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NPS in the News Weekly Media Report - May 10-16, 2022

Naval Postgraduate School (U.S.)

Weekly Media Report – May 10-16, 2022

DISCOVERY DAY:

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(Navy.mil 13 May 22) … Mass Communication Specialist 2nd Class Tom Tonthat
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Discovery Day Returns to the Naval Postgraduate School

(Monterey Herald 15 May 22) … Molly Gibbs
(My Droll 13 May 22) … Mathews John

After a two-year hiatus, Discovery Day at the Naval Postgraduate School returned with a bang – closely followed by bottle rockets flying 100 feet into the air.

COLLABORATION:

Partnerships Support Science, Research Exchange Between NPS, Norway

(Navy.mil 10 May 22) … Mass Communication Specialist 2nd Class Lenny Weston
(NPS.edu 10 May 22) … Mass Communication Specialist 2nd Class Lenny Weston

Through the Department of Defense's Engineer and Scientist Exchange Program, Naval Postgraduate School (NPS) Permanent Military Professor (PMP) U.S. Navy Cmdr. Thor Martinsen worked with respected cryptography expert and researcher Dr. Tron Omland of Norway's National Security Authority (NSM). Martinsen and Omland are conducting collaborative research at NPS in the fields of cryptography and secure communications, with the intention for both countries to develop improved cyber security systems.

US Naval Postgraduate School Partners with Microsoft

(MS Cloud News 10 May 22)

The US Naval Postgraduate School (NPS) in Monterey, California announced a new partnership with Microsoft after the signing of a Cooperative Research and Development Agreement between the two organizations. Together with Microsoft, NPS plans to carry out research to support the Navy and Marine Corps.

STUDENTS:

Flying Dirty: Unmanned Casualty Evacuation on the Contaminated Battlefield

(War on the Rocks 11 May 22) … Mike Hicks and John Stoodley

In recent years, militaries have prioritized adoption of unmanned solutions to offload the most "dull, dirty and dangerous" tasks on the battlefield. The secretary of the Air Force recently highlighted the need for expendable "uncrewed" aircraft to fight in a future great-power conflict, but focused largely on combat aircraft. Leaders should

pay closer attention to one of the military's most dangerous and dirty missions: evacuating wounded and dead servicemembers from a battlefield where chemical or biological weapons have been used… Mike Hicks is a Navy explosive ordnance disposal officer with an operational and academic focus on chemical, biological, radiological, and nuclear threats. John Stoodley is an Air Force special missions aviator and CV-22 flight engineer. They are students in the Applied Design for Innovation program in the **Naval Postgraduate School's** Department of Defense Analysis.

Culture, Partnerships Take Center Stage with Return of International Day

(Navy.mil 12 May 22) … Javier Chagoya
(NPS.edu 12 May 22) … Javier Chagoya

Following two agonizing years of wrestling with the pandemic and its varied restrictions, the return to a 'new normal' has opened possibilities for finally coming together as a community. The Naval Postgraduate School's (NPS) international students and their families, eager to share their unique and varied cultures, proudly welcomed the return of International Day.

Is Artificial Intelligence Made in Humanity's Image? Lessons for an AI Military Education

(War on the Rocks 16 May 22) … Vincent J. Carchidi

Artificial intelligence is not like us. For all of AI's diverse applications, human intelligence is not at risk of losing its most distinctive characteristics to its artificial creations… Identifying the tendency to anthropomorphize AI in military affairs is not a novel observation. U.S. Navy Commander Edgar Jatho and **Naval Postgraduate School** researcher Joshua A. Kroll argue that AI is often "too fragile to fight." Using the example of an automated target recognition system, they write that to describe such a system as engaging in "recognition" effectively "anthropomorphizes algorithmic systems that simply interpret and repeat known patterns."

FACULTY:

The Lawfare Podcast: Oil Wars in Myth and Reality, with Emily Meierding [Podcast]

(Lawfare 16 May 22) … Jen Patia Howell

During the past couple of months, since the Russian invasion of Ukraine, there have been several claims that Russia was invading its neighbor to seize its oil and gas resources. And even in the cases where pundits were claiming that Russia was not doing this, they would often phrase it as, "This is not yet another oil war." But do oil wars happen at all?

David Priess sat down with the woman who has literally written the book on this: Emily Meierding, assistant professor at the **Naval Postgraduate School** in Monterey, California. She has argued that countries do not launch major conflicts to acquire hydrocarbon resources because the costs of foreign invasion, territorial occupation, international retaliation and damage to oil company relations deter even the most powerful countries from doing so. They talked about the myth of oil wars, about the logic behind why they will not happen and about why it is that the Russian invasion of Ukraine probably has very little to do with hydrocarbons at all.

Energy Security is Critical to NATO's Black Sea Future

(Atlantic Council 12 May 22) … Arnold C. Dupuy

Sitting astride the European and West Asian land masses, the Black Sea region is vital to NATO's security. Longstanding rivalries have turned the region into a contested space. Amid the risks of the Russia-Ukraine war dragging NATO into a broader conflict with Moscow, it's time for the Alliance to also address a critical, related challenge: energy security along its southeastern flank. Like many of NATO's continental members, the Black Sea's littoral states are also dependent on Russian energy, and the region is a vital conduit for (primarily piped) oil and gas imports to Europe. Potential energy supply-chain disruptions there could fundamentally disrupt joint military capabilities and Alliance cohesion… Arnold C. Dupuy is a faculty member on the **Naval Postgraduate School's** Energy Academic Group. He is also chair of "Energy Security in the Era of Hybrid Warfare," a NATO Science and Technology Organization program to study hybrid warfare's impact on energy security and Alliance cohesion.

From Iraq to Ukraine: A new Perspective on the Russian-Western Confrontation

(War on the Rocks 16 May 22) … Samuel Helfont

In December 1998, Bill Clinton called Boris Yeltsin, pleading: "The relationship between the United States and Russia that you and I have worked so hard to build is far too important and, to my mind, far too sound, to be

subverted by Saddam Hussein." To Clinton's dismay, Yeltsin answered that indeed, "what is at stake is not just the person of Saddam Hussein but our relations with the U.S." As I have discussed elsewhere, this was but one of many tense exchanges between American and Russian officials over Iraq during the 1990s. Such quarrels between the two former Cold War rivals irrevocably damaged their relationship in the post-Cold War period, but they have been largely overlooked by history, even in the memoirs and post-hoc analyses of officials who participated in those events. Nevertheless, these disputes are worth reexamining today as they provide critical insight into what drives the deep animosity between Moscow and Washington… Samuel Helfont is an assistant professor of strategy and policy in the Naval War College program at the **Naval Postgraduate School** in Monterey, California. He is the author of Compulsion in Religion: Saddam Hussein, Islam, and the Roots of Insurgencies in Iraq (Oxford University Press, 2018). His next book, Iraq against the World: Saddam, America, and the Post-Cold War Order, is currently undergoing peer review.

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ALUMNI:

Memorial Day Parade and Keynote Speech to Unify Community in Remembrance

(Transylvania Times 11 May 22)

This year's Memorial Day Parade will begin at 9 a.m. on Monday, May 30. The parade will have two grand marshals this year, Brevard residents LC and George Poor… Herbert, who graduated from Davidson College in 1983, holds a Master of Arts in National Security Affairs from the **Naval Postgraduate School**, a Master of Science in National Security Studies from the National War College, and a doctorate in international relations and political theory from the University of Virginia.

How to Keep Ego From Derailing Your Efforts to Become a Great Leader

(Herald Times 12 May 22) … Barbara Bell

When it comes to leadership, a fine line can exist between confidence and egotism… Barbara Bell (www.captainbarbarabell.com), author of Flight Lessons: Navigating Through Life's Turbulence and Learning to Fly High, was one of the first women to graduate from the U.S. Naval Academy and the U.S. Naval Test Pilot School. Now she works to empower the next generation of female leaders. In 1992, Bell and fellow aviators went to Capitol Hill to help successfully repeal the combat exclusions laws, opening up combat aircraft and ships to women in the military. Bell holds a B.S. in systems engineering from the United States Naval Academy, an M.S. in astronautical engineering from the **Naval Postgraduate School**, an M.A. in theology from Marylhurst University, and a doctorate in education from Vanderbilt University. She is an adjunct professor of leadership at Vanderbilt.

Cyber at Sea: Protecting Strategic Sealift in the Age of Strategic Competition

(MWI 10 May 22) … Jason Ileto

Months before the shooting started in the Russo-Ukrainian War, the US intelligence community warned of Russian troop movements amassing at Ukraine's border. The gradual buildup, which included transportation of equipment from as far away as Siberia to Ukraine's doorstep via railcars, showcases the arduous and logistically complex process of mobilizing for war. Things are even more complex when transportation involves a significant maritime component, which is precisely the situation the United States would find itself in should conflict with China break out… Commander Jason Ileto is a supply officer in the US Navy. He earned a master of science in operations research from the **Naval Postgraduate School** in 2011 and is currently pursuing a graduate degree at the Naval War College. He has conducted a directed research project under the Cyber & Innovation Policy Institute (CIPI) Vice Admiral Samuel L. Gravely Jr. Program.

NASA Astronaut From Long Island Set to Make 1st Trip to Space [Video Interview]
(ABC 7 13 May 22)

NASA and the European Space Agency recently selected two astronauts to launch on NASA's SpaceX Crew-7 mission to the International Space Station, and one of them is from Long Island…Moghbeli became a NASA astronaut in 2017 after earning a bachelor's degree in aerospace engineering from MIT and a Master's degree from the **Naval Postgraduate School** in Monterey, California.

UPCOMING NEWS & EVENTS:

May 17: Defense Energy Seminar
May 17: NWSI Seapower Conversation with Vice President of Leidos, RADM Nevin Carr, USN (ret)
May 23-27: Joint Interagency Field Experimentation (JIFX)
May 24: Strategic Communication Workshop (SCW)
May 24–26: MOVES Open House
May 24–26: Mine Technology Symposium
May 30: Memorial Day (Federal Holiday)

DISCOVERY DAY:

Discovery Day at NPS Opens Campus to Central Coast Students

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In a sight not seen for more than two years, nearly 2,000 students, teachers and parent chaperones from throughout the Central Coast descended upon the Naval Postgraduate School (NPS) for the return of Discovery Day at NPS, May 13, touring the university and interacting with the more than 40 inspirational Science, Technology, Engineering and Mathematics (STEM) venues set up around the campus.

Discovery Day highlights how the university researches and applies the STEM disciplines to its unique mission of defense-focused graduate education and research, with the goal of inspiring visiting students to develop and hopefully pursue their own interests in the sciences.

"Visiting students are going to get a cross-section of the services and NPS' science displays in action, from physics to robotics to simulations and more, and potentially stir the juices to make them excited to study STEM further," said U.S. Navy Capt. Edward McCabe, NPS Air Warfare Chair, and this year's Discovery Day at NPS Chair.

Groups of students ranging from elementary through high school were guided through the campus by active duty NPS student volunteers to explore and experiment with the various STEM venues manned by volunteer faculty and researchers. Students launched bottle rockets into the sky; piloted ant-weight robots against each other in the Combat Robots competition; tapped into the powers of electricity and magnetism; and, watched art created before their eyes through additive manufacturing.

In addition to the action across campus highlighting the wonder of science, visitors also had the opportunity to see how STEM can help them to reach for the stars. Discovery Day's special guest, U.S. Navy Capt. Victor Glover Jr., NASA astronaut and an NPS alumnus, was a member of the SpaceX Crew-1 mission, spending 168 days aboard the International Space Station before returning to Earth in May 2021.

Speaking to the audience in King Auditorium, Glover answered questions about being an astronaut and living in space while encouraging students to be resilient, to be good teammates, and to be lifelong learners.

"This is a day of discovery," said Glover. "This is their chance to run out and see science in action and cause a reaction using their own hands, bodies, voice or creativity. Letting them see science in action that they caused themselves can give them the motivation to continue reaching for their goals."

In addition to the hands-on venues, NPS also demonstrated its breadth of interdisciplinary studies during Discovery Day through exhibits providing a look into the school's social sciences and national security affairs curricula. These exhibits painted a global picture of how other regions such as Africa and Latin America view the world, and how they interact with each other.

For visitors, Discovery Day also provides an opportunity to engage directly with servicemembers currently studying at NPS who escorted them around the campus or provided insight at STEM venues. These NPS ambassadors took time from their busy schedules as NPS students to provide a personal voice to the community they are stationed in.

"For many of these kids, Discovery Day at NPS will be their first and possibly only interaction with our uniformed services and to get exposure to what we do here at NPS and our role in the community and for the nation," said McCabe. "This is also a great opportunity for NPS faculty and scholars to represent [NPS] as ambassadors to these children, using their vast intellect and ability to turn difficult concepts into something that school kids can understand."

In a first-ever event for Discovery Day, the Office of Naval Research and the Naval Postgraduate School Foundation and Alumni Association helped sponsor NPS' inaugural Rapid Innovation Design Challenge, giving high school students an opportunity to apply their own intellect to develop and design innovative solutions to critical naval challenges. Developed under the leadership of NPS Department of Oceanography Assistant Professor Mara Orescanin, the regional winners of the Rapid Innovation Design Challenge were announced as the culminating event of Discovery Day.

"We feel very fortunate to participate in Discovery Day at NPS to show these girls what's out there as far as opportunities for them," said Amy Mulgrew, a math and computer science teacher at nearby Santa Catalina School who enrolled multiple student teams in the event. "The Design Challenge Championship really gave them an opportunity to work as a team in practice using the iterative process."

The university has big plans in the works for the future of the Rapid Innovation Design Challenge, with plans to expand its reach across the nation significantly in future iterations.

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Discovery Day at NPS Opens Campus to Central Coast Students - Naval Postgraduate School

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Discovery Day Returns to the Naval Postgraduate School

(Monterey Herald 15 May 22) … Molly Gibbs
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After a two-year hiatus, Discovery Day at the Naval Postgraduate School returned with a bang – closely followed by bottle rockets flying 100 feet into the air.

"It's an opportunity to get back to normality. Something like this was impossible for the last two years," said Navy Captain Edward McCabe. "And it's wonderful … I think it's that step forward that we needed."

The school opened its campus to more than 1,500 students, teachers and chaperones Friday to engage fifth through 12th graders with science, technology, engineering and math.

Students were able to see the campus' labs and learn more about the Naval Postgraduate School's mission, as well as interact with more than 40 STEM and service-related activities throughout the campus.

Along with the bottle rockets, one popular exhibit was the physics department's liquid nitrogen cannon, where a soda bottle was filled with liquid nitrogen and exploded, propelling water and tennis balls into the air. Another crowd favorite was the unmanned surface vehicles display, where students had the chance to direct small versions of the boats across the pool.

Students also had the chance to meet current military leaders and learn about the various military branches and roles within them. The Marine Corps tent was a popular stop for those who wanted to demonstrate how many pullups they could do.

McCabe explained that Discovery Day's mission centered around military exposure, encouraging science, technology, math and engineering and creating positive interactions between students and military members.

"For a lot of these kids, this might be their first positive interaction" with someone in uniform, McCabe explained. "It's important to give them a view of the Navy, the Army, the Air Force, the Marine Corps with a friendly face."

This year's Discovery Day also included a new "Rapid Innovation Design Challenge," where schools and students were invited to design and develop innovative solutions for ongoing naval challenges. Earlier this spring, students in grades 6-12 were tasked with solving one of four challenges: climate change, additive manufacturing, automated systems or cybersecurity.

Faculty-student teams competed in the challenge for a chance to win prizes up to $7,000, and winners were announced at a ceremony on Discovery Day.

First place overall went to a Pacific Grove High team, for their solution to the additive manufacturing challenge, which challenged students to design a 3D printed boat to deliver humanitarian aid. The boat was required to carry two people and cargo across a body of water with a designated wave swell.

Also, new this year was a presentation and chance to meet NASA astronaut and NPS alumnus, Capt. Victor Glover, one of 44 NASA astronauts who have graduated from the Naval School. Glover spoke to students about his experience on the International Space Station on SpaceX's Crew Dragon. Students

lined up in the auditorium to ask him a variety of questions, including: “who inspired you?”, “what was it like being on the space station?” and “what do you do if you have to pee in space?”

“It’s great that kids want to come and listen to me talk about going to space, but when you get to see them launch bottle rockets outside, that’s all you need to see,” Glover said. “That’s really what it’s about – them going and doing something that we can also let them know later that, ‘hey that’s science, that’s math, that’s engineering.’ But they were out there having fun.”

It was clear students were having fun at the event as they rushed from one display to another, asking questions and cheering as bottle rockets launched into the sky.

For Diane Dumbacher, who teaches fourth grade at Washington Union Elementary School, Discovery Day at NPS was great way for students to have fun while getting hands-on experience with science and technology.

“We have a new science curriculum and we really wanted to get more hands-on STEM activities. That’s a great way to get them excited and interested,” she said. “The kids are so excited, many have already wanted to go into space, and this has just kind of catapulted them into learning more about it.”

Teaching students that science, technology, math and engineering can be fun and engaging was one of the key missions of Discovery Day. But many of the Naval Postgraduate School leaders and faculty members were also aware of the importance of getting students interested in STEM at a young age.

“Obviously we’ve got a responsibility to encourage STEM to young people. And you know, for some of them, this is just a field trip. I get it, you’re an 11-year-old just looking to not be in school,” McCabe said, smiling. “But there will be kids here that, after listening to (Glover), now they know they want to go to Mars. They want to be astronauts, they want to get us to where we need to be to fix the planet. And if we don’t encourage that, then what are we doing?”

Faculty research associate, Giovanni Minelli, works in the space systems academic group at NPS and was one of the faculty members in charge of the bottle rocket demo, along with some other space displays.

“STEM is a very important field for our country to encourage, particularly at an early age,” Minelli explained. “By getting them interested in it early, we’re basically telling them that studying in school is very important, working hard is very important. And then they can go on and have interesting careers and solve very challenging problems for our country and for the world.”

Glover concluded his presentation with a similar sentiment, when he told the crowd of students, “We need you to get us out of this mess that my generation has gotten us into.”

For Glover, that means teaching students to think critically and understand the power of the truth.

“Things that are important in this country – liberty, justice, freedom – those things depend on knowing the truth. Our country was designed to be run and supported by informed people,” he said. “I want these kids to know, you might have to work for it, but it’s worth the work to know the truth. I really do think their generation needs to be prepared to do better than our generation has done.”

Discovery Day returns to the Naval Postgraduate School – Monterey Herald

Discovery Day returns to the Naval Postgraduate School – Monterey Herald - My Droll

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Through the Department of Defense's Engineer and Scientist Exchange Program, Naval Postgraduate School (NPS) Permanent Military Professor (PMP) U.S. Navy Cmdr. Thor Martinsen worked with respected cryptography expert and researcher Dr. Tron Omland of Norway's National Security Authority (NSM). Martinsen and Omland are conducting collaborative research at NPS in the fields of cryptography and secure communications, with the intention for both countries to develop improved cyber security systems.

"Working together, sharing ideas, and learning from one another is crucial to realizing scientific advances," said Martinsen.

"So far, the two main aspects of our collaborative research at the Naval Postgraduate School have been one, studying certain classes of mathematical functions that are among the most basic ingredients in the construction of cryptosystems, and two, studying ways of using artificial intelligence, in particular machine learning, to analyze the security of algorithms and ciphers," said Omland.

According to Martinsen, their investigation into the security properties and vulnerabilities associated with Boolean functions is expanding their knowledge of cryptographic primitives and will help cryptographers design more secure systems in the future.

The capabilities of artificial intelligence and machine learning have made them valuable tools for cryptographers, cryptanalysts, and signal intelligence operators.

"Machine learning shows great promise and is quickly being adopted in a host of applications and industries," said Martinsen. "Our adversarial machine learning research focuses on investigating machine learning vulnerabilities and developing safeguards which must be put in place before the Department of the Navy can incorporate this promising technology into its platforms, systems, and networks."

Omland noted the cyclical nature of this research, pointing specifically to the lack of a finish line. Instead, it is a continuous and constant race between creating and breaking cyber security systems.

While Omland's arrival at NPS marked the first time NSM has sent a research scientist to the institution, NPS' partnership with Norway has a solid foundation.

"The Norwegian Navy (special forces) have a long history of attending the NPS Defense Analysis curriculum, which is great," said Martinsen, who added that he hopes to see that expand in other disciplines, especially cyber and network security, in the future.

"For Norway, being a small country with relatively few research scientists, it is especially important to collaborate with our allies, both in terms of research, but also in networking," added Omland.

Martinsen is making his own history in expanding the university's partnerships and collaborations with Norway. In March 2021, Martinsen was the first NPS PMP to receive a Fulbright U.S. Scholar award to attend the Selmer Center for Secure Communications at the University of Bergen in Norway for the 2021-2022 academic year.

"I'm joining forces with Norwegian research colleagues to undertake important cryptographic and secure communications research," said Martinsen.

Through academic and professional advancement and cross-cultural dialogue, the prestigious Fulbright Scholarship fosters connections with 140 countries worldwide. Program participants pursue graduate study, conduct research, or teach English abroad. Martinsen will be traveling to Norway for 90 days during the scholarship to focus on research within the cryptology field.

"I hope my operational experience as a former Navy cryptologic warfare officer, along with my academic and research skills as a Permanent Military Professor for NPS, prove useful in ongoing research taking place at the University of Bergen," he said. "I am looking forward to teaming with Norwegian colleagues on cryptography and machine learning research of common interest."

Omland mentioned that in all research fields, it is vital to collaborate with new people, explore new ideas and new problems, and seek new experiences.

Martinsen believes exchange programs like these also allow us to connect on a human level by experiencing the people and culture of other countries, so we can better understand and appreciate the viewpoints and concerns of others, which, in turn, bring us together.

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Partnerships Support Science, Research Exchange Between NPS, Norway - Naval Postgraduate School

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US Naval Postgraduate School Partners with Microsoft

(MS Cloud News 10 May 22)

The US Naval Postgraduate School (NPS) in Monterey, California announced a new partnership with Microsoft after the signing of a Cooperative Research and Development Agreement between the two organizations. Together with Microsoft, NPS plans to carry out research to support the Navy and Marine Corps.

Through the partnership, NPS will use Azure, Office 365, and Teams. With a jointly developed Cooperative Research Initiative, it will support cloud networking, edge computing, gaming, exercises, and modeling. Additionally, NPS plans to create a hybrid learning "smart campus."

"For over four decades, we've worked with the U.S. Department of Defense on a longstanding and reliable basis in support of its mission to ensure our national security. This Cooperative Research Initiative with the Naval Postgraduate School will provide a remarkable opportunity for us to work shoulder to shoulder with our nation's brightest leaders and servicemembers and help them solve the complex challenges they face. And through this collaboration, we look forward to sharing our latest research and furthering our joint efforts to empower our military to make our nation safer," stated Jason Zander, executive vice president of Microsoft.

"Today, so much innovation and technological research and development is powered by America's robust corporate base. The Department of the Navy has been trying to find ways where our organizations can emulate and evolve with the nimble agility of these organizations, and with success. This agreement between NPS and Microsoft takes that initiative to the next level, creating a defined cooperative research collaboration between a global tech giant and the capabilities it brings to bear, with the Navy's leading science and technological university, where operationalizing innovation is core to their mission," said Aaron Weis, the Department of the Navy's Chief Information Officer, in a statement.

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STUDENTS:

Flying Dirty: Unmanned Casualty Evacuation on the Contaminated Battlefield

(War on the Rocks 11 May 22) … Mike Hicks and John Stoodley

In recent years, militaries have prioritized adoption of unmanned solutions to offload the most "dull, dirty and dangerous" tasks on the battlefield. The secretary of the Air Force recently highlighted the need for expendable "uncrewed" aircraft to fight in a future great-power conflict, but focused largely on combat aircraft. Leaders should pay closer attention to one of the military's most dangerous and dirty missions: evacuating wounded and dead servicemembers from a battlefield where chemical or biological weapons have been used.

The aviation industry aims to field electric flying taxis within the next decade, targeting both remotely piloted and eventually fully autonomous passenger flight. If adopted by the military, these

platforms could offset a critical reliance on conventional manned aircraft, removing warfighters from one of the highest risk missions on the battlefield while enabling the force to fight and win in the face of chemical and biological weapons.

These weapons are not just novel tools for assassination. They may still be used on the battlefield, perhaps even soon in Ukraine. Chemical and biological weapons remain attractive for a cornered foe. For example, analysts warn of potential North Korean chemical warfare use at the onset of conflict on the peninsula. One expert fears that China's military training to operate in contaminated environments may indicate that "Chinese political and military leaders see operational utility for these weapons on modern battlefields."

The Problem

The use of chemical and biological weapons diminishes combat power by contaminating both warfighters and equipment. America's commitments to save its troops from a dirty environment will rapidly deplete the personnel and aircraft available to sustain the broader fight. This creates a dilemma that commanders will already be familiar with: risking valuable resources to save a wounded warfighter. Though some may argue protective measures and decontamination mitigate risks, they may be overly optimistic. Multi-service publications acknowledge the continued risk of using aircraft after decontamination efforts, which cannot completely eliminate residual hazards to future crews.

As for the aircrew, current protective measures sacrifice combat effectiveness for adequate protection against chemical and biological threats. Crew endurance, visibility, dexterity, and communication are negatively impacted by the necessary protective equipment required to operate in this environment. A hundred years after gas masks were widely fielded, the American military continues to make incremental improvements but has failed to introduce disruptive options to remove aircrews altogether. Manned aircraft may have replaced the gas mask-wearing pack mules of World War I, but technology will not eliminate the risk until aviators are removed from dirty battlefield.

Operational vulnerabilities create opportunities for adversaries to leverage these weapons as strategic deterrents to American involvement. A force that is widely impacted, in all aspects of warfighting, by chemical and biological threats is less capable of fighting and winning. This vulnerability builds the adversarial case for chemical or biological warfare in conflict and their own deterrent posture in competition.

An Unmanned Solution

Military adoption of unmanned aircraft can fundamentally change how the joint force mitigates operational risk. While unmanned aircraft are not new, the urban air mobility market offers a diversity of new capabilities and options. For relevance in this dirty job, the military should look only towards the aircraft that are remotely piloted or fully autonomous, expendable (comparable to current aircraft), and capable of rapidly ferrying casualties out of the contaminated environment for transfer to manned platforms.

Urban air mobility aircraft are at the convergence of several key technologies, all of which have the potential to increase in performance and decrease in cost over time. The global trend towards electric vehicles will continue to push the performance envelope in terms of range, speed, payload, and endurance. The parallel advances in autonomy are on their own upward trajectory. By leveraging commercial competition, the military has an opportunity to adopt well-resourced research and development rather than commit to costly and classically slow military-specific solutions.

Speaking of costs, there will be financial benefits in addition to force preservation. To be competitive in the commercial market, leaders are targeting future costs on par with current ride-share applications. One estimate projects aircraft to run around $700 per operating hour versus approximately $5000 for an Army Black Hawk or over $25,000 for an Air Force Osprey. The biggest savings will not be financial but in mitigating risk by removing the aircrew altogether. It will be up to commanders to decide if incurring the risks of unmanned casualty evacuation is worth preserving a multi-million-dollar helicopter and priceless aircrew whose performance in this environment is already questionable.

The U.S. military has an established relationship with the domestic urban air mobility market, but the current infrastructure is postured only as an innovation incubator. Special Operations Command is well positioned as a potential adopter due to its special acquisition authorities and its charter to lead the Department of Defense's mission to counter weapons of mass destruction. A more modern approach would be for operational commanders specifically postured against these threats to contract out casualty evacuation as another form of drones as a service.

Obstacles

Drones aren't new, and neither is the call for unmanned casualty evacuation. If both the capabilities and demands are so obvious, what's barred their use on the battlefield? In 2014, Paul Scharre called out the biggest problem: policy. At the time, medical experts were concerned that unmanned vehicles incurred more risk to the patient than a human pilot. Though still a valid concern, emerging aircraft designed to fly civilian families without an onboard pilot will be safe enough for an urgent casualty movement. To be blunt, if a human pilot is considered the standard for safety, one must consider the impaired abilities of pilots flying in gas masks. The unmanned solution may just be the safer ride.

In addition to the concerns of unmanned aircraft, Scharre highlighted the challenges of overcoming the well-intentioned hurdles of medical ethics. Standards for medical evacuation (a level above casualty evacuation that uses dedicated medical aircraft with onboard care) require continuous treatment of patients that cannot yet be met by the capabilities of autonomous or remote medicine in flight. Numerous military initiatives to develop future platforms to meet this standard should rightfully continue, but unfortunately, they will likely remain constrained by high standards of care.

By limiting the scope to casualty evacuation for now, commanders will have an unmanned platform to move "casualties as cargo" that should be precluded from the standards of medical evacuation. This provides commanders an option to expedite patient movement, limit contamination to only the unmanned aircraft, and transfer patients to treatment outside of the threat environment. Fielding unmanned casualty evacuation aircraft now can fill a current vulnerability while leaving medical experts time to integrate and certify unmanned medical capabilities into future aircraft.

Down and Dirty on the Contaminated Battlefield

The urban air mobility market offers an unmanned solution to the challenge of sustaining combat on the contaminated battlefield. The operational requirement is valid, the threats are explicitly stated, and operational improvements will affect both conflict and competition. The commercial ecosystem is driven by global competition and bolstered by rapidly improving technology trends. The military can be a "fast follower" in this adoption race, by leveraging existing and projected commercial capabilities to enhance combat effectiveness in the most dangerous and dirty of missions.

The technology reduces tactical risk by providing commanders an unmanned alternative that avoids committing priceless aircrews and high-dollar aircraft to contamination or combat loss. The capability for unmanned casualty evacuation alone is not going to deter the use of chemical or biological weapons on the battlefield. However, the adoption of this technology can reduce the attractiveness of chemical and biological weapons by shoring up America's critical reliance on manned airpower.

If the U.S. military truly wants to prevail on a contaminated battlefield, adopting an unmanned solution to the dirtiest job is the place to start. The technological and ethical hurdles of unmanned casualty evacuation will remain challenging, but sticking with the status quo only showcases a critical vulnerability. Instead, the military can disruptively alter the way America wins in a dirty war that hopefully never comes.

Mike Hicks is a Navy explosive ordnance disposal officer with an operational and academic focus on chemical, biological, radiological, and nuclear threats. John Stoodley is an Air Force special missions aviator and CV-22 flight engineer. They are students in the Applied Design for Innovation program in the **Naval Postgraduate School's** Department of Defense Analysis.

Flying Dirty: Unmanned Casualty Evacuation on the Contaminated Battlefield - War on the Rocks

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Culture, Partnerships Take Center Stage with Return of International Day

(Navy.mil 12 May 22) … Javier Chagoya
(NPS.edu 12 May 22) … Javier Chagoya

Following two agonizing years of wrestling with the pandemic and its varied restrictions, the return to a 'new normal' has opened possibilities for finally coming together as a community. The Naval Postgraduate School's (NPS) international students and their families, eager to share their unique and varied cultures, proudly welcomed the return of International Day.

The long-standing annual tradition of NPS' international students hosting International Day was revived enthusiastically May 7 in the school's academic quadrangle. Students from 28-nations came together, along with their U.S. counterparts to buoy the festival as an event that unites all countries.

The International Day Festival has been around since the 1960s, and this festival serves both as celebration for its return and turning the page on the pandemic. And despite the limited audience and entertainment venues, visitors were only too excited to join in with the festivities.

This year's festival was only open to the NPS community, as well as DOD access card holders, military retirees, and their families. However, the enthusiasm and excitement found at the food booths and performances at International Center Stage couldn't have been better. The day seemed more intimate as friends and families had a chance for longer conversations and activities to share with their children.

Ultimately, it was the food, the music, and the colorful, cultural backdrop that drew crowds who were transported to parts unknown. They were not disappointed. The transformation of scholar turned cook is astonishing as well, with help from spouses and fellow countrymen living in the area, the international students brought rich, authentic recipes that can only be had from the country's family kitchen.

Each spoonful of food and drink was served with pride and joy as visitors traded purchased, red tickets for scrumptious dishes from an ensemble of menus, tempting taste buds, from savory to spicy to sweet, and sweet and sour – one could walk the length of Root Hall and have criss-crossed the palate of the world. Root Hall was bedecked brilliant with national flags and regional fauna, as one could get a cultural tour from country experts at each booth.

According to International Executive Committee Co-Chair Lt. Col. Kristof Trier of Germany, says it's one of the greatest blessings of his stay in the U.S. that all the delegations can join their American friends, in the day-to-day work in exchange of ideas, opinions and laughter, and culture.

"Those common [everyday] things make for greater trust and friendships …the direct contact, face-to face conversations, are invaluable," said Trier.

Another fact is that NPS' international reach continues to grow. Recently, Grenada has been added to the member of countries represented on campus. Assistant Superintendent of Police Vah Hercules-Lambert is a student in the National Security Affairs program and is grateful for the opportunity to share foods from Grenada and surrounding region – coconut bakes and saltfish souse, which are popular in her country. She represents leadership from the Organization of Eastern Caribbean States and is proud to be the first representative from Grenada.

Besides food being at the center of the festival, the Yamamoto Hula Ohana Dance Troupe performed with colorful, delicate Hawaiian story telling in dance. The Monterey Bay Taekwondo Demo Team kicked and chopped away at stacked cement slabs as kids watched in amazement at the focused power of a trained hand or foot. There was also the bounce house, arts and crafts tables, Henna hand painting and face painting – The Ukrainian flag being the most popular to be stroked onto a cheek.

The Ukrainian delegation was in force not only with the borscht and cakes, but the entire delegation also played on center stage draped in blue and yellow singing contemporary songs with a finale of the Ukrainian national anthem, "Ukraine Has Not Yet Perished," bringing the audience to their feet, expressing solidarity.

"I consider having places and events like International Day, where we all can come together and share a beautiful afternoon, as equal human beings, of vital importance, and I am grateful to have been given the opportunity to contribute to this event," added Trier.

For more sights from the event, check out the 2022 International Day photo gallery.

Culture, Partnerships Take Center Stage with Return of International Day > United States Navy > News-Stories

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FACULTY:

The Lawfare Podcast: Oil Wars in Myth and Reality, with Emily Meierding [Podcast]

(Lawfare 16 May 22) … Jen Patia Howell

During the past couple of months, since the Russian invasion of Ukraine, there have been several claims that Russia was invading its neighbor to seize its oil and gas resources. And even in the cases where pundits were claiming that Russia was not doing this, they would often phrase it as, "This is not yet another oil war." But do oil wars happen at all?

David Priess sat down with the woman who has literally written the book on this: Emily Meierding, assistant professor at the **Naval Postgraduate School** in Monterey, California. She has argued that countries do not launch major conflicts to acquire hydrocarbon resources because the costs of foreign invasion, territorial occupation, international retaliation and damage to oil company relations deter even the most powerful countries from doing so. They talked about the myth of oil wars, about the logic behind why they will not happen and about why it is that the Russian invasion of Ukraine probably has very little to do with hydrocarbons at all.

The Lawfare Podcast: Oil Wars in Myth and Reality, with Emily Meierding - Lawfare (lawfareblog.com)

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Energy Security is Critical to NATO's Black Sea Future

(Atlantic Council 12 May 22) … Arnold C. Dupuy

Sitting astride the European and West Asian land masses, the Black Sea region is vital to NATO's security. Longstanding rivalries have turned the region into a contested space. Amid the risks of the Russia-Ukraine war dragging NATO into a broader conflict with Moscow, it's time for the Alliance to also address a critical, related challenge: energy security along its southeastern flank. Like many of NATO's continental members, the Black Sea's littoral states are also dependent on Russian energy, and the region is a vital conduit for (primarily piped) oil and gas imports to Europe. Potential energy supply-chain disruptions there could fundamentally disrupt joint military capabilities and Alliance cohesion.

Since the start of the war, NATO has positioned additional forces in the region, notably in Romania and Bulgaria, to thwart Russian aggression. While these reinforcements have enhanced Alliance capabilities and sent strong messages to friend and foe alike, it is unclear whether the energy systems of these host nations can accommodate an even greater influx of personnel and equipment. Local grids support critical infrastructure upon which the Alliance depends for everyday operations. Furthermore, what happens if these power sources were to come under attack? To address the Black Sea region's energy security vulnerabilities, NATO must prepare a coordinated response at the political and joint military operational levels. The Alliance's focus on its southeastern flank at the moment presents an opportune time to look for answers.

This isn't just about the energy security of NATO members along the Black Sea. Europe's NATO members are systemically dependent on Russian energy: Roughly 40 percent of all hydrocarbons they use are imported from Russia. Relying on a hostile source of energy has clear national security and military operational ramifications. A recent and clear example of energy coercion is Russia's April 27 decision to stop gas shipments to Poland and Bulgaria for failing to pay in rubles—a wartime demand designed to skirt sanctions and split European Union solidarity against the Kremlin. Still, Russian energy exports to the rest of Europe continue, generating revenue to support the Kremlin's aggression in Ukraine and elsewhere. Ensuring alternative, affordable energy supplies to NATO's European member states is an impossibility without considering the Black Sea region's unique geopolitical and geographic attributes.

In addition to seeking out non-Russian fossil fuels abroad, regional member states are expanding domestic production of hydrocarbons. Romania and Turkey are developing offshore Black Sea reserves, yet are encountering harsh conditions there. Romania is particularly vulnerable to Russian coercion and is seeking Western partners to reconstitute its land-based and offshore reserves. For instance, Romania's older wells need advanced technologies to keep them in production. Turkey is an example of a successful energy diversification effort; Ankara has expanded domestic production of fossil fuels in the Black Sea but is also aggressively enhancing its energy infrastructure to include growing its nuclear power generation. Other regional solutions should include unconventional extraction, such as hydraulic fracturing; nuclear power, including from small modular reactors; renewables; and hydro power for a reasonable blend of sources.

At the same time, regional states must be willing to expand energy infrastructure and improve the resilience of the critical pipeline network, most of which supplies both civilian and military customers. For example, the NATO Pipeline System, which has existed since the early Cold War days and delivers petroleum products, should be expanded to support forward-deployed assets. For NATO's Black Sea security posture, the Northern Italian Pipeline Systems and Turkish Pipeline System need to be modernized with more, hardened storage facilities. Finally, alternate routes and transportation modes, including by road, rail, and barge must also be devised and undergo proof of concept testing. It should be noted that the Three Seas Initiative has proven to be an important multinational venue, outside of NATO, with which to address broader energy security issues on Europe's eastern tier.

NATO's military options to source and distribute operational energy in the Black Sea region are limited. Supply-chain disruptions, changing tactics, evolving force structures, and energy-hungry weapons systems add further stresses to the Alliance's energy needs. The Russia-Ukraine war has underscored how NATO can no longer assume energy on demand in a vast battlespace against an adversary with advanced anti-access/area denial capabilities. Indeed, NATO's military logistics and supply-chain systems are now potentially challenged like never before.

Modern militaries that effectively manage operational energy will be rewarded with success. This not only requires better joint command and control of liquid fuels, but power generation and distribution, and the ability to leverage these assets into enhanced capabilities. The Aegis Ashore facility in Deveselu, Romania, which provides critical integrated missile defense but also needs an uninterrupted power supply, is an example.

An attack in the Black Sea region could have unexpected political or military consequences and simultaneously disrupt member-state energy flows and weaken joint operational capabilities just when the Alliance needs them the most. While NATO's political leaders must address supply constraints through realistic energy policies, its military leaders must also recognize the evolution of the modern battlespace because of operational energy considerations in time to limit the impact on capabilities.

Arnold C. Dupuy is a faculty member on the **Naval Postgraduate School's** Energy Academic Group. He is also chair of "Energy Security in the Era of Hybrid Warfare," a NATO Science and Technology Organization program to study hybrid warfare's impact on energy security and Alliance cohesion.

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From Iraq to Ukraine: A new Perspective on the Russian-Western Confrontation
(War on the Rocks 16 May 22) … Samuel Helfont

In December 1998, Bill Clinton called Boris Yeltsin, pleading: "The relationship between the United States and Russia that you and I have worked so hard to build is far too important and, to my mind, far too sound, to be subverted by Saddam Hussein." To Clinton's dismay, Yeltsin answered that indeed, "what is at stake is not just the person of Saddam Hussein but our relations with the U.S." As I have discussed elsewhere, this was but one of many tense exchanges between American and Russian officials over Iraq during the 1990s. Such quarrels between the two former Cold War rivals irrevocably damaged their relationship in the post-Cold War period, but they have been largely overlooked by history, even in the memoirs and post-hoc analyses of officials who participated in those events. Nevertheless, these disputes are worth reexamining today as they provide critical insight into what drives the deep animosity between Moscow and Washington.

The war in Ukraine has reignited decades-old debates about what went wrong in the post-Cold War Russian-American relationship. On one side of this debate, politicians and pundits ranging from Bernie Sanders on the left to Tucker Carlson on the right as well as realist international relations scholars have blamed American and Western policies in Eastern Europe for the breakdown in Russian-American relations. "Hubris, wishful thinking, and liberal idealism" led to NATO expansion into Moscow's traditional sphere of influence, which was a clear threat to the Russian homeland. Moscow's policies in places like Ukraine, this argument goes, is a regrettable but predicted response to this provocation.

Of course, others have countered that such arguments are "inconsistent," and that conflicts between Russia and the West in Eastern Europe stem from Russian pathologies and Moscow's paranoia rather than Western liberalism. Yet, even these critiques have focused on Eastern Europe.

The Eurocentric fixation of the discussion has blinkered all sides to the global nature of the American disagreements with Russia since the 1990s. After all, in addition to Ukraine, Russia also intervened militarily in Syria and, less prominently, in Libya. Likewise, bringing Iraq into the conversation expands the discussion about Russian foreign policy. Doing so belies the notion that delusional American commitments to liberalism and the threatening nature of NATO forces butting up against the Russian border drove post-Cold War history.

Russian disagreements with the United States were just as intense in Iraq, which is nowhere near the Russian border. American actions there were certainly not a threat to the regime in Moscow. Rather, focusing on Iraq suggests that Russia's main problem in its post-Cold War relations with the West has been its own weakness, which thwarted Moscow's attempts to shape international politics as it had during the Cold War.

Iraq played as important a role in the breakdown in Russian-American relations in the 1990s as anything that occurred in Europe. Moscow went along with Washington in the Gulf Crisis of 1990 because it was powerless to stop it. As a British diplomat privately quipped in the wake of Iraq's invasion of Kuwait, "it doesn't make any difference what the Soviet analysts may think since the person determining Soviet policy in the Middle East these days is [U.S. Secretary of State] James Baker." Although the Soviet Union supported the United States in the Gulf War, the Iraqi military was armed with Soviet weapons. Moscow watched with embarrassment as its military hardware proved impotent in the face of a high-tech Western onslaught in Iraq.

Following the war, the Russians tacitly supported a humanitarian intervention in Kurdish areas of northern Iraq, but behind closed doors they expressed some reservations to Bush about encroachments on Iraq's territorial integrity.

Internal Iraqi archives reveal that Iraqi diplomats struggled to maintain influence in Moscow in 1991 and early 1992. However, by courting the Russian opposition they were able to transform American policies toward Iraq into a wedge issue in Moscow. By the end of 1992, the Iraqis forced a change of policy. Despite the end of the Cold War and the collapse of the Soviet Union, the Russian government increasingly fell into old patterns of treating Iraq as a client state in the fight against American hegemony.

When Iraq moved surface-to-air missiles into a no-fly-zone in January 1993, the Americans, British, and French launched airstrikes against Saddam's regime. As declassified American intelligence reports show, these air strikes "caught Russia … by surprise." Moscow believed it was "not adequately

consulted" and it began to question "Western attempts to manage UN-authorized military actions independently." These reservations about American unilateralism in Iraq bled into suspicions about American actions in the Balkans later in 1993. American intelligence reports suggested that Russia was taking a harder line in the Balkans "because of domestic reactions to the latest [American-led] military actions against Iraq." Yeltsin began pairing the two issues, accusing "the US of dictating to the international community on Iraq and Yugoslavia."

By the end of 1993, internal Iraqi files show that the regime in Baghdad could count on the support of every major political party in Russia — from the Christian Democrats to the Communists to the Liberal Democrats and everyone in between. In their meetings with Iraqis, they all "agreed repeatedly" to aid the Iraqi regime and many of them visited Iraq to show their support. Moscow hesitated to break publicly with Washington, but by the fall of 1994 it clearly opposed American-backed sanctions.

Iraq owed Russia large sums of money, and the regime in Baghdad enticed Moscow further by offering lucrative oil and reconstruction contracts to Russian firms. Thus, Moscow had considerable economic interests in backing Iraq.

However, Russian condemnations of American policies were most severe when the United States failed to live up to the liberal principles that it claimed to support. The George H.W. Bush administration had sold the Gulf War and sanctions on Iraq as a means to launch a "new world order" in which "the rule of law supplants the rule of the jungle." The Clinton administration adopted similar rhetoric. Yet, while the United Nations never authorized regime change in Iraq, both the Bush and Clinton administrations made it increasingly clear that they would settle for nothing less than that. Such hypocrisy inflamed the Russian-American relationship. As Russian Foreign Minister Andrei Kozyrev argued in 1994, if Iraq adhered to U.N. resolutions, the United States and the U.N. Security Council "must be ready to take 'Yes' for an answer." The Russians were not liberals. They certainty were not immune to hypocrisy and cynicism. In Iraq, they were supporting one of the late 20th century's most brutal dictators — someone who launched two wars against his neighbors and gassed his own people. However, in this instance, it was not America's imposition of liberal concepts like a rules-based system or international law, but rather the flouting of them which sparked Russian ire.

Disagreements over Iraq increasingly inflamed tensions between Moscow and Washington as the decade progressed. In 1996, Baghdad sent the Iraqi Army into the autonomous region of northern Iraq to intervene in a Kurdish civil war. In response, the United States and Britain launched cruise missiles at Iraq without a Security Council resolution. Russia described the attack as "inappropriate and unacceptable." Its foreign minister, Yevgeny Primakov, condemned the United States, arguing that Washington felt there was "only one superpower in the world that could dictate its terms to others."

Then, in 1997 and 1998, Iraq provoked a series of crises when it restricted U.N. weapons inspections. In August 1998, Baghdad suspended inspections until the teams were reconfigured with fewer "Anglo-Saxons." The Russians could not defend Iraq in the face of such a blatant violation of a U.N. resolution and they remained uncharacteristically quiet throughout the fall. However, as it became clear that Washington and London were moving toward another military campaign in Iraq without a new U.N. Security Council resolution, Clinton's relationship with Yeltsin worsened.

Yeltsin recognized that Iraqi actions were problematic, but in private, he implored Clinton not to "overdramatize the situation." In December 1998, as military strikes became imminent, the relationship hit rock bottom. Internal American assessments argued that Yeltsin was under immense domestic pressure and that Russian Foreign Minister Primakov was acting "very emotionally." On December 18th, Moscow recalled its ambassador to Washington for the first time since World War II. It did so not because of NATO expansion or Western intervention in the Balkans, but because of Iraq.

In the following days, the exchange that opened this article occurred. Yeltsin made clear that what was "at stake" in the crisis over Iraq was not just the fate of the regime in Baghdad, but the entirety of Russian-American relations. However, none of the Russian protests and threats in the 1990s, including this one, had any influence on American policies. In the following years, the Russian-American relationship deteriorated further, hitting another low point against the backdrop of the American invasion of Iraq in 2003, again without clear authorization from the U.N. Security Council.

Highlighting the role of Iraq in the breakdown in Russian-American relations during the 1990s does not negate the importance of NATO expansion or Balkan interventions. However, it does challenge some of the assumptions that stem from a Eurocentric analysis. Pundits and analysts who blame the West for the breakdown in Russian-American relations often point to Western policies in Russia's near abroad. Yet, expanding the scope to include Iraq suggests that threats to the Russian homeland did not necessarily drive Russian policies. By extension, a few Western policy shifts in Eastern Europe would not have changed the course of history.

Neither was American liberalism necessarily at the heart of the dispute. Russia's fury with American policies in Iraq were most acute when Washington's propensity for unilateralism led it to defy liberal principles such as commitment to a rules-based system and international law.

That type of unilateralism was at the heart of Moscow's disagreement with the United States both in Iraq and in the post-Cold War world more generally. After winning the Cold War, the United States dominated the post-Cold War order. Moscow did not like how decisions were being made, or who was making them. As the case of Iraq shows, the Russians could complain and protest, yet they were not powerful enough to shape events in the manner that they saw fit. In the end, Moscow's dissatisfaction with its own weakness was and remains a much more fundamental issue than NATO expansion. But addressing it would require more than simply changing a few American policies in Eastern Europe.

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Is Artificial Intelligence Made in Humanity's Image? Lessons for an AI Military Education

(War on the Rocks 16 May 22) … Vincent J. Carchidi

Artificial intelligence is not like us. For all of AI's diverse applications, human intelligence is not at risk of losing its most distinctive characteristics to its artificial creations.

Yet, when AI applications are brought to bear on matters of national security, they are often subjected to an anthropomorphizing tendency that inappropriately associates human intellectual abilities with AI-enabled machines. A rigorous AI military education should recognize that this anthropomorphizing is irrational and problematic, reflecting a poor understanding of both human and artificial intelligence. The most effective way to mitigate this anthropomorphic bias is through engagement with the study of human cognition — cognitive science.

This article explores the benefits of using cognitive science as part of an AI education in Western military organizations. Tasked with educating and training personnel on AI, military organizations should convey not only that anthropomorphic bias exists, but also that it can be overcome to allow better understanding and development of AI-enabled systems. This improved understanding would aid both the perceived trustworthiness of AI systems by human operators and the research and development of artificially intelligent military technology.

For military personnel, having a basic understanding of human intelligence allows them to properly frame and interpret the results of AI demonstrations, grasp the current natures of AI systems and their possible trajectories, and interact with AI systems in ways that are grounded in a deep appreciation for human and artificial capabilities.

Artificial Intelligence in Military Affairs

AI's importance for military affairs is the subject of increasing focus by national security experts. Harbingers of "A New Revolution in Military Affairs" are out in force, detailing the myriad ways in

which AI systems will change the conduct of wars and how militaries are structured. From "microservices" such as unmanned vehicles conducting reconnaissance patrols to swarms of lethal autonomous drones and even spying machines, AI is presented as a comprehensive, game-changing technology.

As the importance of AI for national security becomes increasingly apparent, so too does the need for rigorous education and training for the military personnel who will interact with this technology. Recent years have seen an uptick in commentary on this subject, including in War on the Rocks. Mick Ryan's "Intellectual Preparation for War," Joe Chapa's "Trust and Tech," and Connor McLemore and Charles Clark's "The Devil You Know," to name a few, each emphasize the importance of education and trust in AI in military organizations.

Because war and other military activities are fundamentally human endeavors, requiring the execution of any number of tasks on and off the battlefield, the uses of AI in military affairs will be expected to fill these roles at least as well as humans could. So long as AI applications are designed to fill characteristically human military roles — ranging from arguably simpler tasks like target recognition to more sophisticated tasks like determining the intentions of actors — the dominant standard used to evaluate their successes or failures will be the ways in which humans execute these tasks.

But this sets up a challenge for military education: how exactly should AIs be designed, evaluated, and perceived during operation if they are meant to replace, or even accompany, humans? Addressing this challenge means identifying anthropomorphic bias in AI.

Anthropomorphizing AI

Identifying the tendency to anthropomorphize AI in military affairs is not a novel observation. U.S. Navy Commander Edgar Jatho and **Naval Postgraduate School** researcher Joshua A. Kroll argue that AI is often "too fragile to fight." Using the example of an automated target recognition system, they write that to describe such a system as engaging in "recognition" effectively "anthropomorphizes algorithmic systems that simply interpret and repeat known patterns."

But the act of human recognition involves distinct cognitive steps occurring in coordination with one another, including visual processing and memory. A person can even choose to reason about the contents of an image in a way that has no direct relationship to the image itself yet makes sense for the purpose of target recognition. The result is a reliable judgment of what is seen even in novel scenarios.

An AI target recognition system, in contrast, depends heavily on its existing data or programming which may be inadequate for recognizing targets in novel scenarios. This system does not work to process images and recognize targets within them like humans. Anthropomorphizing this system means oversimplifying the complex act of recognition and overestimating the capabilities of AI target recognition systems.

By framing and defining AI as a counterpart to human intelligence — as a technology designed to do what humans have typically done themselves — concrete examples of AI are "measured by [their] ability to replicate human mental skills," as De Spiegeleire, Maas, and Sweijs put it.

Commercial examples abound. AI applications like IBM's Watson, Apple's SIRI, and Microsoft's Cortana each excel in natural language processing and voice responsiveness, capabilities which we measure against human language processing and communication.

Even in military modernization discourse, the Go-playing AI "AlphaGo" caught the attention of high-level People's Liberation Army officials when it defeated professional Go player Lee Sedol in 2016. AlphaGo's victories were viewed by some Chinese officials as "a turning point that demonstrated the potential of AI to engage in complex analyses and strategizing comparable to that required to wage war," as Elsa Kania notes in a report on AI and Chinese military power.

But, like the attributes projected on to the AI target recognition system, some Chinese officials imposed an oversimplified version of wartime strategies and tactics (and the human cognition they arise from) on to AlphaGo's performance. One strategist in fact noted that "Go and warfare are quite similar."

Just as concerningly, the fact that AlphaGo was anthropomorphized by commentators in both China and America means that the tendency to oversimplify human cognition and overestimate AI is cross-cultural.

The ease with which human abilities are projected on to AI systems like AlphaGo is described succinctly by AI researcher Eliezer Yudkowsky: "Anthropomorphic bias can be classed as insidious: it takes place with no deliberate intent, without conscious realization, and in the face of apparent knowledge." Without realizing it, individuals in and out of military affairs ascribe human-like significance to demonstrations of AI systems. Western militaries should take note.

For military personnel who are in training for the operation or development of AI-enabled military technology, recognizing this anthropomorphic bias and overcoming it is critical. This is best done through an engagement with cognitive science.

The Relevance of Cognitive Science

The anthropomorphizing of AI in military affairs does not mean that AI is always given high marks. It is now cliché for some commentators to contrast human "creativity" with the "fundamental brittleness" of machine learning approaches to AI, with an often frank recognition of the "narrowness of machine intelligence." This cautious commentary on AI may lead one to think that the overestimation of AI in military affairs is not a pervasive problem. But so long as the dominant standard by which we measure AI is human abilities, merely acknowledging that humans are creative is not enough to mitigate unhealthy anthropomorphizing of AI.

Even commentary on AI-enabled military technology that acknowledges AI's shortcomings fails to identify the need for an AI education to be grounded in cognitive science.

For example, Emma Salisbury writes in War on the Rocks that existing AI systems rely heavily on "brute force" processing power, yet fail to interpret data "and determine whether they are actually meaningful." Such AI systems are prone to serious errors, particularly when they are moved outside their narrowly defined domain of operation.

Such shortcomings reveal, as Joe Chapa writes on AI education in the military, that an "important element in a person's ability to trust technology is learning to recognize a fault or a failure." So, human operators ought to be able to identify when AIs are working as intended, and when they are not, in the interest of trust.

Some high-profile voices in AI research echo these lines of thought and suggest that the cognitive science of human beings should be consulted to carve out a path for improvement in AI. Gary Marcus is one such voice, pointing out that just as humans can think, learn, and create because of their innate biological components, so too do AIs like AlphaGo excel in narrow domains because of their innate components, richly specific to tasks like playing Go.

Moving from "narrow" to "general" AI — the distinction between an AI capable of only target recognition and an AI capable of reasoning about targets within scenarios — requires a deep look into human cognition.

The results of AI demonstrations — like the performance of an AI-enabled target recognition system — are data. Just like the results of human demonstrations, these data must be interpreted. The core problem with anthropomorphizing AI is that even cautious commentary on AI-enabled military technology hides the need for a theory of intelligence. To interpret AI demonstrations, theories that borrow heavily from the best example of intelligence available — human intelligence — are needed.

The relevance of cognitive science for an AI military education goes well beyond revealing contrasts between AI systems and human cognition. Understanding the fundamental structure of the human mind provides a baseline account from which artificially intelligent military technology may be designed and evaluated. It possesses implications for the "narrow" and "general" distinction in AI, the limited utility of human-machine confrontations, and the developmental trajectories of existing AI systems.

The key for military personnel is being able to frame and interpret AI demonstrations in ways that can be trusted for both operation and research and development. Cognitive science provides the framework for doing just that.

Lessons for an AI Military Education

It is important that an AI military education not be pre-planned in such detail as to stifle innovative thought. Some lessons for such an education, however, are readily apparent using cognitive science.

First, we need to reconsider "narrow" and "general" AI. The distinction between narrow and general AI is a distraction — far from dispelling the unhealthy anthropomorphizing of AI within military affairs, it merely tempers expectations without engendering a deeper understanding of the technology.

The anthropomorphizing of AI stems from a poor understanding of the human mind. This poor understanding is often the implicit framework through which the person interprets AI. Part of this poor understanding is taking a reasonable line of thought — that the human mind should be studied by dividing it up into separate capabilities, like language processing — and transferring it to the study and use of AI.

The problem, however, is that these separate capabilities of the human mind do not represent the fullest understanding of human intelligence. Human cognition is more than these capabilities acting in isolation.

Much of AI development thus proceeds under the banner of engineering, as an endeavor not to re-create the human mind in artificial ways but to perform specialized tasks, like recognizing targets. A military strategist may point out that AI systems do not need to be human-like in the "general" sense, but rather that Western militaries need specialized systems which can be narrow yet reliable during operation.

This is a serious mistake for the long-term development of AI-enabled military technology. Not only is the "narrow" and "general" distinction a poor way of interpreting existing AI systems, but it clouds their trajectories as well. The "fragility" of existing AIs, especially deep-learning systems, may persist so long as a fuller understanding of human cognition is absent from their development. For this reason (among others), Gary Marcus points out that "deep learning is hitting a wall."

An AI military education would not avoid this distinction but incorporate a cognitive science perspective on it that allows personnel in training to re-think inaccurate assumptions about AI.

Human-Machine Confrontations Are Poor Indicators of Intelligence

Second, pitting AIs against exceptional humans in domains like Chess and Go are considered indicators of AI's progress in commercial domains. The U.S. Defense Advanced Research Projects Agency participated in this trend by pitting Heron Systems' F-16 AI against a skilled Air Force F-16 pilot in simulated dogfighting trials. The goals were to demonstrate AI's ability to learn fighter maneuvers while earning the respect of a human pilot.

These confrontations do reveal something: some AIs really do excel in certain, narrow domains. But anthropomorphizing's insidious influence lurks just beneath the surface: there are sharp limits to the utility of human-machine confrontations if the goals are to gauge the progress of AIs or gain insight into the nature of wartime tactics and strategies.

The idea of training an AI to confront a veteran-level human in a clear-cut scenario is like training humans to communicate like bees by learning the "waggle dance." It can be done, and some humans may dance like bees quite well with practice, but what is the actual utility of this training? It does not tell humans anything about the mental life of bees, nor does it gain insight into the nature of communication. At best, any lessons learned from the experience will be tangential to the actual dance and advanced better through other means.

The lesson here is not that human-machine confrontations are worthless. However, whereas private firms may benefit from commercializing AI by pitting AlphaGo against Lee Sedol or Deep Blue against Garry Kasparov, the benefits for militaries may be less substantial. Cognitive science keeps the individual grounded in an appreciation for the limited utility without losing sight of its benefits.

Human-Machine Teaming Is an Imperfect Solution

Human-machine teaming may be considered one solution to the problems of anthropomorphizing AI. To be clear, it is worth pursuing as a means of offloading some human responsibility to AIs.

But the problem of trust, perceived and actual, surfaces once again. Machines designed to take on responsibilities previously underpinned by the human intellect will need to overcome hurdles already discussed to become reliable and trustworthy for human operators — understanding the "human element" still matters.

Be Ambitious but Stay Humble

Understanding AI is not a straightforward matter. Perhaps it should not come as a surprise that a technology with the name "artificial intelligence" conjures up comparisons to its natural counterpart. For military affairs, where the stakes in effectively implementing AI are far higher than for commercial applications, ambition grounded in an appreciation for human cognition is critical for AI education and training. Part of "a baseline literacy in AI" within militaries needs to include some level of engagement with cognitive science.

Even granting that existing AI approaches are not intended to be like human cognition, both anthropomorphizing and the misunderstandings about human intelligence it carries are prevalent enough across diverse audiences to merit explicit attention for an AI military education. Certain lessons from cognitive science are poised to be the tools with which this is done.

Is Artificial Intelligence Made in Humanity's Image? Lessons for an AI Military Education - War on the Rocks

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ALUMNI:

Memorial Day Parade and Keynote Speech to Unify Community in Remembrance

(Transylvania Times 11 May 22)

This year's Memorial Day Parade will begin at 9 a.m. on Monday, May 30. The parade will have two grand marshals this year, Brevard residents LC and George Poor.

LC Poor served with the Marine Corps during WWII in the Pacific region and worked on the famous Corsair fighter aircraft as an aircraft technician with Marine Fighter Squadron VMFA 115.

George Poor served in the Air Force during the Korean War. He was a Transylvania County Honor Guard Commander and conducted military funeral services for veterans over many years.

Brevard resident Capt.Roger Herbert, US Navy (retired), will present the keynote speech for the Transylvania County Memorial Day Observance in front of the courthouse at 10 a.m.

Memorial Day is about coming together as a people to remember those who gave their lives while serving in the U.S. armed forces, said Herbert. "For my part, I observe Memorial Day by taking time to remember personal friends and colleagues who lost their lives in the line of duty. There have been far too many."

Herbert, who graduated from Davidson College in 1983, holds a Master of Arts in National Security Affairs from the **Naval Postgraduate School**, a Master of Science in National Security Studies from the National War College, and a doctorate in international relations and political theory from the University of Virginia.

"It's significant, I think, that the Memorial Day tradition began shortly after the civil war," said Herbert. "I imagine that those who originally conceived a national day of remembrance hoped that future generations of Americans would not only remember those who had fallen during America's costliest war, but would also recognize the folly of civil war, of attempting to resolve political differences by turning our guns on neighbors and fellow citizens."

Herbert received his commission as an officer in the Navy in 1984. His junior officer tours include assignments at SEAL teams two and eight, SEAL delivery vehicle team two and the naval special warfare development group. As a senior officer, he commanded the SEAL delivery vehicle two, Naval special warfare unit three (headquartered in Bahrain) and the naval special warfare center (naval special warfare's training command). Significant shore assignments include executive assistant to the deputy commander of U.S. naval forces Europe, executive assistant to the joint staff's deputy director for information operations and U.S. special operations command's liaison to the U.S. Coast Guard.

"Memorial Day reminds us—or should remind us—that we are one nation, a people capable of great achievements when united, but also capable of inflicting unmitigated carnage and suffering when we're at each other's throats," said Herbert.

Following his retirement from the Navy in 2010, Herbert served as head of school for The Outdoor Academy, a semester school for high-achieving teens in Pisgah Forest, and as a backpacking instructor for the National Outdoor Leadership School.

From 2018 to 2021 he served as the Robert T. Herres Distinguished Military Professor of Ethics at the U.S. Naval Academy. He continues to teach military ethics on a periodic basis for the University of New South Wales in Australia, as honorary professor. His publications include two forthcoming books "Special Ops Ethics: Raids, Recoveries, Reconnaissance and Rebels" with co-authors Deane-Peter Baker and David Whetham.

"Find a veteran—there are many in our county—and ask if he or she would be willing to share with you a story about a friend or colleague killed in the line of duty," said Herbert. "Your curiosity will not only honor the memory of that fallen service member, but it will also show respect and appreciation for the loss that veteran bears."

https://www.transylvaniatimes.com/community/memorial-day-parade-and-keynote-speech-to-unify-community-in-remembrance/article_e23bd6e8-cfb9-11ec-b504-eb0a4ef34114.html

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How to Keep Ego From Derailing Your Efforts to Become a Great Leader

(Herald Times 12 May 22) … Barbara Bell

When it comes to leadership, a fine line can exist between confidence and egotism.

Certainly, everyone has an ego and we would achieve little in life if there wasn't a part of us filled with the conviction that we can tackle the challenges before us.

But unfortunately, sometimes things get out of hand. When a leader has an outsized ego, that can result in the entire team's morale slumping, with some people beating a hasty retreat and seeking better opportunities elsewhere.

There are other negative impacts on the organization as well. One study revealed that not only are narcissistic leaders less collaborative and less ethical, but the cultures of the organizations they lead also are less collaborative and ethical.

In other words, the bad example those egotistical leaders set permeates everything within the culture.

So it's important for everyone involved that leaders keep their egos in check even as they exude the confidence that's needed to inspire those around them. With that in mind, here are a few things leaders need to know about out-of-control egos – and how to correct those problems:

Ego can make you think of your needs over others. Leaders with big egos are caught up in their own importance, and that can make them blind to the team's importance. If you see your team's needs as inconsequential, it's time to re-evaluate both them and yourself. As a veteran, I can tell you that the military tries to instill in people right from the start the importance of the team because lives depend on how well you work together. Lives may not be on the line at your business or organization, but how the team functions is on the line. And if your ego prevents you from conveying to team members how important they are, and that you care about their needs, the entire enterprise can suffer.

Ego can cause you to devalue those around you – at a cost. Sometimes people with big egos build themselves up by tearing others down. If members of your team are made to feel that they can do no right, that they aren't valued, then their self esteem will wane. (I can remember seeing women in the military struggle when they were made to feel that they didn't belong or that they weren't qualified.) It's hard for people to perform at their best when their self esteem is low. Certainly, if team members aren't performing up to the job's specifications they need to be corrected and told how to improve. But view this as an opportunity to build them up rather than tear them down.

Ego can keep you from admitting you don't know everything. When you see yourself as always right and everyone else always wrong, then you aren't likely to demonstrate to your team that you value their input. And people want to feel that they are being heard. Let go of the notion that you have to be the smartest person in the room and that you need to know everything to be a great leader. As your leadership

responsibilities grow and become increasingly more complex, become comfortable being more of a generalist. Rely on those who work for you as the specialists and lead them in the direction you want them to go.

Maintaining the right amount of ego can be a balancing act. After all, a certain degree of ego is a good thing because it gives you the confidence to soar and to make the tough decisions your job requires.

Just be careful that it's not allowed to balloon out of control.

About Barbara Bell

Barbara Bell (www.captainbarbarabell.com), author of Flight Lessons: Navigating Through Life's Turbulence and Learning to Fly High, was one of the first women to graduate from the U.S. Naval Academy and the U.S. Naval Test Pilot School. Now she works to empower the next generation of female leaders. In 1992, Bell and fellow aviators went to Capitol Hill to help successfully repeal the combat exclusions laws, opening up combat aircraft and ships to women in the military. Bell holds a B.S. in systems engineering from the United States Naval Academy, an M.S. in astronautical engineering from the **Naval Postgraduate School**, an M.A. in theology from Marylhurst University, and a doctorate in education from Vanderbilt University. She is an adjunct professor of leadership at Vanderbilt.

How to keep ego from derailing your efforts to become a great leader | Rio Blanco Herald Times | Serving Meeker, Rangely, Dinosaur & Northwest Colorado (theheraldtimes.com)

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Cyber at Sea: Protecting Strategic Sealift in the Age of Strategic Competition

(MWI 10 May 22) … Jason Ileto

Months before the shooting started in the Russo-Ukrainian War, the US intelligence community warned of Russian troop movements amassing at Ukraine's border. The gradual buildup, which included transportation of equipment from as far away as Siberia to Ukraine's doorstep via railcars, showcases the arduous and logistically complex process of mobilizing for war. Things are even more complex when transportation involves a significant maritime component, which is precisely the situation the United States would find itself in should conflict with China break out.

To make matters worse, this process is vulnerable to disruption. The credibility of Russia's fighting effectiveness was put into question in the first month of its invasion of Ukraine following cracks in its logistical network. Russian ships providing replenishment of tanks were damaged off the coast of Berdyansk and the Saratov was sunk. But ships are vulnerable to more than missile attacks. The maritime transportation industry, like any global network, is vulnerable to cyberattacks and disruptions. What effects on mobility could a cyberattack have and what can be done to make sealift vessels more resilient?

These questions are of paramount importance. Besides being prepared for an actual conflict, strategic sealift plays a role in deterrence. Having a credible combat force capable of retaliation factors into the cost calculation of potential aggressors. In the event of a protracted conflict, one essential capability the United States military must maintain is overseas force projection. While air mobility can quickly send limited forces anywhere in the world, the bulk of ground combat forces would be transported on a fleet of strategic sealift vessels. Having a clear understanding of what some of the main vulnerabilities are and how to fix them is essential.

What is Sealift?

Naval Doctrine Publication 1, Naval Warfare defines sealift as "the afloat pre-positioning and ocean movement of military materiel in support of United States and multinational forces," and as one of the enduring functions of the naval service. Indeed, sealift delivers 90 to 95 percent of all military cargo in wartime. The US Navy's Military Sealift Command (MSC) manages a portfolio of vessels that perform the strategic sealift mission—mass movement of military cargo during wartime—and other associated vessels. These other vessels include pre-positioning ships, which are loaded with military equipment and

staged in strategic locations, awaiting activation during a contingency. MSC also operates a combat logistics force of fleet oilers and dry cargo/ammunition ships that replenish Navy operating forces during day-to-day operations, and other ships for fleet support and special missions.

During the first Persian Gulf War, over 230 ships delivered twelve million tons of ground vehicles, helicopters, cargo, fuel, and ammunition by sea. Some of the ships used during Desert Storm performed the same sealift missions during the wars in Afghanistan and Iraq and continue to serve in the fleet today. In the summer of 2021, US Transportation Command completed a study that found that the United States currently has enough sealift ships to "satisfy the demands of the National Defense Strategy and project and sustain the Joint Force on a global scale."

What would happen if the number of ships was affected due to a cyberattack? One possibility is that the amount of ground forces able to flow into theater would be reduced. This, in turn, would extend the time it would take to enter different phases of a campaign. By understanding the methods of attack that malicious actors could enact on ships and the companies that operate them, policies can be implemented to promulgate best practices.

Methods of Attack

Malicious actors can use cyberattacks to disrupt the flow of forces into theater in multiple ways. From the point of origin, cyberattacks against rail networks can force DoD to engage in suboptimal means of moving cargo to a port. Once at the port, cyberattacks on port facilities can slow the loading of cargo onboard ships causing bottlenecks. This article will focus on vulnerabilities during the final leg of the journey of military cargo into theater. These include attacking the operating companies that manage sealift vessels, disrupting systems that ships rely on for positioning and navigation, or infiltrating critical systems onboard ships.

Operating Companies

Consider first the prospect of malicious actors targeting operating companies. Maersk, the world's largest global shipping company, which owns and operates many ships enrolled in the Maritime Security Program (MSP), is a telling example. The MSP, run by the US Department of Transportation's Maritime Administration, subsidizes the operations of commercially owned and commercially operated US-flagged ships. These ships must be considered commercially viable and militarily useful and are active in international trade. In return for this subsidy, these ships must make themselves available for DoD to use during a national emergency to move combat forces.

In June 2017, Maersk fell victim to a cyberattack when its systems were infected by NotPetya. Maersk was not alone—this malware destroyed data belonging to senior government officials, as well as other institutions such as energy firms and the banking sector. According to the Washington Post, the CIA attributes NotPetya to Russia's Main Intelligence Directorate and assessed that Ukrainian companies were its primary target. The United Kingdom's National Cyber Security Centre also determined that the Russian military aimed to disrupt Ukraine's government, financial, and energy sectors.

While Ukraine may have been the target, NotPetya had spillover effects and found its way into Maersk's systems. Around 3,500 of 6,200 servers were destroyed along with 49,000 laptops and 1,000 applications. Phone lines were inoperable. Cloud services were affected. Maersk's operations ground to a halt. In the aftermath, Maersk reported financial losses of up to $300 million.

Based on the international havoc NotPetya caused, it is easy to imagine a state actor intentionally launching a cyberattack against ships enrolled in the MSP. If successful, an attack could significantly delay the movement of military materiel into a theater—something that would be particularly problematic prior to the onset of a conflict. In a race to bring combat power across the ocean, even a short delay can impact strategic mobility. Finding quick workarounds to mitigate delays, such as using airlift, are akin to using a soda straw to move a barrel's worth of cargo. Military planners transition between campaign phases only after certain conditions are met. Mobilization delays that impact the aggregation of combat power are likely to shift any phase transition points to the right, perhaps dramatically so.

Positioning and Navigation

Another possible attack is the targeting of a ship's navigation systems by misdirecting GPS signals or spoofing Automatic Identification Systems (AIS) and Electronic Chart Display and Information Systems.

Russia recently demonstrated its GPS-jamming capabilities during its invasion of Ukraine but has used these tactics for years. Russia also practiced how it would operate its military forces in the event it's GLONASS satellite navigation system was degraded by jamming during its quadrennial Zapad exercise with Belarus in 2017. Operating in the high north, Zapad focused on insulating the area of war and preventing enemy reinforcements from entering the area. A component of Russia's antiaccess and area-denial strategy was the employment of electronic warfare. However, the jamming of GPS signals spilled over to areas outside the exercise zone, namely into Norway and Latvia.

Russia has also used GPS jamming offensively. NATO conducted Exercise Trident Juncture in 2018, and brought all NATO allies to Norway for a major operation and to assess NATO's ability to evaluate the information environment. During the exercise, NATO allies experienced GPS signals jamming and suspected Russia. Again, the effects spilled over to areas outside the exercise bounds. Besides areas within Norway near the Russian border, signals were interrupted in Lapland, the northernmost area of Finland. While these examples occurred over land, GPS jamming could easily extend out to the sea and confuse mariners if standard navigation protocols do not require them to double-check their position through other means.

However, GPS is not the only navigational tool that can be hacked. Another maritime awareness system, AIS, is also vulnerable. The International Maritime Organization requires "AIS to be fitted aboard all ships of 300 gross tonnage and upwards engaged on international voyages, cargo ships of 500 gross tonnage and upwards not engaged on international voyages and all passenger ships irrespective of size." The US Coast Guard also requires AIS for all vessels over 1,600 gross tons when operating within the navigable waters of the United States. The Coast Guard makes an exception for warships, but warships typically transmit AIS for safety and awareness.

AIS takes information from one ship and transmits its data to all other ships, as well as aircraft and shore-based maritime infrastructure such as port facilities. The transmitted data includes the ship's name, location, course, and speed. AIS software also alerts ship drivers if they are in danger of getting too close to a vessel so they can adjust course or speed well in advance to avoid an in extremis situation.

According to the US Department of Transportation Maritime Administration, AIS signals can be spoofed. Indeed, there are cases of AIS spoofing in recent years. One example is the British-flagged oil tanker Stena Impero. As the oil tanker transited the Strait of Hormuz, its AIS signal was spoofed and it was tricked into sailing into Iranian territorial waters. The ship was summarily seized by the Islamic Revolutionary Guard Corps and the crew detained. The Stena Impero was held by Iran for two months before it was eventually released.

Another case involves the MV Manukai, a US-flagged container ship owned by Matson, a transportation services company based in Hawaii. In July 2019, the Manukai was inbound to Shanghai, the world's busiest port. Maneuvering through a heavily trafficked channel is one of the more dangerous evolutions of a ship, and is a situation that requires accurate data about the other ships in the channel. When the Manukai was maneuvering to its assigned berth it started to see an AIS contact jump around and move from position to position before ultimately disappearing. A visual check confirmed that the ship never left port. The Manuaki then experienced a loss of all GPS and AIS. This phenomenon points to electronic warfare. Many containerships in the Maritime Security Program are similar in build to the Manukai. If the Manukai's positioning and navigation equipment was vulnerable to loss, the same is theoretically true of any containership relied upon to move military cargo.

Finally, in June 2021 two NATO ships docked in Odesa, Ukraine had their AIS signals spoofed. The HMS Defender, a Royal Navy destroyer, and the HNLMS Evertsen, a Royal Netherlands Navy frigate, appeared to leave port and sail toward Sevastopol, a major port on the Black Sea, which also serves as the headquarters of Russia's Black Sea Fleet—at least, that's what their AIS signals said. Webcams around the Port of Odesa confirmed that the warships never left port. A malicious actor could use either of these techniques, GPS jamming or AIS spoofing, to confuse ships' navigational systems and crew. During long

stretches of sailing in the open ocean, ships are often steered on autopilot and rely fully on GPS navigation. Disrupting these systems could lead to ships going off course.

Critical Systems

Lastly, a malicious actor could use cyberattacks to disrupt the safe operations of a ship. Software that calculates the stability of a ship, moves rudders, or operates machinery can be hacked using satellite communications, serial ports, or USB sticks. The cybersecurity company Naval Dome created a virus designed to take over a ship's machinery control system. Using a USB stick for delivery, they successfully overtook auxiliary systems such as fuel systems, generators, and air-conditioning. Their attack was also able to take over the ship's ballast system.

Two additional examples show how programs used to accomplish mission-essential tasks can spell disaster for a ship when used improperly. The MV Golden Ray was a roll-on/roll-off (RO/RO) vehicle carrier that capsized in 2019 while traveling outbound from the Port of Brunswick, Georgia as it turned on its intended track. The interior spaces of a RO/RO resemble a giant parking garage. The National Transportation Safety Board performed an investigation and found that the Golden Ray's center of gravity was too high and caused the capsizing. The ship's center of gravity was off because the chief officer entered incorrect data into the shipboard stability calculation computer.

A similar event happened a few years earlier with another RO/RO vessel, the MV Höegh Osaka. The ship onboarded construction equipment and Range Rovers in the Port of Southampton, England and cargo was primarily loaded on the upper vehicle decks, while the lower vehicle decks were lightly loaded. The Höegh Osaka was also low on bunker fuel oil, which is stored in the lower parts of the ship. Additionally, ballast tank levels were estimated onboard and did not reflect actual tank levels. As a result, the center of gravity was too high for the ship to be stable. The vessel developed a severe list and went aground after losing control during a turn on its outbound track. Despite damaged cargo and damage to the vessel, the Höegh Osaka was salvageable due to the location of the grounding. Had the ship turned any earlier or later, it would have grounded in the only deepwater channel in the area. An obstruction like this would have rendered the Port of Southampton unusable for large shipping vessels.

Imagine if a state-sponsored actor was able to hack into the ballasting software for RO/RO vessels in the Ready Reserve Force. Load plans for vessels are normally planned ahead of time but ballast tanks also fit into the calculation for ship stability. If water levels were programmed to read a certain amount but the actual amount of water brought onboard was much less, a ship's crew could unknowingly be piloting an unstable ship subject to capsize during a turn. Since several turns are common when maneuvering into or out of a port, having a ship capsize in a channel could impact any other ships entering or exiting the port. These effects would be compounded if multiple ships were trying to queue to receive military cargo during a major mobilization.

Implications

Cyberattacks of the sort described above can happen to friendly and adversarial ships alike. However, if the United States ended up in a war with China or Russia, sealift would present an asymmetric vulnerability. Most likely, a war with China or Russia would be fought in the Indo-Pacific or in Europe, meaning either adversary's fleets would not have long distances to travel for replenishment. Because the United States is reliant on sealift vessels for long-term combat operations overseas, developing defenses for all three methods of attack is essential.

Operating companies that manage these ships must invest in hardening networks for resiliency and use the most up-to-date software with robust patching. These companies should also operate under the assumption that a cyberattack will strike their business operations and should maintain and test plans for mitigation and recovery. Maersk was able to bring back its operations by a stroke of luck—one of the company's servers was offline due to a power outage during the attack and allowed it to recover its Active Directory.

Mariners should also train to operate ships without vulnerable technologies like GPS and AIS. On the high seas, mariners should be experts in celestial navigation. Closer to shore, coastal navigation should always be a backup. Mariners should also rehearse and enforce good cybersecurity practices to prevent

malware from penetrating networks onboard ships. Relatedly, the Department of Transportation should mandate that operating companies or the unions that organize mariners require in-person classroom training on cybersecurity. Computer-based training is often rushed and fails to build the requisite knowledge to ensure good cybersecurity habits. Finally, DoD should send cyber red and blue teams to sealift ships as well as other naval vessels to inspect for vulnerabilities, patch any outdated systems, and conduct training with the crew. The requirements for strategic sealift are great during a major contingency overseas. Any efforts to reduce risk in cyber vulnerabilities would be a worthy investment.

Commander Jason Ileto is a supply officer in the US Navy. He earned a master of science in operations research from the **Naval Postgraduate School** in 2011 and is currently pursuing a graduate degree at the Naval War College. He has conducted a directed research project under the Cyber & Innovation Policy Institute (CIPI) Vice Admiral Samuel L. Gravely Jr. Program.

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NASA Astronaut From Long Island Set to Make 1st Trip to Space [Video Interview]
(ABC 7 13 May 22)

NASA and the European Space Agency recently selected two astronauts to launch on NASA's SpaceX Crew-7 mission to the International Space Station, and one of them is from Long Island.

Jasmin Moghbeli is from Baldwin, and this will be her first space flight.

Moghbeli became a NASA astronaut in 2017 after earning a bachelor's degree in aerospace engineering from MIT and a Master's degree from the **Naval Postgraduate School** in Monterey, California.

As an AH-1W Super Cobra pilot and Marine Corps test pilot, she has flown more than 150 missions, accruing 2,000 hours of flight time in more than 25 different aircraft.

She also graduated with honors from the U.S. Naval Test Pilot School in Patuxent River, Maryland. At the time of her selection as an astronaut, Moghbeli was testing H-1 helicopters and serving as the quality assurance and avionics officer for VMX-1.

"I really wanted to go to the International Space Station," she said. "I think it's incredible that we have a lab orbiting around the earth, and I was extremely excited and ran downstairs and told my husband."

Her mission will keep her in space for six months, and she will be able to video chat with her twin girls once a week.

Moghbeli will spend more than a year training.

"It does come with costs of being away from them during training and missions," she said. "But I hope they watch us and learn it's important to go after things you're really passionate about, and they do the same thing."

Moghbeli has been an inspiration and a role model for her girls and for kids everywhere, including in her hometown, where students have followed her successes.

"For the people in Baldwin, please spot the station," she said. "I'll be waving."

She dreams of going to to the moon, a goal that's looks increasingly within her reach.

She will be joined by ESA astronaut Andreas Mogensen, who will be making his second trip to the space station.

Astronaut from Long Island chosen to lead SpaceX Crew-7 mission to the International Space Station - ABC7 New York (abc7ny.com)

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