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DEMYSTIFYING REMOTELY PILOTED AIRCRAFT (RPA)

SUPPORT FOR DOMESTIC OPERATIONS (DOMOPS)

by

Rodney Brickell, Col, Virginia Air National Guard

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BIOGRAPHY

Colonel Rodney Brickell is currently attending Air War College in Residence at Maxwell AFB, Alabama. Col Brickell joined the Virginia Air National Guard as a Drill Status Guardsman in 1984 as an Aircrew Life Support apprentice. He cross-trained into Intelligence in 1988 and commissioned in 1995 through the Academy of Military Science Program, Knoxville, TN. As an Intelligence Officer, Col Brickell supported various fighter aircraft such as the A-7, F-16C, and F-22A. He is an Intelligence, Surveillance, and Reconnaissance Mission Operations Commander and supported combat operations in Iraqi Freedom, Enduring Freedom, Unified Protector and Odyssey Dawn. His former positions include Chief of Wing Intelligence, Operations Support Squadron Commander, Air Staff plans and programs, Deputy of Air Operations and Virginia Joint Force HQ Director of Intelligence J2.

ABSTRACT

The technological capabilities of Remotely Piloted Aircraft (RPAs) are converging with the state′s needs for emergency response. The National Guard can utilize RPA′s to support Domestic Operations (DOMOPS). RPA′s, although not optimal for all conditions, are valuable assets and can provide enhanced support to operations. Through an understanding of the legal approval process and their operational capabilities and limitations, a state will be prepared to weigh the costs and benefits of RPA support to any operation. States will need to practice the way they operate in an emergency by including RPAs in future exercises, thereby by improving the level of understanding and confidence in these emerging capabilities. Planning and preparation are key to a state′s improved response options. Disasters are not planned, but responses to them are. RPAs warrant consideration for inclusion and response to DOMOPS.

Introduction

Many Remote Piloted Aircraft (RPA) systems solutions exist today. This paper looks at the potential to use RPAs, including Title 10 (T10) federal equipment, as viable response assets available to support a state's National Guard (NG) Domestic Operations (DOMOPS). The Army National Guard and Air National Guard's (ANG) primary mission is to protect our homeland and support federal efforts[1]. The foreign terrorist threat has increased drastically over the last twenty years, yet the greatest threats experienced by most states is from natural disasters. Extreme weather such as hurricanes, flooding, winter weather, and forest fires affect nearly every state each year. Military support for disaster response is not new, however what has changed is the NG's technological advances in Intelligence, Surveillance, and Reconnaissance (ISR) capabilities and the emergence of RPAs. Many state's NG, both Army, and Air have equipment and intelligence skill sets that can assist in responding to these types of domestic operations. With the increase in technological capabilities of RPAs, there is a greater desire and need to utilize these assets by the NG for support to DOMOPS. Currently, there are 17 ANG locations operating MQ-1 Predator or MQ-9 Reaper RPAs, and 19 ANG Intelligence units and 30 NG units operating RQ-7 Shadow and RQ-11 Raven RPAs.[2] The density of available assets now warrants consideration for use in response planning. The National Guard can utilize RPA's and increase much-needed intelligence support for DOMOPS. The potential for improved situational awareness these capabilities bring is significant. RPA's, although not optimal for all conditions, are valuable assets and can provide enhanced support to operations. An integral step is for states to practice the way they operate in an emergency by including RPAs in future exercises. This will accomplish training objectives and help to improve better understanding of the capabilities of these assets.

Terminology can also complicate understanding. Incident Awareness and Assessment (IAA) is the ISR of DOMOPS. IAA synchronizes and integrates the planning and operation of various information capabilities that provide situational awareness and assessment to civil authorities in support of domestic operations.[3] The focus of IAA is to save lives, mitigate suffering, minimize serious property damage and protect vital infrastructures. NG support to federal missions and DOMOPS are not mutually exclusive. In its federal mission, the NG is a strategic reserve. While most Guardsmen are training one weekend a month and up to 15 additional training days per year, the skills honed for the NG federal missions are transferable to support DOMOPS. RPA Employment for foreign missions is similar for DOMOPS activities in the United States. Intelligence analysts trained to support combat operations would apply the same imagery and Full Motion Video exploitation skills to support DOMOPS. NG support to DOMOPS not only improve a state's response capabilities but also provides operational-based training for responders. RPA use will continue to grow in domestic, commercial, and military operations and must be managed to shape employment in the most effective and efficient manner possible. Despite the transferable nature of federal and DOMOPS missions, states are reluctant to bring these highly valuable capabilities to bear. It appears the skills of operators are not the limiting factor but the understanding of legal authorities and approvals.

As previously mentioned, this paper is a primer for an understanding of RPAs as viable options for DOMOPS consideration. It does not circumvent or claim to provide all legal aspects and considerations for use and implementation of RPA and intelligence support. It is important to note certain conditions can create a negative public opinion of domestic RPA use. Although RPA and intelligence support to civil disturbances may be useful, public perception may view this negatively and out of context for the intended purpose. Additionally, the scope of this paper

does not consider any conditions for armed or weaponized RPA support in the U.S. Although

RPA use for DOMOPS can be effective, they present several legitimate factors that need

consideration. These factors are legal requirements, RPA employment, and operating costs.

Legal Requirements

Understanding legal and operational challenges is paramount in any states' future response of

RPA support to DOMOPS. The differentiation between Defense Support to Civil Authority

(DSCA) and DOMOPS create legal challenges and obstacles, which can limit a states emergency

response. DOMOPS is a response to support a state's needs in a Title 32 (T32) or their States'

Active Duty (SAD) status. The State's governor declares a "state of emergency or major

disaster" and orders NG forces to report on a T32, SAD status or a combination of both. Once

state resources are exhausted or overwhelmed, the governor can ask the U.S. President for a

Stafford Act declaration for DSCA. The "Federal Emergency Management Agency (FEMA)

coordinates the response to disasters that overwhelm the resources of local and state

authorities."[4] DSCA is a federal response with military support executed by T10 personnel.

DSCA can also include the mobilized forces in T32 and SAD status from the affected state(s).

"FEMA, under the direction of the Department of Homeland Security, is the Primary Agency

(PA) in the federal response to natural disasters. A state's requests for Department of Defense

(DOD) resources, in coordination with FEMA, are to augment local, state, and federal assistance

with a state's emergency response. An exception is wildland firefighting, in which case the

National Interagency Fire Center is the PA."[5]

When we think of RPAs, most can envision the combat capabilities these assets provide

but do not appreciate or consider the humanitarian support and situational awareness these assets

offer to DOMOPS. States are at a crossroads in adapting to the rapid technological advances,

legal concerns, and challenges facing the NG. Because of the possible ramifications of employing RPAs, very senior approvals are required for consideration. The Secretary of Defense (SECDEF) has to approve the employment of any RPA in the continental US. "No DOD unmanned aircraft systems (UAS) will be used for DSCA operations, including support for Federal, State, local, and tribal government organizations unless expressly approved by the SECDEF."[6] Requests for RPA use start with the states chief executive. "Governors may consider DOD UAS employment in their planning for disaster response activities."[7] The lack of understanding of required legal approvals creates perceived risk for senior leaders that hinders many states considering the use of RPAs for DOMOPS. In addition, intelligence support to process the data from the RPAs, without proper approvals, can create a reportable "questionable intelligence activity." National Guard units need to train the way they would operate responding to real-world crises. In any large-scale state disaster response, it is possible for the state's capabilities to be overwhelmed. Units need to start now, before such events occur, to exercise their capabilities to the fullest. Units accomplished can accomplish this by including RPAs in their training plans and understanding that legal approvals are part of the process.

Legal authorities are more flexible to support DOMOPS than previously thought. While RPA support and the information can provide us is advantageous when employed in times of crisis, the publics access to this type of information can raise privacy issues, which will need to be contained. For this reason, each state needs to abide by regulatory documents and orders when using manned or unmanned aircraft, ISR equipment, and personnel for training and emergency response. The primary governance includes Intelligence Oversight,[8] United States Air Force, United States Army, and National Guard Bureau regulations, memoranda, and instructions. Although initially appearing insurmountable, these approvals are manageable.

Intelligence units create Proper Use Memorandums (PUMs), which define the scope of intelligence collection, the assets employed, and specific unit involvement during a given timeframe and geographic boundary. The primary purpose is to protect U.S. citizen's rights and explain valid reasons behind IAA activities. PUMs are required for each crisis response as they arise; emergency PUMs are not pre-authorized. A PUM submission is required for any activity that NG units participate whether it be for exercises, winter storms, hurricanes, fire support, flood, civil disturbance, Search and Rescue, or National Special Security Events. A PUM is also required for units conducting any training in T32 or SAD status while in garrison in the conduct of the unit's ISR asset employment, collection, and processing of ISR data. The detail of all participating assets including both manned and unmanned aircraft, and intelligence unit(s) are contained within in the PUM. PUM approvals start with the Joint Staff and the director of intelligence (J2) of the requesting state, along with a legal review by the states Judge Adjutant General (JAG) staff. When the review is complete and signed, the requests go to the National Guard Bureau (NGB) for review and concurrence through their J2 and JAG. The PUM request once reviewed for accuracy and compliance with all governing laws, memorandums, and instructions will receive an approval letter acknowledging and authorizing the request. However, since requests for RPA use during DOMOPS events must start with the governor, the NG of each state will have to educate the executive office on the chain of procedures needed to procure RPA support along with this assets capabilities and limitations. In addition to a PUM, SECDEF approval for all DOD (T10, T32 or SAD) use of RPA is necessary. The SECDEF requires at least 30 days to approve RPA use and submitted no more than one year before the planned exercise start date. Depending on the crisis level, SECDEF approval times can vary, however, it is unrealistic to expect emergency approvals in less than one or two days, except under the most

dire of circumstance. Approval for large-scale short notice emergencies would likely be in the form of a vocal order provided by the SECDEF. Some disasters such as forest fires, tornados, and winter storms are under control and terminated in as little as 1-3 days. These short duration disasters may not warrant RPA support because the emergency is over before receiving SECDEF approval. The more likely cases are the long dwell responses for DOMOPS, like the large forest fires experienced in California and hurricanes such as Katrina that required extended support for weeks or months. RPA use will enhance the Information obtained during such long-term events. It would also help mitigate the responders being overwhelmed due to limited infrastructure for manned aircraft and increased demand for IAA.

Some states have T10 RPAs based in the state, which can be considered for DOMOPS support. These states include California, Arizona, New York, North Dakota, Ohio, and Texas. Identifying all assets within a state are important to considering asset viability, administrative, and operational considerations prior to use during an emergency response. For example, Customs and Border Protection (CBP) operates MQ-9 Reapers, while other first responders are adding Small Unmanned Air Systems (SUAS), all of which makes up potential asset options. Approaching these agencies will allow each State's National Guard headquarters to work through the willingness, viability, procedures, and operational considerations and constraints of using these assets in times of crisis. Memorandum of Agreements and planning factors considered and agreed to in advance should be drawn up and include the requirement for exercise and training opportunities. Coordinating such events in response to emergencies prior to a real-world event will reduce risk and increase operational success.

Although the legal approvals process can be daunting, approvals are possible as illustrated by the MQ-1 RPA support for the California Wildfires in 2013 and T10 DSCA

earthquake and tsunami support to Haiti with RQ-1's in 2010. A positive indication of RPAs use

is the speed at which units are submitting training and exercise-related PUMs to NGB for

approval. In fiscal year (FY) 2010, five PUMs were submitted and approved. In FY 2016, that

number climbed to 148. During this period, 12 new ANG Intelligence units and 30 new NG

units have begun operating RQ-7 and RQ-11 RPAs. The skills honed and maintained for T10

missions is transferable for DOMOPS. Through a better understanding of legal requirements,

units are able to take advantage of these opportunities and train with RPAs and intelligence units.

Previously, legal concerns restricted domestic RPA consideration due to the lack of knowledge

on how to get the approvals for operation during NG emergency responses. However, in the last

few years, there have been great improvements in garnering SECDEF approval and the states

willingness to seek RPAs capabilities within specified constraints.

RPA Employment

After legal considerations, the next step is to understand the specific RPAs capabilities

that a state has at its disposal. Knowing approvals are possible, units can focus on employment

options that best leverage these capabilities in support of DOMOPs. States can utilize

experience gained from training operations to consider when to utilize RPAs for support of

DOMOPS. The primary concerns are airspace issues, the safety of flight, and employment

limitations for DOMOPS.

Airspace Issues

The Federal Aviation Agency (FAA) flight restrictions for RPAs vary depending on the

class of airspace. "Unmanned flight will require new or revised operational rules to regulate the

use of sense and avoid systems as another method to comply with "see and avoid" operational

rules currently required of manned aircraft."[9] Larger RPAs are restricted to Military Operating

Areas in Special Use Airspace, which represents only 25 percent of the National Airspace System (NAS).[10] The value of using RPAs in Special Use Airspace is that it releases manned aircraft to respond in controlled airspace or high-density areas not currently available to RPAs. "Precedent should be set, guidance provided, and the infrastructure ready for RPA flight in the NAS before the next major national disaster event occurs."[11] Class G airspace appears to be viable for Small Unmanned Air Systems (SUAS) support, restrictions on which require operators to maintain a Visual Line of Sight (VLOS) on the aircraft and limit altitude operation to less than 400 feet Above Ground Level (AGL). As a government entity, two options are available for the use of SUASs in support of DOMOPS. The first option would be to follow the business user requirements and operating rules under the FAA small UAS rule, "Part 107." The second option would, "apply for a blanket public Certificate of Authorization (COA) which allows flights at or below 400 feet in Class G airspace nationwide, self-certification of the UAS pilot, and the ability to obtain emergency COAs under special circumstances."[12] RPAs must remain within VLOS of the remote pilot in command who is the person manipulating the flight controls of the SUAS. The FAA will address new airspace considerations in 2018. The NG must work to identify RPA needs for DOMOPS and coordinate with the FAA to influence and optimize the next step for airspace control and management. Technologies like geo-fencing, allows specific coordinates to be loaded into the SUAS to create "no fly zones." Use of this technology in areas such as airports would preclude these SUASs from operating there. Future technologies such as collision avoidance are also key to safe RPA use. Safety mitigation can occur through airspace deconfliction, however, RPAs have operational limitations for each specific RPA platform. These limitations will dictate how RPAs operate to satisfy mission requirements. Examples include performance limits like maximum altitude, and airspeed or even weather capability

restrictions. Airspace designation will aid greatly in RPA operations and is the first step for safe operations.

Safety of flight

Operational constraints affect RPA employment considerations. Few RPAs can fly in icing conditions, high winds, or under Instrument Flight Rules. This limits the operational response of a SUAS to navigate around certain weather conditions. For pragmatic reasons, decision makers are often more confident with manned aircraft operations than RPA operations. After all, commanders are familiar with piloted aircraft and their ability to navigate severe weather issues during routine training operations, making them the obvious choice to integrate into DOMOPS. However, RPAs need the chance to prove their worth.

Although extreme weather may have created an emergency, post-disaster the weather can be conducive to operation and utilization of RPAs. RPAs are not the go to for use in all circumstances and preplanning is critical to reduce potential risks and to optimize RPA use. The primary mission for DOMOPS is the protection of life and property. Over the last decade, large to medium class RPAs such as MQ-1, MQ-9 and RQ-4 have proven the ability to operate safely, but they still have a higher accident rate than manned aircraft. Smaller RPAs may be at risk for accidents due to the lower altitudes in which they operate; however, the size of this category aircraft, often weighing less than 55 pounds, can limit ground damage risk. These hazards need factoring and should not preclude RPA use. RPAs employment is especially prudent during higher risk missions or in circumstances where no other asset is available to support operations. Also in Search and Rescue or remote Line of Communication scans, the employed RPA would be flying in remote areas. At such times even if the asset crashed, damage on the ground would be negligible.

Although military RPAs have advanced, the greatest technological improvements appear to be in SUASs. Exciting technologies to address the "see and avoid" problem may include miniaturized radar, Lidar, and novel radio frequencies management techniques. The auto industries improvement in self-driving technologies is likely to be transferable to RPAs. The ability for a car to sense objects within inches of accuracy certainly will enhance the viability and safety of RPAs once these technologies are incorporated. The future holds many possibilities with these new emerging technologies. The commercial pursuit for delivery applications from large corporations such as Amazon is helping to bring these capabilities to fruition. In the not too distant future, it will be possible to order takeout dinner and have it delivered to your home by a RPA. Deliveries on this scale will require specialized deconfliction and airspace considerations, yet technological solutions are presenting options that just a few years ago seemed impossible. In fact, the first wave may include ground-based autonomous vehicles since FAA regulations would not apply to them.

Employment Limitations

Numerous RPA systems solutions exist today. Employment considerations make SUASs great candidates for monitoring floods, winter weather or supporting localized searches. Arguments persist over SUASs use regarding limited sensor capabilities and area coverage. A SUAS flying at 400 ft. AGL with the sensor zoomed out can only see areas to a maximum of square acres.[13] An aircraft operating the same sensor at 8-12k ft. AGL would have twenty to thirty times the Field of View, providing more information but at a much poorer resolution. RPAs still possess resources that make them valuable in a DOMOPS situation. Although SUASs have limitations, their full motion video and imagery can provide enhanced situational awareness. Depending on the aircraft, a larger RPA can have highly sophisticated instruments

that SUASs do not possess, such as Infrared sensors, Synthetic Aperture Radars and high-powered Electro-Optical (EO) sensors. These options are more expensive and may not be available on SUASs due to power and payload limits, however these more robust sensors can provide day, night and all-weather capabilities. One advantage SUAS's possess is that many have High definition (HD) EO cameras. Employing these cameras on an SUAS operating at only 400 ft. AGL allow for resolution clearer than high-performance EO cameras of RPAs operating at higher altitudes and two to three miles from the area of interest. That being said, the key challenges of SUAS may be less about data resolutions and more about technical control through Radio Frequencies (RF).

Communication with the RPAs can creates serious challenges. Although the camera data transmitted from larger category RPAs is very good, it still does not fulfill the See and Avoid FAA requirement. The level of situational awareness is significantly better with SUASs because the operator has the aircraft in sight. However, some SUASs fly based on a pre-programmed waypoint flight profile, which limits their ability to maneuver away from obstacles in its flight path. SUASs do have an advantage that their RF band is already an approved operating frequency by the Federal Communications Commission. Therefore, they do not require special frequency management approvals that larger RPA Ground Control Stations (GCS) may require. However, while most military RPAs have primary and secondary communications and safe orbit options if they lose the link with their GCS, a drawback for SUASs, is that there are no backup communication options in case of RF interference. In addition, there are only so many radio frequencies and RF interference and bandwidth limitations place a greater burden and need for asset automation for SUASs. That needed autonomous operation restricts adoption due to regulations and unproven technologies.

An accident, no matter how unlikely, creates the potential for loss of life and significant damage. If a RPA crashed, it would create concerns and liabilities that regulatory agencies and insurance companies have yet to adjudicate. There have been narrow escapes, for example on January 7, 2017, a Boeing 737 passenger jet in Mozambique collided with a drone on landing, causing significant damage to the plane's nose cone. Although the aircraft landed safely, this illustrates the dangerous possibilities for accidents. The concern is that with the increase in the number of available RPAs, near misses will become more common. SUAS projected sales range from three to seven million units by 2021.[14] It is only a matter of time before a RPA is involved in a serious mishap. It is more important than ever to manage airspace and execute operations in a safe manner so that RPAs can continue to provide critical information in support of DOMOPS yet in a cost effective and affordable manner.

Operating Costs

The cost to purchase sophisticated RPAs and their related operating costs can be out of reach for some states budgets. Few if any states have budget plans for T10 RPA support to DOMOPS. The lack of RPA knowledge, proficiency, and infrastructure are a challenge for many states. Additionally, limited funding and personnel require significant federal support. "Support provided under immediate response authority should be provided on a cost reimbursable basis, where appropriate or legally required, but will not be delayed or denied based on the inability or unwillingness of the requester to make a commitment to reimburse the Department of Defense."[15] The cost of a manned Civil Air Patrol aircraft such as a Cessna 172 may cost $150 per flight hour as opposed to larger fixed wing military aircraft that can cost thousands of dollars per flight hour. The same variables hold true for the costs of RPAs based on size and capability. If a state has to reimburse the federal government for the use of these long-

dwell time assets, the costs need to be clearly stated. "While the cost of operating the MQ-1 on the Rim Fire, which exceeded $100,000, is a small percentage of the total cost of more than $100 million to suppress the Rim Fire, and was likely offset by savings incurred as a result of more timely and efficient suppression operations, the number of fires with values at risk that justify that level of expenditure are limited."[16] There are tangible and intangible costs for not using all of the assets at the state's disposal. The use of RPAs by California helped reduce the time needed for firefighting efforts but at significant cost. When considering the costs associated with the personnel needed to operate RPAs the state should consider the highly trained NG as a viable option. "A governor may request reimbursement from the federal government to resource pay and costs associated with state call-up of the National Guard to support an emergency. Potential funding through the federal agency providing support, such as FEMA is available. The governor may also request federal funding from the SECDEF under T32 United States Code. Regardless of the funding source, state or federal, NG forces remain under command of their respective governor."[17]

The cost of commercially available systems makes it possible to procure lower-cost alternatives to military RPAs, such as the Insitu Scan Eagle or Insitu Integrator. Other Commercial off the Shelf (COTS) purchases, such as a DJI Phantom 4 Quadcopter, are also available. Although less capable than the larger class of airframes such as the MQ-1/9s or Shadows, the COTS assets could suffice for a rapid response. As a generic cost comparison, several relatively capable SUAVs are less than $1,000 each airframe to purchase. It is possible to procure a modest fleet for the cost of a single 12-hour sortie of a predator. Funding is always a concern, yet the time may be right to utilize National Guard and Reserve Equipment Appropriation money to support these types of acquisitions for DOMOPs. In high-risk

scenarios, the SUASs low cost makes it a disposable item if needed. Some individual states are showing interest in the acquisition of RPAs for first responders, such as police, fire, and rescue, and NG units. These assets from other agencies will aid in cost effective solutions for DOMOPS support. Assets owners such as the National Aeronautics and Space Administration (NASA), Customs and Border Protection (CBP) operating out of locations such as Fort Huachuca, AZ; Grand Forks AFB, ND; Cape Canaveral, FL and Corpus Christi, Texas are potential partners for states RPA needs. RPAs can be a sizable investment that states cannot afford and may lack the current operational experience to operate. Contracting services and support may be worth considering.

While it sounds like a positive idea, leasing aircraft systems on a "pay, as you go" concept, has several limitations. Assets would take the time to request, contract, and arrive for emergency response. Although the NG is not designed as an immediate first responder-style support, NG DOMOPS support is necessary within a reasonable amount of time. Leased support may be regionally available yet take days or weeks to deploy. Another critical challenge is operational integration for the leased assets. This requires a minimum level of exercise and unit level support to work critical communication and logistics before a natural disaster. Contract coordination is more than just writing a check for RPAs to show up during a disaster. Mitigation of these challenges will occur if the state works contractual details in advance and can exercise the capabilities prior to an emergency response. This would allow for properly scoped contract support, proficiently trained operators, the appropriate equipment, and RPAs that a state would be unable to fund and staff. It is never a good idea to learn during a crisis, as critical considerations need factoring up front.

First responders such as police, fire, and rescue are starting to explore the purchase and use of SUASs. This is a compelling argument since first responders have the charter to provide rapid support to any crisis. They would have the best local familiarity, and in theory, be trained to use and support the RPA assets. More importantly, first responders possess the legal authorities and protections likely not granted to civilian or corporate users. The NG can and should leverage these opportunities. As part of the same communities, the NG should team with first responders to create a coherent and executable response strategy. NG intelligence analysts could support situational awareness and exploit sensor data from first responders RPAs while operations personnel could augment flight operations. Legal considerations will still need evaluation for how the NG and first responders can integrate RPA operations to provide the best response options. It is one thing to fly an RPA, but the data coming off the aircraft must be processed and converted into information to be useful. Having the video stream sent to a command location for situational awareness and decision-making is one of the key reasons for using the assets. Regardless of who is flying the aircraft, data collection has legal restrictions to protect the rights of U.S citizens and needs proper evaluation.

Some States may not see the value for investment in RPAs due to limited resources and competing priorities. The state may not have the resident technical experience such as intelligence analysts, RPA qualified pilots, and maintainers to operate the RPAs and exploit the sensors data. Although all are legitimate concerns, mitigation can occur through proper planning and consideration. Options include creating an Emergency Management Assistance Compact[18] with the Border States to create agreements that share resources and personnel in times of crisis. For example, the digital world allows data to be streamed anywhere in the U.S. for exploitation and use. Another state could process data and convert it into usable information to enhance

command and control, and situation awareness for the affected state(s). Understanding the various intelligence units, along with their capabilities and locations will help identify available resources. The physical location of equipment and communications infrastructure will play a role in how these capabilities can respond to DOMOPS missions.

When not using RPAs, intelligence units are still key contributors by providing valuable information to decision makers, such as baseline-planning data for an operating picture, lines of communication, critical infrastructure, and other geographic data important to situational awareness. "Intelligence Mission - Intelligence Specialists work to gather, analyze and interpret information from a variety of sources to allow leaders to make the necessary decisions to protect and defend the national interests of the United States. Through combined research, Air National Guard intelligence specialists create databases of information and materials to support combat mission planning and ensure our Airmen are aware of the enemies' resources and abilities."[19] During large scale DOMOPS, every resource is needed to prevent loss of life and minimize property damage. Properly employed, the added situational awareness and rapid access to current informational conditions can allow decision makers and responder's improved support and response options they may not organically possess.

Recommendation

The US military is the most experienced entity with utilizing RPAs and can provide valuable perspectives on how RPAs can integrate safely into the NAS. RPA use in DOMOPS is at the beginning of a 3-5 year dialogue for inclusion and employment for most states NG responses. Steps to identify potential assets in each states should include inventory from T10 and other agencies such as NASA, CBP or first responders. Time should be taken to understand the capabilities each specific asset can provide and identify circumstances where using the asset

warrants SECDEF approvals for long dwell and or catastrophic events. Once potential assets are identified, training needs to be implemented to mirror operations in support of DOMOPS. This starts by creating a PUM for NGB approval and requesting SECDEF RPA consent. Training before an emergency would allow time for staff to coordinate and conduct training analysis, exercise the legal approvals, and help reduce operational risks by being better prepared for future responses to natural disasters under DOMOPS.

Units need to train the way they plan to operate during real world Events. A good starting point would be tabletop and notional Command and Control (C2) exercise using RPAs at lower levels of operations and command. Logistical consideration of C2 and communication pathways for off-boarding sensor data and the operational rehearsals to maintain positive control of the assets need evaluation. Other key activities include working out the sensor data transfer to intelligence units so that raw data is processed into useable decision quality information. As the comfort level of units RPA use increase, inclusion in larger scale exercises is important.[20] Practicing and expanding RPAs use will allow for better understanding of how to include these capabilities in future DOMOPS. Even when RPAs provide limited support to an event, it still provides a learning opportunity for the operators to make recommendations for future DOMOPS missions. A unit with RPAs access has a very distinct resource at its disposal, and although not useful for every NG's response, there is enough capability to warrant investment in time and resources for RPA inclusion in full-scale DOMOPS support. This has to start with training and exercises that allow RPA use with legal and airspace approvals. Rules and regulations will evolve with or without NG input. Because of the high level of US military experience, it is critical that the states leverage this knowledge to lead the way for future operations of RPAs.

Conclusion

RPAs provide tools and capabilities that should be utilized when the conditions and needs align to provide DOMOPS support. The lack of understanding both real and perceived, of legal restrictions limits a state's access to RPA and intelligence assets that could be a viable DOMOPS response resource. Enlisting NG's resources for DOMOPS improves the use of all available resources of each state. "Protecting the Homeland" is one of the NG's primary missions. Using both NG RPA operators and intelligence personnel support this mission as the skills learned from combat missions can provide senior leaders with improved situational awareness during DOMOPS.

IAA support to various DOMOPS has been limited primarily to manned ISR and intelligence support. It was not until the California Rim Fire in 2013 that SECDEF approved MQ-1 Predator support for DOMOPS. The proliferation of SUASs warrants greater NG involvement in utilizing RPAs in all size categories. While RPA use will only increase, no one entity has more experience in using RPAs than the U.S. military.

Learning during a crisis creates dilemmas and added risks. In responding to DOMOPs with RPAs, the key to training is using real world scenarios before a situation occurs. Once practiced, the required PUM and SECDEF approvals are not as daunting and identification of key airspace concerns, employment considerations, and cost factors for successful integration into DOMOPS can be managed. Evaluation of rapidly evolving technologies need consideration for their utility before a crisis. Progress will occur, with or without the help of the NG, but through direct involvement, the Guard can shape future RPA employment and help discover opportunities that will provide improved responses to DOMOPS. Disasters are not planned, but responses to them are. It is not just about lawyers, drones, and money but the willingness for a state's leadership to justify and pursue the use of RPAs for the capabilities they bring.

Endnotes / Footnotes

[1] The Air National Guard's federal mission is to maintain well-trained, well-equipped units available for prompt mobilization for war and provide assistance during national emergencies (such as natural disasters or civil disturbances). In peacetime, the combat-ready units and support units are assigned to most Air Force major commands to carry out missions compatible with training, mobilization readiness, humanitarian and contingency operations such as Operation Enduring Freedom in Afghanistan. http://www.ang.af.mil/main/welcome.asp.

[2] "Air National Guard Missions," n.d., https://www.goang.com/missions/isr/intelligence-mission.

[3] *Incident Awareness and Assessment (IAA) Handbook, 4th Edition-2015*, 4th ed. (National Guard Joint Force Headquarters-State J2, 2015), 3.

[4] Ibid., 10.

[5] Department of Defense, *DSCA Handbook.* (Washington, D.C.: Dept. of Defense] : U.S. G.P.O., 2010), 1–3.

[6] Department of Defense (DOD) Directive 3025.18, *Defense Support of Civil Authorities (DSCA)*, 2012, para 4.o.

[7] "Policy Memorandum 15-002, Guidance for the Domestic Use of Unmanned Aircraft Systems" (Deputy Secretary of Defense, February 17, 2015), 3.

[8] Based on Executive Order 12333

[9] US Department of Transportation Federal Aviation Administration (FAA), Integration of Civil Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS) Roadmap, First Edition – 2013, p 19. https://www.faa.gov/uas/media/uas_roadmap_2013.pdf.

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[11] Totten, Lindsay, "Remotely Piloted Aircraft an Integrated Domestic Disaster Relief Plan," *Air Command and Staff College*, Wright Flyer Paper, 49 (n.d.): 4.

[12] "Public Entities, Know Before You Fly," n.d., http://knowbeforeyoufly.org/for-public-entities/.

[13] An Acre is 43,560 Square Feet

[14] Federal Aviation Administration (FAA)

[15] Department of Defense (DOD) Directive 3025.18, *Defense Support of Civil Authorities (DSCA)*, 5.

[16] Jones, Jennifer, "U.S. Forest Service Explores Use of UAS In Fire Management" (Fire and Aviation Management, n.d.), 7.

[17] Department of Defense, *DSCA Handbook.*, 3–6.

[18] EMAC is a national interstate mutual aid agreement that enables states to share resources during times of disaster

[19] "Air National Guard Missions," n.d., https://www.goang.com/missions/isr/intelligence-mission.

[20] Events like Vigilant Guard need to create a safe environment for operational executing of RPAs to glean lessons learned for sharing throughout the NG.

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