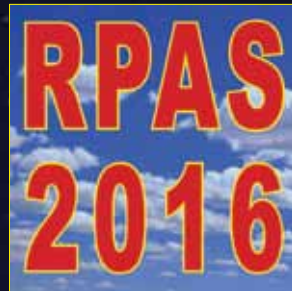




18th ANNUAL
INTERNATIONAL CONFERENCE



REMOTELY PILOTED AIRCRAFT SYSTEMS

REGULATORY, POLICY & INNOVATION FORUM

VENUE, LOCATION & DATE

Royal Military
Academy
8 Hobbema straat
Brussels, Belgium
22 & 23 June 2016

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RPAS 2016 - Conference Programme

DAY 1 - WEDNESDAY 22 JUNE 2016

- Session 1 Regulatory & Organisational Matters
- 09.00-09.15 **Overview of Japanese Small UAV Regulatory Situation & Involvement of the JUIDA**
Hiroko Nakamura - University of Tokyo, Japan
(On behalf of the Japan UAS Industrial Development Association - JUIDA)
- 09.15-09.30 **Update on the French Civil Drone Council**
Carine Donzel-Defigier - DGAC, France
(On behalf of «Conseil pour les drones civilisé»)
- 09.30-09.45 **Qualified Entities: A New Actor in Aviation?**
Filippo Tomasello - EuroUSC-Italia, Italy
- 09.45-10.00 **RPAS: Overview of the French Situation & Future Perspectives**
Muriel Preux - DGAC, (Civil Aviation Authority), France
- 10.00-10.15 ♦ Interactive Panel Discussion
10.15-11.00 ♦ Refreshment Break
- Session 2 Policy & Regulations
- 11.00-11.30 **Development of the Future European Rules on Unmanned Aircraft**
- Koen de Vos - European Commission DG Mobility & Transport (MOVE)
- Jean-Pierre Lentz - European Commission DG for Internal Market, Industry, Entrepreneurship & SMEs (GROWTH)
- Antonio Marchetto - European Aviation Safety Agency (EASA)
- 11.30-11.45 **The European RPAS Roadmap**
Alain Siebert - Single European Sky ATM Research Joint Undertaking (SJU)
- 11.45-12.00 **NATO UAS Policy**
Allan Storm - NATO Headquarters
- 12.00-12.15 ♦ Interactive Panel Discussion
12.15-13.30 ♦ Lunch in the RMA Cafeteria
- Session 3 Awareness Creation
- 13.30-13.45 **Presentation & Overview of the DroneRules Website**
Philippe Carous - SpaceTec Partners, Belgium
(On behalf of "Drone-Rules.eu" Consortium)
- 13.45-14.00 **RPAS-Related Insurance – European Survey Analysis & Preliminary Conclusions**
Jean Fournier - Global Aerospace, France
(On behalf of the "Drone-Rules.eu" Consortium)
- 14.00-14.15 **Trends & Prospects for RPAS in Commercial and Civil Applications**
Pacôme Revillon - EuroConsult, France
- 14.15-14.30 **RPAS Operations for Maritime Surveillance - Opening the Market To Civil Applications**
Olaf Trieschmann - European Maritime Safety Agency (EMSA)
- 14.30-14.45 **A Software Development Methodology Enabling Effective, Efficient & Profitable Certification of Avionics Software for Micro/Mini RPAS**
John Pyrgies - Royal Military Academy, Belgium
- 14.45-15.00 ♦ Interactive Panel Discussion
15.00-16.00 ♦ Refreshment Break
- Session 4 Societal Matters
- 16.00-16.15 **Tackling the Challenges of Rules Across Europe**
Oliver Heinrich - BHO Legal, Germany
(On behalf of the European Drone Lawyers Network)
- 16.15-16.30 **Adapting RPAS Technology to Privacy & Data Protection Requirements**
Catherine Erkelens - Bird & Bird, Belgium
- 16.30-16.45 **How to Implement the Law of the Air on a RPA**
Michael Naderhirn - NM Robotic, Austria
- 16.45-17.00 **Adoption of UAS: What Lies Within?**
Johnny Chamata - Curtin University, Malaysia

- 17.00-17.15 ♦ Interactive Panel Discussion
17.30-19.00 ♦ Drinks in the RMA Mess
(sponsored by UniFly, Belgium)

DAY 2 - THURSDAY 23 JUNE 2016

- Session 5 Standards
- 09.00-09.10 **Update on ASTM F38 Committee Small UAS Standards Development**
Ted Wiersbanowski - ASTM, USA
- 09.10-09.15 **RPAS Standards Development (Finalized & Projected)**
André Clot - EuroUSC, UK
("Drone-Rules.eu" Consortium Member)
- 09.15-09.45 **A Coherent Bottom Up Approach for the Regulation & Standardization of UAS**
Christian Caballero - Caballero & Hesselbarth Consulting, Germany
- 09.45-10.00 **Integration of Commercial RPAS into Global, Non Segregated Airspace**
John Walker - The Padina Group, USA
- 10.00-10.15 ♦ Interactive Panel Discussion
10.15-11.00 ♦ Refreshment Break
- Session 6 Applications
- 11.00-11.15 **Expanding Maritime Capabilities & Airspace Integration**
RAdm (rtd) Chris Ames - General Atomics Aeronautical Systems, USA
- 11.15-11.30 **Challenges of Monitoring a National & Complex Railway Infrastructure with RPAS**
Nicolas Pollet - SNCF, France
(Member of «Conseil pour les drones civils»)
- 11.30-11.45 **Integration of RPAS in the EU Civil Protection Mechanisms - Challenges & The Way Forward**
Alessandro Carotta - European Commission DG Humanitarian Aid & Civil Protection (ECHO)
- 11.45-12.00 **RPAS Use in the Field of Powerline Monitoring**
- Taro Kuusiholma - SharperShape, Finland
- Sanil Nambodiripad - Sterlite Power Grid Ventures, India
- 12.00-12.15 ♦ Interactive Panel Discussion
12.15-13.30 ♦ Lunch in the RMA Cafeteria
- Session 7 Applications
- 13.30-13.45 **Safe RPAS Operations at Airports - Lessons Learned**
Nico Nijenhuis - Clear Flight Solutions, The Netherlands
- 13.45-14.00 **Introduction to Ongoing Work & Interim Conclusions**
Guillaume Thin - Sagem, France
On behalf of «Conseil pour les drones civils» - Long Range RPAS Working Group
- 14.00-14.15 **RPAS for Medium/Low Voltage Electricity Distribution Network**
Christophe Lin - ERDF, France
(Member of «Conseil pour les drones civils»)
- 14.15-14.30 **Inspections of Industrial Structures & The Environment - Perspectives of Uses**
Coline Brothier - EDF - DTG-DMM, France
(Member of «Conseil pour les drones civils»)
- 14.30-14.45 **From Data Acquisition to Touchless Spraying**
Tamme van der Wal - Aerovision, The Netherlands
- 14.45-15.00 ♦ Interactive Panel Discussion
15.00-16.00 ♦ Refreshment Break
- Session 8 Experimentation, Research & Development
- 16.00-16.15 **A Safe & Dynamic Approach to Geofencing**
Valentin Brossard - Hionos, France
- 16.15-16.30 **A RPAS Multi Sensor System for Environmental Monitoring of River Environments & Weather Phenomena**
Prof Paulus Gernot - Carinthia University of Applied

RPAS 2016 - Conference Programme

- 16.30-16.45 Sciences, Austria
Light RPAS Interacting with the Environment
 Antidio Viguria - FADA-CATEC, Spain
- 16.45-17.00 **The SafeShore System for the Detection of RPAS Threats in a Maritime Border Environment**
 Geert de Cubber - Royal Military Academy, Belgium
 (On behalf of the SafeShore Consortium)
- 17.00-17.15 ♦ Interactive Panel Discussion
 17.15-17.25 ♦ Closing Remarks + End of Conference

SPLINTER MEETINGS

Day 1 - Wednesday 22 June 2016

16.00-17.00 **Remote Pilot Training & Flight School Qualification**

Day 2 - Thursday 23 June 2016

11.00-12.00 **Safety Rules for Test Ranges**

16.00-17.00 **RPAS Insurance**

PRESENTING ORGANISATIONS & AFFILIATIONS

Aerovision, The Netherlands

- Geospatial data
- BIOSCOPE Consortium Member

ASTM F38 Committee Small UAS, USA

- Standards organisation

BHO Legal, Germany

- High technology law experts
- European Drone Lawyers Network
- Drone-Rules.eu Consortium Member
- Member of UVS International

Bird & Bird, Belgium

- Legal experts

Caballero & Hesselbarth Consulting, Germany

- Consulting company
- Member of UVS International

Carinthia University of Applied Sciences, Austria

- Academic institution

Clear Flight Solutions, The Netherlands

- Design, production & operation of flapping wing RPAS
- Member of UVS International

Conseil pour les drones civils, France

- French national public/private initiative overseen by the National Aviation Authority

Conseil pour les drones civils - Long Range RPAS WG, France

- Working Group of the Conseil pour les drones civils

Curtin University, Malaysia

- Academic Institution

DGAC, France

- National Aviation Authority
- Conseil pour les drones civils

Drone-Rules.eu Consortium, European Union

- Consortium co-funded by the Executive Agency for Small & Medium-sized Enterprises (EASME) of the European Commission within the context of the COSME Programme

EDF - DTG-DMM, France

- French utility company
- Conseil pour les drones civils

ERDF, France

- French utility company - Electricity distribution
- Conseil pour les drones civils

EuroConsult, France

- Strategic, economic and financial consulting relative to the satellite and broadcasting communities.
- Member of UVS International

European Aviation Safety Agency (EASA), European Union

- European Union Agency

European Maritime Safety Agency, European Union

- European Union Agency

European Commission, European Union

- Directorate General Humanitarian Aid & Civil Protection (ECHO)

- Directorate General Internal Market, Industry, Entrepreneurship & SMEs (GROWTH)
- Directorate Mobility & Transport (MOVE)

EuroUSC-Italia, Italy

- Qualified Entity
- Member of UVS International

EuroUSC, UK

- Qualified Entity
- Drone-Rules.eu Consortium Member
- Member of UVS International

FADA-CATEC (Centre for Advanced Aerospace Technologies), Spain

- Research organisation
- AEROARMS Consortium Member
- AEROBI Consortium Member
- ARCAS Consortium Member
- SAFEMOBIL Consortium Member
- Member of UVS International

General Atomics Aeronautical Systems, USA

- Design & manufacturing of Medium Altitude Long Endurance (MALE) fixed-wing RPAS
- Member of UVS International

Global Aerospace, France

- Aviation Insurers
- Drone-Rules.eu consortium member
- Member of UVS International

Hionos, France

- Autopilot & software design & production company.

Japan UAS Industrial Development Association (JUIDA), Japan

- National RPAS association
- Member of UVS International

North Atlantic Treaty Organization (NATO) Headquarters

- International organisation

NM Robotic, Austria

- Consulting services in the field of software & mechatronical aspects of complex robotic systems
- Member of UVS International

Royal Military Academy, Belgium

- Academic institution
- SafeShore Consortium Member
- Member of UVS International

SharperShape, Finland

- RPAS-related high tech company
- Member of UVS International

Single European Sky ATM Research Joint Undertaking (SJU), EU

- European public/private partnership that manages the development of phase of the Single European Sky Air Traffic Management Research Programme

SNCF, France

- French utility company - Railway
- Conseil pour les drones civils

SpaceTec Partners, Belgium

- Programme management company
- Drone-Rules.eu Consortium Member

Sterlite Power Grid Ventures, India

- Indian utility company - Powerline management

The Padina Group, U.S.A

- Regulatory consultancy

University of Tokyo, Japan

- Academic institution
- Member of JUIDA

GEOGRAPHICAL REPRESENTATION

| | | | |
|-----------------|--------------------|----------------|---------------|
| Austria | Belgium | Finland | France |
| Germany | India | Italy | Japan |
| Malaysia | Netherlands | Spain | UK |
| USA | | | |

European Union: European Commission DG ECHO
 European Commission DG GROWTH
 European Commission DG MOVE
 EU Agencies: EASA, EMSA, SESAR JU
North Atlantic Treaty Organisation (NATO)

The Council for Civil Drones - France

CONSEIL POUR LES
DRONES CIVILS

The first meeting of the "Conseil pour les drones civils" (Council for Civil Drones), took place on 4 June 2015, under the chairmanship of Patrick Gandil, the director general of the French civil aviation authority.

At this meeting a review was made of the work accomplished within the framework of the first phase of the French government's "New Industrial France" initiative. The "Conseil pour les drones civils" consists of representatives of the national professional drone federation (FPDC), the national aeronautical and space industry trade association (GIFAS), various aeronautical industrial groups, operators, public utility companies, agricultural cooperatives, academia, competence clusters, and governmental authorities from various ministries & agencies. It makes recommendations on behalf of the French RPAS community.

The "Conseil pour les drones civils" has adopted a set of action plans encompassing three themes:

- **Operations, Regulation & Use:** To collectively identify future markets, frequency protection, remote pilot qualification, define the regulatory evolution necessary for the rational incremental development of the use of drones;
- **Technology & Security:** To draw up a roadmap permitting to identify the most promising technologies and to coordinate the research efforts required to develop them (incl. test facilities);
- **Support & Promotion:** To facilitate the development of the national civil drone community (export, communication & education, access to financing, insurance, data protection & privacy, general acceptance).

In each of these domains, it is the objective, by means of a pragmatic approach, to coordinate all national efforts at all levels and involve all players, in order to support the multiplication of the usage of civil drones and the development of civil drone-related innovative technologies and services.

With the support of the "Direction générale des entreprises" (an agency of the French Ministry of Economy, Industry & Digital Matters, responsible for the development of the competitiveness & growth of industrial & service enterprises), the Council for Civil Drones watches over the correct integration of its action plan with the solutions of the second phase of the national "New Industrial France" initiative, namely "Transport of Tomorrow", "Intelligent Objects" and "Digital Confidence", and in particular the technological projects identified by its technical roadmap.

The current French civil RPAS community consists of well over 2300 companies and the economic activity associated with this budding community (2147 RPA operators deploying 3851 RPA; 140 approved RPAS producers; 398 granted RPA type certificates Qnties valid on Nov 2015) already represents several hundred million Euros per year. The rapid development of the French drone community is the fruit of the conjunction of a balanced regulation, a dense network of very innovative small & medium-sized companies, a long national aeronautical tradition, and visionary agricultural users and public utility companies.

Drone-Rules.EU - Belgium, France, Germany, UK

DRONE-RULES.EU
CONSORTIUM

The Drones-Rules.EU project aims at building a comprehensive and high quality online presence in order to create THE reference web portal in the European Union (EU) (+ Norway and Switzerland) with the purpose of increasing awareness and facilitating understanding of the legal environment and constraints in relation with light RPAS operations (safety, privacy and data protection, insurance, etc.), with a focus on non-commercial operators (incl. hobbyists). The project will also facilitate access to the European market for commercial operators intending to use RPAS in their home country, or in other EU countries, and showcase the opportunities for economic and job market growth that RPAS represent for entrepreneurs and Small & Medium-sized Enterprises (SMEs).

The Drones-Rules.EU project has three objectives:

- Design online educational and training material intended to increase awareness and knowledge of commercial and non-commercial operators about the regulatory framework applicable to the use of light RPAS in the European airspace, as well as informing them on the potential safety, liability and privacy risks associated to RPAS operations.
- Collect, elaborate and monitor information from all EU Member States (+ Norway & Switzerland) to present the requirements related to Light RPAS operations in the areas of privacy & data protection, operational safety, liability and insurance requirements.
- Develop & deploy a comprehensive, engaging and accessible web library that will act as a one-stop-shop for the RPAS community (existing stakeholders and potential new entrants). The portal will be available in the five main EU languages (EN, DE, ES, IT, FR) with country-specific information on RPAS rules and regulations translated in the language of the concerned Member State. The portal will also showcase success stories and best practices, so as to increase the uptake of RPAS technologies by small & medium-sized enterprises (SMEs) in new entrepreneurial ventures, as well as their acceptance by civil society. In order to maximise the impact of the project, the Consortium will actively promote the platform by organizing training sessions and promotional events.

The Drone-Rules.EU consortium partners combine a wealth of experience in RPAS regulations and EU institutional communication activities. In addition, they also represent a unique team, gathering some of the most knowledgeable and renowned specialists of the European RPAS regulatory landscape. The seven consortium partners are:

- BHO Legal, Germany
- Blyenburgh & Co, France
- EuroUSC International, UK
- GOPAcom, Belgium
- Global Aerospace, France
- SpaceTec Partners, Belgium
- Trilateral Research & Consulting, UK

The Drone-Rules.EU consortium has received the support of key RPAS stakeholders in the EU (national RPAS associations, manufacturers, operators, service providers, etc.), thus ensuring that the impact of the project will be maximised across the EU, thanks to a strong network of multipliers.

The Drone-Rules.EU project is the result of the call for proposals «COS-RPAS-2014-2-03: Facilitating access to regulation for Light Remotely Piloted Aircraft Systems (RPAS)» launched by the European Commission Executive Agency for Small & Medium-sized Enterprises (EASME). It started on 1 October 2015 and has a duration of 24 months.

RPAS 2016 - RPAS Regulatory, Policy & Innovation Forum - Royal Military Academy - Brussels, Belgium - 22 & 23 June 2016

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pvb@uvs-international.org - www.rpas-civops.org - www.uvs-info.com - www.rpas-regulations.com - Issue Date: 160516 - Page: 4/21

Peter van Blijenburgh
Blyenburgh & Co, France

(Member of the Drone-Rules.EU & SkyOpener Consortia)

UVS International, The Netherlands



Bio Data Peter van Blijenburgh, a Dutch national, was born in The Netherlands (1948) and resides in Paris, France (since 1976). He is the CEO of Blyenburgh & Co, a French strategic consultancy company & publisher. Mr. Van Blijenburgh is the founder of EuroUVS (1997), which became UVS International in 2000. He is currently in his 9th two year mandate as president of UVS International (www.uvs-international.org), a non-profit association registered in The Netherlands and operating out of offices in Paris, France, which represents more than 3000 companies (manufacturers & operators) & organizations involved with RPAS/drones in 44 countries. He has instigated the creation of 14 national RPAS/drone associations, and has been the instigator of and/or participant in multiple initiatives related to RPAS/drone regulations & standards. He is the founder of the International RPAS Coordination Council, which federates 25 associations in 23 countries. He is the editor of "RPAS: The Global Perspective", the well-respected annual RPAS/drone reference publication and is also the creator of www.rpas-regulations.com, the world's only web site dedicated to RPAS/drone regulations, which monitors 267 countries & overseas territories, as well as www.uvs-info.com (a generic RPAS/drone information source), a data base of internationally registered patents relative to RPAS/drones (at system & sub-system level) & the architect of the related promotional web site (www.uas-patents.org). Mr. Van Blijenburgh has been implicated with RPAS/drones since 1987 & has supplied advisory services to corporate & governmental entities in Europe, the Middle East, and Far East & USA. He is a member of the ICAO RPAS Panel, European RPAS Steering Group, the EC's RPAS Roadmap Implementation Coordination Group, EASA's Safety Standards Consultative Committee, JARUS' Stakeholder Consultation Body, the SESAR Outlook Study Reference Group, as well as various corporate & academic advisory committees.

DAY 1 - WEDNESDAY 22 JUNE 2016

Session 1 Regulatory & Organisational Matters

09.00-09.15 Overview of Japanese Small UAV Regulatory Situation & Involvement of the JUIDA

Hiroko Nakamura - University of Tokyo, Japan

(On behalf of the Japan UAS Industrial Development Association - JUIDA)



Bio Data Hiroko Nakamura is a Project Assistant Professor at the Centre for Aviation Innovation Research at the University of Tokyo and works with the aviation industry to stimulate technology innovation and higher education for innovation. She previously worked for Nissan Motor Co. Ltd., as a product planner, making the efforts of engineers meet to market expectations. She received her P.h.D degree in Management of Technology and her M.S. degree in Environmental and Ocean Engineering from the University of Tokyo in 2013 and in 2006 and a Special Master's degree in Industrial System Engineering from the Ecole Centrale Paris in 2004. Her research interests include transition management of innovation, such as small RPAS, alternative jet fuels and open rotor.

Abstract We present recent small RPAS regulatory discussions at the Public-Private Council and corresponding working group meetings concerning safety and efficiency in terms of economic growth in Japan. We also present the JUIDA's involvement in these discussions.

09.15-09.30 Update on the Activities of the French Civil Drone Council

Carine Donzel-Defigier - DGAC, France

(On behalf of the «Conseil pour les drones civils»)



Bio Data After a degree in engineering, Carine Donzel-Defigier joined the French Civil aviation authority (DGAC, direction générale de l'aviation civile) as deputy head of the french air carriers and public intervention office, tasked with economic regulation and oversight of French aircarriers and the implementing of the French public service obligation (PSO) programme. Carine then joined the Airworthiness and Operations department, where she headed the international activities monitoring and operational quality office for four years. This office participates in elaborating and implementing the safety oversight policy of French aircarriers and is responsible for elaborating and implementing the ramp inspection programme in France, both on French and foreign aircarriers (technical inspection of aircraft during turn-around). In September 2015, she joined the aeronautic department as deputy head. This department is in charge of defining and putting into effect the aeronautical research and development support policy and of the secretariat of the Civilian Drones Council.

Abstract A dynamic drone market emerged rather quickly in France, thanks to a drone regulation dating back to april 2012, allowing professional use of drones under some restrictions. Now, more than 1900 drone operators exist in our country. The Civilian Drones Council was created in early 2015 in order to structure the drone industry in France, maintain links between its various actors and help to develop the drone market. The Council, which first plenary was held one year ago, and whose third is planified for the 1st of July, gather drone manufacturers, drone operators, state representatives, clusters, equipment manufacturers and big drone clients. It consists

of an executive committee, and three technical committee: «Operations, uses and regulation», «technologies and safety» and «drone industry support and promotion». The latter deals with export matters, privacy rights, financing, insurance, societal acceptance of drones. The «technologies and safety» committee elaborates the technological roadmap of the Council and proposes research projects in accordance to the roadmap. The «operations, uses and regulations» committee has to identify the various operational and regulatory barriers to the full use or operation of drones and propose adequate actions to remove these barriers. At the January RPAS CivOps, we introduced the Council to the European RPAS community, now we intend to update the community on the Council's on-going work and achievements.

09.30-09.45 **Qualified Entities: A New Actor in Aviation?**
Filippo Tomasello - EuroUSC-Italia, Italy



Bio Data Filippo was flight test engineer in the Italian Air Force for about 10 years. From 1984 in ENAV (Italian civil Air Traffic Control) was responsible for R&D and for a number of modernization projects. Member of the ICAO Committee on Future Air Navigation Systems (FANS), then chaired ICAO Panels on Automatic Dependent Surveillance and Mobile Communications. In 2000, he joined EUROCONTROL as manager for ATM/ANS plans in Northern Europe. In 2005, he entered the European Commission, working on accident investigation and extension of EASA to ATM/ANS and aerodromes. From 2007 to 2015, he was a rulemaking officer at EASA, with focus on unmanned aircraft and co-chair of the ICAO Study Group on the matter. He currently is Professor at University Giustino Fortunato, Technical Director of the Italian branch of EuroUSC, UK and senior instructor on RPAS at JAA-TO.

Abstract Transport disasters not only sadly cause victims, but also economic damage. That is why, in 1828 in Antwerpen, the first Qualified Entity (QE) of history was created to independently assess «seaworthiness» and organisations and personnel involved in sea navigation, to reduce the financial risks for insurers. At the time, there was no idea of safety regulatory authority: the QEs are older than the regulators. Aviation emerged almost one century after, but in a different historical context, authorities initiated the issue of pilot licences and certificates of airworthiness to individual aircraft. Soon the authorities realised that they had not enough resources to check the performance and handling of each aircraft. So they introduced, already before WW II the type certificate. Development of technology induced other non-aviation regulators to establish detailed standards and to check safety of industrial products ... but the proliferation of technologies and the dimensions of the mass markets gradually made this no longer possible. In 1985, the Council of the European Union decided to leave to standard making bodies the development of detailed technical specifications and to «notified bodies» the assessment of designs, safety and quality of organisations. In aviation, the principle of QEs was already introduced in 2002 in the first EASA Basic Regulation. Then in 2004 in the Single European Sky. A significant step forward in 2008 was to enshrine the principle of independence. In 2015, the Commission, aware of the limited resources of the authorities to face current and future challenges, proposed to extend their privileges. Also in ICAO, the role of QEs is being discussed in Annex 19. For the operators, they could represent cheaper and faster approval processes.

09.45-10.00 **RPAS: Overview of the French Situation & Future Perspectives**
Muriel Preux - DGAC (Civil Aviation Authority), France



Bio Data Ms Preux is graduated from École Normale Supérieure in 1989 (and PhD in molecular and cellular pharmacology), and from the French National School of Civil Aviation in aeronautics techniques engineering in 1991. From 1991 to 1998, she was involved in HMI and Human Factors R&D activities for DSNA. From 1998 to 2002, she was head of training tools division in STNA "ATM systems" department. From 2002 to 2004, she was head of En-Route R&D department in CENA. From 2004 to 2008, she was ERATO Programme Manager in DSNA DTI. ERATO is the French implementation of MTCD, MONA and CORA 1. From 2008 to 2012 she was deputy head of DSNA DTI (Technical Directorate of French ANSP). From 2012 to 2015 she was DGAC Human Resources Manager. Since 2015, she is DGAC RPAS programme manager.

Abstract France adopted a first regulation for RPAS in April 2012, which enabled the RPAS sector to develop. A new regulation was implemented in January 2016: taking into account the return of experience, clarifying requirements, adjusting scenarios to operational needs and technology evolution, and decreasing administrative burden was necessary. In addition, a new regulation concerning remote pilots training and competencies is currently underway. However several challenges remain to be faced. Illegal flights are a concern in terms of safety and security, and might endanger the professional sector's growth. Technology improvements are necessary to allow new applications such as network surveillance, or parcel delivery. RPAS integration in controlled airspace requires R&D. Last but not least, RPAS traffic growth raises new questions and studying and defining a UTM concept at a European level might be necessary.

- 10.00-10.15 ♦ **Interactive Panel Discussion**
- 10.15-11.00 ♦ **Refreshment Break**

11.00-11.30 **Development of the Future European Rules on Unmanned Aircraft**

Koen de Vos - European Commission DG Mobility & Transport (MOVE)

Jean-Pierre Lentz - European Commission DG for Internal Market, Industry, Entrepreneurship & SMEs (GROWTH)

Antonio Marchetto - European Aviation Safety Agency (EASA)

Bio Data

Koen de Vos (Belgian, born on 21 March 1962) studied law (1985) and economics (1987) at the University of Leuven, Belgium. He started his career at the centre for development studies of the University of Antwerp (1988-89) and at the higher institute for labour studies of the University of Leuven (1990-93). He joined the services of the European Commission in 1993 to work on social and employment issues in the Coal and Steel industries and on Social Dialogue. He moved to the Transport Directorate-General in 2002 to join the Single European Sky team, working in the field of air traffic management to prepare the second Single European Sky package. Since September 2009, he has assumed responsibilities in the field of aviation safety and environment where he is currently working on drones.



Bio Data

Jean-Pierre Lentz is civil engineer. He joined SABCA a Belgian aerospace company, where he first worked on space programmes for the European Space Agency. He led in particular the development of a European space suit. Subsequently, Jean-Pierre became assistant to the head of the company, supporting the cost reduction programme and the reorganisation of the company. He joined the European Commission in 1999 as project officer in the aeronautics unit of DG Research. Height years later, Jean-Pierre moved to DG Enterprise, where he worked on Intellectual Property and Space industrial policy. Since 2 years, Jean-Pierre is part of the team leading the work of the European Commission in the area of RPAS.



Bio Data

As EASA RPAS Technologies Expert Antonio Marchetto is involved on regulatory as well as certification activities in the civil unmanned aircrafts domain. He has been particularly engaged in the process leading to the publication of the Agency's technical opinion on a regulatory framework for the operation of unmanned aircrafts. Before joining the Agency he worked for several years in the military unmanned aircraft domain being deeply involved in the nEUROn program and, previously, in the UAV demonstrator program Sky-X. He formerly carried out systems design, development and certification activities for several other programs, such as the C27-J airlifter and the Eurofighter. He holds a degree in Electronics Engineering from the Turin Polytechnic and a Master in Technology Management from the Stetson School of Business and Economics of Mercer University, Atlanta.



Abstract

On 7 December 2015 a proposal for a regulation of the European Parliament and of the European Council on common rules in the field of civil aviation was published by the European Commission (European Aviation Package). This initiative is part of the 2015 European Commission's 'Aviation Strategy to Enhance the Competitiveness of the EU Aviation Sector'. Its objective is to prepare the EU aviation safety regulatory framework for the challenges of the next ten to fifteen years and thus to continue to ensure safe, secure & environmentally friendly air transport for passengers and the general public. This initiative builds on over twelve years of experience in the implementation of Regulation (EC) No 216/2008 & its predecessor. This proposal must also be seen in the context of the Commission priorities of fostering jobs & growth, developing the internal market and strengthening Europe's role as a global actor. This initiative aims at contributing to a competitive European aviation industry and aeronautical manufacturing, which generates high value-jobs and drives technological innovation. It will create an effective regulatory framework for the integration of new business models & emerging technologies. In particular this initiative proposes to create a Union framework for the safe integration of RPA into the European airspace. This presentation will highlight the major points pertaining to RPAS and will explain the way forward.

11.30-11.45 **The European RPAS Roadmap**

Alain Siebert - Single European Sky ATM Research Joint Undertaking (SJU)



Bio Data

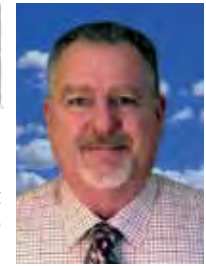
Alain Siebert is responsible for all economical and master planning aspects of the SESAR Joint Undertaking. In this position he is also responsible for corporate risk management, performance, SESAR demonstration activities and the relationship with EASA, National Authorities and civil airspace users. Prior to joining the SESAR Joint Undertaking Alain started his career as a Management Trainee at Air France and later joined SAS Group as Executive Assistant to the Chief Financial Officer. He was later promoted Manager for Strategic Development & Head of Fuel Conservation under the responsibility of the Chief Operating Officer. Alain holds a MSc in Management and was educated at the Toulouse Business School and the London School of Economics.



Abstract

Inclusion of all air vehicles into the airspace is a new priority for SESAR following the update of the European ATM Master Plan in 2015. This presentation will present the roadmap for inclusion of RPAS in Europe, summarizing where we are today and what we are still missing.

11.45-12.00 **NATO UAS Policy**
Allan Storm - NATO Headquarters



Bio Data Assigned to North Atlantic Treaty Organization (NATO) Headquarters in Brussels, Belgium as an International Staff Officer providing expert advice on Air Traffic Management (ATM) issues relating to NATO operations, as well as working "Civil/Military Aviation Issues". These include a myriad of issues relating to Kosovo, Afghanistan, and global ATM to include Communication, Navigation & Surveillance (CNS) issues that impact flight safety, and airspace integration of Remotely Piloted Aircraft. Retired from the U.S. Marine Corps, holds many Air Traffic Controller qualifications & FAA Air Traffic Controller Certificate, Commercial Pilot License and is a designated single engine flight instructor.

Abstract This presentation will discuss UAS Policy and interoperability issues within NATO. This will also include the Engagement of Low, Slow and Small detection.

- 12.00-12.15 ♦ **Interactive Panel Discussion**
- 12.15-13.30 ♦ **Lunch in the RMA Cafeteria**

Session 3 **Awareness Creation**

13.30-13.45 **Presentation & Overview of the DroneRules Website**
Philippe Carous - SpaceTec Partners, Belgium
(On behalf of the Drone-Rules.EU Consortium)



Bio Data Philippe Carous is a consultant at SpaceTec Partners and the deputy coordinator of the Drone-Rules.eu project. He has gained legal and technical expertise in the field of RPAS since 2012 when he joined EUROCONTROL and participated in the UAS Panel Initiative. After graduating with a Master in European Law, Philippe obtained in 2013 a LL.M. in Aviation and Space Law (Leiden University, The Netherlands) and specialised in the regulatory aspects of RPAS operations. Philippe also worked in the business development department of Airbus Defence & Space in The Netherlands.

Abstract The Drone-Rules project is co-funded by the Executive Agency for Small and Medium-sized Enterprises (EASME) of the European Commission under the COSME programme. Its main objective is to promote awareness and facilitate understanding of the regulatory framework applicable to light RPAS operations in Europe in the areas of privacy and data protection, safety and operation, liability and insurance. The speaker will present the new www.drone-rules.eu website (to be launched in June 2016).

13.45-14.00 **RPAS-Related Insurance – European Survey Analysis & Preliminary Conclusions**
Jean Fournier - Global Aerospace, France
(On behalf of Drone-Rules.EU Consortium)



Bio Data Jean Fournier is the Managing Director of the French branch of Global Aerospace. He joined Global Aerospace in April 2009 to open the French branch and to insure all classes of aerospace risks (airlines, airports, general aviation, manufacturers and space) as a leader on the French market. He is also in charge of innovation and new products for the entire Group. Prior to joining Global, Jean spent 19 years with Marsh, including 10 years as Head of the French Aviation & Space team and 3 years as Managing Director in charge of Innovation. In the early part of his professional life, he worked as MATRA (now Airbus) on military & space programmes. He accomplished his military duties as a research engineer at ONERA (French Aerospace Research Centre). Jean is a graduate engineer from the ENS d'Arts et Metiers, and holds a Master degree from the University of Stanford (CA) as well as a DESS in Finance from the University Paris I - Sorbonne. He is a licensed pilot and a non-executive member of the UVS International Board of Directors. Global Aerospace is the world's leading aviation insurer and provides underwriting and claims expertise from its worldwide headquarters in London, UK and its network includes six offices in the United States, two offices in Canada and three continental European offices located in Cologne, Germany, Paris, France and Zurich, Switzerland. Global Aerospace has been dedicated to the aerospace industry for over 85 years and underwrites insurance on behalf of some of the world's largest and most secure insurers and reinsurers.

Abstract Within the framework of the European Commission (COSME Work Programme) - Drone-Rules.eu - RPAS rules regulation portal – Project, a survey has been conducted to gather information on insurance requirements and availability in the 28 countries of the European Union as well as Iceland, Norway and Switzerland, in relation with the operation of drones within said countries. The information collected provides a commercially neutral overview of the third party liability drone insurance products available on the market, and serves as the basis for a communication aiming at increasing the general public's and SME's knowledge about insurance related to the operation of drones within the European Member States. The activities related to this Survey have been conducted by Blyenburgh & Co, and Global Aerospace on behalf of the DroneRules Consortium made up of SpaceTec Partners Sprl, Blyenburgh & Co Sarl, Gopa.com S.A., Global Aerospace Underwriting Managers Ltd, European UAV Systems Centre Ltd, Trilateral Research & Consulting LLP, and BHO – Baumann, Heinrich, Ortner Rechtsanwälte und Patentanwalt Partnerschaft mbH. They took place between March 21, 2016 and May 31, 2016. This presentation will provide a first set of analyses of the answers provided in the survey, and share with the audience the preliminary conclusions resulting from this activity. It will outline the different approaches that have been observed across Europe on means to insure:

- RecreDrones: Drones used for recreational purposes only with mass below 25 kg;
- ProDrones: Drones used for professional purposes with mass below 25 kg;

- AviaDrones: Drones with take-off mass above 25 kg or with special uses insured only by the aviation insurance market.

The European Commission (COSME Work Programme) - Drone-Rules.eu - RPAS rules regulation portal - is co-funded by the COSME Programme of the European Union under the Grant Agreement N°680960.

14.00-14.15 **Trends & Prospects for RPAS in Commercial and Civil Applications**
Pacôme Revillon - EuroConsult, France



Bio Data

Pacôme Révillon is the CEO of Euroconsult, based in Paris, France. Over a career spanning 15 years, he has become a trusted advisor working with the world's top companies in the satellite industry. In this role, Pacôme is responsible for the overall business vision, strategic growth, profitability and operations of the firm. Under his leadership, the company has experienced continuous global growth and has become recognized as the leading reference for strategic, economic and financial aspects of satellite and broadcasting activities. Pacôme has spearheaded crucial consulting projects for stakeholders at all levels of the satellite value chain located in over 20 countries. He has directly advised new and leading operators, banks and investment funds, leading government organizations and industrial players, including diverse communication service companies and broadcasters. Mandates ranged from support to strategic planning and decision-making to performance assessments, feasibility studies and due diligence missions. In particular, he manages and contributes to due diligence projects related to project financing and M&A transactions. He has also led Euroconsult research activities in the satellite communication and broadcasting sector over several years, editing and contributing to all research reports published by Euroconsult. Pacôme has served as the CEO & Managing Director of Euroconsult since 2003. Prior to joining Euroconsult, he worked on the design of communication networks at DLR in Germany and Thales in France. He holds a Graduate Engineering Degree in Telecommunications & Space and a Diploma in Management and Economics (DESIA) from leading aerospace institute SUPAERO in France. Pacôme is recognized as a foremost expert in the satellite and broadcasting industry and is frequently invited to speak and moderate at industry conference. Pacôme regularly contributes to corporate events involving presentations to board meetings, executive brainstorming sessions and customer events. He also gives lectures in several universities for graduate and MBA programs.

Abstract

The presentation will focus on the recent dynamics in the RPAS market for commercial and civil applications (e.g. agriculture, civil protection, oil & energy, transportation, cinema...) and the current market size. It will also highlight what should be the key drivers and inhibitors in coming years and provide forecasts on the economics of the market (e.g. number of RPAS used in the commercial and civil market, usage, revenues...).

14.15-14.30 **RPAS Operations for Maritime Surveillance - Opening the Market for Civil Applications**
Olaf Trieschmann - European Maritime Safety Agency (EMSA), European Union



Bio Data

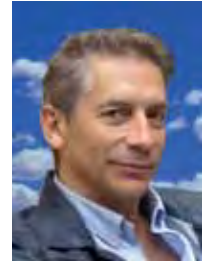
Olaf Trieschmann is currently with the European Maritime Safety Agency (EMSA), where he heads the development for remote piloted aircraft systems for maritime surveillance. Previously he set up the Agency's earth observation services and the satellite-based European oil spill and vessel detection service "CleanSeaNet". He is a senior expert on remote sensing, was founding chairman of EGEMP (European Group of Experts on Satellite Monitoring of Sea-based Oil Pollution), member of the German delegation to the international GEO/GEOSS (Global Earth Observation System of Systems) initiative, and member of the GMES (Global Monitoring of the Environment and Security) "Marine Core Service Implementation Group". Dr. Trieschmann received his diploma and PhD in Physics from the University Karlsruhe, Germany. He started his professional career in remote sensing of the upper atmosphere in the framework of ozone hole and global warming research. Since 2000 he has been working on aerial monitoring and earth observation systems and in particular in the maritime domain.

Abstract

Maritime domain awareness is of growing importance, due to societal challenges, such as maritime pollution, the growth of irregular immigration, illegal fishing, safety of navigation. The European Maritime Safety Agency (EMSA), which is tasked to ensure a high, uniform and effective level of maritime safety, provides comprehensive maritime domain information to the European Member States and bodies. In general, maritime domain awareness implies the capacity not only to monitor activities over large sea areas, but also to find certain risk activity patterns. The detection, tracking and identification of small boats is important. Detailed analysis and continuous monitoring is necessary to achieve this. From a technical perspective however, it remains a challenge; the services based on satellite imagery do not have the capability to cover particular areas of interest at a given moment of need. Remotely Piloted Aircraft Systems (RPAS) have the potential to radically improve surveillance and detection capabilities. A high level European conference on 5-6 March 2015 already framed with the 'Riga Declaration on Civil RPAS (Drones)' the future of civil RPAS operations. Against this backdrop, EMSA is procuring multi-purpose RPAS services in support to EU Member States and bodies. However, the operational requirements are presently primarily fulfilled by military drones. Consequently a transition from the military to the civil domain in terms of capacity and asset availability, with an affordable price structure and sustainable business model, is necessary and a challenge for industry. EMSA encourages industry to analyse their capabilities and to be prepared for a civil market.

The presentation will address the operational requirements of RPAS needed for maritime surveillance, the obstacles still to be overcome, and will describe the Agency's activities in support of European capacity in the area of RPAS-based maritime surveillance.

14.30-14.45 **A Software Development Methodology Enabling Effective, Efficient & Profitable Certification of Avionics Software for Micro/Mini RPAS**
John Pyrgies - Royal Military Academy, Belgium



Bio Data John Pyrgies is graduated in computer sciences and management sciences and is undertaking a PhD at the Belgian Royal Military Academy (Mathematics department) and uNamur University (PRECISE Research Center) in the fields of computer sciences & mathematics. His research covers a 'software development methodology enabling an effective, efficient & profitable DO178C certification for avionics software embedded in micro/mini RPAS'. The outcomes of this research will be exploited in drones applications supporting the critical missions of public & military forces: Search & Rescue, reconnaissance for the special forces, rogue drone interception...

John has acquired a 28 years professional experience in Information Technology, mostly in engineering software (requirements elicitation & specification) supporting critical information systems (banking sector) and developed under agile/iterative/waterfall methodologies. He has a sound experience in cybersecurity (threat analysis, security architecture, cryptography...) and also has expertise in legal & financial aspects of software engineering. End 2014, he founded SkyAngels, a startup company aimed to support his RPAS research activities whose current themes are: a) Cybersecurity measures aimed at protecting governmental RPAS; b) Protection of the community against 'rogue' drones (e.g. used as a vector for leading or preparing a terrorist attack); c) Specification, Verification & Certification of avionics software embedded in RPAS; d) RPAS applications supporting critical missions of civil security, police and military forces. The presentation is co-authored by Major Dr.Ir. Robby Haelterman, Mathematics Professor at the RMA and promotor of his thesis.

Abstract Embedded avionics software developed for the 'traditional', 'manned' aeronautics industry follows stringent Software Development LifeCycle (SDLC) rules and must comply against the RTCA DO-178C/EUROCAE ED-12C, which is used by the aeronautics authorities (FAA, EASA) to certify that software. The DO-178C certification process determines 5 levels corresponding to the effects of a failure on the crew, passengers and aircraft: no effect, minor, major, hazardous, catastrophic. The rigor, details and traceability of the certification artefacts are determined by those levels. Embedded avionics software is also used to control the flight, the navigation and the payload of micro/mini RPAS, but the SDLC of such software is not subject, so far, to DO-178C compliance and certification processes. However, although an RPAS does not carry any crew members or passengers, a software malfunction could cause it to crash on a city, collide with a manned aircraft, disrupt airport activities, etc... This could lead to severe, even lethal, injuries and substantial economic losses. Moreover, from a manned aircraft cockpit, the pilot can try to find a remedy to a software failure. The RPA pilot's margin is more limited as she/he is only bound to her/his aircraft by a datalink Ariane's Thread... which can be broken. This presentation will cover:

- The benefits (higher dependability, security, safety...) and tradeoffs (higher costs, longer time to market, lower flexibility for changes...) for the drone's embedded avionic software editors and micro/mini drones manufacturers that like to have, on a voluntary basis, their software certified against the DO178C.
- The methods allowing their software development teams to reach this DO178C certification in an effective, efficient and profitable way: Agile methods, risks analysis, model-based design (DO-331), formal methods (DO-333), runtime verification with formal specification, Integrated Modular Avionics (DO-297), Software Product Lines, Software Of Unknown Pedigree Framework.

14.45-15.00 **◆ Interactive Panel Discussion**

15.00-16.00 **◆ Refreshment Break**

Session 4 **Societal Matters**

16.00-16.15 **Tackling the Challenges of Rules Across Europe**

Oliver Heinrich - BHO Legal, Germany

(Drone-Rules.EU Consortium Member)

(On behalf of the European Drone Lawyers Network)



Bio Data Oliver Heinrich is co-founder and partner of BHO Legal - a consortium member of the «Drone.Rules.eu» EU funded project. Oliver studied German and Anglo-American law at the Universities of Trier and Cologne. He wrote his doctoral thesis at the Institute of Air and Space Law of the University of Cologne on legal questions of national and European research funding. Prior to working as an attorney, Oliver was a project manager for the European Satellite Navigation System Galileo at the German Aerospace Centre (Deutsches Zentrum für Luft- und Raumfahrt e.V.). Oliver is a member of the extended board of UAV DACH, member of the association's air law expert group and head of its legal work group.

Abstract Europe is currently lacking a uniform regulatory system for drones below 150kg MTOM. European Member States apply their own rules. Companies wishing to do business in and across European Members need to know these rules in order to legally implement their business case. A number of law firms in various European have therefore taken the initiative to establish the European Drone Lawyers Network. The network's goal is to overcome the legal obstacles of a true common market for drone manufacturers, operators and related service providers in Europe and to provide a pan-European legal service. The presentation gives a brief overview of the legal situation in Europe, the concept behind the network and the services offered to tackle the currently legal issues for companies to establish their business on a wider scale.

16.15-16.30 **Adapting RPAS Technology to Privacy & Data Protection Requirements**

Bird & Bird

Catherine Erkelens - Bird & Bird, Belgium



Bio Data

Catherine joined Bird & Bird as a partner in Brussels in 2000 and is Joint Head of the International Aviation & Defence Group. Since 1994 Catherine has developed a strong client base and leading reputation working for companies operating in or dealing with the Aviation & Aerospace sector. Catherine and her team specialise in all matters of European Aviation regulation. Her experience includes commercial advice and litigation in relation to airport infrastructure, aircraft operation and maintenance, groundhandling, liability, data protection. Catherine also has a strong focus on technology and provides commercial and contentious advice on business relationships between airlines and their service providers. Catherine is a member of the European Aviation Club and of the International Aviation Women's Association. She was awarded Best in Aviation by Euromoney European Women in Business Law, 2014 and again Euromoney European Women in Business Law, 2015, and was awarded the Client Choice Award 2016 for Aviation, Belgium.

Abstract

Data protection by design and by default, the implementation of appropriate technical and organisational measures for protecting data and data subjects, is now embedded in the new General Data Protection Regulation. Organisations that are processing personal data with the use of RPAS will be accountable, will have to adopt the necessary technical and organisational measures to demonstrate compliance. Where processing may have considerable impact on privacy, such as with monitoring activities, a detailed privacy impact assessment must be undertaken and documented. It may be necessary to obtain the view of the supervisory authority on the adequacy of measures proposed. The requirements and possible measures will be discussed.

16.30-16.45 **How to Implement the Law of the Air on a RPA**

Michael Naderhirn - NM Robotic, Austria



Bio Data

Dr. Michael Naderhirn founded NM Robotic in October 2013. He serves as CEO and CTO at NM Robotic. He is responsible for several operational aspects of NM Robotic. Prior to NM Robotic LLC. Dr. Naderhirn was founder, co-founder of several startups in field of mobile robotics and sensor systems. Dr. Naderhirn was a technical staff member at the Johannes Kepler University Linz where he worked on research projects. In 2005 he was a visiting scholar at the University of California Los Angeles at the ARES lab of Prof. Emilio Frazzoli where he was part of the Golem group participating in the DARPA Grand Challenge. In 2011 he received his PhD from the Johannes Kepler University in Linz in the field of robotic and control engineering. Dr. Michael Naderhirn has published several papers and patents. He received the Thales UAS Innovation Award 2010, Bordeaux, France, was finalist in Sikorsky entrepreneurial challenge in 2012 and was recipient of the Austrian export prize 2015.

Abstract

In this presentation we want to show how the rules of the air can be implemented on a RPA so that the RPA can satisfy the rules of the air & other specifications given in a natural language. We apply verification technologies known from software development into a system with the difference that the verification has to be done in hard real time. To our knowledge, the proposed method allows, for the first time worldwide, to use written law and/or specifications to be applied for a control task. This could be the foundation for the certification of RPA for BLOS operations.

16.45-17.00 **Adoption of UAS: What Lies Within?**

Johnny Chamata - Curtin University, Malaysia



Bio Data

Johnny Chamata graduated as an electronics engineer in 2000, however he decided to have his professional experience in the business field. Therefore, he started and developed his career in business development over various Middle Eastern and Asian countries such as Egypt, Qatar, Bahrain and Malaysia. In 2013, the presenter completed a Master degree in business at Curtin University whereas he is currently undertaking his doctoral research at the same institution addressing a multidisciplinary research about unmanned aircraft (aka RPAS, UAV). The presenter also acts as a business consultant for different reputable firms in Malaysia.

Abstract

Several technologies have been introduced over the years, among which most recently is the unmanned aircraft technology (e.g. RPAS; aka drones). A technology which is highly useful in hundreds of applications (e.g. search & rescue, fire-fighting, oil & gas exploration) has however created controversy because of several associated technical, social & legal issues. Technical dysfunctionality is evident through many records of drone crashes around the world, less often though leading to injuries or damage of property. This mal-functionality however does not mean drones do not enjoy super capabilities allowing them to fly over areas inaccessible to humans. This being perceived as useful in many cases (e.g. search & rescue, fire-fighting), when accompanied with unethical behavior usually by hobbyists is resulting in a breach of people's privacy at different levels. On the other hand, existing regulations mostly adapted from those of commercially piloted aircraft which are argued to not be suitable for regulating drone flights. Moreover, attempts of aviation authorities to formulate drone-specific regulations are resulting in laws that are often too immature for a broad drone integration, and promises of well-developed regulations seem to be taking too long. This situation is worsening the social feeling about the technology and consequently slowing down its wide adoption internationally. The presenter hence addresses various worldwide societal perceptions of unmanned aircraft considering several factors suggested as potential causes for slow adoption.

17.00-17.15 ♦ **Interactive Panel Discussion**

17.30-19.00 ♦ **Drinks in the RMA Mess Bar (sponsored by UniFly, Belgium)**

Session 5 **Standards**

09.00-09.10 **Update on ASTM F38 Committee Small UAS Standards Development**
Ted Wiersbanoswki - ASTM, USA



Bio Data

Ted Wierzbowski is a retired USAF Colonel & an experimental test pilot. He has been deeply involved in advanced aircraft development since the early 80s when he was the first Air Force test pilot for the X-29 program. During that time he also was the fighter branch chief at the Air Force Flight Test Center and helped create and then manage a new organization responsible for all one-of-a-kind and research Air Force Flight Test Center aircraft programs. After leaving the X-29 program Ted moved on to the X-30/NASP program where he served in many senior level positions over a period of seven years. Ted retired from the Air Force in 1994 and went to work at AeroVironment (AV) where, prior to his retirement from AV in early 2013, he managed many advanced technology electric vehicle, distributed energy, and unmanned aircraft systems (UAS) programs and was AV's Director of UAS Airspace Integration responsible for AV's interaction with the FAA and other government agencies on UAS issues. In the past he was the President of UNITE (UAV National Industry Team), the Industry Co-Chair of the FAA's Small UAS Aviation Rulemaking Committee (ARC), and a member of EUROCAE UAS Working Groups 73 and 93. He is currently the Chair of the ASTM F-38 UAS Standards Committee and the Industry Co-Chair of the current FAA UAS ARC. Ted graduated from the Air Force Academy in 1968 and also has a M.S. in Systems Management from USC. He is a graduate of the USAF Test Pilot School and the Defense Systems Management College as well as a member of Society of Experimental Test Pilots and a senior member of AIAA. In 2012, he received the AUVSI Outstanding Contributor Award for all of his work in supporting UAS airspace integration efforts.

Abstract

In 2003, ASTM International established committee F38 on Unmanned Aircraft Systems (UAS). The purpose of the committee is to produce cost-effective, timely consensus standards that, when applied, will enhance the safe design, manufacture, maintenance, and operation of UAS in any nation's airspace. In April 2010, ASTM and the FAA signed a Memorandum of Agreement (MOA) whereby ASTM F38 can "participate in, and help facilitate, the development of standards utilizing the ASTM voluntary consensus process." The work under this MOA is in support of the FAA efforts to safely integrate UAS in civil airspace for compensation or hire. The presentation will first cover how F38 is organized and structured. It will then cover the current status of the standards developed in support of all Civil Aviation Authority's efforts (including the U.S. FAA) to integrate UASs into their nation's airspace. This will include details of specific standards currently under development including: operations over people; extended and beyond visual line of sight operations; operational risk assessments; design, construct, and test of fixed wing and vertical takeoff and landing UASs; use of batteries; design of the command and control system; software dependability; maintenance and continued airworthiness; production acceptance; quality assurance; crew training; aircraft flight manual; and marking. The presentation will end with specifics on how interested entities, both in the U.S. and in the international community, can participate in the development and refinement of those standards.

09.10-09.15 **RPAS Standards Development (Finalized & Projected)**
André Clot - EuroUSC, UK
(Drone-Rules.EU Consortium Member)



Bio Data

André J. Clot founded EuroUSC™ in 2003 whilst working as the rapporteur for the Safety and Security working group of the JAA/Eurocontrol UAV Task Force. In 2004 the task force's report became the basis for the newly formed European Aviation Safety Agency (EASA). He is a former chairman of the Royal Aeronautical Society's UAS Specialist Group and was Vice Chairman of EUROCAE WG93 on Light RPAS standards for three years. André is now an advisor to Eurocontrol on the International Civil Aviation Organisation Authority (ICAO) RPAS Panel, the interactions with the Air Traffic Management WGs and the overall Concepts of Operations for RPAS (CONOPS) at JARUS. He is also a non-executive member of the UVS International Board of Directors. EuroUSC™ is a Qualified Entity who adhere to EC 216/2008 ANNEX V and working on future global RPAS standards following on from EuroUSC™'s own standards initially developed in 2014 for Airworthiness (LUASS-AW™), Design and Production Assessment (LUASS-DPS™) and Flight Crew Licensing (LUASS-FCL™). EuroUSC™ now operates in over 10 countries supporting National Aviation Authorities on work which includes pilot qualification, airworthiness and operational assessments and incident investigations.

Abstract

Global co-ordination and harmonization within the RPAS industry has been hampered by many different approaches being adopted by National Aviation Authorities. Within Europe and the United States this is beginning to change but it will be a few years before tangible benefits appear. In the meantime standards have begun to emerge from industry led standards organisations bodies and industry organisations to drive the market towards greater acceptance by regulators, insurers and the public whose safety is paramount. The residual risk currently for most safety assessments is still the airworthiness of the aircraft system and the competence of the pilots that operate them. This presentation highlights standards available today from EuroUSC™ to address these short-term issues.

09.15-09.45 **A Coherent Bottom Up Approach for the Regulation & Standardization of UAS**

Christian Caballero - Caballero & Hesselbarth Consulting, Germany



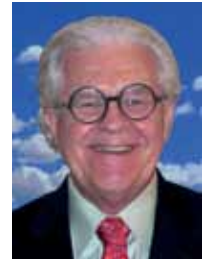
Bio Data

Christian Caballero is CEO of an unmanned systems consulting company. After his 15 years of military service as an army officer, he has deep knowledge of the integration of unmanned systems into permissive & non-permissive environments. As a former Joint Terminal Attack Controller, Forward Air Controller and Airspace Manager, he is well experienced, trained in several countries, holds multiple certificates and has real-life experience of the integration of UAS into complex scenarios. He is a combat veteran and is now committed in different associations & companies as an independent project & communications consultant. He is the German representative for AirShepherd (www.airshepherd.org), a wildlife preservation mission of the Lindberg Foundation in Africa, using RPAS to fight poachers. Furthermore, he is the deputy chairman of Federal Association for Unmanned Systems in Germany, focusing on unmanned systems at sea, air and land. (www.BuVuS.de)

Abstract

It is essential to involve local and regional authorities into the process of integrating UAS into civil airspace, because it gives a common understanding on all levels and speeds up all work flows. The presentation refers to current activities with authorities, to underline the necessity of this approach. Produced content and results were taken into the different standardization organization (DIN, ASD-STAND, ISO) to discuss and to lighten the needs of the permission giving authorities at the base. It is the aim to gain public acceptance and to bring qualifying standards into service solutions. Furthermore, it is important that the informative effect of the workshops and projects are published into local medias and that the society, as well as local political leaders are involved. A transparent view towards the integration process of unmanned technology, guaranties a responsive and mutual solution. Standards and regulations function as a catalyst and are important to form a sustainable growing market.

09.45-10.00 **Integration of Commercial RPAS into Global, Non Segregated Airspace**
John Walker - The Padina Group, USA



Bio Data

John has fifty-one years of aviation experience in a career rich in air traffic control, airspace management, flight navigation and airport development skills. John's aviation career includes thirty-two years with the United States Federal Aviation Administration (FAA) as well as four years served in the United States Air Force. His last Senior Executive Service assignment was served as the FAA's Program Director of Airspace Management. In this position John was responsible for the management of all civil airspace within the United States. He also provided leadership for initiating the FAA's National Airspace Redesign program, intended to transform both integration and design of America's airspace for spacebased operations. Prior to his assignment in Washington, DC, John was the FAA's Air Traffic Division Manager in New York City, responsible for all air traffic operations in the Northeast United States. John believes that our global airspace is one of the last un-tapped resources remaining in the world today and is dedicated to further his vision and passion for modernizing global airspace use. Additionally, John served as the Co-Chairperson of RTCA Special Committee 203, developing industry recommended performance standards for Unmanned Aircraft Systems (UAS). He currently participates with the Association for Unmanned Vehicle Systems International (AUVSI) Industry Advisory Committee, the Aerospace Industries Association (AIA) UAS Committee and the FAA's UAS Executive Committee International sub-working group; he also served on the UVSI Board of Directors in Paris, France. In addition, John serves on the ICAO RPAS Panel in Montreal, Canada as well as being the Chairperson of the ISO UAS Committee (ISO TC20/SC16). He resides in Lancaster County, Pennsylvania, USA with his wife Darlene and two children, Elisabeth and Andrew.

Abstract

Presenting a programmatic framework to achieve civil / commercial RPAS integration into non-segregated airspace through cooperation and coordination between international Civil Aviation Authorities, Air Navigation Service Providers, international standards organizations and airspace users.

10.00-10.15 **◆ Interactive Panel Discussion**

10.15-11.00 **◆ Refreshment Break**

Session 6 **Applications**

11.00-11.15 **Expanding Maritime Capabilities & Airspace Integration**

RAAdm (rtd) Chris Ames - General Atomics Aeronautical Systems, USA



Bio Data

As Regional Vice President Europe of International Strategic Development for General Atomics Aeronautical Systems, Inc. (GA-ASI), Chris Ames is responsible for promoting opportunities for the company's full line of RPAS, radars, and electro- optic and related mission systems in U.S and international markets. Prior to joining the GA-ASI in 2006, Mr. Ames served in the U.S. Navy, retiring as a Rear Admiral. During his naval career, he commanded Expeditionary Strike Group 5, Task Force 58, Amphibious Group 3, the Bonhomme Richard Amphibious Ready Group, Amphibious Squadron 3, and the USS TARAWA (LHA 1). He led multiple deployments to the Arabian Gulf supporting Operations Desert Strike, Enduring Freedom, Iraqi Freedom, and Unified Assistance. A naval aviator, Mr. Ames also commanded Patrol Squadron 16 and piloted the P- 3C Orion aircraft on multiple worldwide deployments. While ashore, he served with The Joint Staff, the U.S. Pacific Command, the U.S. Transportation Command, the Navy Staff, and numerous Washington area, Fleet staff, and operational aviation and shipboard assignments. Mr.

Ames is a graduate of the United States Naval Academy. He also holds a Master's in Public Administration from Harvard's Kennedy School. Mr Ames is a non-executive member of the UVS International Board of Directors.

Abstract

In 2009, the U.S. Department of Homeland Security (DHS) acquired a Predator B configured for maritime operations ("Guardian") to enhance the department's long-range maritime detection and surveillance capabilities further. Guardian serves as a powerful and affordable force multiplier, increasing maritime domain awareness while conducting persistent and long-range surveillance, safeguarding maritime approaches from illicit activity. During missions in the Caribbean, Gulf of Mexico, and other regions, Guardian delivers Maritime Patrol Aircraft (MPA) surveillance capabilities, streaming critical real-time data to support successful mission execution across a range of operational scenarios. Guardian capitalizes on its long-endurance, Beyond-Line-of-Sight (BLOS) capability and sophisticated sensor suite to detect, identify and track contacts of interest. Equipped with a state-of-the-art sensor package, its 360-degree maritime surface search radar and Automatic Identification System (AIS) support detection and electronic identification of AIS-equipped vessels, while its sophisticated Electro-optical/Infrared (EO/IR) cameras provide the critical ability to discern a vessel's intent. To exploit Predator B's expanding capabilities more fully, GA-ASI's Certifiable Predator B (CPB) is designed to meet NATO/European/U.S. airworthiness certification standards and, thus, is capable of operating in non-segregated airspace and integrating seamlessly with manned aircraft. Further increasing Predator B's operational flexibility, CPB will provide increased endurance and an extended mission radius with greater payload capacity to complement and support additional MPA mission functions such as sonobuoy dispensing. General Atomics Aeronautical Systems, Inc.'s (GA-ASI's) Due Regard Radar (DRR) is integral to CPB's Detect-and-Avoid (DAA) system. Combined with onboard TCAS II and ADS-B capabilities, the DRR will ensure safe separation from cooperative and non-cooperative aviation platforms while operating in national airspace and over international waters. GA-ASI is partnered with NASA and the FAA in pioneering the testing and advancements to this DAA system.

11.15-11.30 **Challenges of Monitoring a National & Complex Railway Infrastructure with RPAS**

Nicolas Pollet - SNCF, France

(Member of the «Conseil pour les drones civils»)



Bio Data

Nicolas Pollet is the lead of Drones for SNCF –French Railway Company– a team in charge of integration of RPAS into the railway system. The aim is to collect data to perform all the SNCF activities.



The team is developing civil activities in engineering & data acquisition. Nicolas collaborates with authorities (DGAC), aeronautic companies (Airbus DS, Thales ...) and industrial societies (EDF, RTE...) in the technical committee of the French National UAV Plan. Nicolas POLLET is an expert in engineering geology & rock mechanics with a PhD in characterization & analysis of rock massifs leading to definition and sizing of works, reinforcement or protection against rocky collapses. He develops competence in network maintenance & risk analysis as a tool for the French railway asset management policy regarding natural hazards, earthworks & hydraulics aspects. He is also involved in research projects: PhD thesis in terrestrial laser scanning & photogrammetry, PhD thesis in rock mass expertise, infrared thermal imaging.

Abstract

Railway network monitoring gives information for asset management. Aim is to characterize all the components to maintain a high level of performance and service by optimizing investments (upgrade) and maintenance. General stakes and rules have to be preserved (inspection reliability of the works, security ...) : economic constraints, continuity of service (reliability, availability, maintainability) and impacts on countries (strategic networks, development of the territory...) even if there are very variable between the systems and inside those. As drones can capture data autonomously (automated machines, robots, helicopters...) without disturbing train traffic they can be considered as a new and efficient solution. This solution could be relevant if and only if, it is powerful (quality, at least equivalent to what is carried out by other means, but preferentially better to invest under development), effective (objective results), efficient (results/resources/environmental impact) and profitable (complete economic model, direct and indirect costs, productivity gains) for the decision-making aid. To ensure a full system coherence, it is essential to interface this new acquisition method with all existing measurement systems : infrastructure-based sensors and on-board measurement systems. By combining all kind of data, asset manager obtains a widened vision of the network and all its components. To maximize value of data, it is from the beginning advisable to articulate the solution around vision of the system and of well-defined and controlled applications. The solution thus comprises an optimum between acquisition system (which kind of drone) sensor, data and data processing. Control of the full value chain makes it possible to gather the data with the objective of achieving a viable economic model.

11.30-11.45 **Integration of RPAS in the EU Civil Protection Mechanisms - Challenges & The Way Forward**

Alessandro Carrotta - European Commission DG Humanitarian Aid & Civil Protection (ECHO)



Bio Data

Dr. Alessandro Carrotta holds an MSc in Engineering and a PhD in Operations Research. In the last ten years he has covered positions related to research and technology in the transport and defence sectors, both in public and private organisations. In 2015 he joined DG ECHO at the European Commission where he is in charge, among others, of the file on innovative technologies for Civil Protection.»

Abstract:

In a world in which disaster risks are becoming more and more unpredictable and more frequent, the use of RPAS has proved effective in improving capacities for data and imagery collection to support better decision making for response in the midst of emergencies and crisis, particularly in dangerous and life-threatening situation, when situation awareness from land is limited, or when operational conditions do not allow the deployment of any

other systems. Since the first civilian applications, technological development of RPAS and possible applications in different sectors have quickly evolved and expanded, posing challenges touching legislation, operations, business models, research, technology and ethics. In January 2016, DG ECHO organised a workshop with Member States experts to discuss the main challenges for the use of RPAS in disaster management, in particular their deployment in the context of the Union Civil Protection Mechanism (UCPM). The workshop was articulated along three sessions dealing with the primary challenges to use and deploy RPAS in disaster management:

- Regulatory session: covering aspects enabling a safe, rapid, legal, effective and efficient deployment of RPAS across the EU and, to the possible extent, outside the EU.
 - Operational and technical session: discussing the concept of operation and the requirements of RPAS in the context of UCPM missions.
 - Strategic session: discussing business & operating models, ethical aspects, and the mutualisation of military assets.
- This presentation will clarify the main conclusions of the workshop and the undergoing initiatives.

11.45-12.00 **RPAS Use in the Field of Powerline Monitoring**
Taro Kuusiholma - SharperShape, Finland
Sanil C. Namboodiripad - Sterlite Power Grid Ventures Limited, India



Bio Data Taro Kuusiholma is Senior Vice President of Sharper Shape Ltd. responsible for regulation and Space as of 1st September 2015. Formerly he worked eight years as Special Advisor for Finnish Transport Safety Agency (CAA Finland) Regulation and Development department and Chairman of Finnish CAA UAS Working Group. He was Plenary member of JARUS (Joint Authorities for Rulemaking on Unmanned Systems) representing Finland and member of WG2 (leader), WG3 and WG7. He is also member of ICAO RPASP & ICAO Space Learning Group (as advisor to UVS International) and member of the Legal and Regulatory Committee of the International Association for the Advancement of Space Safety (IAASS). He served as Advisor in EASA P&M TAG, was a member of EUROCAE WG93, was an advisor for Norway in ICAO UASSG (2013-2014) and he was awarded UVS International's Catherine Fargeon Award 2014. He is member of the Royal Aeronautical Society, a professional member of IAASS, and a non-executive member of the UVS International Board of Directors.

Bio Data Sanil has been working in the Power industry for more than twenty two years in commissioning and O&M of Gas based combined cycle power plants and Coal fired power plants. He is an Electrical engineering graduate with Masters in Business Administration. Currently, Sanil is responsible for the management of all the operating assets of Sterlite Grid. Sterlite Grid owns and operates two 765 kV , 3000 MVA substations and more than 2500 kilometers of 765 and 400 kV Transmission lines. He is engaged in setting up an advanced asset management system with focus on data analytics and predictive technologies Earlier, he worked as Asst. Vice President – Operations in the Corporate Operations Group of Reliance Power guiding the management in O&M strategies, systems and processes. He was responsible for the Central Plant Information and M&D systems for the power stations being setup by Reliance. His responsibilities included technical support to site issues starting from the commissioning phase and onward to O&M. Reliance Power has 2500 MW of operating capacity and more than 30000 MW under various stages of development and construction. He was the Nodal Officer / Technical Manager for all the Gas based power stations being operated by Reliance Power. Before joining the Reliance group, he was associated for more than seventeen years with National Thermal Power Corporation, the largest power generating company in India which operates about 40000 MW thermal capacity which includes 6000 MW of gas based power plants. He has hands on experience in both operation as well as maintenance of large gas turbine power plants. He was the commissioning manager for the restart of 2000 MW Dabhol power station, the largest gas based power station in India.



Abstract Sharper Shape one of the leading UAS solution providers and India's largest developer of private transmission systems, Sterlite Grid entered early 2016 into a strategic partnership to deliver cutting-edge UAS technologies for the power transmission industry. The alliance will provide business solutions to transmission line operators and help them in reducing delivery time of projects, and increase the uptime of power systems. Sterlite Grid's role in this alliance is to set up operations in India involving all customer-facing activities. The technology provider, Sharper Shape will offer software solutions, technical know-how and capabilities required to fulfill the scope of the work. Today, Indian Power Transmission sector is facing serious challenges in terms of overburdened network, execution delays and high T&D losses. Sterlite has been at the forefront of introducing new technologies to the power delivery sector. It was the first to introduce helicopter-aided construction, LiDar-based route inspection, and was also the first private company to commission a transmission project ahead of schedule. The presentation illustrates how the use of UAS will help eliminating manual inspections which take a lot of time and offer very low accuracy. UAS offer timely information from remote places which are inaccessible through manual methods, thereby making operations & maintenance more efficient and reducing technical losses. To ensure uninterrupted electricity for all, UAS will play a critical role in preventing breakdowns by offering also predictive analytics.

12.00-12.15 ♦ **Interactive Panel Discussion**
 12.15-13.30 ♦ **Lunch in the RMA Cafeteria**

Session 7 **Applications**

13.30-13.45 **Safe RPAS Operations at Airports - Lessons Learned**
Nico Nijenhuis - Clear Flight Solutions, The Netherlands



Bio Data Nico Nijenhuis (29) studied Applied Physics and Engineering Fluid Dynamics at the University of Twente. During his studies he spent time in Malawi, Africa with local tobacco farmers, wrote his Bachelor thesis at CERN in Geneva, and did an internship at the Dutch Aerospace Laboratory NLR during his Master, where he developed and validated a novel theory for the aerodynamic Near Ground Effect. Soon after being handed an early prototype of a Robird by his professor, Nico founded Clear Flight Solutions together with Robert. The company now has 13 employees and completely focuses on the development and operation of their Robirds and other (bird-like) Remotely Piloted Aircraft Systems (drones) technologies in wildlife control and wildlife protection.

Abstract Bird strikes are one of the major problems in aviation, a problem that is getting worse due to the growing number of birds and the increasing number of flights with aircraft that are getting quieter and faster. By far the best way to deter birds is by using a RPAS robotic bird of prey. The dilemma is the legal restrictions of using RPAS in a CTR on the one hand and enhancing the safety manned aviation on the other hand. For the operations inside the CTR stakeholders had to come up with protocols for separation whereby effective bird control is still possible without increasing the workload of ATC.

13.45-14.00 **Introduction to Ongoing Work & Interim Conclusions**
Guillaume Thin - Sagem, France



On behalf of the Long Range RPAS Working Group, of the «Conseil pour les drones civils», France)

Bio Data Guillaume Thin (1964) is VP Future Avionics, Avionics Division, Sagem. After having been Product Line Manager for Sagem UAS, he joined Sagem Avionics Inc., USA as Director of Programmes. Then became VP Program Future Helicopters at Sagem and was in charge of the “HdF” French collaborative programme along with Airbus and Thales. He now coordinates product roadmaps and collaborative studies for the Avionics Division.



Abstract Based on a French “Conseil des Drones Civils” initiative, a working group was setup to study the specific conditions applicable to RPAS systems capable of routine long range operations above generic linear infrastructures. Organized in 4 subgroups, the study developed a safety policy, and analyzed its consequences on major functional domains, as well as the rulemaking aspects. Recommendations are made for subsequent demonstrations addressing more particularly the specific challenges of such missions, keeping in mind twin step timely perspectives: short term and mid/long term.

14.00-14.15 **RPAS for Medium/Low Voltage Electricity Distribution Network**
Christophe Lin - ERDF, France
(Member of the «Conseil pour les drones civils»)



Bio Data Christopher Lin has been employed as an Electrical Engineer by EDF Group since 1992, first in R&D Department in the field of Electric Vehicles & charging infrastructures, then in Thermal Powerplant engineering (Combined cycle erection for Mexico & Vietnam), Project Manager at RTE (electrical transport network), and finally at ERDF (electrical distribution network) since 2008 as a key account manager & technical manager.



Abstract RPAS are already used at erdf (experimentations) and their applications will be generalized in the future. They mainly operate for Maintenance and Fault clearance of Low Voltage/Medium Voltage overhead Lines and Power Substations. But RPAS may have also other uses : diagnosis, cartography, tree pruning for electrical distribution network. Research & Development axis of Digital sensing devices for RPAS are also encouraged and developed.

14.15-14.30 **Inspections of Industrial Structures & The Environment - Perspectives of Uses**
Coline Brothier - EDF - DTG-DMM, France
(Member of the «Conseil pour les drones civils»)



Bio Data Coline Brothier is a graduate of the Hydraulic and Environmental Engineering school of Toulouse, France. She is responsible for the EDF Drone Expertise Center. The objectives of this center are to develop and qualify new solutions by using drones in order to carry out inspections of industrial structures and the environment.



Abstract Since 2012, more than fifty experiments with drones have been completed at EDF to determine the possibilities of this new tool for the inspection of industrial structures and the environment. Different applications have been tested for use in its diverse park of production (nuclear, thermic and hydraulic) : visual inspection, topography, 3D modelling, acoustic, thermography, hyperspectral acquisition. This presentation illustrates the results of the different civil drone applications tried and the perspectives of uses.

14.30-14.45 **From Data Acquisition to Touchless Spraying**
Tamme van der Wal - AeroVision, The Netherlands



Bio Data Tamme has a degree in Land & Water Management from Wageningen University, The Netherlands and has dedicated his career mostly to innovations in agriculture with geo-information and ICT. Since 2009, he has joined AeroVision to help users to understand how geospatial technologies & data can improve their business. Within AeroVision Tamme is developing the agriculture & environmental markets, including the use of RPAS for data acquisition and robotics. Tamme is coordinating the BIOSCOPE consortium to set-up a remote sensing service to farmers with RPAS (www.projectbioscope.eu). He is also involved in the development of a soil moisture monitoring drone (www.mistrale.eu). Furthermore he is advisor to governments and businesses concerning the use and opportunities of RPAS.

Abstract RPAS are a major innovation in agriculture, in particular for precision agriculture (or Smart Farming). RPAS can be used for different applications. The use of RPA as 'flying camera' is already well known. Besides cameras, the drone can also carry other sensors, like a soil moisture sensor. But the most challenging innovation is the RPA as 'flying sprayer'. This is maybe an even more relevant innovation for agriculture. And spraying is maybe the simplest technique: in combination with sensors & artificial intelligence, the RPA can become the flying tractor. Currently the effect of large, heavy tractors & machinery is a substantial soil compaction, and a flying tractor may make a huge difference. This presentation will provide an overview how RPA are and will be used in agriculture. From this user point of view, the requirements towards manufacturers & policy makers / legislators are discussed.

14.45-15.00 **◆ Interactive Panel Discussion**

15.00-16.00 **◆ Refreshment Break**

Session 8 **Experimentation, Research & Development**

16.00-16.15 **A Safe & Dynamic Approach to Geofencing**
Valentin Brossard - Hionos, France



Bio Data Valentin Brossard has spent several years in critical embedded software development for Sogilis in both avionic systems and drones. He has been involved in the development of the Inertial Unit of the A350, meeting DO-178C at its highest level of criticality. Then he worked on the development of Hexo+, an autonomous drone system, controlled by a smartphone, aiming at following and filming someone. Today, he is CEO of Hionos, a Sogilis subsidiary, that provides software solutions that comply with DO-178C to make drones safer and to extend their use. Hionos develops an autopilot and a dynamic geofencing solution.

Abstract Geofencing is mentioned in EASA regulation proposal ^[1] and operators understand the need of this feature. There are already Geofencing solutions, the most well-known is probably DJI GEO system. But these systems have several limitations, as you need to control your drone with a connected device, and they cannot react to quick No Fly Zone modifications, which is a main safety concern ^[2]. Moreover, there is no proof that software controlling fences has been correctly developed. We believe that, in order to develop the use of drones, we need to increase the safety and reliability of drones. Managing dynamic issues like No Fly Zones around helicopters is a way to get to safer drones. We are currently working on an embedded system, that provides a means to respect these dynamic No Fly Zones. This embedded system will be developed with respect to DO178-C, in order to provide a high level of reliability and correctness. It could also be a means to achieve collision avoidance between drones, by defining temporary No Fly Zones around each of them.

^[1]: <https://easa.europa.eu/document-library/opinions/opinion-technical-nature>

^[2]: <http://sanfrancisco.cbslocal.com/2015/12/06/near-collision-with-drone-forces-chp-helicopter-to-abandon-search-for-stolen-car-over-martinez/>

16.15-16.30 **A RPAS Multi Sensor System for Environmental Monitoring of River Environments & Weather Phenomena**
Prof Paulus Gernot - Carinthia University of Applied Sciences, Austria



Bio Data Gernot Paulus holds a PhD from the University of Salzburg in Austria and has been appointed Professor for Geoinformation at the Department for Geoinformation and Environmental Technologies at Carinthia University of Applied Sciences in Villach, Austria in 2002. One of his major research interests is the integration of small RPAS and different sensors for high resolution data capture and multidimensional spatio-temporal analysis and visualization. He has been awarded a Fulbright research grant at San Diego State University in 2016.

Abstract The cooperative R&D project "Remotely Piloted Aircraft multi Sensor System (RPAmSS)" has as major goal to develop, apply and quantitatively assess the capabilities of a civil, low-cost unmanned aerial multi-sensor system for the fast and high resolution capture of multidimensional environmental data. In this project we investigate the capabilities of a holistic Remotely Piloted Aircraft multi Sensor System (RPAmSS) for long term monitoring of dynamic river environments and weather phenomena. A comprehensive quantitative validation of the RPAmSS GNSS-based positioning quality using high precision geodetic reference measurements was performed as positioning quality of the sensor measurement is a key issue for the reliability of any RPAmSS based monitoring service. Furthermore, we have developed a new non-commercial scientific proof-of-concept RPAS prototype for the capturing of dynamic

weather data in the meteorological boundary layer. Commercial-Off-The Shelf (COTS) environmental sensors have been evaluated and empirically tested in terms of suitability for RPAS missions. A new meteorological sensor module called “weather frog” was designed and integrated into an RPAS airframe. Since 2015 we have performed more than 50 RPAS missions in 2 river restoration test sites at the river Gail and Drau in Carinthia, Austria. Furthermore, the Gail valley acts as a typical location for studying characteristic alpine weather phenomena like inversions. We will present selected results regarding spatio-temporal analysis and visualization of high resolution multidimensional data from our test sites and discuss the challenges and new opportunities of RPAS for environmental monitoring.

16.30-16.45 **Light RPAS Interacting with the Environment**
Antidio Viguria - FADA-CATEC, Spain



Bio Data

Dr. Viguria holds a PhD in Telecommunications Engineering from University of Seville, a M.S.E.C.E degree from Georgia Institute of Technology and he is since 2008 the Head of the Avionics & Systems department at the Centre for Advanced Aerospace Technologies (FADA-CATEC). His research interests are focused on unmanned aerial system technologies mainly related with control strategies, perception applications and multi-vehicle systems. During this time, he has been the Principal Investigator of more than 30 R&D projects and contracts with companies related to avionics, UAS and aerial robotics, and he has participated as the technical leader of FADA-CATEC in the FP7 projects: PLANET, ARCAS, FieldCopter, euRathlon, MUAC-IREN and EC-SAFEMOBIL. Also, he has participated in a large number of international projects funded by NASA, DARPA, European FP, SESAR and Cleansky related with unmanned aerial systems and their applications, and other aerospace related technologies. Nowadays, he is managing a group of more than 20 engineers and technicians and he has worked directly in technology development programs with: INDRA, Airbus D&S, GMV, Deimos, Selex, etc. Also, he has published more than 30 publications in international conferences and journals, and he appears as inventor in two patents (one of them an international PCT). Also, his PhD Thesis on multi-robot cooperation obtained the European CONET PhD award in 2009. Finally, he is member of the teaching staff of SENASA (Services and studies for Air Navigation and Aeronautical Safety) the Spanish state training service provider for Unmanned Aircraft pilots certification.

Abstract

This presentation will be focused on two novel technologies where the RPAS is not only used as a tool to gather information from the environment, but it is also able to directly interact with the environment. In the first part of the presentation a new technology, that allows a rotary-wing RPAS to follow and land on a mobile platform in a GPS-denied scenario by using a tether that connects the RPAS with the landing area, is presented. A new control and sensor fusion strategy has been designed for landing accurately by means of relative position and velocity commands. The system only uses on-board sensors and it does not require the use of GPS at any moment. Although the technology has been developed for landing operations in the framework of the FP7 EC-SAFEMOBIL project, it can be used for other applications related to security and monitoring missions where it is required to have a flying camera during a long period of time that is able to follow accurately a mobile vehicle (land or marine) without the need of GPS. In the second part of the presentation the novel concept of aerial manipulation will be exposed. Particularly the final results of the FP7 ARCAS project will be presented. In this project it was developed a new technology that allows executing manipulation tasks while flying using an on-board robotic arm integrated in a multicopter system. This technology opens the path to an extensive number of applications like contact inspection in inaccessible areas that can be applied for example to bridges and gas&oil infrastructures. These specific applications will be developed in the next years within the framework of AEROARMS and AEROBI, both of them H2020 projects.

16.45-17.00 **The SafeShore System for the Detection of RPAS Threats in a Maritime Border Environment**

Geert de Cubber - Royal Military Academy, Belgium
(On behalf of the «SafeShore Consortium»)



Bio Data

Geert De Cubber received the degree of Master in Engineering at the Vrije Universiteit Brussel (VUB), with as specialization Electro-Mechanical Engineering. He then obtained a PhD. for his research in the field of 3-dimensional reconstruction of natural scenes perceived by mobile robots. This PhD. and the associated research project were part of a joined research effort between the Vrije Universiteit Brussel and the Belgian Royal Military Academy (RMA). Currently, he is the coordinator of the H2020 project SafeShore.

Abstract

The speaker will present an overview of the SafeShore project, which has a main objective to cover existing gaps in coastal border surveillance, increasing internal security by preventing cross-border crime such trafficking in human beings & the smuggling of drugs. It is designed to be integrated with existing systems & create a continuous detection line along the border. One of the treats to the maritime coast are small Remotely Piloted Aircraft Systems (RPAS) which can carry explosives or which can be used for smuggling drugs, boats & human intruders on the sea shore.

- 17.00-17.15 ♦ **Interactive Panel Discussion**
- 17.15-17.25 ♦ **Closing Remarks & End of Conference**

THEMED SPLINTER MEETINGS & CO-LOCATED EVENT - See Next Page

SPLINTER MEETINGS

LOCATION: Ground Floor Amphitheatre in the building where RPAS 2016 is taking place
PARTICIPATION: RPAS 2016 Conference Participants
Each meeting will be (co-) chaired by a panel of domain experts

Day 1 - Wednesday 22 June 2016

16.00-17.00 Remote Pilot Training & Flight School Qualification (RPT & FSQ)

Background: Pan-European recognized remote pilot training schools & training courses (theoretical & practical) and pilot certificates are imperative to the free flow of flight services and the development of the civil RPAS market in Europe. This will require a harmonised European standard.

Purpose: Discussion of the «certificated & non-certificated» remote pilot training courses & flight school qualification standards currently existing in Europe and definition of the way forward.

Objective: Initiate the start-up of a UVS International RPR&FSQ Stakeholder Group that will collect and review the existing remote pilot courses and, going out from them, draw up a document that will be submitted to open consultation, subsequently submitted as a recommendation to EC DG MOVE, EASA, JARUS and all national regulatory authorities. The recommendation will also be made freely available to all other interested parties.

Participants: National aviation authorities, flight schools, remote pilots, RPAS operators, qualified entities.

Day 2 - Thursday 23 June 2016

11.00-12.00 Safety Rules for Test Ranges (SRTR)

Background: Civil/commercial test ranges will play an important role in the development & validation of the RPAS of the future. However, safety rules at civil/commercial test ranges are currently not harmonized in Europe and in many European countries are not audited by an independent organisation, nor approved by the National Aviation Authority.

Purpose: Discussion of the currently existing safety rules applicable at civil test ranges in Europe, the interest of a community approach and definition of the way forward.

Objective: Initiate the start-up of a UVS International SRTR Stakeholder Group that will, subsequent to the meeting, collect and review the existing test range safety rules and, going out from these documents, formulate a document that will be submitted to open consultation, and subsequently submitted as a recommendation to EC DG MOVE, EASA, JARUS and all national regulatory authorities. The recommendation will also be made freely available to all other interested parties.

Participants: National aviation authorities, test ranges, RPAS manufacturers, qualified entities.

16.00-17.00 RPAS Insurance

Background: This meeting should be seen in the context of the Insurance Survey conducted within the framework of the Drone-Rules.EU project, and as a follow-on to the presentation «RPAS-Related Insurance – European Survey Analysis & Preliminary Conclusions» in Session 3 on 22 June 2016.

Purpose: Evaluation of the interest of having professional light RPAS (ProDrone) operations insured by general professional liability (i.e. non-aviation) insurers, and determination of the actions to undertake in order to disseminate this possibility across the EU.

Objective: Participants will share the experience obtained in their respective countries, including difficulties encountered and results obtained, when seeking adapted and efficient insurance for various professional drone operations. The participants will also discuss the interest of creating a RPAS Insurance Stakeholder Group.

Participants: Risk managers interested in RPAS operations, insurers, re-insurers, insurance brokers, insurance agents & intermediaries, RPAS operators.

CO-LOCATED EVENT

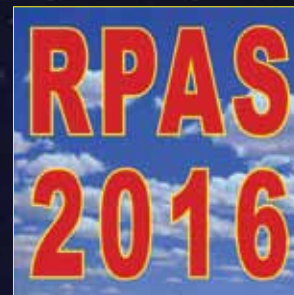
EVENT: EU SafeShore Project Kick-Off Meeting
LOCATION: Ground Floor Amphitheatre in the Conference Building
DATES: 20 & 21 June 2016
PARTICIPATION: SafeShore Consortium Members Only

As national regulators are increasingly opening up the access to airspace for Remotely Piloted Aircraft Systems (RPAS), the number of RPAS operations is rising dramatically in recent years. However, one cannot be blind to the fact that besides all the advantages offered by RPAS, this new technology also brings with it some serious threats related to the safety, privacy and security of the citizens. A regulatory framework for managing the RPAS operations can only be credible if there is a means of policing the access to airspace, which means that it must be possible to detect illegal operations. The European Commission noted this discrepancy between on one hand strict rules for access to airspace and on the other hand a poor capability to detect illegal operations. Therefore, they decided to fund the SafeShore project, which focuses on the detection of threat agents like RPAS in a marine border surveillance scenario. The main objective of the SafeShore project is to cover existing gaps in coastal border surveillance, increasing internal security by preventing cross-border crime such as trafficking in human beings and the smuggling of drugs. It is designed to be integrated with existing systems and create a continuous detection line along the border. One of the threats to the maritime coast are small RPAS, which can carry explosives, or which can be used for smuggling drugs, boats and human intruders on the sea shore. Mini-RPAS can be launched from maritime platforms such as yachts. Their low cost and very small signature makes them a favorite platform for smugglers and terrorists. The mini-RPAS Radar Cross Section is too small to be detected by the regular coastal radars, which is where SafeShore comes in.





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REGULATORY, POLICY & INNOVATION FORUM

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ARGENTINA



www.arpasa.com.ar

AUSTRALIA



www.acuo.org.au

AUSTRIA



<https://www.aaig.at>

BELGIUM



www.beuas.be

CANADA



www.unmannedsystems.ca

CHINA



www.auvsc.com

COLOMBIA



www.artccolombia.org

FINLAND



www.rpas.fi

FRANCE



www.federation-drone.org

GERMANY



www.uavdach.org

HONG KONG



www.arpashk.com

IRELAND



www.uaai.ie

ITALY



www.assorpas.it

ITALY



www.fiapr.it

JAPAN



www.uas-japan.org

LATVIA



www.larpas.lv

THE NETHERLANDS



www.darpas.nl

NORWAY



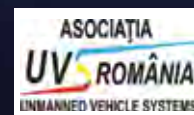
www.uasnorway.no

PERU



www.apevant.org

ROMANIA



<https://www.uvsr.org>

SOUTHERN AFRICA



www.cuaasa.org

SOUTH KOREA



www.kdaa.org

SPAIN



www.aerpas.es

SWEDEN



www.uassweden.org

SWITZERLAND



www.civil-drones.ch

UNITED KINGDOM



<http://arpas.uk>

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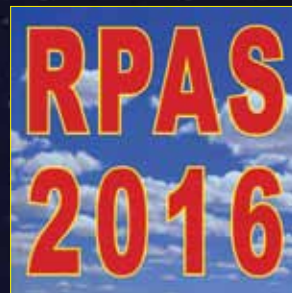
www.uavs.org

RPAS 2016 - RPAS Regulatory, Policy & Innovation Forum - Royal Military Academy - Brussels, Belgium - 22 & 23 June 2016

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