

NORAD and USNORTHCOM

North American Defense and Security Academic Alliance

Academic Year 2024 – 2025 Research Topic Nominations

NORAD and USNORTHCOM invites all institutions to partner in research that is mutually beneficial in the areas of Homeland Defense, Aerospace Warning and Control, Maritime Warning, Cyber Defense, Security Cooperation, and Defense Support of Civil Authorities. We have a broad research topics list that can potentially be used to satisfy student research project requirements while helping to advance NORAD and USNORTHCOM's understanding of a given focus area. Students and student research teams are paired with NORAD and USNORTHCOM subject matter experts to complete research on the Commander's priority areas of interest, topic from the new Academic Year, or legacy research topic list. Subject matter experts provide informational guidance and considerations, in conjunction with applied research, methodology, and editorial expertise supplied by the student's academic advisor(s).

Research projects derived from the Research and Writing Program are entered for consideration for the NORAD and USNORTHCOM Writing Award and for presentation at the annual Homeland Defense Awareness Symposium. Each submission will undergo an internal peer review by defense and security experts, practitioners, and NORAD and USNORTHCOM subject matter experts. Exceptional submissions will be nominated for publishing with one of our affiliated journals. Submissions are evaluated on their writing proficiency and consistency, methodological rigor and integrity, and their overall utility and relevance to NORAD and USNORTHCOM's mission sets. There are no submission guidelines for participants in the Research and Writing Program, outside of the educational institution writing requirements.

Contact us by emailing n-nc.peterson.n-ncj7.mbx.j72-education-team-omb@mail.mil.





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Drone Intrusion: Authorities & Policies

CLASSIFICATION	UNCLASSIFIED
RESEARCH TOPIC TITLE	Drone Intrusion: Authorities & Policies
TOPIC DESCRIPTION	Identify, describe, and document authorities and policies relevant to undesired drone activity
DESIRED OBJECTIVES	Streamline future drone response actions
EXTENDED TOPIC DESCRIPTION	This research should use a "future scenario" format to identify, describe, and document authorities and policies related to undesired drone activity.
REQUESTING/SPONSORING ORGANIZATION	NORAD J3
DESIRED COMPLETION DATE	Aug 2024
POINT OF CONTACT	NORAD and USNORTHCOM / J72
MAILING ADDRESS	NORAD&USNORTHCOM/J7, 250 Vandenberg Street, Suite B016, Peterson SFB, CO 80914
EMAIL ADDRESS	n-nc.peterson.n-ncj7.mbx.j72-education-team-omb@mail.mil
TELEPHONE NUMBER (COMMERCIAL AND DSN)	COMM 719-554-7340; DSN 692-7340
FAX NUMBER (COMMERCIAL AND DSN)	N/A
AVAILABLE FUNDING (IF APPLICABLE)	N/A
COMMENTS	<p>Potential future scenarios that may serve as useful vignettes could range from undesired drone activity during a civilian event such as the Super Bowl, to drone activity near a sensitive Department of Defense installation, or a Department of Energy location. The goal is to identify the legal authorities and responsibilities, as well as relevant policies that govern a military, law enforcement, or other government Department or agency response. Preferred research will not focus on technical aspects of the problem such as sensors or weapons; research desired is scoped around the legal and policy considerations.</p> <p>Recommended research starting point to reference authorities is RAND Corporation's National Security Research Division 2023 tabletop exercise Inverted Rook.</p>



Global Force Management Sourcing via Artificial Intelligence

CLASSIFICATION	UNCLASSIFIED
RESEARCH TOPIC TITLE	Global Force Management (GFM) Sourcing via Artificial Intelligence (AI)
TOPIC DESCRIPTION	Could some portion of the Joint Staff's GFM force Assignment and Allocation processes be performed using AI or Machine Learning (ML) (i.e., recommendation formulation based on predetermined formula & presented for Chairman Joint Chiefs of Staff/Secretary of Defense decision).
DESIRED OBJECTIVES	Consolidate, expedite, & streamline multiple, desperate Joint Staff GFM processes for decision.
EXTENDED TOPIC DESCRIPTION	There are a number of known factors Joint Staff uses to Allocate operational forces to CCMDs. Services and Joint Force Providers present their force offerings early in the rotational process (known force availability), shortly before Geographical CCMDs submit their operational force requirements (known allocation requests). The NDS and NMS establishes operational Global Priorities in general terms. The recently published Joint Risk Assessment Methodology (CJCSM 3105.01A) removes much of the ambiguity from assessing Risk to Force and Risk to Mission. AI & ML could be a useful tool to replace several Joint Staff processes, reduce a significant amount of manning, while still providing DoD senior leaders to make final decisions.
*REQUESTING/SPONSORING ORGANIZATION	NORAD J3
*DESIRED COMPLETION DATE	June 2025
*POINT OF CONTACT	NORAD and USNORTHCOM / J72
*MAILING ADDRESS	NORAD&USNORTHCOM/J7, 250 Vandenberg Street, Suite B016, Peterson SFB, CO 80914
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FAX NUMBER (COMMERCIAL AND DSN)	N/A
AVAILABLE FUNDING (IF APPLICABLE)	None identified
COMMENTS	

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Operations in the Information Environment: Audience and Narrative Analysis

CLASSIFICATION	UNCLASSIFIED
RESEARCH TOPIC TITLE	Operations in the Information Environment: Audience & Narrative Analysis
TOPIC DESCRIPTION	Identify and understand the potential target audiences of homeland defense-related OIE
DESIRED OBJECTIVES	Enhance OIE effectiveness
EXTENDED TOPIC DESCRIPTION	This research should borrow from marketing and sales best practices, to identify the potential target audiences for NORAD & USNORTHCOM Operations in the Information Environment (OIE). After identifying potential audiences, this research should describe what themes, narratives, or stories will gain and maintain traction in the public information space.
REQUESTING/SPONSORING ORGANIZATION	NORAD J3
DESIRED COMPLETION DATE	Aug 2024
POINT OF CONTACT	NORAD and USNORTHCOM / J72
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FAX NUMBER (COMMERCIAL AND DSN)	N/A
AVAILABLE FUNDING (IF APPLICABLE)	N/A
COMMENTS	Potential audiences for homeland defense-related Operations in the Information Environment include USA and Canadian domestic public, partner and ally domestic public, competitor nation civilians, competitor nation military or political decision and policymakers, USA and Canadian policymakers, etc. The main goal of this research is to identify compelling stories and narratives that will influence perceptions and decision-making from the target audiences. The research output should include vignettes or examples of successful marketing campaigns or past military information-related operations, to illustrate best practices to current military planners.

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Resiliency of Faith Communities and How It Adds to Overall National Resiliency

CLASSIFICATION	UNCLASSIFIED
RESEARCH TOPIC TITLE	Resiliency of Faith Communities and How It Adds to Overall National Resiliency
TOPIC DESCRIPTION	How resilience of faith communities can strengthen community, national resilience
DESIRED OBJECTIVES	Determine how we can assess resilience of faith communities.
EXTENDED TOPIC DESCRIPTION	What means can we use to assess the resiliency strength of faith communities and how they contribute to overall resiliency of our nation to recover from natural disasters or attacks on the homeland?
REQUESTING/SPONSORING ORGANIZATION	NORAD and USNORTHCOM Special Staff
DESIRED COMPLETION DATE	April 2025
POINT OF CONTACT	NORAD and USNORTHCOM / J72
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FAX NUMBER (COMMERCIAL AND DSN)	n/a
AVAILABLE FUNDING (IF APPLICABLE)	n/a
COMMENTS	National resilience, how a nation responds to and recovers from a natural disaster demonstrates to our peer competitors our overall strength and ability to recover. This in turn could serve as a deterrent to our adversaries when they consider actions against our homeland. The resilience of our faith communities - strengthening individuals and communities in the face of extreme challenges - can contribute greatly to our nation's overall resilience. And this is a strength that not all of our adversaries possess.

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Arctic Operations

CLASSIFICATION	UNCLASSIFIED
RESEARCH TOPIC TITLE	Arctic Operations
TOPIC DESCRIPTION	The Arctic is a critical region for power projection and homeland defense. Growing strategic competition, rapid advancements in technology, and ongoing changes in our climate are transforming the geophysical environment and strategic landscape in the Arctic.
DESIRED OBJECTIVES	Advance National Security in the Arctic Region by building resilience into military operations and infrastructure for extremely harsh operating conditions and climate change challenges.
EXTENDED TOPIC DESCRIPTION	<p>1. What are the most effective means and methods (in both policy and practice) for defending the North American Arctic, ensuring national sovereignty, and deterring military escalation in the High North?</p> <p>2. What are the most likely military and security threats and risks to the US-defined Arctic Region and how should this inform and influence future homeland defense and national security policy and operational postures?</p> <p>3. What are the specific critical infrastructure, capabilities, and force postures needed to ensure homeland defense in the 21st century?</p>
REQUESTING/SPONSORING ORGANIZATION	NORAD and USNORTHCOM/J7, HDI
DESIRED COMPLETION DATE	Jun 2025
POINT OF CONTACT	NORAD and USNORTHCOM / J72
MAILING ADDRESS	NORAD&USNORTHCOM/J7, 250 Vandenberg Street, Suite B016, Peterson SFB, CO 80914-3813
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AVAILABLE FUNDING (IF APPLICABLE)	None identified
COMMENTS	The U.S. National Strategy for the Arctic Region outlines a collaborative approach with Arctic Allies to build resilience to the impacts of climate change, pursue sustainable economic development, and enhance the capability to defend our interests, while mitigating risks of unintended escalation. Canada's Arctic and Northern Policy Framework has complimentary efforts related to enhancing military presence, strengthening Canada's cooperation and collaboration with domestic and international partners, and researching climate change to address adaption and resilience.

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Predicting and Assessing Risk to Critical Infrastructure

CLASSIFICATION	UNCLASSIFIED
RESEARCH TOPIC TITLE	Predicting and Assessing Risk to Critical Infrastructure
TOPIC DESCRIPTION	The Department of Defense (DOD) relies on a network of critical infrastructure to project, support, and sustain its forces and operations worldwide. The incapacitation, exploitation, or destruction of one or more of its assets would seriously damage DOD's ability to carry out its core missions at home and abroad.
DESIRED OBJECTIVES	Strengthen resilience and adaptability of our homeland defense ecosystem.
EXTENDED TOPIC DESCRIPTION	<p>1. Explore different threat scenarios to identify the most likely/most dangerous homeland defense threats and predict potential impacts on infrastructure to include interdependencies across government and private sector resources.</p> <p>2. Identify alternate infrastructure protection options including redundancy, hardening, dispersal and deception capabilities and implementation plans.</p> <p>3. Identify supply chain vulnerabilities and dependencies jeopardize military operations to include the defense industrial base and what can be done to mitigate that risk?</p>
REQUESTING/SPONSORING ORGANIZATION	NORAD and USNORTHCOM J7 / HDI
DESIRED COMPLETION DATE	Jun 2025
POINT OF CONTACT	NORAD and USNORTHCOM / J72
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AVAILABLE FUNDING (IF APPLICABLE)	None identified
COMMENTS	While DOD Directive 3020.40, Mission Assurance and DOD Instruction 3020.45, Defense Critical Infrastructure Program Management defines roles and responsibilities for DOD's critical assets and infrastructures, military facilities and missions depend on civilian systems like energy grids and transportation networks. DOD continuity of operations requires the identification of core capabilities for homeland defense and an understanding of the interdependencies and capability gaps in critical infrastructure assets, systems, and networks to prepare for, withstand, and recover from disruptions. Because many critical infrastructure assets are owned and operated by the private sector and overseen by interagency partners, a whole-of-nation approach must be employed when developing mitigation strategies.

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Force Protection Threat Information Sharing and Collaborations

CLASSIFICATION	UNCLASSIFIED
RESEARCH TOPIC TITLE	Force Protection Threat Information Sharing & Collaborations
TOPIC DESCRIPTION	In order to establish a front line of protection against today's immediate threats, nations must enhance shared situational awareness of network vulnerabilities, threats, and events within services, agencies and other Government entities - and ultimately with allied nations, governments, and private sector partners.
DESIRED OBJECTIVES	Enhance domain awareness, information dominance, and decision superiority to achieve integrated deterrence in homeland defense.
EXTENDED TOPIC DESCRIPTION	<p>1. What lessons can be drawn from allies and partners currently facing homeland defense threats or attacks with a focus on how organizations collect, process, analyze, distribute, and share information.</p> <p>2. What are the best practices gleaned from countries successful in homeland defense to deter or respond to threats with a focus on how organizations collect, process, analyze, distribute, and share information.</p> <p>3. What is the most likely course of action for a future attack on the North America and what can be done to better predict and prepare for such events with a focus on how organizations collect, process, analyze, distribute, and share information.</p>
REQUESTING/SPONSORING ORGANIZATION	NORAD and USNORTHCOM
DESIRED COMPLETION DATE	Jun 2025
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FAX NUMBER (COMMERCIAL AND DSN)	COMM 719-554-6250, DSN 692-6250
AVAILABLE FUNDING (IF APPLICABLE)	None identified
COMMENTS	Effective interorganizational cooperation in Homeland Defense operations relies on inclusive information sharing environments that facilitate swift and accurate intelligence dissemination, involving essential participants for quick and informed decision-making. The implementation of information sharing capability for the Department of Defense emphasizes creating a system that enables seamless sharing of critical information among mission partners, enhancing collaboration, and ensuring effective communication for military operations and defense activities.

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Homeland Port Security

CLASSIFICATION	UNCLASSIFIED
RESEARCH TOPIC TITLE	Homeland Port Security
TOPIC DESCRIPTION	America's seaports are the cornerstone of the U.S. economy and serve as critical nodes to projecting the nation's military force. New and evolving threats, physical and digital, expose potential vulnerabilities to maritime port equipment, networks, operating systems, software, and infrastructure.
DESIRED OBJECTIVES	Strengthen resilience and adaptability of our homeland defense ecosystem.
EXTENDED TOPIC DESCRIPTION	<p>1. What are the risks to the US port industry's critical infrastructure relative to external threats and adversarial aggression (i.e. deliberate / targeted disruptions to US commerce and military/commercial goods flow) and how can we mitigate against these risks and deter the threats.</p> <p>2. What technical solutions exist or are needed to mitigate operational and intelligence vulnerabilities in America's seaports.</p> <p>3. What are the most effective means and methods (in both policy and practice) for defending the eastern, western, and southern coastal approaches to the US homeland from external threats and aggression?</p>
REQUESTING/SPONSORING ORGANIZATION	NORAD and USNORTHCOM J7 / HDI
DESIRED COMPLETION DATE	Jun 2025
POINT OF CONTACT	NORAD and USNORTHCOM / J72
MAILING ADDRESS	NORAD&USNORTHCOM/J7, 250 Vandenberg Street, Suite B016, Peterson SFB, CO 80914-3813
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FAX NUMBER (COMMERCIAL AND DSN)	COMM 719-554-6250, DSN 692-6250
AVAILABLE FUNDING (IF APPLICABLE)	None identified
COMMENTS	The widespread integration of information and communications technology in maritime and port infrastructure, including systems for tracking shipments, vessel navigation (Position, Navigation, and Timing (PNT)), and automated control enhances efficiency but also raises significant cybersecurity threats. These technologies, if exploited, could disrupt port operations, compromise data integrity, increase collision risks, or damage critical infrastructure. Specifically, proprietary foreign adversarial companies manufacture, install, and maintain port equipment that pose potential vulnerabilities to global maritime infrastructure information technology (IT) and operational technology (OT) systems. Despite these vulnerabilities, there is a lack of understanding about potential attackers, existing protections, and response capabilities, leading to concerns about America's preparedness to counter threats to port infrastructure. Innovative research is required to mitigate these risks to prevent deployment/supply chain delays and disruptions caused by adversaries, as well as shortcomings arising from the state of existing seaport infrastructure.

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Linear-Radial Munitions for Tunnel Warfare

CLASSIFICATION	UNCLASSIFIED
RESEARCH TOPIC TITLE	On the Straight and Narrow: Linear-Radial Munitions for Tunnel Warfare
TOPIC DESCRIPTION	Adapt current penetrating and directional explosives technology to develop a linear-penetrating munition that subsequently explodes with radial force perpendicular to the axis of penetration and along its fully develop
DESIRED OBJECTIVES	Design a prototype for a family of munitions capable of penetrating and collapsing a narrow, rectilinear tunnel of given length.
EXTENDED TOPIC DESCRIPTION	Subterranean tunnel systems in use during current and recent combat situations appear to be networks of connected segments of mostly straight tunnels, with protective blast doors blocking them at various intervals. This research conceives of a two-phased munition, sized for the estimated length of the tunnel segment to be collapsed, that first travels the segment, penetrating any obstacles in its path and positioning the second-phase components along the segment, which then explode radially to collapse the tunnel segment locally along its entire length.
REQUESTING/SPONSORING ORGANIZATION	NORAD and USNORTHCOM J7
DESIRED COMPLETION DATE	Jul 2025
POINT OF CONTACT	NORAD and USNORTHCOM / J72
MAILING ADDRESS	NORAD&USNORTHCOM/J7, 250 Vandenberg Street, Suite B016, Peterson SFB, CO 80914-3813
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AVAILABLE FUNDING (IF APPLICABLE)	None identified
COMMENTS	Point of Contact may be updated based on sponsorship within Headquarters NORAD and USNORTHCOM.

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Maneuverable Subterranean Munitions

CLASSIFICATION	UNCLASSIFIED
RESEARCH TOPIC TITLE	Banana Bomb: Maneuverable Subterranean Munitions
TOPIC DESCRIPTION	Develop a concept for a penetrating munition capable, once underground, of following a prescribed curvilinear path through substrates of varying porosity.
DESIRED OBJECTIVES	Design a prototype for a family of munitions capable of penetrating the ground at right or nearly right angles and then curving to reach a relatively shallow target displaced laterally from the point of ground entry.
EXTENDED TOPIC DESCRIPTION	Recent combat discoveries of operational military facilities located directly underneath structures otherwise protected from attack suggests the utility of a family of munitions capable of initially penetrating the surface in an open area displaced laterally from the protected structure, then following a curved path through substrate(s) of only estimated composition, achieving a detonation point deep enough to encounter the subterranean facility and having traveled the necessary lateral distance as well. As an added bonus, the munition would avoid having to penetrate a protective in-ground concrete slab above the target facility, and in fact could leverage that slab as a reflective surface to cause additional, second-wave blast damage to the facility.
REQUESTING/SPONSORING ORGANIZATION	NORAD and USNORTHCOM J7
DESIRED COMPLETION DATE	Jul 2025
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AVAILABLE FUNDING (IF APPLICABLE)	None identified
COMMENTS	Point of Contact may be updated based on sponsorship within Headquarters NORAD and USNORTHCOM.

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Satellite Survival Strategies for Predictable Orbits

CLASSIFICATION	UNCLASSIFIED
RESEARCH TOPIC TITLE	Satellite Survival Strategies for Predictable Orbits
TOPIC DESCRIPTION	Develop a capability, somewhat analogous to anti-jamming frequency-hopping around a carrier frequency for radios, applied to satellites on a given carrier orbit, to improve survivability against anti-satellite missiles.
DESIRED OBJECTIVES	Determine requirements for energy conservation, continuity of position-dependent parameters, and minimum and maximum angular deviation limits.
EXTENDED TOPIC DESCRIPTION	Satellites with dedicated or dual-use military capabilities that orbit the Earth on predictable trajectories are more susceptible to intercept by anti-satellite weapons than they would be if they followed a "random" variable orbital path determined (and synchronized) from a perspective analogous to frequency hopping used to protect certain radio transmissions. As a kinetic rather than an electronic technique, research is required to propose a workable energy expenditure and conservation plan; minimum (survivable) and maximum (recoverable) angular and axial deviations from the base orbital track; and continuity of operations (comms, image resolution, position, orientation, etc.) throughout the expanded flight envelope.
REQUESTING/SPONSORING ORGANIZATION	NORAD and USNORTHCOM J7
DESIRED COMPLETION DATE	Jul 2025
POINT OF CONTACT	NORAD and USNORTHCOM / J72
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FAX NUMBER (COMMERCIAL AND DSN)	COMM 719-554-6250, DSN 692-6250
AVAILABLE FUNDING (IF APPLICABLE)	None identified
COMMENTS	Point of Contact may be updated based on sponsorship within Headquarters NORAD and USNORTHCOM.

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Maritime Escort Strategies for Littoral and Chokepoint Shipping Lanes

CLASSIFICATION	UNCLASSIFIED
RESEARCH TOPIC TITLE	Laps in the Pool: Maritime Escort Strategies for Littoral and Chokepoint Shipping Lanes
TOPIC DESCRIPTION	Design an indefinitely sustainable scheme of escort for naval warships protecting military and commercial cargo vessels along vulnerable shipping routes.
DESIRED OBJECTIVES	Develop and describe (or demonstrate) a commercial shipping protection plan in risk-prone waters that can operate continuously.
EXTENDED TOPIC DESCRIPTION	Recent persistent shore- and air-launched maritime attacks on commercial vessels along littoral, chokepoint, and other vulnerable sea lanes require a protective scheme that can be sustained indefinitely and even independently of separate preemptive or retaliatory strikes on the offending force(s). This research seeks to explore and evaluate novel proposals for warship escort along such routes, in both directions, with an economy of resource expenditure, to reduce the risk of a successful attack and reestablish a favorable benefit-to-cost calculus for a given route compared to a more circuitous alternative.
REQUESTING/SPONSORING ORGANIZATION	NORAD and USNORTHCOM J7
DESIRED COMPLETION DATE	Jul 2025
POINT OF CONTACT	NORAD and USNORTHCOM / J72
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