FIRST ANNUAL

FAA UAS SYMPOSIUM

DAYTONA BEACH, FL
APRIL 19-20, 2016

Federal Aviation Administration

EMBRY-RIDDLE Aeronautical University™

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The Federal Aviation Administration (FAA) hosted the 2016 Unmanned Aircraft Systems (UAS) Symposium in conjunction with Embry-Riddle Aeronautical University (ERAU) on April 19-20, 2016.

The objective of the event was to broaden the dialogue with the UAS industry and stakeholder community on various topics related to safe UAS integration into the National Airspace System (NAS).

Registration was open to the public, and the attendees included approximately 500 representatives from UAS industry and stakeholder communities. The agenda was designed to allow the Agency to provide an overview of its vision for future integration, and to give attendees a forum to provide input and feedback directly to FAA decision-makers. The speakers and panelists invited to speak during the event were considered to be on the forefront of the issues and challenges associated with UAS integration and represent a myriad of interests.

A lot has changed since the Symposium was held. The Agency issued the first operational rule for routine commercial use of small UAS, essentially opening the pathway for the full integration of UAS into the NAS. The Drone Advisory Committee (DAC) was established as a direct result of stakeholder feedback received at the Symposium. The group provides key industry decision-makers with a venue to provide the FAA with recommended actions to facilitate the resolution of issues affecting the efficiency and safety of integrating UAS into the NAS.

This is a recap of what happened and provides context for where we are now, upcoming initiatives, and helps to establish the discussion for this year's event. This report contains a synopsis of each session held in 2016.

Day 1 of the Symposium included four plenary sessions, during which the FAA outlined its objectives for the Symposium and provided an overview of its vision for integrating UAS into the NAS. More focused discussions took place in nine breakout sessions on Day 2 of the Symposium. Each session was scheduled for 90 minutes, and speaker panels included FAA decision-makers and industry representatives. Questions collected during Day 1 sessions were provided to panelists for use, and FAA speakers were encouraged to allow ample time for questions from and discussion with the audience. At the end of each day, members from each panel reported out on the takeaways from their session discussion.

Breakout session topics included:

- Airspace management
- Aircraft certification
- Operator certification
- Technological enablers and restrictors
- Stakeholder engagement
- Airspace authorities
- Research challenges and opportunities
- Airports issues
- Managing public perception

Throughout the various Symposium sessions, FAA decision-makers emphasized that, while the Agency's role is to develop regulations that promote safe UAS operations, its objective is to create a regulatory environment that does not inhibit innovation. The types of challenges presented by integrating unmanned aircraft into the United States' very complex airspace will only be overcome more expeditiously if regulators and innovators work together and make safety their top priority. ■

OVERVIEW OF DAY 1 PLENARY SESSIONS

Keynote Address – *UAS Integration: Strategies for Success*

- FAA Administrator **Michael Huerta**

During his keynote luncheon address, Administrator Michael Huerta expressed his desire for the FAA to maintain a collaborative approach with industry stakeholders and strike a "sweet spot" between safety and innovation. While the FAA's job is to set a framework for safety, it cannot unduly restrict innovation in the process. He also set expectations for all attendees during the Symposium, emphasizing that collaboration is a two-way street and that safety is a shared responsibility in the aviation community. He urged attendees to participate actively throughout the Symposium, to explain, listen, and engage with one another on the topics at hand, and emphasized that this event was the beginning of a much bigger, more long-term conversation.

Plenary Session 1 – *Airspace Management Discussion: Welcome to the NAS*

- **Lynn Ray**, Vice President, Mission Support Services, FAA Air Traffic Organization
- **Steven Pennington**, Executive Director, Policy Board for Federal Aviation, Department of Defense
- **John Cavolowsky**, Director of Airspace Operations and Safety Program for Mission Directorate, NASA
- **Thomas Haun**, Vice President of Strategy, PrecisionHawk

Themes: Predictability, Scalability, and Risk Management

Predictability is a cornerstone of safe and efficient air traffic management (ATM). Creating a predictable environment for aircraft requires a high degree of reliability, not only with regards to aircraft and their operation, but also the knowledge and skills of the pilots flying them. However, achieving repeatable processes and operations on the scale of the UAS community is challenging and requires a thoughtful, incremental approach to integrating operations. What is authorized as an exception today will become increasingly routine as we learn more about risks and how to manage them, and structure will be established to maintain safety and efficiency.

The FAA is asking for feedback about whether it is framing its work around the correct user communities (modelers, low-altitude commercial VLOS, low-altitude commercial BVLOS, public, and integrated). Questions were also posed to the audience about whether existing systems and structures could manage the complexity of low-altitude concepts of operation and how to best balance risks associated with human error vs. technology failure. A broader conversation about ATM is already happening, both in the United States and internationally, and the several panelists emphasized the need for the U.S. to be a leader in this arena.

Plenary Session 2 – *Certification Discussion: Rules of the Game*

- *Moderator:* **Earl Lawrence**, Director, FAA UAS Integration Office
- **Dorenda Baker**, Director, FAA Aircraft Certification
- **John Duncan**, Director, FAA Flight Standards Service
- **Andy Thurling**, Director of Product Safety & Mission Assurance, AeroVironment
- **Todd Graetz**, BUAS Program Manager, BNSF Railway

Themes: Risk-based Approach, Performance-based Rules, Holistic Certification

The emergence of a robust UAS industry necessitates that the FAA commit to risk-based certification for aircraft, operators, mechanics, and operations. The Agency has a long history of successfully integrating new entrants into the NAS. Balancing certification rigor with safety risk is crucial, because too little rigor can result in accidents, but too much rigor can stifle the ability for innovative technology to enter the NAS, which can also diminish overall safety. Working with partners in industry is helping the FAA focus on identifying risks that need to be mitigated and developing performance-based rules that address these risks, rather than prescribing solutions. While processes may at times seem tedious, the industry is also learning and adapting to the constraints of the existing regulatory process, and the FAA is learning to focus its certification and oversight activities on the specific risks associated with UAS operations. This approach will ultimately resolve scalability challenges and support a holistic approach to certification that accounts for the variety of "products" involved in a given operation.

Plenary Session 3 – *Technological Enablers and Restrictors: How Do We Evolve Together?*

- *Moderator:* **Jim Eck**, FAA Assistant Administrator for NextGen
- **Jay Merkle**, Director, Program Control and Integration, FAA Air Traffic Organization
- **Earl Lawrence**, Director, FAA UAS Integration Office
- **Dr. Ed Waggoner**, Director, NASA Integrated Aviation Systems Program, Aeronautics Research Mission Directorate
- **Paul McDuffee**, Vice President of Government Relations, Insitu
- **Michael Lewis**, Senior Engineering Advisor, Wiley Rein LLP

Themes: Scalability, Degree of Interoperability, Implications of Automation

Panelists focused less on outlining an approach or vision for integration, but rather on the challenges associated with various technologies and capabilities, and the questions that both the FAA and industry must answer together to move forward. First and foremost, unmanned aircraft don't have pilots on board to see and avoid other aircraft. While the concepts of "detect and avoid" and "command and control (C2)" are commonly understood and accepted within the community, both have implications for interoperability with manned aircraft and require the FAA to make decisions about provisioning to support scalability. These conversations also have implications for spectrum allocation and saturation, because manned aviation relies on spectrum as well, and raise questions about the level of automation the FAA must or should be able to support. For example, as UAS automation increases, the level of risk associated with losing the C2 link decreases, which could be less burdensome on radio frequencies. The interplay between all of these questions has resulted in a lack of focus on clearly defined solutions, both within industry and the R&D community, and raises hard questions about who is responsible for funding what moving forward.

BREAKOUT SESSION TAKEAWAYS

Engaging Industry: Improving our Collaborative Working Relationships

Session 1, Room 101

- **Marke "Hoot" Gibson**, Senior Advisor on UAS Integration, Federal Aviation Administration (FAA)
- **Brian Wynne**, President and CEO, Association for Unmanned Vehicle Systems International (AUVSI)
- **Dave Vos**, GoogleWing Project Lead, Google[x]
- **Craig Fuller**, Chairman, The Fuller Company
- **Margaret Jenny**, President, RTCA
- **Pete Dumont**, President and CEO, Air Traffic Control Association (ATCA)

The success of smaller, more focused groups like the Registration Task Force and Micro UAS Aviation Rulemaking Committee (ARC) have made it clear to FAA leadership that working with industry to achieve consensus-based solutions increases community acceptance of rules and likely increases compliance down the road. The Agency wants to take this collaborative approach one step forward by formalizing a more long-term UAS advisory body. This panel discussion focused on considerations for the establishment of such a group, including structure, scope, and membership.

The group's recommendations focused on overarching principles for the advisory body's work and representations. The work should be focused, progressive, and transparent – communication is crucial, and there was a clear preference for a Federal Advisory Committee for transparency reasons. In the same vein, industry representatives should be diverse enough to balance aviation community incumbents with newcomers to the community; it should be high-level, in the sense that voting members should control the resources that will be needed to implement recommendations and support work; and it should be action-oriented, to ensure work is delegated to appropriate subject matter experts and everyone stays in their swim lane.

Airspace Management: Welcome to the NAS – A Deeper Dive

Session 1, Room 102

- **Lynn Ray**, Vice President, Mission Support Services, FAA Air Traffic Organization
- **Steven Pennington**, Executive Director, Policy Board for Federal Aviation, Department of Defense
- **Parimal Kopardekar Ph.D**., Principal Investigator, Unmanned Aerial Systems Traffic Management (UTM)
- **Thomas Haun**, Vice President of Strategy, PrecisionHawk

UAS present a unique challenge to existing concepts of air traffic management, not only due to the lack of onboard pilot, but also due to differences in size and technological capabilities compared to manned aircraft. The future of high density operations and interoperability depend on a myriad of variables, including tracking, identification, and deconfliction policies. While NASA and the FAA are collaborating on a UAS traffic management (UTM) research platform to handle tomorrow's air traffic, today's commercial operators are struggling to follow policies and procedures that were written for a different kind of aircraft. This panel discussion focused on frustrations current operators are experiencing and a collective vision for bridging the gap to more integrated operations.

The group's recommendations focused on addressing frustration from commercial operators on several fronts. There is widespread confusion about who to talk to and where to get information about airspace access, and a suggestion was raised about establishing a call center. They also perceive a lengthy process to get to fly legally, and then see rogue operators taking business from them or creating safety risk with little or no consequences. Commercial operators also sense an imbalance with hobbyists who are relatively unregulated and unconstrained in where and how they fly. The group's focus was really on ensuring optimal outcomes, both from safety and economic standpoints, while figuring out better ways to increase access and increase the operational envelope.

Aircraft Certification: Rules of the Game – A Deeper Dive

Session 1, Room 103

- **Wes Ryan**, Manager, Programs & Procedures (Advanced Technology), FAA Aircraft Certification Service
- **Kevin Hull**, Manager, Los Angeles Aircraft Certification Office, FAA Aircraft Certification Service
- **Andy Thurling**, Director of Product Safety & Mission Assurance, AeroVironment
- **Paul McDuffee**, Vice President of Government Relations, Insitu

The FAA uses a risk-based approach to its aircraft certification activities, applying a lighter touch where less risk is present, and a more rigorous process where more risk exists. This involves painting a complete picture of the operational concept, from what kind of aircraft is being used, to where it's being operated and what kind of operation is being conducted. Both the applicant and the regulator play a role in the certification process – applicants have a choice about whether to wait for standards to be developed for the FAA to certify to, or to do the work up front themselves by identifying risks and presenting their proposed mitigation strategies to the FAA for approval. In the absence of industry standards, the criticality of the system and its components is dependent on the operational concept as a whole. Potential applicants should talk to the FAA early and often about the certification process, because at this early stage, collaboration is critical to pushing operational boundaries. This panel discussion focused on why the FAA certifies aircraft and how the Agency can better engage industry, and vice versa, to support certification work.

The group's recommendations focused on how the FAA communicates and carries out its certification work, and what steps it can take to better support these activities. Clarification of the certification process and the relationship between standards and certification is critical, as many potential applicants are unsure how the Agency certifies aircraft or components without industry standards. Additionally, the group talked about a more transparent explanation of the factors that influence the certification process, and that the FAA needs to coordinate internally during certification projects and better utilize operational data to justify risk management decisions and certification policies. Finally, the Agency needs to move outside its comfort zone and consider overall societal risk, beyond just airspace safety, in its certification activities, while the industry needs to help the FAA by supporting standards development and openly discussing risk mitigation techniques.

Airspace Authorities: Considering Federal Pre-emption Authority and State and Local Interests

Session 2, Room 101

- **Reggie Govan**, FAA Chief Counsel
- **Travis G. Mason**, Public Policy and Government Relations, Google[x] & Moonshots
- **Amanda Essex**, Research Analyst II, National Conference of State Legislatures (NCSL)
- **Victoria Mendez**, City Attorney, Miami, FL

The federal government has pre-emptive regulatory authority over U.S. airspace from the ground up, which has traditionally served the best interests of the aviation community by preventing a patchwork of airspace regulations and enabling regulatory uniformity throughout the NAS. State and local interests have generally been preserved by maintaining authority to designate takeoff and landing locations (i.e. airports and heliports). However, the emergence of a category of aircraft with the capability to take off and land virtually anywhere raises questions about the efficacy of this balance of airspace authorities. Local and state legislators perceive an absence of federal regulations in the UAS arena, and the industry is starting to see a multitude of proposals, particularly at the state level, seeking to regulate UAS use. This panel discussion focused on accounting for the interests of state and local entities and whether the balance of authorities is appropriate in the context of UAS operations.

The group's recommendations focused the need for better collaboration between the FAA and state/local entities. The prevailing sense in the room was the federal preemption authority serves a similar purpose for the unmanned community as it does for the manned, namely preventing a patchwork of regulations that the user community sees as prohibitive to innovation and economic development. The operator community also has concerns about whether local entities fully understand the regulatory landscape and technological safeguards already in existence to mitigate their constituents' concerns. At the same time however, the group also concurred that a role exists for state and local authorities to preserve local interests, and urged the FAA to provide more clarity and work more closely with these authorities to develop a uniform nationwide ordinance.

Key Research Challenges and Opportunities: Considering the Role of Research in Regulatory and Policy Development

Session 2, Room 102

- **Sabrina Saunders-Hodge**, UAS R&D Portfolio Manager, FAA/NextGen
- **Dallas Brooks**, Director, Raspet Flight Research Lab, Mississippi State University
- **Dr. R. John Hansman**, Director of the MIT International Center of Air Transportation and Professor of Aeronautics & Astronautics
- **Dr. Ed Waggoner**, Director, NASA Integrated Aviation Systems Program, Aeronautics Research Mission Directorate

The research and development (R&D) landscape regarding UAS has changed significantly over the past decade. Federal agencies went from considering high-altitude operations by large UAS operating like manned aircraft to low-altitude altitude operations by small UAS that share almost no characteristics with their manned counterparts. This shift has impacted the iterative government research cycles dramatically because of the long-term planning needed to conduct a decade-long project, and the pace of technological change in the UAS industry makes research planning difficult for regulators and policymakers. Because research plays a crucial role in developing standards, certification processes, policies, procedures, and regulations, the FAA has made a concerted effort in the last few years to streamline and consolidate its UAS R&D efforts. This panel discussion focused on challenges associated with performing necessary research in an industry that measures technology generations in months instead of years.

The group's recommendations focused on key areas of research need and the role research plays in regulatory development. The traditional research cycle of defining research questions and then collecting and analyzing data to inform decision-making continues to challenge UAS research portfolio managers – more work needs to be done up front to identify research questions that meet real operational needs, which will drive data needs. Confusion also exists within the industry about who is responsible for what research area (e.g. security and operator identification). There is a clear need to baseline Concepts of Operations, use cases, and architectures, decomposed by different operational environments, to guide research questions and planning.

Pilot/Operator/Maintenance Certification: Considering Operational and Pilot Certification in the Context of Unmanned Aircraft

Session 2, Room 103

- **John Duncan**, Director, FAA Flight Standards Service
- **Dale Hawkins**, Manager, Maintenance Special Programs, FAA Flight Standards Service
- **Alex Mirot**, Assistant Professor of Aeronautical Sciences, Embry-Riddle Aeronautical University
- **Brad Anderson**, Market Development Manager, Unmanned Systems (UMS) Division, Yamaha Motor Corporation

The Notice of Proposed Rulemaking (NPRM) for small UAS operations included the creation of a UAS operator certificate, which would require an individual to pass an aeronautical knowledge exam. This is a notable departure from the FAA's traditional knowledge/skill/experience airman certification process, but an example of the Agency recognizing that it cannot levy universal requirements across both the manned and unmanned aircraft industries, because the risks are not necessarily commensurate. Similar risk disparities exist with regards to oversight activities, which the FAA undertakes using a risk-based approach. This panel discussion focused on establishing a common understanding of the FAA's pilot certification ad oversight philosophies, and identifying areas where the operator and industry community felt additional clarification is needed.

The group's recommendations focused on the efficacy and scalability of certification and oversight activities and the need to weigh economics and cost of entry against safety concerns. There was frustrated sentiment from the group that the FAA continues to change the requirements to operate, particularly with regard to pilot qualifications, and that a need exists for UAS operators to be tested on their operating skill in addition to aeronautical knowledge. This skill assessment is necessary to ensure a level playing field in the commercial industry, though the challenge in setting a minimum requirement given the magnitude of operating platforms was also acknowledged. Section 333 holders are also frustrated about the perceived lack of enforcement against illegal operators who undercut legitimately operated businesses, and the FAA was encouraged to work with the industry more closely in addressing these concerns. Finally, the Agency was encouraged to keep the economics of the business community in mind when creating regulations, as onerous conditions for entry inhibit competition within the industry.

Managing Public Perception: Considering Public Perception Challenges and Messaging Opportunities

Session 3, Room 101

- **Jenny Rosenberg**, FAA Assistant Administrator for Communications
- **Doug Johnson**, Vice-President of Technology Policy, Consumer Technology Association (CTA)
- **Naveen Rao**, U.S. House of Representatives
- **Mark Aitken**, Government Relations Manager, AUVSI

Few people likely foresaw the enormous consequences of unprecedented growth in the UAS industry since Congress passed the FAA Modernization and Reform Act of 2012. Though significant progress has been made over the past few years, challenges persist around communicating effectively with the UAS stakeholder community and balancing flexible policymaking with public concerns about safety, privacy, and security. Genuine concern continues to pervade both the community that a single catastrophic event will undo years of work and momentum built around the societal benefits UAS can deliver. Education and engagement is needed at all levels of legislature, the user community, and the general public to counter misperceptions and stereotypes. This panel discussion focused on the impacts of negative public perceptions about UAS and how to leverage messaging opportunities to manage them.

The group's recommendations focused on how the FAA and the UAS stakeholder community can collaborate to tell a balanced, unified safety message around the benefits of UAS use. There was overall concern from all sides about the potential for overreaction to a single bad event. Education should be leveraged today, and good news stories highlighted, to build positive momentum and counter a potential knee-jerk reaction from policymakers who would be under public pressure in the event of a tragedy. Everyone agreed that the industry must do a better job overall at delivering the safety message in the context of use cases. Finally, the FAA needs to follow-up on its guidance to the law enforcement community, because reports of unverifiable UAS sightings create a push-and-pull environment for lawmakers and increase perceptions about lack of enforcement.

Airports Issues: Considering Challenges of and Opportunities for Unmanned Aircraft in Airport Environments

Session 3, Room 102

- **Victoria Wei**, Deputy Director, FAA Airport Planning and Programming
- **Greg Principato**, National Association of State Aviation Officials (NASAO)
- **Justin Towles**, American Association of Airport Executives (AAAE)

UAS undoubtedly present airports and airport operators with unique challenges and opportunities. Given that today's approach to accommodating UAS operations is primarily through segregation of manned aircraft, airports represent the real world nexus of the manned and unmanned aviation communities, and present regulators with an array of complex issues to resolve. The division of responsibility between an airport and air traffic control complicates the process of authorizing UAS operations, and all parties concede that the existing regulatory and statutory frameworks leave little room for flexibility. This panel discussion focused on identifying and acknowledging challenges for UAS operators who want to fly in proximity to airports, and the need for more balanced and streamlined approval processes to foster a culture of compliance and safety.

The group's recommendations focused on existing process issues for operating in airport environments. The burdens placed on commercial operators to conduct legal operations are onerous and confusing, and the requirement to get a Letter of Agreement (LOA) with an airport is prohibitive, particularly when both the airport and air traffic control tower are not cooperative. Meanwhile, the perception persists that recreational users can fly without constraints and their operational limits are not enforced. The required five mile radius around airports for hobbyists is inappropriate and arbitrary, and the lack of distinction between airports creates a culture of noncompliance and increases risk. The group also observed that the industry needs to agree on a unified policy position on this issue, because the regulatory constraints on the FAA make flexibility almost impossible.

Technological Enablers and Restrictors: How Do We Evolve Together? – A Deeper Dive

Session 3, Room 103

- **Jim Eck**, FAA Assistant Administrator for NextGen
- **Jay Merkle**, Director, Program Control and Integration, FAA Air Traffic Organization
- **Dr. Ed Waggoner**, Director, NASA Integrated Aviation Systems Program, Aeronautics Research Mission Directorate
- **Paul McDuffee**, Vice President of Government Relations, Insitu
- **Michael Lewis**, Senior Engineering Advisor, Wiley Rein LLP

The evolution of the UAS industry is in large part due to technology development and innovation, but the limits and restrictions imposed by technology must also be acknowledged in this arena. The degree of technical capability and reliability needed in an air traffic management concept principally hinges on the operational risk, and the implications of differentiated access to airspace are extremely complex. Levels of automation and the impact to spectrum saturation add additional nuance. This panel discussion was focused on reaching a common understanding of the technological and regulatory dependencies and what roles the FAA and industry have in arriving at consensus solutions.

The group's recommendations focused on approaches to resolve issues associated with technological restrictors. Spectrum was a key area of discussion, as performance standards for airspace access and interoperability will be a crucial determinant for managing safety spectrum allocation. Engagement across industry and government will also be crucial to resolving technological barriers and determining priorities, performance standards, and solutions, because ultimately the consensus infrastructure will have to support the UAS community writ large. Identifying roles and responsibilities across government and industry helps everyone determine and manage expectations for the FAA's involvement in developing or endorsing a solution. There is a real need to aggregate communities of interest so they can start working toward agreed performance levels and considering technology solutions.

CONCLUSION

The Symposium served as a forum for the UAS stakeholder community to provide feedback directly to FAA decision-makers about industry and operator perspectives on integrating unmanned aircraft.

Discussions during the Symposium, as well as responses to the post-event survey, demonstrated that there is still a clear divide between the traditional and non-traditional aviation communities, but a dichotomy also exists within the non-traditional aviation community.

Overall survey results indicated that participants attended the Symposium because they were interested in a specific agenda topic, and they were largely satisfied with the sessions provided. The majority of participants indicated they would participate in a future FAA-led UAS Symposium. An attendee who admitted to being unfamiliar with aviation in general stated that "I found there was a lot more I needed to learn. But I also found people who were happy to help along that path. Collaboratively, I believe this symposium is an excellent example of what needs to happen more to bring all sides together. We all become better."

The survey also provided the FAA with feedback to make its second Symposium even more valuable to participants. For example, many small UAS operators expressed frustration that their operational concerns were not addressed and that more tailored sessions about purely operational challenges (e.g. COAs, getting an exemption, and pilot requirements) were not provided.

Conversely, larger interest groups, operators, and manufacturers expected to engage in more meaningful discussions about long-term integration and conveyed impatience with the level of conversation being too tactical, rather than strategic. Additionally, attendees who were already well-versed in the UAS environment felt the Agency could have gone further, one attendee commented: "While I felt the symposium was a good idea, it didn't really provide any new info which, from discussion with other attendees, was what was expected."

Overall attendee reactions indicate that the Symposium was a positive step, but that more concrete actions and more sustained engagement efforts are necessary. The FAA will use this feedback to adjust how it structures Symposiums to present information in a way that ensures these events continue to be a valuable experience for all types of drone stakeholders. ■

OTHER SURVEY RESULTS

A post-event survey was sent to all registrants a few days after the Symposium ended. Approximately 37% of attendees submitted the survey. Responses to survey questions are provided below.

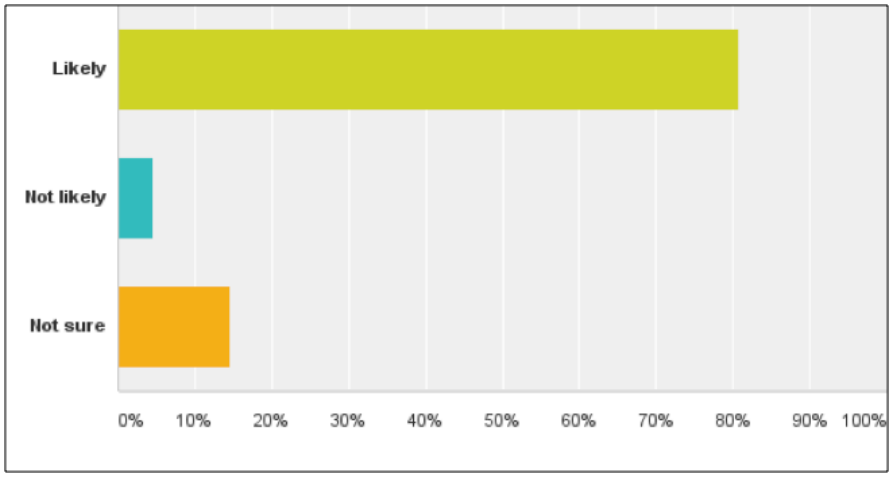
Question: Overall, how satisfied were you with the Symposium?

	Dissatisfied	(no label)	Neutral	(no label)	Satisfied	Total	Weighted Average
(no label)	1.70% 3	5.11% 9	11.36% 20	35.80% 63	46.02% 81	176	4.19

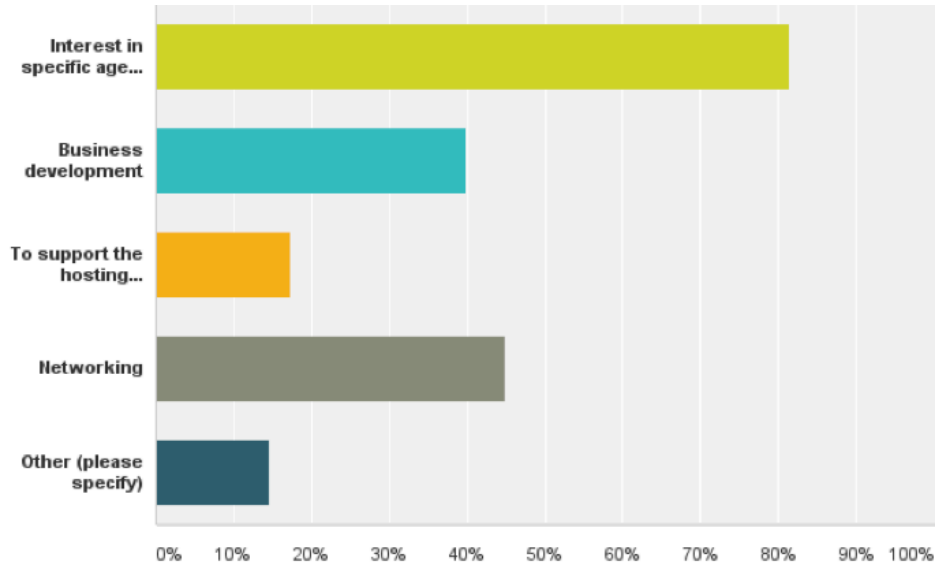
Question: One of the objectives of this Symposium was to improve stakeholder engagement with the FAA. How well do you feel the Symposium achieved this objective?

	Not at all	(no label)	Neutral	(no label)	Very well	Total	Weighted Average
(no label)	4.52% 8	9.60% 17	16.95% 30	38.98% 69	29.94% 53	177	3.80

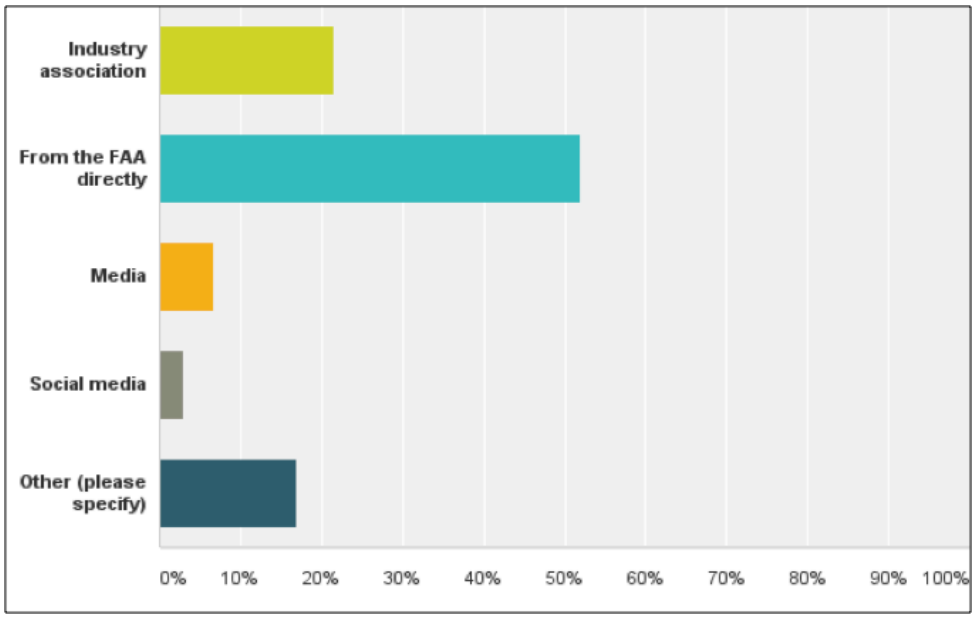
Question: Based on your experience at this year's Symposium, how likely are you to attend future Symposiums?



Question: Why did you attend this Symposium? Select all that apply.



Question: How did you hear about the UAS Symposium?



*Other included colleagues and clients, Embry Riddle, employers, Federal and State government, and specific companies or organizations.

Rate your satisfaction with the following plenary sessions:

	Dissatisfied	(no label)	Neutral	(no label)	Satisfied	N/A	Total	Weighted Average
Airspace Management Plenary Session on Day 1	**2.87%** 5	**4.02%** 7	**12.07%** 21	**13.22%** 23	**58.62%** 102	**9.20%** 16	174	4.33
Certification Plenary Session on Day 1	**2.34%** 4	**6.43%** 11	**13.45%** 23	**15.20%** 26	**49.71%** 85	**12.87%** 22	171	4.19
Technological Enablers/Restrictors Plenary Session on Day 1	**1.17%** 2	**5.26%** 9	**15.79%** 27	**16.37%** 28	**51.46%** 88	**9.94%** 17	171	4.24
Luncheon Keynote Address on Day 1	**2.31%** 4	**1.16%** 2	**9.25%** 16	**16.76%** 29	**63.01%** 109	**7.51%** 13	173	4.48
Luncheon Panel Discussion on Day 2	**1.71%** 3	**2.86%** 5	**12.00%** 21	**17.71%** 31	**56.00%** 98	**9.71%** 17	175	4.37

Rate your satisfaction with each breakout session:

	Dissatisfied	(no label)	Neutral	(no label)	Satisfied	N/A	Total	Weighted Average
Engaging Industry (Session 1, Room 1)	**0.62%** 1	**3.09%** 5	**7.41%** 12	**7.41%** 12	**24.07%** 39	**57.41%** 93	162	4.20
Airspace Management (Session 1, Room 2)	**2.47%** 4	**3.70%** 6	**8.64%** 14	**14.20%** 23	**29.63%** 48	**41.36%** 67	162	4.11
Certification – Aircraft (Session 1, Room 3)	**0.00%** 0	**3.95%** 6	**6.58%** 10	**9.21%** 14	**28.29%** 43	**51.97%** 79	152	4.29
Airspace Authorities (Session 2, Room 1)	**0.63%** 1	**3.80%** 6	**5.70%** 9	**7.59%** 12	**29.75%** 47	**52.53%** 83	158	4.31
Research Challenges and Opportunities (Session 2, Room 2)	**1.31%** 2	**5.23%** 8	**7.84%** 12	**9.15%** 14	**20.92%** 32	**55.56%** 85	153	3.97
Certification – Pilot/Operator/Maintenance (Session 2, Room 3)	**2.53%** 4	**8.23%** 13	**7.59%** 12	**12.66%** 20	**25.95%** 41	**43.04%** 68	158	3.90
Managing Public Perceptions (Session 3, Room 1)	**3.18%** 5	**3.18%** 5	**4.46%** 7	**11.46%** 18	**19.75%** 31	**57.96%** 91	157	3.98
Airports Issues (Session 3, Room 2)	**0.65%** 1	**5.16%** 8	**7.10%** 11	**13.55%** 21	**25.16%** 39	**48.39%** 75	155	4.11
Technological Enablers/Restrictors (Session 3, Room 3)	**0.65%** 1	**6.49%** 10	**9.09%** 14	**9.09%** 14	**22.73%** 35	**51.95%** 80	154	3.97

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