

Virginia UMS Commission
Recommendations
6/07/2016

This document represents a set of recommendations produced by the Virginia Unmanned Systems (UMS) Commission. Discussion and approval took place at the UMS Commission meeting of June 7, 2016 with the understanding that the approval was with respect to the contents and intent. Edits may be made in the course of preparing the Commission final report for clarity and organization. A point of clarity noted on June 7 is that any lists of organizations given below are to encourage inclusivity and are not intended as proscriptive or limiting to those organizations.

The recommendations are currently organized by work group. IBE – Innovation and Business Environment; MA = Marketing; EDU = Education; and PRC = Policy, Regulatory and Culture

Recommendations:

The Commission recommends initiatives to aggressively increase focus and effectiveness of the development of the UMS industry in Virginia.

IBE-1: Establish a Public/Private Consortium to aggressively increase focus and effectiveness of UMS economic development in Virginia. Establish an ecosystem consisting of a Commonwealth position for sustained leadership to carry the mission forward and improved alignment of other Virginia organizations. The Commission recommends that:

- (1) A senior UMS Advocate position, reporting directly to the Secretary of Technology, should be created with the express mandate of carrying this mission forward and to facilitate coordination across Virginia assets for the benefit of the New Virginia Economy¹, including all organizations suggested below. The Commission also recommends that a UMS Work Group be established led by the UMS Advocate and including the UMS office (defined below), the UMS trade association (see below), Virginia Associate Director for the Mid-Atlantic Aviation Partnership (MAAP), Director of Virginia Tech Transportation Institute (VTTI), and representatives from appropriate cabinet offices. The UMS Work Group should meet regularly to develop and update the Virginia UMS growth strategy, review market developments and opportunity, identify opportunities to leverage all Virginia fund sources for opportunity capture, and prioritize marketing efforts or proposal development.
- (2) A marketing/economic development office (hereafter referred to as the UMS Office) be created focused solely on the nascent UMS industry and to create functional connections between the expertise and deep industry knowledge of our UMS test assets (VTTI and MAAP) and economic development. Economic development is an inherently government function and will conflict with internal business goals if solely held within a university or within a privately funded trade group. An office that possesses the expertise and tools for professional marketing, leveraging all Virginia assets and available economic incentives and the deep industry intelligence resident in the VTTI and MAAP, offers significant opportunity for Virginia.
- (3) The UMS Advocate and the UMS Office should collaborate with a Virginia UMS trade association that is currently emerging. The trade association is expected to bring a unified voice to advocacy efforts, Virginia representation at national and international trade shows, and conferencing or networking events with significant potential to connect entrepreneurs, venture capital, technologists, manufacturers, and end users.

¹ New Virginia Economy, <https://commerce.virginia.gov/media/3501/new-virginia-economy-12052014.pdf>

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Collaboration between this trade association, the Virginia UMS Advocate, and the UMS office, and by extension the other parties to the UMS Work Group, will provide a powerful voice for Virginia.

- (4) The UMS Advocate and the UMS office should facilitate integration of existing incentives and additional incentives targeted at the startup firms that are crucial to this nascent industry. Both financial and non-financial incentives should include vouchers for low to no-cost UMS testing and incubator support leveraging Virginia incubators and a Virginia UAS Commercialization Center of Excellence established in the Virginia fiscal year 2017 budget. The new UMS incentives should be available for UMS firms in the aerial, surface, and maritime domains. Selection criteria should be developed for these incentives considering Virginia residency or relocation, matching funding by other investors, and market viability of the technology under development.

This integrated ecosystem will provide the ability to market and promote the unmanned systems industry, represent the interests of the unmanned systems industry in Virginia before federal, state and local legislators, provide financial and business support to entrepreneurial firms via Virginia's existing incubators and accelerators, and facilitate beneficial connections between the unmanned systems industry, its supply chain, product users, educational and research institutions, and investors through seminars, forums, educational publications and other means.

IBE-2: Establish an Automated Automobile Work Group to evaluate and recommend options for strengthening Virginia's posture in the automated automobile industry. This Work Group should focus on autonomous technology and leverage the work already done in the Commonwealth including the VTTI Smart Road and the Virginia Automated Corridor. Virginia is well postured to attract research and development to the Commonwealth in the absence of regulations or laws that slow the industry. This Work Group should guide efforts in a portfolio that potentially spans improved testing and collaboration facilities (e.g.; the VTTI Smart Village Concept and Virginia Automation Park), improved outreach to the industry, incubating startups, and pilot projects. Members of the Work Group should include Transportation, Technology, VEDP, Virginia start-up companies, Original Equipment Operators (OEMs), the UMS Advocate, and other experts in the field of automation.

IBE-3: Establish University Center/s of Excellence in Robotics At the heart of great industrial centers of technology lies a major university: MIT in Boston, Carnegie-Mellon in Pittsburgh, Stanford in Silicon Valley, etc. These universities have been built up over decades and are the product of concerted individual, private, and public support. The impact of these centers is illustrated by recent decision of Uber to locate its development center for driverless cars in Pittsburgh. This was directly due to the talent available from the National Robotics Engineering Center (NREC), itself an affiliate of Carnegie Mellon. The State of Virginia has an outstanding university system. However we lack a concentrated and focused center of excellence of the caliber needed to attract and anchor an ecosystem in the robotics area. The Commission recommends that Virginia examine the initiatives to establish the Humans and Autonomy Laboratory (HAL) at Duke University and the NREC in Pittsburg and consider an initiative to establish a Virginia center, or possibly three such centers: one for ground robotics, perhaps built around the current VTTI; one for marine robotics, perhaps located in the Hampton Roads area, and one for aerial robotics, perhaps located in Northern Virginia or in the Hampton Roads area. The Commission notes that Virginia possesses no maritime research and test assets equivalent to the automotive and aerial assets represented by VTTI and MAAP. A Hampton Roads based robotic center of excellence offers the opportunity to create significant growth in maritime systems development, testing, and deployment.

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IBE-4: Establish an IT environment within Virginia for the UMS industry. The heart of robust commercial UMS systems demands a robust capability for cyber security, data services, and trustworthy autonomy. The Commission recommends that Virginia (1) provide low-cost data services and infrastructure to Commonwealth users of UMS and commercial activities spanning testing and commercialization of UMS services and (2) establish an Autonomy Commercialization Center of Excellence to address the related challenges of high-reliability, trusted autonomous software/hardware systems and cyber security for UMS. This COE has also been recommended in the Commonwealth of Virginia Cyber Security Commission First Report, August 2015, "Threats and Opportunities" under their recommendation ECON-6 which says in part "Leverage existing resources with the National Institute of Standards and Technology and NASA Wallops to develop the cyber security capabilities for unmanned systems that can help create a new industry in Virginia. Establish a university-based unmanned systems cyber security Center of Excellence to support the workforce and technology development needed for this emerging area."

IBE-5: Accelerate commercial pull for UAS services. Provide a commercial pull for UAS services while improving services to Virginia citizens via one-year dedicated funding to accelerate the use of UAS by the Commonwealth for lifesaving missions and highway construction and assessments, and other infrastructure. The use of UAS to provide search and rescue is practical today and the use of UAS for inspecting transportation infrastructure has already begun in other states. UAS can drastically reduce the cost and time to locate persons in distress, improve the safety of first responders in emergency situations, and can dramatically lower the cost while improving frequency and effectiveness of inspections for bridges and other infrastructure. Use of UAS in Virginia for these services will attract UAS operators, data services, training services, and other related services. Specifically: fund efforts to operationalize the use of UAS by first responders. This will support and expand Virginia-wide the ongoing efforts of the Albemarle County Sheriff's Department, Virginia Department of Emergency Management (VDEM), the Piedmont Virginia Community College, and others to enable routine uses of UAS by first responders in life-saving applications. Likewise bring VDOT and the Virginia Department of Aviation (DOAV) together to explore the benefits of the use of UAS in transportation infrastructure services. This work not only will put UAS to use in very positive and meaningful ways for the public good, it potentially will strengthen the Commonwealth's UMS product and service industries.

IBE-6: Establish a Public/Private Center Dedicated to Certification. The largest single impediment to the growth of the unmanned systems industry today is the lack of a certification and regulatory structure that gives private businesses the incentives to invest with confidence in this area. Type certification of aircraft is necessary for true integration of unmanned systems to occur and to enable efficient use of the technology for challenging applications. There is no place in the United States today where companies can go and receive competent, efficient services and support for the certification of aircraft and development of operator certification requirements. Such a center in Virginia would attract businesses from around the world. With its close proximity to the FAA headquarters in Washington, and with the technical resources of NASA Langley and other groups throughout the Commonwealth, Virginia is well positioned to meet this need. In conjunction with the MAAP, academia, industry, government labs, and in collaboration with the FAA establish a Public/Private Center for Certification to develop these processes and provide the certification services to UMS developers and manufacturers.

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Marketing

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MA-1: Develop, implement, and update a comprehensive marketing strategy. A comprehensive marketing strategy to include use of web sites, interfaces to general and trade press, road shows, trade and “reverse-trade” missions, trade show presence, use of industry days or conferences/summits, cold calls and mailings, and other venues should be developed along with resource estimates for execution. The UMS private-public consortium recommended by IBE-1 should have responsibility for tailoring and implementing the strategy in cooperation with the Office of the Secretary of Technology and local EDA officials.

MA-2: In the near term develop and update specific marketing materials targeted toward several target audiences; air, automotive, and maritime interests. These should be professionally produced, concise, and highlight attractive factors such as our industry friendly policy, regulations, incentives, workforce, infrastructure, geography, proximity to customers, quality of life, and successes.

Education and Workforce

Recommendations

EDU-1: The Commission recommends that in the fall 2016, all universities and community colleges (all higher education institutions) that already have existing academic programs be convened to develop collaborative programs in unmanned systems. This group of higher education individuals should also include industry partners who can provide guidance and streamline the curriculum from community colleges into universities into the workforce. Based on the courses that are already developed, this group should work with the respective agencies to define a clear path for students to gain credit in a degree program at a Virginia community college or university.

EDU-2: Jointly develop Virginia wide standards and curricula. Coordinate development of training curricula for UAS operators for commercial and emergency applications and for UAS maintenance technicians. This should be done in consultation with subject matter experts for application mission training (emergency services, construction, etc.) and in collaboration with the MAAP, DOAV, VDEM, VDOT, consensus-based standards bodies where applicable, and the FAA. As curricula develop, the Commonwealth should reverse map to military training so veterans can come into the field and be hired based on their actual skills/expertise.

EDU-3: Develop an integrated message for our UMS related educational activities. Working with the Secretary of Education, the Secretary of Technology, and the consortium described by recommendation IBE-1, the Virginia STEM Coordinator should solicit information from higher education institutions to develop an integrated description and message concerning Virginia educational capabilities and activities. This message will be provided to marketing efforts and to the educational institution community. The message will be updated as necessary. Consider production of a periodic newsletter that will be distributed to interested parties as well as be posted on the Virginia STEM website and the Virginia Unmanned Systems website.

EDU-4: The Commission recommends that the Commonwealth of Virginia strengthen elementary and secondary education with an eye to expanding existing co-curricular activities, such as robotics and rocketry programs. Seed funding can be obtained through various grant programs to develop a summer enrichment curriculum for grades 4-9.

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Student tuition and corporate sponsors should subsidize the remaining portion of the expenses that the grant does not cover.

Policy and Regulation

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PRC-1: The Commission recommends that the Commonwealth of Virginia, at this time, take no action to establish laws or regulations about the development, testing, or use of unmanned systems. Furthermore, the Commission recommends that the Commonwealth establish a sufficient basis of data to clearly justify action before any legislation is enacted.

The Commission has considered the types of legislation passed in various states, including their impact on achieving the intended objectives as well as their impact on encouraging or stifling innovation. Although there are good intentions motivating the legislative actions, the Commission believes there are not always sufficient supporting data available to justify them. Also, significant concerns have been raised by manufacturers and research institutions about the strong possibility for such actions to stifle innovation given the extremely fast pace of technology development. The Commission has concluded that it is premature for the Commonwealth to establish laws or regulations specific to unmanned systems development, testing, or use.

PRC-2: The Commission recommends that the Commonwealth of Virginia establish a Work Group to work in conjunction with the FAA to reconcile FAA and Commonwealth jurisdictional interests in the airspace.

The Commission anticipates a future when commercial UAS are ubiquitous and it may become necessary to resolve jurisdictional issues between state, local, and federal authorities. The FAA has acknowledged this need in its State and Local Regulation of Unmanned Aircraft Systems (UAS) Fact Sheet². The Commission sees value in the Commonwealth addressing these competing interests before disputes arise and engaging early with the FAA as it addresses these issues. With knowledgeable state representatives working closely with the FAA, Virginia will be on the forefront of the complex federal preemption issues associated with balancing federal authority with regard to air safety and the state authority with regard to privacy, property rights, land use, nuisance, and trespass; and state legislators will be better positioned to make decisions supportive of commercial UAS operations. The Work Group should include expertise from the Office of the Attorney General, state lawmakers and agencies, private industry, UAS and aviation experts, the MAAP, and the DOAV.

PRC-3: Initiate activities to educate the public and legislators regards UMS. Prepare fact sheets to describe the uses of UMS, perception and reality in issues such as privacy and federal airspace regulations, and the economic and other benefits to Virginia citizens. Update and provide these fact sheets annually to Virginia legislators and cabinet officials prior to the legislative session and also provide to the public via the Virginia UMS web site and as input to marketing/public relations efforts.

PRC-4: The Commission recommends that the Commonwealth of Virginia include the promotion of positive public acceptance of unmanned systems in its ongoing and future marketing efforts. Include public acceptance and perceptions in marketing efforts. Unmanned systems by their very nature can become quite controversial with respect to ethics, job security, safety, and privacy. Public opinion towards UAS is being formulated daily in the media based, in many cases, on inaccurate information. Public acceptance of automation in automobiles will be highly

² State and Local Regulation of Unmanned Aircraft Systems (UAS) Fact Sheet, Federal Aviation Administration Office of the Chief Counsel, December 17, 2015, http://www.faa.gov/uas/regulations_policies/media/UAS_Fact_Sheet_Final.pdf

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dependent on confidence in the safety of these systems. Media handling will again be critical in obtaining positive perceptions of these vehicles. It is important that the people of Virginia understand how unmanned systems, when used appropriately, can efficiently, effectively, and safely meet critical public needs.