Strategy Research Project

NATIONAL REMOTELY PILOTED AIRCRAFT SYSTEM

BY

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USAWC CLASS OF 2011

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REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
05-03-2011	Strategy Research Project	

4. TITLE AND SUBTITLE

National Remotely Piloted Aircraft System

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

Lieutenant Colonel William D Phillips, Jr.

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

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Center for Strategic Leadership

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

U.S. Army War College
122 Forbes Avenue
Carlisle, PA 17013

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT

Distribution A: Unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

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This paper will propose the establishment of a centralized federal agency, charged with fulfilling diverse RPA mission sets in support of the domestic security of the United States. It will suggest structure and processes that will allow for servicing law enforcement, defense and other governmental functions through the use of RPA's, while adhering simultaneously to concerns of economy and efficiency. Finally this paper will suggest near term and (if necessary) future safeguards that will allow for these economies and efficiencies without impeding upon the rights of United States persons and citizens.

15. SUBJECT TERMS

UAV, UAS

16. SECURITY CLASSIFICATION OF: Unclassifed			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			**19b. TELEPHONE NUMBER** *(include area code)*
UNCLASSIFED	UNCLASSIFED	UNCLASSIFED	UNLIMITED	26	

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This SRP is submitted in partial fulfillment of the requirements of the Master of Strategic Studies Degree. The U.S. Army War College is accredited by the Commission on Higher Education of the Middle States Association of Colleges and Schools, 3624 Market Street, Philadelphia, PA 19104, (215) 662-5606. The Commission on Higher Education is an institutional accrediting agency recognized by the U.S. Secretary of Education and the Council for Higher Education Accreditation.

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ABSTRACT

AUTHOR: Lieutenant Colonel William D. Phillips, Jr.

TITLE: National Remotely Piloted Aircraft System

FORMAT: Strategy Research Project

DATE: 05 March 2011 WORD COUNT: 5,205 PAGES: 26

KEY TERMS: UAV, UAS

CLASSIFICATION: Unclassified

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This paper will propose the establishment of a centralized federal agency, charged with fulfilling diverse RPA mission sets in support of the domestic security of the United States. It will suggest structure and processes that will allow for servicing law enforcement, defense and other governmental functions through the use of RPA’s, while adhering simultaneously to concerns of economy and efficiency. Finally this paper will suggest near term and (if necessary) future safeguards that will allow for these economies and efficiencies without impeding upon the rights of United States persons and citizens.

NATIONAL REMOTELY PILOTED AIRCRAFT SYSTEM

The Remotely Piloted Aircraft (RPA) currently is becoming recognized as a valuable asset across multiple government sectors. The utility of these vehicles rapidly translates to the current requirements of law enforcement, public safety and home land security. Fiscal constraints, however, weigh against establishing separate agencies across the various levels of government in pursuit of seemingly distinct, but ultimately similar ends. In the pursuit of these ends, however, any given agency must obey the law and pay due homage to the traditional notion of privacy and civil liberties while executing “reconnaissance operations” in the domestic environment.

This paper proposes the establishment of a centralized federal agency charged with fulfilling the RPA missions designed to improve the domestic security of the United States. It also offers structure and processes that will allow the servicing of law enforcement, defense, and other governmental functions, through the use of RPAs, while adhering to concerns of economy and efficiency. Finally, this paper will suggest current and future safeguards that will allow for the economical and efficient implementation of these systems without infringing upon the rights of United States citizens.

A search through any of the plethora of media outlets offered by the global market will inevitably uncover many urgent requirements by many diverse governmental agencies which the RPAs are perfectly equipped to address. The Department of Defense (DoD) was the first to use RPAs as a way to accomplish its mission. The DoD developed RPAs for intelligence, surveillance, and reconnaissance (ISR) type missions. The military continued the RPA development to produce an offensive combat weapon.

The success enjoyed by the military in its use of RPAs is now being sought by other government agencies for domestic missions within the airspace of the United States. The main thrust of those missions would be to provide information and situational awareness to a wide variety of Federal, State and local agencies. From estimating the extent of damage caused by natural disasters to observing basic criminal acts, RPAs are envisioned as a means to greatly enhance an agency's ability to accomplish its duty to the American public.

The first and only agency to acquire RPAs (for use specifically in the United States) is part of the Department of Homeland Security (DHS). Customs and Border Protection's (CBP's) Office of Air & Marine (A&M) utilizes advanced technology to augment its U.S. Border Patrol agents' ability to perform its mission.[1] The CBP now has two squadrons operating along the southern and northern borders of the United States. Congress saw the need for these squadrons and their mission, and between FY2006 through FY2010 funded the operation with nearly one hundred and twenty two million dollars.[2] This is the first non-military agency to establish the requirement for RPAs to enhance their ability to provide for border security.

A different agency that has shown the requirement for the use of RPAs is the Federal Emergency Management Agency (FEMA), which also falls within the Department of Homeland Security. Although FEMA does not own or operate RPAs, they have used the military's during natural disasters to estimate damage and establish situational awareness.[3] The most recent use was over the Gulf of Mexico during the BP oil spill.[4] FEMA has indicated during press conferences the need for RPA capabilities during natural disasters such as hurricanes, floods, and earthquakes to assess

damages on the ground.[5] When all other sources of information are unavailable due to the destruction caused by a natural disaster, the use of an RPA can give FEMA the necessary information to begin appropriate corrective actions.

Interest has also been expressed within the Department of Homeland Security by the United States Coast Guard (USCG).The U.S. Coast Guard is required to patrol a vast amount of coastal area for its traditional safety mission and to stop narcotics from entering the U.S. illegally. RPAs are ideally suited for both missions and would also be well suited for search and rescue missions.[6] The use of RPAs could greatly enhance their capabilities of patrolling the more than eighty-eight thousand miles of U.S. coastline (not including fresh water).[7]

The main goal for the Department of Homeland Security's Preparedness, Response and Recovery efforts is:

> In the event of a terrorist attack, natural disaster or other large-scale emergency, the Department of Homeland Security will provide a coordinated, comprehensive federal response and mount a swift and effective recovery effort. [8]

To acquire up to the minute information during these types of events the information will most likely need to come from outside the affected area. The use of normal communications in an area under extreme conditions (including manmade or natural disasters) has, in the past, been ineffective at producing the necessary situational awareness to coordinate the appropriate response. The use of RPAs will enhance the situational awareness and provide some of the necessary data to help coordinate the appropriate response by DHS and other agencies.[9]

Although the Department of Homeland Security has well established requirements for RPAs, there are other agencies that could clearly gain from the asset.

For example, the Department of Agriculture (DoA) is required to observe large areas of land to determine changes in plant life and water resources. Manned fixed wing aircraft traditionally have been use to collect data on large areas of land; however, RPAs are ideally suited to meet this requirement.[10] The U.S Forestry Service, which falls under the DoA's umbrella, would also benefit greatly from the use of RPAs. By way of illustration, an RPA recently demonstrated the ability to act as a wildfire remote sensing platform, gathering thermal data over fires and relaying that information through a satellite communications telemetry system in real-time to fire management personnel on the ground.[11] The demonstration indicated that the use of RPAs could be an asset in gathering the necessary information to effectively fight and manage wildfires.

Little imagination is required to understand how the Federal Bureau of Investigation (FBI), the Bureau of Alcohol, Tobacco, Fire Arms and Explosives (ATF) and the Drug Enforcement Administration (DEA) could utilize the unique capabilities of RPAs. "The FBI is experimenting with a variety of unmanned aerial vehicles," said Marcus Thomas, an assistant director of the bureau's Operational Technology Division.[12] The availability of this type of surveillance and chase platform for the FBI, the ATF and the DEA could be invaluable in their efforts in the law enforcement arena.

State, city and local law enforcement offices, could also reap benefits from the use of RPAs. These law enforcement agencies have utilized stationary cameras, in- car cameras, and aerial (manned aircraft) cameras for many years.[13] Lately larger cities have been investigating and testing the use RPAs as a new means of fighting crime. The Houston Police Department recently tested a small type of RPA and the results were widely publicized by the media.[14] Las Vegas Police have apparently used

unmanned aerial vehicles (UAV) and associated systems to patrol the city and deliver aerial imagery during incidents or special events.[15] The Miami Police Department has also been searching for a way to obtain RPA capabilities.[16] The need for the use of RPA's in law enforcement appears to be increasing.

There are two ways in which the RPA could be an indispensable tool for local a law enforcement agency during terrorist attacks or organized criminal activities. The first and most obvious is the ability of RPAs, through the use of satellite telemetry, to collate information and make it available to operations personnel instantaneously. Another, closely related benefit is the additional security offered by RPAs. The traditional manned aircraft presently utilized in this type of situation depend on the observers making reports to the operational center via radio. This, however, has two drawbacks. One is that someone at the operational center must collate the information. The second, and more critical drawback, is that a well organized terrorist cell or crime syndicate may be able to intercept the information and utilize it in their effort to stay a step ahead of the law enforcement agency. Conversely, the RPAs could relay the information through encrypted satellite telemetry making it extremely difficult for anyone to intercept the information. This additional security could make use of RPAs very desirable to law enforcement agencies at every level.

While the requirement for RPAs has been established, the constraints of their use in the domestic United States must also be addressed. For the purposes of this paper, the constraints will be examined in five distinct areas:

1. Safety, Airspace and Regulations
2. Development, Purchase and Maintenance Costs

3. Military Limits
4. Intergovernmental and Interagency Coordination
5. Safeguarding against Privacy and Civil Liberties Violations

The following is an examination of each of these areas.

1. Safety, Airspace, and Regulations:
    a. The Federal Aviation Administration is charged with the mission "to provide the safest, most efficient aerospace system in the world."[17] The FAA has safety concerns with any new type of aircraft, and therefore has been slow to react to the use of RPAs in the domestic U.S.[18] However, the main areas of concern surrounding RPAs from the FAA's perspective are the safe operation of the systems, their integration into an already congested airspace, and the certification of aircraft and operators. In order for the FAA to maintain the safe operation of the airspace over the U.S., regulations and procedures will have to be established to coordinate the introduction of these new vehicles into the national aviation system.
    b. Among the safety concerns the FAA must address in RPA operations is the issue of "see and avoid".[19] The "see and avoid" concept is based on the notion that pilots can make split-second decisions (using their field of vision) to avoid mid-air collisions.[20] RPAs as of yet do not have the ability to use "see and avoid" maneuvers.
    c. The FAA also has concerns with the operation of RPAs in American airspace. On average every 24 Hours there are over eighty thousand airport arrivals in the U.S., and at any given time nearly six thousand

aircraft flying in its airspace.[21] (These numbers do not include all the light aircraft traffic also in that airspace). The FAA has some apprehension with the additional strain the introduction of RPAs could put in that already crowded environment.

d. The FAA has regulations on the certification and procedures to operate all aircraft that operate in the U.S.; however, there are currently no regulations established for the use of RPAs. The Administration will have to test and evaluate RPAs and their operators to determine the minimum standards that will be necessary to safely incorporate this new technology. As with any new technology, it takes time to devise appropriate tests, and RPAs are no exception. The FAA's main concern is not the speedy incorporation of RPAs into use, but the safe operation of this new technology in the U.S. airspace.

2. Development, Purchase and Maintenance Cost:

The next limitation on the use of RPAs by any agency, from the Department of Homeland Security down to local police departments, is the budget required to purchase, operate and maintain the equipment. The United States Congress allocated approximately seventy million dollars for the Customs and Border Patrol to purchase only twelve RPAs for patrol.[22] This may not seem like a huge amount to a Federal Department, but would put a considerable strain on a local law enforcement agency. The amount of money required to not only purchase, but to train, license, operate and maintain the system will make it difficult for most agencies below the cabinet level to independently

budget for RPAs. Not only would the interested agencies have to make the initial investment they also must consider that the other agencies requesting the same budgetary increase would put an additional strain on the taxpaying population. The cost will restrict many agencies from establishing any real type of RPA programs without Federal aid.

3. Military Limits:
    a. There are limitations placed on the use of the U.S. military in the domestic arena. Since the existing operational RPAs are owned by the military (or the Department of Homeland Security) there is some question as to whether their use may fall under these limitations. The DoD Directive governing intelligence activities limits the military when participating in information gathering activities. The military is restricted from gathering information on U.S. persons with special emphasis on the protection of constitutional rights and privacy.[23] The Department of Defense components will only participate in covert activity during times of declared war by Congress or approved by the President and directed by the Secretary of Defense.[24] These limitations could restrict the use of military RPAs in the United States
    b. The laws of the United States and DoD directives establish DoD policy and assigns responsibility for military assistance to civil authorities. The Secretary of the Army and the Secretary of Defense have specific authorities for support to civil authorities. The criteria that must be applied by both authorities are: Legality (compliance with laws), Lethality

(potential use of lethal force by or against DoD forces), Risk (safety of DoD forces), Cost (who pays and impact on DoD budget), Appropriateness (whether the requested mission is in the interest of the Department to conduct), and Readiness (impact on Defense's ability to perform its primary mission).[25] The National Response Plan which established a comprehensive all hazards approach to domestic incidents could require the military to respond if the above criteria can be met.[26] This response could include the use of military RPAs to support civil authorities. The criteria above could also limit the use of military RPAs in the United States.

4. Intergovernmental and Interagency Coordination:

The stove piped and separatist functionality of the various federal agencies creates problems for interagency cooperation. Likewise, the inherent sovereignty issues encountered between Federal, State, and Local government is a source of friction in many programs. Both may result in problems when a national system for implementing the controls of RPAs is debated. The relationship between federal agencies and local agencies in the past, has been somewhat acrimonious. Similar problems arise when inter-agency cooperation is needed for a federal project. These types of problems will be a tough obstacle for the introduction of a "National Remotely Piloted Aircraft System." For the past few years the notion of different agencies working together for the common good is gaining in popularity; however, this subject will take much more discussion and a concerted effort in coordination.

5. Safeguarding against Privacy and Civil Liberties Violations:

   Whenever a new technology is introduced that has the potential of encroaching on individual privacy, concerns are likely to be voiced. "For some privacy advocates, the talk about civilian use of unmanned aircraft has raised a specter of Big Brother in the skies, and a new privacy debate is brewing."[27] The thought of RPAs flying over head and intruding into U.S. citizens lives brings privacy and civil liberty questions into the discussion of the use of RPAs. Society is not willing to set aside the notion of "open fields" or "in plain view" when RPAs capture images in a legal authorized manner. The ability of an RPA to exercise advanced imaging capabilities, such as thermal sensing and infrared imaging, would raise particular privacy concerns, spawning questions as to whether or not utilization of the device automatically amounts to "unreasonable search and seizure."[28] The Supreme Court sited that the warrantless use of thermal imaging violated a person's Fourth Amendment rights because such technology was not in widespread use.[29] The law suit stated that thermal imaging "is not in general public use and therefore could be unconstitutional."[30] The court concluded with the notion that the more something is used, the more acceptable it becomes.

Having discussed the limitations in making RPAs available to domestic law enforcement agencies, it is now time to discuss how to make it a reality. The nation should implement the development and construction of a National Remotely Piloted Aircraft System (NRPAS). The strategic objective to having this new comprehensive system would be to attain the most effective and efficient course of action to gain RPA

capabilities, while addressing the utilization, privacy and civil liberty concerns previously cited. When determining the structure of the system, the country needs to consider a level of unity of effort and cooperation that will allow all agencies to address their individual interests. The criteria used to achieve the goals of the NRPAS must be derived from the prioritized requirements of the country. To create this type of overarching system we must move away from an "agency" structured system to an area or regional, structured system.

Establishing criteria based on regional areas could require that the Department of Homeland Security consider who "needs" the system rather than who is asking for RPA. Delineating the precise criteria for prioritization of assets is beyond the scope of this paper, but a regional system could be aligned along venues of mission type, population density, or total area. Therefore, for example, regional based systems could prioritize and employ RPAs in support of:

1. Border patrol: This is an established requirement by the Department of Homeland Security. Some regions could have international borders and should be allocated the RPAs to meet border patrol requirements.
2. Big cities: This could be criteria for RPA allocation due to the increase in crime and numbers of individuals associated with larger cities. DHS would need to determine the size criteria and number of RPAs needed for use in "Big Cities".
3. Total area: The square miles of a region could require the allocation of more RPAs due to limitations of speed and range of the aircraft. During the

development phase the total area may become a determining factor in basing and the number of RPA required.

These three basic criteria could be used to estimate the required assets needed in each area and total number of RPAs for the proposed NRPAS program. The Department of Homeland Security could adjust the criteria which are being used here as a suggested starting point to approximate the size and scale of the NRPAS program.

The NRPAS could be constructed using the area borders setup by the FAA for their air traffic centers. This results in twenty regions covering the continental United States.[31] Each region should have one base centrally located and equipped with the appropriate number of RPAs using the criteria established by DHS. The base in each region could become the regional center for the employment of the RPAs. To estimate the RPA requirement at each base (using the suggested criteria) the formula should include the number of cities, plus mission requirements, and total area of a given region. Over time, based upon operation and maintenance data, additional assets could be deployed in the regions as required “spares.”

In order to better illustrate the concept, Houston, Texas is offered as a potential location for a NRPAS regional base. The Houston NRPAS Regional Center could require three RPAs for New Orleans, Austin and Houston; two more systems for border patrol operations, an additional system to support DEA operations, and (perhaps) two spares. This would give the Houston Center eight total RPAs to cover their area. DHS would need to determine if this type of calculation would serve the needs of the nation.

If the Department of Homeland Security used the suggested example and applied it to all twenty areas listed by the FAA, an estimate of the total number of RPAs

required for NRPAS could be calculated. The total RPAs required to cover the continental United States would be approximately one hundred and seventeen. Sixty-one would be allocated based on city requirements, sixteen would be allocated for border patrol and forty would be allocated for area size and spare RPAs. All the suggested proposals thus far are to illustrate the approximate size and scope that the NRPAS program could eventually encompass. The DHS would need to study and evaluate the requirements to refine these numbers in an actual NRPAS program. The numbers are only used to calculate the total number of RPAs for each regional center. The deployment of the RPAs will be discussed in the following section.

The term deployment is used to denote where the RPA system is directed to go and to which agency. The deployment should be based on a national priority list generated by the Department of Homeland Security (DHS) with oversight done by the House and Senate Intelligence Oversight Committees. The list should be periodically reviewed by Congress to ensure it is both effective and efficient. An example of the priority list based on the requirements presented in this paper could include:

1. Natural Disaster
2. Terrorist Watch
3. Border Patrol
4. Search and rescue
5. Agriculture Survey
6. ATF Surveillance
7. Fire fighting Missions
8. Weather Missions

9. State and Local law enforcement

Once the RPA is assigned to a priority mission it will stay with that mission until completion or until a higher priority mission becomes critical and redeployment is necessary.

The national priority list should take into account each of the authorized agencies requiring access to the capabilities of the NRPAS program. Each agency will request access through the Regional NRPAS Center to gain access to the RPAs and to establish a satellite link which would allow them access to the information gathered. DHS will maintain oversight to secure the system for integrity and access requirement rights. The Department of Homeland Security's Office of Intelligence and Analysis could perform these functions, through a NRPAS directorate established solely for the intent.

The best platform to use in the NRPAS system at this time appears to be the MQ-9 Reaper. The MQ-9 Reaper was renamed for civil application to "Ikhana. The new name comes from the Choctaw word for "intelligent" or "aware". To assist fire fighters with real time information NASA designed an infrared sensor package for fire mapping. The Ikhana could transmit information to fire command centers allowing them to warn fire fighters of dangerous conditions.[32] " This is the platform currently being used by the Customs and Border Patrol with great success. The use of RPA's by USBP allows the patrol to use less manpower while still maintaining the ability to detect and stop illegal intrusions into the U.S. The USBP refers to the concept and use of RPAs as a "force multiplier" and is becoming part of daily operations.[33]

The MQ-9 Ikhana is a medium-to-high altitude, long endurance remotely piloted aircraft system. The crew for the MQ-9 is a pilot and a sensor operator, who operate

the aircraft from a remotely located Ground Control Station (GCS). A refined basic MQ-9 Ikhana setup consists of the aircraft, a control station, communications equipment, support equipment, simulator and training devices, Readiness Spares Packages (RSP), technical data/training, and personnel required to operate, maintain, and sustain the system. [34] Imagery is provided by an infrared sensor, a color/monochrome daylight TV and an image-intensified TV. The video from each of the imaging sensors can be viewed as separate video streams or fused with the IR sensor video. The aircraft is also equipped with a color nose camera, generally used by the pilot for flight control.[35]

The MQ-9 Ikhana cost between 5 million and 17 million dollars per unit. This large range of pricing is due to the various configurations that can be purchased. For domestic use the MQ-9 Ikhana will end up on the low end of the cost range. At the 5 million dollar per unit cost the domestic MQ-9 will be fully operational with all components necessary for operational use.[36] The estimated total budget necessary to fulfill the needs of constructing a National Remotely Pilot Aircraft System (NRPAS) will be approximately five hundred and eighty-five million dollars. The annual budget for operation and maintenance is not addressed in this SRP.

The availability of information obtained by the use of the NRPAS system could raise great concern with the citizens of the United States, if the Department does not create fail safe processes to monitor who is receiving the data. This is necessary in order for the Department to instill an environment that addresses the civil and privacy rights of the U.S. population. Whenever the federal government initiates a new program that could have implications on the civil rights and civil liberties of its citizens there is a requirement to have concrete safe guards to minimize its effects. The National

Remotely Piloted Aircraft System could be seen to many as an infringement to individual privacy and civil liberties. The Department of Homeland Security will be required to work diligently at protecting the citizens of the United States from privacy or civil liberty violations.

The Office of Civil Rights and Civil Liberties (OCRCL) at the Department of Homeland Security could serve as the logical oversight mechanism to prevent excessive intrusions in the application of the RPAs to their mission. The Department of Homeland Security, in conjunction with the FAA, should share charge of establishing the procedures and regulations for the use of RPAs in the United States. The department must establish procedures and regulations for the access, use and distribution of information gained through the NRPAS program. The most important determination required by the OCRCL is the procedures for reporting and disciplining of misconduct by agencies utilizing the NRPAS program when infringement on the rights and privacy of our citizens occurs.

Potential civil liberties and privacy violations as a result of RPA operations can be greatly reduced by the Department of Homeland Security maintaining tight controls on the information gained from the NRPAS program. The Office of Civil Rights and Civil Liberties will need to constantly monitor and take appropriate action against any such violation of American civil liberties or privacy. The most important objective in resolving this problem is transparency and education. The Department of Homeland Security will need to maintain an ever watchful eye on the civil rights and privacy of our citizens. The DHS could work with the Office of the Director of National Intelligence (ODNI) to use the procedures already implemented by that office when sharing personal information.

The ODNI plan for protecting information could assist the Department of Homeland Security in complying with applicable privacy and civil liberties requirements with respect to sharing information, and with the safeguards for United States citizens. The plan encompassed the need for training, accountability, enforcement, auditability, data security, and process to ensure compliance with laws.[37] This plan could help DHS protect the civil rights and privacy when sharing information from the NRPAS program.

The Department of Homeland Security should also be tasked with the information campaign to inform the US population of the use and benefits of the new NRPAS program. The more transparent the department can become with this new system the fewer problems associated with civil liberties and privacy advocate groups should occur. The Office of Civil Rights and Civil Liberties should work together with DHS Public Affairs to promote the new system to the country. The main objective for the department when it comes to the promotion of the new RPA system should be to educate the American people.

The requirement for the use of RPAs in the United States seems to be real. The benefits of information and situational awareness obtained through the NRPAS program, during multiple types of crises in the pursuit of security and welfare of the citizens could be a benefit. As stated above, there are numerous agencies attempting to acquire and use RPAs. The Department of Homeland Security has already been successful as a civilian authority operating RPAs in the domestic United States. Other agencies are demonstrating their requirement for the use of RPAs. From the Department of Homeland Security to local law enforcement, the requirement for this type of system is greater than the existing assets can satisfy. These requirements will

only increase as more and more agencies become aware of the capabilities of an RPA system.

The question then becomes, how do we mitigate the constraints that are critical to the deployment of RPAs in the domestic airspace of the United States? By creating the office of National Remotely Piloted Aircraft Systems some of the limitations will be much easier to overcome. The three main constraints identified by the Federal Aviation Administration of safety, airspace, and certification of aircraft and operators can be overcome with the development and construction of the National System. The Department of Homeland Security and the Federal Aviation Administration can work together to develop the aircraft and operational guidelines to deal with any safety concerns related to RPAs flying in the national airspace. The national system will limit the total number of RPAs, which will help mitigate the airspace concerns of the FAA. The NRPAS will negate the constraints that the FAA has at this time. But the FAA's role is not the only concern that must still be addressed.

Budget constraints are growing across all government agencies. The cost to construct and maintain an RPA system may be out of reach for city and state government. The possibility of any local agency purchasing and operating RPAs is somewhat limited. The only sure way to overcome budget constraints in these very lean times is a National Remotely Piloted Aircraft System. This system will create the most effective and efficient way for the United States to achieve this capability and the desired results for the nation as a whole.

The constraint imposed on our military not to be used as overseers of U.S. citizens will remain. The use of military RPAs will be limited to requests by the Office of

the National Remotely Piloted Aircraft Systems only when they are over taxed by situations such as natural disasters or similar type of short term events. If NRPAS becomes a reality, the use of military RPAs will be restricted to unarmed aircraft. Any RPA assets coming from the military must be configured in the manner established by NRPAS.

The interagency cooperation for the use of a National Remotely Piloted Aircraft System will need to be concerted and predicated on “Need” as established by NRPAS. Although the frequency of cooperation between different governmental agencies has been on the rise, for this system to work effectively it is imperative that agencies at every level of government follow directives to be established by the NRPAS. The interagency cooperation can become better with communication and a willingness of government agencies, whether federal, state, or local to work to a common goal.

The development and construction of a National Remotely Piloted Aircraft System suggests itself as the most efficient and effective way for the United States to gain the tremendous capability that RPAs can provide. The information gained by this system will help save American lives. Whether it is used during a natural disaster, fighting terrorists, monitoring the environment, or helping local law enforcement apprehend a common criminal, the advantages of the NRPAS program cannot be overstated. An effective and efficient way to obtain this capability is by establishing a national system. The requirement is real and should be thoroughly investigated. A national system will be the easiest path to overcome all of the previously discussed limitations. The advantage of using RPAs in the security and welfare of our citizens is

that they will increase our ability to gather and collate information exponentially. The NRPAS program should rank high on the list of national priorities.

Endnotes

[1] Chad C. Haddal and Jeremiah Gertler, "Homeland Security: Unmanned Aerial Vehicles and Border Surveillance (Congressional Research Service, July 8, 2010), 1.

[2] Ibid., 3.

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