



Human Systems Community of Interest Quarterly Newsletter



Feb 2018



FROM THE CHAIR: 2018 is shaping up as an exciting year for HS COI. Our brief to the S&T EXCOM was well received and each of the Services has been highlighting the central role of humans to ensure mission effectiveness. Over the next year, it is my intent to enhance our partnership across the Services through site visits, joint proposals, and focused funding initiatives. I trust you will find these newsletters useful in furthering those goals.

HAIL & FAREWELL

Farewell - Dr. Scott Galster has taken a position at West Virginia University as a Professor in the Department of Physiology, Pharmacology & Neuroscience and Director, Human Performance Research, Rockefeller Neurological Institute, both in the WVU School of Medicine. The last will manage three Centers: 1) Human Performance Innovation Center, 2) Human Performance Analytics Center and 3) Center for Human Performance and Translational Neuroscience.

Farewell - CDR Brent Olde is now the Military Director at Human Systems Dept/AIR 4.6 Naval Air Warfare Center Aircraft Division at Pax River. The Division's mission is to provide full spectrum life cycle research and engineering expertise in warfighter performance, survivability, and training. They will conduct crew systems research on personnel protection, survivability equipment, crew station displays, and pilot aids. In addition, they'll also perform Human Systems Integration tasks such as human interfaces with the weapon system, human-computer interface, and personnel/skills analysis.

Both provided excellent leadership as COI Working Group Chair. Key OSD taskers and Steering Group guidance were met as well as developing an outstanding story of HS COI capabilities and accomplishments. Dr. Todd Nelson is now the Chair. CDR Olde's replacement is LCDR Pete Walker, currently at the Office of Naval Research, Human & Bioengineered Systems Code 34.

OUR HUMAN SYSTEMS COI



Overall: One of 17 COIs OSD created to coordinate key decisions between DoD and S&T communities. Goal: Make COIs a "go-to" source for DoD S&T expertise, leadership and coordination.

Vision: Develop & deliver new human-centered technologies to quantify mission effectiveness, select, train, design, protect, and operate for measurably improved mission effectiveness.

Mission: Enhance mission effectiveness through: 1) Integrated simulations for mission training and experimentation, 2) Human-machine designs for mission effectiveness, 3) Assessment of operator effectiveness, 4) Operating through battlespace stresses and 5) Mastering the PMESII battle space.

Key Products: Integrated service roadmaps; taxonomy, budget & programs; seedling and tri-service ARAP proposals, collaboration opportunities; success stories.

Data Links: Key information on the COI can be found at the Marketplace website:
http://www.defenseinnovationmarketplace.mil/coi_humansystems.html

What's new: The Human Information, Interpretation and Influence (HI3) subarea will become a major thrust area under Systems Interfaces & Cognitive Processing.

COI HIGHLIGHTS (EVENTS)

The schedule shows major events and activities the COI will participate in over the course of the year. For most of the major events, we'll go back a quarter and give a summary; for next quarter's events we'll provide a "heads-up".

Inter-service/ Industry Training, Simulation and Education Conference (I/ITSEC) - Held 27 Nov - 1 Dec in Orlando Florida. I/ITSEC is the premier Modeling & Simulation and Training Conference and the COI was again well represented by the COI with the previous chair Dr. Tangney and three of the subarea leads. POC: Katie Smith

Feedback: If you have content or suggestions please send to our Newsletter Editor: Alan.Livada.ctr@us.af.mil

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COI Chair: Dr. Kevin Geiss	AFRL
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Army Lead: Mr. John Lockett (acting)	ARL
Army Lead: TBD	ARI
Army Lead: Mr. Doug Tamilio	NSRDEC
WG Chair: Dr. Todd Nelson	AFRL
PAE&T Lead: Dr. Glenn Gunzelmann	AFRL
SICP Lead: Dr. Todd Nelson	AFRL
PSWP Leads: Dr. Michael Lafiandra & Dr. Peter Squire	ARL ONR



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2018 S&T Strategic Overview - Held 30 Jan - 1 Feb 18 at the Office of Naval Research in Arlington, VA. The Overview is an annual event for the S&T Executive Committee (ExCom) and Defense organizations with S&T funding to share information on programs, priorities and discuss the Department's S&T budget request and out-year investments. There were S&T presentations from Components and S&T Executives. Also, COIs presented their Annual Update briefing to ExCom for visibility into COI state of technology and future direction, with the goal to facilitate discussions in these technical areas and on whether the Department is hitting the mark. Our COI Update was very well received with thanks to all who helped pull it together. Please note the COI Information Exchange, which used to be linked with the S&T Overview, is now set for 5-6 June 18 in Arlington VA. POC: Katie Smith

Applied Research for the Advancement of S&T Priorities (ARAP) Call - OSD's intent with the ARAP program is to help services develop a lasting in-house government capability that does not currently exist. The COI subareas provided a summary of major topics to the COI Steering Group which ultimately selected the PAE&T submission titled "Multi-Domain Understanding of Situations for Intelligent Decision Support" as the COI candidate. No announcement yet from OSD as to the winner. POC: Katie Smith

"Next Up" 2018

NDIA Human Systems Division Conference - The NDIA Humans Systems Division will be hosting its 5th Annual Conference on March 13-14, 2018 at the Waterford in Springfield, VA. The theme is '*Human Systems in Emerging Domains: Autonomy, Human Augmentation and Cyber.*' The NDIA Division works closely with the Human Systems COI to help advance the shared mission to develop and deliver new human-centered technologies which improve mission effectiveness. The forum typically draws @ 120 attendees from government and industry from an array of small and large businesses, national laboratories, and academia. Interaction during the presentations, poster displays and demonstrations advances understanding of the unique challenges of dynamic military environments and approaches to overcoming them. We're looking at adding an HSI Panel to the normal Government and Industry Panels. POC: Katie Smith

NDIA Science & Engineering Technology (S&ET) Conference - March 20-22, 2018, in Austin, Texas. An annual opportunity for the DoD to interact with industry. There will be S&T presentations from Combatant Commands and Services with the COIs providing updates on their key activities and presenting posters during networking breaks. We've submitted our new poster to OSD for presentation at this event and the NDIA Human Systems Division Conference. POC: Katie Smith

COI HIGHLIGHTS (ACTIVITIES)

Seedling Winner - OSD received 14 proposals and selected two to fund for FY17 start. They are: 1) Preparing for Enhanced Energetic Materials: An affordable CL-20 sponsored by the Weapons COI and 2) Development of Prototype Soft Epidermal Biosystems with Advanced Sensing Capabilities for Warfighters in Triage Settings sponsored by the ASBREM COI. Our candidate was in the final four for consideration — many thanks for the effort! POC: Katie Smith

OSD - Pacific Rim S&T Collaboration - OSD leadership is planning to meet individually with a number of Pacific Rim countries (South Korea, Japan, Singapore, Indonesia, Philippines, and Australia) for a series of bilateral S&T discussions as part of the PACOM S&T conference in early 2018. Will touch on areas of current S&T cooperation, highlight any issues or challenges with existing collaborative projects, and identify topics of mutual interest for future exploration. COI provided POCs working projects and provided topics of mutual interest. POC: Rebecca Ben-Amou, rebecca.s.ben-amou.ctr@mail.mil

OSD - US/UK Stocktake - Workshop scheduled for 21 -22 Feb 18 in the United Kingdom to determine if Human Systems will be an enduring topic for future US/UK Stocktake events. The event will focus on identifying new opportunity areas for joint collaboration between the US and UK, and doing a portfolio-level evaluation of human systems activities on-going between the two countries. At the end of the workshop, participants will make a recommendation to the US and UK Stocktake Principals (Ms. Miller for the US) on whether Human Systems should become a recurring topic within Stocktake. We currently have several key human systems experts attending the event. POC: Hannah Freeman, Hannah.l.freeman7.ctr@mail.mil.

Major Annual Events/Activities

Reliance 21 Meeting	Jan
ARAP Proposal Data Call	Jan
Roadmap Review (Every 18 months – not until 2019)	Feb
NDIA Human Systems Conference	Mar
NDIA S&ET Conference	Mar
HFE TAG	May
COI Information Exchange	Jun
DoD Lab Day/DARPA Day	Jun
Seedling Proposal Data Call	Jun
IR&D Technical Interchange (Biannual Not until 2019)	Jun
COI Steering Group/All Hands	Sept
I/ITSEC	Dec



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COI HIGHLIGHTS (ACTIVITIES Continued)

DoD - Exoskeleton Workshop - U.S. Army Natick Soldier Research, Development and Engineering Center (NSRDEC) will host an April 2018 event to bring together DoD Exoskeleton stakeholders. Discussions and road-mapping efforts will center around tactical capabilities for SOCOM, PEO Soldier projects, Navy and Air Force logistics and maintenance efforts to reduce stress on the soldier, and prosthetics. Includes a demonstration day. POC: Jen Coughlin, jennifer.r.coughlin.ctr@mail.mil

New collaborative workspace for COI - The COIs have the opportunity to use a site other than DoD Techpedia to store and collaborate on COI documents. The HS COI hopes to blaze the trail for all COIs to share data via MITRE's Secure File Transfer capability. We expect to begin using the site when final sign off has occurred on security issues. POC: Gary Klein, gklein@mitre.org

DoD Autonomous Medical Evacuation Workshop - Purpose is to get SMEs from the DoD Biomedical, Air Platforms, Autonomy, C4I, Energy and Power, Human Systems, and Sensors COIs to provide visibility of medical needs to enable autonomous evacuation, the medical framework for a concept of operation, what gaps exist and who could fill those gaps, and finally how to integrate medical requirements into other efforts.

Steering Group Lab Visits - Dr. Geiss has requested the COI Steering Group get the opportunity to visit their counterparts service labs over the course of 2018. We will try to take advantage of already scheduled COI events to make this happen, with the first opportunity tentatively scheduled for early May at the Air Force Research Labs, Wright Patterson AFB OH.

International Corner

NATO Information Systems Technology (IST) Research Technology Group (RTG)-144 - Content-Based Multimedia Analytics. International researchers interested in information interpretation of multimedia streams met to explore approaches for better automated integration of text and video information into decision support environments. The effort was supported by researchers from Norway, Netherlands, UK, and Sweden. POC: Dr. Liz Bowman, elizabeth.k.bowman.civ@mail.mil

The Technical Cooperation Program (TTCP) C4I Group, Technical Panel 41 - All-Source Analytics. Dr. Liz Bowman is soliciting interest among US HS and C4I Communities of Interest for membership in TP41. Panel initiated Sept 17 to develop and integrate technologies for multi-INT and open source data analytics responsive to operational queries arising from hybrid and traditional warfighting challenges." This panel has an interdisciplinary focus of computer, human, and information sciences. Initial challenge will be to define a reference maturity model for All-Source Analytics processes. The inaugural meeting is planned for March 12-16 in Adelaide, Australia. POC: Dr. Liz Bowman, elizabeth.k.bowman.civ@mail.mil

Project Agreement (PA) with Singapore - A PA between Singapore and the Air Force Research Laboratory's Human Performance Wing has been completed. The PA on Modeling Fatigue from Prolonged Driving Project Agreement has helped in the validation of computational models that simulate effects of fatigue on cognition and performance. It forms the critical foundation that is supporting current research efforts being conducted to investigate fatigue and fatigue risk management with Air Mobility Command. POC: Dr. Glenn Gunzelmann, 711 HPW/RHAC, glenn.gunzelmann@us.af.mil

Foreign Comparative Testing (FCT) effort with Israel - The FCT included a helmet integrated physiological monitoring system which was further developed by Elbit of Israel using IR&D funds and became part of the Digital Joint Helmet Mounted Cueing System. The system underwent a flight demo and flight test at China Lake in an F-18 and at Edwards AFB in a T-38 respectively in 2017. POC: Dr. Lloyd Tripp, AFRL, lloyd.tripp@us.af.mil

Project Agreement (PA) Involving Speech Translation with France: A Somali speech transcription PA was signed for activities planned from March 2017- March 2022. The agreement work aims to collect resources and develop prototype(s) for Somali speech recognition that could support US and French troops stationed in Africa; develop Somali speech and text corpora in relevant domain and multiple dialects; and develop Somali Automatic Speech Recognition (ASR) systems including performing systematic evaluations of developed speech recognition systems. POC: Tim Anderson, timothy.anderson.20@us.af.mil



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ACCOMPLISHMENTS

- **IMPACT: Realizing Autonomy via Intelligent Adaptive Hybrid Control:** Refined tri-service "Base Defense" challenge scenario to include more unexpected, dynamic events; New rapid joint human-machine "Course of Action" tool; New Task Manager capability: system workload balancing
- **Human Insight and Trust Program** - Baseline trust of operational pilots for F-16 Automatic Ground Collision Avoidance System (AGCAS) and F-22 Line in the Sky (LIS) System, identified trust barriers for current and future forms of autonomy
- **Research on Reduction of Sleep Deprivation Induced Fatigue Stress** provided Airmen with a tool to mitigate effects of fatigue for up to 24 hours during long duration missions – improves mission effectiveness and performance
- **Multi-Modal Communication Management Suite** - Provided net-centric software with integrated voice and chat, spatial audio, automatic speech recognition, keyword spotting, communication recording, search, and playback
- **Human-Machine Integration: Advanced Wearable Technology for Dismounted Operators** minimized operator difficulty using trauma kits - allowed more easily used body-worn devices, increased medical responsiveness on the battlefield
- **Transitioned the Training Executive Agent (TXA) into the Navy's Next Generation Threat System** - Trainees received tactically realistic entities in realistic complex battle scenarios
- **Transitioned ARL/ARO Social Understanding and Reasoning Framework (SURF) to the Army G2 and SOCOM SUNet enclave** for beta testing
- **Protection: Developed wearable monitoring to support HRI detection at scale during Marine Corps training events**
- **Developed Readiness Dashboard for individuals and teams, AFRL and ONR Funded** – monitoring ~1000 athletes
- **COI published numerous protection deliverables:**
 - ⇒ Revised Human Injury Risk Criteria in MIL-HDBK-516C
 - ⇒ Revised criteria in MIL-STD-1472H for Vibration and Shock
 - ⇒ Transitioned Injury Risk Criteria for Next Gen Helmet Program SRD
 - ⇒ Transitioned Escape Safety Criteria for USAF Next Generation Ejection Seat Program SRD
- **Training - Delivered PALMs (adaptive "flash cards") to Marines Awaiting Training** for empirical testing
- **Training - Phase I Demonstration of the Total Learning Architecture (TLA):** Trial demonstrated the interoperability and effectiveness of DoD-centric technologies. The TLA is not a training device or educational tool; it connects all other learning technologies into an integrated system. The Advanced Distributed Learning Initiative has scheduled phase two of TLA testing for August 2018 at Ft. Bragg, which will focus on integrating baseline feedback and new learning analytics. The release and widespread adoption of this project will take place by 2020. POC: Ms. Sae Schatz, sae.schatz@adlnet.gov
- **COI published article in Psychonomic Bulletin and Review** describing a quantitative comparison of different computational models that explain how fatigue impacts cognition and performance. The comparison assesses both the complexity of the models and how well they fit human data. The comparison exposes similarities in the underlying theory, and point to opportunities to integrate across modeling formalisms that create more comprehensive accounts of fatigue's impact.





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Personalized Assessment, Education, and Training (PAE&T)

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