

Strategy Research Project

Countering Unmanned Aircraft Systems in the National Capital Region

by

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Abstract

Is the Homeland Security Enterprise (HSE) well postured to protect the National Capital Region (NCR) from a criminal or hostile Unmanned Aircraft Systems (UAS) attack? Currently, the answer is no. Malicious use of UAS technology represents the emergence of a clear and present danger in a complex landscape containing numerous jurisdictions, interagency partners and national defense. Countering UAS to protect the NCR must be a whole-of-government approach mobilized for collective action by a shared sense of interests where each stakeholder reliably contributes in their appropriate role. Complexity and ambiguity pervade the institutional seams that connect homeland defense, homeland security, and law enforcement authorities. Furthermore, there is a lack of policy and cohesive strategy to counter UAS in the NCR. This paper's method is to employ the Institutional Analysis and Development (IAD) framework, developed by Nobel Laureate Elinor Ostrom, to the collective action problem of countering UAS and finds existing institutions lacking. The findings recommend HSE stakeholders employ this institutional analysis as a starting point towards creating suitable policy and strategy.

Countering Unmanned Aircraft Systems in the National Capital Region

On January 24, 2017, the Islamic State in Iraq and Syria's (ISIS) media office in Ninawa province, Iraq released a video displaying its small Unmanned Aircraft Systems (UAS) dropping dozens of bombs on Iraqi soldiers. The video documented multiple bombs being dropped on tanks and groups of soldiers causing damage and injuries. Since this video was released, ISIS has carried out frequent UAS attacks on a nearly daily basis.¹ United States Central Command said coalition troops have as many as 30 encounters a week with inexpensive enemy UAS modified to drop grenades or surveil troop movements.²

The same technology ISIS employs in Iraq threatens U.S. citizens and the U.S. Capital. Is the Homeland Security Enterprise (HSE) well postured to protect the National Capital Region (NCR) from a criminal or hostile Unmanned Aircraft Systems (UAS) attack? Currently, the answer is no. Malicious use of UAS technology represents the emergence of a clear and present danger in a complex landscape containing numerous jurisdictions, interagency partners and national defense. Countering UAS to protect the NCR must be a whole-of-government approach mobilized for collective action by a shared sense of interests where each stakeholder reliably contributes in their appropriate role. Complexity and ambiguity pervade the institutional seams that connect homeland defense, homeland security, and law enforcement authorities. Furthermore, there is a lack of policy and cohesive strategy to counter UAS in the NCR. This paper will present a holistic view using the Institutional Analysis and Development (IAD) framework to understand the operational environment and address the collective action problem of countering UAS in the NCR's Flight Restricted Zone (FRZ) in the hope of affecting a successful operational approach and strategic direction. In the following

paper, I (a) describe the paper's method, (b) present key definitions and the problem set, (c) apply the IAD framework to analyze the institutional landscape relevant to UAS in the NCR and (d) conclude with the recommendation that HSE stakeholders employ this institutional analysis as a starting point towards creating suitable policy and strategy.

Methodology

This paper uses the IAD framework to analyze the counter UAS collective action problem and understand the operational environment by mapping the authorities, responsibilities and relationships of the entities charged with combatting unauthorized UAS in the NCR FRZ. Institutional Analysis and Development is a theoretical tool created in 1973 by Elinor Ostrom and colleagues at the Workshop in Political Theory and Policy Analysis at Indiana University. "The IAD framework highlights how physical and material conditions, rules-in-use, and the attributes of community jointly shape policy outcomes."³

This framework is used to better understand the institutional arrangements, information and motivations or perverse incentives inherent in the HSE countering UAS in the NCR. The international development cooperation octangle is also used to depict the important patterns of interaction between the law enforcement, homeland defense and security enterprise actors. Given the granularity of the paper, for the reader that wants to get to the gist of the analysis they can look at pages 18 through 21, where I describe the triadic relationships and the resulting tensions that need to be resolved.

Key Definitions and Concepts

The following key definitions and concepts are integral to understanding the NCR landscape in respect to countering UAS in the FRZ.

Homeland Defense “is the protection of U.S. sovereignty, territory, population and critical defense infrastructure against external threats or other threats as directed by the President.” Homeland defense is a Department of Defense (DOD) responsibility.⁴

Homeland Security “is a concerted national effort to prevent terrorist attacks within the U.S.; reduce domestic vulnerability to terrorism, major disasters, and other emergencies. Homeland Security includes law enforcement (LE) activities related to countering terrorism and other criminal activities.” The Department of Homeland Security (DHS) is the lead federal agency (LFA) for homeland security missions.⁵

The term Homeland Security Enterprise refers to “the collective efforts and shared responsibilities of federal, state, local, tribal, territorial, nongovernmental, and private-sector partners to maintain critical homeland security capabilities.”⁶

For this paper, the term HSE will refer to all entities in the NCR with a role in the counter UAS mission. Unified action is “the synchronization, coordination, and integration of the activities of governmental and non-governmental entities to achieve unity of effort.”⁷

The Unmanned Aircraft Systems (UAS) is “an unmanned aircraft (an aircraft that is operated without direct human intervention from within or on the aircraft) and associated elements (including communication links and components that control the unmanned aircraft) that are required for the pilot or system operator in command to operate safely and efficiently in the National Airspace System.”⁸

The Washington, DC FRZ is a 13 to 15-nautical mile ring around Ronald Reagan International airport. The FRZ is a dedicated National Defense Airspace with significant

restrictions, security requirements and procedures for operating in the area to include the prohibition of flying UAS within the FRZ boundaries.⁹

Counter UAS Problem Set

Numerous non-state actors including ISIS, al Qaida, Taliban, Lebanese Hezbollah, and Fatah al-Sham are using both commercial-off-the-shelf and military drones to conduct operations against U.S. and coalition forces. This threat has evolved from reconnaissance and surveillance missions to weaponized drone attacks resulting in battlefield casualties.¹⁰

Malicious use of UAS technology represents the emergence of an already clear and present danger in a complex operational environment that contains numerous jurisdictions, interagency partners and national defense. A clear definition of the problem is requisite for suitable alignment of relationships, authorities, capabilities, roles, and responsibilities to protect the NCR from this threat because the low cost and widespread availability of UAS platforms make them an appealing procurement for terrorists or criminals to add aerial capability to illicit activities. The Department of Defense (DOD), Department of Homeland Security (DHS), Department of Transportation (DOT), Department of Justice (DOJ), and law enforcement partners are challenged to protect the NCR from unauthorized, criminal or hostile, UAS while the Federal Aviation Administration (FAA) is faced with finding a timely solution to safely integrate authorized UAS into the national airspace system.

The complexity and ambiguity of countering UAS straddles the seam between homeland defense, homeland security, and law enforcement authorities. Furthermore, there is a lack of policy and cohesive strategy to systematically counter criminal, hostile or unauthorized UAS in the NCR. Understanding the problem set will help articulate how operational variables in the NCR can be projected to oppose or enable a unified counter UAS action. Identifying the areas of tension, competition, and opportunities affecting the

operational environment is paramount to transforming the current conditions to the desired end state, which is essential before adversaries transform the current gaps in the NCR homeland defense and security to their desired end state.¹¹

The UAS provide freedom of movement for operators, which prevents exposure to hazards such as radioactivity or ordnance from an improvised explosive device. They are small and stealthy, and have a low radar cross-section, which is beneficial to the adversary in contested environments.¹² The ability to operate smaller UAS at low altitudes decreases the probability of detection by North American Aerospace Defense Command (NORAD) as their capabilities can effectively counter larger classes of UAS but have difficulty tracking low, slow flying UAS. Currently, there are more than 600 types of UAS used in over 80 countries. The production of small UAS are inexpensive and estimates vary from 80,000 to 500,000 currently flying in U.S. airspace. The Consumer Electronics Association approximated 700,000 UAS platforms were sold to commercial and recreational U.S. users in 2016.¹³

There is a rapidly expanding global market for commercial UAS applications and technology. In May 2016, PricewaterhouseCoopers LLP stated that current UAS sales of \$2 billion are expected to increase to \$127 billion by 2020 due to the inexpensive cost of UAS technology making it more affordable to users.¹⁴ The UAS proliferation has created an airspace environment that challenges target identification and response.

China is leading the world in UAS due to a privately-owned company called D.J.I., which accounts for more than 70 percent of the global market.¹⁵ A *Foreign Policy* article published in January 2016 discussed the proliferation of UAS through China exports of armed unmanned aircraft procured by Iraq, Saudi Arabia, Egypt and the

United Arab Emirates. China has 75 corporate and state sponsored companies developing products for the UAS industry and is postured to become a major supplier due to their policy statement of “price, privacy and product.” China provides an inexpensive price with discreet transactions, which is appealing to buyers with hostile intent who wish to remain anonymous when purchasing advanced weaponized UAS.¹⁶

The HSE in the NCR is faced with the threat of UAS platforms utilized by malicious actors for terrorism. These systems can be modified with relative ease to be used for Intelligence, surveillance and reconnaissance of critical infrastructures or weaponized to produce destructive results. A UAS with explosives or chemical biological toxins can be flown into a target as an airborne weapon. On January 6, 2018, Russia’s airbase in Syria came under attack by weaponized UAS. Weaponized UAS have been repeatedly used by extremist organizations in the Middle East. In Yemen, Houthi rebels, with the help of Iranian backers have employed small UAS in the destruction of enemy air defenses role. Previously, this capability was only available to state actors. As small UAS become increasingly sophisticated and easy to weaponize, it becomes just a matter of time before this threat will be used against the U.S. homeland. Furthermore, there is no known robust kinetic defensive capability able to counter hostile UAS.¹⁷

The HSE must be ready to respond to the domestic terrorist threat. For instance, in July 2015, an 18-year-old in Connecticut posted a YouTube video demonstrating the lethal modifications to his UAS. He mounted a remote-controlled weapon to the off-the-shelf platform and made it capable of firing live ammunition. In December 2015, the same teenager posted another YouTube video showing a do it yourself conversion that

effectively mounted a flamethrower to his UAS, which was purchased from Amazon and used it successfully to roast a turkey.¹⁸ On April 22, 2015, security personnel discovered a UAS on the roof of the Japanese Prime Minister Shinzo Abe's office. The UAS was marked with radioactive symbols, carried a plastic bottle with unidentifiable contents and registered trace levels of radiation. Security personnel did not know when the aircraft landed on the building since the roof had not been accessed for a month.¹⁹

There are numerous examples of unauthorized UAS operations in the NCR FRZ. In 2011, a terrorist plot involving UAS was prevented by the FBI. A 26-year old was arrested for planning to attack the Pentagon and Capital buildings using three remotely controlled miniature, jet-powered models packed with 15 pounds of C-4 directed at the target buildings.²⁰ In January 2015, an operator crashed his UAS on the White House lawn. The platform was reportedly sighted by an on-duty law enforcement officer, but went undetected by the White House's aerial defense radar.²¹ A few months later, in April 2015, due to low radar cross-section a small manned gyrocopter was able to land on the U.S. Capitol's West Lawn.²² In the summer of 2017, the Commander of Joint Base Meyer-Henderson Hall placed a radio frequency sensor on the roof of the National Defense University, which is located inside the FRZ and documented 52 UAS sightings in 26 days. Technicians then moved the equipment nearby to Arlington National Cemetery and recorded 43 UAS sightings in a month.²³ These examples demonstrate a glaring gap in enforcing the NCR FRZ homeland defense and homeland security mission.

Institutional Analysis of the Homeland Security Enterprise

The IAD approach starts by identifying the action arena of relevance to the problem, the actors framing the arena, and the rules affecting the behavioral interactions.²⁴

The Action Arena

Action Arenas are “composed of the incentives generated by the situation’s context and the incentives of the particular actors or organizations involved.”²⁵ The organizations involved in the HSE are all the entities charged with countering unauthorized UAS in the FRZ. Due to the complexity of the collective action and the simultaneous and sequentially linked interactions, the action arena must first be identified in order to understand the operational environment.²⁶ UAS events in the FRZ are often characterized by ambiguity, uncertainty and the need for quick reactions. It is therefore compulsory for each entity of the NCR HSE to understand their counter UAS authorities and responsibilities.

After the September 11, 2001 attacks, the FAA used its 49 U.S.C. authority to implement temporary flight restrictions (TFRs) throughout the U.S. for national security, which included a 25-nautical mile TFR around Washington D.C. In February 2003, under 14 CFR 99.7, Special Security Instructions, the FAA established the Washington, DC Air Defense Identification Zone by issuing a Flight Data Center Notice to Airmen (NOTAM). The NOTAM established a 15-nautical mile Washington, DC Flight Restricted Zone (FRZ). On 4 August 2005, the FAA codified the NOTAMs, classified the area as a National Defense Airspace, and renamed it as a Special Flight Rules Area (SFRA) where the airspace from 15 to 30-nautical miles around Washington D.C. provides a buffer area, which allows air traffic control, DOD and law enforcement officials to be

aware of non-compliant aircraft before it penetrates the boundary of the 15-nautical mile FRZ.²⁷ The FAA, DOD and DHS established the SFRA to allow the NCR entities “to carry out their responsibilities to lawfully identify, counter, prevent, deter, or, as a last resort, disable with non-lethal or lethal force, any airborne object that poses a threat to national security.”²⁸ By the time an aircraft or UAS is at the edge of the DC FRZ, it is only minutes away from targets in the nation’s capital. The purpose of the DC SFRA is to identify, track and control targets that may pose a threat to the NCR as the HSE needs enough time to take appropriate action if determined a target has nefarious intentions. The FAA, DHS, and DOD created the lateral limits based on the locations of critical infrastructure within the NCR, launch response time, and speed of intercept.²⁹

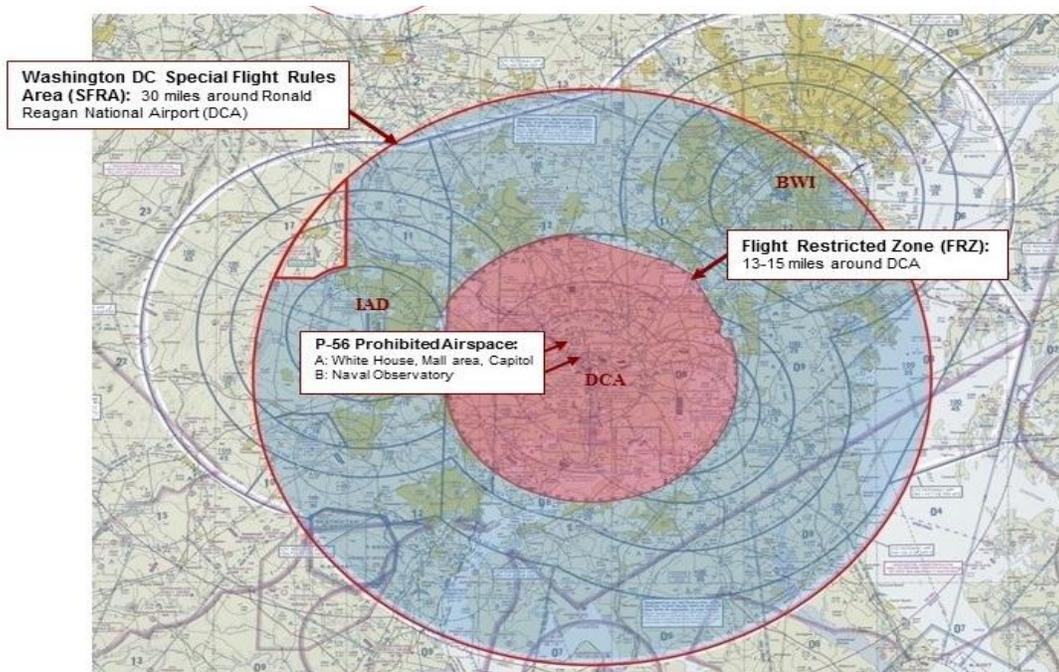


Figure 1. NCR FRZ and SFRA³⁰

The federal government currently faces the challenge of safely and securely integrating UAS technology into the national airspace system, while ensuring privacy,

civil rights, civil liberties, and countering UAS use by potential attackers. Another challenge the government faces is ensuring community safety as the commercial industry continues to expand (e.g., Amazon delivering packages with UAS).³¹

The National Capital Region-Integrated Air Defense System (NCR-IADS) conducting operation NOBLE EAGLE (ONE) is a homeland defense mission with response forces involving multiple organizations and is part of the action arena. DOD employs an integrated air defense system with sensors, weapons, visual warning system, C2 systems, and personnel as part of a continuous, multilayered, joint military and interagency effort. The NCR-IADS is the ONE fighter defense, U.S. Coast Guard helicopters and Ground-Based Air Defense (G-BAD), which are in a quick reaction posture to protect the seat of the U.S. Government, as well as other key locations in the NCR from air attacks. The military forces coordinate with DOT, DHS, DOJ and other federal agencies with multiple jurisdictions, which demonstrates the complexity of the counter UAS environment.³²

The FRZ is the main action arena and, according to NOTAM 6/1117 issued in October 2017, prohibits flying UAS within the 13 to 15-nautical mile radius inner ring and violators are subject to criminal prosecution.³³ 49 U.S. Code § 46307 – Violation of National Defense Airspace, states a person that knowingly or willfully violates this regulation shall be fined, imprisoned for not more than one year, or both.

The Role of Key Actors

In order to understand the institutional incentives that prompt stakeholders to action, the actor's authorities and responsibilities of the HSE action arena should be mapped out to determine the relationships between the NCR mission partners and characteristics of the operational environment. Knowing the actors will lead to an

understanding of the relationship dynamics between all the counter UAS mission partners in the NCR and produce a holistic view of the relevant antagonist and friendly connections as part of a larger complex system with external influences.³⁴ The component agencies amalgamated within the NCR are: DOT, specifically the FAA; DHS including the Transportation Security Administration (TSA), U.S. Coast Guard, U.S. Secret Service and U.S. Customs and Border Patrol; the Federal Bureau of Investigations (FBI) in the DOJ; U.S. Northern Command (USNORTHCOM), North American Aerospace Defense Command (NORAD), Continental United States North American Aerospace Defense Command Region (CONR), and National Guard in DOD; and numerous federal, state and local law enforcement agencies to include the Capitol Police.

NCRCC

The National Capital Region Coordination Center (NCRCC) located in Herndon, VA is a continuously manned entity that brings together the NCR-IADS and security partners as an information sharing and coordination center for the federal agencies responsible for monitoring the Washington D.C. airspace. The NCRCC does not have command or control of forces. Participants include the FBI, TSA, FAA, U.S. Capitol Police, U.S. Secret Service, U.S. Customs and Border Protection Office of Air and Marine Operations, U.S. Coast Guard, JFHQ-NCR, and NORAD. Representatives from other state and local law enforcement agencies, and the Joint Air Defense Operations Center (JADOC) also participate at the NCRCC when threats or circumstances warrant.³⁵

DOT

Pursuant to 49 U.S.C. 40103, the FAA has extensive authority to regulate the safe and efficient use of the nation's airspace and air traffic management for reasons of national security. The FAA is obligated to issue air traffic rules and regulations to govern the flight and identification of aircraft for the protection of persons and property on the ground and for the efficient use of the navigable airspace.³⁶ As authorized under the Modernization Reform Act of 2012, the FAA serves as the lead agency in developing the UAS traffic management system to facilitate low-altitude UAS operations. The FAA has principal authority over airspace regulation, which preempts local or state government entities from enacting a statute or regulation that is exclusively reserved for the U.S. government.³⁷

DHS

The U.S. Coast Guard has unique national defense and law enforcement authorities. In 2006, the U.S. Coast Guard assumed a continuous alert watch at Washington-Reagan airport as part of the NCR-IAD mission. Pursuant to 10 USC 101 in support of national defense, their mission is to execute Rotary Wing Air Intercept (RWAI) operations for ONE under the tactical control of NORAD against unauthorized low slow flying Tracks of Interest (TOI) in the NCR to facilitate senior military engagement authority decision-making. Pursuant to 14 USC 141, U.S. Coast Guard operating in the NCR also have law enforcement authority and conduct air security under U.S. Coast Guard TACON to maintain security of protected assets and support lead law enforcement agencies for exigent circumstances. The U.S. Coast Guard is at all times an "armed force" under Title 14 USC, and does not require Title 10 USC, authority to participate in the national defense of the U.S.

TSA was created by the 107th Congress when they passed the Aviation and Transportation Security Act after the September 11, 2001 terrorist attacks. TSA is the executive agency for running the NCRCC and is responsible for programs that allow General Aviation operators access to the NCR FRZ. TSA has broad statutory authority over aviation security issues but has not formally addressed the potential security concerns from UAS in domestic airspace.³⁸

The U.S. Secret Service has distinctive protective responsibilities for the overall DHS NCR mission and their protected entities. The U.S. Secret Service has classified counter UAS capabilities and a suite of situational awareness tools, which includes an operational air surveillance picture.³⁹

The U.S. Customs and Border Protection (CBP) Air and Marine Operations supports the DHS mission by providing the NCRCC with the Air and Marine Operations Surveillance System (AMOSS), which is an advanced air surveillance picture integrated with various law enforcement tools and databases.⁴⁰

DOJ

The FBI is the lead for crisis management and counter terrorism, the Attorney General has responsibility for investigating terrorist acts or threats and coordinating law enforcement activities to detect, prevent and disrupt terrorist attacks. If an attack occurs, the FBI is responsible to identify and prosecute the perpetrators. DOJ has charged the FBI with executing its lead agency responsibilities for managing a federal law enforcement response to threats or acts of terrorism where the NCR might be a target.⁴¹

Law Enforcement

Law enforcement entities include U.S. Capitol Police, U.S. Park Police, Washington D.C. Metro, Pentagon Protective Agency and numerous local police

departments. The U.S. Capitol Police are responsible for establishing regulations and enforcing prohibited activities on the U.S. Capitol Grounds. The established rules provide for the safety of all persons, prevent destruction or damage and enforce regulations that address special restrictions within the U.S. Capitol Grounds. Specifically, §16.2.90 prohibiting the use of model rockets, remote-controlled model gliders, model airplanes or unmanned aircrafts.⁴²

DOD

The USNORTHCOM was established in October 2002 by the President for homeland defense and defense support of civil authorities (DSCA). State and federal government lawmakers adopted policy and law authorizing a dual status commander to legally assume simultaneous but mutually exclusive command and control over both Title 32 and Title 10 forces during domestic operations.⁴³

The NORAD executes air defense operations within North America through the NCR-IADS to include the NCR. Using data from satellites, as well as airborne and ground-based radar, NORAD monitors, validates and warns of attack against the NCR. They ensure air sovereignty through a network of alert fighters, U.S. Coast Guard helicopters, airborne early warning aircraft, and ground-based air defense assets cued by military and interagency surveillance radars.⁴⁴

The Continental U.S. North American Aerospace Defense Command Region (CONR) commander provides OPCON for the tactical command and control entities that provide air defense for the NCR. The Eastern Air Defense Sector (EADS) is responsible for surveillance, identification and air intercept operations and the Joint Air Defense Operations Center (JADOC) provides ground based air defense forces to supplement EADS capabilities. EADS and JADOC coordinate on all UAS tracks of interest within the

NCR.⁴⁵ EADS has a full-time air defense liaison at the NCRCC that presents NORAD's situational awareness of a counter UAS event through their Remote Tactical Air Picture display and communications system.

The District of Columbia National Guard incorporates the 113th Aerospace Control Alert (ACA) fighter detachment for the NORAD mission in support of ONE. The 113th conducts continuous alert operations and maintains the ability to quickly scramble aircraft in response to airborne threats in the NCR.⁴⁶ The Army National Guard also has continuous ground-based air defense (G-BAD) capabilities responsible for defending the 2,500 square miles of airspace over Washington DC. The District of Columbia National Guard is commanded by the President as Commander in Chief. When federalized, pursuant to Title 10 USC, National Guard units and personnel are subject to federal command and control.⁴⁷

Rules-in-Use

The IAD framework uses the term rules-in-use as "shared understandings among those involved that refer to enforced prescriptions about what actions are required, prohibited or permitted."⁴⁸ Countering UAS in the NCR will require a collective-action approach synchronizing efforts and capabilities from all areas of government and local law enforcement. DHS, DOD and law enforcement agencies are responsible for aviation security, protection of people and infrastructure, homeland security and homeland defense in the NCR while the FAA is accountable for implementing UAS safely into the airspace. The simultaneous safety, defense and security missions distributed among the NCR entities, all with different authorities illuminate the complexities of integrating and de-conflicting actions to counter UAS.

The most prominent rule-in-use is that flying a UAS in the NCR FRZ is prohibited and the SFRA is considered national defense airspace subjecting a violator to criminal prosecution. The DOJ is responsible for determining if such action is warranted.⁴⁹ However, some civilian UAS operators are ignorant to the prohibition but are aware of the June 2016 FAA guidelines for the use of UAS within jurisdictions nationwide. These regulations permit commercial use of UAS as long as it does not conflict with existing FAA guidelines. The rules include visual line of sight operations only, not exceeding 400 feet above ground level, daytime operations only, not flying over a large crowd, not flying in a careless or reckless manner, and prohibition of operations within 5 miles of an airport. The FAA further states that substantial air safety issues are raised when state or local governments attempt to regulate the operation or flight of aircraft. If municipalities enacted ordinances regulating UAS in the navigable airspace and a significant number of municipalities followed suit, fractionalized control of the navigable airspace could result. The FAA requires a navigable airspace free from inconsistent state and local restrictions for a safe air transportation system.⁵⁰

A UAS observed in the FRZ is a complex event because it can be characterized as criminal, hostile, or ignorance of the airspace rules such as a 15-year-old flying a quadcopter purchased at Best Buy. The dynamics associated with these events, to include the difficulty in determining intent, quickly make the HSE response ambiguous because it could be a Homeland Defense, Homeland Security or law enforcement situation that crosses the seams of responsibilities and authorities of the entities that make up the HSE. When jurisdictions are crossed, there is a natural friction of working

together due to different authorities, cultures and focus areas relevant to the different actors.

Another rule-in-use that can blur the seam between homeland defense, security and law enforcement is the Posse Comitatus Act. The Posse Comitatus Act prohibits the use of military personnel from performing various functions within the homeland. However, while performing homeland defense operations under Title 10 USC, DOD is not subject to Posse Comitatus restrictions.⁵¹

Due to disparate counter UAS organizations in the HSE with different authorities, counter UAS joint rules of engagement (ROE) and rules for the use of force (RUF) must be established and disseminated. The ROE and RUF should be properly tailored to the situation spanning homeland defense, homeland security and law enforcement authorities. Appropriate ROE will facilitate timely engagements of hostile UAS while mitigating risk.⁵² Another rule-in-use for homeland defense is DOD, through NORAD and USNORTHCOM engagement authorities, are the only HSE entity authorized direct engagement using deadly force against airborne civilian aircraft or UAS presenting an imminent threat to U.S. national interests. RUF for those engaged in law enforcement or security duties also exist for civilian law enforcement officers authorized to use deadly force to protect certain high priority national security assets and to otherwise perform their law enforcement or security related duties.⁵³

Institutional stovepiped information that should be distributed among NCR entities is access to the established information sharing systems. The Domestic Events Network (DEN) is a continuous interagency unclassified conference managed by the FAA and dedicated to real-time coordination of national airspace security. Information is

shared via the DEN so that participating entities can jointly analyze a UAS incident and form a collaborative response to manage the event. The Defense Red Switch Network (DRSN) is a DOD classified telephone communication system. The NORAD and USNORTHCOM Command Center initiates an ONE conference on the DRSN when defense assets respond to a UAS event. Lastly, the NCRCC hotline was established in April 2015, after the gyrocopter landing on the U.S. Capitol's west lawn, to provide NCR Law Enforcement agencies and 911 dispatch a way to report unauthorized UAS sightings.⁵⁴

Interactions within the Octangle

The international development cooperation octangle identifies how actors interact with each other in repeated action situations. By studying these patterns of interaction, the main institutional incentives influencing each entity of the counter UAS enterprise can be identified in order to develop an active learning process about field activities and institutional responses to undesired outcomes throughout the HSE to include the staff and tactical level.⁵⁵

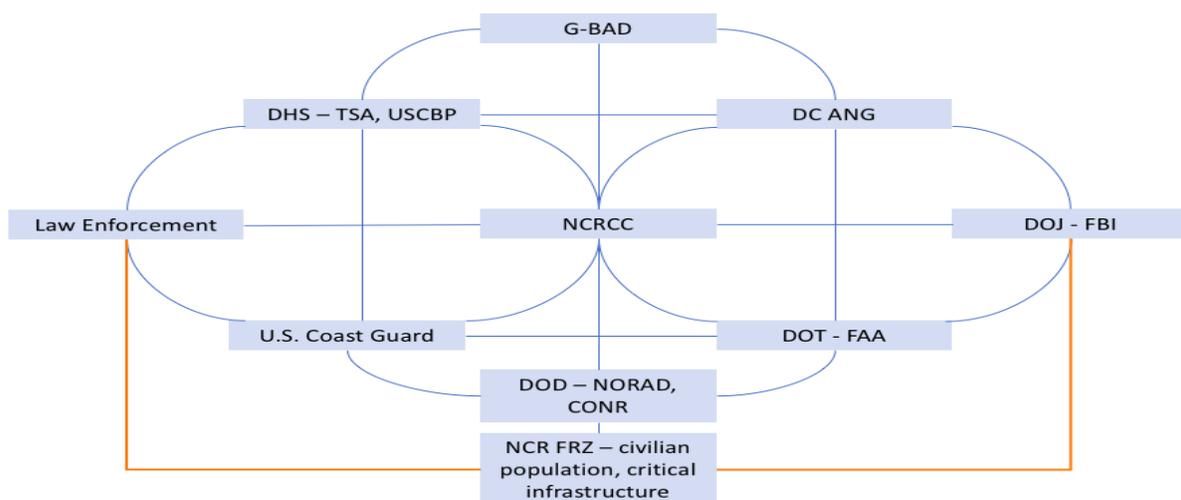


Figure 2. International Development Cooperation Octangle⁵⁶

Before making a crucial decision to shoot down a reported UAS with possible hostile intent or a hobbyist operating a \$50 Walmart quadcopter, the designated DOD Engagement Authority relies on input from a variety of intermediary actors in the NCR counter UAS enterprise. These intermediary actors do not have direct contact with the Engagement Authority, which makes it very difficult to gain accurate information about what is actually going on in the field.⁵⁷ HSE leaders may have a strategic understanding of the counter UAS problem but the field level has a better understanding of the realities of the local operating environment. Merging these perspectives will help achieve synthesis and enable unity of effort.

FAA – DOD – DOJ triad

The FAA oversees the safety of civil aviation and maintains primary jurisdiction over all air space within the U.S. national airspace system. The FAA works closely with the Secretary of Defense, NORAD, and DOJ to identify and evaluate aviation related threats, establish national defense airspace and facilitate the appropriate level and scope of response.⁵⁸ In close coordination with NORAD, the FAA will clear air traffic as needed to expedite UAS intercept operations. The tensions are that FAA's main concern is air traffic safety, DOD is committed to homeland defense, and DOJ's purpose is law enforcement activities to disrupt terrorist attacks. A single counter UAS event can blur all three entities' authorities and jurisdictions.

FAA – NORAD – U.S. Coast Guard triad

As part of the HSE interactions, the FAA will convey target information or the NORAD G-BAD system will acquire a TOI, which provides initial cueing that an unauthorized UAS is present in the FRZ. NORAD will then start the notification and launch process in accordance with ONE procedures. The U.S. Coast Guard will launch

under Title 10 authority to attempt an intercept of the unauthorized UAS. The challenge is that UAS have small radar cross sections and fly at slow speeds making them difficult to detect and intercept.

NORAD – U.S. Coast Guard – Law Enforcement triad

The U.S. Coast Guard was launched 15 times, under Title 10 authority, in 2016 for reported UAS in unauthorized airspace. If a U.S. Coast Guard helicopter intercepts an unauthorized UAS and determines a Homeland Defense nexus exists, NORAD will maintain control of the event and notify other HSE agencies through the NCRCC. If it is determined there is no Homeland Defense nexus and it is a Homeland Security or law enforcement situation, NORAD releases the asset from its air defense tasking and the aircrew can perform law enforcement functions to assist the law enforcement agency under U.S. Coast Guard command and control. Law enforcement personnel will use their authority to enforce the no-fly zone and query the suspect. Friction exists in this triad because DOD is usually hesitant to release an active air asset from a Homeland Defense mission to a security or law enforcement mission.

NCR FRZ civilian UAS operator – FAA – LE triad

The U.S. Capitol Police, U.S. Park Police or local law enforcement will likely be the initial sighting and response to incidents involving a civilian's illegal use of UAS in the FRZ. The NCR law enforcement agencies will initiate the investigative process by identifying the suspect operator, gathering information on the operator's intention and conduct witness interviews. The FAA is the enforcement entity for the investigative and punitive aspect of UAS violations. However, it is understood the Capitol police and local law enforcement agencies will likely be the first point of contact with violators and will assess the initial violation and take the appropriate enforcement action.⁵⁹ Currently, this

is the most likely scenario and there is a gap because no policies or legislation addressing clear legal enforcement authority or liability exist. Without clear policy or legal authority, there will be perverse incentives of indecision or excessive enforcement to counter UAS at the local level.

Findings and Conclusion

The results of this analysis finds an unacceptable level of ambiguity whose clarification via a thoughtfully produced policy and strategy, is necessary... and becomes increasingly urgent daily. The findings recommend HSE stakeholders employ this institutional analysis as a starting point towards creating suitable policy and strategy.

A terrorist with a weaponized UAS operating in the NCR is at the intersection of incredible destructive power with exceedingly evil intent. This paper conveys that countering hostile or criminal UAS to protect the NCR must be a whole of government approach mobilized to unified action by shared sense of interests where each entity reliably contributes in their appropriate role. The simultaneous safety, defense and security missions distributed among the NCR entities, all with different authorities illuminate the complexities of integrating and de-conflicting actions to counter UAS. An effective response will depend on synchronizing efforts and capabilities from all areas of government and local law enforcement.

UAS events create friction as they blur HSE seams of responsibility. They are ambiguous of which entity has authority because countering UAS crosses homeland defense, homeland security and law enforcement jurisdictions. Effective relationships and coordination are key to gaining situational awareness of counter UAS stakeholders who can positively impact the mission. However, coordination alone cannot accomplish

assigned tasks adequately without a comprehensive HSE counter UAS policy, strategy, and well-defined legal authorities.

Successfully defeating malicious actors armed with UAS will require innovative solutions in policy, strategy, planning and technology. Counter UAS policy makers will need to clearly define agency responsibilities and authorities, while understanding the potential impacts on all organizations in the HSE as they develop strategic policy for their respective agencies and jurisdictions. An effective unified command must also be implemented and socialized throughout the HSE. The unified command will need a clear understanding of the roles and responsibilities of all participating organizations and ensure interoperability across the multi-jurisdictional authorities where each counter UAS entity maintains its own authority, responsibility, and accountability.⁶⁰

This paper attempted to present a holistic view of the HSE NCR counter UAS systems as a complex whole, while identifying the links and relationships between the NCR entities that can positively affect the problem. The IAD framework identified interdependencies exist among the HSE where the defense, safety, and security actors often rely on each other's resources and functions. Synergy among counter UAS mission resources and responsibilities is important to maximize capabilities and minimize risk. The challenge will be for the HSE leaders to communicate and coordinate engagement with the whole NCR counter UAS community by developing policy and strategy that align capabilities to reduce the risk of impinging or overwhelming any jurisdiction. Layered and mutually supporting capabilities of the HSE can allow for unity of effort to deter, detect and defeat the inevitable UAS event.

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