passed without some sort of teasing among us students. The most memorable moment during training, however, was probably the first time that I took controls while flying the TH-57. It was near sunset over a marshy area and I was flying along one of those long, arched bridges found all over the Florida panhandle. I thought back to how just a few months prior, I was sitting in a coffee shop writing my dissertation and how I had no idea that I was going to be doing something so crazy and unique in my near future.

What work are you involved in now, and how does/will it impact the Navy?

During this first tour, I have been eager to try a number of different projects and roles. In the past two years, I have



LT Joe Geeseman at work at NAVAIR

completed two experiments in their entirety – from grant writing to article writing (hopefully, coming to a journal near you!). These projects are centered around human performance metrics and

What was the most challenging point of your training?

Although ODS presented some challenging adjustments from civilian to military life, I think the academic portion of Aviation Preflight Indoctrination (API) was the most difficult. The topics covered in API were in areas that I had never studied, so the learning curve was steep. I likened the experience of API academics to studying for my qualifying exams in graduate school, but in a foreign language.

What was your most memorable (or embarrassing) mo-

impacts on mission effectiveness and safety.

The first project investigated the ability of sensor operators to maintain target tracking performance while seated in the back of a P-3. The results indicated that tracking performance was worse in the air than during ground based trials, and there were higher incidents of headaches and nausea during the airborne trials as well. For the second project, I am attempting to quantify the change in visual scan of helicopter pilots when landing during degraded visual environment (DVE) and the subsequent effects on cognitive and perceptual capabilities. I fit helicopter pilots with eye-tracking glasses and recorded their gaze while



LT Joe Geeseman onboard the USS Truman in Norfolk, VA

tive manner – well, relatively cost effective to the traditional approach to DoD acquisitions.

Finally, some of my efforts are an attempt to keep on the cutting edge of information for the Navy, and these efforts include chairing or being a member of a number of national and international research panels: NATO Human Factors Study Team, Chair; NATO Human Factors in Medicine Panel, Chair; DoD HFE Sub-TAG (Cognitive Readiness), Chair; and ICAO Human Factors in UAS Panel, Member.

Where do you see yourself in 10 years? (long-term professional goals?)

In 10 years, I hope to still be an active part of the AEP community and continuing to contribute my growing expertise in interesting avenues throughout the Navy and

they landed an H-60 simulator during clear and DVE conditions. The results of this study revealed that scan does change during DVE conditions and their functional field of view decreases during this high-stress event.

I am also the scientific lead for the development of an air vehicle operator (AVO) model for airspace integration of UAS, specifically the Triton platform. In this effort, I am collecting performance data of AVOs while they fly a simulated Triton platform in oceanic due-regard flight environment. I am hoping to sample enough encounter geometries (i.e., intruder aircraft entering the UAS flightpath) to run a Monte Carlo simulation to thoroughly model AVO responses for all types of traffic patterns. This project will hopefully help the Navy reach the safety goal of 1 mishap per 1 billion flight hours. This project is also a motivation for a Coalition Warfare Project that I am in the process of proposing for International Airspace Integration of UAS including the U.S., U.K., Netherlands, and Canada.

Other projects include science and technology acquisition for the Navy through the Small Business Innovation Research and Small Business Technology Transfer programs. I am the technical point of contact for three active projects including areas of computer vision, spatial discordance resolution, and electronic kneeboard development and standardization. These efforts support the mission of the Navy by providing relatively quick technology solutions to problems identified by the Fleet in a cost effective

DoD. By looking at the experiences of previous AEPs, it is obvious that the possibilities for us are endless. Because of the abundance of opportunity, it is truly difficult to plan too far ahead in my career. In only the last few months, my “likely” location for my next PCS has changed at least four times!

Final thoughts?

I’m still early in my career, and probably naïve, but it is my opinion that this career is truly what you make of it. It seems that in almost any billet, there is a specific job description that the Navy wants you to complete. These things may take up some of your day, but probably not all of your day, and certainly not all of your days will be spent finishing these required tasks. In your downtime, find other ways to contribute to the mission – ways in which you are passionate. I’m sure it’s bound to change someday, but for now I drive to work with a smile on my face most days because I have a passion for what I do and for what we do as AEPs to further the mission of the Navy and, in a broader sense, science.

Bravo Zulu




mander on 1 December. Congratulations, CDR Olde!

- CDR Hank Phillips was awarded the 2015 Army HSI Program Award for Technology R&D or Studies for his team's development of the HSI Progress and Risk Summary Tool on 2 December 2015.

- LCDR Brian R. Johnson is the Deputy Director of the Warfighter Effectiveness Research Center (WERC) at the U.S. Air Force Academy. The WERC was selected as Team of the Quarter and Team of the Year in the Department of Behavioral Sciences and Leadership. They competed at the division level and won again as they were selected as Social Sciences Team of the Year.

- LT Stephen Eggan (below, second from right) led and coordinated SOF AT&L's Service Academy Summer Intern program, which exposed 2 U.S. Air Force Academy and 4 U.S. Naval Academy interns in various engineering disciplines to the SOF mission and SOF AT&L acquisition processes and procedures. The interns were assigned to the JATF-TALOS and played an integral role in the TALOS Tactical Systems June RPE working side by side with program engineers to develop technical solutions to meet program

- LT Brennan Cox (above left) and his team from NHRC won 3rd place poster at this year's Military Health System Research Symposium (MHSRS). There were 750 posters presented from researchers across all the services, so this recognition was viewed as a big win for Navy Medicine, NHRC, and the AEP community. The poster, entitled "Assessing Objective Neuromarkers in an Immersive Virtual Reality Environment," provided evidence that (1) we can obtain a robust EEG signal with a wireless device in an environment loaded with interference, and (2) the brain responds differently to cognitive tasks when subjects are stationary versus when they are moving about.

- LT David "PoPo" Rozovski was selected by CNAF as the first MSC officer not already a designated Naval Aviator or Naval Flight Officer ever selected for the Aeromedical Dual Designator (AMDD) program in the 40 year history of the program. This historic selection was 2 years in the making.

- Brent Olde was promoted to the rank of Com-



requirements in computing, human factors, C3I, helmet and armor design, and digital optics. LT Eggan's efforts contributed to USSOCOM being selected as the winner for the 2015 Defense Acquisition Workforce Development Gold Award for the Small Organization category. SOCOM's selection and accomplishments were celebrated at an awards ceremony hosted by the Honorable Frank Kendall, Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) on Thursday, December 10, 2015 in the Pentagon's Hall of Heroes.

- LCDR Tatana Olson (above, right) received a Navy Commendation Medal for serving as the 2015 Pensacola Area Navy Ball Chairperson. She expertly led a committee of 30 members and 200 volunteers through 40 fundraising events to raise \$86,000 for a 700 seat sold-out event. LCDR Olson received her award during a ceremony at the Naval Aerospace Medical Institute (NAMI) from the NAMI Officer In Charge, Captain Jack Wyland (pictured below).
- LT Eric Vorm (below, right) received a Navy and Marine Corps Achievement medal for serving as the Graphic Artist, Marketing and Social Media chairper-



son for the 2015 Pensacola Area Navy Ball Committee. LT Vorm contributed 500 volunteer hours to the design and distribution of all Navy Ball advertisement, including the official 2015 Pensacola Area Navy Ball logo, numerous road signs, posters, banners, and programs. LT Vorm received his award during a ceremony at the Naval Aerospace Medical Institute (NAMI) from the Officer in Charge, Captain

Jack Wyland, who was kind enough to crouch in order to avoid making LT Vorm feel short in his photo.

- Sidney Fooshee was promoted to the rank of Captain by Captain Trey Hayden, CNATRA Assistant Chief of Staff for Training in September, 2015. Congratulations, Captain Fooshee!



CONGRATULATIONS, ALL!

Calendar: Mark These Dates Down!

Society for Industrial and Organizational Psychology annual meeting

- April 14-16; Anaheim, CA

Aerospace Medical Association annual meeting

- April 24-28; Atlantic City, NJ

International Conference on Applied Human Factors and Ergonomics

- July 27-31; Orlando, FL

Human Computer Interaction international conference

- July 17-22; Toronto, Canada

American Psychological Association annual convention

- August 4-7; Denver, CO

Military Health System Research Symposium

- August 17-20, Ft. Lauderdale, FL (tentative)

Human Factors and Ergonomics Society annual meeting

- September 19-23; Washington, D.C.

Society for Neuroscience annual meeting

- November 12-16, San Diego, CA



CALL SIGNS

Call Signs is a bi-annual publication of the United States Navy Aerospace Experimental Psychology Society (USNAEPS).

President: LCDR Tatana Olson, PhD

Vice President: LT Brennan Cox, PhD

Treasurer: LCDR Will Wells, PhD

Secretary: LT Lee Sciarini, PhD

Call Signs Editor: LCDR Peter Walker, PhD

Call Signs Co-Editors: LT Joe Geeseman, PhD; LT Eric Vorm, MS

Historian & Layout Editor: LT Eric Vorm, MS

