



Virginia Unmanned Systems Commission

Policy/Regulation/Culture

Working Group

Progress & Plans

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Policy/Regulation/Culture Working Group Progress & Plans Approach

- Introduction - Culture
- Background and Context – Current Status
- Policy and Regulatory Environment
- Barriers
- Proposed Mitigation
 - FAA
 - State of Virginia
 - Other
- Call List and Recommendations for Consideration
 - FAA
 - State Legislature
 - Other
- Investments Needed
 - Suggested programs to Educate & Improve Public & Legislator’s Perceptions



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Introduction - Culture

- Public Reaction

- Fascination with technology
- Business potential
- Resistance to changes represented
- Fear

- Familiarity & Acceptance

- Underwater research & salvage operations
- Robotic surgery
- Radio controlled aircraft

Now known as UAS, UAV, RPA, sUA, Drone

- Aerial vehicle popularity has skyrocketed

- 700,000 sales of small systems estimated in 2015 alone – primarily for personal recreational use - > 2 million estimated sold over the last couple of years



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Background & Context – Current Status – Land Systems

- Automation in cars has increased over the last several years and has been popular
- Driverless automobiles remain in the development & test stage - data being collected for inclusion in Interim Report
- Federal oversight is through National Highway Traffic Safety Administration (NHTSA)- states have considerable latitude to regulate how vehicles are operated
- Other potential applications of remotely operated or autonomous land systems are in agriculture and construction

Note that a contract has been awarded to gather data on how other states regulate in all of the domains



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Background & Context – Current Status - Watercraft

- Current growth in this market is primarily military for both unmanned surface vehicles (USV) and unmanned underwater vehicles (UUV). Virginia business and Navy labs have played a major role in this work
- Rolls Royce & EU investing in research aimed at unmanned cargo ships – still on the far horizon. Other commercial applications include underwater mapping, search operations, environmental data gathering, fish counts, oil rig support operations, undersea cable monitoring and repair, harbor security, port patrol and life guard operations
- USV and UUV operations are covered by the US Coast Guard International/Inland Navigation Rules and International Maritime Operations Regulations for Preventing Collisions at Sea. Requirements are the same for manned and unmanned vessels. The Coast Guard official in charge in Virginia– the Captain of the Port of Virginia - has been contacted for inputs specific to the Commonwealth.
- State boating law is under the Dept of Game and Inland Fisheries –They have not had to address UMS to date



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Background & Context – Current Status - Aircraft

- Applications of Unmanned Aircraft Systems (UAS) are numerous from military to civilian applications
- Congress mandated integration of UAS into commercial airspace by September 2015
- Aircraft are regulated by the FAA if operating in civilian airspace
 - Model aircraft weighing less than 55 lbs do not require special permission to operate – covers the majority of the 2 million + vehicles
 - 3 top manufacturers: Parrot, DJI, 3D Robotics
 - Commercial & public operations require special permissions from the FAA
 - 70% of permissions granted by FAA have been for operations of one of the same vehicles available for recreational use
- Autonomous operations – and even beyond line-of-sight (BLOS) operations - in civilian airspace are still very much in the future
- FAA has recently announced its intention to require registration of UAS – including some or all vehicles operated for hobby or recreation purposes
 - A Task Force has been established with a report on their recommendations due Nov 20
 - Expect FAA ruling by the end of the year



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FAA Regulations

- Two categories of FAA approval for operation of a UAS
 - Special airworthiness certificate or exemption under Section 333 of the FAA Modernization and Reform Act of 2012 (Public Law 112-95) for applicants for civil purposes.
 - Certificate of Waiver or Authorization (COA) for applicants for public aircraft. Additionally, in order to fly, the Section 333 certificate holder has typically needed to apply for and receive a COA for a particular block of airspace. This may take from 30-60 days.
- The FAA has recently issued a Blanket 200 ft COA for flights at or below 200 ft
 - Any operator with a Section 333 certificate for aircraft weighing less than 55 pounds may operate in daytime with visual line of sight anywhere in the country except restricted airspace
- Statutory parameters of model aircraft operation are outlined in Section 336 of Public Law 112-95
 - Individuals who fly their aircraft within the scope of the parameters do not require permission to operate their UAS
 - Flights outside the parameters require FAA authorization



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Policy & Regulatory Environment

- Policy Concerns: Safety, Liability, Ethics – common to all
- Water operations
 - Regulations demand a level of safety equivalent to manned operations which means sense and avoid capability will be required for use in commercial waters
 - *Liability ?*
- Land operations
 - Current levels of automation have not attracted concern beyond the safety and liability rules in place for vehicles today.
 - Fully autonomous operations will no doubt bring safety, liability and ethical considerations into focus
 - This will happen “eventually but not soon”
 - Development and testing is underway. 3 states & the District of Columbia have enacted special rules for this testing. Feedback is that these rules discourage testing and therefore limit innovation.



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Policy & Regulatory Environment

- Air operations – lots of concern today
 - Safety
 - Concerns are related to vehicle design & construction and operator capabilities (certification) as well as how these vehicles are operated (air space rules)
 - There have been numerous instances of UAS operating in restricted airspace such as sports arenas, over the White House and in Class B airspace which have served to heighten public awareness and concern.
 - FAA has established a Task Force to consider registration requirements for small UAS.
 - Liability
 - *Researching personal and property liability issues for Unmanned Aircraft Systems*
 - Planned FAA rule on small UAS is silent on liability
 - Operator is subject to legal penalties for operational violations. FAA has issued law enforcement guidance for suspected unauthorized UAS operations.



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Policy & Regulatory Environment

- Air operations – lots of concern today
 - Ethics
 - Concerns stem from how these systems are used. Privacy considerations are the paramount issue.
 - There has been a tendency to want to enact special rules for UAS. 45 states have considered 166 bills related to UAS with 26 states passing legislation and 6 adopting resolutions.
 - Maryland has explicitly preempted counties and municipalities from regulating or prohibiting UAS operations.
 - Virginia has enacted legislation requiring law enforcement officials to acquire a warrant before using UAS to search private property – specifically excludes other applications such as recreational use
 - Many experts believe that current privacy and harassment laws are sufficient to deter and hold operators accountable. UAS just represent another means by which illegal events can occur and do not necessarily need to be treated differently than any other form of surveillance.



Policy/Regulation/Culture Working Group Progress & Plans Barriers to Growth

- Water operations
 - Potential disruption to commercial and recreational activities when testing
 - Regulatory hurdles linked to current international seafaring conventions
- Land operations
 - Non-standard signage, sign maintenance, clear lane striping
 - Premature laws and regulations can slow pace of development and restrict innovation, raise costs and discourage consumers
- Air operations
 - Negative press related to interference with passenger aircraft, privacy and security intrusions
 - Reactive environment - demand for immediate “fixes” through legislation and regulation
 - Difficulty obtaining permission for legitimate operations
 - Lack of standards for certification of vehicles and operators
 - FAA has been slow to publish the rule that would simplify small UAS operations while it appears that they will be quick to implement a rule requiring registration of all UAS of any type
 - Lack of a traffic management regime for the vehicles that the small UAS rule will address
- All operations
 - Insufficient numbers of available workers with appropriate skills
 - Immaturity of technologies that will enable full integration with commercial traffic – particularly for larger vehicles
 - Sense & avoid capabilities, beyond line-of-sight (BLOS) operations (spectrum/lost link considerations), cyber security, certification of vehicles and operators



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Possible Mitigations

- Avoid implementation of policy and regulations before technology has matured
- Before enacting special legislation to protect privacy, determine if existing law can be interpreted to cover UMS
- Focus on how information is used instead of how it is acquired
- Educate the casual recreational user of unmanned systems – educate rather than regulate
- Improve regulatory clarity
- Limit negative public impact when testing - such as road and waterway blockages
- Accelerate release of standards for certification of all classes of UAS
- Offer specialized degree programs in related technical skills in community colleges, 4 year colleges and universities in Virginia
 - Conduct research aimed at solving technical challenges such as sense and avoid, BLOS operations, spectrum management, cyber security and certification
- Recognize the value of industry growth in all aspects of UMS – manufacturing, services, software, governance, security, consumer support, etc
- Offer special liability protection for researchers in all domains (Indemnify R&D ?)



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- FAA
 - Michael Huerta, Administrator, FAA Headquarters
 - Peggy Associate Administrator for Safety, FAA Headquarters
 - Teri Bristol, Chief Operating Office, FAA Headquarters
 - Mark “Hoot” Gibson, Senior Advisor on UAS Integration, FAA Headquarters
 - Earl Lawrence, Director of the UAS Integration Office in the Office of Aviation Safety, FAA Headquarters
- NASA
 - Dr. Bob Pearce, Aeronautics Mission Directorate, Deputy AA, NASA Headquarters
- Amazon
 - Ben Gielow, Senior Manager, Public Policy, Washington, DC
- Google
 - Travis Mason, Project Wing, Washington, DC
 - Ron Barnes, Head of State Legislative Affairs, Washington, DC



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Possible Recommendations*- FAA

***to be turned into talking points once selected**

- Seek certification and licensing authority for certain operations in Virginia
- Seek collaboration between FAA and VA Dept of Aviation on a pilot program aimed at education of casual recreational UAS pilots
- Seek establishment of a pilot program between FAA, AOPA and VA Dept of Aviation to investigate how to coordinate civil and public UAS flights with General Aviation community
- Encourage FAA to accelerate UAS standards development. Failure to establish standards will raise risk and curb investment slowing realization of new business.
- Encourage future rules to be performance-based.
- Encourage investment in research that will facilitate full integration of all classes of UAS into the NAS with BLOS operations
 - Spectrum management, Certification (to include sense and avoid), Cyber Security, Traffic Management



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Possible Recommendations*- Commonwealth of Virginia

- Establish a Permanent Virginia POC for Unmanned Systems
 - Role would be to provide regulatory and process support to industry, academia and the Virginia legislature
 - Consider FOIA exemption to facilitate information sharing with industry
 - Review & Update the Virginia UMS website
- Organize and conduct a vigorous education campaign aimed at making recreational users aware of the airspace restrictions and operational rules governing their devices. Provide registration training if necessary.
- Collection of safety data is essential to development and approval of operational procedures. Devise a mechanism for civil and public operators in Virginia to share data while protecting intellectual property – make data available to the FAA to support UAS safety cases
- Enable partnerships across universities to support tailoring of course work aimed at creation of specialized degrees in fields of interest to UMS industries
- Create a UMS research center with cooperating universities and invite industry partners
- Consider legislation prohibiting municipalities from enacting restrictive ordinances



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Possible Recommendations*- Other

*to be turned into talking points once selected

NASA

- Seek to conduct joint research and demos
- Solicit ideas from NASA

Amazon/Google

- Propose joint venture/demo
- Propose demo in Virginia,
 - Suggest taking advantage of Amazon fulfillment centers in the state
- Solicit ideas from both



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Investments Needed to Change Perceptions Suggestions

- Public relations campaign aimed at balancing negative press with a focus on positive aspects of UMS.
 - Emphasize safety, convenience, cost benefits
 - Talk about UMS activities in Virginia
 - Industry, colleges & universities, VA Test Site, Navy, NASA, Air Force, etc
 - Be consistent with terminology – never use the word “drone”
- Jointly sponsor and publicize demonstrations aimed at familiarizing public with UMS
- Set up a UMS event for the Virginia legislature
 - Include industry and other exhibits
 - Provide presentations
 - Collect data on ongoing UMS activities by district
 - Target individual representatives



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DISCUSSION

Backup Slides FAA Regulations



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 - Certificate of Waiver or Authorization (COA) for applicants for public aircraft. Additionally, in order to fly, the Section 333 certificate holder has typically needed to apply for and receive a COA for a particular block of airspace. This may take from 30-60 days.
- Applicants under Section 333
 - Must specify the kind of operation they wish to perform after which the FAA (after a lengthy 120 plus day period) grants the petitioner an exemption under Section 333 and issues them a set of rules they must abide by. Most of the rules are common to all of the 333 exemption holder
 - No flying over people, daylight only, visual line of sight, flight at 400 feet and below, no operations close to airports etc.
 - Approval is attached to a specific type of vehicle
 - The UAS pilot must also possess, at a minimum, a sport pilot's license issued by the FAA.
- Public operations with a COA must comply with similar rules.



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FAA Regulations

- The FAA has recently issued a Blanket 200 ft COA
- Flights at or below 200 ft with a Section 333 certificate for aircraft weighing less than 55 pounds may operate in daytime with visual line of sight anywhere in the country except restricted airspace.
- The blanket 200 ft COA now allows civil operators who want to use UAS within the limitations of the Blanket COA the ability to start flying much more quickly than before.
- The Blanket 200 ft COA is also available to the six FAA approved Test Sites.



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FAA Regulations

- The following safety guidelines are in place for individuals flying for hobby or recreation
 - Fly below 400 feet and remain clear of obstacles
 - Keep the aircraft within visual line of sight
 - Remain well clear of and do not interfere with manned aircraft operations
 - Don't fly within 5 miles of an airport unless you contact the airport and control tower before flying
 - Don't fly near people or stadiums
 - Don't fly an aircraft that weighs more than 55 lbs
 - Don't be careless or reckless with your unmanned aircraft – you could be fined for endangering people or other aircraft
- Statutory parameters of model aircraft operation are outlined in Section 336 of Public Law 112-95
 - Individuals who fly their aircraft within the scope of the parameters do not require permission to operate their UAS
 - Flights outside the parameters require FAA authorization



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FAA Regulations – Proposed Small UAS Rule

- Operational limitations – vehicle must
 - Weigh less than 55 lbs; operate within visual line of sight only; not operate above any persons not directly involved in the operation; only operate during the day; not exceed a maximum airspeed of 100 mph; not fly at an altitude above 500 feet above ground level; not operate carelessly or recklessly; yield right of way to other aircraft – manned or unmanned.
- Operators must
 - Pass a knowledge test initially and every 24 months thereafter; be vetted by the Transportation Security Administration; obtain an unmanned-aircraft operator's certificate with a small UAS rating; inspect the UAS to ensure that it is in a condition for safe operation;
- FAA airworthiness certification not required if operator has inspected and ensured it is safe for operation.
- Aircraft marking is required – if the aircraft is too small to display markings in standard size, the markings should be displayed in the largest practicable manner.
- The rule establishes a micro-UAS category for 4.4 lbs or less.
- The rule does not apply to model aircraft that satisfy all of the criteria specified under Section 336 of Public Law 112-95 (FAA Modernization and Reform Act of 2012).
- The rule would incorporate a 2012 Act provision that preserves the FAA's enforcement authority to pursue enforcement against model aircraft operators who endanger the safety of the National Airspace System.
- The FAA expects to release the final rule in mid-2016