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CONTENT

FROM THE PRESIDENT

Greetings! It is my privilege to introduce this issue of *Call Signs*, focused on international scientific and technology collaboration of U.S. Naval Aerospace Experimental Psychologists through engagement with our NATO partners.

The 2025 National Security Strategy reframes U.S. relations with our international partners, including NATO, emphasizing greater burden-sharing, more distributed responsibility, and deeper collaboration among allies.

For Aerospace Experimental Psychologists, this environment elevates the importance of multinational science and technology partnership, particularly where human performance, training, and system-integration challenges benefit from shared data, common standards, and coordinated research.

In this issue, we highlight how our profession contributes directly to that collective technical foundation. We begin with a practical overview of how U.S. scientists can engage with NATO science and technical committees, followed by articles from AEPs currently working within NATO groups. Their contributions span cybersickness in VR training, human-autonomy teaming, and the development of standardized languages, survey tools, and methodological recommendations for use across partner nations.

We also highlight junior officers who recently presented their research at a NATO conference in Bavaria, providing an example of how early-career engagement strengthens both professional development and long-term Allied cooperation.

The issue concludes with a profile of LCDR Knapp, whose transition from naval flight officer to AEP reflects the operational grounding and analytic expertise that define our community.

As our strategic landscape evolves, the efforts highlighted herein demonstrate how Aerospace Experimental Psychologists advance U.S. and Allied capabilities together through coordinated, evidenced-based collaboration. This issue of *Call Signs* underscores strength through partnerships. Thank you for reading and for remaining connected to our community.

Very respectfully,

- President, CDR Brennan “Tip” Cox
- Vice President, LCDR Stephen “Bacon” Eggan
- Secretary, LT Kaila “Wizzle” Vento
- Treasurer, LT Brittany “Cat$” Neilson
- Editor-in-Chief, LT Adam “DOM” Braly
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BUILDING BETTER WARFIGHTERS

NATO science committees unite medicine and human performance research

By: LCDR Mike "Tinder" Natali, Ph.D, AEP #150

The NATO Scientific and Technical Committees (STCs) offer unparalleled opportunities for collaboration and innovation in science and technology, particularly through the Human Factors and Medicine (HFM) Panel. These initiatives are highly relevant to Aerospace Experimental Psychologists (AEPs) and professionals with comparable expertise in human factors, psychology, research, and human performance. By engaging in these international activities, experts in these domains can contribute to advancing defense and aerospace medicine, fostering innovation, and strengthening partnerships across NATO nations.

Overview of the NATO HFM Panel

The NATO Science and Technology Board (STB) oversees eight Scientific and Technical Committees, including the HFM Panel, which focuses on enhancing human performance, resilience, and decision-making in complex operational environments. The panel's program of work addresses critical topics such as human-machine teaming, cognitive warfare, physiological optimization, and emerging biotechnologies.

Research activities within the HFM Panel are designed to address challenges faced by NATO nations in defense and aerospace contexts. These initiatives aim to optimize operational readiness, improve resilience in high-stress environments, and develop evidence-based strategies to enhance performance in complex scenarios. Participation in these activities provides an opportunity for experts to contribute to global advancements in science and technology while fostering collaboration among NATO allies.

Relevance to Aerospace Experimental Psychologists

Aerospace Experimental Psychologists possess expertise that is directly applicable to the HFM Panel's focus areas, to include human factors, aviation psychology, and operational performance. Our work in science and technology, research and development, and acquisitions commands across Naval Aviation and the Navy Medical Research and Development Enterprise also provides strategic positioning to support these groups, making AEPs ideal candidates for contributing to NATO's research initiatives.

Participation in NATO HFM activities offers several benefits:

Application of Expertise

Opportunities to address challenges in aviation and defense, such as optimizing aircrew performance in high-stress environments or integrating artificial intelligence into training systems.

Advancement of Innovation

Contributions to cutting-edge research that shapes the future of aerospace medicine and human performance, including initiatives focused on cognitive warfare, human-machine teaming, and biotechnologies.

Global Collaboration

Engagement with international experts, fostering relationships that enhance interoperability and shared knowledge among NATO allies. Collaborative efforts can lead to long-term advancements that benefit both national defense and the broader international community.

Professional Development

Exposure to diverse perspectives and methodologies, enriching profes-

sional growth and expanding the impact of expertise in human factors and related fields.

2025 HFM Research Opportunities: A Snapshot

Although the 2025 opportunities are now closed, they provide a clear example of the breadth and relevance of the HFM Panel's work. The following research activities highlight the alignment between these initiatives and the expertise held by AEPs:

Flying Environment to Achieve Physiological Currency (HFM 417 RTG)

Research focused on optimizing the flying environment to maintain physiological readiness for aircrew, addressing challenges related to physiological stress and performance in aviation contexts.

AI in Military Training (HFM 418 RTG)

Exploration of artificial intelligence to revolutionize military training and education technologies, enhancing learning outcomes and operational preparedness through advanced AI-driven methods.

Human-Swarm Interaction (HFM-AVT 420 RTG)

Investigation into human interaction with autonomous swarms, emphasizing effective communication, control, and decision-making in multi-agent systems for military operations.

Human Performance Biotechnologies (HFM 421 RTG)

Integration of biotechnologies to enhance human performance by enabling sense-and-respond capabilities and optimizing human-machine teaming in multi-domain operations.

Medical Additive Manufacturing (HFM 423 RTG):

Research into leveraging additive manufacturing (3D printing) for medical applications, including battlefield medicine and personalized healthcare solutions.

Exercise for Mental Fatigue Resistance (HFM 424 RSM)

Examination of the role of exercise in mitigating mental fatigue, aiming to develop evidence-based strategies to enhance cognitive resilience in high-stress environments.

Cognitive Warfare Methods (HFM 426 RTG)

Advancement of psychological and neuroscience-based defense strategies, addressing cognitive warfare methods and technologies to enhance operational effectiveness.

Multi-Domain Human-Machine Teaming (HFM-SCI 430 RTG)

Investigation into human-machine teaming across multiple domains, emphasizing meaningful human control and integration of AI systems to improve decision-making and operational outcomes.

These initiatives, among others, underscore NATO's commitment to advancing human factors and medicine in defense contexts.

Participation Process

Nomination for participation in NATO HFM activities involves submitting a package that includes the following:

(1) Security Form: Verified by the nominee's home command security office for individuals with an active security clearance.

(2) Support Letter: Signed by an authorized individual in the nominee's organization to confirm support for their time and travel.

(3) Short Bio: A concise CV, resume, or bio (1–2 pages preferred).

It is important to note that funding for time and travel must come from the nominee's home organization. While the 2025 opportunities are now closed, future calls for participation will provide new avenues for engagement.

Looking Ahead

The HFM Panel's research activities are designed to address the evolving challenges of modern warfare and defense. Experts in human factors, psychology, and related fields can contribute to solutions that enhance operational readiness, resilience, and decision-making in aviation and beyond. These collaborations not only advance NATO's mission but also strengthen national capabilities by integrating global innovations into domestic practices.

Future calls for participation will offer opportunities for professionals to engage in these initiatives. Preparing nomination packages early and staying informed about upcoming opportunities will ensure readiness to contribute to these efforts. The expertise of Aerospace Experimental Psychologists is vital to shaping the future of human performance and aerospace medicine, with lasting impacts on both national and international defense efforts.

For more information on upcoming opportunities, visit the NATO Science and Technology Organization website or contact your command's research liaison. These initiatives represent a unique chance to advance human factors and medicine in defense contexts, fostering innovation and collaboration for the challenges of tomorrow.

CYBERSICKNESS IN NAVAL AVIATION

AEPs contribute key insights through NATO HFM-346 research

By: LT Sarah Beadle, Ph.D, AEP #164 & CDR Brennan "Tip" Cox, Ph.D., AEP #142

Historical Perspective

The AEP community has a long history of work in the motion sickness, simulator sickness, and now cybersickness field. We'd be remiss if we did not acknowledge the historical contributions of AEP #10 Bob Kennedy as we get into this topic. You'll see later in this issue we highlight the Simulator Sickness Questionnaire (SSQ) he developed is still considered the baseline and best practice for measuring symptoms in the field- not only in our community but with our NATO Allies worldwide. It is a pleasure to know when we represent the community and the U.S. Navy's science apparatus in this field, people still reflect on the role Bob Kennedy played in quantifying the phenomena and using the science to directly impact Naval Aviation. The August 2020 issue of Call Signs has a dedication to Bob Kennedy's career worth a read.

Figure 1. https://www.navair.navy.mil/news/Project-Link-New-T-45-Mixed-Reality-Trainer-improves-readiness/Fri-10112024-0807

Current State

As virtual and mixed reality (VR/MR) systems become increasingly embedded in aviation training pipelines, cybersickness remains an unintended outcome. Cybersickness can manifest as disorientation, nausea, headache, eye strain, and altered postural stability. These effects may reduce training throughput, increase drop□out, degrade learning transfer, and create safety risks when trainees leave simulators disoriented.

As Aerospace Experimental Psychologists (AEPs), we are uniquely positioned to address this issue. With expertise in human factors engineering, human performance, and human systems integration, AEPs serve across the full lifecycle of aviation training systems—from concept to cockpit. Our collective efforts to mitigate cybersickness are advancing both U.S. and international understanding of VR/AR systems.

AEP Contributions Across Naval Aviation

AEPs are stationed at key points within the naval aviation training ecosystem, each playing a vital role in understanding and mitigating cybersickness:

NAMRU-D (Naval Medical Research Unit Dayton):

AEPs at NAMRU-D conduct human subjects research, to include mechanistic studies (vestibular, ocu-

lar, postural) and controlled trials to evaluate mitigation strategies and produce evidence supporting aeromedical policy.

NAWC-TSD (Naval Air Warfare Center Training Systems Division):

AEPs at NAWC-TSD apply experimental validation and human-in-the-loop test protocols to measure training effectiveness while quantifying cybersickness risk across hardware/software variants.

CNATRA (Chief of Naval Air Training):

AEPs embedded with CNATRA convert field observations into iterative improvements—adjusting curriculum sequencing, exposure timing, and locally appropriate mitigation tactics. These efforts ensure VR/AR training systems are implemented effectively for operational use, leveraging insights from cybersickness studies to optimize training outcomes.

PMA-205 (Naval Aviation Training Systems & Ranges Program Office):

AEPs at PMA-205 embed human factors criteria into requirements and procurement language, ensuring devices meet physiological tolerances aligned with training goals. Here, we oversee the full lifecycle acquisition of training systems, addressing cybersickness concerns from design to deployment.

This distributed presence allows AEPs to link laboratory findings to acquisition decisions and operational practice, facilitating rapid evidence-informed changes that reduce risk across the training enterprise.

NATO's HFM-346: A Multinational Research Effort

In 2023, the NATO Human Factors and Medicine (HFM) and Modeling and Simulation Group (MSG) launched Research Task Group HFM-346: Assessment of Factors Impacting Cybersickness. With over 30 participants from nine partner nations—including the U.S., Canada, UK, Germany, and Australia—HFM-346 aims to develop standardized methodologies, shared datasets, and cooperative demonstrations to guide defense use of immersive systems. The final report, due in June 2026, will provide practical recommendations across training, acquisition, and operational domains.

The group's work is organized into six work packages (WPs), with examples of AEP contributions highlighted below:

WP1: Standardization of Measures:

Cybersickness research has long suffered from inconsistent tools. WP1 focuses on standardizing subjective scales like the Simulator Sickness Questionnaire (SSQ) and Motion Sickness Assessment Questionnaire (MSAQ), as well as hardware specifications (e.g., field of view, resolution, latency) and stimulus descriptors.

Example: At CNATRA, student naval aviators using VR/AR devices reported symptoms using the SSQ, revealing that oculomotor strain was more prevalent than nausea—an insight that informs both hardware selection and training protocols.

WP2: Visual Factors and Eye Movements:

The visual system is central to cybersickness. WP2 investigates how optic flow, depth perception, and accommodation-convergence conflicts contribute to symptoms. Eye strain and blurred vision, often precursors to nausea, are studied in relation to dynamic visual acuity and gaze behavior.

Example: NAMRU-D's research into the vestibulo-ocular reflex and cerebellar adaptation has highlighted how inter-system sensory conflicts—especially between visual and vestibular inputs—can trigger cybersickness in VR environments.

WP3: Personal Factors:

Individual susceptibility varies widely. WP3 explores demographic, biological, and psychological traits that influence cybersickness vulnerability, such as age, sex, ethnicity, and visual dependence.

Example: Naval flight students showed low overall cybersickness prevalence, but qualitative data revealed nuanced symptom profiles. These insights help tailor training systems to individual needs and inform personnel selection strategies.

WP4: Temporal Dynamics and Training Impact:

Cybersickness isn't just about onset—it's about duration, recovery, and retention. WP4 examines how symptoms accumulate, habituate, and affect users throughout their experience and beyond (e.g., training transfer). Understanding these patterns can guide scheduling, grounding policies, and dropout risk mitigation.

Example: Studies show that while habituation can reduce symptoms over time, it may also increase postural instability—a tradeoff that must be managed in flight training environments.

WP5: Theoretical Foundations:

WP5 revisits the neural mismatch theory and other conflict models to refine our understanding of cybersickness mechanisms. By integrating

cognitive, visual, and vestibular models, researchers aim to build predictive frameworks for system design and user experience.

Example: NAWC-TSD's work on display ergonomics and content design—such as reducing optical flow or adjusting reference frames—has led to tangible improvements in headset tolerability and training outcomes.

WP6: Implications for Military Application:

WP6 considers how findings from the report apply specifically to military populations, offering recommendations to leaders on selecting, implementing, and monitoring VR/AR systems for both intended and unintended outcomes.

Practical Recommendations and Partner Engagement

As HFM-346 progresses toward its final report, several near-term actions can accelerate safe, effective integration of immersive systems:

- Adopt the recommended reporting set for VR/AR headset specifications, stimulus descriptions, and participant motion context.
- Implement brief subjective monitoring protocols and longitudinal tracking to quantify incidence, habituation, and recovery.
- Prioritize non-sedating mitigation strategies: ergonomic headset fit, inter-pupillary distance (IPD) calibration, graded exposure, and content design changes.
- Collaborate on cooperative demonstrations and pooled datasets to power analyses of susceptibility and temporal effects.

Conclusion: AEPs Leading the Way

Cybersickness is a solvable risk when human-centered science, acquisition policy, and operational practice align. AEPs are uniquely equipped to address this challenge, leveraging our expertise to enhance human performance and systems integration. Through international collaboration on projects like NATO's HFM-346, AEPSs are advancing the understanding of cybersickness, developing mitigation strategies, and ensuring the effective use of VR/AR technologies in military training. This work benefits not only the U.S. Navy but also allied partners—informing procurement, shaping courseware, and defining operational limits for immersive training systems.

Figure 2. https://navalaviationnews.navy.mil/Editorial-Staff-Tools/Article-Submission/Article-Display/Article/4006601/onr-techsolutions-delivers-new-realistic-flight-simulator/

ADVANCING HUMAN-AUTONOMY TEAMING IN NATO

And how AEPs are shaping multinational standards

By: CDR Joseph "Beans" Geeseman, Ph.D., AEP #148, CDR Brennan "Tip" Cox, Ph.D., AEP #142, & LT Adam "DOM" Braly, Ph.D., AEP #162

As autonomous systems increasingly redefine the battlespace, the imperative to integrate human factors engineering and human systems integration (HFE/HSI) into their design and deployment has never been more urgent. U.S. Naval Aerospace Experimental Psychologists (AEPs) have long served as subject matter experts in optimizing human-machine interaction across manned and unmanned platforms. This expertise is critical not only for advancing U.S. capabilities but also for fostering international collaboration, as demonstrated by the NATO Human-Autonomy Teaming Specialist Team (HAT-ST) in support of the Joint Capability Group for Unmanned Aircraft Systems (JCGUAS). Our recent work on the NATO Autonomy Guidelines exemplifies how AEPs enhance interoperability, safety, and operational effectiveness across allied nations.

AEPs in NATO: A Legacy of Leadership and Innovation

For over 15 years, AEPs have played a pivotal role in shaping NATO's approach to unmanned systems and autonomy. CDR Brent Olde (ret.) previously chaired the Human Factors Specialist Team (HFST), and CDR Joe Geeseman currently chairs the HAT-ST, along with members CDR Brennan Cox and LT Adam Braly. Our ongoing work ensures that autonomous systems are not only technically robust but also operationally viable, ethically sound, and aligned with the cognitive and behavioral realities of human operators.

JCGUAS and HAT-ST: Strategic Function and Organizational Context

As a key NATO body, the JCGUAS oversees the development and implementation of unmanned aircraft systems (UAS) capabilities. Its focus spans operational requirements, interoperability, and the integration of emerging technologies like autonomy and artificial intelligence (AI). Its mandate includes harmonizing technical standards, facilitating integration across national platforms, and supporting policy development related to airworthiness, safety, and operational employment of UAS.

Within this structure, the HAT-ST is tasked with advancing human-autonomy teaming concepts, developing autonomy guidelines, and identifying priorities for future STANRECs. The team comprises representatives from seven NATO member nations and meets regularly to refine guidance documents, conduct survey-based research, and support NATO's broader standardization objectives.

Understanding STANRECs: Purpose and Development Process

A STANREC (Standardization Recommendation) is a formal NATO document that encourages—but does not mandate—the adoption of common standards, procedures, or technical solutions. It occupies a position below the STANAG (Standardization Agreement) in NATO's standardization hierarchy and is particularly suited for emerging technologies or practices that require further validation before binding adoption.

The development of a STANREC follows a structured process:

- Identification of a standardization need by a NATO body or working group
- Endorsement by a Tasking Authority (e.g., ACT or ACO)
- Drafting by a custodian working group, referencing existing standards and operational lessons learned
- Consultation with NATO member states and relevant bodies
- Approval and publication by the NATO Standardization Office (NSO)
- Periodic review and potential elevation to STANAG status upon broad adoption
- This process enables NATO to accelerate interoperability while preserving national flexibility, particularly in domains characterized by rapid technological evolution.

The NATO Autonomy Guidelines STANREC: A Case Study in Human-Centered Standardization

The HAT-ST's recent development of the NATO Autonomy Guidelines STANREC exemplifies the effective integration of human systems expertise into multinational standardization. Completed in under 18 months—a timeline recognized by senior NATO leadership as exemplary—the guidelines were field-tested at Exercise REP(MUS) in Portugal and are scheduled for version 2 promulgation in summer 2026.

The Autonomy Guidelines comprise three foundational components:

1. **Lexicon:** A standardized vocabulary for autonomy-related terminology, resolving ambiguities and promoting consistent communication across NATO and partner nations. It includes definitions for key concepts such as "autonomy," "automatic systems," and classifications of human involvement (e.g., Human-In-the-Loop, Human-On-the-Loop, Human-Off-the-Loop). For example, the guidelines distinguish "Frozen AI" (fixed parameters post-development) from "Adaptive AI" (evolving during deployment).
2. **Ontology:** A conceptual framework for understanding the relationships among autonomy-related entities, including governance structures, system health, fault detection, human-machine teaming, and ethical oversight. It supports both hierarchical and relational mapping, enabling practitioners to visualize dependencies across domains.
3. **Taxonomy:** A structured method for classifying autonomous functions along eight dimensions:
    - Domain (e.g., air, land, maritime)
    - Human involvement
    - Input types
    - Compliance and oversight
    - Control layer
    - Readiness level
    - Behavior transparency
    - System interdependence

For instance, an airborne obstacle avoidance function may be classified as "Human-Off-the-Loop," with inputs including terrain maps and live sensor data, and outputs involving optimized flight paths and geofenced safety buffers. This classification facilitates comparative analysis and supports procurement, certification, and operational planning.

Building on a Legacy: STANREC 4685 and Beyond

The Autonomy Guidelines STANREC builds upon the foundation laid by STANREC 4685, "Human Systems Integration Guidance for Unmanned Aircraft Systems," developed by the HFST. That document emphasized usability, workload management, and operator trust—principles that continue to inform current efforts.

Through collaboration with the European Defence Agency (EDA), the HAT-ST has ensured alignment between NATO and EU standards, promoting interoperability and ethical deployment across multinational operations.

Survey Development and Future Priorities

In addition to guideline development, the HAT-ST has published the "2023 Human Factors for UAS Questionnaire Report" and the "2025 JCGUAS Standards Prioritization Survey." These instruments support evidence-based prioritization of future STANRECs and reflect the team's commitment to continuous improvement through stakeholder engagement.

Conclusion

The contributions of AEPs to NATO's autonomy standardization efforts underscore the strategic importance of human systems expertise in shaping the future of defense technology. Through leadership in the HAT-ST and the development of foundational documents such as the Autonomy Guidelines STANREC, AEPs are advancing both national and international understanding of human-autonomy integration.

CDR Joe Geeseman and CDR Brennan Cox, pictured with members of the HAT-ST from the Netherlands, Germany, Canada, and United States, at the JCGUAS Fall Conference 2024 Gala dinner.

AUTONOMY TAKES CENTERSTAGE

And AEPs are defining how NATO integrates it

By: CDR Joseph "Beans" Geeseman, Ph.D., AEP #148, CDR Brennan "Tip" Cox, Ph.D., AEP #142, & LT Adam "DOM" Braly, Ph.D., AEP #162

Autonomous systems are now central to how NATO expects to operate in the future. The pace of change across the Alliance is accelerating and every member nation recognizes the need to prepare for autonomy that will be present in day-to-day missions. As we discussed previously in this issue of Call Signs, the NATO Autonomy Guidelines STANREC laid the foundation for common terminology, classification approaches, and human roles in autonomy. That document, including considerable contributions by U.S. Naval Aerospace Experimental Psychologists, reinforced that fielding autonomy responsibly depends on understanding how humans and autonomous systems work together.

Building from that foundation, the NATO Joint Capability Group for Unmanned Aircraft Systems (JCGUAS) recently requested the Human-Autonomy Teaming Specialist Team (HAT-ST) to conduct the 2025 Standards Prioritization Survey. The intent was to understand what the international community views as the most urgent standardization needs. Responses came from 14 NATO nations and mission partners, showing both the breadth of coalition engagement and the degree to which autonomy integration has become a shared priority. The United States and Canada led participation, followed by several European partners with increasing investment and operational interest in autonomy-enabled systems.

The results demonstrate a coalition that is preparing for a future where autonomous systems must fight and survive in highly contested environments while still working effectively as part of a broader human-machine team. These themes closely align with the challenges Naval Aviation is working to solve in our own programs.

Near-Term Priorities: Safety, Trust, and Interoperability

For the next two years, NATO partners identified a clear set of standardization priorities focused on fielding autonomy that can be trusted in operational settings (see Figure 1). The highest ranked needs included Sense and Avoid, coalition interoperability, and data and sensor fusion. These priorities are the core elements that allow multiple systems to operate in the same space without creating new hazards or information conflicts for operators. This near-term view reflects a pragmatic approach. Nations want to establish standards that ensure autonomy supports safe flight and contributes meaningful information to operators before scaling to more advanced tasks.

Mid- and Long-Term Priorities: Resilient Autonomy at Scale

Looking toward the next five to ten years, priorities shift toward contested and denied operational environments (see Figure 2). The two top-ranked priorities for this timeframe involve continuing operations when communications and networks are degraded or intentionally denied. The need for resilient autonomy, able to recognize threats and maintain

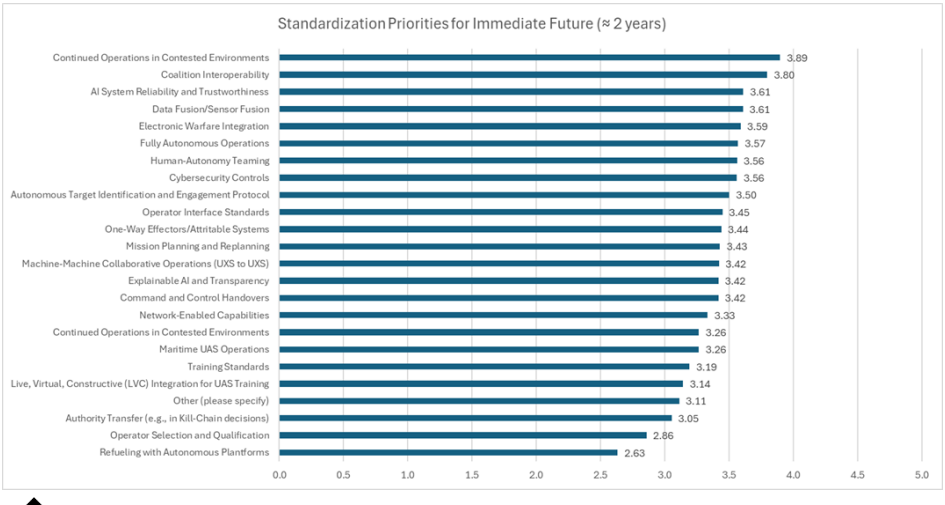


Figure 1. Top 5 Near-Term (2-Year) Standardization Priorities

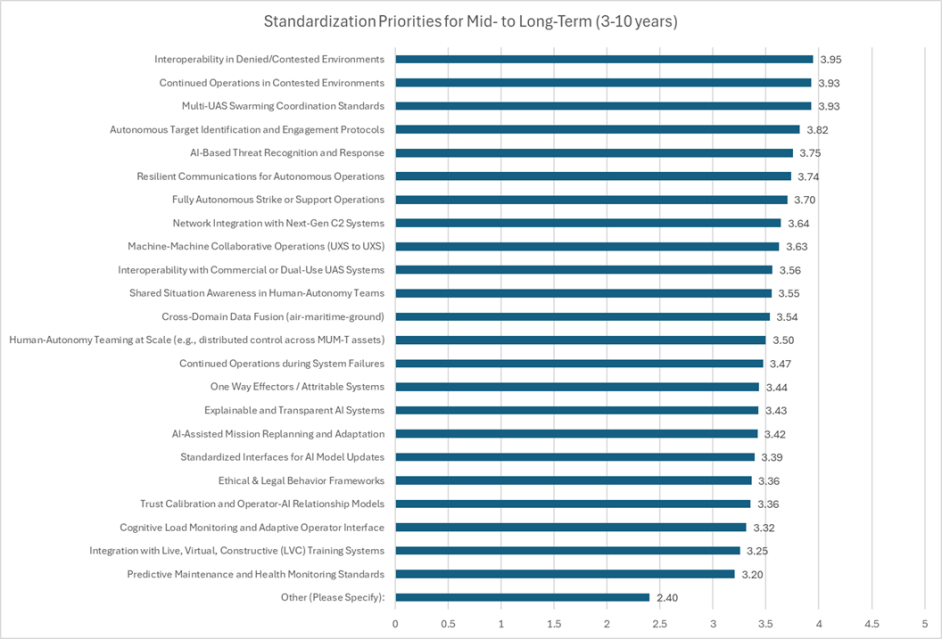


Figure 2. Top 5 Mid-/Long-Term (3–10 Year) Standardization Priorities

mission progress without constant human direction, becomes increasingly important. These results show that the Alliance expects autonomous systems to be ready for high-end conflict. Autonomy will not remain a supporting capability on the sidelines. It will need to survive in the fight (i.e., contested environments).

What Nations Want Demonstrated in Exercises

Responses to demonstration and experimentation needs tell an even more compelling story (see Figure 3). The top requested capability for upcoming NATO exercises was multi-UAS coordination and swarming. Electronic warfare resilience and continued operations in contested environments closely followed. Interest in machine-machine coordination, attritable systems, and dynamic mission replanning also ranked high. Coalition partners want to see autonomy perform where it matters most. If a capability cannot function in an operationally relevant scenario, it is unlikely to transition to real-world use. These results give NATO a clear mandate to shape exercise content and coalition testing around resilient collaborative autonomy.

These survey results are already informing future STANREC priorities and upcoming multinational exercises. They will contribute directly to the next update of the NATO Autonomy Guidelines, planned for 2026. The findings also reinforce that human-autonomy teaming must continue evolving toward distributed operations across larger formations of manned and unmanned systems. The contributions of our community will ensure that NATO fields autonomy in a responsible and operationally effective way that supports the warfighter every step of the way.

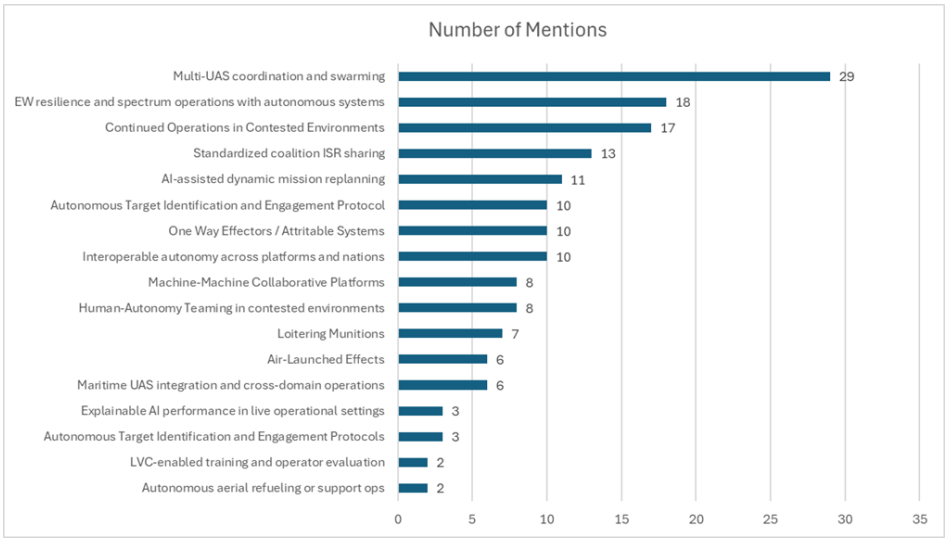


Figure 3. Top Requested NATO Exercise Demonstrations and Experimentation

Why This Matters to AEPs

This shift in NATO priorities aligns directly with the growing role of Aerospace Experimental Psychologists in autonomy programs. AEPs bring a uniquely qualified perspective on operational psychology and human-machine integration. The community is expanding its experience in UAS and autonomy, providing expertise that connects human cognition and performance to system behavior in real missions.

LIEUTENANTS IN THE ALPS

First-tour officers join RAMS and NATO HFM-350 in Bavaria

By: LT Xan "Carny" Kaplan, PhD, AEP #165 & LT Kaila "Wizzle" Vento, PhD, AEP #169

Against the majestic backdrop of the Bavarian Alps in Garmisch-Partenkirchen, Germany, the 2024 RAMS/NATO STO HFM-350 Aerospace Medicine Summit and Technical Course convened, offering a vital forum for addressing critical challenges in military aviation health. This prestigious event, recognized for its collaborative atmosphere and groundbreaking research, brought together leading experts from around the globe to explore innovative solutions and disseminate best practices. Among the esteemed presenters at the 2024 summit were two first-tour Lieutenants, LT Kaplan and LT Vento. While their relative experience may have been dwarfed by that of their senior colleagues, these rising stars brought a wealth of knowledge, fresh perspectives, and a palpable dedication to enhancing the well-being of aircrew. Their participation emphasize the importance of cultivating emerging talent within the NATO community and fostering an exchange of ideas across all levels of expertise, showing that even the most seasoned professionals can benefit from a fresh set of eyes – particularly when those eyes are focused on improving the health and performance of our aircrew.

Kaplan: Demographic Differences in Cybersickness among Student Naval Aviators

No matter how beautiful the backdrop or how esteemed the audience, LT Kaplan is always willing to talk about bodily functions. She flew more than four thousand miles across the Atlantic to tell the participants of the 2024 RAMS/NATO STO all about puke—particularly, how demographic differences in SNA's correlate to cybersickness on a variety of scales. During a poster session, she spent the time articulating the finer points of nausea, oculomotor, and disorientation symptoms to include burping, increased salivation, and stomach awareness. For some reason, her poster wasn't as well-attended as it might have been, a fact she attributes to it being nearly lunchtime.

If her talk was gross, it was for good reason. In a landscape where the consideration of adverse impact is on the backburner, it is imperative we consider all the effects of integrating emerging technology into training. This is particularly important when it could cause unrecognized barriers to one demographic over another. Our Navy has the best fighting force in the world. While we blaze ahead, we have to be especially careful not to leave anyone behind.

Vento: Prioritizing Aircrew Urinary Well-being

The opportunity to present at the 2024 RAMS/NATO conference on

the prevalence of UTIs in aviation active-duty US military personnel was a significant milestone in LT Vento's early scientific career. It provided a valuable platform to raise awareness about an often-overlooked health concern within a specialized population. Her presentation focused on the intersection of demanding operational environments, physiological stressors, and the potential increased vulnerability of aircrew to UTIs. The hope was that the data would speak for itself, advocating for a proactive, preventative approach and highlighting the need for practical solutions - something beyond just encouraging everyone to "drink more water."

While the presentation itself went smoothly (minus the brief, unscheduled battery launch following a remote-control malfunction), the most impactful part of the conference proved to be the in-depth conversations that followed. The audience's insightful questions challenged LT Vento's perspective and prompted a critical refinement of her research methodology. Discussions ranged from the intricate effects of dehydration in high-G environments on urinary health to the effectiveness of various preventative measures and the practical hurdles of implementing thorough hydration strategies during flight. These interactions ignited collaborations that continue to flourish. Since then, she has made it a priority to maintain these relationships through virtual platforms and international partnerships, continually exploring the complexities of urinary tract health and hydration in aviation and sharing the latest research findings. This has led to LT Vento's involvement in international working groups and ongoing research initiatives designed to enhance the health and performance of military aircrew worldwide. The 2024 RAMS/NATO conference wasn't just a presentation; it was the launchpad for a continuing mission – a mission to ensure our aircrew stay mission-ready, and that their bladders, unlike her remote, remain fully operational.

Closing Remarks

Travel is an essential part of being an AEP. The opportunity to share our research and collaborate with like-minded scientists across all branches of the DoD is what makes our community strong. It is why so many people know about our tiny, ~30-person force. Our number may be small, but our global footprint is huge.

LTs Kaplan & Vento presenting at the 2024 RAMS/NATO STO HFM-350 Aerospace Medicine Summit and Technical Course in Garmisch-Partenkirchen, Germany.

MEET AN AEP

LT Jennifer "Cupcake" Knapp, Ph.D., AEP #166 on her journey from Naval Flight Officer to AEP

What is your Academic Background?

Unlike many of our brilliant AEPs, my academic background looks a little different. I received a bachelor's in chemistry from the University of Akron in 2012 after I enlisted in the Navy through the Baccalaureate Degree Completion Program (BDCP). Once I qualified as a Mission Commander in VQ-3, I began working on my master's degree in organizational psychology. I was specifically drawn to the application of leadership practices on high-risk organizations and their effects on organizational outcomes, such as mishaps and turnover. I received my master's through Penn State World Campus in 2020. Once I began pursuing a lateral transfer to the AEP community, I wanted to work towards my Ph.D. like my colleagues in the community. Because I was a winged aviator, I didn't need a Ph.D. to join the AEP community. However, I knew how valuable it is to the community to have a background in research, stats, and scholarly writing, so I applied to Embry Riddle's Ph.D. in Aviation. I am currently a doctoral candidate in the Human Factors specialization, and my dissertation is focused on the effects of basic psychological needs satisfaction on turnover intentions in Navy aviation.

How did you learn about the AEPs?

I met two AEPs, one in 2018 and one in 2019, both at the School of Aviation Safety in Pensacola, FL. They described to me what the community was, what expertise the community seeks, and some of the process for a lateral transfer. I then met several AOPs while serving at the Safety School, who helped me complete a lateral transfer package, and I was accepted into the Medical Service Corps in 2022. I earned my second set of wings later that year.

What was the most challenging part of AEP training?

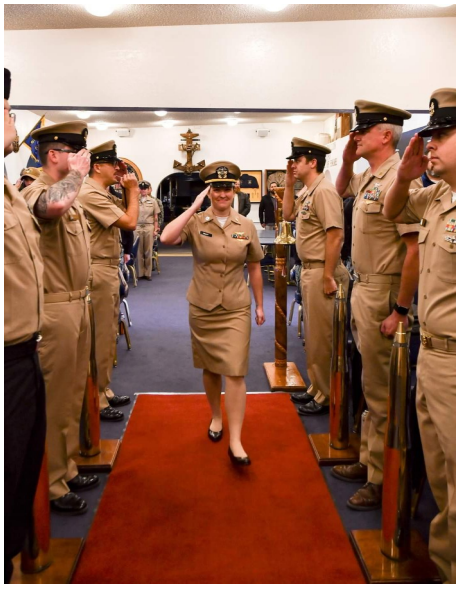
I thought Navy operational training was difficult, but AEP training was a whole new world to me! Training really emphasizes the unique technical challenges that AEPs will face in the Navy. I was grateful to already have completed flight training in 2013, so I could focus all my energy on learning things like acquisitions, human-subjects research in the DoD, and Navy medicine. I'm sure that other AEPs may feel the exact opposite – flight training is no joke – but I joined the Navy to fly, and I did for the first 10 years of my career. I didn't feel prepared for the level of analytical knowledge that Ph.D. AEPs would already have in their back pocket, so I really had to hit the books hard before my first AEP duty station.

What was your most memorable moment during training?

Hands down, getting to know other servicemembers in this niche experience. The AEP and MSC communities are so unique, and you will meet individuals from all different backgrounds. Yet, we somehow click rather effortlessly. It was new and exciting to meet such a close-knit community within Navy aviation, and I felt like I belonged instantly. Whether you are a direct accession or a lateral transfer, you will learn something new from other members in the group while being able to harness your own expertise to serve the Naval Aviation Enterprise.

What are you working on now?

I'm currently stationed at the United States Air Force Academy as a Human Factors and Aviation Psychology Instructor. I also teach part of the Leadership core to over 1000 Cadets. My collateral duties include the Navy Cross-Commission liaison, helping any interest-



ed Cadets commission in the Navy upon graduation. I've led the change in leadership psychology and Human Factors curriculum across the Behavioral Sciences and Systems Engineering majors, and I'm the Course Director for the Systems Engineering Capstone course, which encompasses over $2mil in grant funding and $9mil in equipment for 22 seniors. Most of the projects focus on the psychology behind Human-AI teaming. And, of course, I'm still working on my doctorate. I should be defending my proposal next month.

What is something other people are surprised to learn about you?

Before I was an AEP, I was a Naval Flight Officer (NFO) onboard the E-6B "Mighty Mercury" at Tinker AFB from 2014-2019. I guess my Navy career loves sending me to Air Force bases! Once I finished my operational tour at Tinker, I served as a Crew Resource Management Instructional Model Manager and Mishap Reporting Instructor at the School of Aviation Safety. That billet is where I learned how much I love teaching and studying aviation safety, specifically the psychology behind why aviators may make critical decisions in the cockpit. It is also where I learned about the AEP community. Some days I miss the hustle and bustle of operational life; detachments, flight missions, and working with enlisted personnel on flight crews. However, I never made it to a ship!

What is the best part of being an AEP?

The best part of being an AEP is the sense of community and camaraderie. You're not just joining a unit in the Navy, you're joining a group of diverse scientists that chose military service over working in the industry. Furthermore, AEPs differ from other disciplines within the Medical Service Corps because we train to fly as aeromedical officers and special aircrew. Being able to fly with the fleet and apply our expertise to meet the challenges of safety and readiness in Naval Aviation brings a level of fulfillment I couldn't have found in any other career.

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