Civilian UAS – The Flight Path from Legislation to Reality

October 10, 2012

The webinar will begin shortly. The slides and a recording of the webinar will be sent to you after the event.
Panelists

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Discussion

• Introduction to Civilian UAS
• Legislation, Rulemaking and Advocacy
• Civilian UAS Market Outlook
• FAA and the Current Regulatory Environment
• Civilian UAS Require a Comprehensive Legal Framework
CONNECTING THE UNMANNED SYSTEMS COMMUNITY ACROSS THE GLOBE
Unmanned Aircraft Systems in the National Airspace

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Discussion Topics

- About AUVSI
- State of the UAS Industry
- UAS Integration Timeline
- Outstanding Issues (with a focus on privacy)
AUVSI’s mission is to advance the unmanned systems and robotics community through education, advocacy and leadership.

AUVSI’s vision is to improve humanity by enabling the global use of robotic technology in everyday lives.

- In its 40th year, AUVSI is the world’s largest non-profit association devoted exclusively to unmanned systems and robotics
  - Air, Ground and Maritime
  - Defense, Civil and Commercial
- AUVSI represents 7,000 members, including more than 580 corporate members from over 60 allied countries
- Diverse membership from industry, government and academia

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AUVSI Events

- AUVSI’s Unmanned Systems North America Symposium and Exhibition *(Las Vegas, 6-9 August 2012)*
  - The World’s Largest Unmanned Systems Event
  - More than 7,400 Delegates and 571 Exhibitors from more than 40 Countries
  - Michael Huerta, Acting Administrator, FAA, and Leslie Cary, Secretary, UAS Study Group, ICAO delivered keynotes
  - Jim Williams, executive manager of the FAA UAS Integration Office, briefed on the FAA’s most recent efforts to integrate UAS into the National Airspace System
  - 100+ “other” presentations, panels, workshops and posters

- AUVSI’s Unmanned Systems Program Review
  - Military and Civilian Government Agency Updates on Unmanned Systems Programs

- Global Reach and Participation in Events in Australia, Canada, Europe, Asia, South America, the Middle East and the United States
- Webinars, Roundtables, Workshops and more

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AUVSI Advocacy

Advocacy

- AUVSI advocates for the interests of the entire unmanned systems community (air, ground and maritime) with lawmakers, regulators and decision makers.

- In the US, AUVSI works closely with a number of Congressional Committees and Subcommittees, the House Unmanned Systems Caucus, which has more than 60 members and with Members to develop a Senate Unmanned Systems Caucus.

- AUVSI serves on the FAA’s Aviation Rulemaking Committee (ARC) Implementation Planning Working Group.

- AUVSI has held numerous events on Capitol Hill to educate Members of Congress and their staff.

- AUVSI works with the FAA and other US federal agencies (DHS, DOJ, DOD, NASA).

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AUVSI Products and Services

- Publications
  - Unmanned Systems Magazine – readership of 18,000
  - Mission Critical – more than 40,000 individual page views
  - eBrief – distributed to more than 36,000 individuals

- Communications
  - Media Outreach
  - Public Awareness and Education Campaign
  - Social Media
    - LinkedIn Group – more than 6,300 members
    - Twitter – more than 2,200 followers
    - Facebook – more than 1,400 followers

- Knowledge Resources
  - Knowledge Vault
  - Market Reports
    - US Jobs Report
    - Economic Analysis
    - Home Healthcare, Agriculture and First Responder Market Reports
  - Vehicle Database

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What is an Unmanned Aircraft System (UAS)

- There is nothing unmanned about an unmanned system!

- What to call it?
  - Unmanned Aircraft System (UAS)
  - Unmanned Aerial Vehicle (UAV)
  - Remotely Piloted Aircraft (RPA)
  - Remotely Piloted Vehicle System
  - “Drone”
  - Model Aircraft?

- Public perception is somewhat skewed
  - Predators/Drones
  - Weaponized
  - Autonomy

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### Why Use a UAS?

- Border Security
- Arctic Research
- Firefighting
- Flood Monitoring
- Crop Dusting
- Mining
- Farming
- Aerial Photography
- Real-estate
- Communications
- Industrial Logistics
- Pollution Monitoring
- Storm Research
- HAZMAT Detection
- Asset Monitoring
- Event Security
- Port Security
- Construction
- Cargo
- Broadcasting
- Search & Rescue
- Volcanic Research
- Pipeline Monitoring
- Filmmaking
- Crowd Control
- Aerial News Coverage
- Wildlife Monitoring
- Forensic Photography
- Power line Surveying
- Damage Assessment

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UAS Economic Potential

- The latest Teal Group report estimates and forecasts (in US dollars):
  - The UAS global market is currently **$6.6 billion**
    - Research and development (R&D) and procurement spending
  - Over the next 10 years, the UAS global market will double, for a total of **$89 billion**
  - The Teal Group study predicts that the U.S. will account for **62%** of the worldwide research and development spending on UAS technology over the next decade, and **55%** of the procurement.
Current Rules to Operate a UAS

- FAA considers UAS an “aircraft”
  - Once defined as an aircraft……rules apply
  - Only certificated aircraft can operate in the NAS
    - UAS are not yet certified (no standards)
    - Advisory Circular 91-57 exempts model aircraft

- “Accommodation Phase” (only 3 options)
  1. Experimental Certification (only 12 issued)
  2. Special Use Airspace (DOD owned/operated)
  3. Waivers: Certificate of Authorization (COA)
    - Approximately 300 current COAs
    - Only for “Public” operators

- One Size Should NOT fit all!
  - 4lbs small UAS vs. 23,000lbs Global Hawk
After 5 years, and 23 extensions, Congress passed an FAA bill on 14 Feb. 2012

For the first time ever, Congress included language requiring the FAA to safely integrate UAS into the national airspace

The bill creates a number of deadlines for the FAA to meet on their way to the safe integration of UAS by 30 Sept. 2015

The major provisions include:
- First responder access
- Arctic provision
- Six UAS test sites
- UAS Roadmap
- Small UAS rule
FAA Bill Timeline

• 14 Feb. 2012
  ▪ FAA bill signed into law

• 14 May 2012 (90 days)
  ▪ Expedited Certificate of Authorization (COA) for **public** UAS
  ▪ FAA agreement with the U.S. Department of Justice, National Institute of Justice’s Aviation Technology Program on a “new law enforcement expedited COA process”
    ▪ Some of the proposed changes include:
      1. Allow for similar type operations throughout an agency’s jurisdiction (blanket COA) for operations (not just testing)
      2. UAS weighing 25 lbs or less (there are currently **146 platforms** that weigh less than 25 lbs manufactured by **69 different companies** in North America)
      3. Under 400’ AGL
      4. Line-of-sight under VFR conditions
      5. Permit certain operations within Class C, D, E, and G airspace
      6. Develop an online knowledge based test in lieu of a pilots license
      7. The FAA will create a sample Safety Risk Analysis Plan for agencies to use/adopt
      8. DOJ planning a law enforcement conference to help educate agencies on these new rules.

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12 Aug. 2012 (180 days)

- Establish a program for **Six UAS test sites**
  - On 7 March, the FAA released a Request for Public Comment
  - Currently under “Executive Review”
    - A recent GAO report cites privacy concerns for the delay

- Develop a plan and initiate a process for designating permanent areas in the **U.S. Arctic** where small UAS (55lbs and less) can operate: 24 hours a day
  - beyond line-of-sight
  - for research and commercial purposes
  - over water
  - with coastal launch sites
  - to at least 2,000’ in altitude
FAA Bill Timeline Cont.

• 10 Nov. 2012 (270 days)
  ▪ The FAA must develop a comprehensive integration plan to safely accelerate the integration of civil UAS into the NAS
  ▪ The FAA is working with their Aviation Rulemaking Committee and the Joint Planning and Development Office (JPDO) on developing the plan. AUVSI is helping the JPDO through the NextGen Institute and FAA ARC.

• 14 Feb. 2013 (1 year)
  ▪ The FAA must release a 5 year roadmap

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14 Aug. 2014 (2.5 years)
- The FAA must publish a Final Rule on small UAS (55lbs or less)
- First time commercial use will be allowed
- Notice of Proposed Rulemaking Pending at DOT
- Still restricted use

15 Sept. 2015
- The date for the safe integration of UAS
  - What does “safe integration” mean?
    - Full Integration?
    - Small UAS?
    - File and Fly?
    - Beyond Line-of-Sight?
    - Nighttime Operations?
    - Over Populated Areas?
Outstanding Issues....

- Issues that need to be addressed:
  - Standards (ASTM F-38 and RTCA SC203)
  - Definitions
  - Sense and Avoid
  - Aircraft certification/registration
  - Operator training/certification/registration/licensing
  - Air traffic requirements/procedures
  - Spectrum allocation
  - Secure command and control links
  - Secure GPS
  - Lost link procedures
  - Safety analysis/risk acceptance
  - Insurance
  - Liability
  - Public perception
  - Privacy

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Privacy – What Sparked the Debate

- EPA flying “drones” over farmer fields
  - Numerous news agencies erroneously reported that the EPA was flying UAS to conduct Clean Water Act violation inspections
    - EPA doesn’t own/fly any UAS
      - It’s been flying manned aircraft for decades
  - Charles Krauthammer on Fox News, 14 May 2012
    "I would say that you ban it under all circumstances and I would predict, I'm not encouraging, but I am predicting that the first guy who uses a Second Amendment weapon to bring a drone down that's been hovering over his house is going to be a folk hero in this country,“

- Numerous bills were introduced and Members of Congress spoke about the government’s regulatory overreach.

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AUVSI: Strongly Supporting Privacy

- AUVSI believes we can expand the use of unmanned systems safely and responsibly without infringing Americans’ Constitutional rights.

- AUVSI encourages an open dialogue at the national, state and local level with multiple stakeholders to discuss issues related to the integration of UAS into the national airspace, including privacy.
  - Met with more than a dozen privacy groups
  - Met with approximately 100 Congressional offices

- Privacy Panel at conference

- Submitted testimony to a Congressional hearing

- Given over 100 media interviews

- Working with numerous law enforcement agencies
  - IACP, NSA, ALEA, DOJ, DHS

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Judicial Precedent and Proposed Legislation

- UAS industry supports laws already on the books to protect privacy
  - AUVSI Code of Conduct: “We will comply with all federal, state, and local laws, ordinances, covenants, and restrictions as they relate to UAS operations.”

- UAS operations will ALWAYS have to comply with:
  - Fourth Amendment to the U.S. Constitution against unreasonable searches and seizures
  - Supreme Court precedent

- More than a dozen bills introduced impacting the use of unmanned aircraft this year, including:
  - Rep. Michal Burgess (R-Texas) H.R. 5950 introduced the “No Armed Drones Act”
  - Rep. Shelley Moore Capito (R-W.V.) H.R. 5961 the “Farmer’s Privacy Act”
In July 2012, AUVSI released the industry’s first ever “Code of Conduct” to ensure the safe, non-intrusive operation of UAS.

- Provides guidelines for those who design, test and operate UAS
- Emphasizes safety, professionalism and respect

The Code of Conduct explicitly supports individual privacy:

- “We will respect the privacy of individuals.”
- “We will respect the concerns of the public as they relate to unmanned aircraft operations.”
- “We will support improving public awareness and education of the operation of UAS.”
AUVSI’s Code of Conduct

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“I think it's really important that they're paying attention to privacy. That's to their credit.”
- Chris Calabrese, American Civil Liberties Union, 7/2/12
Privacy Guidelines for Law Enforcement

- AUVSI publicly applauded law enforcement’s push for privacy
  - Supported and promoted privacy guidelines introduced by the International Association of Chiefs of Police (IACP)

- IACP guidelines adopted by:
  - The Airborne Law Enforcement Association
  - The FBI Law Enforcement Executive Development Association
  - FBI National Academy Associates
  - Grand Forks (ND) Sheriff’s Department
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Police chiefs urge limits on use of drones
Washington, DC - The nation’s largest consortium of police officials is calling for the limited use of unmanned drones in local law enforcement operations...
Privacy Guidelines for Law Enforcement

“The IACP is to be applauded for addressing this issue, and for issuing recommendations that are quite strong…”

- Jay Stanley, ACLU Senior Policy Analyst, 8/17/12
Experts agree: Legal framework already in place a good start to protecting Americans’ privacy…
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Flurry of 'drone' bills shows Congress has much to learn

“It is quite reasonable for Americans to be concerned how a new technology will impact their personal privacy. It has been a concern since the founding of this country. Fortunately, there is already precedent, through the Constitution’s Fourth Amendment and case law, by which users of this new technology must abide.”

- Tim Adelman, legal expert on the use of unmanned aircraft systems by law enforcement agencies, 9/20/12

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Will "Drones" Outflank the Fourth Amendment?

“In a word, no. The Fourth Amendment...has served us well across over two centuries of technology advances, and there is no reason to expect that it will suddenly lose its protective power when domestic use of unmanned aircraft becomes common.”

- John Villasenor, UCLA Professor and Brookings Institute Non-Resident Fellow, 9/20/12
Questions?
Civilian UAS Market Outlook

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UAS in Manned Airspace - Future

• FAA, JPDO, & DoD’s Vision
  – A global transportation system which allows **routine access** for all classes of Unmanned Aircraft Systems

• Foundational Requirements
  – Conduct UAS operations safely and expeditiously, present no threat to the general public, and **do no harm** to other users of the NAS
    • Aircraft must be certified
    • Pilots/Operators must be qualified to operate the aircraft in the class of airspace
    • Flight operations must be in compliance with applicable regulatory guidance
  – UAS integration plan must be **compatible with ATM infrastructure**

The market potential of unmanned aircraft on the civil side is considerably larger than the military sector in the long term

– Frost & Sullivan 2012
Indicators of Emerging Market

“FAA is projecting a fleet of 10,000 active sUAS in five years. In ten years, the fleet is projected to increase to 25,000 units and grows to 30,000 units by 2030”
Additional Indicators

• Department of Defense

• Department of Transportation

Pivotal Issue: Airspace Access
Congress Steps in and Demands Action

2012 FAA Modernization and Reform Act
- Defines UAS-in-NAS integration timetable for small UAS
- Creates 5-year Pilot Projects
- Expands UAS Applications in Arctic
- Creates Provision for non-DoD (Public) UAS

2015 is a Key Year!
Summary

- UAS Market Poised for Growth
- UAS Market Potential is Promising
- Key Constraint: Access to Airspace
- Certification Unlocks Access
Questions?
Webinar: Civilian Unmanned Aircraft Systems (UAS)

FAA and the Current Regulatory Environment

October 10, 2012

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FAA’s Statutory Role

• Safe and efficient use of airspace by civil and public operators
• Minimum safety standards for civil aircraft and airmen
  UAS are “aircraft” - Therefore
  Registration
  Type and Airworthiness Certification
• General Operating and Flight Rules (Part 91) for operations in the National Airspace System (NAS)
  Some apply only to civil aircraft
  Some apply to all aircraft
  Each aircraft operator must “see and avoid” other aircraft
UAS Challenges

• Need for an accepted technical equivalent for “see and avoid”
• Need for specific airworthiness standards for civil UAS
• Therefore:

  Civil UAS need special airworthiness certificates - experimental

  Appropriate operating limitations
  Commercial operations prohibited

  Public aircraft operations with UAS need a Certificate of Authorization (COA)

  Appropriate operating limitations
Ongoing UAS activities

- UAS Test Site Selection process
  77 FR 14319, March 9, 2012

- UAS Test Site Webinar, April 10-11, 2012

- UAS Aviation Rulemaking Committee II

- Small UAS (sUAS) Notice of Proposed Rulemaking

- RTCA/ SC 203 Developing technical standards for UAS
International aspects

• Outside the NAS there are only “civil” and “state” aircraft

• ICAO, Article 8, Chicago Convention of 1944
  “No aircraft capable of being flown without a pilot shall be flown over the territory of a contracting State without special authorization...[e]ach...State [must] insure that the flight of such aircraft without a pilot in regions open to civil aircraft shall be controlled as to obviate danger to civil aircraft.”
Regulations and Policies

• Title 14 Code of Federal Regulations

• Part 1, Definitions, Aircraft and Civil Aircraft, section 1.1

• Part 21, Certification Procedures for Products and Parts

• Part 21, Subpart H, Airworthiness Certificates, Experimental Certificates, sections 21.191 and 21.193

• Part 91, General Operating and Flight Rules
Regulations and Policies (cont’d)

Advisory Circulars

• **AC 21-12**, Application for U.S. Airworthiness Certificate, FAA Form 8130-6

• **AC 45-2**, Identification and Registration Marking

• **AC 91-57**, Model Aircraft Operating Standards
Regulations and Policies (cont’d)

Orders

- **Order 1110.150**, Small Unmanned Aircraft System Aviation Rulemaking Committee (ARC)

- **Order 8130.2**, Airworthiness Certification of Aircraft and Related Products

- **Order 8130.20**, Registration Requirements for the Airworthiness Certification of U.S. Civil Aircraft

- **Order 8130.34** (PDF), Airworthiness Certification of Unmanned Aircraft Systems
Regulations and Policies (cont’d)

Policies

- **Federal Register Notice - Clarification of FAA Policy**, UAS Operations in the U.S. National Airspace System
- **Interim Operational Approval Guidance 08-01**, Unmanned Aircraft Systems Operations in the U.S. National Airspace System
- **UAS Certification Status, November 15, 2006**, includes FAA focal points for UAS certification project coordination
- **UAS Certification Status, Optionally Piloted Aircraft and Accidents Involving UAS, August 18, 2008**, Revision to AVS Policy
Questions?
Civilian UAS Require a Comprehensive Legal Framework

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Safety & Licensing

• Who will be permitted to operate UAS outside of government/research purposes?
• What qualifications, licensing and training will be required for such operations?
• What types of business models will these regulations support?
  ▪ GAO suggests a multi-use leasing model
• Insurance requirements – both regulatory and market driven, will play a role.
Privacy²

• Given the projected growth in utilization of UAS, will The Privacy Act of 1974 and the E-Government Act of 2002 be a broad enough base from which to assure privacy?

• Should UAS have their own set of privacy regulations?

• Should privacy regulation at the federal level be centralized?

• And where will the Supreme Court come down?
Security Regulation

• TSA indicates that its UAS security advisories apply
• TSA has not indicated the steps it has taken to mitigate or eliminate known and potential threats implicit in UAS operations
• Some DHS/TSA references pertain to limited UAS operations in a controlled environment, but what about the future environment?
Loss of Control, Jamming and Spoofing

• What will the regulations require?
• What should they require?
• Will safety trump the cost of redundant guidance systems or signal encryption?
• Is risk analysis all that is required?
Don’t Forget Mom, Pop, & the Kids

• Model aircraft – hobbies and recreation
• Will voluntary compliance suffice as the number of UAS and UAS operations greatly increase?
• Is 25 year old guidance reflective of current technology?
• Is this the biggest security risk?
Questions?
Thank you

Reminder. The slides and a recording of the webinar will be sent to you.