



Human Systems Community of Interest (HS Col) Newsletter



Nov 2019



Senior Leader Perspective: The past two years have gone by quickly, and it has been an honor to be the Chair of our Col. We shared great stories with DoD leadership and the S&T EXCOM about our outstanding research teams that keep our Warfighters safe, ready for the fight, and mission effective every day. That relevance pays off. I also believe we made great strides in strengthening our Col with site visits and joint efforts to create new capabilities through creative proposals and funding initiatives. The challenge is to keep that energy going. And, I believe we're in good hands with Dr. Michelle Zbylut to continue our success!

Dr. Kevin Geiss, Director 711 HPW/RH, and Air Force lead for HS Col.

Hails/Farewells & News

Hail - Dr. Kelly Ervin has taken over duties as the Working Group chair for Ms. Roxanne Constable who provided outstanding support to Dr. Kevin Geiss. Roxanne will thankfully stay active in the Col. Kelly is a Senior Research Psychologist at the U.S. Army Research Institute, and has quickly jumped into the seat as we got ready for the Roadmap briefing and other key Col activities for 2020. Welcome!

Farewell - Dr. Jill McQuade stepped down in her roles on both the project team and PSWP subarea. She did a great job on our major briefings and Col poster, and will move on to provide direct support to the 711 Human Performance Wing. Thanks Jill!

News - Dr. Kevin Geiss handed the HS Col Chair baton over to Dr. Michelle Zbylut at the Steering Group meeting in October and will remain as the Air Force Lead. Many thanks to Dr. Geiss for his exemplary leadership that kept our Col as one of the premier groups in Reliance 21!

News - Dr. Kendy Vierling is the new PAE&T lead, taking over for Dr. Glenn Gunzelmann. Kendy was already on the team so she's quickly stepped right in. Fortunately, we also keep Glenn and his wealth of knowledge as the lead AF rep for the subarea!



HUMAN SYSTEMS Col

<https://defenseinnovationmarketplace.dtic.mil/communities-of-interest/human-systems/>

Vision: Develop & deliver technologies to enable, sustain, enhance and quantify human performance 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; Col taxonomy, budget & programs; seedling and tri-service ARAP proposals, collaboration opportunities; success stories.

Col Highlights - Past Events

Annual Human Systems Steering Group Meeting. The meeting was held on September 18 - 19 at Strategic Analysis Inc. in Alexandria VA. Service level and subarea presentations provided insight into both outstanding FY19 accomplishments and a sound FY20 strategy, while other presentations by the Col and its partners/stakeholders allowed us to engage in great discussions on the potential for new collaboration opportunities. The Col Steering Group Panel met and answered questions and there was a vigorous exchange of topic ideas for the upcoming Applied Research for the Advancement of S&T Priorities (ARAP) Call. At the meeting, Dr. Geiss formally handed off the Col Chair role to Dr. Michelle Zbylut.

POC: Katie Smith Stilling, Strategic Analysis, Inc. kstilling@sainc.com

Feedback: Please send comments to our Newsletter Editor: Alan.Livada.ctr@us.af.mil

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Key Personnel

OSD Chair: Dr. Ben Petro
COI Chair: Dr. Michelle Zbylut, Army
Navy Lead: Dr. John Tangney
Air Force Lead: Dr. Kevin Geiss
Army Lead: Dr. Corde Lane
Army Lead: Dr. Robb Wilcox
Army Lead: Dr. Patrick Baker
SOCOM Rep: Ms. Lisa Sanders, SOCOM
WG Chair: Dr. Kelly Ervin, Army
PAE&T Lead: Dr. Kendy Vierling, USMC
SICP Lead: Dr. Mark Draper, AF
PSWP Leads: Dr. Peter Squire, Navy Dr. Mike LaFiandra, Army



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Col Highlights - Past Events (Continued)

Roadmap Briefing. On Nov 6th, Dr. Geiss and key Col members successfully briefed our roadmap to OSD staff as part of the 18 month cycle for all Cols. There were great discussions over major changes in direction, important goals met in the past 5 years, recent accomplishments, upcoming products, significant engagements, and vital academic collaborations. In addition, key take-aways were the importance of developing transformational ideas and continuing to track priorities. Dr. Geiss was also praised for his exemplary leadership of the Col! POC: Katie Smith Stilling, kstilling@sainc.com

Col Highlights - “Next Up”

Applied Research for the Advancement of S&T Priorities (ARAP) Call. There’s a request out for Col’s to submit their candidate 2020 ARAP White Paper to OSD by 27 December 2019.

OSD’s final decision will be announced in April 2020. This is an annual call where efforts can range from expansion and application of basic research, to design and development of prototypes — all with a goal to expand DoD capabilities into a new scientific area. Duration is three years, with funding not to exceed \$15M per year. The Col has already begun gathering topics, so please watch for further announcements. POC: Katie Smith Stilling, Strategic Analysis, Inc. kstilling@sainc.com

Inter-service/ Industry Training, Simulation and Education Conference (I/ITSEC). Scheduled for 2-6 December in Orlando Florida, I/ITSEC is the premier Modeling & Simulation and Training Conference and we hope once again for the Col to be well represented, including subarea leads and subject matter experts. POC: Katie Smith Stilling, Strategic Analysis, Inc. kstilling@sainc.com

Reliance 21 Col Update. The 2020 S&T Strategic Overview will be held 27-31 Jan at DARPA in Arlington, VA. This is an annual event for the S&T Executive Committee (ExCom) and Defense organizations with S&T funding to share information on programs and priorities and to discuss the Department’s S&T budget request and out-year investments. There are also presentations from Components and S&T Executives. Cols also present their Annual Update briefing to ExCom for visibility into their state of technology and future direction, with the ultimate goal of facilitating discussions on whether the Department is hitting the mark. POC: Katie Smith Stilling, Strategic Analysis, Inc. kstilling@sainc.com

NDIA Human Systems Division Conference. The 7th Annual Conference is on March 3-4, 2020 at the Sheraton Pentagon City Hotel in Arlington, VA with the theme: “*Human Systems within Multi-Domain Operations*”. The Division is hosting the event and works closely with the Human Systems Col to help advance the shared mission to develop and deliver new human-centered technologies which improve mission effectiveness. The forum typically draws over 100 government and industry attendees from an array of small and large businesses, national laboratories, and academia. Interaction during presentations, poster displays, and demonstrations not only advances understanding of the unique challenges of dynamic military environments, but discusses approaches to overcoming them. Abstracts will close 11 December. For more information, go to NDIA.org/HumanSystems20. POC: Katie Smith Stilling, Strategic Analysis, Inc. kstilling@sainc.com

Department of Defense Human Factors Engineering (HFE) Technical Advisory Group (TAG) Meeting. The TAG meets annually and is hosted by a different Service or Agency each year, with the Navy hosting HFE TAG 74 in May 2020. The meeting facilitates working-level coordination of Federal agencies that engage in research, development, testing, evaluation, and acquisition to share best practices, identify technical issues and technology gaps, and hopefully minimize redundancy across Services and Agencies. The TAG also provides an opportunity for cross-community coordination, updates on active projects, status of HFE within each organization and community, and development work on important standards.

This is a DoD event organized and conducted by the participating Services and Agencies (Army, Navy, Air Force, DHS, FAA, NASA, and VHA) via their representation on the Executive Committee and under the guidance of the proponent organization in the Office of the Under Secretary of Defense for Research and Engineering. These meetings provide an important forum to integrate and synchronize efforts across the Services and Agencies. The call for abstracts will begin soon, and HS Col members at large are invited to submit abstract ideas. For questions about the meeting or call for abstracts please contact Dr. Ben Petro (TAG Proponent) or TAG coordinator Dr. Liana Algarín, liana.m.algarin.ctr@mail.mil

Major Annual Upcoming Events 2019/2020

Roadmap Review w/OSD	Nov
ARAP Proposal Data Call	Nov
I/ITSEC	Dec
2020	
Reliance 21 Meeting	Jan
NDIA Human Systems Conference	Mar
NDIA S&ET Conference	Apr
Human Factors Engineering TAG	May
DoD Laboratory Day	Jun
Seedling Proposal Data Call	Jun
COI Steering Group/All Hands	Sept/ Oct



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From Our Stakeholders and Partners

USMC Training and Education Command (TECOM) S&T Expo. Since 2015, TECOM has hosted an annual S&T Expo at Quantico in partnership with the Office of Naval Research (ONR) Code 34, Human Performance, Training, and Education (HPT&E) Program. The S&T Expo enables Marine Corps training and education stakeholders to better understand programs focused on addressing learning related gaps and needs, and to directly provide feedback to S&T partners to inform product development. This year's expo was held on 24 Sep 2019 in Quantico, VA and provided greater visibility of Marine Corps S&T needs and initiatives to government, industry, and academic partners to facilitate future partnerships. During the event, participants observed prototype demonstrations and interacted with a variety of technologies that included augmented reality and human performance sensors. The 39 ONR and three USAF exhibits also provided information on S&T programs aiming to enhance military decision-making, expertise development, instructor development, resilience, and human performance. Over 150 people participated in the event from the Marine Corps, Department of Defense, Federal Government, industry, and academia. If your organization is interested in additional information or participating in future S&T Expos, please contact Dr. Kendy Vierling at kendy.vierling@usmc.mil

Advanced Distributed Learning (ADL)— Several great efforts or opportunities below! POC for each: outreach@adlnet.gov

- 1). ADL Initiative's global reach has expanded again. The Global Partnership Network, an ADL Initiative collaboration with allied militaries and multinational organizations like NATO, now includes 15 international defense organizations. The network helps to expand access to quality education and training by strengthening international ties and creating a community for sharing requirements, establishing common standards and specifications, and exchanging lessons learned. Ukraine signed-on as the latest ADL Global Partnership network member on 27 September after a NATO meeting in Kiev.
- 2). ADL Initiative, in collaboration with the National Training and Simulation Association, supported this year's iFEST e-learning science and technology event on 26-28 August in Alexandria, Virginia. Human Systems topics included learning through Virtual Reality and immersive technology; visual augmentation systems for close combat training; self-directed and self-regulated learning; alternate reality courses; and others. The event proceedings and presentations are available to the public at <https://www.trainingsystems.org/events/2019/8/26/91d0/proceedings>.
- 3). HS Col members are invited to visit ADL Initiative's booth #1159 at the I/ITSEC event in Orlando on December 2-6. In addition to the exhibit, ADL Initiative will be participating in two special events and presenting three papers. These include panels and papers on AI-empowered learning, modernizing learning, and emerging trends in learning.
- 4). The Elearning! Media Group in August identified ADL Initiative as a top 50 public and private-sector organization providing excellence in learning innovation, collaboration, and business performance. ADL Initiative was recognized for its ongoing development of a Learning Warehouse, which will be a secure cloud hosting environment where Defense and federal training/education managers can access and evaluate different platforms, systems, and tools. The ADL Learning Warehouse will serve as a bridge between research and practice, aiding the transition of ADL Initiative R&D deliverables into the operational community.

International Corner

5th International Congress on Soldier's Physical Performance (ICSPP). Hosted by the Human Performance Research and Development, Directorate of Fitness, Canadian Forces Morale and Welfare Services, this meeting carries on the rich legacy of knowledge sharing and dialogue among international partners from the first and second meetings in Jyväskylä in 2005 and 2011, followed by Boston in 2014 and finally the 4th ICSPP hosted in Melbourne by the Australian Defense Forces and the Defense Science and Technology Group. With over 500 participants and a world-leading scientific program, the latest edition has been a tremendous success. Our community has come together and shown the power of collaboration in a friendly collegial atmosphere, making this congress a premiere event for anyone working on optimizing the physical performance of the men and women serving our respective countries.



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International Corner (ICSPP Continued)

ICSPP is the most important international congress in applied military human performance research and therefore attracts experts from all over the world. The congress covers a broad range of disciplines including physical training programs and adaptations, occupational and physical performance, testing and assessment, injury prevention, public health and health promotion, nutritional considerations, human factors, ergonomics, equipment design, biomechanics, load carriage, gender integration issues, thermo-regulation and environmental issues, deployment considerations, and psychological and cognitive factors.

The 5th ICSPP will focus on translating knowledge to practice whereas symposia, poster sessions and featured science sessions by international experts will aim to influence change in practices, programs, services, policies and decision making. As such, we aim to bring researchers, practitioners, operators and leaders together in open discussions, thought-provoking brainstorming sessions and knowledge translation activities. We're confident the program will appeal not only to the military sector but also to delegates from a range of physically demanding occupations including emergency services, police, fire and ambulance. Website is at <http://www.icspp2020.ca/> POC: Karen N. Gregorczyk, Karen.n.gregorczyk.civ@mail.mil

Other Col Accomplishments

ATLAS Field Testing. On 20 & 27 Sep 2019, ONR HPT&E successfully conducted field-testing of the Assessment Toolkit for Leader Adaptability Skills (ATLAS) at the School of Infantry-East (SOI-E) at Camp Geiger, NC. ATLAS is a simulation-based assessment system that puts squad leaders in tactical mission contexts requiring adaptation. The purpose of ATLAS is to provide an objective and validated means of assessing the adaptive component of small unit decision making so that formal school and unit commanders can adjust and individualize training to create more adaptive squad leaders. The field test verified the effectiveness of ATLAS for measuring various levels of performance on several adaptability metrics. System measures will be refined based on the psychometric analysis and a second field test using a different vignette is being planned. POC: Dr. Peter Squire, peter.squire@navy.mil

Warfighter Augmented Reality (WAR) training. On 13 Oct 2019, ONR performers from Lockheed Martin conducted training using COTS technology with a fire support team from 1st Battalion, 6th Marines, 29 Palms, CA. The battalion, deployed from Camp Lejeune, NC, is participating in an Integrated Training Exercise/Marine Air Ground Task Force Warfighter Exercise (ITX/MWX). The Marines demonstrated the ability to coordinate the system with the Marine Corps Common Handheld (MCH) and, following two and a half hours of training, the team was able to run practice missions. All participants were familiar with previous virtual reality training simulations and felt this system was an improvement over previous versions in its ease of use and functionality. ONR will make improvements based on feedback after a month of experimentation with the battalion. POC: Dr. Peter Squire, peter.squire@navy.mil



Rapid After Action Capability Demonstration at Integrated Training Exercise. From 20-24 Aug, HPT&E performers from the Next Generation Training (NGT) for Infantry, Spectrum and Augmented Reality Training program participated in an Integrated Training Exercise (ITX) in 29 Palms, a service-level training exercise that evaluates Marine Corps units through a series of live fire and force-on-force training evolutions. The ONR team demonstrated a rapid after action report (AAR) capability using Integrated Tactical Decision Games during the free play force-on-force training evolution as part of the event. The team worked directly with Exercise Control in the AAR cell to develop the AAR products and showcased the capability to the Commanding General and training units at the conclusion of the exercise.

The AAR capability uses data from the Instrumented Tactical Engagement Simulation System battle management system and Tactical Video Capture System to develop detailed AAR products that can be used by exercise control and unit commanders to debrief their tactical actions and decision making processes within the evolution. The AAR capability allows units to draw out critical information that can inform training and reinforce learning points. The NGT team is now making capability improvements to support the next ITX (renamed to Marine Air-Ground Task Force (MAGTF) Warfighting Exercise) in 29 Palms. POC: Dr. Peter Squire, peter.squire@navy.mil



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Other Col Accomplishments (Continued)

Air Force Research Laboratory (AFRL) New Operating Location at Carnegie Mellon University (CMU). Both the 2018 “National Defense Strategy” and this year’s “United States Air Force Science and Technology Strategy” emphasize the important role of external partnerships in pursuit of innovative technological advantage to solve the military challenges of tomorrow. AFRL’s operating location at CMU follows this emphasis by embedding personnel on campus where they can work directly alongside faculty, post-docs and students on a daily basis. Key efforts include cognitive modeling, interactive task learning between humans and machines, and validation/verification techniques for artificial intelligence (AI) models -- including machine learning and human cognitive-processing models. A common challenge across these areas is in computational implementation of human and machine understanding, which has become an early focus of emerging collaborations. Together, CMU’s experts will work with AFRL scientists to address gaps in our knowledge of how to use AI to understand humans and how to improve capabilities for AI and humans to work collaboratively in challenging, dynamic task environments.

Following the establishment of AFRL’s new operating location, CMU kicked-off a University Center of Excellence in Trusted Human-Machine Teaming, funded by the Air Force Office of Scientific Research and the 711th Human Performance Wing. In addition, the Army AI Task Force launched its research hub at CMU’s National Robotics Engineering Center in February 2109. Connecting research to mission areas is bolstered by pioneering efforts in AI engineering at the Software Engineering Institute, a DoD federally funded research and development center located on the CMU campus. Overall, the new AFRL operating location at CMU places AFRL at the heart of efforts connecting Defense researchers with the broader AI research community. POC: Dr. Leslie Blaha, 711 HPW leslie.blaha@us.af.mil

Next Generation Training Technology Demo at V16’s Field Exercise Five. From 17-22 August, ONR Code 34’s Next Generation Training for Infantry, Spectrum and Augmented Reality Training (NGT) program demonstrated and received Marine feedback on two different training technologies during the 1st Battalion, 6th Marine Regiment’s (V16’s) Field Exercise 5 (FEX V) at Camp Lejeune. The first technology was a training variant of Warfighter Augmented Reality (outdoor low-cost, commercial gaming hardware for observer training), which was demonstrated at an observation post overlooking the largest east-coast USMC impact area. Attendees included the V16 Operations Officer, V16 Weapons Company commander, and the director of the 10th Marines Artillery Training School. Despite known hardware limitations, the Operations Officer wanted to keep the system and use it as-is. He has requested ONR provide a complete team set of four for his Battalion’s use in preparation for V1/6 Integrated Training Exercise (ITX) in September, and MWX 1-20.

The second technology demonstrated was the latest release of the Radio Frequency (RF) Propagation Visualization software. Initially, the system used actual transmitter characteristics including transmit power, frequency, and bandwidth to visualize the probability of detection according to the Sandbar propagation model. These parameters were then adjusted in a series of “what if” scenarios in order to determine their effects on the battalion’s EM footprint. V16 provided a debrief which included feedback on the system and requests for additional features that would help them in future field exercises.

POC: Dr. Peter Squire, peter.squire@navy.mil

More From Our Stakeholders and Partners

DoD Combat Feeding Research & Engineering Program (CFREP) Technology Demonstration. On October 3, 2019, the Office of the Under Secretary of Defense for Research and Engineering Human Systems Directorate hosted the CFREP demonstration at the Pentagon Conference Center in Arlington, VA. Representatives from the U.S. Army Combat Capabilities Development Command – Soldier Center (CCDC SC) Combat Feeding Directorate and the U.S. Army Research Institute of Environmental Medicine (USARIEM) provided ration and prototype samples and engaged attendees on current and future combat feeding materials. Senior DoD leadership in attendance included Dr. Lisa Porter, Deputy Under Secretary of Defense for Research and Engineering, Dr. Milan Nikolich, Director of Defense Research and Engineering for Research and Technology, and Dr. JihFen Lei, Deputy Director for Research, Technology & Laboratories. The live demonstration of military nutrition, operational rations, and field feeding concepts provided an insightful hands-on experience for senior DoD leadership and other attendees regarding the importance of CFREP’s work in addressing the practical needs of our warfighters.



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From Our Stakeholders and Partners (CFREP Continued)



Dr. Milan Nikolich &
Mr. Stephen Moody

Led by Mr. Stephen Moody, Director of Combat Feeding, the demo showcased work the CFREP team is doing to ensure the survivability and lethality of our combat forces. CFREP is a DoD Joint Program run by the Army to optimize Warfighter performance and overmatch by leveraging cutting-edge technologies, nutritional strategies, and interventions. The Joint program is developing novel science and technology solutions for warfighter nutrition, such as reducing the mass and weight of the warfighter's supplies. The team is also leveraging emerging biotechnologies for military nutrition, and this aligns with the OUSD biotechnology modernization roadmap.

The Directorate provided these prototype samples of military nutrition, operational rations, and field feeding concepts:

- ♦ Chocolate Performance Readiness Bars (provided by USARIEM)
- ♦ Meals – Ready-to-Eat (MREs), Beef Goulash, High Protein Pudding
- ♦ Meals – Cold Weather (MCWs), Beef Stew, Mexican Style Chicken & Rice
- ♦ First Strike Rations (FSRs) - Shelf Stable Barbeque Pork Wrap, Filled French Toast
- ♦ Close Combat Assault Rations (CCARs) - Vacuum-Microwave Dried (VMD) Lemon Cheesecake Bar, Toasted Toffee Dessert Bar – Extruded



CFREP is leveraging nutritional S&T to lighten warfighter load while ensuring peak nutrition for optimal performance. MREs provide excellent nutrition; however, they are bulky and a one week supply more than fills a standard rucksack. FSRs were developed over the last decade to allow an expeditionary force to carry sufficient food for limited combat operations. CCARs are the next generation combat rations that have 42% less volume and weigh 39% less than FSR, leaving more than half of the rucksack available for additional supplies while providing a variety of meal options.

In addition to load reduction, the latest nutritional interventions are designed for gut microbiome and biological optimization. The Go for Green USARIEM Performance Readiness Bars include calcium and vitamin D to supply warfighters with necessary nutrients for growing muscles and strong bones. Omega-3 and caffeine are incorporated to improve cognitive performance, situational awareness, alertness, and decision-making. Contributions from CFREP and USARIEM ensure our warfighters never find themselves in a fair fight! POC: Dr. Liana Algarín, Liana.M.Algarin.CTR@mail.mil

Other News

New Website for the Human Systems Directorate (HSD). The Office of the Under Secretary of Defense for Research and Engineering's HSD has a new website at <https://rt.cto.mil/ddre-rt/dd-rtl/hsd/>. HSD strives to ensure DoD S&T will maximize Warfighter lethality. On the new website, you can see both the HSD vision and mission, plus highlights of HSD's four portfolios, each of which addresses one facet of DoD S&T HSD partners who are supporting this effort.

Vision: Superior Warfighter lethality in all domains through innovative research and Science & Technology policy.

Mission: Frame, shape, integrate, and oversee DoD research investments, policies, and practices to ensure Warfighter dominance across all military operations.

Human Systems Portfolio: Research targeted to assess and optimize performance, nutrition, cognition, and integration with manned, unmanned, and autonomous systems for seamless operation in all domains.

Medical and Life Sciences Portfolio: Research targeted to optimize the Military Health System's ability to both provide cutting-edge care for the warfighter and their families, and leverage biological science advances for Defense innovation.

Environmental Sciences Portfolio: Research targeted to understand, project, assess, and mitigate challenges and hazards the warfighter likely will encounter in current and future operational environments.

Regulatory Oversight Portfolio: Ensure DoD-wide awareness of and compliance with statutes, regulations, guidelines, policies, and procedures for human subjects and animal use in research and training. Partners include HFE TAG, the National Science & Technology Council (NSTC), Armed Services Biomedical Research Evaluation and Management Col, Autonomy Col, and – *everybody's favorite* – the Human Systems Col.

An additional products page for Distro A documents that highlight HSD-related achievements is coming. If you'd like to submit documents to the HSD website or just have questions, contact the HSD website POC for Content and Approval and liaison to the OUSD(R&E) Webmaster, Dr. Liana Algarín at Strategic Analysis, Inc., Liana.M.Algarin.CTR@mail.mil.



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Human Systems Col – SUB-AREA LEADS & MEMBERS

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Protection, Sustainment and Warfighter Performance (PSWP)

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Human Systems Community of Interest (HS Col) Newsletter



Nov 2019

Human Systems Col – SUB-AREA LEADS & MEMBERS

System Interfaces and Cognitive Processing (SICP)

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