



Unmanned Aerial Systems (UAS) in Virginia

Mr. Pete Bale
IPC Chairman of the Board
AUVSI

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 more than ***7,000 members***, including ***more than 580 corporate members*** from more than ***60 allied countries***
 - We add a new corporate member every 3.2 days
- ***Diverse membership*** from industry, government and academia

AUVSI Events

- **AUVSI's Unmanned Systems 2013 (Washington, D.C., 12-15 August)**
 - The World's Largest Unmanned Systems Event
 - • 570+ Exhibitors
 - • 8,000+ Attendees including: commercial and defense operators, CEOs and high-level decision makers, government and industry program managers, policy makers, scientists, researchers and students
 - • Delegates from more than 40 countries
 - • 100+ educational sessions
 - • Live Demonstrations on the show floor
 - • Exhibit Hall Uniform Days - military and first responders receive complimentary access to the exhibit hall and general sessions ALL 3 days
- **AUVSI's Unmanned Systems Program Review**
 - Military and Civilian Government Agency Updates on Unmanned Systems Programs

www.auvsi.org



AUVSI
ASSOCIATION FOR UNMANNED
VEHICLE SYSTEMS INTERNATIONAL

AUVSI Events Cont.

- **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.
- **AUVSI's Unmanned Systems Europe Conference (Köln, Germany, 15-16 October)**
 - Brings international UAS leaders around the world together to address the most important trends, advancements and information impacting the UAS industry.
- **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**



AUVSI Products and Services

■ **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 and the Senate Unmanned Aerial Systems Caucus.
- AUVSI has submitted testimony and questions for several US Congressional hearings related to UAS integration
- AUVSI works with the FAA and other US federal agencies (DHS, DOJ, DOD) to facilitate communication between industry and government
- AUVSI created a coalition of aviation-related associations in the US to work together on UAS integration issues and challenges (AOPA, ALPA, NATCA, AIA and more)
- AUVSI serves on the NextGen Institute's Management Council (part of the JPDO) to provide information and guidance to the FAA on NextGen implementation

AUVSI Products and Services

■ **Advocacy**

- AUVSI serves on a working group of the FAA's Aviation Rulemaking Committee (ARC)
- AUVSI is a member of both ASTM F-38 and RTCA SC203
- AUVSI meets with a variety of civil liberties groups to discuss the challenges with UAS and privacy
- AUVSI serves as an observer on the ICAO UAS Study Group and holds a position on EUROCAE's WG-73
- AUVSI participates in developing the defense robotics section for the national robotics roadmap
- AUVSI continues working with all relevant stakeholders involved with vehicle automation by bringing the industry together, exchanging ideas and disseminating information, providing a greater understanding by delving into the issues and policy through an open forum

AUVSI Products and Services

■ Publications

- *Unmanned Systems Magazine* – readership of 18,000
- *Mission Critical* – more than 250,000 individual page views
- eBrief – distributed to more than 40,000 individuals

■ Communications

- Media Outreach
- Public Awareness and Education Campaign
- Social Media
 - LinkedIn Group – more than 7,100 members
 - Twitter – more than 2,700 followers
 - Facebook – more than 1,700 followers

■ Knowledge Resources

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

Unmanned Systems Potential Applications



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





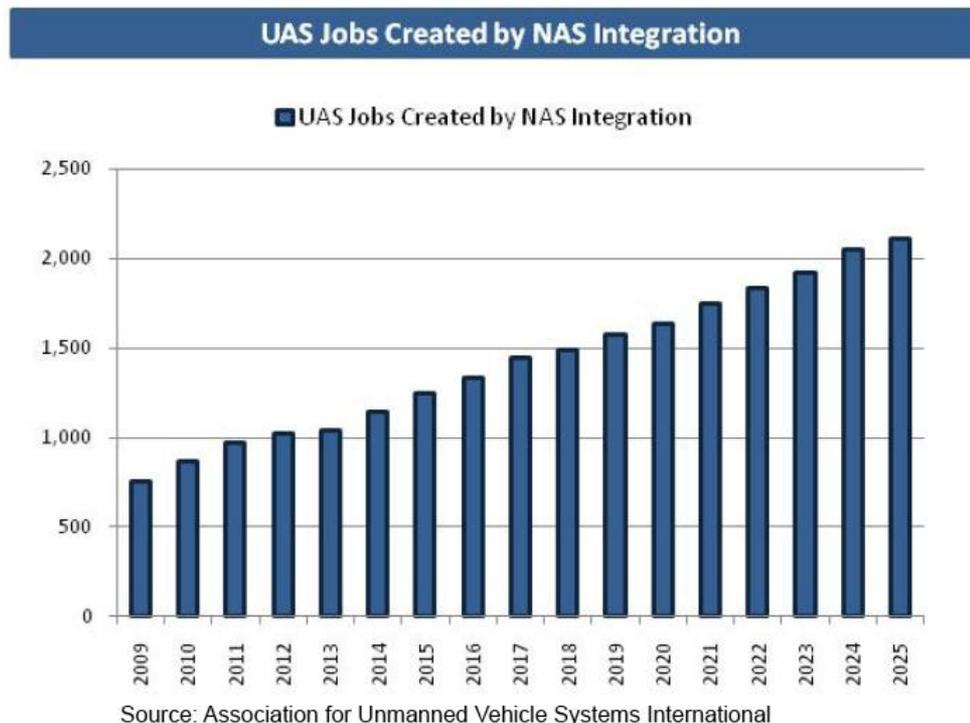
State of the Global UAS Industry

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 total **\$89 billion**
- In other detailed estimates, the Teal Group reported out of the total market estimate in R&D and procurement, **more than \$450 million** is European marketshare
 - **More than \$300 million** is Asia-Pacific marketshare
 - **More than \$350 million** is Middle East marketshare

UAS Job Potential

- In a 2010 AUVSI study of job creation in the United States, AUVSI found the integration of UAS into the airspace will create more than 23,000 new, high paying jobs by 2025
 - Research coverage limited to commercial/civil UAS sector
 - Focus on primary employment position
 - Additionally tens of thousands of secondary jobs could be created with integration



UAS Job Potential

- These jobs would equate to more than \$1.6 billion in worker earnings/wages from 2010-2025, or \$106.6 million annually
 - 2010 Sample Job Salary Ranges
- AUVSI currently producing a broader, current US jobs report and economic analysis which will be published later this year

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

UAS Platforms

- AUVSI research (to date) has identified more than 2,400 UAS platforms manufactured in the world by more than 700 companies (and still counting...)
 - North America – more than 840
 - Europe – more than 950
 - Asia – more than 200
 - Middle East – more than 150
- AUVSI's Vehicle Database continues to be updated on a real-time basis and platform manufacturers still being researched

Recent Examples of UAS Use

- U.S. **military** flew more than 600,000 UAS flight hours in 2011
- **Disaster response** and **radiation** monitoring at the Fukushima nuclear plant in Japan
- US CBP Predator B aircraft provided aerial surveillance for **wildland fire** in Southwest
- US CBP Predator surveyed **flood waters** in the upper Midwest
- USGS used small UAS to monitor cranes, Pygmy rabbits and several other **wildlife species**
- NOAA using UAS to monitor ice and **weather conditions** in the U.S. Arctic, in addition to **wildlife monitoring**
- **Police** using small UAS for **public safety**



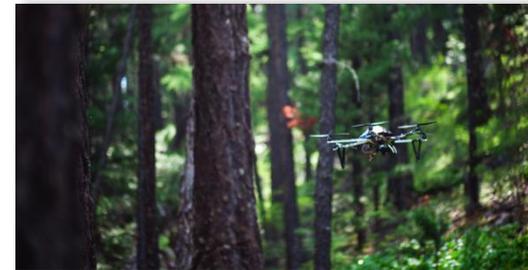
Recent Examples of UAS Use

- Aurora Flight Sciences is using the Skate UAS to study archeological sites in **Peru**
- **NATO** to operate and maintain the AGS program on behalf of all 28 alliance nations using Northrop Grumman's Block 40 Global Hawks and associated ground systems from **Germany, Italy and Norway**
- ASTRAEA and partners in the **UK** are using BAE Systems aircraft as Flying Testbed for testing weather avoidance and sense and avoid technologies
- **Japan** is using unmanned helicopters for spraying crops for pest control
- **Nepal** is testing UAS to save the Himalayan nation's endangered tigers and rhinos from poachers



Recent Examples of UAS Use

- **Russia, Angola, Nigeria, Germany, Saudi Arabia, Kuwait, United States** and others to use/using UAS to monitor and protect oil rigs, fields and pipelines
- **Brazil** to use UAS for public safety efforts, to conduct environmental surveys of the Amazon basin and for surveillance of drug crops
- **Israel** use of UAS for police surveillance patrols
- **Germany** to employ UAS use for photography, map-making, surveillance of solar farms, industrial complexes and construction sites – 500 applications as of June 2012
- **Austrian** Defense Minister wishes to use UAS to protect troops in theater, for search and rescue in natural catastrophes and for border patrol



Recent Examples of UAS Use

- **European Union** exploring use of UAS to police farm subsidies and enforce environmental rules
- The **United Kingdom's** airspace regulator exploring use of UAS to photograph and analyze agricultural land
- **Germany's** University of Berlin developed UAS for delivering pizza
- **United Kingdom, France and the Netherlands** exploring UAS use to patrol its coastline and the English Channel
- **Dutch** Firm, Green X, using bird-like UAS around Schiphol Airport to scare away geese
- **Northern Ireland** Fire Service to test use of UAS
- **Austrian** sky lit up by 50 quadrotor UAS for...art

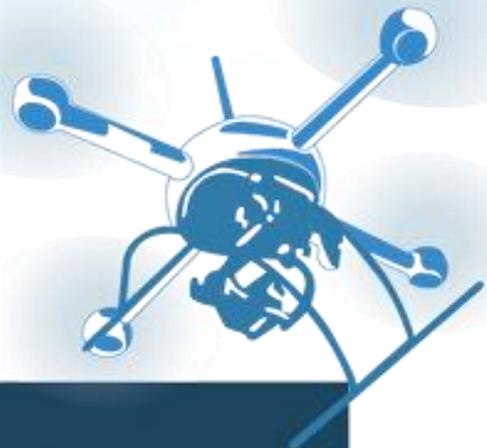


UAS Benefits to Public Safety Agencies

- **Situational Awareness** – Supporting firefighters by providing overhead view of fires
- **Search and Rescue** – Assisting the search for missing children and hikers by covering hard to access areas more quickly
- **Saving Money** – Operating UAS cost a police department a fraction of manned helicopters

the average cost of a small unmanned aircraft which is about the price of a patrol car with standard police gear.

\$ 50,000



Additional UAS Benefits



■ **Mitigating Disasters**

- From capturing real time images of flooding damage to assisting in efficient oil spill clean up, UAS can play invaluable roles in analyzing and mitigating the impacts of disasters.



■ **Protecting the Environment**

- Environmental organizations and governments can use unmanned aerial systems to monitor forests for illegal logging, protect green space, observe wildlife and monitor erosion.



■ **Enhancing Agriculture**

- UAS can provide farmers with a cost efficient way to spray for pests and diseases, manage their crops and check for signs of drought and blight.

Current Jobs are at Risk...

- More than 50 companies manufacturing UAS already have a footprint in Virginia
 - Legislation could jeopardize over **1,200 current jobs in Virginia**
- A moratorium would restrict development and testing, making Virginia unattractive to existing and new companies

The logo for BAE SYSTEMS, featuring the company name in white, bold, uppercase letters on a red rectangular background.

BAE SYSTEMS

The logo for Aurora Flight Sciences, featuring a stylized blue globe icon to the left of the word "Aurora" in a large, blue, italicized font, with "FLIGHT SCIENCES" in a smaller, blue, sans-serif font below it.

Aurora
FLIGHT SCIENCES

The logo for Triumph Aerospace Systems - Newport News, featuring a red stylized aircraft icon to the left of the text "Triumph Aerospace Systems - Newport News" in a dark grey font, with "A Triumph Group Company" in a smaller font below it.

**Triumph Aerospace Systems -
Newport News**
A Triumph Group Company

The logo for AUVSI, featuring a stylized globe icon to the left of the word "AUVSI" in a large, blue, sans-serif font, with "ASSOCIATION FOR UNMANNED VEHICLE SYSTEMS INTERNATIONAL" in a smaller, blue, sans-serif font below it.

AUVSI
ASSOCIATION FOR UNMANNED
VEHICLE SYSTEMS INTERNATIONAL

...And Future Jobs are at Stake Too

- A forthcoming AUVSI study shows that in the three years following the integration of UAS into the national airspace Virginia is poised to recognize:
 - **2,380 new jobs (by 2017)**
 - **\$460 million in economic impact**
- Beyond 2017, Virginia stands to capture hundreds, and perhaps thousands, of additional new jobs by 2025.
- Many of these are highly-skilled positions with starting salaries around \$55,000 per year

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Virginia's Vying to Become an FAA Test Site

- Virginia has indicated interest in joining Maryland and New Jersey in putting forth a joint-bid for one of six test sites designated by the Federal Aviation Administration for the development of UAS
- **Pending legislation could jeopardize FAA test site designation**
- An FAA test site would:
 - Create additional jobs and bring economic benefits to Virginia
 - Establish the state as a leader in UAS technology

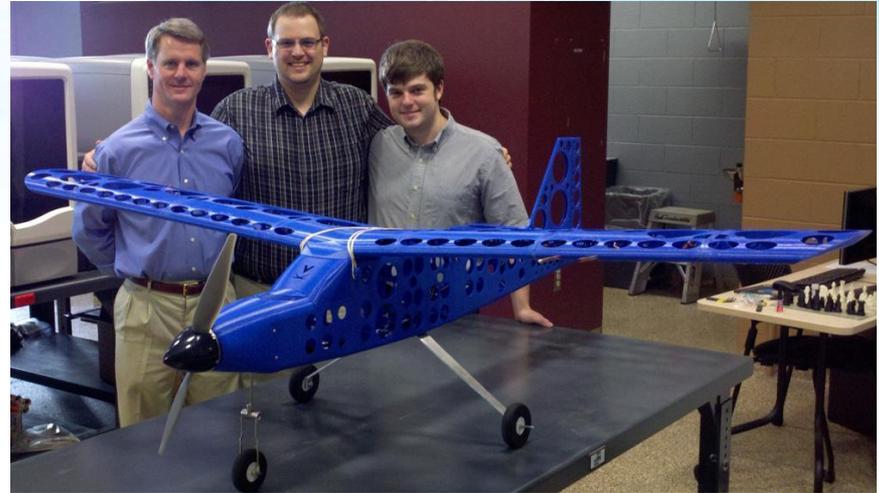
ExecutiveGov

Virginia, New Jersey, Maryland Join In UAS Test Venture

“The agreement between Maryland, Virginia and New Jersey represents a comprehensive approach to an efficient and effective testing process and integration.”

Virginia Universities are Leading R&D

- Universities in Virginia are already on the cutting edge of UAS research
- **Virginia Tech** is using UAS to study the spread of plant diseases which have a significant impact on agriculture
- **University of Virginia** students are using 3-D printing to create inexpensive UAS for emergency response



Professor Sheffler, with brothers/lab partners Steven Easter and Jonathan Turman, shows off the exoframe of "Wendy," their 3D-printed plane. *Photo: University of Virginia*

Users Committed to Responsible Operation

- The **International Association of Chiefs of Police**, the world's largest police organization, has issued recommended policies and procedures for law enforcement's use of UAS. Among the recommendations:
 - Implement a transparent planning process for agencies desiring UAS, including a period of public comment.
 - Secure a search warrant prior to conducting a flight, if there are specific and articulable grounds to believe that an unmanned aircraft will collect evidence of criminal wrongdoing and will intrude upon reasonable expectations of privacy.
 - Images captured should not be retained unless required as evidence of a crime.



Industry Committed to Responsible Operation

- AUVSI has developed an industry **Code of Conduct**, which addresses the safe and responsible use of UAS. The Code is built on three specific themes: **Safety, Professionalism and Respect**.
The Code:

AP Associated Press

**Conduct code for
unmanned aircraft is
unveiled**

- Recommends when and by whom UAS should be flown, to minimize risk.
- Commits to complying with all federal, state and local laws and cooperating with authorities at all levels.
- Commits to respecting other users of the airspace, the privacy of individuals, the concerns of the public and improving public awareness of UAS.