Drone and Space Law: Let's Fly Wisely

Continuing Legal Education Seminar

AGENDA

July 15, 2015

The Inn at Wise
110 East Main Street
Wise, VA 24293

Register at:
http://www.courtbar.org/cle/

Registration Fee: $25

CLE Credit: 6.5 live hours

10:00 United States Senator Mark R. Warner *(via skype)*

10:10 Governor Terry McAuliffe *(via video)*

10:15 Space Law Panel
M. Bruce Harper, Williams Mullen
Jim Dunstan, Mobius Legal Group, PLLC

11:15 Col. Dawn Zoldi, USAF

12:00 Lunch and Keynote Speaker
Capt. Jon Greene

1:00 Virginia Drone Law Panel
Office of the Attorney General
G. Timothy Oksman, Moderator
Margaret O'Shea, State and Federal Laws
Linda Bryant, Drone Use in Law Enforcement Carolyn Juran, Board of Pharmacy
Del. Scott Surovell, Virginia House of Delegates

2:45 Patrick Cushing, Williams Mullen

3:00 National Drone Law Panel
Kevin Pomfret, Williams Mullen
Michael E. Sievers, Hunton and Williams
Douglas Kenyon, Hunton and Williams

4:00 Comparative Law Panel
Diana Marina Cooper, Canadian Law
Matt Sweeny, New Zealand Law

5:00 Business Opportunities Panel
Col. Jerry Wright, USAF (ret)
Shyam Chidamber
Liz Povar

6:00 Closing Remarks
Honorable Karen Jackson, Secretary of Technology
Honorable Brian Moran, Secretary of Public Safety and Homeland Security

6:30 Reception featuring entertainment by The Weight.

**Agenda subject to change.*

Virginia MCLE Board

CERTIFICATION OF ATTENDANCE (FORM 2)

MCLE requirement pursuant to Paragraph 17, of Section IV, Part Six, Rules of the Supreme Court of Virginia and the MCLE Board Regulations.

INSTRUCTIONS

Certify Your Attendance Online at www.vsb.org see Member Login

Complete this Certification. Retain for two years.

MCLE Compliance Deadline - October 31. MCLE Reporting Deadline - December 15.

A $100 fee will be assessed for failure to comply with either deadline.

Member Name: _____ **VSB Member Number:** _____

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City **State** **Zip**

Course ID Number: **NCC1810**

Sponsor: **Wise County & City of Norton Circuit Court Clerk**

Course/Program Title: **Drone and Space Law: Let's Fly Wisely**

Live Interactive * **CLE Credits (Ethics Credits):** **6.5** **(0.0)**

Date Completed:_____ **Location:** _____

By my signature below I certify

___ I attended a total of _____ (hrs/mins) of **approved CLE**, of which (_____) (hrs/mins) were in **approved Ethics**. Credit is awarded for actual time in attendance (0.5 hr. minimum) rounded to the nearest half hour. (Example: 1hr 15min = 1.5hr)

___ The sessions I am claiming had written instructional materials to cover the subject.

___ I participated in this program in a setting physically suitable to the course.

___ I was given the opportunity to participate in discussions with other attendees and/or the presenter.

___ I understand I may not receive credit for any course/segment which is not materially different in substance than a course/segment for which credit has been previously given during the same completion period or the completion period immediately prior.

___ I understand that a materially false statement shall be subject to appropriate disciplinary action.

* NOTE: A maximum of 8.0 hours from pre-recorded courses may be applied to meet your yearly MCLE requirement. Minimum of 4.0 hours from live interactive courses required.

_____ Date _____ Signature

Questions? Contact the MCLE Department at (804) 775-0577 or E-mail questions to mcle@vsb.org

If not certified online, this form may be mailed

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[Office Use Only: Live]

Space Law:
At Home and Abroad

Drone and Space Law: Let's Fly Wisely
Continuing Legal Education Seminar

M. Bruce Harper, Partner, Williams Mullen

The Inn at Wise, Wise, Virginia
July 15, 2015

WILLIAMS MULLEN

Agenda

- > **Introduction**
- > **International Space Law**
- > **United States National Space Law**
- > **Virginia Space Law**
- > **Questions**

<u>Please note</u>: This presentation contains general, condensed summaries of actual legal matters, statutes and opinions for information purposes. It is not meant to be and should not be construed as legal advice. Individuals with particular needs on specific issues should retain the services of competent counsel.

Introduction

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Some Policy Themes

> **These policy interests influence the legal environment at all levels:**

- The preservation and maximizing of space resources, including limited availability of orbits.
- The management of risk and liability.
- The promotion of consistency in practice and expectation.
- The promotion of the peaceful use of space.

International Space Law

Practices or rules governing relationships between nations

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BACKGROUND

> **International Conventions or Treaties:**
  - An agreement between two or more nations.
  - Both (substantive) law and contract.
  - Requires consent, constitutional compliance.
  - Generally considered binding, within the scope of its terms.

> **Customary International Law:**
  - General practices accepted as law: established by (i) state practice, or (ii) subjective acceptance of an obligation.

> **General Principles of Law recognized by civilized nations.**

> **Judicial decisions.**

Statute of the International Tribunal art. 38

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Treaties

- **The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, Jan. 27, 1967,**

  18 UST 2410, 610 UNTS 205 (the "Outer Space Treaty").
- **The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Apr. 22, 1968,**

  19 UST 7570, 672 UNTS 119 (the "Rescue Agreement").
- **The Convention on International Liability for Damage Caused by Space Objects, March 29, 1972,**

  24 UST 2389, 961 UNTS 187 (the "Liability Convention").
- **The Convention on Registration of Objects Launched into Outer Space, Jan. 14, 1975,**

  28 UST 695, 1023 UNTS 15 (the "Registration Convention").
- **The Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 18, 1984,**

  18 ILM 1434, 1363 UNTS 3 (the "Moon Agreement").

Outer Space Treaty

- The exploration and use of outer space shall be carried out for the benefit and in the interests of all countries and shall be the province of all mankind;
- Outer space shall be free for exploration and use by all States;
- Outer space is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means;
- States shall not place nuclear weapons or other weapons of mass destruction in orbit or on celestial bodies or station them in outer space in any other manner;
- The Moon and other celestial bodies shall be used exclusively for peaceful purposes;
- Astronauts shall be regarded as the envoys of mankind;
- States shall be responsible for national space activities whether carried out by governmental or non-governmental entities;
- States shall be liable for damage caused by their space objects; and
- States shall avoid harmful contamination of space and celestial bodies.

Rescue Agreement

> **Expands on portions of articles 5 and 8 of the Outer Space Treaty.**

> **States shall take all possible steps to rescue and assist astronauts in distress and promptly return them to the launching State, and that States shall, upon request, provide assistance to launching States in recovering space objects that return to Earth outside the territory of the launching State.**

Liability Convention

- **Expands on article 7 of the Outer Space Treaty.**
- **Provides that a launching State shall be liable for compensation for damage caused by its space objects on the surface of the Earth or to aircraft, and liable for damage due to its faults in space.**
- **Provides for procedures for the settlement of claims for damages.**

Registration Convention

- **Provides that member States conducting space launches are to provide the United Nations with information on their launchings.**
- **A registry of launchings has been maintained by the Secretary General since 1962.**
  - Approximately 93.5% of functional space objects (satellites, probes/landers, manned spacecraft, space station components) have been registered.
  - About: http://www.unoosa.org/oosa/en/SORegister/index.html
  - Search: http://www.unoosa.org/oosa/showSearch.do
- **Information from member States is published.**
- **Includes intergovernmental organizations that are parties to the Convention, such as the European Space Agency.**

Moon Agreement

- **Reaffirms and elaborates on various provisions of the Outer Space Treaty, with respect to the Moon and other celestial bodies.**
- **Provides that these bodies should be used exclusively for peaceful purposes, without disruption of their environments.**
  - The Moon and its natural resources are the common heritage of mankind, and that an international regime should be established to govern the exploitation of any Moon resources when such exploitation is about to become feasible.
  - Benefits derived from Moon resources are intended to be equitably shared.
- **Provides that the United Nations should be informed of the location and purpose of any station established on these bodies.**

Moon Agreement

- While the United States is a signatory to the Outer Space Treaty, the Rescue Agreement, the Liability Convention, and the Registration Convention, it is not a signatory to Moon Agreement. (See Committee on the Peaceful Uses of Outer Space Report: "Status of International Agreements relating to activities in outer space as of 1 January 2015").
- "Lunar material retrieved from the moon during the Apollo Program is U.S. Government Property." NASA Office of Inspector General, Rep. No. IG-12-007 (Dec. 8, 2011).
- See H.R. 1508, 114th Cong. § 51301 (2015)(Space Resource Exploration and Utilization Act of 2015)("'space resource' means a natural resource of any kind found in situ in outer space.")

UN General Assembly Declarations

- **The Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space. G.A. Res. 1962 (XVIII)(Dec. 13, 1963)**
- **The Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting. G.A. Res. 37/92 (Dec. 10, 1982)**
- **The Principles Relating to Remote Sensing of the Earth from Outer Space. G.A. Res. 41/65 (Dec. 3, 1986)**
- **The Principles Relevant to the Use of Nuclear Power Sources in Outer Space. G.A. Res. 47/68 (Dec. 14, 1992)**
- **The Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries G.A. Res. 51/122 (Dec. 13, 1996)**

United Nations

> **Committee on the Peaceful Uses of Outer Space (COPUOS):**
  - Supported by United Nations Office for Outer Space Affairs (UNOOSA).
  - Issues various reports and other documents.
  - http://www.unoosa.org/oosa/en/COPUOS/copuos.html

> **International Telecommunication Union (ITU):**
  - Specialized agency for information and communication technologies (ICTs). The ITU allocates radio spectrum and satellite orbits.
  - http://www.itu.int/en/Pages/default.aspx

> **Conference on Disarmament:**
  - Militarization of Outer Space
  - http://www.unog.ch/disarmament

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United Nations – COPUOS

> **Report of the Legal Subcommittee on its fifty-third session:**

"104. The Subcommittee agreed that capacity-building, training and education in space law were of paramount importance to national, regional and international efforts to further develop the practical aspects of space science and technology, especially in developing countries, and to increase knowledge of the legal framework within which space activities were carried out. It was emphasized that the Subcommittee had an important role to play in that regard."

United Nations – ITU

> **193 countries**

> **Equitable allocation of geostationary orbits: "radio frequencies and any associated orbits, including the geostationary-satellite orbit, are limited national resources and that they must be used rationally, efficiently and economically… so that countries or groups of countries may have equitable access…" ITU Constitution, ch. VI, art. 44.**

> **ITU Process:**

- Allocation of frequency bands to specific telecommunication services by ITU World Radio Conferences.
- Upon government member application, allotment of orbital positions or slots.
- The government member (e.g., Federal Communications Commission) then coordinates with its domestic users, and makes the assignment.

United Nations – ITU

> **Developing countries complained:**

– The “first-come first-served” concept restricts and sometimes prevents access to and use of certain frequency bands and orbit positions.

– A relative disadvantage for developing countries in coordination negotiations “due to various reasons such as lack of resources and expertise.”

> **Developed countries complained:**

– Differences in consistency of application of the Radio Regulations.

– The submitting of “paper” satellites that restricts access options.

See ITU Resolution 80 (WRC-97), Due diligence in applying the principles embodied in the Constitution (Geneva 1997)

https://www.itu.int/dms_pub/itu-r/oth/0c/0a/R0C0A00000A0031PDFE.pdf

United States National Space Law

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Background

> **Domestic space law:**
  - Largely, but not entirely statutory.
  - Typically directed to specific policy interests, as opposed to omnibus legislation - often employs familiar models.
  - Often lagging technological developments.

> **Liability:**
  - Astronauts and heirs unable to sue under the Federal Tort Claims Act, though suits had been brought against government contractors.
  - Government contractor defense: Boyle v. United Technologies Corp., 487 U.S. 500 (1988).
  - Government likely to settle .

> **Overview of Selected U.S. Space Laws**

Selected U.S. Space Laws

- **The National Aeronautics and Space Act**
  - Established NASA and governs the conduct of the national civilian space program.
- **The Commercial Space Launch Act (CSLA)**
  - Designated the Department of Transportation as responsible agency for commercial space flight; established the commercial liability scheme.
- **The Commercial Space Act**
  - Extended the CSLA to reentry in 1988.
- **The Land Remote Sensing Policy Act**
  - Land remote sensing programs (LANDSAT).

Title 51, United States Code

> **The various existing laws relating to national and commercial space were restated into Title 51 (Pub. Law 111-314, Dec. 18, 2010).**

See 51 U.S.C. §§ 10101, et seq.

> **The restatement did not create new law or change the meaning or effect of existing laws. Instead, it was intended as an improvement in organization and the correction of certain ambiguities, contradictions, and other imperfections.**

See http://uscode.house.gov/codification/t51/index.html

Title 51, United States Code

> **General organization:**

- The National Aeronautics and Space Act (Subtitles I–IV)
- The Commercial Space Launch Act (Subtitle V)
- The Land Remote Sensing Policy Act (Subtitle VI)
- Subtitle VII – Access to Space
  - Use of Space Shuttle or Alternatives (Ch. 701)
  - Shuttle Pricing for Commercial and Foreign Users (Ch. 703)
  - Human Space Flight Independent Investigation Commission (Ch. 707)
  - International Space Station (Ch. 709)
  - Near-Earth Objects (Ch. 711)

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National Aeronautics and Space Act

Source: NASA

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NASA: Policy and Purposes

a) **Devotion of space activities to peaceful purposes for benefit of all**
b) **Aeronautical and space activities for welfare and security of United States**
c) **Commercial use of space**
d) **Objectives of aeronautical and space activities:**
   1. The expansion of human knowledge
   2. The improvement of… aeronautical and space vehicles
   3. The development and operation of [space] vehicles
   4. The establishment of long-range studies of… the problems involved in the utilization of aeronautical and space activities
   5. The preservation of the role of the United States as a leader in aeronautical and space science and technology
   6. The making available to… national defense of discoveries that have military value or significance
   7. Cooperation… with other nations

NASA: Policy and Purposes

d) Objectives of aeronautical and space activities, *continued*:

8. The most effective utilization of the scientific and engineering resources of the United States…
9. The preservation of the United States preeminent position in aeronautics and space… manufacturing processes.

e) Ground propulsion systems research and development…so as to contribute to the objectives of developing energy and petroleum-conserving ground propulsion systems, and of minimizing the environmental degradation

f) Bioengineering research, development, and demonstration

g) Warning and mitigation of potential hazards of near-earth objects

51 U.S.C. § 20102

NASA: Contracting

- **Procurement: 10 U.S.C. § 2302**
  - NASA FAR Supplement § **1801.104:** "The NFS applies to all acquisitions as defined in **FAR Part 2** except those expressly excluded by the FAR or this regulation."
- **Grants: 31 U.S.C. § 6304**
- **Cooperative Agreements: 31 U.S.C. § 6305**
  - Transfer a thing of value to the State, local government, or other recipient to carry out a public purpose of support or stimulation authorized by a law of the United States instead of acquiring (by purchase, lease, or barter) property or services for the direct benefit or use of the United States Government
- **Cooperative Research and Development Agreements: 15 U.S.C. § 3710, et seq.**
- **Space Act Agreements: 51 U.S.C. § 20113(e)**
  - "(e) …the Administration is authorized,… to enter into and perform… *other transactions* as may be necessary in the conduct of its work…"

NASA: Seal and Insignia

> **Use governed by 14 C.F.R. § 122.**
  - *"These images may not be used by persons who are not NASA employees or on products (including Web pages) that are not NASA sponsored."*

> **Violations:**
  - NASA Seal: Any person who uses the NASA Seal in a manner other than as authorized in this subpart shall be subject to the provisions of Title 18 U.S.C. 1017.
  - NASA Insignia, NASA Logotype, and NASA Program Identifiers: Any person who uses the NASA Insignia, NASA Logotype, or NASA Program Identifier in a manner other than as authorized in this subpart shall be subject to the provisions of title 18 U.S.C. 701.

14 C.F.R. § 1221.115

Commercial Space Launch Act

Source: NASA.

CSLA: Policy and Purposes

a) Findings. - Congress finds that:

1. the peaceful uses of outer space continue to be of great value and to offer benefits to all mankind;
2. private applications of space technology have achieved a significant level of commercial and economic activity and offer the potential for growth in the future, particularly in the United States;

…

5. the development of commercial launch vehicles, reentry vehicles, and associated services would enable the United States to retain its competitive position internationally, contributing to the national interest and economic well-being of the United States;

CSLA: Policy and Purposes

b) Purposes. – The purposes of this chapter are:

1. To promote economic growth and entrepreneurial activity through use of the space environment for peaceful purpose;

…

3. to provide that the Secretary of Transportation is to oversee and coordinate the conduct of commercial launch and reentry operations, issue permits and commercial licenses and transfer commercial licenses authorizing those operations, and protect the public health and safety, safety of property, and national security and foreign policy interests of the United States;

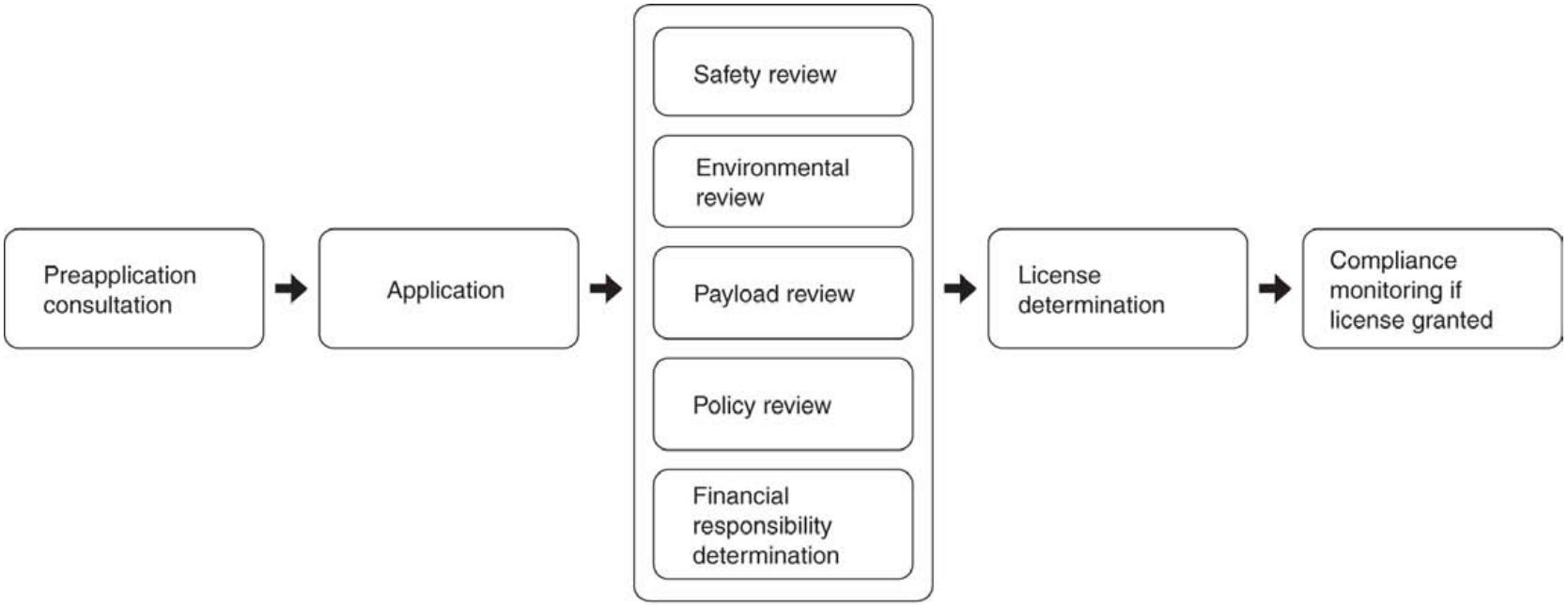
51 U.S.C. § 50901

CSLA: FAA License Types

> **FAA oversight includes four types of licenses:**
  - A launch license (for expendable launch vehicles)
  - A reusable launch vehicle mission license
  - A reentry license
  - A launch or reentry site operator license

51 U.S.C. § 50904(a)

CSLA: FAA Licensing Process



Source: GAO presentation of FAA information.

GAO, Commercial Space Transportation: Industry Trends , Government Challenges, and International Competitiveness Issues, GAO-12-836T (Washington, D.C. June 20, 2012)

CSLA: Conventional Risk Structure

- **(First tier) liability insurance to compensate for the Maximum Probable Loss (MPL) from claims by:**
  - third parties for death, bodily injury, or property damage - up to $500M or reasonably available.
  - the U.S. Government for damage or loss to Government property - up to $100M or reasonably available.

51 U.S.C. § 50914(a)

- **Reciprocal waiver of claims with contractors and customers for property damage or loss, or for personal injury… or death…"**

51 U.S.C. § 50914(b)

- **(Second tier) U.S. Government to pay successful claims of third parties to the extent more than the above insurance, but not more than $1.5B**

51 U.S.C. § 50915

- **(Third tier) reverts to the party at fault.**

CSLA: Conventional Risk Structure

> **Summary of the three tiers of risk management:**

- First Tier: FAA calculates a maximum probable loss (MPL) for the launch provider to insure (capped at $500M) to protect uninvolved third parties and government property (capped at $100M).
- Second Tier: Subject to appropriation, U.S. Government covers the difference between the MPL and $1.5B.
- Third Tier: Claims beyond the Second Tier are the responsibility of the launch provider or other liable party.

CSLA: Maximum Probable Loss

> **14 C.F.R. § 440.7 Determination of maximum probable loss.**

- The FAA will determine the maximum probable loss (MPL) from covered claims by a third party for bodily injury or property damage, and the United States, its agencies, and its contractors and subcontractors for covered property damage or loss, resulting from a permitted or licensed activity…
- The FAA issues its determination of maximum probable loss no later than ninety days after a licensee or permittee has requested a determination and submitted all information required by the FAA… The FAA will consult with Federal agencies that are involved in, or whose personnel or property are exposed to risk of damage or loss…
- Appendix A of this part contains information requirements for obtaining a maximum probable loss determination…

CSLA: Reciprocal Waivers

- **The CSLA reciprocal waiver codified a common commercial practice:**
  - Limit the universe of claims.
  - Avoid the need for duplicate insurance coverage.
- **The reciprocal waiver of claims is required for licensee's contractors and subcontractors, each customer and each of the customer's contractors and subcontractors, and under which each party waives and releases claims against all the other parties to the waiver and agrees to assume financial responsibility for property damage it sustains and for bodily injury or property damage sustained by its own employees. 14 C.F.R. § 440.17(b)**
- **Standard waiver forms are provided. 14 C.F.R. § 440.17(c)**

CSLA: Reciprocal Waivers

- **Not generally considered as extending to gross negligence. Martin Marietta Corp. v. Int'l Telecomm. Satellite Org., 991 F.2d 94, 100 (4th Cir. 1993)**
- **Not generally considered as preventing contractual rights and obligations. Commercial Space Launch Act Amendments 1998, Report of the Senate Comm. on Commerce, Sci., and Transp. on H.R. 4399, S. Rep. No. 100-593 (Oct. 7, 1988), at 14.**

Other Considerations

- **Historically, most launches before the CSLA were intensely Federal - CSLA introduced an additional risk structure, recognizing advance of private payloads and private launch service providers.**
- **A classic CSLA model is a private satellite owner engaged with a private launcher at a private spaceport.**
- **However, many launches diverge from this model:**
  - Private use of a Federal ranges
  - Federal acquisition of commercial launch services ("Except as otherwise provided in this section, the Federal Government shall acquire space transportation services from United States commercial providers…" 51 U.S.C. § 50131)

Other Considerations

- **Statutory authority for indemnification of conventional government contractors has been provided to various agencies:**
  - Department of Defense (Pub. L. 85-804)
  - NASA(Space Act § 308, and Pub. L. 85-804)
- **Pub. L. 85-804 indemnification generally requires some national defense function or aspect, or risks that are unusually hazardous (or nuclear.)**
- **Otherwise, Federal agencies may not agree to open-ended indemnification clauses because they can violate the Antideficiency Act, 31 U.S.C. § 1341, and the Adequacy of Appropriations Act, 41 U.S.C. § 11 (See Hercules, Inc. v. United States, 516 U.S. 417 (1996)**

Other Considerations

Federal Agency	Type of Launch	Risk Scheme	Notes
DoD			
	National Defense	Pub. L. 85-804	Indemnification may be available under FAR 52.250
	Commercial (Gov't provides services to a private user.)	Commercial Space Operations Support Agreement	Indemnification of the U.S. Gov't by the user and a CSLA-like scheme.
NASA			
	Civil (for National Defense)	Pub. L. 85-804	Indemnification may be available under NASA FAR Supplement 1850.104
	Civil	Nat'l Space Act (Specific cross waiver for ISS activities)	Indemnification may be available under the National Space Act, but not uniformly – can include aspects of a CSLA-like waiver scheme, but with some NASA specific differences
	Commercial	CSLA	Note ISS Specific cross waiver
DHS: Anti-Terrorism			
		Pub. L. 85-804	Indemnification may be available under FAR 52.250
		SAFETY Act	Several forms of third-party liability protection available

Other Considerations

"52.250-1 -- Indemnification Under Public Law 85-804.

As prescribed in 50.104-4, insert the following clause:

Indemnification Under Public Law 85-804 (Apr 1984)

…

b) Under Public Law 85-804 (50 U.S.C 1431-1435) and Executive Order 10789, as amended, and regardless of any other provisions of this contract, the Government shall, subject to the limitations contained in the other paragraphs of this clause, indemnify the Contractor against --

1. Claims (including reasonable expenses of litigation or settlement) by third persons (including employees of the Contractor) for death; personal injury; or loss of, damage to, or loss of use of property;
2. Loss of, damage to, or loss of use of Contractor property, excluding loss of profit; and
3. Loss of, damage to, or loss of use of Government property, excluding loss of profit."

Other Considerations

"52.250-1 -- Indemnification Under Public Law 85-804.

…

c) This indemnification applies only to the extent that the claim, loss, or damage

1. Arises out of or results from a risk defined in this contract as unusually hazardous or nuclear and
2. Is not compensated for by insurance or otherwise.

Any such claim, loss, or damage, to the extent that it is within the deductible amounts of the Contractor's insurance, is not covered under this clause. If insurance coverage or other financial protection in effect on the date the approving official authorizes use of this clause is reduced, the Government's liability under this clause shall not increase as a result."

Other Considerations

"52.250-1 -- Indemnification Under Public Law 85-804.

…

d) When the claim, loss, or damage is caused by willful misconduct or lack of good faith on the part of any of the Contractor's principal officials, the Contractor shall not be indemnified for --

1. Government claims against the Contractor (other than those arising through subrogation); or
2. Loss or damage affecting the Contractor's property."

Other Considerations

"52.250-1 -- Indemnification Under Public Law 85-804.

…

e) With the Contracting Officer's prior written approval, the Contractor may, in any subcontract under this contract, indemnify the subcontractor against any risk defined in this contract as unusually hazardous or nuclear. This indemnification shall provide, between the Contractor and the subcontractor, the same rights and duties, and the same provisions for notice, furnishing of evidence or proof, and Government settlement or defense of claims as this clause provides. The Contracting Officer may also approve indemnification of subcontractors at any lower tier, under the same terms and conditions. The Government shall indemnify the Contractor against liability to subcontractors incurred under subcontract provisions approved by the Contracting Officer."

Other Considerations

- **Space flight participants waive claims against the U.S. Government (14 C.F.R. § 460.49), but are not required to waive claims against the launch provider.**
- **Informed consent is required. 14 C.F.R. § 460.45**
- **Space flight participants are excluded from U.S. Government coverage in the Second Tier. 51 U.S.C. § 50915(a)**
- **Virginia, Colorado, Florida, New Mexico, Texas, and California have sought to protect launch providers from liability to space flight participants. See, e.g., VA Code §§ 8.01-227.8-.10 (2007).**

Virginia Space Law

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Virginia Legislation

> **Introduction:**

- Virginia Commercial Space Flight Authority Act of 1995, VA Code §§ 2.2-2201, et seq.
- The Spaceport Liability and immunity Act of 2007, VA Code §§ 8.01-227.8, et seq.
- The Zero G Zero Tax Act of 2008, VA Code §§ 58.1-322, 58.1-402

VA Comm. Space Flight Authority Act

> **A political subdivision of the Commonwealth, to "… promote industrial and economic development through the development and promotion of the commercial space flight industry."**

VA Code § 2.2-2202

> **"[G]overned by a board of directors consisting of nine members, two of whom shall be the Secretary of Transportation and the Director of the Virginia Department of Aviation or their respective designees. The remaining seven members shall be appointed by the Governor…"**

VA Code § 2.2-2203

VA Comm. Space Flight Authority Act

> **Powers include: to acquire property, improve property, charge fees, sue and be sued, borrow funds, issue bonds, provide services, etc.**

VA Code § 2.2-2204

VA Comm. Space Flight Authority Act

> **"House Bill 813 authorized $9.5 million in funding each year to VCSFA from the Transportation Trust Fund for operations, personnel, site maintenance and infrastructure. The funding is committed for the five years spanning FY2012 to FY2016."**

VA Comm. Space Flight Authority, Strategic Plan 2012-2017, 9, Dec. 1, 2012

Va Comm. Space Flight Authority Act

- **Mid Atlantic Regional Spaceport facilities are located within a foreign trade zone, which permits an exemption from import duties when importing equipment for the purposes of launching.**
- **Since 1997, certain property used for spaceport activities (directed or sponsored at a VCSFA facility) can qualify as a Commercial and Industrial exemption from sales tax. Authority. VA Code § 58.1-609.3(13)**

The Spaceport Liability and Immunity Act

"A. Except as provided in subsection B, a spaceflight entity is not liable for a participant injury resulting from the risks of spaceflight activities, provided that the participant has been informed of the risks of spaceflight activities as required by federal law pursuant to federal law and this article, and the participant has given his informed consent that he is voluntarily participating in spaceflight activities after having been informed of the risks of those activities as required by federal law and this article. …"

VA Code § 8.01-227.9

The Spaceport Liability and Immunity Act

"B. Nothing in subsection A shall prevent or limit the liability of a spaceflight entity if the spaceflight entity does either of the following:

1. Commits an act or omission that constitutes gross negligence evidencing willful or wanton disregard for the safety of the participant, and that act or omission proximately causes a participant injury; or
2. Intentionally causes a participant injury. "

VA Code § 8.01-227.9

The Spaceport Liability and Immunity Act

"WARNING AND ACKNOWLEDGEMENT: I understand and acknowledge that, under Virginia law, there is no civil liability for bodily injury, including death, emotional injury, or property damage sustained by a participant in space flight activities provided by a space flight entity if such injury or damage results from the risks of the space flight activity. I have given my informed consent to participate in space flight activities after receiving a description of the risks of space flight activities as required by federal law pursuant to 49 U.S.C. § 70105 and 14 C.F.R. § 460.45. The consent that I have given acknowledges that the risks of space flight activities include, but are not limited to, risks of bodily injury, including death, emotional injury, and property damage. I understand and acknowledge that I am participating in space flight activities at my own risk. I have been given the opportunity to consult with an attorney before signing this statement.“

VA Code § 8.01-227.10

Virginia Zero G Zero Tax Act

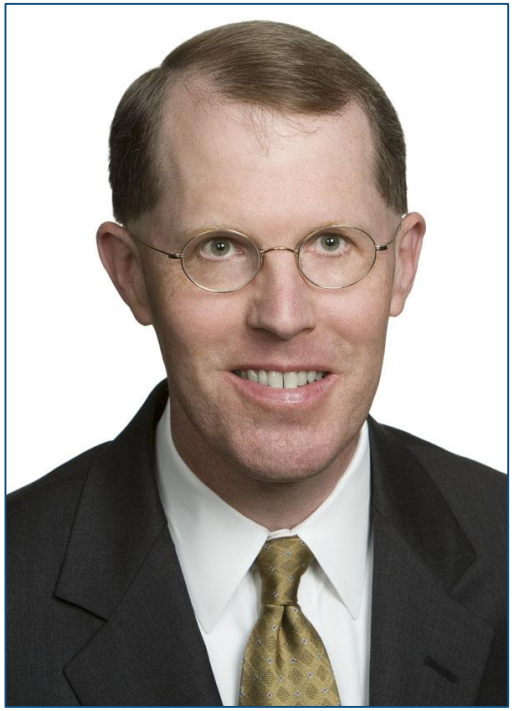
- **Provides an exemption from state income taxes for space transportation business in Virginia with the intent to either launch payloads from MARS or conduct space flight training:**
  - (33) or (22) "… any gain recognized from the sale of launch services to space flight participants, as defined in 49 U.S.C. § 70102, or launch services intended to provide individuals the training or experience of a launch, without performing an actual launch. To qualify… launch services must be performed in Virginia or originate from an airport or spaceport in Virginia."
  - (34) or (23) "… any gain recognized as a result of resupply services contracts for delivering payload, as defined in 49 U.S.C. § 70102, entered into with the Commercial Orbital Transportation Services division of the National Aeronautics and Space Administration… and launched from an airport or spaceport in Virginia."

VA Code §§ 58.1-322, 58.1-402

Questions?

WILLIAMS MULLEN

Presenter



M. Bruce Harper
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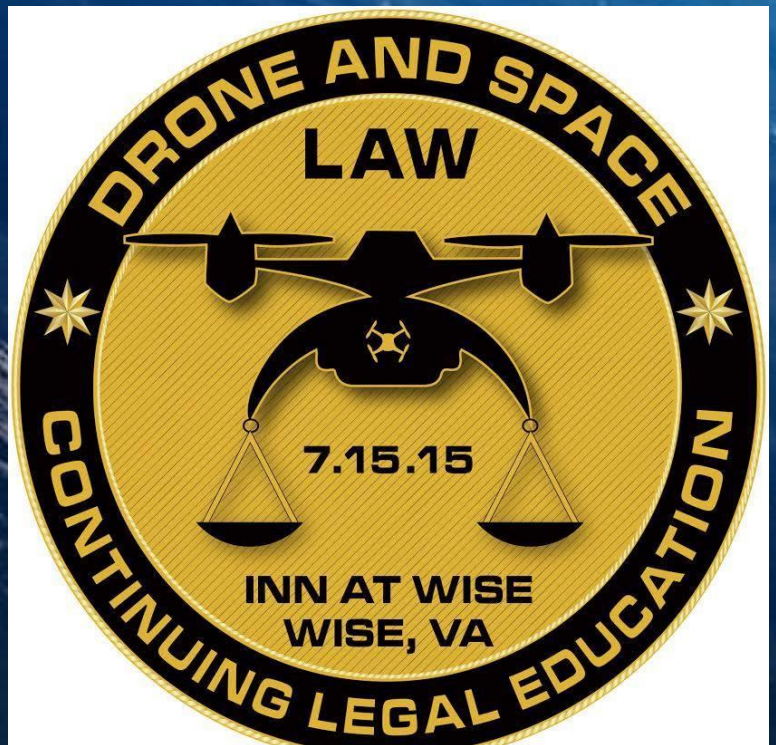
WILLIAMS MULLEN

Where Does Outer Space Begin?

James E. Dunstan

Mobius Legal Group, PLLC



Are We In Space?

Of Course. Earthrise from Apollo 8

DRONE AND SPACE LAW
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Are We In Space?

Sure. The view from Geostationary Orbit

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How about here?

Nope. We're "only" 100,000 feet (30 km) up in a JP Aerospace balloon.

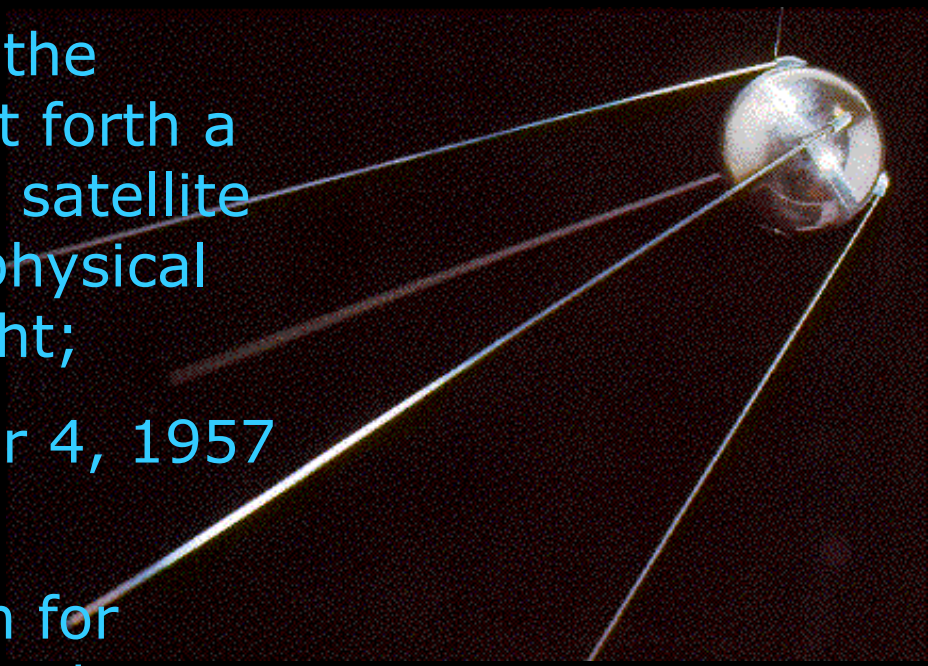
Why is it important to determine where space begins?

Completely different legal regimes:

- Airspace is controlled and regulated by individual countries (and to a lesser extent by international agreements);
- Concept of free overflight applies to space;
- Liability regimes different as between air and space law.

How was Free Overflight established?

- In NSC-5520, May 20, 1955, the Eisenhower administration set forth a plan to orbit a small scientific satellite during the International Geophysical Year to establish free overflight;
- Sputnik was launched October 4, 1957 by the Soviet Union;
- USSR did not seek permission for overflight from countries Sputnik passed over and no one objected.



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The Freedom to Use Outer Space Embodied in Four Major Treaties

(a) The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (the "Outer Space Treaty" or "OST"), adopted by the General Assembly in its resolution 2222 (XXI), opened for signature on 27 January 1967, entered into force on 10 October 1967;

(b) The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (the "Rescue Agreement"), adopted by the General Assembly in its resolution 2345 (XXII), opened for signature on 22 April 1968, entered into force on 3 December 1968;

The Freedom to Use Outer Space Embodied in Four Major Treaties

(c) The Convention on International Liability for Damage Caused by Space Objects (the "Liability Convention"), adopted by the General Assembly in its resolution 2777 (XXVI), opened for signature on 29 March 1972, entered into force on 1 September 1972;

(d) The Convention on Registration of Objects Launched into Outer Space (the "Registration Convention"), adopted by the General Assembly in its resolution 3235 (XXIX), opened for signature on 14 January 1975, entered into force on 15 September 1976.

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The Freedom to Use Outer Space Embodied in Four Major Treaties

- OST, Article I: "outer space… shall be free for exploration and use";
- OST, Article II: "Outer space, including the Moon and other celestial bodies, shall be free for exploration and use by all States … and there shall be free access to all areas of celestial bodies."
- OST, Article IX: "use of outer space" shall be conducted without "harmful interference" to other parties;
- Rescue Agreement, Article II: "If, owing to accident, distress, emergency or unintended landing, the personnel of a spacecraft land in territory under the jurisdiction of a Contracting Party, it shall immediately take all possible steps to rescue them and render them all necessary assistance."

Liability Regime For Space

- Liability Convention, Article II: "A launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the Earth or to aircraft in flight;"
- Liability Convention, Article III: "In the event of damage being caused elsewhere than on the surface of the Earth to a space object of one launching State or to persons or property on board such a space object by a space object of another launching State, the latter shall be liable only if the damage is due to its fault or the fault of persons for whom it is responsible."

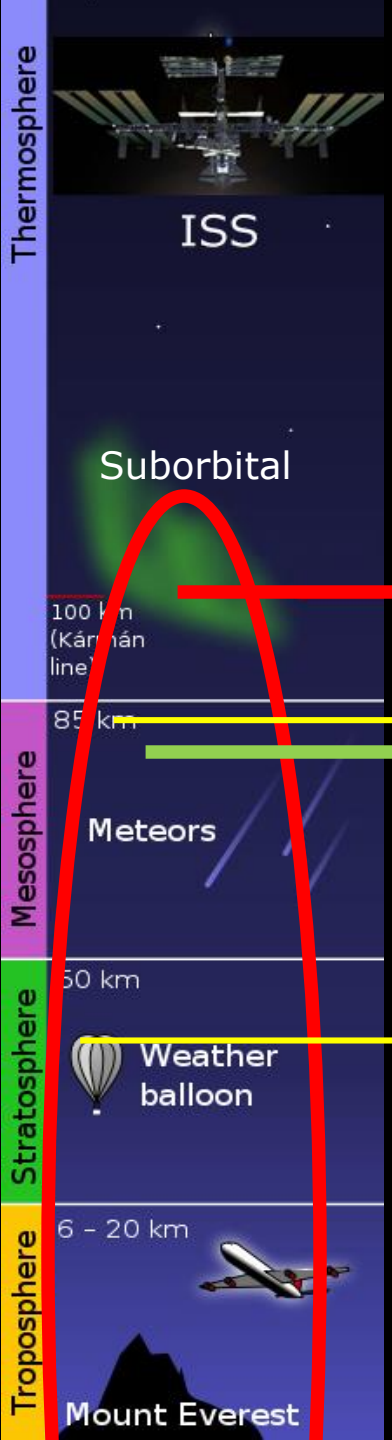
Where Outer Space Begins Certainly was Covered in the Treaties, Right?

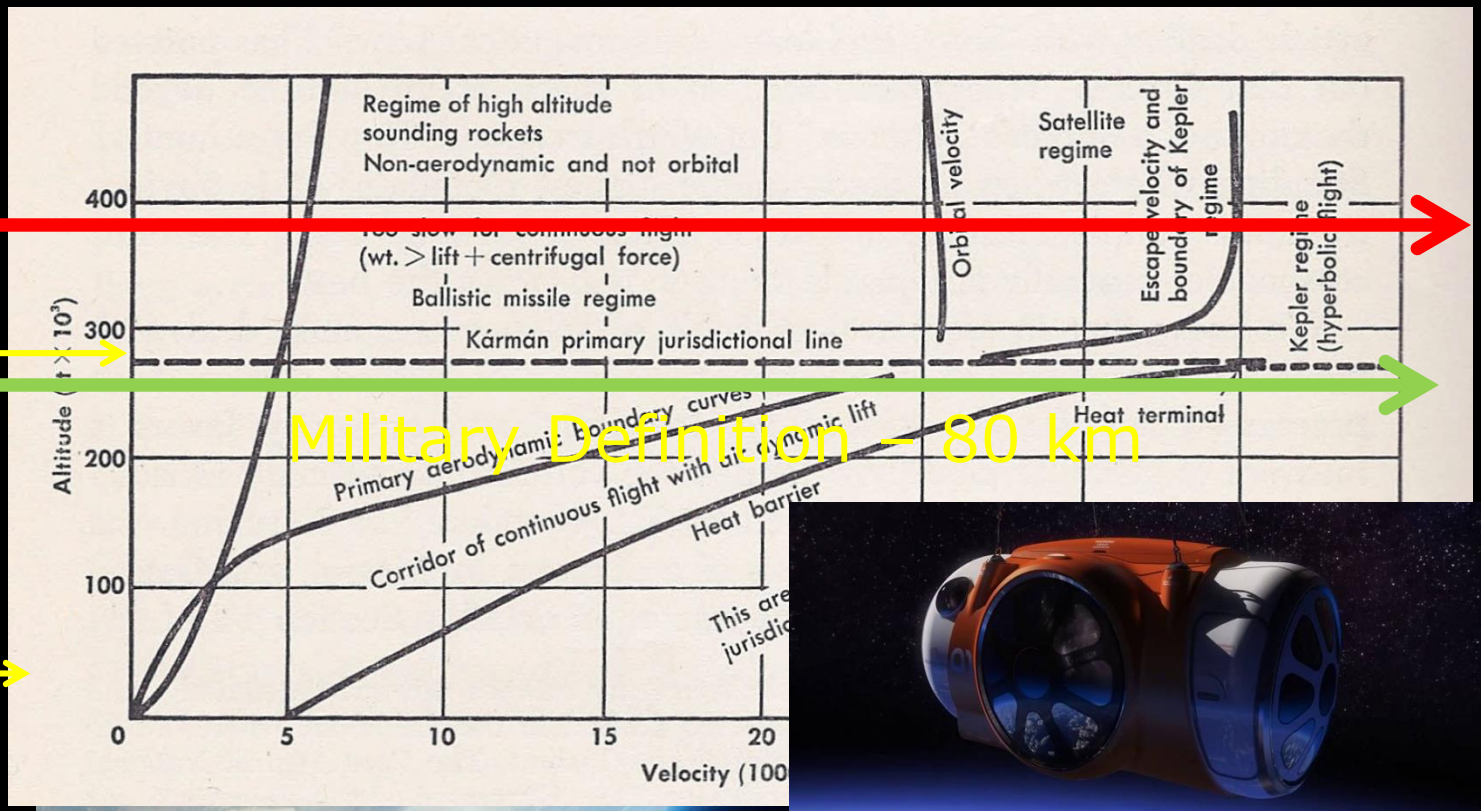
No, it was not.

- There is NO definition of Outer Space under International Law.
- The UN's Committee on the Peaceful Uses of Outer Space has been "wrestling" with this issue since 1958.

Where Does Outer Space Begin?

Von Karman Line (83-100km)

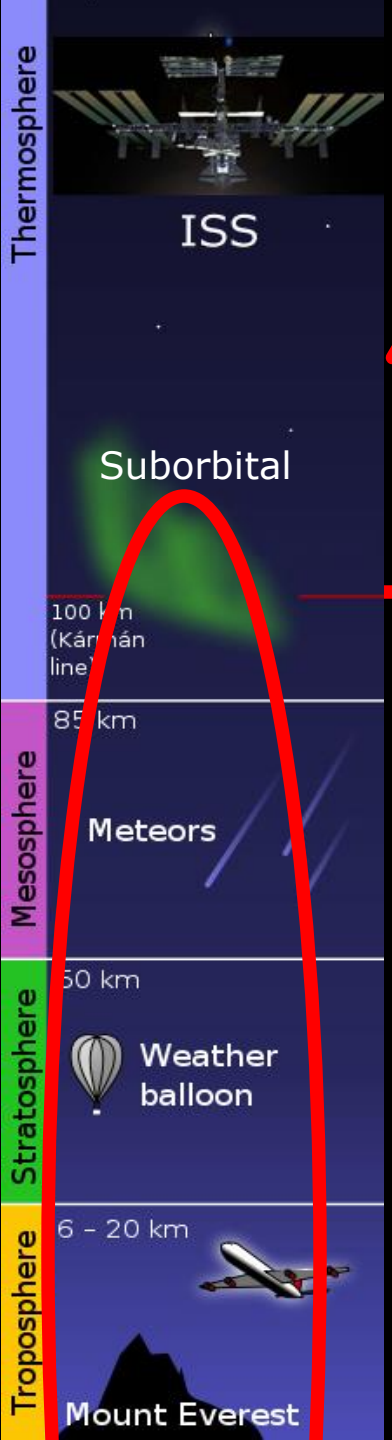




Military Definition – 80 km

Worldview Gondola declared a "space vehicle" by FAA/AST

How Has This Been Applied?



Melvill and Binnie awarded first commercial astronaut wings in 2004 by FAA/AST;

X-15 pilots who did not cross 100 km were not awarded astronaut wings until 2005.

10/4/04 Binnie SS1 flight (112 km)

9/29/04 Melvill SS1 flight (102 km)

8/22/63 Walker X-15 flight (108 km)

7/17/62 White X-15 flight (95 km)

7/21/61 Grissom Mercury flight (190 km)

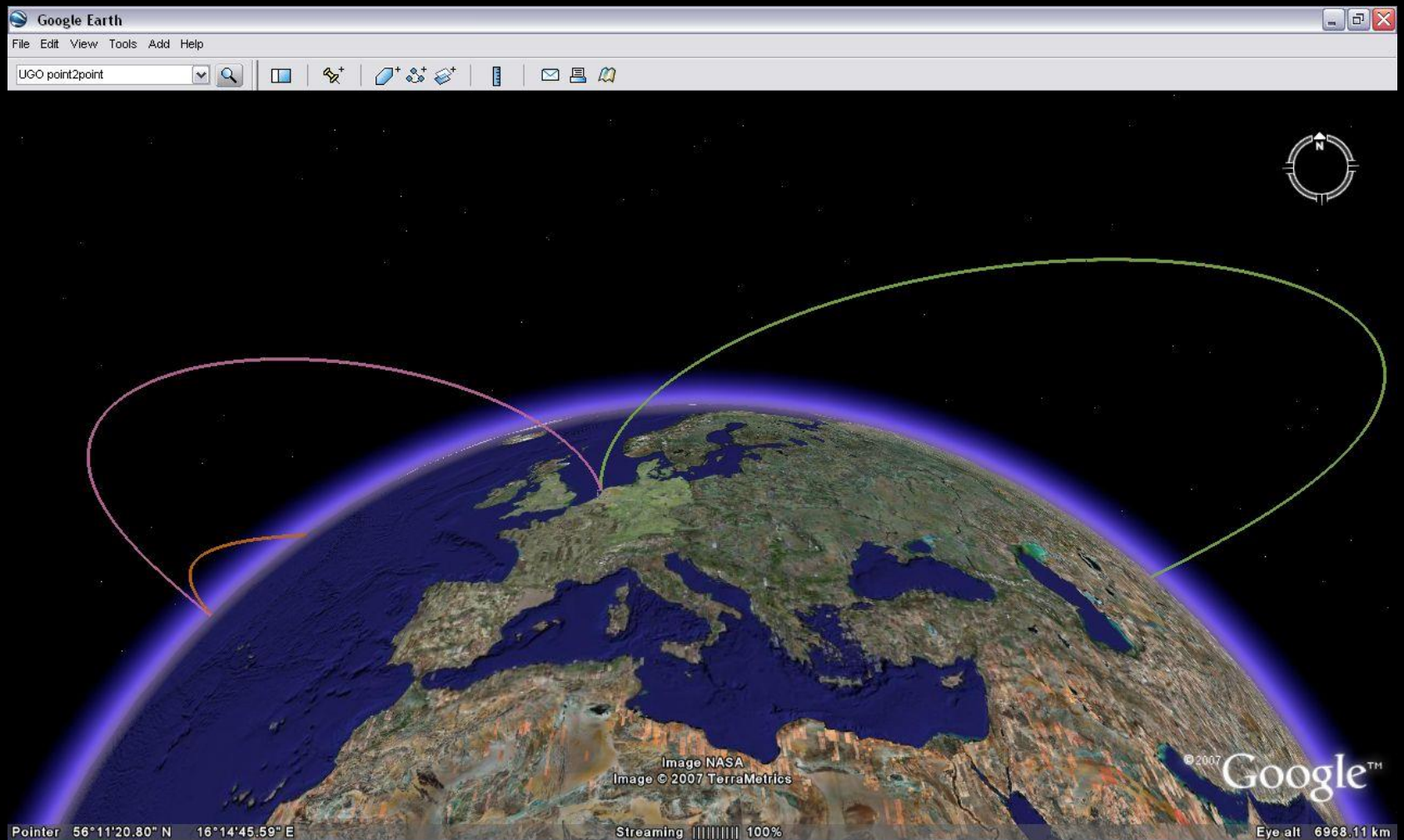
5/5/61 Shephard Mercury flight (187 km)

What are the Implications of No Definition?

- Applicability of State Spaceflight Liability and Immunity Laws:
  - Virginia (VA Code Ann. §§ 8.01-227.8 (2007));
  - Florida (Fla. Stat. § 331.501 (2012));
  - Texas (Tex. Civ. Prac. & Rem. Code Ann. § 100A.001 (2013));
  - New Mexico (N.M. Stat. Ann. § 41-14-3(C)(2013));
  - California (Cal. Civ. Code § 2212(d) (2013));
  - Colorado (Colo. Rev. Stat. §41-6-101 (2013)).
- Under Federal law, a "suborbital trajectory" means: "the intentional flight path of a launch vehicle, reentry vehicle, or any portion thereof, whose vacuum instantaneous impact point does not leave the surface of the Earth." 51 U.S.C. § 50902 (recodification of former 49 U.S.C. § 70102).

What are the Implications of No Definition?

- Point-to-Point Suborbital Travel
  - Do I have to get UK permission to land in France?
  - Where is the interface with Air Traffic Control?



How Do We Get a Definition?

- International Resolution?
  - There is little to no momentum within the United Nations to resolve the issue
  - COPUOS has done little over the past two decades. http://www.unoosa.org/oosa/en/COPUOS/Legal/wg-ddos/index.html
  - 2014 report on various national legislation as it relates to the definition of Outer Space:
    - Australia (100 km)
    - Belarus (controlled airspace ends at 20 km)
    - Columbia (owns all airspace up to Geostationary Orbit – 35,000 km)
    - Kazakhstan (100 km)

How Do We Get a Definition?

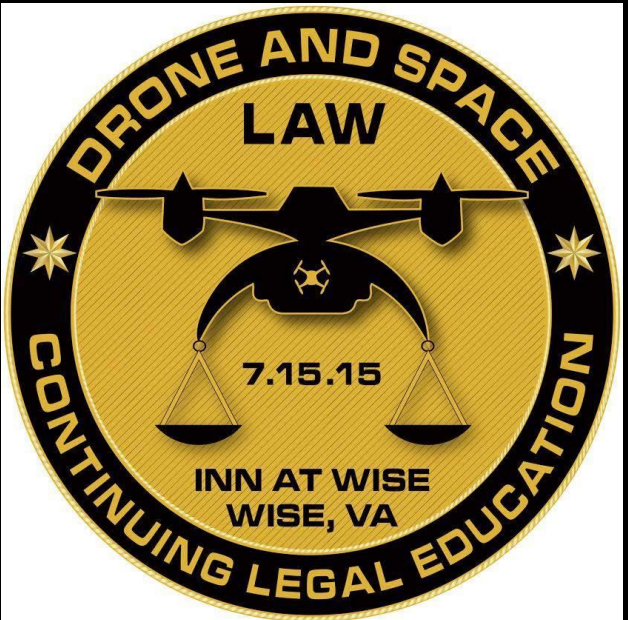
- United States Domestic Legislation?
  - Suborbital commercial launch providers appear satisfied that they can operate in this definitional vacuum;
  - Significant opposition within the Defense Establishment to adopting any definition for fear it could hinder operational flexibility.
- My prediction is that it is going to take a suborbital accident and a court challenge to one of the state statutes to force Congress into adopting a definition.

Thank You!

James E. Dunstan

Mobius Legal Group, PLLC

jdunstan@mobiuslegal.com



Drone Regulations:

The view from the Mid-Atlantic Aviation Partnership

For

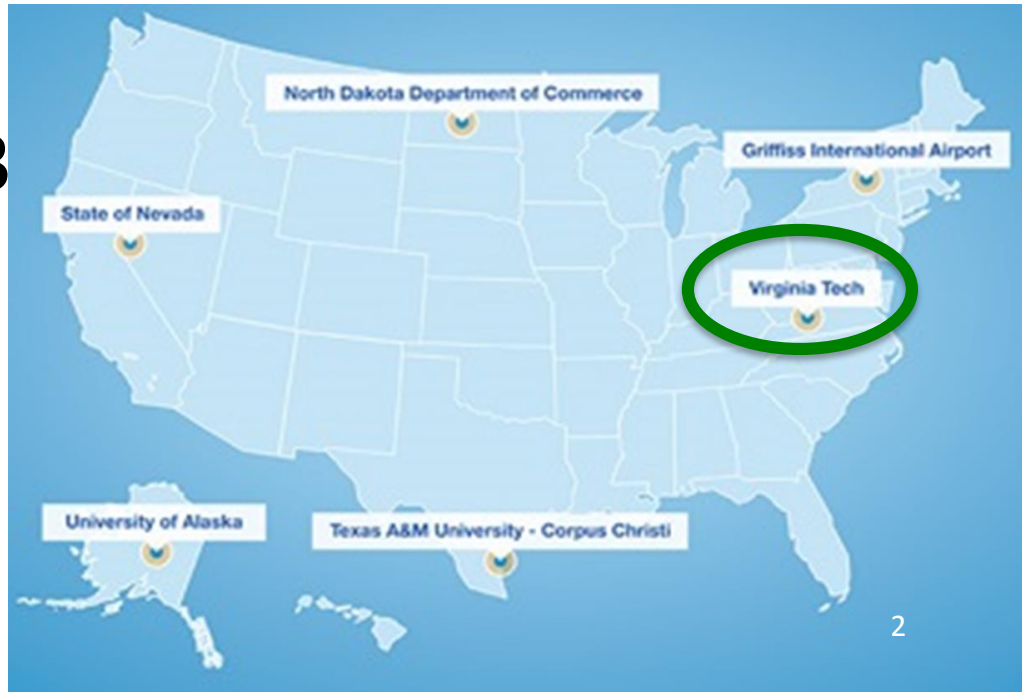
Drone and Space Law CLE

July 15, 2015

Jon Greene
Associate Director, Mid Atlantic Aviation Partnership
Associate Director, Virginia Tech Institute for Critical Technology and Applied Science

The Mid Atlantic Aviation Partnership (MAAP)

- Awarded one of 6 FAA UAS (unmanned aircraft system) Test Sites Dec 30, 2013
- Led by Virginia Tech, Univ. of MD, and Rutgers
- 70 team members
- First flight Aug 13, 2013



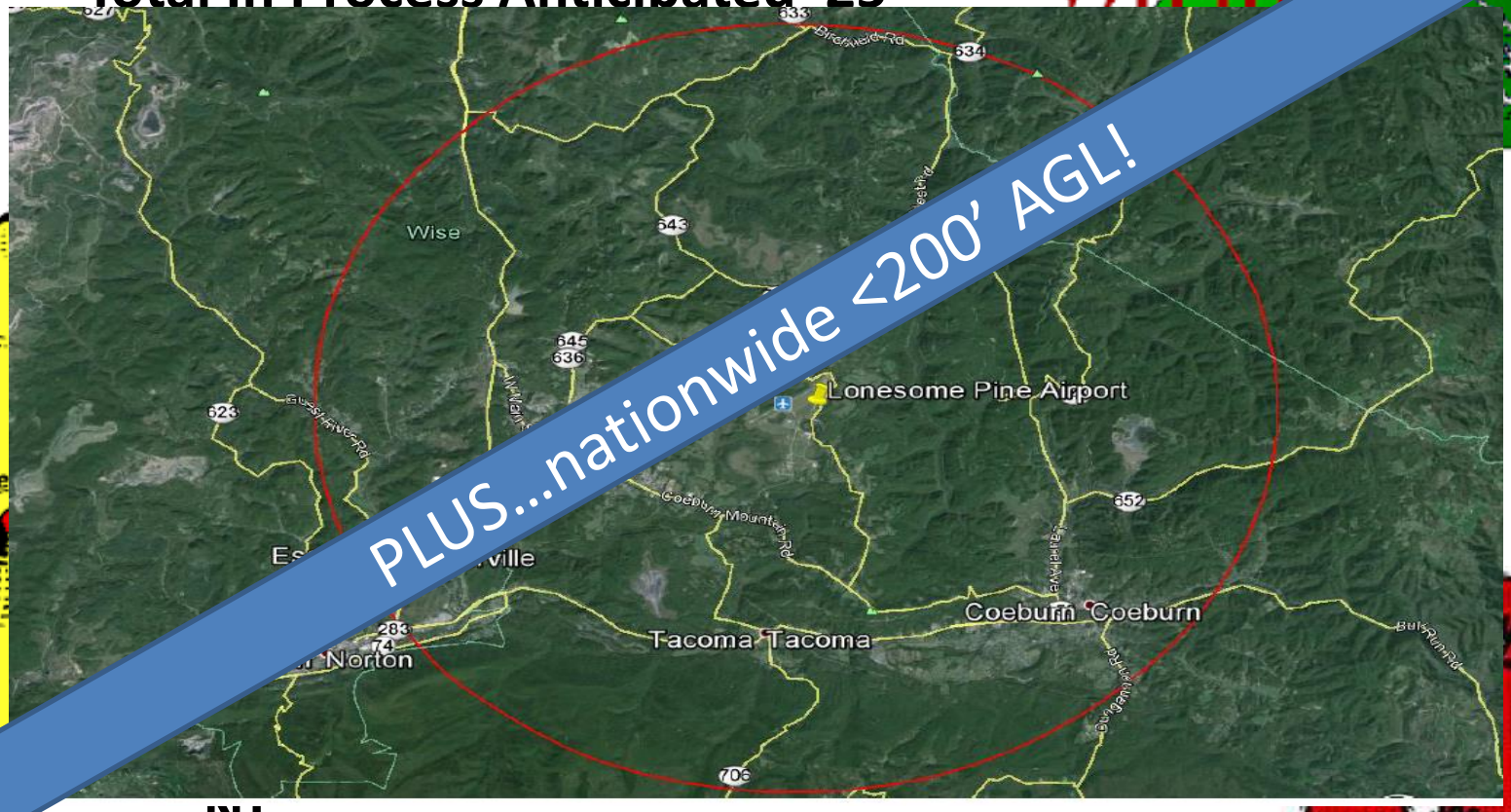
Our Team

- Awarded the FAA UAS Test Site OTA through Virginia Tech
- Led by Virginia Tech, Rutgers and University of Maryl
- Includes Academia, Government, Industry, Econ evelopment Agencies and Non-Profit Organizations
- Specific Team strengths:
  - Three top 50 research univers
  - Companies w/ experienc s development, manufacture, operation and testing
  - Existing relation federal UAS R&D centers
    - William nes FAA Technical Center
    - NA igley
    - A Wallops
    - NAVAIR Patuxent River
    - NSWC Dahlgren
  - International airport with 10,000' runway
  - Flexible and diverse airspace
  - Funding provided from State Economic Development

Run by a university, but focused on BUSINESS!

MAAP Flight Locations

- **Total In Process Anticipated 25**



PLUS…nationwide <200' AGL!

NJ

- Cape May

Eagle's Nest

UAS Regulation

- Rules are a little confusing
- Please note:
  - I'm not from the FAA,
  - I don't speak for the FAA,
  - I'm not the drone police
  - I'm not here to bash FAA.

Remember the FAA has given us not only the busiest, but the **SAFEST** airspace on earth!

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The Fundamental Issue…

14 CFR 91.113 - Right-of-way rules- Requires:

When weather conditions permit, regardless of whether an operation is conducted under instrument flight rules or visual flight rules, vigilance shall be maintained by each person operating an aircraft so as to ***see and avoid*** other aircraft.

This is interpreted to require

- a human eye ball and
- first person view

Thus, every UAS flight requires some sort of waiver to this requirement.

Hobby Use

- Considered model aircraft
- Visual Line of Sight
- <400 feet above ground level (AGL)
- > 5 miles from airport
- < 55 pounds
- Don’t interfere with manned traffic
- Don’t fly over people

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- Three throttle channel settings, entry-level setting, altitude hold setting and normal setting
- "Auto-return" function, the safety guard against lose control of aircraft
- Brake function, built-in altitude sensor and signal loss protection function
- "Headless flying" under intelligent control mode makes it extremely easy for beginners to manage flying an R/C quadcopter

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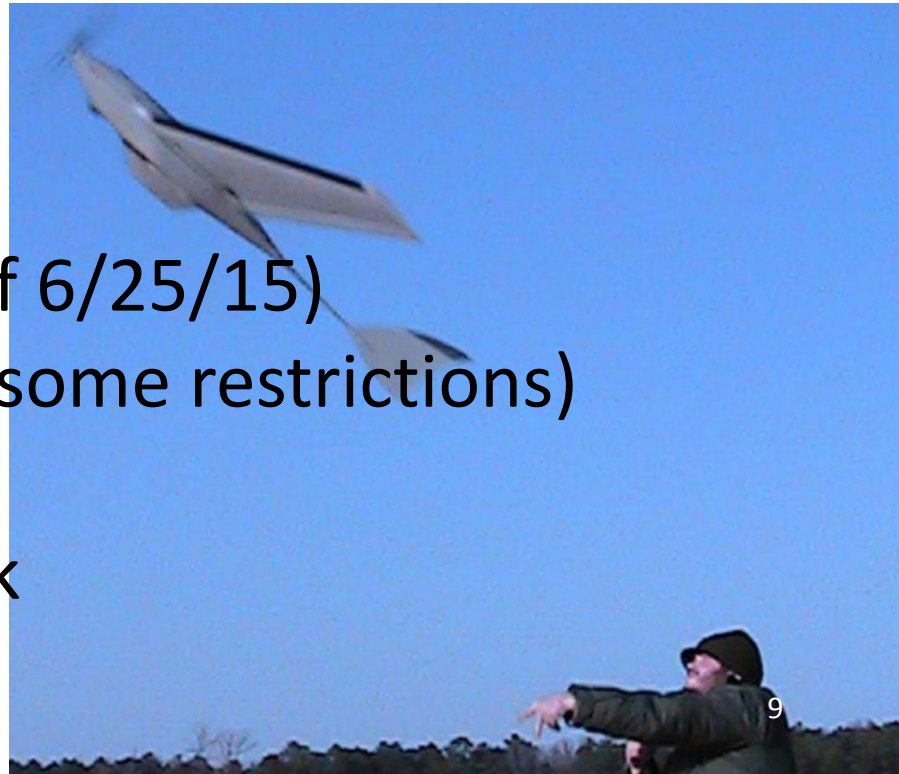
Public Use COA

- Certificate of Authorization or Waiver
- Public entity (federal, state or local govt) must certify airworthiness of the vehicle
- Public entity must own, or lease (for a period of not less than 90 days) the vehicle
- Must be for a public good such as
  - Search and Rescue
  - Public infrastructure inspection
  - Research

Section 333

- Waiver to permit commercial use
- Aimed at “low risk” operations
  - Visual line of sight
  - Low altitude
  - Small UAS
  - Unpopulated area
- 664 waivers granted (as of 6/25/15)
- Blanket COA…<200’ AGL (some restrictions)
- ~ 6 months to approve
- Opportunities to fast track



Small UAS Rules

- Notice of Proposed Rulemaking issued Feb. 23
- Comment Period Ended Apr. 23
- Over 5000 comments
- Promise by June 2016
- Summary
  - <55 pounds
  - Visual line of sight
  - <100 knots
  - <500 feet AGL
  - >5 miles from airport

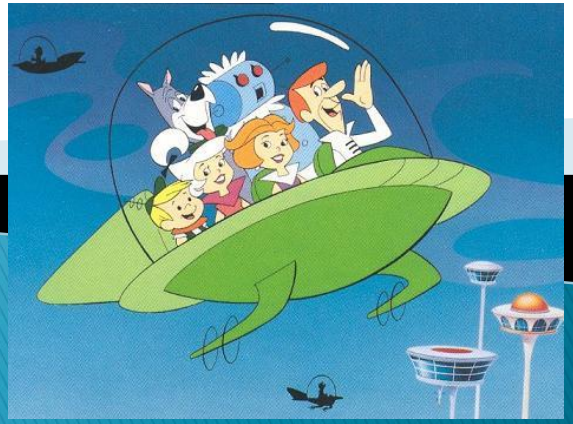
Issues

- Certification
  - System
  - Pilot
  - Detect and avoid capability
- Larger UAS
- Beyond Visual Line of Sight
- Non-VFR flight

Questions?

Jon Greene
greenej@vt.edu
540-231-8566

The Intersection of Privacy and Public Safety



Technological Advances

- Technology has improved drastically in the last 20 years.
- This has had a direct impact on how law enforcement and investigations function.
- This is particularly relevant for drone technology and surveillance. (Fourth Amendment and Privacy Rights).

Chief Justice Roberts on the Fourth Amendment and Technology

Drone Regulation

- 13 States have regulated drone usage- one of which is Virginia.

- Virginia Regulation:
  - **Moratorium**: no law enforcement agencies can use drones at all, outside of missing persons cases.

  - **Weaponization** – not allowed.

  - **Can only be used in missing persons cases.**

Drone Regulation *(Continued)*

- Other State Regulations:
  - Some have similar moratoriums (like that of Virginia).
  - Weaponization is similarly banned
  - Information Retention Rules
  - Information Disclosure Rules
  - Registration and Reporting Rules

Privacy Concerns

- The current test for what constitutes a "search" under the Fourth Amendment is outlined in *Katz v. U.S.*, 389 U.S. 347, 361(1967):
  - "(1) That a person has exhibited an actual (subjective) expectation of privacy
  - (2) that the expectation be one that society is prepared to recognize as reasonable."

Policy Concerns

- "Reasonable" Expectation of Privacy.
  - This is a subjective standard, open to debate.
  - This variability is worrisome for many people.
- What is usually considered reasonable:
  - Interior of Homes
  - In home activities, with exceptions for illegal activity.

Legal Frameworks

- *Kyllo v. United States*, 533 U.S. 705, 714-15 (2001)
  - Scalia's opinion was meant to apply forever as technology improves.
    - 13 states have their own laws protecting interest of their citizens.
    - Federal courts will likely look to state law to determine how to regulate drones, as they apply to Fourth Amendment rights and privacy issues.

Warrants

- Local officials who are able to use drones (in states with no moratorium) must obtain a warrant.
  - Each of the drone states that enacted statues in 2013 have a warrant provision.
  - This implies that rights to privacy are important and must be protected.

In Virginia

- Moratorium speaks for itself, in that its very existence implies that privacy rights are important, and should be protected in this state

- Virginia House Bill 2125- "**Use of unmanned aircraft systems by public bodies; search warrant required.**" H.B. 2125, 2015 Gen. Assemb., Reg. Sess. (Va. 2015).

Pros and Cons of Drones

- Pros
  - Makes investigation of crimes easier, more efficient, and safer.
  - Detecting marijuana, meth labs, and other forms of criminal activity is much easier.
  - Can be used to counteract terrorism/terror attacks.
  - State emergencies can benefit from drone usage too.
  - Already used to facilitate missing persons cases
    - Used in Hannah Graham Case

Pros and Cons of Drones

- Cons
  - If improperly used, drones could facilitate improper/unlawful searches.
    - This is the fear, that privacy rights will be directly violated.
    - Possible that even with a warrant, data can be collected about private citizens that was not meant to be collected if this happens.

Conclusion

- States form their own laws, which implies an emphasis on the protection of privacy rights. These laws, in conjunction with the Fourth Amendment, will likely shape and define reasonable expectations of privacy.
- Tally Matiteyahu, Drone Regulation and Fourth Amendment Rights, Colum. J.L.& Soc. Probls. (2014).

- Essentially, how states interpret and regulate based on the Fourth Amendment helps the federal government form its own opinion about how to regulate drone usage and privacy rights. *Id.*

News Coverage on Drones

- **"Wise County Sheriff Wants Review of Virginia Drone-Use Ban" – Realty Times (August 1, 2014)**
  - "There are so many times that we could possibly have a use for it. Our intention was to use them for a lost person or to search for a marijuana patch on national forest land or something of that nature." – Wise County Sherriff Ronnie Oaks

- **"More police departments considering the use of drones" – Baltimore Sun (August 24, 2014)**
  - Law enforcement agencies in the Baltimore area and across the country are researching drones, intrigued by their potential for high-risk tactical raids and gathering intelligence.

News Coverage on Drones

- **Many Consider Police Drone Use An Invasion Of Privacy – CBS Baltimore (August 25, 2014)**
  - Police are increasingly using drones in high risk situations but some fear a loss of privacy and say law enforcement is going too far.

News Coverage on Drones

- **"Baltimore drone operators mostly pleased with proposed FAA rules" – Baltimore Sun (February 16, 2015)**
  - Baltimore's nascent commercial drone industry has been growing in a gray area for the past few years, experimenting with videos like one that caught last year's Monument Lighting ceremony from the air and taking on real estate clients while facing the threat of fines from the federal government.

- **"SWVA Projects to share $2.1 million in grants" – Times News (April 7, 2015)**
  - Wise County projects ranging from unmanned aerial vehicles (UAV's) to redevelopment of the former Mutual Pharmacy Complex in Big Stone Gap are among Southwest Virginia projects to share over $2.1 million in Appalachian Regional Commission grants.

ATTRIBUTION:

Thank you to Jennifer Lynch, Senior Staff Attorney, Electronic Frontier Foundation ("Drones on the Horizon") and Richard Warner, Chicago-Kent College of Law, ("Fourth Amendment") for their work in educating others on Drones and the Fourth Amendment.

Survey of State Legislation Governing the Use of UAS

Drone and Space Law: Let's Fly Wisely
Continuing Legal Education Seminar

Patrick A. Cushing, Partner
Government Section, Williams Mullen

The Inn at Wise, Wise, Virginia
July 15, 2015

WILLIAMS MULLEN

Agenda

- > **State legislation governing use of UAS**
- > **2015 state legislation/common elements**
- > **North Carolina legislation**
- > **Questions**

<u>Please note</u>: This presentation contains general, condensed summaries of actual legal matters, statutes and opinions for information purposes. It is not meant to be and should not be construed as legal advice. Individuals with particular needs on specific issues should retain the services of competent counsel.

State Legislation Governing Use of UAS

> **A brief history of UAS state legislation:**

- Since 2013, almost every state has considered some form of UAS legislation.
- Virginia is distinguished as the first state to enact UAS-specific legislation in 2013 (*See* HB 2012, 2013 Sess. (Va. 2013)).
  - Two-year moratorium on any use of UAS by law enforcement or regulatory enforcement agencies.
  - Exemptions for Amber/Senior/Blue alerts, search and rescue and National Guard.

2015 State Legislation

- **In 2015, 45 states have considered 151 bills related to drones.**
- **Legislation has passed in 15 of those states: Arkansas, Florida, Louisiana, Maryland, Michigan, Mississippi, Nevada, New Hampshire, North Dakota, Oregon, Tennessee, Texas, Utah, Virginia and West Virginia.**

Common Elements of State Legislation

- Apply to public vs. private use
- Establish a study committee or direct an agency to study
- Prohibit use to monitor hunting and fishing
- Warrant vs. no warrant for law enforcement use
- Require a state license to operate UAS
- Outright moratorium
- Limit or authorize local regulation
- Exceptions for search and rescue operations
- Prohibit use to monitor agricultural practices
- Limit use to research and development

2015 State Legislation

- **Arkansas HB 1349 prohibits the use of UAS to commit voyeurism. HB 1770 prohibits the use of UAS to collect information about, or photographically or electronically record information about, critical infrastructure without consent.**
- **Florida SB 766 prohibits the use of a drone to capture an image of privately-owned property of the owner, tenant or occupant of such property without consent if a reasonable expectation of privacy exists.**

2015 State Legislation

- **Maryland SB 370 specifies that only the state can enact laws to prohibit, restrict or regulate the testing or operation of UAS. This preempts county and municipal authority. The bill also requires a study on specified benefits.**
- **Michigan SB 54 prohibits using UAS to interfere with or harass an individual who is hunting. SB 55 prohibits using UAS to take game.**
- **Mississippi SB 2022 specifies that using a drone to commit "peeping tom" activities is a felony.**
- **New Hampshire SB 222 prohibits the use of UAS for hunting, fishing or trapping.**

2015 State Legislation

- **North Dakota HB 1328 provides limitations for the use of UAS for surveillance.**
- **Oregon HB 2534 requires the development of rules prohibiting the use of UAS for angling, hunting, trapping or interfering with a person who is lawfully angling, trapping or hunting.**
- **Tennessee HB 153 prohibits using a drone to capture an image over certain open-air events and fireworks displays. It also prohibits the use of UAS over the grounds of a correctional facility.**

2015 State Legislation

- **Utah HB 296 allows a law enforcement agency to use UAS to collect data at a testing site and to locate a lost or missing person in an area in which a person has no reasonable expectation of privacy. It also institutes testing requirements for a law enforcement agency's use of UAS.**
- **West Virginia HB 2515 prohibits hunting with UAS.**

North Carolina Legislation

> **Current Law (N.C. Gen. Stat. § 63-95):**

- No state or local governmental entity or officer may procure or operate UAS or disclose personal information about any person acquired through the operation of UAS unless the State Chief Information Officer (CIO) approves an exception specifically granting disclosure, use or purchase (expires Dec. 31, 2015).
- Additionally, no agency or political subdivision may operate UAS unless the user passes a knowledge and skills test for operating UAS (developed by the Division of Aviation).

North Carolina Legislation

> **Current Law (N.C. Gen. Stat. § 63-95):**

- No person may operate UAS for commercial purposes unless issued a license by the Division of Aviation.
- General requirements:
  - Over 18 years of age
  - Valid federal permit
  - Pass knowledge and skills test
  - Valid driver's license
- Division of Aviation responsible for creating the licensing program.

North Carolina Legislation

- **Pending legislation: House Bill 4**
- **Changes for public entities:**
  - CIO's authority to approve and disapprove procurement of UAS is strengthened and made permanent
  - Technical changes
- **Changes for commercial use:**
  - "License" changed to "permit" to reflect federal language
  - Permit age lowered from 18 to 17
  - Requirement to pass skills test removed, only need to pass knowledge test (state statutes and regulations)

QUESTIONS?

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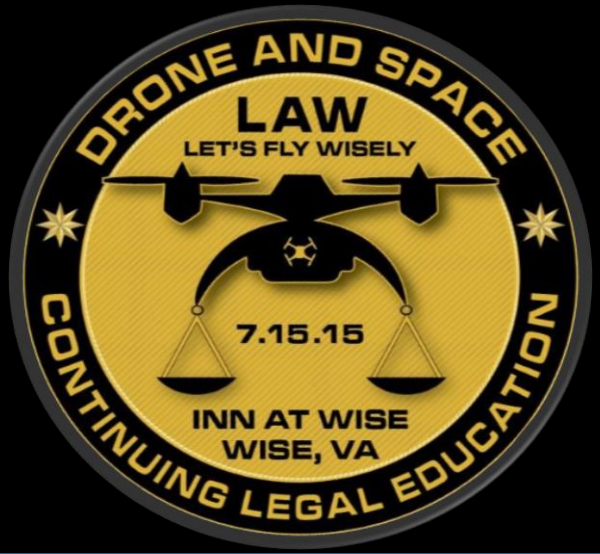

WILLIAMS MULLEN

Unmanned Aircraft Systems

U.S. Legal and Regulatory Landscape

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Unmanned Aircraft Systems

- Commonly referred to as “UAS” or “Drones”
- “Small” UAS < 55 lbs
- Remotely operated (radio-controlled/GPS aided)
- Battery powered
- Typically equipped with cameras or sensors

UAS Types

- Rotor Craft (vertical take-off and landing)
  - DJI “Spreading Wings” S800 EVO

UAS Types

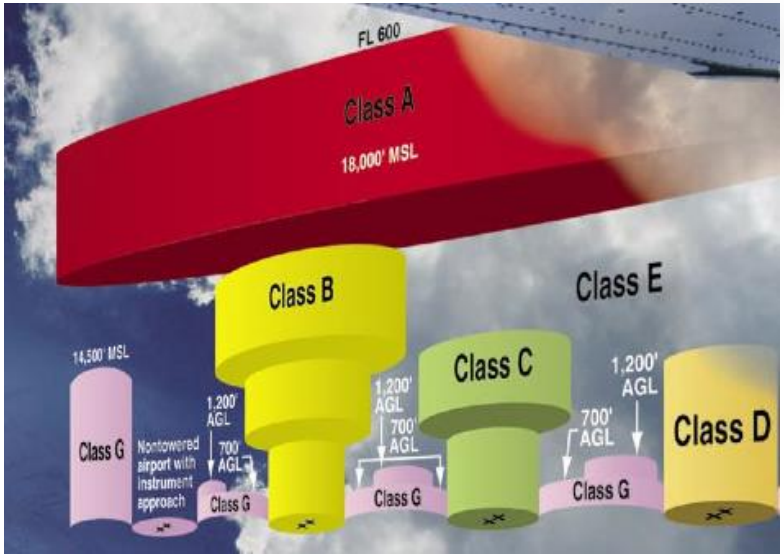
- Fixed-Wing
  - senseFly “eBee”

Current Applications

- Aerial videography/photography
  - Film & Television, Realtors, Weddings
- Aerial surveying, mapping, and imaging
  - Precision Agriculture
- Infrastructure inspection and monitoring
  - Buildings, Bridges, Pipelines, Utility Lines…
- Any job that is “dirty, dangerous, or dull”

FAA Regulation

- FAA regulates the “navigable airspace”
  - for UAS, that means anywhere out-of-doors and above ground*
- FAA operates the “National Airspace System”
  - infrastructure, personnel, and regulations



Art credit: http://www.faa.gov/regulations_policies/handbooks_manuals/aviation/pilot_handbook/media/phak%20-%20chapter%2014.pdf

FAA Regulation

- Federal Aviation Regulations (FARs) govern all aircraft operations within the National Airspace System
  - 14 CFR Parts 1-199
- An unmanned aircraft is still an “aircraft” in the eyes of the FAA, and thus subject to FARs

FAA Regulation

- FARs are ill-suited to UAS
  - “see and avoid” requirement
  - on-board crew and document requirements
  - airworthiness certification requirement
- Lawful **commercial** operation of UAS is effectively impossible in most cases without exemption from the current rules

UAS Integration

- FAA Modernization and Reform Act of 2012
  - Charges FAA with responsibility for achieving safe integration of UAS into the NAS by September 2015
  - Section 333 effectively authorizes FAA to regulate UAS separately from manned aircraft
  - Hobbyist exemption (§ 336) ("model aircraft")
- "Road Map" issued in 2013
  - Move from accommodation to integration

UAS Integration Timetable

- FAA is behind schedule but making progress
- Six test sites authorized for R&D in 2014
- Section 333 exemption process launched in 2014 and streamlined in 2015
- Proposed new regulation for small UAS released February 15, 2015
- Schedule for subsequent steps is undefined

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R&D Test Sites

- Mid-Atlantic Aviation Project (Virginia Tech)
- Griffiss International Airport (Rome, NY)
- Texas A&M
- North Dakota Department of Commerce
- State of Nevada
- University of Alaska

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Section 333 Exemptions

- Case-by-case approval from FAA based on individual petition
- **740** exemptions granted ***as of July 6, 2015****
  - filming for motion pictures and television
  - aerial surveying and photography
  - inspection and monitoring of linear infrastructure
  - flare stack inspections
  - agricultural inspections and monitoring
  - bridge inspections

Section 333 Exemption Process

- Satisfies Airworthiness Certification Requirement
- Relief from Specified FARs
- Certificate of Waiver or Authorization (COA) from local Air Traffic Organization

Section 333 Exemption Process

- Petition Requirements:
  - specific aircraft information
  - specified “use cases” and proposed operational constraints
  - operator specific SOP or Flight Ops Manual
  - identification of requested FAR exemptions
  - public interest and equivalent safety demonstration
- Separate Application for COA to Operate*
  - “Blanket” COAs automatically issued for 333 grantees

Section 333 Exemption – "Summary Grant" Process

- Announced and implemented in April 2015
- Applies to petitions that are similar to previous exemptions
  - Film/TV Production or Aerial Data Collection
- No need to solicit public comment
- No need for FAA to repeat exemption analysis in toto
- Effective in breaking the logjam at FAA

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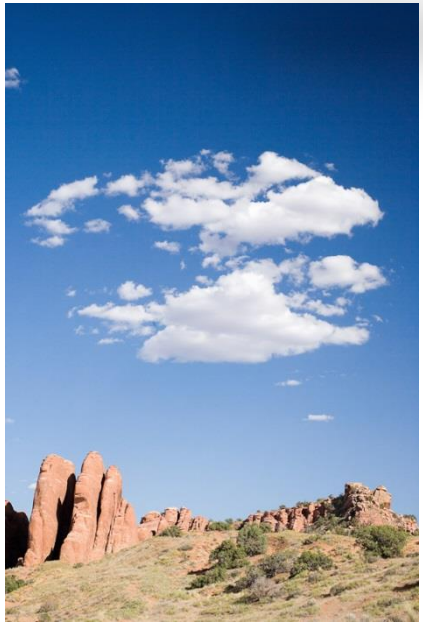
Standard Exemption Conditions

- Operations limited to specified aircraft and specified purpose (but may be broadly stated)
- Visual Line of Sight and Visual Observer
- Day time only; good visibility; away from clouds and non-participating/exposed people
- Below 400 feet AGL
- Only over private or controlled access property
- Limits on airspeed and flying time
- Private, recreational, or sport pilot's certificate



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Outsourcing UAS Operations

- Section 333 Exemptions have been granted to numerous companies offering third-party UAS services for various applications

- Ask to see the papers
  - Know requirements/limitations
  - Consider liability and insurance

Towards Further UAS Integration

- Proposed “Small” UAS Rule
- Pathfinder Program
- Center of Excellence

Proposed Small UAS Rule

- Would authorize general use of small UAS (<55 lbs) subject to certain restrictions:
  - Visual line of sight
  - Maximum altitude of 500 feet
  - Maximum airspeed of 100 mph
  - At least 3 miles visibility from control station
  - May not operate above any persons not directly involved in operations

Proposed Small UAS Rule

- Would provide wide flexibility and likely would cover many known and anticipated applications
- Less restrictive than typical Section 333 exemption:
  - No limit on purpose of operation
  - No pilot's license required (only operator certificate)
  - No COA required in Class G airspace
  - Wider range of operation (vertical and horizontal)
  - No FAA evaluation of aircraft

Proposed Small UAS Rule

- Timetable
  - Public comment period expired April 24, 2015
  - More than 4500 comments submitted
    - Users
    - Pilots
    - Privacy advocates
  - Final Rule by late-2016 or early-2017?

Pathfinder Program

- VLOS operations in urban spaces (CNN)
- Extended line of sight for agricultural applications (Precision Hawk)
- Beyond VLOS along rural railway corridors (BNSF Railway)

Center of Excellence

- Mississippi State University led team
- Research, education, and training in areas important to safe integration of UAS into the NAS
- Initial research to commence by September 2015
  - Full research agenda by January 2016

AFTER YOUR 333 EXEMPTION
&
OTHER LEGAL CONSIDERATIONS

Location Privacy Paradox

St. Peter's Square – 2008

Luca Bruno/AP

Change in expectations outpace laws/policies

St. Peter's Square – 2013

Michael Sohn/AP

Impact of Changing Perceptions of Privacy in Public Places

- Federal:
  - Supreme Court ruling that police use of GPS device without a warrant to monitor movements of suspects in public violated 4th amendment.
  - Federal Trade Commission requiring privacy policies for mobile apps that collect geolocation information.
  - Some (increasing) federal courts requiring warrant to access cellphone geolocation metadata.
  - Increased challenge to use of license plate readers, Stingray

UAS are Increasingly at Forefront of Privacy Battle

- White House released two “Big Data” reports in May 2014.
- President's Council of Advisors on Science and Technology (PCAST) report:
  - Describes various types of geospatial technologies that collect born-analog data that contain “personal information”
  - Many of these relate directly to UAS, including:
    - video from . . . overhead drones
    - imaging infrared video
    - synthetic aperture radar (SAR)
    - LiDAR, “precise geolocation in imagery from satellites and drones”

Recent White House Initiatives

- Presidential Memorandum: Promoting Economic Competitiveness While Safeguarding Privacy, Civil Rights, and Civil Liberties in Domestic Use of Unmanned Aircraft Systems:
  - Released in conjunction with Notice of Proposed Rulemaking (NPRM).
  - Pertains to data collected by UAS by and for federal agencies.
- NTIA Request for Public Comment on Privacy, Transparency, and Accountability Regarding Commercial and Private Use of Unmanned Aircraft Systems:
  - Pertains to data collected by UAS for commercial purposes.

Presidential Memorandum

- Applies to federal agencies
- Limits retention of data that may contain personally identifiable information (PII)
- Restricts distribution unless maintained in “system of records”
- Status report within 180 days; publish policies and procedures within one year
- Directs federal agencies to:
  - Verify existence of rules of conduct and training for federal contractors
  - Policies and procedures for individuals that have access to “sensitive information”
  - Conduct oversight of use (including audits or assessments)

National Telecommunications and Information Administration

- President's principal advisor on telecommunications and information policy
- Hosted similar multi-stakeholder meetings in past
  - Smart grid
  - Facial recognition software
  - Mobile apps
- Asked by White House to develop similar process for commercial use of UAS

Multi-Stakeholder Process

- Identify best practices
- Protect privacy, civil rights and civil liberties
  - Identify privacy safeguards
- Accountability
  - Oversight and privacy training
  - Policies on how handle data
  - Audits, assessments
- Transparency
  - Identifying operators
  - Purpose of flight
  - Data practices

Recent Developments

- Electronic Privacy Information Center (EPIC)
- Previously petitioned the FAA to start a public procedure that would lead to drone privacy regulations
- FAA rejected the request
  - “not an immediate safety concern”
- Asked D.C. Court of Appeals to reverse decision

Federal and State Legislation

- Two Primary Considerations
  - Use by Government Agencies
  - Use by industry and citizens
- Considerations
  - Preemption
    - FAA's authority to regulate airspace vs. privacy rights
  - First Amendment Rights
    - How do you apply Free Speech Principles?
  - Definitions
    - Devil in the details (i.e. law enforcement vs. regulatory)
  - New sensor types
  - How will you know?
    - How will you know who is flying drone and what is being collected

Recent State Legislation

- Florida
  - Creates a reasonable expectation of privacy in open if on private property and not observable from street
- Nevada
  - Law defines trespass as flying drone lower than 250 feet over property
- Illinois
  - Bill waiting for Governor's signature would requirement notification for breach or loss of "geolocation information" of a person

Other Legal Issues

Other legal considerations:

- Liability
  - Insurance
- Ownership/licensing of data collected
  - Expectations are likely to change.
- Trespass
  - Law is unclear
  - Will overflight easements be needed?
- Law enforcement/homeland security concerns
  - Section 333 exemption means little to law enforcement.

Thank You!

DRONE AND SPACE
LAW
LET'S FLY WISELY
7.15.15
INN AT WISE
WISE, VA
CONTINUING LEGAL EDUCATION

Canadian and US Commercial UAV Regulations

July 15, 2015

Diana Cooper, Head of UAS & Robotics Practice Group,
LaBarge Weinstein LLP
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LABARGE WEINSTEIN

Open Doors.
Close Deals.

Agenda

- Introduction
- Current Regulatory Frameworks
- Proposed Amendments
- Final Thoughts

Introduction

POPULAR SCIENCE

TRENDING: PLUTO METEOR STRIKE RISE OF DRONES MORE BOOKS SUBSCRIBE

AVIATION

WHY IS CANADA WINNING THE DRONE RACE?

IN THE PUSH TO GET COMMERCIAL DRONE OPERATIONS OFF THE GROUND, AMERICA HAS FALLEN FAR BEHIND.

By Andrew Rosenblum Posted March 11, 2015

118 Shares

Introduction

- Transport Canada has been approving commercial operations for nearly a decade
- The FAA only began to issue exemptions for commercial operations in 2014
- In 2014: TC approved 1672 SFOCs, whereas the FAA only issued 9 Section 333 exemptions (in 2015 around 735 to date)

Introduction

Key differences – In Canada…

- **Pilot license is not required**
- **Generally, there is no airworthiness or design standard (except for Compliant operators who receive broader certificates)**
- **UAVs are not required to be marked and registered**
- **The SFOC system provides flexibility to accommodate technological developments i.e. sense-and-avoid systems that assist in BVLOS operations**

Current Framework: Canada

- UAVs are "aircraft" under the *Aeronautics Act*
- Commercial UAV operators generally need a Special Flight Operations Certificate (SFOC) to fly
- The *Canadian Aviation Regulations* outline information that must be submitted to the Minister to obtain a SFOC
- Pursuant to the *Aeronautics Act*, the Minister delegates responsibility for approving SFOCs to inspectors in the regional and national offices who have discretion to determine conditions of SFOCs

SFOCs

- Generally, commercial operators need a SFOC
- Minimum 20 days to receive approval
- Operator must demonstrate he/she can mitigate risk to an acceptable level based on factors including:
  - Skill and experience of the operator
  - UAV specifications
  - Location of the proposed operation
    - Distance from built-up areas, aerodromes etc.
- SFOCs range from a few days to 3 years and they can be site specific or geographically flexible
- There are 3 types of SFOCs for commercial operations: Restricted Simplified, Restricted Complex and Compliant

1) Restricted Simplified

- Only 1 UAV, 1 operator and 1 control station
- MTOW 25 kgs or less
- VLOS
- Maximum altitude 300 feet AGL
- Minimum 100 feet lateral distance from persons not associated with operation
- At least 3 nm from center of an aerodrome
- Maximum speed 87 knots

2) Restricted Complex

- UAVs that do not fit into other categories (Simplified or Compliant)
- MTOW 25 kgs or less
- BVLOS operations are possible
- UAVs operated by eligible foreign operators
- UAVs operating in Class F restricted airspace dedicated to testing

3) Compliant

- MTOW 25 kgs or less
- VLOS
- UAV meets Design Standard
- Operator is compliant as demonstrated by Operator and Training Manuals
- Operator must meet qualifications (medical declaration, knowledge requirements, skill and experience)
- Benefits: greater geographic flexibility, longer certificates, priority review

Standing SFOCs

- Operate in defined geographic area (i.e. province, region) at sites not previously assessed by Inspector
- Need to show history of safe operations
- Must conduct site survey prior to each operation at a site not previously assessed by Inspector

Exemptions

- Two exemptions from SFOC process introduced in Nov., 2014 to relieve administrative burden on regulator
- Exemptions intended to take very low risk operations out of SFOC system
- Interim measure – expire in 2016 when new regulations come into force

Exemptions

Exemption requirements for operating UAVs without permission

THIS INFOGRAPHIC IS FOR EASE OF REFERENCE ONLY. YOU MUST CONSULT THE OFFICIAL EXEMPTIONS.

UAVs 2 kg or less

- Be safe, well trained and know the rules of the sky
- Be 18 years old, or at least 16 years old to conduct research under academic supervision
- Have at least $100,000 liability insurance
- Be alert—not tired or under the influence of alcohol or drugs
- Inspect your UAV and site before flight to ensure they are safe
- Get permission before you go onto private property
- Inform Air Traffic Services if your UAV enters controlled airspace
- Give right-of-way to manned aircraft
- Fly during daylight and in good weather
- Keep your aircraft in direct line of sight and always be able to see it with your own eyes
- Verify that radio frequencies/transmissions won't affect control of your UAV
- Have an emergency plan ahead of time
- Carry a copy of your UAV exemption, proof of liability insurance, contact information, and aircraft system limitations
- Follow the manufacturer's operating and emergency procedures, including those if the remote control loses contact with the aircraft
- Respect laws from all levels of government
- Operate only one UAV at a time, with a single remote control
- Immediately stop all operations if you can no longer meet the exemption requirements or if the safety of a person, property or other aircraft is at risk
- Stay at least 30 metres away from people, animals, buildings, structures, and vehicles not involved in the operation

UAVs between 2.1 kg and 25 kg

- Be safe, well trained and know the rules of the sky
- Be 18 years old
- Have at least $100,000 liability insurance
- Be alert—not tired or under the influence of alcohol or drugs
- Inspect your UAV and site before flight to ensure they are safe
- Get permission before you go onto private property
- Carry a copy of your UAV exemption, proof of liability insurance, contact information, and UAV system limitations
- Respect laws from all levels of government
- Keep your UAV in direct line of sight and always be able to see it with your own eyes
- Operate only one UAV at a time, with a single remote control
- Give right-of-way to manned aircraft
- Fly during daylight and in good weather (no clouds, snow or icy conditions)
- Create and follow procedures for landing and recovering your UAV and for contacting emergency responders and air traffic control.
- Have an emergency plan ahead of time
- Follow the manufacturer's operating and emergency procedures, including those if the remote control loses contact with the aircraft
- Verify that radio frequencies/transmission and eletronic devices won't affect control of your UAV
- Assess the risk of losing connection with the UAV and decide when to use the flight termination setting
- Have a fire extinguisher on site
- Inform Air Traffic Services if your UAV enters controlled airspace
- Follow the manufacturer's maintenance/assembly instructions
- Ensure the UAV does not have an emergency locator transmitter
- Report accidents to Transport Canada and stop operations until you have addressed the risks
- Immediately stop all operations if you can no longer respect the exemption requirements or if the safety of a person, property or other aircraft is at risk
- Stay at least 150 metres away from people, animals, buildings, structures, and vehicles not involved in the operation

DO NOT:

- Fly closer than 9 km from forest fires, airports, heliports, aerodromes, or built-up areas
- Fly over military bases, prisons or in controlled or restricted airspace
- Fly over crowds or higher than 90 metres
- Participate in special aviation events, air shows or system demonstrations
- Carry dangerous goods or lasers

tc.gc.ca/safetyfirst

Canada

Catalogue No. T86-5/2014E-PDF ISBN 978-1-100-25401-2

Current Framework: US

- A UAV is considered an "aircraft" – it must be certificated and registered and flown by a licensed pilot pursuant to an operational authorization
- Section 333 of the *FAA Modernization and Reform Act* (FMRA) grants the Secretary of Transportation authority to exempt operators from meeting certain requirements i.e. airworthiness certification
- However, the FAA states that Section 333 does not provide a means for exempting operators from other requirements i.e. pilot license (even though the FAA concedes in the NPRM that there is not much overlap in terms of skillsets between operators of manned and unmanned aircraft)

Section 333s

- Typical conditions include:
  - Sport pilot license
  - Daytime operations only
  - Maximum altitude 400 feet AGL
  - Generally, maintain a distance of 500 feet from people, vehicles and structures not involved in operation

Certificate of Waiver or Authorization (COA)

- In addition to a Section 333 exemption, commercial operators require a COA for airspace authorization
- Blanket COA issued for Section 333 holders below 200 feet at specified distances from airports
- All other operations – must apply for a COA

The Case of Amazon

- Last summer, Amazon applied for an experimental certificate and a Section 333 exemption for testing
- Took 8 months to get approval from FAA
- In the meantime, Amazon received a SFOC in Canada and began testing in BC

The Case of Amazon

- FAA approvals are more restrictive than TC approvals
  - Experimental certificate approved for design that was already obsolete
  - 333 exemption requires Amazon to register each UAV and to use operators who have a pilot's license – these requirements are not mandated in Canada

Proposed Amendments

- US released anticipated Notice of Proposed Rulemaking (NPRM) for SUAVs in Feb., 2015 (195 pgs)
- Canada followed suit with a Notice of Proposed Amendment (NPA) for SUAVs in May, 2015 (34 pgs)

Proposed SUAV Regulations

	Canada *SFOC available for other operations i.e. BVLOS, higher altitudes, heavier UAVs		US *Exemptions available from prescribed requirements
Category	SUAVs Limited Operations • 25 kgs or less • Remote areas	SUAVs Complex Operations • 25 kgs or less • Built-up areas or near aerodromes	SUAVs (less than 25 kgs)
Max altitude AGL	300 feet	400 feet	500 feet
Flying over people	No	Yes	Can't fly over people not involved in operation unless they are under a covered structure
Knowledge requirement	Yes, basic test	Yes, more advanced test	Yes , basic test
Operator certificate	Yes, but **only** for larger operators	Yes, but **only** for larger operators	Yes, must pass knowledge test
Design Standard	Yes	Yes	No
Marking	Yes	Yes	Yes
Registration	Yes	Yes	Yes
Nighttime	No	Yes	No
Distance from airports	Proposal considers 9 kms and 20 kms	May fly closer to airports	Around 8 kms

Proposed Micro Categories

	Canada – Very Small UAVs	US – Micro UAVs
Definition	TBD: • Weight – possibly up to 2kg (similar to exemption) • Kinetic energy	Weight up to 2 kg
Max altitude AGL	300 feet	400 feet
Flying over people	No	Yes
Knowledge requirement	Yes – basic knowledge test	Yes – self certify
Operator certificate	Yes – but, only for larger operators (numerous employees, larger scope of operations)	Yes – but, no knowledge test
Airworthiness	No	No
Marking	No, however must identify pilot name and contact on UAV	No
Registration	No	No
Nighttime	No	No
Distance from airports	9 km distance	No

Final Thoughts

- The proposals suggest that the gap between Canada and US will close
- Canada's framework is becoming more restrictive i.e. marking and registration, design standard, operator certificates
- Canada's framework will remain more forward-looking and flexible via SFOC process which can account for unique circumstances and technological advancements

Thank you

Flirtey

stuff by air anytime anywhere

My name is Matthew Sweeny, and I founded Flirtey, one the world's first small unmanned aircraft systems delivery companies, to revolutionize three industries – online retail, fast food, and logistics.

Today, we sit together at an inflection point in the development of commercial unmanned aircraft systems technology. We have an opportunity to democratize and commercialize these small flying robots to create a new industry. Imaginative minds are just beginning to explore the applications of this technology, which is at a similar point on the technology curve to personal computing in the early 1980s.

This technology will prove to be both life saving and lifestyle changing.

In the near future commercial drones will be ubiquitous. According to the Congressional Research Service, the FAA predicted, "30,000 drones will fill the skies in less than 20 years". This reminds me of a famous quote, commonly attributed to Thomas Watson, "I think there is world market for maybe 5 computers".

The biggest barrier to the commercialization of this technology is regulation.

The FAA's proposed regulations will neither facilitate a safe nor swift commercialization of this technology. Implementing the proposed regulations would be akin to restricting modems in the early days of the Internet. Other countries around the world are currently adopting regulations that will provide a safer and faster path for companies to commercialize this technology at scale, and these foreign regulators will attract entrepreneurs and opportunities to their geographies.

I would strongly encourage you to base your regulations on New Zealand, which has pioneered the industry globally. The European Union has also just announced regulations based on similar principles to New Zealand, which are planned to take effect in 2016 – These will outpace the FAA's proposed regulations.

I speak with experience, because the company I founded has already conducted commercial drone deliveries in Australia, New Zealand and Dubai (including, ironically, to the President of the Dubai Civil Aviation Authority) – Drone delivery is an activity that is not currently legal in the United States.

In light of these considerations, I recommend the following framework for your regulations:

1. Adopt a risk-based approach to unmanned aircraft systems activities
    i. Consider several key criteria to determine the risk of unmanned aircraft systems activities:
        i. How many joules of impact energy will be delivered by a crash (this will be impacted by both the speed and weight of the vehicle)?
        ii. Are operations below commercial airspace and outside the range of aerodromes and controlled airspace?
        iii. Are operations outside populated areas?
        iv. Are operations within the live sight of the person authorized to override the autopilot?
        v. What are the risks involved in the activity, what is the probability of each risk occurring, what is the severity should each risk occur, and how effective are the technologies and operational procedures in place to mitigate each risk?

   ii. Exempt low-risk operations from requiring any form of regulatory approval
   iii. Provide a clear and achievable path to scale for higher risk operations for all above criteria
2. Provide a free internet service for all unmanned aircraft systems operators to log their flight paths, plan flights in advance, and to submit requests to Air Traffic Control for higher risk operations on the fly

A risk-based regulatory framework will provide more logical answers to many of the questions the FAA has asked the public (including about line of sight operation, night operation, launching drones from vehicles, pilot certification requirements, etc). This regulatory framework would also enable incremental steps toward higher risk activities and the gradual testing of new and innovative technologies in a commercial environment. Such a framework will also be proactive rather than reactive, which may help to reduce the risk of States passing laws which inhibit freedom of small unmanned aircraft system operations in the public domain.

This year marks the 111th anniversary of the Wright Brothers first powered flight at Kitty Hawk. If you get these regulations right, you will empower a new industry across the United States.

If you get these regulations wrong, you may cause the United States to fall behind the rest of the world in the emerging drone age.

Matthew Sweeny
CEO | Co-Founder
Flirtey

The Future of Unmanned Systems in the Protection of Critical Infrastructure

Drone Law Conference
15 July 2015

Predictions of The Near Term Future

- *"The UAS market is on the cusp of an explosive growth period"* – 2012,2013,2014
  - The Teal Group / Frost and Sullivan
  - Virginia Department of Economic Development
  - Association for Unmanned Vehicle Systems International (AUVSI)

- Projections based on anticipated changes in the regulatory environment have been consistently – premature.

The Old, Military Paradigm

Unmanned Aerial System (UAS)

MQ-9 Reaper

New, Commercial Paradigm

Recent Changes in Perspective

- Public awareness of UAS capabilities
- FAA sUAS Operating Rules and Section 333 Exemptions to support Commercial Applications
- Six FAA Test Sites to develop Integration into the NAS technologies and methodologies
- Legislators seeing economic benefits as greater than potential privacy issues

Commercial Opportunities for sUAS

- Faster-Better-Cheaper ways to accomplish current responsibilities to Survey, Monitor and Inspect Critical Infrastructure.
  - Replace / augment humans (man on a rope)
  - Replace / augment manned aviation
  - Begin heretofore unachievable SMI collections

- Avoid Dull – Dirty – Dangerous operations
  - Not all tasks, but those where it makes Safety or Financial sense.

Examples for Discussion

- Apply sUAS technology to existing data gathering requirements in :
  - Agriculture, Energy, Water/Dams, Mining

- Support the Construction, Security, Monitoring and Inspection of all such Facilities.

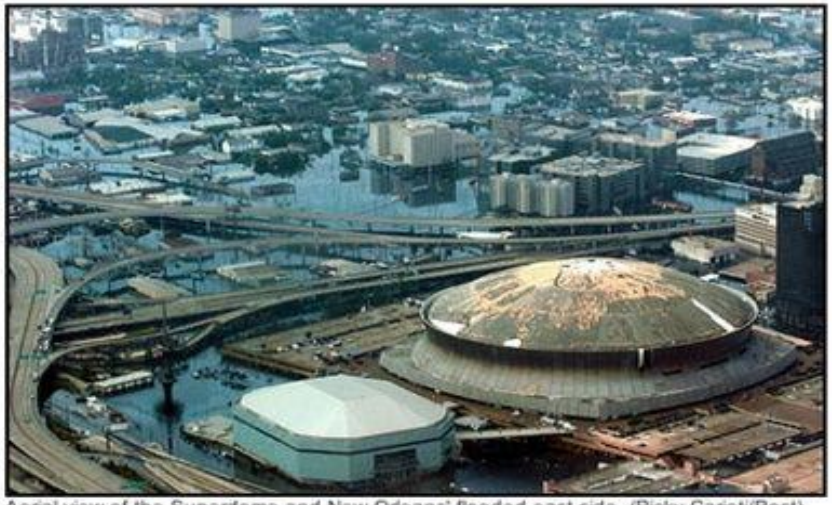
“Data is the New Oil”

- In general, more data is better and more granularity is better
  - Because it allows for better analytics
- Lower costs of data gathering equals increased frequency for the same price, which equals better analytics and improved outcomes for the customer
- Whether in Compliance or Due Diligence or Risk Management – the more you know the better.

Mid Term Future

- Technologies
  - Geo Fencing
  - The Next GPS
  - Miniaturized Sensors
  - Effective Sense and Avoid

- Applications
  - Public Safety
  - Emergency Management



Aerial view of the Superdome and New Orleans' flooded east side. (Ricky Carioti/Post)

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WHAT IS VEDP?

VEDP History

The Virginia General Assembly created the Virginia Economic Development Partnership (VEDP) in 1995 to attract new businesses to the Commonwealth, help major Virginia businesses expand, and increase trade opportunities for Virginia businesses

VEDP is governed by a 25 member Board Of Directors comprised of businesspersons from around Virginia, each of whom is appointed by the Governor and the General Assembly; 6 Cabinet officials

VEDP's President & Chief Executive Officer is employed by the Board to oversee the fulfillment of our mission

AEROSPACE IN VIRGINIA

Virginia
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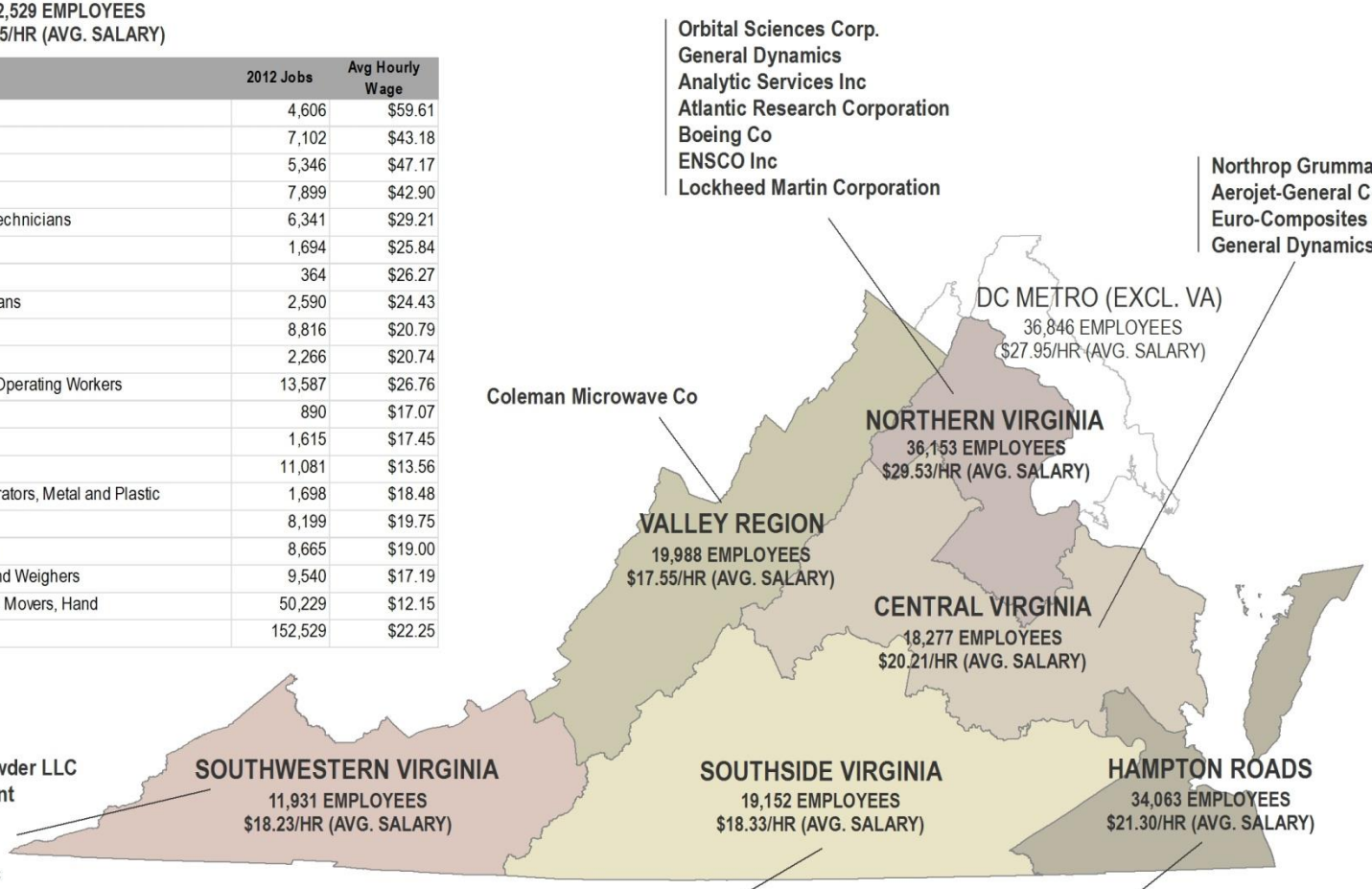
BEST STATE FOR BUSINESS

STATEWIDE

152,529 EMPLOYEES
$22.25/HR (AVG. SALARY)

Occupation	2012 Jobs	Avg Hourly Wage
Aerospace Engineers	4,606	$59.61
Electrical Engineers	7,102	$43.18
Electronics Engineers, Except Computer	5,346	$47.17
Mechanical Engineers	7,899	$42.90
Electrical and Electronics Engineering Technicians	6,341	$29.21
Mechanical Engineering Technicians	1,694	$25.84
Avionics Technicians	364	$26.27
Aircraft Mechanics and Service Technicians	2,590	$24.43
Industrial Machinery Mechanics	8,816	$20.79
Maintenance Workers, Machinery	2,266	$20.74
First-Line Supervisors of Production and Operating Workers	13,587	$26.76
Engine and Other Machine Assemblers	890	$17.07
Structural Metal Fabricators and Fitters	1,615	$17.45
Team Assemblers	11,081	$13.56
Computer-Controlled Machine Tool Operators, Metal and Plastic	1,698	$18.48
Machinists	8,199	$19.75
Welders, Cutters, Solderers, and Brazers	8,665	$19.00
Inspectors, Testers, Sorters, Samplers, and Weighers	9,540	$17.19
Laborers and Freight, Stock, and Material Movers, Hand	50,229	$12.15
Total	152,529	$22.25



Source: EMSI Complete Employment, 2012.3

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Major Employers

AERIAL Machine & Tool
Aerojet
Alcoa Howmet
Aurora Flight Science
BAE Systems
Boeing
Cobham North America
Dynamic Aviation Group
EADS North America
Euro Composites
General Dynamics
Goodyear Tire & Rubber
Kollmorgen
L-3 Communications
Lockheed Martin
Measurement Specialties
Moog
Northrop Grumman
Orbital Sciences Corp.
Raytheon
Rockwell Collins
Rolls-Royce N. A.
RTI International Metals
The Aerospace Corp.
Triumph Aerospace

Military and Federal

The Pentagon
Central Intelligence Agency
Dept. of Homeland Security
Fort Belvoir
Fort Lee
Fort Myer
Fort Pickett
Joint Base Langley-Eustis
Marine Corps Base Quantico
Missile Defense Agency
National Ground Intelligence Center
National Reconnaissance Office
Naval Air Station Oceana
Naval Surface Warfare Center, Dahlgren
Navy Commander Operational Test and Evaluation Force
Norfolk Naval Base
Office of Naval Research
Space and Naval Warfare Systems Command

Research and Development

Commonwealth Center for Advanced Manufacturing
Commonwealth Center for Aerospace Propulsion Systems
Defense Advanced Research Projects Agency
NASA Langley Research Center
National Center for Coatings Application, Research & Education
National Center for Hypersonic Combined Cycle Propulsion
National Institute of Aerospace
Virginia Modeling, Analysis, and Simulation Center
Virginia Space Grant Consortium

Education

University

Virginia Tech
University of Virginia
Old Dominion University
Virginia Commonwealth University
Liberty University
Hampton University
Averitt University

Community College

Blue Ridge Community College
John Tyler Community College
Thomas Nelson Community College

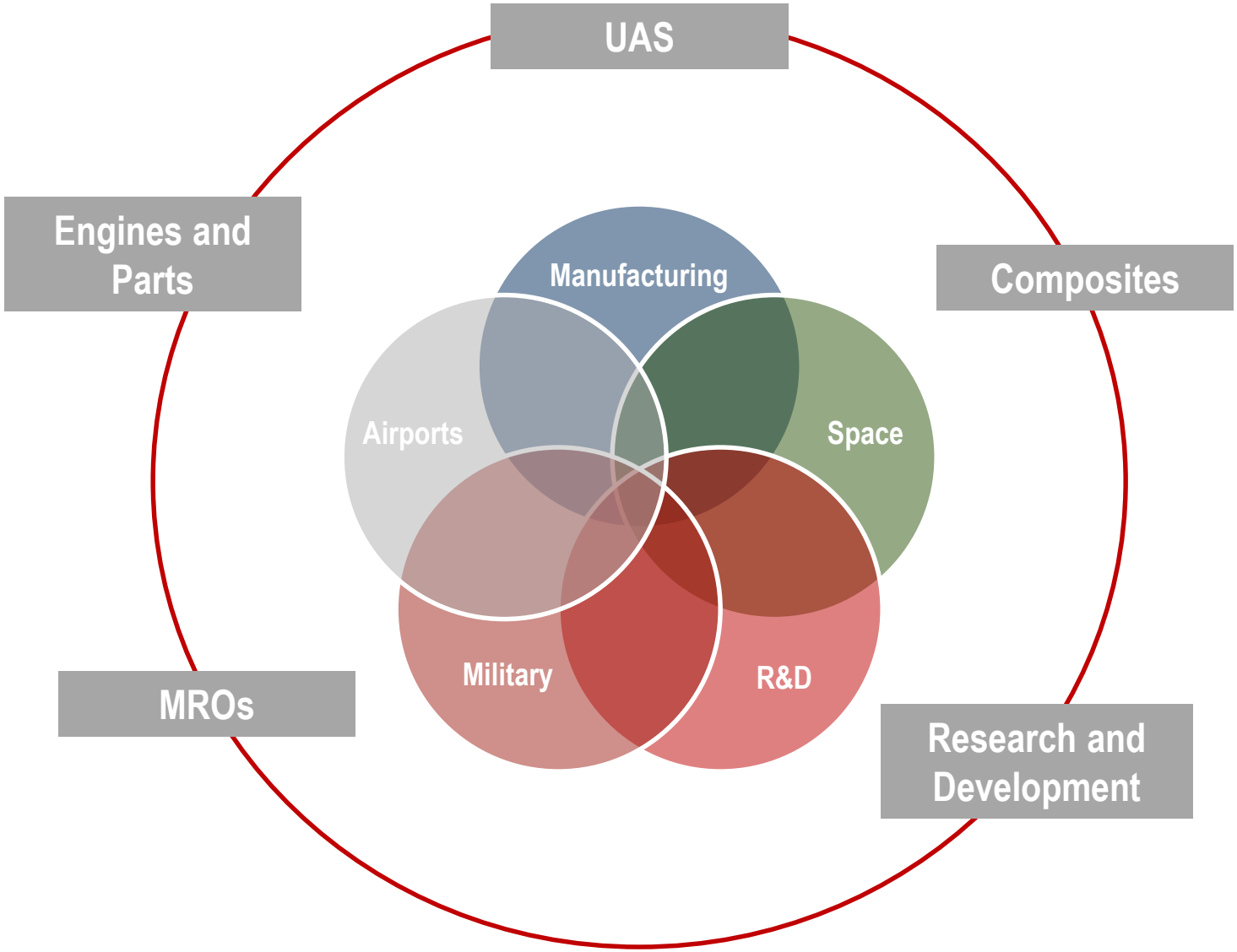
High School

Aviation Academy of Newport News Public Schools

Airports

Washington Dulles International Airport
Ronald Reagan Washington National Airport
Charlottesville-Albemarle County Airport
Lynchburg Regional Airport
Newport News-Williamsburg International Airport
Norfolk International Airport
Richmond International Airport
Roanoke Regional Airport
Shenandoah Valley Regional Airport
57 general aviation airports

VIRGINIA'S AEROSPACE TARGETS



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An Ideal Launch Pad for Success

Virginia's role in the aerospace industry dates to 1917, when the nation's first civil aeronautics laboratory was established in Hampton – it is now known as the **NASA Langley Research Center**

The **federal government** and the **military** continue to play leading roles in Virginia's aerospace industry

Virginia Tech and the **Mid-Atlantic Aviation Partnership** were named as one of the FAA's six UAS test sites

In the past ten years, 67 aerospace industry projects in Virginia have announced almost **7,400 new jobs** and over **$1.7 billion** in **investments**

Recent major announcements include

- **Alliant Techsystems**
- **Boeing**
- **Goodyear Tire & Rubber**
- **Orbital Sciences Corporation**
- **Rockwell Collins**

AEROSPACE IN VIRGINIA

Virginia's Aerospace Policy

The **Mid-Atlantic Regional Spaceport** (MARS) on Wallops Island is one of four sites in the U.S with a FAA license for launches of orbital rockets

Virginia's support for **MARS** includes funding and research through the **Virginia Commercial Space Flight Authority** and **Old Dominion University**

Aircraft Sales and Use Exemption for companies headquartered in Virginia which make a minimum of a $4 million capital investment in Virginia, create at least 50 new jobs in Virginia, and enter into a memorandum of agreement with the Virginia Economic Development Partnership

Zero G Zero Tax provides an exemption from state income taxes to any space transportation company doing business in Virginia with the intent to either launch payloads from MARS or conduct spaceflight training

Space Liability and Immunity Act makes Virginia the most progressive state in the country in addressing the challenge that existing tort law posed to emerging human spaceflight transportation companies

The **Virginia Department of Aviation** cultivates an advanced aviation system that is safe and secure, provides for economic development, and promotes aviation awareness and education

Virginia supports aerospace R&D and workforce development through **Virginia Tech**, **UVA**, **Old Dominion University**, and the **Virginia Community College System**

VIRGINIA'S COMPETITIVE BUSINESS COSTS

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	Virginia
Right-to-Work	Yes
State Corporate Income Tax	6.00%
Single Sales Factor Apportionment	Yes
Sales and Use Tax	5.30%
Workers' Compensation Employer Insurance Costs Per $100 of Payroll	$0.72
Unemployment Insurance Tax Per Employee	$177
Average Industrial Electric Rate (cents per kilowatt)	6.38
Average Price of Natural Gas Delivered to Industrial Customers (dollars per thousand cubic feet)	6.44

VIRGINIA'S AEROSPACE STRENGTHS

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MFG

- 9,100 people in Virginia make aerospace products
- 4,000 people in Virginia make composite products
- 5,300 people in Virginia work in machine shops

Military

- #1 state for U.S. Department of Defense Contracts
- 18,000 people exit the military from Virginia bases annually
- Home to the Pentagon and multiple major military installations

R&D

- Defense Advanced Research Projects Agency – directs and conducts military research
- National Institute of Aerospace – conducts aerospace research and awards advanced degrees
- Commonwealth Center for Aerospace Propulsion Systems – joint UVA-Virginia Tech research

Space

- Space launches from NASA Wallops Flight Facility – Mid-Atlantic Regional Spaceport
- Space systems integration expertise at NASA Langley Research Center
- Orbital Sciences Corporation manufactures satellites in Dulles, Virginia

Airports

- 9 commercial airports and 57 general aviation airports
- 25.3 million people board commercial aircraft in Virginia annually
- 1,400 people in Virginia work at FAA certificated repair stations

VIRGINIA'S AEROSPACE STRENGTHS

R&D Assets

Defense Advanced Research Projects Agency — directs and conducts military research

NASA conducts aerospace research at its **Langley Research Center and Wallops Flight Facility**

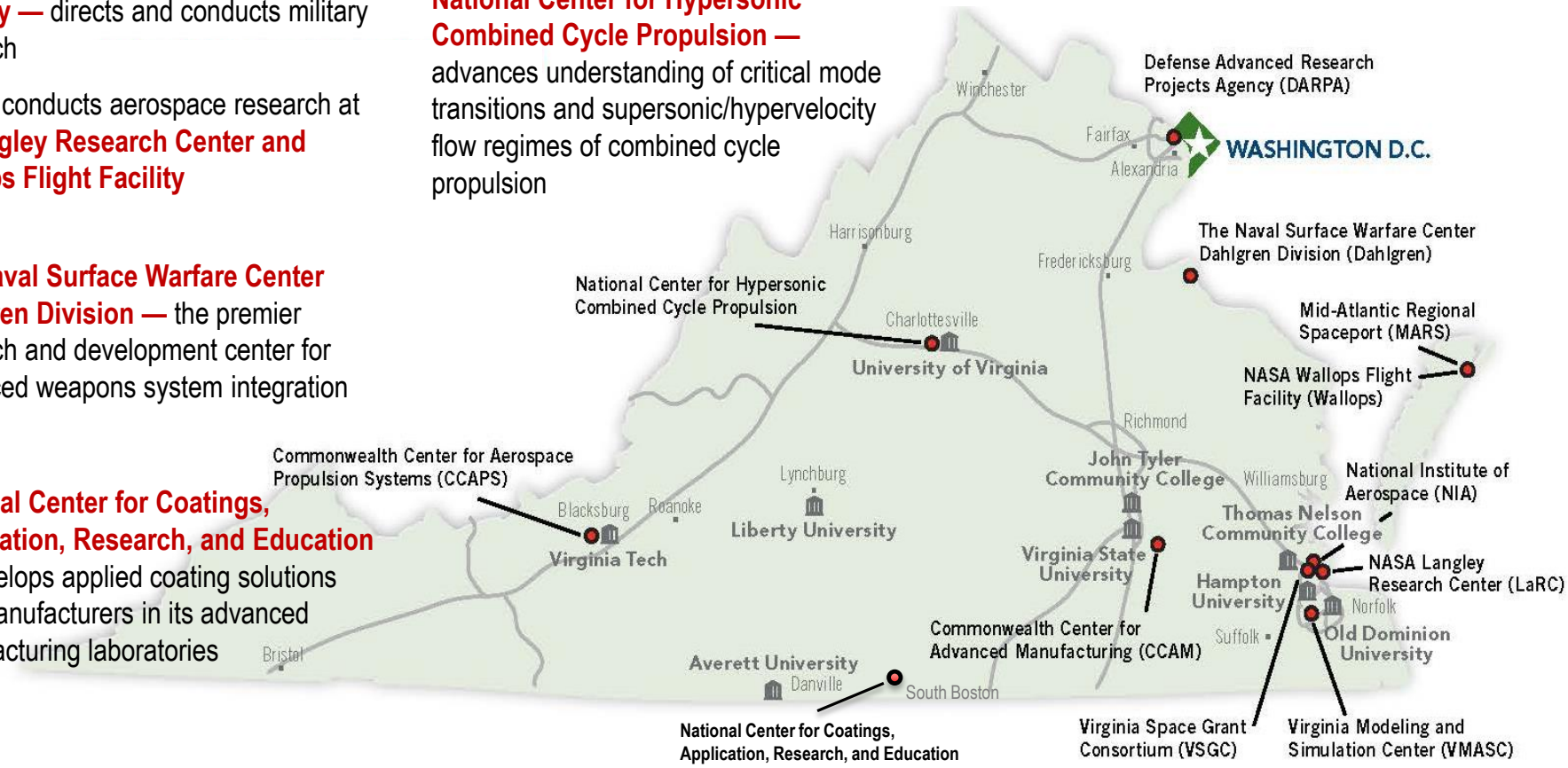
The Naval Surface Warfare Center Dahlgren Division — the premier research and development center for advanced weapons system integration

National Center for Coatings, Application, Research, and Education — develops applied coating solutions with manufacturers in its advanced manufacturing laboratories

National Institute for Aerospace — conducts research and awards advanced degrees in aerospace engineering through a partnership with nine universities

National Center for Hypersonic Combined Cycle Propulsion — advances understanding of critical mode transitions and supersonic/hypervelocity flow regimes of combined cycle propulsion

Commonwealth Center for Aerospace Propulsion Systems — a joint UVA / Virginia Tech / Rolls-Royce research effort



VIRGINIA'S AEROSPACE STRENGTHS

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R&D Assets – Virginia Tech

Key Virginia Strengths

The **Department of Aerospace and Ocean Engineering** has over 600 students, 19 full-time faculty, and offers Bachelor's, Master's, and Doctoral degrees

The **Virginia Center for Autonomous Systems** (VaCAS) designs, fabricates, flies, and tests remotely piloted vehicles and unmanned air vehicles

The **Multidisciplinary Analysis and Design** (MAD) Center designs innovative air vehicle concepts for **NASA** and the **Air Force**

Operates a full range of **wind tunnels** covering subsonic, transonic, supersonic, and hypersonic speeds

The new **Space@VT** will include an operations center for tracking satellites in orbit and a clean room for designing and preparing experiments to fly on satellites

The new **Advanced Propulsion and Power Laboratory** (APPL) will house test cells to conduct experiments on full-size gas turbine engines and cover all phases of the engine, from intake to exhaust

VIRGINIA'S AEROSPACE STRENGTHS

R&D Assets – University of Virginia

Key Virginia Strengths

The **Department of Mechanical and Aerospace Engineering** awards Bachelor's, Master's, and Doctoral degrees

Aerospace Research Laboratory	Hypersonic Propulsion
	Hypersonic Aerodynamics
	Flapping Wing Aerodynamics
	Optical Detectors
Rotating Machinery and Controls (**ROMAC**) Industrial Program	Rotor Dynamics
	Turbo Machinery
	Structural Dynamics
	Magnetic Bearings
	Automatic Controls
	Fluid Film Bearings
Undergraduate aerospace study includes	Fluid dynamics
	Structures
	Propulsion
	Controls
	Flight dynamics
	Design

VIRGINIA'S AEROSPACE STRENGTHS

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R&D Assets – Other Universities

Key Virginia Strengths

Old Dominion University – Department of Mechanical and Aerospace Engineering	Wind Tunnels Microfludidics Lab Vibration and Space Systems Lab
Hampton University – Center for Aeropropulsion	Aerodynamics Propulsion Aeroacoustics Hypersonics Sensors
Averett University – Areas of study include	Flight Operations Aviation Business Aviation Maintenance Operations Aviation Technical Systems Aerospace Management
Liberty University – Areas of study include	Commercial/Corporate Aviation Military Aviation Missions Aviation Unmanned Aerial Systems Aviation Maintenance
Virginia Commonwealth University – Unmanned Aerial Vehicle Laboratory	

VIRGINIA'S AEROSPACE WORKFORCE

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Workforce and Education

The **National Institute of Aerospace** is a graduate education center created to

- Conduct leading-edge aerospace research
- Develop new technologies
- Prepare the scientists and engineers of the future

Virginia Tech, **University of Virginia**, and **Old Dominion University** offer undergraduate and graduate degrees in aerospace engineering

In *Aviation Week*'s 2013 Workforce Study, aerospace employees ranked **Virginia Tech** as one of the top universities for advancing their career

The **Virginia Community College System** provides education and training programs, including degrees in

- Aviation Maintenance Technology
- CAD/CAM
- Industrial Production
- Mechanical Engineering Technologies
- Precision Machining Technology
- Welding

State of the art equipment used in a **John Tyler Community College - Rolls-Royce Crosspointe** workforce training partnership

- 5-axis horizontal machining center
- Coordinate measuring machine
- Electrical discharge machine
- Non-destructive testing equipment

The **Aviation Academy** in the City of Newport News is an aviation magnet school with a four-year program to prepare high school students for aerospace careers

VIRGINIA AND THE MAAP STRUCTURE

- Awarded the FAA UAS Test Site OTA through Virginia Tech
- Led by Virginia Tech, Rutgers and University of Maryland
- Includes Academia, Government, Industry, Economic Development Agencies and Non-Profit Organizations
- Specific Team strengths:
  - Three top 50 research universities
  - Companies w/ experience in UAS development, manufacture, operation and testing
  - Existing relationships to federal UAS R&D centers
    - William J. Hughes FAA Technical Center
    - NASA Langley
    - NASA Wallops
    - NAVAIR Patuxent River
    - NSWC Dahlgren
  - International airport with 10,000' runway
  - Flexible and diverse airspace
  - Funding provided from State Economic Development

VIRGINIA'S AEROSPACE TARGETS

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UAS

Virginia's Advantages

Aurora Flight Sciences develops and builds UAS in Manassas

UAV Pro conducts UAS training and research in Blackstone at the **Fort Pickett** Army National Guard Maneuver Training Center

Virginia Tech and the **Mid-Atlantic Aviation Partnership** were named as one of the FAA's six UAS test sites

Northrop Grumman is headquartered in Fairfax

Over **1,500** people work at **34** UAS-related companies

The **Pentagon**, home to the Department of Defense, the primary buyer of UAS, is in Alexandria

DARPA funds and conducts UAS research, headquartered in Arlington

National Institute of Aerospace conducts UAS research in Hampton

Virginia Tech and the **University of Virginia** conduct UAS research in Blacksburg and Charlottesville

The **Kitty Hawk** moment in Wise – UAS delivering medical supplies

CAPITALIZING ON UAS GROWTH OPPORTUNITIES

- Advertising
- Lead Generation
- Governor’s Marketing Missions
- Public & Media Relations
- Marketing Materials
- Web Development
- Social Media
- Trade Shows & Event Marketing

Fly WISELY & Virginia: Innovating Together

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