

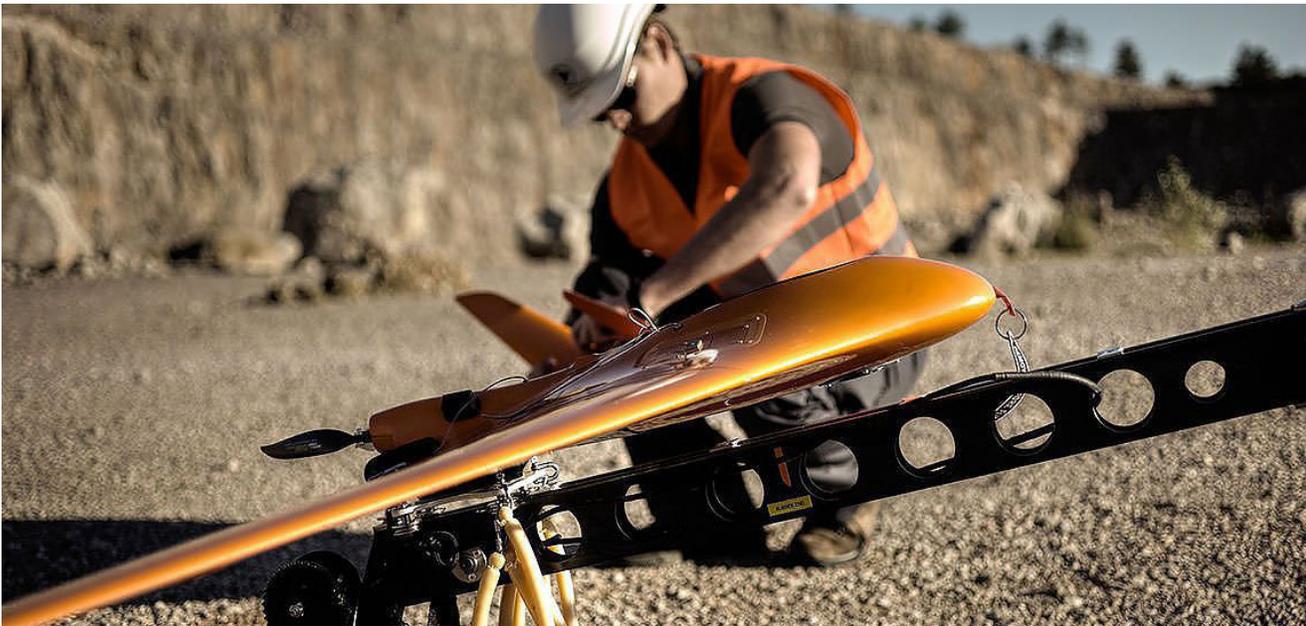


U N M A N N E D
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DEVELOPING AN ECOSYSTEM FOR UAS SAFETY

2017 WHITEPAPER SERIES





THE ADDITION OF UNMANNED AIRCRAFT SYSTEMS (UAS) TO A CORPORATE FLIGHT DEPARTMENT

The use of Unmanned Aircraft Systems (UAS) is becoming popular for varying solutions in a wide range of organizations. Depending on the current staffing and subject matter experts inside such organizations, one typically will see the management and oversight of UAS operations reside in one of the following four corporate departments; Information Technology (I.T.), The Corporate Flight Department, The Governance / Legal Department or in an organically created standalone UAS department. For the discussion of this paper we will further expand upon the alignment of the UAS program being managed by a Corporate flight department and assess those unique considerations. The main objective of this paper is to inform the reader of how robust your support system shall be to support risk adverse UAS operations and the association of using an existing flight department to accomplish this.

When we think of the capabilities a UAS platform and associated payload can accomplish, we quickly see value added into having such assets. Simple tasks like aerial storm damage assessments or having access to live or day old imagery for geographical planning

helps decision makers have the best situational awareness to help make the absolute best decisions. Inversely, we need to ensure having such worthy equipment and tools at disposal is being managed to not create secondary consequences or hazards that increase the overall risk exposure of an organization. The last thing an organizations leadership team would want to hear is that their company drone caused a helicopter to crash while it was performing a storm damage assessment in the same airspace as a rescue helicopter. This scenario is one of a few that yields the highest severity and consequences from the loss of life, financial impact and brand reputation. By no means should this example create a psychological barrier for entry of using UAS, but instead provide a glimpse at the direct hazards associated with using UAS technology. This in turn highlights why it is critical a safety eco-system be established to effectively manage UAS operations being performed organically or through contracted services. The first step in creating this eco-system is to assign a team, project manager or prime stakeholder who will create and foster a support system through documented and implemented; policy, governance and standardized procedures. If operating in the U.S., all associated, shall be in alignment with the Federal Aviation Regulation requirements of 14 CFR Part-107.

Digging deeper into the associated eco-system to support a UAS program it should be noted that the following high level management swim lanes must exist: A safety management system or program, a maintenance program (Hardware & Software), a formal training program, a logistics support system, a security program and an operations/production system that has established protocol for performing flights based on approved requests and policy. When you think through this list, exactly what's already established in most corporate flight departments to perform and sustain manned aviation flight operations. In addition, the corporate flight department has an abundance of knowledge and understanding of Federal Aviation Regulations and the associated national airspace system. To place the UAS program under the wings of the corporate





flight department and tie it into the functional areas such as maintenance and safety could be considered the path of least resistance for an organization looking to build an organic UAS program. Expanding further, by giving authority and responsibility to the aviation department you have also established critical communication throughout all stakeholders who have the ability to fly and maintain manned and unmanned. This becomes very important when you think of efficiencies, airspace deconfliction and having a direct capacity to influence and create a safe culture throughout all aviation operations. Most tasks, workflows, and management activities translate from manned operations to unmanned operations relatively easily with the biggest differentiator being 14 CFR Part-107. If the existing aviation department can become well submersed in Part-107 and add two or three subject matter experts to be the UAS program leaders, you will have completed the first steps of creating the desired eco-system.

When looking for a subject matter expert to be tasked as the manager of UAS Operations the following is a guideline to define the roles, knowledge and experience this individual should have:

“Manage the deployment of drone solutions for organizational needs in a risk adverse capacity. Operate, manage and oversee commercial drone operations for a wide variety of business applications. The Program Manager will also have the lead role in developing and maintaining Remote Pilots in Command and associated support staff like UAS maintenance personnel. The main responsibility will be to help tailor a solution with the right set of hardware, software, and cloud services to help the organization gather needed data and generate reports for operations with the goal to save money and improve safety. The Program Manager shall work to understand and define various business unit requirements, design solutions, and manage the full system implementation and delivery. The Program Manager will wear one hat as a remote pilot an analyst and another as the Program Manager.

Ideally, the Program manager will have formal education in unmanned aircraft systems, a minimum of 100 hours of flight experience, and project management experience such as a PMP certificate.”

Once you have assigned a program manager or lead stakeholder team to create your risk adverse and scalable UAS program the second step is to further develop the eco-system in a methodical approach. Below is a guideline of recommended steps to follow:

Define the mission, tasks and goals of the Unmanned Systems program:

- What will be the primary use of the drone?
- Define all areas that could benefit from drone technology.
- Which business units will utilize or request drone technology support?
- Are UAS requests in line with existing technology solutions?
- How will the UAS program be developed and associated timeline?
- Clearly develop a return on investment (ROI) assessment

Resource planning:

- Define the annual budget for the unmanned systems program. Select drones and payloads that align with your requirements to meet program goals and mission.
- Consider choosing less complex system when starting out and utilizing them as part of your initial new hire training program.
- Assess employee resources and identify cross training existing employees to become RPICs or bring in trained RPICs.

Develop and implement approved policy, procedures and rules for:

- Operations (General Operations Manual)





- Safety (Safety Management System Manual)
- Maintenance (General Maintenance Manual)
- Governance (UAS use policy and authority)
- Emergency Planning (Emergency Response Plan)
- UAS Vendor processing (UAS Vendor manual / third party audit program)
- Checklists (Aircraft specific, site specific, etc.)

Develop and maintain a sound UAS training program for the following:

- Remote Pilot in Command (RPIC)
- Visual Observer (VO)
- Line Managers
- Payload System Operators (as required)
- Maintainers / Maintenance personnel (as required)

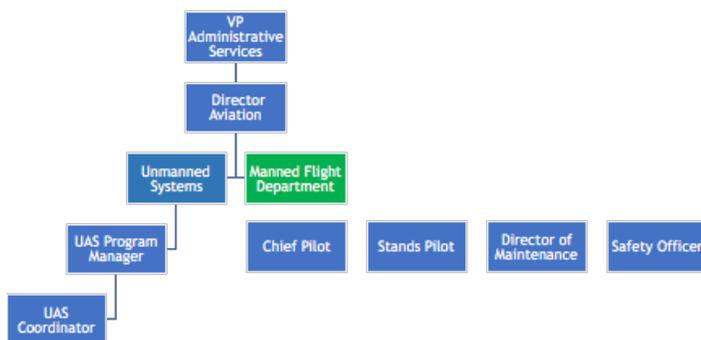
Operational workflow and sustainment:

- Ensure safety nets are created and tasks are standardized
- Have full asset management visibility
- Establish rigorous processes for requesting UAS flight support

Now that we provided a brief description of the positive benefits of placing the UAS program under the manned flight department and associated follow-on recommendations let's look at some potential draw backs. This primarily includes having an increased workload for the manned flight department team which could induce stress and fatigue. From a human factors standpoint one could state that the overall risk of the manned department could go up which sets the stage for the increased potential for an incident or accident. This is why it's so critical to complete a resource assessment and receive buy-in from the manned aviation flight department at the early stages of UAS operations discussions. As another note, an agreement or policy should be created to identify the ability for manned aircraft pilots to fly unmanned aircraft. Some organizations have instituted direct policy that states

all manned pilots will not fly UAS aircraft but will be stakeholders in the program. This decision lies in the concern that if a UAS accident were to occur, it could potentially negatively impact the manned aviators FAA ratings. Lastly, an organization will typically set the production priority with the manned flight department which may prevent growth or the needed support to the UAS program.

In conclusion, organizations must recognize that in-order to have UAS technology as a readily available resource it must be managed effectively and with the utmost concern for safety. This requires professional leaders with an understanding of UAS technology, a working knowledge of aviation operations, a commitment to following local and federal Regulations and an ability to be agile for the adoption of changing rules and technology. Corporate or existing manned aviation flight departments have proven themselves to be effective at creating, supporting and implementing UAS programs in the electric/utility Industry, the Department of Defense, the agricultural industry, the public safety Industry and telecommunications industry to name a few. If your organization is considering the creation of an organic UAS program and you have an existing manned aviation flight department, it's advantageous



to examine the feasibility to place your UAS program under the arms of the manned aviation department for the benefits outlined throughout this paper.

GLOSSARY OF TERMS

Remote PIC or Remote Pilot. A person who holds

a remote pilot certificate with a sUAS rating and has the final authority and responsibility for the operation and safety of a sUAS under Part 107. (FAA, 2016) The remote PIC is responsible for coordinating ground and flight operations including mission planning, execution, and debriefing; safe operation of the aircraft; aircrew resource management; and customer coordination and coordination with the public.

MPO. Supports UAS flight operations by performing duties as an MPO for a particular academic, industrial, or technical area. Controls high priority UAS mission intelligence collection sensors. Controls and manages data as required. The MPO is responsible for assisting the remote PIC in coordinating ground and flight operations including mission planning, execution, and debriefing; safe operation of the aircraft; aircrew resource management; and customer coordination and coordination with the public. An MPO may also be referred to as a sensor operator (SO).

VO. A person acting as a flight-crew member who assists the remote PIC and the person manipulating the controls to see and avoid other air traffic or objects aloft or on the ground. (FAA, 2016) The VO is responsible for supporting the remote PIC in coordinating ground and flight operations including mission planning, execution, and debriefing; safe operation of the aircraft; aircrew resource management; and customer coordination and coordination with the public. A “VO” is sometimes referred to as a “spotter.”

Subject Matter Expert (SME). Supports UAS flight operations by performing duties as a SME for a particular academic, industrial, or technical area. The SME assists in the technical aspects of UAS mission operation and collection (i.e., sensor work). The SME is responsible for assisting the remote PIC in coordinating ground and flight operations including mission planning, execution, and debriefing; safe operation of the aircraft; aircrew resource management; and customer coordination and coordination with the public.

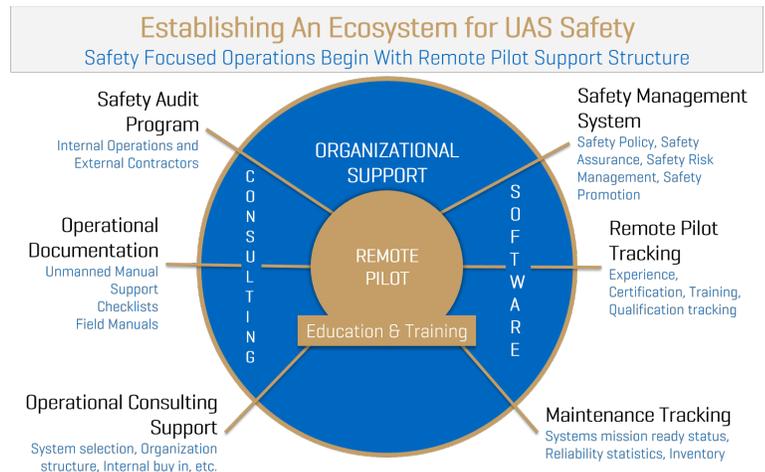
ABOUT UNMANNED SAFETY INSTITUTE ®

Unmanned Safety Institute brings over 30 years of experience in UAS flight safety operations and we have worked around the world delivering our award-winning UAS safety training and certification programs.

Unmanned Safety Institute employs SMEs from varied disciplines including human factors, aeronautics, autonomous technology, safety assurance, and much more.

USI was formed in 2014, and acquired by ARGUS International, Inc., in 2016. We are headquartered in Orlando, FL, with offices in Denver, Cincinnati, and Columbus.

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Calvin Rieb is a Master Instructor for Unmanned Safety Institute® focusing on Safety Management Systems for Unmanned Aircraft Operations. Calvin is also the Vice President of Helicopter & Unmanned Services at PRISM, which is a subsidiary of ARGUS International. Mr. Rieb is a graduate of Embry-Riddle Aeronautical University and a certified Project Management Professional (PMP), who possesses over 14 years of aviation safety management expertise with real world experience in SMS from the DoD and commercial sector. Mr. Rieb has most notably been at the leading front of developing safety systems, safety software applications, documentation and planning for the safe integration of Helicopter & UAS operations for various corporations and government entities.

Mr. Rieb is a rated Army aviator with experience piloting the UH-60 and C-12 aircraft with global deployments. Prior to becoming a pilot Mr. Rieb worked as a UH60 Mechanic and managed the line at a small FBO. FAA Ratings include; Commercial and Instrument for Airplane Single / Multiengine and Helicopter, a Remote Pilot Certificate and a BE200 type rating. Today Mr. Rieb works with a wide array of Helicopter & UAS operators and enjoys flying the C-12 for the Army Guard part-time.