National Council on State Legislatures

Unmanned Aircraft Systems
Roadmap to the Future

Michael Toscano
President & CEO

Association for Unmanned Vehicle Systems International (AUVSI)
Overview

- About AUVSI
- What is an Unmanned Aircraft System
- Economic Impact
- What started the Privacy Debate
- Proposed State Legislation
- FAA SIR on Test Sites
- AUVSI’s Position on UAS Privacy Issues
About AUVSI

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 7,500 members, including more than 600 corporate members from more than 60 allied countries

- Diverse membership from industry, government and academia
AUVSI Events

- **AUVSI’s Unmanned Systems Symposium and Exhibition (Washington DC, 11-15 August)**
  - 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

- **AUVSI’s Unmanned Systems Program Review (Washington, DC, 4-6 November 2014)**
  - Military and Civilian Government Agency Updates on Unmanned Systems Programs

- **AUVSI’s Driverless Car Summit (Detroit, 11-12 June)**
  - Dedicated to understanding and working to solve the core challenges impacting driverless vehicle integration onto tomorrow’s roadways.

www.auvsi.org
AUVSI Advocacy

- AUVSI advocates for the interests of the entire unmanned systems community with Members of Congress, the FAA, and other stakeholders

- **House Unmanned Systems Caucus**, Co-chaired by Reps. McKeon (R-CA) and Cuellar (D-TX) which has more than 60 members.

- **Senate Unmanned Aerial System Caucus**, Co-chaired by Senators Inhofe (R-OK) and Manchin (D-WV), which already has 7 members.

- Testifying at Congressional hearings

- AUVSI hold numerous events on Capitol Hill every year to educate Members of Congress and their staff

- AUVSI works with other US federal agencies (DHS, DOJ, DOD, NASA, USGS…)
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
- Public perception is somewhat skewed
  - Predators/Drones
  - Weaponized
  - Autonomy
## Why Use a UAS?

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<tr>
<th>Border Security</th>
<th>Industrial Logistics</th>
<th>Search &amp; Rescue</th>
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<tr>
<td>Arctic Research</td>
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<td>Firefighting</td>
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<td>Crop Dusting</td>
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<td>Mining</td>
<td>Event Security</td>
<td>Aerial News Coverage</td>
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<td>Farming</td>
<td>Port Security</td>
<td>Wildlife Monitoring</td>
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<td>Aerial Photography</td>
<td>Construction</td>
<td>Forensic Photography</td>
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<td>Real-estate</td>
<td>Cargo</td>
<td>Power line Surveying</td>
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<tr>
<td>Communications</td>
<td>Broadcasting</td>
<td>Damage Assessment</td>
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UAS Economic Potential

- AUVSI’s 2013 Economic Report:
  - www.auvsi.org/econreport

  - The UAS global market is currently $6.6 billion

  - Over the next 10 years, the UAS global market will double, for a total of $140 billion

  - The economic impact of US airspace integration will total over $13.6 billion in the first three years and will grow sustainably for the foreseeable future, cumulating to over $82.1 billion between 2015 and 2025

  - Every year that airspace integration is delayed will cost the U.S. over $10 billion in lost potential economic impact, which translates to $27 million per day
UAS Industry on the Rise

AUVSI Economic Impact Study of UAS Integration

• Nationally:
  • >70,000 jobs in the first three years following integration
  • >100,000 jobs after 11 years

**EXAMPLE:**

• Colorado
  • First three years following integration:
    • 1,191 jobs
    • $232 million in economic impact
  • In the 11 years following integration:
    • 1,760 jobs
    • $1.4 billion in economic impact

Additional economic benefit will be seen through tax revenue to Colorado, which will total more than $10.8 million in 11 years following the integration.
Emerging Commercial UAS Uses

- **Agriculture**
  - 80% of the potential commercial market for UAS
  - Drought management
  - Disease detection
  - Watering
  - Spraying pesticides

- **News Media**

- **Geological surveys**

- **Real estate**

- **Wildlife Monitoring**

- **Filmmaking**

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UAS Job Potential

- US airspace integration will create more than 34,000 manufacturing jobs and more than 70,000 new jobs in the first three years.

- By 2025, total job creation is estimated at 103,000.

- The manufacturing jobs created will be high paying and require technical degrees.

<table>
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<tr>
<th>Position</th>
<th>Annual Salary Range</th>
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<tr>
<td>UAS Pilot</td>
<td>$85,000–$115,000</td>
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<td>Systems Engineer</td>
<td>$72,350–$127,000</td>
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<td>Instructor/Training Specialist</td>
<td>$74,500–$93,000</td>
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<td>Intel/Imagery Analyst</td>
<td>$57,350–$84,600</td>
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<tr>
<td>Maintenance Specialist</td>
<td>$59,500–$67,500</td>
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<tr>
<td>Sensor/Payload Operator</td>
<td>$69,300–$89,450</td>
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<tr>
<td>Manufacturing</td>
<td>$45,700–$67,890</td>
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<tr>
<td>Consultant</td>
<td>$70,500–$145,000</td>
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UAS Test Sites

- Establish a program for **Six UAS test sites**
  - On 14 Feb (the one year anniversary of the FAA bill) the FAA released it’s Request for Proposals

- **50 Applicants from 38 Different States**

- Each applicant must file seven (7) documents on different deadlines, which will be scored, outlining:
  - Safety Plan
  - Experience
  - Risk Mitigation
  - Existing ground infrastructure
  - Airspace design
  - Economic impact assessment
  - Privacy plan

- The FAA is expected to pick the winners by December 31, 2013

- The FAA will lower scores for states that have passed restrictive UAS legislation
## Finding Opportunity

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<th>Cost</th>
<th>Service</th>
<th>Risk</th>
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What Sparked the Privacy Debate

- EPA flying “drones” over farmers’ 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,“
State Legislation – Unintended Consequences

Nearly 40 states have introduced legislation that restricts the use of UAS technology by public safety agencies. Public safety agencies could be prohibited from using UAS in instances where privacy is not an issue including:

- Firefighting assistance
- Search and rescue
- Survey of flooded areas
- Responding to natural disasters
- Forensic mapping of crime scenes
- Aerial photography of traffic accidents
- Monitoring wild fires
- Surveying hazardous material spills

Restricting use of UAS could also prevent significant savings:
- Cost of operating a small UAS: As little as $25 per hour
- Cost of operating a helicopter: $400-$600 per hour
The (Washington) state Department of Natural Resources wants to test the use of drones to combat wildfires this year. But…a bill proposing strict regulations on the purchase and use of unmanned aerial vehicles could hinder the agency’s plans.

“Overreacting to fears of the unknown could prove disastrous to the development of technology with tremendous potential to benefit society…The mishmash of laws, restrictions, and bans add up to a response that is inefficient, imprecise, bound to cause collateral damage…” - Larry Downes

“Since many of these harms may never materialize, forward-looking regulation is likely to overprotect privacy at the expense of innovation.”
Boston: A case study

The tragic bombings in Boston provide context for how technology experts, first responders and disaster managers envision UAS actually being used to help respond to emergencies and even help prevent them:

“[UAS] are a great idea...to cover an event like (the Boston Marathon), and have an eye in the sky that would be much cheaper to run than a helicopter is a really good idea.”

Boston Police Commissioner Edward F. Davis

“[UAS] might have provided the kind of surveillance that could have nabbed the suspected Boston Marathon bombers more quickly...” – NBC Bay Area

“[UAS] are a tool that every law enforcement agency would like to have. ..To say ‘no’ is unreasonable and it puts citizens and public service agencies at a disadvantage.”

Eric Holdeman, Former head of disaster planning, King County, WA

“[UAS], like manned helicopters used by police and emergency responders, can hover, provide a great overall picture of action on the ground, and direct aid to where it's needed....Popular Science

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AUVSI’s Position on UAS Privacy

All stakeholders can work together to advance UAS technology, while protecting Americans’ safety, as well as their rights. AUVSI supports:

- **Transparency Measures**
  - Register unmanned aircraft and pilots with the Federal Aviation Administration (FAA)

- **Prohibiting Weaponization**
  - The FAA already prohibits the deployment of weapons on civil aircraft

- **Data Retention Policies**
  - Governing the collection, use, storage, sharing, and deletion of data
  - Policies should be available for public review and comment
  - Policies should outline strict accountability
  - AUVSI supports the International Association of Chiefs of Police model guidelines

- **Accountability**
  - The Fourth Amendment already protects against unreasonable searches
  - People should be prosecuted for violating privacy laws

- **Technology Neutral Laws**
  - Any new laws or regulations should focus on whether the government can collect and use data, not how it is collected

www.auvsi.org
Questions?

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Back up Slides
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 with ALL stakeholders
  - Met with more than a dozen privacy groups
  - Met with over 200 Congressional offices

- Privacy Panel at conferences

- Testified at a Congressional hearing on privacy

- Given more than 400 media interviews

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

- Privacy is NOT the FAA’s responsibility

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AUVSI Code of Conduct

- In July 2012, AUVSI released the industry’s first ever “Code of Conduct” which emphasizes
  - Safety
  - Professionalism
  - 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.”

“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
Emerging Application Snapshot: Agriculture

### Applications for Unmanned Aircraft in Agriculture

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<tr>
<td>Aerial Application/Crop Dusting</td>
<td>Remote Aerial Surveying</td>
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<tr>
<td>Disease Detection and Mitigation</td>
<td>Crop Harvesting</td>
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<tr>
<td>Parasite Monitoring</td>
<td>Yield Estimation</td>
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<td>Moisture Monitoring</td>
<td>Weed Infestation Monitoring</td>
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<tr>
<td>Crop Growth Monitoring</td>
<td>Asset tracking &amp; Management</td>
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<tr>
<td>Livestock Tracking</td>
<td>Crop Inventory Tracking</td>
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<td>Disease outbreak tracking</td>
<td>Harvest Optimization</td>
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<tr>
<td>Fertilizer Management</td>
<td>Soil Erosion Monitoring</td>
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