Final Agenda

Next Gen DRONES

Commercializing Technological Advancements for the Next Generation of Safe & Efficient Unmanned Systems

June 23-24, 2015 | Bethesda, MD

Highlighted Speakers

Gregory Huff, Ph.D., Director, Huff Research Group, Associate Professor, Electrical & Computer Engineering, Texas A&M University

Keven Gambold, Chief Executive Officer, Americas, Unmanned Experts, LLC

Brian Taylor, Director, UAV Laboratories, University of Minnesota

James Williams, Director, UAS Integration Office, FAA

Program Topics

- UAV Command, Control and Communications
- Cross Application Design, Testing and Development
- UAV Airspace Integration
- Training & Certification Program Implementation
- High Integrity Navigation System Development
- UAV Standardization and Regulations
- Software Development for UAS Applications
- UAV Flight Safety Systems
- Flight Control Systems
- UAV Commercialization for Defense, Transportation, Agriculture, Security, Law Enforcement, Oil & Gas and Hazardous Materials Handling

SAVE $100
REGISTER BY MAY 15!

KNOWLEDGE FOUNDATION
TECHNOLOGY COMMERCIALIZATION ALLIANCE
a division of CHI

KnowledgeFoundation.com/Drones

ABOUT THE CONFERENCE

The use of unmanned autonomous systems is positioned for exponential commercial growth over the next decade. With extensive advancements in these systems for military and consumer use, this market continues to expand into numerous areas that affect our daily lives. The Next Gen Drones 2015 conference presents the latest technical advancements in unmanned systems and their applications for commercialization. Key presentations will address the most advanced research and development for commercialization with industry discussions focusing on the latest regulatory updates and advancements in safety. In addition, technical presentations on advanced UAV Communications, Navigation and Flight Control will be presented. This conference will provide attendees with high-level technical talks combined with a comprehensive industry overview of the entire UAV ecosystem and will bring together the key organizations involved in furthering UAV commercialization and its integration into commercial airspace.

TUESDAY, JUNE 23

12:15 pm Conference Registration

UAV COMMUNICATIONS, NAVIGATION & FLIGHT CONTROL

1:40 Chairperson's Opening Remarks

Colonel Andy Pennington, IMA to the Director of Air and Cyber Operations, PACAF; Assistant Professor and Assistant Program Chair, Embry Riddle University

1:45 Aerodynamically Functionalized Antennas and Beamforming in UAS Clusters

Gregory Huff, Ph.D., Director, Huff Research Group, Associate Professor, Electrical & Computer Engineering, Texas A&M University

Unmanned autonomous vehicles, sensors, and systems (UAS) have become indispensable tools in research, industry, defense, and public safety. This has in turn highlighted a growing need for wireless connectivity in UAS that is ubiquitous, reliable, scalable, and secure. Multifunctional antennas and adaptive arrays have arisen as a means to physically enable these orientation-aware systems since they can provide enhanced communication and sensing capabilities in operationally dynamic application spaces and electromagnetically harsh environments. This talk will highlight our research in radiating systems to support UAS that are defined by their ability to facilitate reversible and coordinated changes in more than one physical and/or operational modality. This includes opportunistic beamforming in random arrays, synchronization of UAS in dynamic clusters, the role of reconfigurable antennas in motion-dynamic and cognitive systems, and the development of applications (apps) and peripheral systems for smart devices that can enable seamless interaction amongst systems and users.

2:15 Beyond-Line-of-Sight (BLOS) Communications for UAS

Rick Lober, Vice President and General Manager, Defense & Intelligence Systems Division, Hughes Network Systems

This presentation will discuss the systems and techniques used to provide beyond-line-of-sight communications to Unmanned Aerial Systems. These include both large and small platforms in either a fixed wing or rotary wing configuration. The communications systems are used to handle both command data to the vehicle and sensor data from the vehicle. BLOS communications becomes critical when operating distances are far from a control station or mountains and buildings block the line of sight path to the vehicle. Certifications required for these communications systems when the vehicles are operating in commercial airspace are also a key issue.

2:45 From Theory to Flight: UAVs as a Platform for Cross Application Research, Development, Testing & Commercialization

Brian Taylor, Director, UAV Laboratories, University of Minnesota

Uninhabited Aerial Vehicles (UAVs) are poised to revolutionize many industries ranging from agriculture to filmmaking and pipeline inspection with a forecasted economic impact of greater than $13 billion over the next three years. While commercial UAVs are commonly marketed toward specific industries, many underlying foundational technologies are common across all applications, and even common to manned aircraft. Furthermore, the regulatory environment is common across application and aircraft type. An approach using a low-cost, open-source research infrastructure has enabled the University of Minnesota to quickly transition theory to flight, advancing many foundational technologies in navigation, reliability and flight control. A few recent examples will be examined along with potential future directions and development.

3:15 Sponsored Presentation *(Opportunity Available)*

3:45 Refreshment Break in the Exhibit Hall with Poster Viewing

UAV RESEARCH, DEVELOPMENT & COMMERCIALIZATION

4:15 Designing Consumer Drones for Commercial Activities

Yannick Levy, Ph.D., Vice President, Parrot

Consumer drones are light, safe and validated by hundreds of thousands of consumers around the world. The integration of technologies makes it as complex as designing a smartphone that flies. Potentially, these devices can be tuned to become professional tools. Parrot is one of the largest manufacturers of consumer drones in the world and this presentation will examine the transformative opportunities in designing drones for commercial activities.

4:45 USGS Applications of UAS Technology

Bruce Quirk, UAS Director, United States Geological Survey

Unmanned Aircraft Systems (UAS) technology is quickly evolving and will have a significant impact on Earth science research. The U.S. Geological Survey (USGS) is conducting an operational test and evaluation of UAS to see how this technology supports the mission of the USGS and the Department of the Interior (DOI). Over the last 5 years, the USGS, working with many partners, has been actively conducting proof-of-concept UAS missions which are designed to evaluate the potential of UAS technology to support the mandated DOI scientific, resource and land management missions. Using small UAS, the USGS is able to tailor solutions to meet

project requirements by obtaining very high-resolution remote sensing data and generating GIS-ready products. UAS technology is providing a mechanism to collect timely remote sensing data at a low cost and at low risk over DOI lands that can be difficult to monitor and consequently enhances our ability to provide unbiased scientific information. This presentation describes the UAS technology and infrastructure being employed, pilot application projects already accomplished, lessons learned and the future of UAS within the DOI.

5:15 End of Day

WEDNESDAY, JUNE 24

8:00 am Morning Coffee

KEYNOTE PRESENTATIONS

8:25 Chairperson's Opening Remarks

Brian Taylor, Director, UAV Laboratories, University of Minnesota

8:30 KEYNOTE PRESENTATION: Airspace Integration of Commercial UAVs: FAA Update

James Williams, Director, UAS Integration Office, FAA

This presentation will give the latest updates from the FAA regarding the integration of UAS into the National Airspace System.

UAV INTEGRATION, SAFETY & REGULATION

9:10 Legal Implications of Remote Sensing by Drones for Government and Commercial Operators

Joseph Vacek, J.D., Associate Professor, John D. Odegard School of Aerospace Sciences, University of North Dakota

This presentation considers the legal ramifications from the use of three example remote sensing systems (unsophisticated, mid-range, and military grade) in the context of current and proposed privacy laws and operating regulations. We present several common scenarios that confront civil and government operators that could result in unexpected civil or criminal liability or constitutional challenges. We discuss gaps in the law relative to public expectations and operational concerns. From this we conclude with general recommendations for limiting legal exposure.

9:40 Pilot or Programmer? Training and Certification in the Age of Autonomy

Keven Gambold, CEO, Americas, Unmanned Experts, LLC

With next generation UAV platforms being expected to work beyond-line-of-sight in non-segregated airspace, the Airborne Decision Making (ADM) will become the domain of the aircraft. Sense and Avoid, Navigation, Self-Defense and potentially Target Engagement may all have to be done onboard. So how or who do we need to train and certify? We will examine some recent technological steps that are bringing AI closer to reality as well as the nascent regulatory environment in which self-driving cars, and soon planes, will find themselves operating.

10:00 Coffee Break in the Exhibit Hall with Poster Viewing

UAV INTEGRATION, SAFETY & REGULATION (cont.)

10:45 Ice Protection System Utilizing Carbon Nanotube Coatings

Brett Burton, Tactical Systems Program Manager, Battelle Memorial Institute

In order to maintain flight performance and safety margins, UAVs that operate in adverse weather conditions require active in-flight Ice Protection Systems (IPS). Through a combination of materials research and systems engineering Battelle has developed a lightweight, retrofittable carbon nanotube coating that can be sandwiched between standard primers and topcoats to provide resistive heating capability.

11:05 Electro-Optical Sense and Avoid for UAS

Andrew White, Program Manager, Sense and Avoid, Operations, Defense Research Associates

Defense Research Associates has developed a passive, optical-based Sense and Avoid system, initially targeted for the Defense market. This system uses industrial cameras and high-speed computing to visually acquire, track and declare nearby air traffic as a collision threat.

11:25 Misuse of Unmanned Vehicles

Colonel Andy Pennington, IMA to the Director of Air and Cyber Operations, PACAF; Assistant Professor and Assistant Program Chair, Embry Riddle University

The use of unmanned vehicles offers great promise to enhancing many endeavors in law enforcement, science and commerce. However, their low cost and simple operation will also provide a new arsenal of capabilities to nefarious non-state actors such as drug runners, common criminals and stalkers—just to name a few. This presentation will explore how unmanned air, land and maritime vehicles are most likely to enter the world of crime, and what capabilities law enforcement must develop to prepare for this certain future.

11:45 Sponsored Presentation *(Opportunity Available)*

12:15 pm Luncheon Presentation *(Sponsorship Opportunity Available)* **or Enjoy Lunch on Your Own**

UAV INTEGRATION, SAFETY & REGULATION (cont.)

1:40 Chairperson's Remarks

Keven Gambold, CEO, Americas, Unmanned Experts, LLC

1:45 Internet of Drones: How Two Technologies Will Collide to Enable the UAVs of the Future

Michael Winn, CEO, DroneDeploy

Drones are already unleashing new possibilities, but they're not yet tools for the everyman. When will a drone be thrown into the back of a pickup, be controlled just off a smartphone, or in fact launch itself when needed? Smarter drones, networked together to enable coordination, collaboration and real time data delivery are required for this future, and this talk is about what already exists and what to expect in the next 12 months.

UAV RESEARCH, DEVELOPMENT & COMMERCIALIZATION

2:15 Reducing SWaP-C in UAVs with a Consolidated PNT Modular Sensor

John Fischer, CTO, Spectracom

Remote sensing payloads such as video, radar, lidar, sigint, etc. on UAVs are increasingly needing Position, Navigation, and Timing (PNT) information to operate. Interfacing to the aircraft's navigation system is intrusive, cumbersome and sometimes even prohibitively expensive. Any connection to the flight control system may require a re-certification of the aircraft. Adding dedicated GPS receivers for each payload application burdens Size, Weight And Power (SWAP) budgets, adds cost and adds to the complexity of the installation with multiple antenna placements. A new concept is proposed to define a PNT Modular Sensor – a device that aggregates the best PNT information available at any one instant and distributes it to all the applications that need it.

2:45 Air Launch Remote Sensing Systems

Matt Pobloske, CEO, Sensintel

Manned, and in the future unmanned, aircraft operating for commercial, defense and research purposes creates an opportunity to distribute remote sensors safely, time-phased and cost effectively. Sensors and their delivery systems can be used to sense and measure the air column as well as deliver small ground-based sensors that measure things like seismic/traffic activity, soil conditions, local meteorological conditions.

3:15 Dessert Break in the Exhibit Hall with Poster Viewing

UAV RESEARCH, DEVELOPMENT & COMMERCIALIZATION (cont.)

4:00 How Cargo Drones Can Achieve Massive Scale

Jonathan Ledgard, Director, Future Africa, Swiss Federal Institute of Technology - Switzerland

Red/Blue is a Swiss based consortium of a pioneering researchers, lawyers, logisticians, designers and entrepreneurs who aim to build the first cargo drone routes in Africa by 2016, where red is a "Red Line" for medical and emergency use in outlying areas and blue is a "Blue Express" for commercial use in and around cities. This talk will address the challenges associated with how cargo drones can achieve massive scale.

4:20 Design and Implementation of an Open Source Small Quadcopter for GPS-Denied Environments

Chang Liu, Aeronautics, Astronautics Engineering, Southampton University - United Kingdom

This presentation addresses the design of a quadcopter control architecture, based on crowd-sourcing electronics. The aim of this quadcopter is to provide a test bed for vision-based autonomous navigation system in GPS-denied environments. The control algorithm is developed under Arduino compatible open source electronics, whereas the complete design also includes an additional downward facing optical flow sensor (PX4FLOW camera) for velocity estimation, and a separate Linux embedded computer (Odriod-U3) for future Simultaneous Localization And Mapping (SLAM) vision algorithm development. In its current stage, by utilizing the PX4FLOW sensor, it is capable of horizontal velocity control and altitude hold, and also a ground station GUI software is developed in Matlab for two-way telemetry visualization and in-air parameter tuning through XBee.

4:40 Technical and Policy Considerations of Autonomous UAVs

Jeremy Straub, John D. Odegard School of Aerospace Sciences, Department of Computer Science, University of North Dakota

This presentation will provide an overview of the 'state of the art' of UAV autonomy, discussing autonomous control as well as single UAV command and cluster command architectures. After looking at current capabilities, the presentation will focus on the next steps towards more robust autonomy, discussing what areas are the proverbial 'low hanging fruit' for greater autonomy and where more development (and consequently time) will be required. Finally, the presentation will turn to a consideration of policy considerations for UAV autonomous control. It will discuss possibilities and potential pitfalls for more autonomous and fully autonomous UAVs in both military and civilian (police/government and commercial/personal) contexts. Finally, it will discuss areas where strong policy is needed to prevent or mitigate potential problems and keep citizen comfort with drone use high.

5:00 Closing Remarks and End of Conference

Media Partners

Sponsorship and Exhibit Opportunities

Knowledge Foundation offers comprehensive sponsorship packages which include presentation opportunities, exhibit space, branding and networking with specific prospects. Sponsorship allows you to achieve your objectives before, during, and long after the event. Any sponsorship can be customized to meet your company's needs and budget. Signing on early will allow you to maximize exposure to qualified decision-makers.

Podium Presentations – *Available Within the Main Agenda!*
Showcase your solutions to a guaranteed, targeted audience. Package includes a 15- or 30-minute podium presentation within the agenda, exhibit space, on-site branding, access to cooperative marketing efforts by Knowledge Foundation, and more.

Breakfast & Luncheon Presentations
Opportunity includes a 30-minute podium presentation. Boxed lunches are delivered into the main session room, which guarantees audience attendance and participation. A limited number of presentations are available for sponsorship and they will sell out quickly. Sign on early to secure your talk!

Invitation-Only VIP Dinner/Hospitality Suite
Sponsors will select their top prospects from the conference pre-registration list for an evening of networking at the hotel or at a choice local venue. Knowledge Foundation will extend invitations and deliver prospects, helping you to make the most out of this invaluable opportunity. Evening will be customized according to sponsor's objectives i.e.:

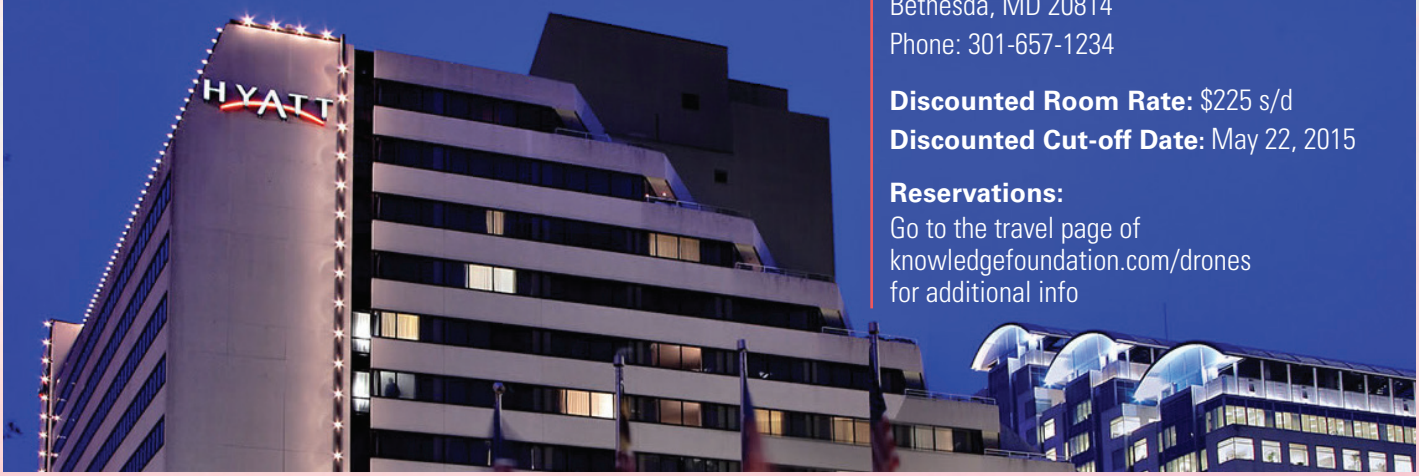
- Plated dinner with specific conversation focus
- Purely social
- Focus group
- Reception style

Exhibit
Exhibitors will enjoy facilitated networking opportunities with qualified delegates. Speak face-to-face with prospective clients and showcase your latest product, service, or solution.

Additional promotional opportunities include items such as conference tote bags, badge lanyards, & literature distribution.
For sponsorship and exhibit information, please contact:

Angela Parsons
VP, Business Development
Knowledge Foundation, a division of CHI
781-972-5467 | aparsons@healthtech.com

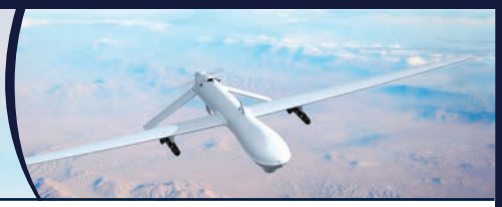
Hotel & Travel Information



Conference Venue and Hotel:
Hyatt Regency Bethesda
One Bethesda Metro Center
Bethesda, MD 20814
Phone: 301-657-1234

Discounted Room Rate: $225 s/d
Discounted Cut-off Date: May 22, 2015

Reservations:
Go to the travel page of knowledgefoundation.com/drones for additional info



Pricing and Registration Information

NEXT GEN DRONES CONFERENCE PRICING

BASIC PACKAGE (Includes Access to Next Gen Drones only)	Commercial Member	Commercial Non-Member	Academic/ Govt. Member	Academic/Govt. Non-Member	Student
Advance Registration until May 15, 2015	$764	$899	$424	$499	
Registration after May 15, 2015	$849	$999	$509	$599	$199

MEMBERSHIP INFORMATION

Knowledge Foundation Technology Commercialization Alliance Membership	Commercial	Academic/Govt.
	$229	$169

Become a Member for as Little as $64!

Benefits Include:

- Exclusive Access to the Knowledge Foundation Digital Library - Grants you free instant access to download our webcasts and speaker presentation slides from our past conferences
- Interactive Online Member Directory that allows you to network with your colleagues and collaborate with new ones
- Exclusive Access to the Knowledge Foundation/LinkedIn Working Groups
- Online Networking Opportunities
- Speaking Opportunities
- Industry News

ADDITIONAL REGISTRATION DETAILS

Each registration includes all conference sessions, posters and exhibits, food functions, and access to the conference proceedings link. Handicapped Equal Access: In accordance with the ADA, Knowledge Foundation is pleased to arrange special accommodations for attendees with special needs. All requests for such assistance must be submitted in writing to Knowledge Foundation at least 30 days prior to the start of the meeting. To view our Substitutions/ Cancellations Policy, go to knowledgefoundation.com/ regdetails

Poster Space Reservation (must be registered attendee)

There is no additional cost for a poster presentation, but poster abstracts are due by May 15, 2015. Once your registration has been fully processed, we will send an email containing a unique link allowing you to submit your poster abstract. If you do not receive your link within 5 business days, please contact jring@healthtech.com.

** Knowledge Foundation reserves the right to publish your poster title and abstract in various marketing materials and products.*

Register 3 - 4th is Free!

Individuals must register for the same conference or conference combination and submit completed registration form together for discount to apply.

How to Register: **KnowledgeFoundation.com/Drones**

Call 617-232-7400 or email custserv@knowledgefoundation.com

Please use keycode **UAVF** when registering!