RPAS CivOps 2013

INTERNATIONAL CONFERENCE

UVS INTERNATIONAL

REMOTELY PILOTED AIRCRAFT SYSTEMS

CIVIL OPERATIONS

ORGANIZED BY

BLYENBURGH & CO FRANCE

IN COOPERATION WITH

ROYAL MILITARY ACADEMY, BELGIUM

VENUE, LOCATION & DATE

Royal Military Academy

8 Hobbema straat
Brussels, Belgium

9-11 Dec. 2013

UNDER THE AUSPICES OF

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WITHIN THE FRAMEWORK OF UVS INTERNATIONAL'S

GLOBAL ACCESS INITIATIVE

THE EUROPEAN RPAS OPERATORS' FORUM

IN COORDINATION WITH

ERSG · EASA · EUROCONTROL · ECAC·CEAC · ICAO·OACI·ИКАО · JARUS · SESAR · WG73 UAS · ULTRA · WG93 Light RPAS

DAY 1 - MONDAY 9 DECEMBER 2013

Session 1 **European RPAS Roadmap**

12.45-13.00 Conference Opening

Moderator: Peter van Blyenburgh

01 13.00-13.30 **European RPAS Roadmap**
Koen de Vos, European Commission, DG Mobility & Transport

02 13.30-13.45 **Current Eurocontrol activities on RPAS**
Dominique Colin, Eurocontrol, Belgium

03 13.45-14.00 **SESAR RPAS Demonstration Projects**
Celia Alves Rodrigues, SESAR JU, Belgium

14.00-14.15 Interactive Panel Discussion

04 14.15-15.00 **Supporting European RPAS Businesses by Facilitating Access to the European Market through Dedicated Measures**
Jean-Pierre Lentz, European Commission, DG Enterprise & Industry

EC Panel Interactive session based on inputs obtained from pre-conference completed questionnaires (available online at www.rpas-civops.org) returned prior to 4 December 2013.

15.00-16.00 Refreshment Break

Session 2 **European Developments & Views**

Moderator: Peter van Blyenburgh

05 16.00-16.15 **BVLOS Operations in Accordance with French Regulations**
Emmanuel de Maistre, Redbird, France

06 16.15-16.30 **ULTRA Consortium: A View on Light RPAS**
Robert Jones, Cranfield Aerospace, UK (*on behalf of the **ULTRA Consortium***)

07 16.30-16.45 **RPAS Qualified Entities: Organisational Aspects & Implementation**
Jan Floris Boer, NLR, The Netherlands

08 16.45-16.55 **Requirement for Safety Regulations for RPAS Flight & Capability Demonstrations** +
Announcement of creation of a study group on this topic
Josef Mendler, Acentiss, Germany
(*on behalf of **SG02 RPAS Flight & Capability Demonstrations***)

09 16.55-17.05 **Requirement for a Remotely Piloted Systems Knowledge Centre** +
Announcement of creation of a study group on this Topic
Geert de Cubber, RMA, Belgium
(*on behalf of **SG03 Remotely Piloted Systems Knowledge Centre***)

17.05-17.30 Interactive Panel Discussion

17.30-19.00 Conference Cocktail in the RMA Mess

DAY 2 - TUESDAY 10 DECEMBER 2013

Session 3 **Operators & Operations**

Moderator: Peter van Blyenburgh

10 08.40-08.55 **RPAS for Photogrammetry & 3D Modeling**
Fabio Remondino, 3D Optical Metrology Unit, Bruno Kessler Foundation, Italy (*on behalf of **EuroSDR** - European Spatial Data Research*)

11 08.55-09.10 **Agricultural RPAS Applications**
Corentin Cheron, Airinov, France

12 09.10-09.25 **Infrastructure Inspection Using RPAS**
Johann Boucher, Novadem, France

13 09.25-09.40 **Photogrammetry & RPAS**
Norbert Haala, Institute of Photogrammetry, University of Stuttgart, Germany

09.40-10.00 Interactive Panel Discussion

10.00-10.45 Refreshment Break

Session 4 **Responsibility, Liability & Insurance**

Panel Chair: Maya Markova, Eurocontrol

14 10.45-10.55 **Opinion of an RPAS Operator**
Paudie Barry, Baseline Surveys, Ireland

15 10.55-11.05 **Opinion of an Insurer**
Jean Fournier, Global Aerospace, France

16 11.05-11.15 **Opinion of a Legal Specialist**
Arthur Flieger, Flieger Law Office, Belgium

17 11.15-11.25 **Opinion of a Safety Specialist**
Christian Janke, EASC - European Aviation Safety Centre, Germany

18 11.25-11.35 **Views from the R&D Side**
Damiano Taurino, DeepBlue, Italy

11.35-12.00 Interactive Panel Discussion + Announcement of Creation of ***SG01 RPAS Responsibility, Liability & Insurance***

12.00-13.30 Lunch

Session 5 **Operators & Operations**

Moderator: Horst Schmidt-Bisschoffshausen

19 13.30-13.45 **Forest Inventory - Tree Counting & Height Measurement Survey with RPAS**
Paudie Barry, Baseline Surveys, Ireland

20 13.45-14.00 **Development of the Camflight Aerial Mapping Robot**
Niels Christian Moen, Bygg Control, Norway

21 14.00-14.15 **Photogrammetry Applications with RPAS in Germany**
Werner Mayr, Germap, Germany

22 14.15-14.30 **Technical Inspections Using Light RPAS**
Antonio D'Argenio, ASSORPAS, Italy

23 14.30-14.45 **National RPAS Regulatory Review**
Erika Billen, Federal Public Service Mobility & Transport, Belgium

14.45-15.05 Interactive Panel Discussion

15.05-16.00 Refreshment Break

Session 6 **RPAS Regulatory Matters**

Moderator: Peter van Blyenburgh

24 16.00-16.15 **Proportionate Common Rules for RPAS**
Filippo Tomasello, EASA

25 16.15-16.30 **Airworthiness – Changes in Concept to Meet the Needs of the Light RPAS Community**
André Clot, European Unmanned Systems Centre (EuroUSC), UK

26 16.30-16.45 **JARUS CS-LURS: VTOL RPAS Standard**
Vladimir Shibaev, TsAGI, Russian Fed. (*on behalf of **JARUS***)

27 16.45-17.00 **Human Error in Operating Mini RPAS - Causes, Effects and Solutions**
Christopher Roos, NLR, The Netherlands

28 17.00-17.15 **The Use of multi rotor RPAS for Inspection of Live & Difficult to Access Assets in the**

		Offshore Oil, Gas & Renewables Industry Mark Sickling, CyberHawk Innovations, UK
	17.30-17.45	Interactive Panel Discussion
	17.45-19.00	Conference Cocktail at RMA Mess

DAY 3 - WEDNESDAY 11 DECEMBER 2013

	Session 7	**Panel on RPAS Operators & Operations - National Views on the Current RPAS Operations Status Expressed by National Associations** Moderator: Peter van Blyenburgh
29	09.00-09.10	**BeUAS, Belgium** Jürgen Verstaen, Vice-President
30	09.10-09.20	**DARPAS, The Netherlands** Rob van Nieuwland, President
31	09.20-09.30	**UAS Norway, Norway** Ole Vidar Homleid, President
32	09.30-09.40	**UAS Denmark, Denmark** Michael Larsen, Chairman
	09.40-10.00	Panel Discussion on the Way Forward
	10.00-10.45	Refreshment Break
	Session 8	**Panel on RPAS Operators & Operations - National Views on the Current RPAS Operations Status Expressed by National Associations** Moderator: Peter van Blyenburgh
33	10.45-10.55	**FPDC-Fédération Professionnelle du Drone Civil, France** Emmanuel de Maistre, President
34	10.55-11.05	**UAV-DACH, Germany** Bernhard von Bothmer, President
35	11.05-11.15	**ASSORPAS, Italy** Paolo Marras, President
36	11.15-11.25	**Sub 20 Group, UK** Philip Tarry, Acting Chairman
	11.25-11.45	Panel Discussion on the Way Forward
	11.45-12.00	Conclusions & Conference Closure

PRESENTATIONS BY

European Commission (EC)
Directorate General Enterprise & Industry (ENTR)
Directorate General Mobility & Transport (MOVE)
European Aviation Safety Agency (EASA)
EUROCONTROL
JARUS - Joint Authorities for Rulemaking on Unmanned Systems
SESAR JU
11 RPAS Operators (commercial, incl. corporate)
7 National Associations & 1 National Working Group
(representing operators & manufacturers)
3 Research Organisations
3 UVS International Study Groups
1 National Aviation Authority
1 Qualified Entity
1 European Consortium

PRESENTING & REPRESENTED ORGANISATIONS

3D Optical Metrology Unit, Bruno Kessler Foundation, Italy *(on behalf of EuroSDR)*
Acentiss, Germany
Aermatica, Italy *(on behalf of ASSORPAS, Italy)*
ASSORPAS, Italy *(represented by Aermatica & Panoptes, Italy)*
Baseline Surveys, Ireland *(also representing SG01 RPAS Responsibility, Liability & Insurance)*
BeUAS, Belgium *(represented by FlightPlus, Belgium)*
Bygg Control, Norway
Cranfield Aerospace, UK *(on behalf of the ULTRA Consortium)*
CyberHawk Innovations, UK
DARPAS, The Netherlands
DeepBlue, Italy *(representing SG01 RPAS Responsibility, Liability & Insurance)*
EASA - European Aviation Safety Agency, Europe
EUROCONTROL, Belgium
EASC - European Aviation Safety Centre, Germany *(representing SG01 RPAS Responsibility, Liability & Insurance)*
European Commission, DG Enterprise & Industry, Europe
European Commission, DG Mobility & Transport, Europe
EuroSDR - European Spatial Data Research Group, Europe *(represented by Bruno Kessler Foundation, Italy)*
EuroUSC - European Unmanned Systems Centre, UK
Federal Public Service Mobility & Transport, Belgium
Flieger Law Office, Belgium *(representing SG01 RPAS Responsibility, Liability & Insurance)*
FPDC - Fédération Professionelle du Drone Civil, France *(represented by Redbird)*
Flight Plus, Belgium *(representing BeUAS, Belgium)*
Germap, Germany
Global Aerospace, France *(representing SG01 RPAS Responsibility, Liability & Insurance)*
Hans Christian Andersen Airport, Denmark *(representing UAS Denmark)*
Institute of Photogrammetry, University of Stuttfart, Germany
JARUS *(represented by TsAGI, Russian Fed.)*
NLR, The Netherlands
Novadem, France
Panoptes, Italy (*on behalf of ASSORPAS, Italy*)
Redbird, France *(also representing FPDC, France)*
Robot Aviation, Norway *(on behalf of UAS Norway)*
Royal Military Academy, Belgium *(on behalf of SG03 Remotely Piloted Systems Knowledge Centre)*
SESAR JU - Single European Sky ATM Research Joint Undertaking, Europe
Sub 20 Group, UK
TsAGI, Russian Federation *(on behalf of JARUS)*
UAS Denmark, Denmark *(represented by Hans Christian Andersen Airport, Denmark)*
UAS Norway, Norway *(represented by Robot Aviation, Norway)*
UAV DACH, Germany
ULTRA Consortium, Europe *(represented by Cranfield Aerospace, UK)*

PRESENTATIONS FROM 10 COUNTRIES

Belgium	Denmark	France	Germany
Ireland	Italy	Netherlands	Norway
	Russian Fed.	UK	

SPECIAL FOCUS

RPAS-related Responsibility, Liability & Insurance

DAY 1 - MONDAY 24 JUNE 2013

Session 1 **European RPAS Roadmap**

12.45-13.00 Conference Opening

Moderator: Peter van Blyenburgh, UVS International, Board of Directors - President

01 13.00-13.30 **RPAS : Opening the Aviation Market to RPAS in a Safe and Sustainable Manner**
Koen de Vos, European Commission, DG Mobility & Transport

Bio Data Koen de Vos (Belgian, March 21st, 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 assumed responsibilities in the field of aviation safety and environment.

Abstract Within the framework of the European Commission's European RPAS Roadmap relative to the incremental integration of RPAS into the European air traffic system from 2016, DG Mobility & Transport will explain its views on the definition and implementation phases of the European RPAS Roadmap.

02 13.30-13.45 **Current Eurocontrol activities on RPAS**
Dominique Colin, EUROCONTROL, Belgium

Bio Data Retired Colonel from the French Air Force after 27 years of service, Mr Dominique Colin has an extensive and comprehensive knowledge of military aircraft operations, joint procurement constraints and airworthiness for State aircraft. He graduated as a telecommunication engineer from the French air force Academy in 1987, as a Aircraft and space systems design engineer from the Ecole nationale supérieure de l'aéronautique de de l'espace (ENSAE) in 1994 and the the War college in 2001. He served for 7 years in reconnaissance and fighter squadrons as head of maintenance, 6 years as head of division in the air staff and in the General inspection of the MoD. He had also taught aerodynamics and flight dynamics at the USAF Academy in Colorado Springs from 1997 to 2000. His last duty in the Fench air force was to develop the State aircraft airworthiness regulation for French State aircraft and to lead for the European defense agency (EDA) a task force on continuing airworthiness harmonization. Since 2009, Mr dominique Colin is a standardisation and certification expert in the civil military coordination division in EUROCONTROL. He is developing interoperability solution for State aircraft, he is leading the RPAS communications, command and control teams within EUROCAE WG 73 and JARUS, HE is also member of th team currently drafting the ICAO RPAS manual.

Abstract This presentation will describe the role and activities of EUROCONTROL in the domain of RPAS. It will show the need for harmonization and cooperation between th European states to foster a strong RPAS internal market in Europe. Some new concepts related to RPAS communications will also be presented,

03 13.45-14.00 **SESAR RPAS Demonstration Projects**
Celia Alves Rodrigues, SESAR JU, Belgium

Bio Data Célia Alves Rodrigues is the Environment Officer at the SESAR Joint Undertaking based in Brussels, Belgium since March 2010. The mission of the SESAR Joint Undertaking is to develop a modernised air traffic management system for Europe. This future system will ensure the safety and fluidity of air transport over the next thirty years, will make flying more environmentally friendly and reduce the costs of air traffic management.
Célia is the focal point for SESAR environmental aspects, working in the Development and Delivery Unit providing guidance to the different work packages and projects to ensure that the environmental objectives of the programme are achieved and supporting dissemination on the SESAR Releases. She is also responsible for the programme management of the Atlantic Interoperability Initiative to Reduce Emissions (AIRE) and the RPAS (Remotely Piloted Aircraft Systems) demonstration activities. Previously Célia was working at ICAO, as an associate environmental Officer since 2007 Célia also collaborated with the World Health Organization on the noise and health unit from 2002 to 2006.
Over the years, Célia has worked in a broad range of cultures, living and working in Portugal, Italy, Belgium, France, Germany, Poland, and Canada. She is Portuguese and speaks fluent English, French, Spanish, and Italian, as well as some German.

Abstract The European RPAS Steering Group (ERSG), established by the European Commission in 2012, has recognised a need to identify, plan, coordinate, and subsequently monitor the activities necessary to achieve the safe integration of RPAS into a non-segregated ATM environment. Given that the full integration of RPAS into the European ATM System is vital and that the mission of SESAR is to create the new generation of ATM systems and operations, RPAS will need to be incorporated into future SESAR solutions. Against this

background, in February 2013, the SESAR Joint Undertaking launched a call for proposals in order to select and co-finance a series of projects offering SESAR integrated RPAS demonstration activities. The purpose of this call was to select a number of projects or activities, including integrated pre-operational flight trials activities, which aim to:

- Demonstrate how to integrate RPAS into nonsegregated airspace in a multi-aircraft flight environment, with the purpose of exploring the feasibility of integration within the wider aviation community by 2016;
- Focus on concrete results filling the operational and technical gaps identified for RPAS integration into non-segregated airspace; and
- Capitalise on the SESAR delivery approach by providing synergies, risk and opportunities, with the overall SESAR programme.

As a result of the call, 9 out of 23 RPAS Demonstration Projects were selected, with a co-financing of EUR 4,2 million. The selected Demonstration Projects represent 38 different partners from 8 different countries: Czech Republic, France, Germany, Italy, Malta, The Netherlands, Spain and United Kingdom. Each project includes an ANSP and Air Operators and will be carried out within the European Union and/or within EUROCONTROL's member states.

14.00-14.15 Interactive Panel Discussion

04 14.15-15.00 **Supporting European RPAS Businesses by Facilitating Access to the European Market through Dedicated Measures**
Jean-Pierre Lentz, European Commission, DG Enterprise & Industry

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.

EC Panel **Background & Purpose**: The absence of safety regulation for RPAS operations is the main showstopper for the development of civil RPAS applications. Six Member States (MS) have now adopted regulations allowing limited RPAS operations. In these countries RPAS activities are rapidly expanding. Seven other MS are developing their national rules (and more may follow), further opening the European Union (EU) market. However, today most companies are mainly active on their own national market (or outside of Europe), and face difficulties to develop businesses in other EU Member States. The Roadmap for the integration of civil RPAS into the European Air System, issued in June this year, calls for the harmonization of the European regulations and even for common rules in order to create a truly open European Market for RPAS applications. However, in the meantime, the market remains fragmented.
In addition to a regulatory initiative, the Commission intends to support the development of European RPAS businesses by facilitating their access to the European market through dedicated measures.
This interactive discussion session should be seen within the framework of the European Commission's European RPAS Roadmap relative to the incremental integration of RPAS into the European air traffic system from 2016; it will be based on the inputs obtained from pre-conference completed questionnaires (available online at www.rpas-civops.org) that have been submitted by the European RPAS operators community prior to 4 December 2013. This purpose of this session is to identify the main problems faced by Small & Medium-sized Enterprises (SMEs) to develop their commercial RPAS-related businesses, in particular in other EU Member States.

15.00-16.00 Refreshment Break

Session 2 **European Developments & Views**

Moderator: Peter van Blyenburgh, UVS International, Board of Directors - President

05 16.00-16.15 **BVLOS Operations in Accordance with French Regulations**
Emmanuel de Maistre, Redbird, France

Bio Data Emmanuel de Maistre is the co-founder and current President of the Professional Civilian RPAS Association in France (FDPC, Fédération Professionnelle du Drone Civil). The FDPC has been founded in June 2013, after the Paris Air Show 2013. The association has grown very fast and has now more than 270 members including Civilian RPAS operators and RPAS constructors, as well as clients, insurrers or medias. The FPDC is actively collaborating with the French Civil Aviation Authority (DGAC) to promote and profesionnalize the industry. Emmanuel de Maistre is also CEO at Redbird, a civilian RPAS operator he co-founded in 2012. Redbird operates 4 types of light RPAS (fixed and rotary wings) and works for large industrial clients in various industries such as Oil&Gas, Power transportation, Construction, Mining, Agriculture. Redbird operates its RPAS in VLOS, E-VLOS and also BVLOS («S4 scenario»). Emmanuel has other entrepreneurial experiences in biotechnology and e-commerce. Since

2008, he has founded or co-founded three companies. Emmanuel graduated from the Ecole Normale Supérieure Paris (ENS Ulm) and from HEC School of Management. He's a private aircraft pilot.

Abstract

In April 2012, the French Civil Aviation Authority (DGAC) published a new regulation for civilian RPAS up to 150 kg. Since then, RPAS below 25 kg can be used by commercial operators on a routine basis. Four predefined scenarios are described, addressing VLOS / BVLOS condition and flight over populated / non populated areas. France is therefore one of the very rare examples in the world where an operator can send a RPAS beyond visual line of sight on long distances (> 10-20 km). Redbird was created in the end of 2012, shorty after the publication of the French regulation. In only 9 months, Redbird hired and trained both pilots and data treatment engineers and started commercial operations. Redbird markets are: transportation networks (railroad, roads), energy supply networks (power cables, oil&gas), construction, mines and quarries, Industrial infrastructures inspection, precision farming. Redbird is the only company in France allowed to operate RPAS in the four scenarios of the French regulation : S1, S2, S3, S4. Redbird operates its RPAS in VLOS, E-VLOS but also BVLOS. Redbird operates 4 different types of light RPAS, both fixed and rotary wings. Redbird has significant experience with the DT-18, a UAV which can be send beyond visual line of sight. Redbird is using the DT-18 for corridor mapping over long distances, or for mapping large areas (up to 5 km2 per flight).

06 16.15-16.30 **ULTRA Consortium: A View on Light RPAS**
Robert Jones, Cranfield Aerospace, UK (on behalf of the **ULTRA Consortium**)

Bio Data

Following studies to doctoral level, Robert joined the academic and research staff of the College of Aeronautics of the then Cranfield Institute of Technology. In addition to academic duties in connection with the Masters courses in Aerospace Vehicle Design and Astronautics & Space Engineering, he performed research related to advanced systems concepts, such as the All/More Electric Aircraft, and took part in European studies such as the CRYOPLANE study of hydrogen powered aircraft. He also began his involvement with RPAS, through Cranfield's work on de-skilling their operation along with RAE (now QinetiQ). In 2002 Robert transferred to Cranfield Aerospace, which holds Approvals from EASA, UK CAA and MoD, as Chief Systems Engineer. Since that point, one of his major responsibilities has been the airframe and mechanical systems design of the dynamically scaled X-48 Blended Wing Body remotely piloted research vehicles. The X-48B air vehicles and GCS were produced by Cranfield Aerospace for Boeing and its operation supported for them, along with NASA and AFRL, at Edwards AFB with later modification to the, low noise, X-48C configuration. In addition to taking part in EUROCAE WG73, Robert has served on a number government and industry committees concerned with RPAS and a range of other aspects of aerospace.

Abstract

The Unmanned Arial Systems in European Airspace (ULTRA) project began in mid-2012, supported by the EC under its 7th Framework Programme to address the defined activity 'Assessment of the potential insertion of unmanned aerial systems in the air transport system'. It has been performed by a consortium of 12 organisations from across Europe and with experience in all aspects related to RPAS. The main objective of ULTRA has been to provide a comprehensive set of recommendations to allow the insertion of civil light RPAS (less than 150 kg) into European airspace in the short term (within 5 years). RPAS 'Use Cases' that could provide 'quick win' opportunities have been considered and developments necessary to unlock the full potential of light civil RPAS in the long-term (10-15 years) have been highlighted. This presentation will provide an overview of the ULTRA project, indicating the approach taken, areas covered and example findings. Direction to a source of the detailed reports and other output material resulting from the ULTRA project will be provided.

07 16.30-16.45 **RPAS Qualified Entities: Organisational Aspects & Implementation**
Jan Floris Boer, NLR, The Netherlands

Bio Data

Jan-Floris Boer received his degree as an Aerospace Engineer in 1990 at the Delft University of Technology with a thesis on Helicopter Systems. He started working at the Delft University of Technology, faculty of Aerospace Engineering, in the Aircraft Structures Disciplinary Group. In 1991 he changed to the helicopter subject again by joining the Helicopter department of the National Aerospace Laboratory, NLR in Amsterdam. He participated in a large number of projects, among which are: preliminary design, wind tunnel testing, helicopter icing, research and modelling activities on the helicopter outwash, helicopter qualification and from 2001 on several Rotorcraft RPAS projects. These include the European framework project CAPECON (design of two rotorcraft RPAS), a domestic (military) light rotorcraft RPAS project, the initiation of the NLR Facility for Unmanned ROtorcraft REsearch FURORE, contributions to the design and development of a light rotorcraft RPAS, regulations, and operational aspects, including the training of RPAS Remote Pilots. More recent projects are a project on the qualification of Light Multi Rotor Systems and the SESAR sponsored project AIRICA (ATM Innovative RPAS Integration for Coastguard Applications). He is a member of the EUROCAE WG-93 Light RPAS leadership team, leader of the WG-93 Focus Group on RPAS-FCL & Training, and a member of EUROCAE WG-73 RPAS-FCL Focus Group, as well as the ASTM Committee F38 on Unmanned Aircraft Systems standards.

Abstract

With the growth of Light RPAS operations currently emerging, the Civil Aviation Authorities (CAA) are confronted with many requests for permission to operate. The CAA-UK has initiated the use of Qualified

Entities in the process of granting permissions to fly. Other CAAs are following this approach to use the advice of a Qualified Entity to provide permission to fly either through a waiver or licence. Although, the first steps have been set, there are some aspects not fully developed with respect to the establishment of Qualified Entities. Currently, also some requirements to which the operators, their personnel and the equipment used have to be checked against are not yet clear.
This presentation provides a concise overview covering the interest at NLR to become a RPAS Qualified Entity, a view on the requirements to become a Qualified Entity, their implementation, and a possible way forward in Europe. Finally, some points for discussion on this subject are presented.

08 16.45-16.55 **Requirement for Safety Regulations for RPAS Flight & Capability Demonstrations** +
Announcement of the Creation of a Study Group on this Topic
Josef Mendler, Acentiss, Germany
(on behalf of SG02 RPAS Flight & Capability Demonstrations)

Bio Data • 01/09/1989 - 30/09/1995: Scientific assistant at the Institute of Lightweight Structures of the Technical University of Munich // Main activities: Lecture assistant for Lightweight Design, Aircraft Design, Composite Technologies • December 1994: Doctoral thesis ‚Dynamics and Acoustics of Composite Sandwich Panels' • 01/10/1995 – 31/08/2002: Stress Engineer at Fairchild Dornier GmbH / Department Structural Mechanics
Main activities: • Design Responsible Engineer (DRE) Static Stress and Strength for the complete Aircraft Do328 and Do728 • Team leader ‚Structural Analyses of Empennage Structures' • Team leader ‚Airframe 928' • Representing the company in international committees (GARTEUR, European projects) • 1999 – 200: Lecturer (part-time) at the University of Applied Science in Munich (Lesson: Stress and Strength Theories) • 01/09/2002 – 31/07/2003: Head of the Stress Department Transport Aircraft at EADS Military Aircraft / Ottobrunn • 01/08/2003– 31/08/2008: Head of Design and Stress Departments Mission and Transport Aircraft at EADS Military Air Systems / Ottobrunn / Manching • Since 01/09/2008: Chief Executive Officer of ACENTISS (Approved Center of Engineering, Technology and In Service Support) • Cooperation with European Aerospace Companies (conceptual design, detail engineering, certification issues) • Training and Consultancy (Aerospace, Automotive) • Startup management and dissemination of ACENTISS portfolio

Abstract As an introduction the current situation in EU related to a total absence of European safety rules for RPAS flight demonstrations is presented. Key technological challenges for operating RPAS are discussed which refer to the fundamental reason of starting this study group & its objective. Potential approaches as a roadmap to civil certification of RPAS, mainly based on existing airworthiness codes are presented.

09 16.55-17.05 **Requirement for a Remotely Piloted Systems Knowledge Centre** +
Announcement of the Creation of a Study on this Topic
Geert de Cubber, RMA, Belgium
(on behalf of SG03 Remotely Piloted Systems Knowledge Centre)

Bio Data Geert De Cubber was born on February 13, 1979 in Halle, Belgium. In 2001, he 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). Within the group of Unmanned Vehicle Centre, Geert's main task is to apply computer vision techniques to mobile robots, rendering these robots able to perceive, analyze, and – to some degree – understand their environment. More specifically, three-dimensional reconstruction and cognitive vision approaches are investigated with the aim to port the capabilities of the human eyesight to intelligent robots.

Abstract This presentation will announce the start up of SG03 – Remotely Piloted Systems Knowledge Centre and the objectives of this study group at the RPAS CivOps conference. The intent of this 10 minutes presentation is to:

a) Explain the current situation [Inexistence of a centralized database grouping EC-funded studies; Inexistence of a centralized database grouping work carried out by academics];
b) Explain the intent to create an easily accessible database grouped in separate sections [All remotely piloted systems (air, ground, naval) studies financed by the EC; All remotely piloted systems (air, ground, naval) studies + R&D carried out and financed by universities, academies, etc];
c) Highlight the advantages of such databases (for the EC, academics, researchers, & industry).

At the end of the presentation, the start up of the study group & its terms of reference will be announced.

17.05-17.30 Interactive Panel Discussion

17.30-19.00 Conference Cocktail in the RMA mess

DAY 2 - TUESDAY 10 DECEMBER 2013

Session 3 Operators & Operations

Moderator: Peter van Blyenburgh, UVS International, Board of Directors - President

10 08.40-08.55 **RPAS for Photogrammetry & 3D Modeling**
Fabio Remondino, 3D Optical Metrology Unit, Bruno Kessler Foundation, Italy
(on behalf of EuroSDR - European Spatial Data Research Group)

Bio Data Dr. Fabio Remondino is head of the 3D Optical Metrology (http://3dom.fbk.eu) research unit at the Bruno Kessler Foundation (http://www.fbk.eu) research center in Trento, Italy. He received a PhD in 2006 from ETH Zurich on image-based 3D modeling. His main research interests are in the field of sensor characterization and integration, reality-based surveying and 3D modeling for mapping purposes and all the automation aspects of the data processing pipeline (i.e. image orientation, dense image matching, automated registration of range data, etc.). He is serving as President of EuroSDR (http://eurosdr.net/) Commission I on «Sensors, Primary Data Acquisition and Georeferencing» and President of ISPRS (http://www.isprs.org) Technical Commission V on «Close-Range Imaging, Analysis and Applications».

Abstract Remotely Piloted Aircraft Systems (RPAS), often also called Unmanned Aerial Vehicles (UAV), are nowadays well-established data acquisition platforms for 3D modeling, documentation, inspection, surveillance, emergency response, as well as mapping purposes. Rotary or fixed wing RPAS, capable of performing data acquisition with imaging (e.g. still/video cameras), ranging (e.g. laser scanners) or environmental sensors (e.g. gas detectors), can fly in manual, semi-automated or autonomatic mode. Photogrammetric products like digital surface models, maps, textured 3D models, etc. can be created, even over large areas (e.g. a few sqkm). The talk will critically review the existing platforms and sensors for the aforementioned applications with different examples and results.

11 08.55-09.10 **Agricultural RPAS Applications**
Corentin Cheron, Airinov, France

Bio Data Corentin Cheron is Chief Technical Officer at Airinov, a company he co-founded in 2012 and which is dedicated to provide high value aerial data to the agricultural sector. Airinov is the first French company to provide high value maps that help farmers manage their farms. Airinov has developed a patented multispectral sensor, and dedicated processing software. Corentin is an electrical and computer science engineer. During his scholarship, he was technical leader of the «Faucon Noir» team arriving third at the French «Chanllenge Minidrones» organised by the French DGA (Min. of Defence) and ONERA. Later, he specialized in Unmanned Aircraft for six months as a research scholar at Utah State University (USA). He is student pilot on Robin DR-221, and rc-model (plane and helicopter) pilot.

Abstract Airinov has developed both an aircraft and a multispectal camera dedicated to agricultural remote sensing. After three years of development of a global solution to vegetation observation they have started to apply their own dedicated agronomic model and processing software to provide high value data to both farmers and researchers. Their system is capable of both high speed low resolution maps of crop fields and high resolution maps of trial plots needed for experimenting. In terms of regulation, they have taken advantage of French regulation to develop their activity. Their mission always consists of flying over farm plots and are mainly simple case scenarios. On the other hand, some areas needed a special planning that have been made possible with the help of the French DGAC and military. Airinov now seeks to expand its activity by hiring new pilots, training them and expanding the missions scenarios. At a European level, Airinov seeks to be able to satisfy clients whose needs are outside France.

12 09.10-09.25 **Infrastructure Inspection Using RPAS**
Johann Boucher, Novadem, France

Bio Data Johann Boucher obtained his Master's degree in International Business Development in 2010 after different experiences in an international context. He has been working in international business development with French SMEs from different sectors for more than five years. He set up a consultancy company in 2012 focusing on business development for innovative start-ups and SMEs. Prior to that, he was employed for a year by a French aerospace cluster. At the beginning of 2013, he joined the team of Novadem, a French micro RPAS manufacturer founded in 2006, for which he is in charge of business development. Johann is also preparing his private pilot licence.

Abstract Novadem is a french micro-UAV manufacturer founded in 2006 and based in Aix-en-Provence (Bouches du Rhône, southern France). Its UAVs are intended for civilian and military markets. Since 2006, the company has been supported by the French Ministry of Defence Procurement Agency, the Ministry of Research and the main actors of innovation.
The U130 is a micro RPAS specifically developed for the inspection of infrastructures. It was used for the third consecutive year by Diades, a French RPAS operator, for the inspection of the Millau viaduct (245 meters high). Already in 2011, this model was used for the first detailed inspection of Millau. This atypical

intervention was considered as a world first. Equipped with a digital HD camera, rotor shields and an ultrasonic rangefinder, the U130 examined 84.000 square meters of pillars oover a length of 2640 meters and up to a height of 245 meters.

13 09.25-09.40 **Photogrammetry & RPAS**

Norbert Haala, Institute of Photogrammetry, University of Stuttgart, Germany

Bio Data

Norbert Haala is Professor at the Institute for Photogrammetry, University of Stuttgart, where he is responsible for research and teaching in photogrammetric computer vision and image processing. He introduced virtual city modeling as one of the main research areas at the Institute for Photogrammetry, also followed up by industrial cooperations for different software developments. In addition to the evaluation and automatic interpretation of LiDAR data, both from airborne and terrestrial platforms, his main interests cover automatic approaches for image based generation of high quality 3D data. In this context, he is currently involved in the development of multiple-stereo matching approaches for dense and accurate photogrammetric 3D data capture from automatic image matching. Norbert Haala is winner of the Carl Pulfrich Award in 2013 and served at ISPRS and DGPF at various positions and published more than 100 papers in academic journals and conferences.

Abstract

RPAS are becoming standard platforms for photogrammetric data capture especially while aiming at large scale aerial mapping for areas of limited extent. Such applications especially benefit from the very reasonable price of a small light RPAS including control system and standard consumer grade digital camera, which is some orders of magnitude lower compared to digital photogrammetric systems. Within the paper the capability of RPAS-based photogrammetric data collection will be discussed and evaluated. For this purpose, the quality of 3D point clouds generated by dense multiple image matching during different projects will be used. Also due to recent software developments such point clouds can be generated at a resolution similar to the ground sampling distance of the available imagery and are used for an increasing number of applications. Usually, image matching benefits from the good images quality as provided from digital airborne camera systems, which is frequently not available from the low-cost sensor components used for RPAS image collection. Despite the considerable differences in system costs, suitable results can be derived from all data, especially if large redundancy is available such highly overlapping image blocks are not only beneficial during georeferencing, but are especially advantageous while aiming at a dense and accurate image based 3D surface reconstruction. Our investigations clearly demonstrated the feasibility of relatively simple RPAS and cameras for 3D point determination in the sub-pixel level. Absolute elevation accuracies in the order of ½ GSD of the captured imagery could be verified for very complex topographic areas. The available dense image matching proved to be a robust and easy-to-parameter matching algorithm. Especially the combination of multiple measurements from highly overlapping images increases the accuracy of the generated 3D point clouds. Even more important, the redundancy allows a very efficient elimination of erroneous matches and results in a considerable reliability of the 3D points at vertical accuracies in the centimetre level. Thus, even for aerial imagery of comparatively limited quality a high quality surface reconstruction is feasible. This is especially beneficial for RPAS imagery, which is frequently captured using consumer grade digital camera, but can be collected at high resolutions and large overlaps.

09.40-10.00 Interactive Panel Discussion

10.00-10.45 Refreshment Break

Session 4 Responsibility, Liability & Insurance

Chair: Maya Markova, Eurocontrol

Bio Data

Maya Markova has a legal background and has been working in the area of ATM/ANS safety regulation and oversight since joining EUROCONTROL in 2002. She holds a Master's Degree in Administrative Law from the University of Sofia and an LLM in Legal Theory and European Legal Integration from the Catholic University of Brussels. She is a qualified Safety Regulatory Auditor and ISO 9000:2000 Auditor. From 2002 till 2010 Maya was involved in the regulation and oversight of the Maastricht Upper Area Control Center(Maaastricht UAC) on behalf of the Director General of Eurocontrol and the 4 Maastrich States (Belgium, Germany, Luxembourg and the Netherlands). The main activities involved drafting of Implementing rules transposing Single European Sky`(SES) legislation and regulatory oversight activites leading to the certfication of Maastricht UAC as an ANS Provider and certification of Maastricht UAC and the Institute of Air Navigation Services (IANS) as training organisations. Following the handover of the Maastricht UAC related activites to the 4 Maastricht States, Maya joined the Safety Regulatory Unit and was involved in the ESSARS Implementation Monitoring and Support Programme both as a team member and a Lead auditor. Since 2012 Maya is involved mainly in support to States activities for the implementation of the SES package. Maya also delivers training course at IANS as part of the National Supervisory Authorities (NSA) Training Initiative.

14 10.45-10.55 **Opinion of an RPAS Operator**
Paudie Barry, Baseline Surveys, Ireland

Bio Data

Starting out his career 1989 with a degree in Civil Engineering, Paudie Barry worked as an Engineering Surveyor on two thrust bore tunneling contracts on the London Water Ring Main project. He returned to his native Ireland in 1990 to set up Baseline Surveys ltd at the age of 22. With already a very strong background in high accuracy, Baseline Surveys Ltd started surveying commercially for a variety of large Irish civil engineering projects such as national primary roads works, track rails, bridges and tunnels. Baseline Surveys Ltd earned its reputation for highly accurate land survey work many years before Ireland's construction boom even started. By 2007 Baseline Surveys had already carried out over 3500 topographical, building and engineering surveys for a variety of clients including government agencies, local authorities, leading consulting engineers, architects developers, and civil engineering contractors using Robotic Total Stations, RTK GPS and AutoCAD. Currently commercially offering Drone Aerial Photogrammetry GIS data capture services, Baseline Surveys Ltd.'s MD; Paudie Barry has been invited into University College Cork's Geography Department as a guest lecturer on the subject of drone mapping technology to their Remote Sensing masters students. Baseline Surveys Ltd currently claim to produce (as far as I can tell) the world's most accurate aerial photogrammetry with a RMSE of only 2.3cm over a 5 acre study area, as they set out in their published paper on Accuracy or RPAS photogrammetry. Paudie is a UVS International committee member and an ESRI Silver partner.

Abstract

During this presentation I will be raising questions about liability, responsibility and liability with regard to operating RPAS equipment. I will be looking at various stakeholders involved including aviation authority, manufacturer and operator with regatrd to liability and responsibility. I will be presenting a number of scenarios and asking the audience where the responsibility and liabilty lay with regard to RPAS malfunction, pilot error and gross misconduct. Current insurance premiums apparently are excessively high for the actual risk. Uncertainty has urged insurance companies to err on the side of caution, which leads to the question of RPAS incident reporting and the difficulties that this presents to the industry.

15 10.55-11.05 **Opinion of an Insurer - RPAS: Pre-requisites to Develop an Efficient Insurance Market?**
Jean Fournier, Global Aerospace, France

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 has been for 19 years with Marsh, including 10 years as Head of the French Aviation and 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 EADS) on military and 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 also obtained his pilot licence when he was in the US. Global Aerospace is the world's leading aviation insurer and provides underwriting and claims expertise from its worldwide headquarters in London, UK. The Global Aerospace 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

We follow up on the presentation made as part of the International Conference on Remotely Piloted Aircraft Systems held in June 2013 in Brussels, and organized by UVS International, on the interest of Aerospace insurers with respect to RPAS. Going one step further, we will detail the various topics that need to be addressed in order to set the scene for the future RPAS insurance market.
What are the regulations that currently request aircraft operators to purchase insurance?
What are their goals and can they be transposed to RPAS?
Besides regulations, who needs to secure insurance before manufacturing, operating, servicing, etc… RPAS?
How the responsibility / liability regime impacts the development of insurance?
Do we have widely understood and supported terms and conditions for RPAS insurance?
How important is it to have opened databases to monitor RPAS in operation and RPAS accidents?
Do authorities need to set different liability requirements depending on the uses of RPAS?
We will give a first view on all these questions and more… with the continuous intent to facilitate the development of an RPAS insurance market that could satisfy the needs of all RPAS interested parties.

16 11.05-11.15 **Opinion of a Legal Specialist - RPAS in a Changing World**
Arthur Flieger, Flieger Law Office, Belgium

Bio Data Admitted to the Bar: 1984, Vrije Universiteit Brussel (Bachelor of Law, cum laude, 1980; Certificate International and European Law, 1984); Universitaire Instelling Antwerpen (Licencee, cum laude, 1983); Universitaire Faculteiten Sint Ignatius Antwerp (Certificate Maritime Law, 1983); Rijksuniversiteit Gent (Certificate Eastern European Studies, 1983; Certificate Portuary and Maritime Science, 1984; Diploma in Air Law; Diploma in Airline Management. Languages: Dutch, French, english, German, Spanish, Italian and Portugese. Member: Antwerp and Belgium Bar (can appear before all EC-Tribunals and Courts); American Bar Association; International Bar Association; European Association for Chinese Law (former Chairman, Standing Committee of the Banking, Foreign Exchange and Monetary Affairs, 1987); American Chamber of Commerce; American Belgian Association; Recognized by the State of Tenesse (USA), Tennessee Economic Development. Military and Civil Aviation Association (MCAA - Antwerp Airport) Co-Founder and Corporate Secretary; Swiss Business Council; Associaçao Internaacional de Estudos Juridicos e Economicos, São Paulo, Brazil (Co-Founder); International Tax Planning Association; Institute of Directors, I.O.D., (London); IOD Zimbabwe; De Industriële Groote Club (IGC Amsterdam); the Belgian Rumanian Chamber of Commerce and Industry (Founder and Chairman, 2006); Worldwide Airport Lawyers Association (WALA); National Business Aviation Association (NBAA); International Society of Transport Aircraft Trading (ISTAT); Helicopter Association International (HAI); FLAG VZW (Flemish Aerospace Group), Dutch Aviation Group (DAG) European Aviation Club (EAC).

Abstract Aviation today provides benefits to the society mainly for transport applications: i.e. it is a typical fall-out of the second industrial revolution. RPAS can add, to the existing aviation activities, digital technologies and massive exploitation of information: in other words bringing aviation in the realm of the third industrial revolution, and so creating highly qualified jobs in the manufacturing sector, in operations and in exploitation of the information acquired through RPAS. RPAS rules must also be as light as necessary, in order to avoid an unnecessary burden on the emerging industry. Last but not least, RPAS integration requires addressing adequately the societal impact of RPAS applications by covering important elements as liability, insurance, privacy, etc. Currently ICAO is limiting the scope of its recommendations to RPAS (for use by interantional civil avaition). The European roadmap follows the same approach, therefore fully autonomous aircraft will not be considered as part of its scope.

17 11.15-11.25 **Opinion of a Safety Specialist**
Christian Janke, EASC, Germany

Bio Data Christian Janke has been in military service for 14 years as a helicopter pilot and instructor for crew training in non-technical-skills, Human Factors & Crew Resource Management. He holds a diploma in political science and is experienced in Public Affairs and Media Relations. His training and consulting background is Safety Management und Risk Assessment, furthermore he is an accredited trainer for Aviation Security/Air Cargo Security and Auditor for quality management (DIN EN ISO 9001).Christian Janke is currently a research engineer at the European Aviation Security Center (EASC) in Germany. His R &D focus is on technology impact assessment in context of legal frameworks, stakeholders and public opinion.

Abstract What are the main priorities for a framework and integration of RPAS in the domestic airspace from a perspective of a legislative authority? This presentation will touch the aspects of Safety (Operations, Risk Assessment, Certification, Standardization) and Security (Safeguarding against unlawful interference like crime and terrorism)

18 11.25-11.35 **Insights from the R&D Side: The Legal Case as a Novel Methodology to Design According to Liability**
Damiano Taurino, DeepBlue, Italy

Bio Data Damiano Taurino holds a Master Degree in Computer Science from the University of Rome 'La Sapienza' and a PhD in Telematics and Information Society from the University of Florence. His research interests include Computer Vision, Network, Systems and Data Security and Autonomous Veichles. He has been working in Deep Blue since 2009, being involved as Information Technology expert in national and EU funded projects concerning RPAS. As responsible for the RPAS division of DeepBlue, he was actively involved in the ICONUS study launched by the SESAR Joint-Undertaking in 2012 for the definition of the operational concept for the introduction of RPAS in non-segregated airspace. Currently he is responsible for the validation activities of the RAID (RPAS ATM Integration Demonstration) project funded by the SESAR Joint-Undertaking.

Abstract How to attribute liability in case of accidents involving automated technologies? ALIAS is a challenging and innovative project focusing on the legal implication of automation in complex socio-technical systems. It looks at liability attribution as an emerging fundamental issue of human-technology interaction to be taken into account in highly automated environments. The project is co-financed by EUROCONTROL acting on behalf of the SESAR Joint Undertaking with funds from the European Union as part of Work

Package E. The research carried out in the project has recently brought to the development of the Legal Case, a novel methodology to address legal issues of new automated devices for ATM during their design process. Thanks to the ALIAS methodology, the need for changes in the allocation of legal liabilities can be identified during the iterative design and evaluation process, and problems can be identified and addressed before deployment, through convenient technological adaptations or legal arrangements. The methodology includes a variety of supporting tools, such as tables to assess levels of automation and identify tasks and duties, flow diagrams to guide the assessment process, tables and reports which embed the produced results. During the presentation the validation process adopted in the RAID project (RPAS ATM Integration Demonstration) will be used in order to show how the legal case can be introduced as a valuable methodology in the process of design and validation of new technologies and operational concepts.

11.35-12.00 **Interactive Panel Discussion** - Besides the speakers, all members of the Definition Team that drew up the Terms of Reference of this Study Group, the panel will also consist of additional Definition Team members, including **José Calvo** (**SESAR JU**), **Andrea Maccapani** (**Selex ES, Italy**), and **Jürgen Verstaen** (**Flight Plus, Belgium**). The panel discussion will be concluded by the announcement of creation of the **Study Group 01 RPAS Responsibility, Liability & Insurance**.

12.00-13.30 Lunch

Session 5 Operators & Operations

Moderator: Horst Schmidt-Bisschoffshausen, UVS International, Board of Directors - Secretary

19 13.30-13.45 **Forest Inventory - Tree Counting & Height Measurement Survey with RPAS**
Paudie Barry, Baseline Surveys, Ireland

Bio Data Starting out his career 1989 with a degree in Civil Engineering, Paudie Barry worked as an Engineering Surveyor on two thrust bore tunneling contracts on the London Water Ring Main project. He returned to his native Ireland in 1990 to set up Baseline Surveys Ltd at the age of 22. With already a very strong background in high accuracy, Baseline Surveys Ltd started surveying commercially for a variety of large Irish civil engineering projects such as national primary roads works, track rails, bridges and tunnels. Baseline Surveys Ltd earned its reputation for highly accurate land survey work many years before Ireland's construction boom even started. By 2007 Baseline Surveys had already carried out over 3500 topographical, building and engineering surveys for a variety of clients including government agencies, local authorities, leading consulting engineers, architects developers, and civil engineering contractors using Robotic Total Stations, RTK GPS and AutoCAD. Currently commercially offering Drone Aerial Photogrammetry GIS data capture services, Baseline Surveys Ltd.'s MD; Paudie Barry has been invited into University College Cork's Geography Department as a guest lecturer on the subject of drone mapping technology to their Remote Sensing masters students. Baseline Surveys Ltd currently claim to produce (as far as I can tell) the world's most accurate aerial photogrammetry with a RMSE of only 2.3cm over a 5 acre study area, as they set out in their published paper on Accuracy or RPAS photogrammetry. Paudie is also a committee member of UVS International and an ESRI Silver partner.

Abstract An RPAS application that looks quite promising is RPAS tree count and height measurement. Our data has already proven itself to be accurate within an RMSE of 23mm within a 95% confidence level, while the survey accuracy test was carried out in similar sub optimal conditions. We published a paper on this, which is available to be read. We carried out a number of trial flights over forestry with our RPA. On the first trial we were accompanied by a state forester, who suggested that if we had tree counting capability that it would be well received within Coillte, the state forestry department. We found that when we analysed the ortho imagery from the RPAS flight we could count every single tree in the forest with amazing accuracy, plus we could tell the height of each tree with amazing accuracy too. We used the Sony nex7 Near Infra Red sensor on board the Bramor RPAS to capture the imagery of the forest canopy below. The imagery from NIR shows the treetops lighting up like little white bulbs so they look like cells, with a nuclear and an outer ring. We applied medical software for blood cell counting to count the tree tops and we found that our accuracy was amazing. The industry currently strives for 10% accuracy levels, whereas we were achieving better than 0.1% accuracy. We were then invited to participate in a research project, where aerial data for forestry was collected and compared. There was satellite data, SAR, LIDAR, manned photogrammetry and us with our RPAS. I will be showing you the various aerial data available for forestry and I will also be showing you RPAS data.

20 13.45-14.00 **Development of the Camflight Aerial Mapping Robot**
Niels Christian Moen, Bygg Control, Norway

Bio Data Niels Christian Moen is the Managing Director of the Norwegian company Bygg Control AS. After finishing his education as an electrician, he joined the Norwegian Navy for his education in the field of submarine electronics. After his studies, he served two and a half years working with sonar and radar equipment on submarines. After his time in the Navy, Niels started to work in a medical firm and was certified to work with medical equipment. During his career he has been working with business and concept development in different companies. He has relevant experience from the Danish consulting company Carl Bro. Here he was sales manager for the road maintenance software RoSy and GIS systems in Norway. In 2010 he founded Bygg Control AS together with some co-investors. The company started to offer consulting services

within building physics to the market. His interests for IT, electronics and RC aircraft led to the development of services and solutions for RPAS-based mapping and the Camflight concept was born.

Abstract

Bygg Control AS is the company behind the Camflight Aerial Mapping Robot concept. From the early beginning in 2010 the first tests with multi-rotor RPAS started. In 2011 they received a grant from Innovasjon Norge for the development of mapping services based on RPAS. This led to modification of existing multi-rotor airframes, and later the development of their own RPAS. During this period, Bygg Control AS has achieved experience in the field doing complicated mapping projects in Norway. The presentation will be focusing on the goals for the development, the results and experience. Examples of high resolution terrain models will be presented. Finally Niels will be talking about the roadmap for the company in the future.

21 14.00-14.15 **Photogrammetry Applications with RPAS in Germany**
Werner Mayr, Germap, Germany

Bio Data

Werner studied Surveying & Photogrammetry, PhD in Photogrammetry, all at TU Munich; he started his professional carreer as development engineer at Vexcel Corp., Boulder, CO, USA; continued at Carl Zeiss as Head of Photogrammetry Development, Germany; subsequently followed several stages as Product Manager at SICAD GIS, a Siemens Division; as Managing Director of INPHO GmbH, a well-known photogrammetric software development company (now Trimble); as Managing Director of CONPIE GmbH, a daughter company of Hansa Luftbild AG, the largest German aerial mapping firm; as Managing Director of Blom Deutschland, a daughter of Blom ASA, a large European aerial mapping firm; in Jan 2012 he started operating his own company GerMAP, GmbH specializing in develop-make-operate-sell custom RPAS for remote sensing and photogrammetry. He has broad professional overview and experiences in development and operations of any kind of photogramemtric systems (from cameras/sensors to data processing software) and hands on experiences in aerial mapping and remote sensing services.

Abstract

RPAS find their way into day-to-day commercial remote sensing. The author looks back to several years of RPAS-operations for service projects in Germany and abroad as well as for RPAS-development projects. Furthermore, practical experiences with the related formal legislation in Germany and some other countries condense to some extent into this presentation. RPAS from point of view of aerial mapping applying photogrammetry technology for extraction of geospatial 3D-information and for conducting 3D-modelling in particular are the focus issues of this presentation. Some examples of completed service projects in various countries complement it and shall give the audience stimulations of and for commerical appications of RPAS.

22 14.15-14.30 **Technical Inspections Using Light RPAS**
Antonio D'Argenio, ASSORPAS, Italy

Bio Data

Antonio D'Argenio is member of the Board of Directors of ASSORPAS, the Italian Light RPAS Association, born to give a unique voice to all the operators of the Italian RPAS market and to promote the development of the national market.
Graduated in Geology in 1992, PhD in Sedimentary Geology in 1997, from 1999 he started to work in the area of Geomatics and in 2009 started the use small RPAS to collect geodata. In 2012 he was Co-Founder and Chief Executive Officer of Panoptes, a start-up company focused on the development of scientific and technical instruments designed for small RPAS. In Panoptes he coordinates the development of multi-sensors to be used in technical inspections. Since 2004 he is a board member of Ticonzero, a consortium of IT companies focused on geospatial information management. In Ticonzero he has also been technical and scientific coordinator of national and regional Italian research projects focused on special applications of geospatial information and R&D activities on the use of small RPAS and the development of dedicated sensors.

Abstract

Technical inspections of utility infrastructures are a key application for which Light RPAS can be used. Even if this application area is not the most relevant for a large quantity of operators, the use of Light RPAS on power lines, energy production plants or other infrastructures is of great interest, due to the economic value of the potential market. In all these cases, the advantages of RPAS inspections are noticeable in terms of costs and time saving and safety but, to correctly compare them with traditional ones (e.g. ground or helicopter inspections), an appropriate metrics should be developed. Moreover, all the issues concerning the quality of the data that can be collected should be clarified.
In order to improve these aspects and to promote the national market, ASSORPAS, the Italian association of Light RPAS operators, is starting to cooperate with scientific associations to correctly define the results that can be generated by RPAS services. Some examples coming from real applications will illustrate the degree of efficiency which is possible to reach even with a very small RPAS.

23 14.30-14.45 **National RPAS Regulatory Review**
Erika Billen, Federal Public Service Mobility & Transport, Belgium

Bio Data Erika Billen has a Degree in Chemical Engineering from the Free University of Brussels (1995) and a post-University Degree in Safety Management & Safety Advise from the Polytechnic Faculty of the University of Mons (2004). She started her career in the petrochemical industry, first as production engineer, and moved later on into the position of safety engineer. Since 2005, she works as a Communications, Navigation & Surveillance Engineer at the Belgian Civil Aviation Authority. She is responsible for the requests for permits to fly RPAS in Belgian airspace. She develops the national legal framework to facilitate the insertion of RPAS into non-segregated Belgian airspace. She represents Belgium in JARUS, EUROCAE WG73 and EUROCAE WG93 and Eurocontrol Regulators Consultation platform. In 2006, she organized the first live trials of RPAS in Belgium at low altitude, and since then facilitates test & research & demonstration & training flights in Belgian airspace. Over the last six years, she has created an expertise centre sharing and collecting all knowledge related to the operation of RPAS. She is also involved in the start-up of the use of RPAS for governmental tasks, like emergency response, monitoring, surveillance & inspections. She is the focal point for all international requests related to commenting upcoming legal texts or proposals for policies and guidance for the safe operation of RPAS (ICAO, EASA, Eurocontrol, European Commission) and coordinates the inputs to present a common Belgian position. In 2012, she also promoted the creation of BeUAS, the national association representing RPAS developers, manufacturers & operators.

Abstract The presentation will speak about the Belgian approach related to RPAS (flights and areas) and their insertion into non-segregated airspace. It will give an overview of the current situation in Belgium, of the regulatory initiatives Belgium is involved in, will discuss the challenges for the future and ends with some conclusions.

14.45-15.05 Interactive Panel Discussion

15.05-16.00 Refreshment Break

Session 6 RPAS Regulatory Matters

Moderator: Peter van Blyenburgh, UVS International, Board of Directors - President

24 16.00-16.15 **Proportionate Common Rules for RPAS**
Filippo Tomasello, EASA-European Aviation Safety Agency

Bio Data Filippo Tomasello was cadet in the Academy of the Italian Air Force in 1969 (…yes; the previous century). After graduating with honours doctor in aeronautical engineering in 1974, he was promoted 1st Lieutenant. Now he is Lieutenant Colonel of the reserve. He then served as flight test engineer in the Italian Air Force until 1984, mainly involved in the multi-national Tornado programme. During this period he had flight experience, including on-board of military prototypes. Subsequently in ENAV, the major Italian Air Navigation Service Provider (ANSP), he was responsible for R&D and for a number of projects for Air Traffic Management (ATM) and Air Navigation Services (ANS), including new radar sites and modernization of automation in Area Control Centres and reorganization of the Italian airspace. Since 1991, he is visiting professor at State University 'Parthenope' in Naples. Member of the ICAO Special Committee on Future Air Navigation Systems (FANS) since 1987, he was rapporteur for development of the standards for data link (VDL Mode 2). Then he chaired the ADS Panel and the Mobile Communications Panel for about 5 years. He joined EUROCONTROL in 2000 as manager for Northern Europe, to harmonise the medium term ATM enhancement plans in the involved States. In 2005 he joined the European Commission, working on accident investigation, data collection and extension of the competences of the European Aviation Safety Agency (EASA) to ATM, ANS and aerodromes. Since 2007 he is a rulemaking official at EASA, responsible for a number of projects, ranging from airworthiness, to flight operations, preparation of the ICAO 37th Assembly in 2010, phasing out of halon for environmental reasons, and communication services via satellite. Last but not least, he is the focal point in EASA for RPAS. EASA has designated him to participate in different ICAO groups, including the UAS Study Group, where he was elected co-chair in 2012. Filippo Tomasello has been strongly involved with the drawing up of the European RPAS Roadmap.

Abstract The EU RPAS roadmap envisages extending the competence of the European Aviaiton Safety Agency (EASA) to all civil Unmanned Aircraft Systems, above and below 150 kg. But on the market we see rerlatively large MALE/HALE used mainly for State (military or non-military) fligths on one side and a number of civil operators, growing day by day, and mostly operating remotely piloted aircraft (RPA) of few kg in visual line-of-sight below 500 feet. The latter RPA are often manufactured and operated by small or medium-sized enterprises (SMEs). Clearly imposing to SMEs the same rules applicable to larger and more complex RPA manufactured and operated by larger organisations, may not allow the SMEs to economically survive. Europe could in this way loose the opportunity of creating thousends of high-tech and high quality jobs. Therefore 'common' EU rules does by no way mean 'same' rules for all categories of RPAS. The taxonomy based on mass, used by the pioneers of aviation in the last century, is out of date in the XXI cantury. A taxonomy based on the complexity of operations needs therefore to be developed. In the simplest cases only one formal certificate (the RPAS operator certificate) could be suffient and encompass also the safety of the system and the training of the remote pilot. In the most demanding cases EASA should continue to issue type certificates. In the intermediate

cases, the authorities at national level should be empowered to issue all required certificates, licences or approvals, for proximity reasons, but based on proportionate common rules. The challenge is hence is to agree on such taxonomy and also to exploit qualified entities in the simplest cases, to avoid putting under strain the scarce public reosurces available.

25 16.15-16.30 **Airworthiness – Changes in Concept to Meet the Needs of the Light RPAS Community**
André Clot, EuroUSC, UK

Bio Data André J. Clot is a director of EuroUSC™ and has a solid background in safety critical systems. He gained his initial introduction to computing whilst at university where he also gained his Private Pilots License before joining the RAF in 1979 as a pilot. Later he moved on to a career in safety critical systems in the defence and nuclear industry. In 1988 he joined the UK CAA later becoming the first Head of Engineering Strategy within the National Air Traffic Service (NATS) as an advocate of a systems approach to Air Traffic Operations and a member of its research and development board. In 1998 he formed the UK UAS trade association (UAVS) and in 2003 formed EuroUSC™. He is a Chartered Engineer and holds a Masters in Business Administration. He is a member of the Royal Aeronautical Society & the current Chairman of its Unmanned Aircraft Systems Specialist Group. In addition he is Vice Chairman of the EUROCAE WG93 and is the accountable manager in EuroUSC™ that overseas remote pilot and systems assessment alongside organisation accreditation for RPAS operations within a national context.

Abstract In August 2009 the United Kingdom (UK) Civil Aviation Authority (CAA) approved EuroUSC™ as a Qualified Entity under the EASA rules (EC 216/2008 Article 13 and Annex V) to carry out airworthiness assessments on RPAS below 150kg (Light RPAS). The airworthiness assessment of Light RPAS has been largely dictated in the past by the concept of mass as a defining factor. Assumptions around this concept have now been called into question by work being carried out within EUROCAE WG93 and several other factors have been brought into focus. Importantly, although operational competence has been put forward by some as being sufficient for sub 20 kg aircraft, recent incidents are pointing to airworthiness still being an important factor in safety assurance, no matter what the mass of the aircraft in the system. This presentation looks briefly at some of the issues in this area and ongoing work to provide practical airworthiness requirements in rural, populated and congested areas.

26 16.30-16.45 **JARUS CS-LURS: The first International Airworthiness Standard in the World for VTOL RPAS**
Vladimir Shibaev, TsAGI, Russian Fed. (on behalf of JARUS)

Bio Data Vladimir M. Shibaev (1951) Ph.D & Fellow of the RAeS, graduated from Moscow Institute for Physics and Technology (State University), Department of Aeromechanics and Aircraft. Post graduate education at the same University. In 1983 he was awarded his Ph.D. with the thesis: Stall and spin flight simulation of modern aircraft with fly-by-wire control system. As a lecturer he has given courses in flight dynamics and fight simulators at Moscow Aviation Institute (State University MAI) and at the test pilot school. In 1994 V. Shibaev was elected a Corresponding Member of the International Engineering Academy. From 1977 he has been a member of the Central Aerohydrodynamics Institute, where his research activity included: aircraft dynamics and flight simulation of flight at high angles of attack, stall and spin. He is expert at ISO and ICAO. V. Shibaev is the author of 17 patents and over 100 publications and proceedings in the mentioned subject areas, including RPAS certification. His current position is: Director of the Aviation Certification Centre (ACC) of the Central Aerohydrodynamics Institute (TsAGI) in Russia. He is the leader of the JARUS Airworthiness Group.

Abstract JARUS is an international group of experts from the National Aviation Authorities (NAAs) and the European Aviation Safety Agency (EASA). Its purpose is to recommend technical, safety and operational requirements for the certification and safe integration of RPAS into airspace and at aerodromes. The group bases their work on review and consideration of existing regulations and other material applicable to manned aircraft and the drafting of specific RPAS guidance material to cover the unique features and characteristics of RPAS.
JARUS has just announced the release of its first official publication - Certification Specification for Light Unmanned Rotorcraft Systems (CS-LURS). This publication marks the first set of civil certification requirements for Remotely Piloted Aircraft Systems (RPAS) and is a major step towards the integration of RPAS in civil airspace. CS-LURS is a set of airworthiness requirements for Light Unmanned Rotorcraft Systems. This set of requirements will facilitate the certification of Unmanned Rotorcraft Systems up to 750 kg maximum take off weight by national aviation authorities. JARUS will consider updating these requirements in the future, so feedback on the usability of these requirements for actual approval projects will be greatly appreciated. JARUS will create online forms on its website for users of this certification specification to provide this feedback. The complete document, which includes two books – Book 1 “Airworthiness Code” and Book 2 “Acceptable Means of Compliance” is available for download on www.jarus-rpas.org.
The JARUS website is kindly hosted by UVS International.

27 16.45-17.00 **Human Error in Operating Mini RPAS - Causes, Effects and Solutions**

Christopher Roos, NLR, The Netherlands

Bio Data

Graduated in Human Factors and Safety, Christopher Roos obtained his MSc in Psychology at the University of Leiden in early 2009. As a Training and Human Factors specialist for the Dutch National Aerospace Laboratory (NLR) he has subsequently done research on a wide variety of different aviation topics from (team) training, selection of RPA personnel, Manned-Unmanned Teaming, Ground Control Station HMI design to automation and Human Factor aspects. He is knowledgeable about ATC, with a training course in ACC Air Traffic Control and with experience as a training expert at the Dutch ANSP LVNL. He is passionate about increasing aviation safety and holds a no-nonsense approach to applying innovations in training design, procedures, organisation or HMI design to reduce risks and increase effectiveness. He is particularly interested in innovations in RPAS operation and all problems that arise with operating unmanned vehicles (e.g. Automation issues, Human Errors, RPAS integration into civil airspace).

Abstract

Developments in the field of unmanned aircraft have led to the emergence of a multitude of RPAS, of which mini RPAS are by far the most prevalent. The availability of relatively cheap, versatile airborne platforms has led to the proliferation of private and commercial users of these mini RPAS. In this emergent situation where professionals and amateurs are operating RPAS largely uncontrolled in a crowded airspace, incidents and accidents are not unthinkable. Indeed, those have already taken place, promptly leading to restrictions in rules and regulations. While RPAS accident research has been performed in the past, this was usually done on large military platforms in the United States. To support this emerging field and specify to the current, European situation, the Dutch National Aerospace Laboratory (NLR) has begun an investigation into potential human errors in the operation of mini RPAS. A mixed academic/operational research approach was chosen including literature reviews, interviews and observations which looked at the operational methods of a wide range of mini-RPAS users. The research has uncovered six main human error themes ranging from user experience, commercial and environmental pressures to automation and HMI design. These causes have subsequently been analysed to determine the underlying constructs and relationships. Lessons learned and potential solutions to prevent human error will be presented. The results of this research can be used by operational users, manufacturers of RPAS and regulatory bodies.

28 17.00-17.15 **The Use of Multi Rotor RPAS for Inspection of Live & Difficult to Access Assets in the Offshore Oil, Gas & Renewables Industry**

Mark Sickling, CyberHawk Innovations, UK

Bio Data

Mark is a former Royal Air Force Pilot with over 24 years experience and 4500 flying hours on Fast Jet and Unmanned Aircraft. He has extensive experience with Unmanned Aircraft of all sizes and is a Flight Instructor and Examiner. Mark has an MSc in Aerospace Systems. Mark currently leads Cyberhawk's team of pilots and flight observers and is a qualified RPAS operator and commercial pilot.

Abstract

There is a continual requirement to carry out close visual inspections of plant and equipment on offshore installations for ongoing maintainance, accessing structures at height or live systems on a process poses a numebr of challenges. 'Traditional' methods of access to carry out inspection of high or difficult to reach parts of the installation involve using rope access techniques, scaffolding or even full-size helicopters. Rope access inspection can be time-consuming and although it has an excellent safety record is still potentially dangerous as it involves personnel working at height which is statisatcally the single biggest cause of work place faitalities accounting for 25% of all workplace fatalities (5). Scaffolding as an access method for inspection can be expensive, time-consuming and also involves a significant amount of working at height or manual handling operations. While full-size helicopter inspection can mean that many parts of a rig are simply unispectable: for example the underdeck of a platform or. These inspections can also put offshore platforms at a huge commercial disadvantage as assets such as flares need to be shutoff or drilling derricks require drilling activities to stop for them to be completed. A new method of inspecting live and difficult to access assets has now been developed that allows certain inspection tasks to be performed quicker, safer and more cost effectively than traditional methods. Similar to underwater Remote Operated Vehicles, it involves allying engineering expertise to the use of RPAS for topside and above the waterline insepction. These miniature flying vehicles use HD video, HD still and thermal cameras to provide detailed images for inspection purposes. RPAS are operated by highly trained pilots in combination with qualified engineers and plant inspectors to create authoritative technical reports and analysis. Offshore operators now have another method available to them to gather information and understand the condition of their assets without shutting down operations allowing informed decision making. The use of RPAS for the visual and thermal inspection of onshore structures in refineries and chemical plants has become an established technique over the last 4 years and is starting to become adopted as best practice by some operators for visual inspection of certain assets such as flare stacks. The potential of the technique of using RPAS for certain inspection tasks is now being recognised in an offshore context with the first use of this technology in the north sea January 2012. This paper provides an introduction to the concept of inspection using RPAS, overview of the technology, the technique, benefits of the technique, limitations of its application, safety considerations, case studies and a look to the future for the industry.

17.30-17.45 Interactive Panel Discussion

17.45-19.00 Conference Cocktail at RMA Mess

DAY 3 - WEDNESDAY 11 DECEMBER 2013

Session 7 Panel on RPAS Operators & Operations - National Views on the Current RPAS Operations Status Expressed by National Associations

Moderator: Peter van Blyenburgh, UVS International, Board of Directors - President

29 09.00-09.10 **The Belgian RPAS Situation**
Jürgen Verstaen, BeUAS, Belgium - Vice-President

Bio Data

Jürgen Verstaen graduated in 1996 with a degree in Sales and Representation. Beginning 2000 he started his military career at the Royal School for NCO's in Campus Saffraanberg. He became a military air traffic controller and gained experience in the domain of Air Traffic Management (ATM). Belgian Defense gave him the opportunity to expand his knowledge and subsequently he received several certificates in ATM. Currently, he still works for the Belgian Defense as an area traffic controller and Traffic Director at ATCC "Belga Radar" and specializes in aviation law and assessments in the field of air traffic control. In 2012, he became Managing Director at Flight Plus, a company which he founded together with his colleague Andres Van Swalm. They are consultants to companies in the manned and unmanned aviation sector. Flight Plus also specializes in obtaining permits to fly for RPAS worldwide. In the same year, his company co-founded BeUAS, the Belgian Association for Unmanned Aircraft Systems. He was elected Vice-President and he advises the association and regulators through working groups, in order to push the unmanned sector forward in Belgium. At the general assembly in February 2013, he was elected to the Board of Directors of UVS International. Today, Flight Plus mainly works on obtaining flight permissions for Belgian RPAS operators and consulting them how to integrate their system into the existing airspace. Since 2013 Flight Plus is part of the LUMEN project (ESA), as a consultant and scenario builder. For the last year, his company worked together with the Belgian CAA and BeUAS to create the new Belgian Royal Decree for RPAS, which will be published in the first part of 2014.

Abstract

BeUAS, Belgian Unmanned Aircraft System Association, was founded on the 4th of July 2012 to help RPAS related companies finding their way in this complex environment. Today, BeUAS comprises 52 companies from different kind of industries in aviation. Manufacturers, operators, but also universities and insurance agencies are amongst the members. To highlight certain aspects in aviation, lectures are given on a regulary base. This way the operators can fly safely and understand what is happening in the airspace around them. BeUAS also created working groups to tackle problems in the RPAS world and to advise regulators and agencies about the unmanned aviation sector. One of the major BeUAS targets was the creation of a solid and comprehensive legislation in Belgium. In the first part of 2014 we will see the results from our "behind the scene" work in the first complete legislation for RPAS in Belgium and the world. Since 2013, Viscount Frank De Winne became the godfather of our association. He is a Brigadier-General in the Belgian Air Component and ESA astronaut. He was the first ESA astronaut to command a space mission when he served as a commander of ISS Expedition 21. Frank De Winne serves currently as Head of the European Astronaut Centre of the ESA in Köln, Germany. Because of those steps taken, the press and other authorities started looking into the unmanned aviaton world. BeUAS brings the sector in a positive light and will do in the future by being present at conferences, expositions and press related events.

30 09.10-09.20 **The Dutch RPAS Situation**
Rob van Nieuwland, DARPAS, The Netherlands - President

Bio Data

Graduated as engineer in 1985 at Technical University of Delft, Technical Physics; End study topic: particle movement in turbulent airflow. Worked at TNO Defense and Security for 23 years as a researcher, project manager, program manager, business developer, account manager in the fields of military aerospace and national security. Since 2009 raised In2Nova to work in the field of aerospace related innovations, mainly focussing on improving the conditions and associational aspects to give unmanned aircraft operations a change to develop. Contributed to project proposals for several innovative RPAS developments in The Netherlands, a.o. to raise a RPAS knowledge centre. After proposal approval, now contributing as a project manager to the project 'UAS Maintenance Valley' by raising the awareness about the potential of using RPAS at end users level by organising roundtable conferences. Became an nono-executive member of the UVS international in 2011. Co-produced two versions (2012 & 2013) of the national RPAS-event in The Netherlands. Initiated and founded, DARPAS, the Dutch Association for RPAS operators and constructors, in Nov. 2012. Now acting as the president of DARPAS performing in various meetings with other aerospace communities in The Netherlands, the Dutch government and politicians. Also acting as a DARPAS spokesman for the media. Since January 2013, as a part timer, employed within REWIN, a public regional business development organisation, as project manager for the international 3i-project, 'UAV, for safety at sea'.

Abstract

A brief insight into how Dutch companies struggle to get their services done: RPAS in the air. Many operators are starting, some are beginning to understand that it is another level than model flying, a few transit from illegal operations to exemptions to be allowed to fly as a professional. But then it is still not certain if you are able to fulfil the needs of your customer. Frustrations due to local permits for takeoff and landing

permissions outside regular airports (TUG) and the temporary “banning” from civil CTR’s.
Since The Netherlands have a rule, namely it is forbidden to professionally fly RPAS, ... unless you get an exemption from the CAA NL, we see a split in the group of suppliers of RPAS services. The honest and respectable companies stop operating and apply for the exemption process (takes more than 6 months) and meanwhile have no RPAS related income. Sadly enough, some already have gone bankrupt. Others keep on flying illegally, risking high financial penalties when operations go wrong because they are not insured. Next to this, they have a negative effect on the market, since they do not have to take in to consideration the costs of becoming an accredited RPAS company in their invoice to their customerss, which creates an unlevel playing field. This situation can only be countered by creating a system of clear and operational usable rules that contribute to the safety of flight and maintain the inherent flexibility of RPAS operations. Also, it needs to go together with a firm action from the national surveillance and inspection to stop the irresponsible and unfair usage of RPAS. Only when such a situation is established, will the accepted companies be able to start showing what they all have dreamed about and to start putting into practice what we have been saying for a long time: “Real innovative use of unmanned aircraft.”

31 09.20-09.30 **The Norwegian RPAS Situation**
Ole Vidar Homleid, UAS Norway, Norway

Bio Data Ole Vidar has a MSc in new renewable energy & environmental physics from the UNIK - University Graduate Centre in Oslo (1994) and the Norwegian University of Life (1996). He was a manager at Multiconsult AS, (consulting and engineering company), responsible for establishing Planning and Energy departments at the Stavanger & Skien offices, and he was responsible for developing the segment of new renewable energy and airport planning. Broad experience managing and organizing international multi-discipline technology projects. Homleid has a long experience and in depth knowledge of RPAS, developing technology and solutions for different applications. He is one of the founders and the chairman of the Board of Robot Aviation, an independent Norwegian technology company founded in February 2008, which has as objective to provide RPAS solutions that meet a wide range of customer needs. Robot Aviation is specialized in aircraft design and development, production, and operation of RPAS for both civilian and military markets. In 2008, Homleid established UAS Norway, the Norwegian Federation of RPAS developers and operators. He was its elected chairman from 2008 until 2011. UAS Norway is non-profit and independent, open to all private and public businesses and organisations related to RPAS. Homleid has also established the UAS Nordic Conference, the leading Nordic RPAS Conference. He is responsible for international communication for UAS Norway and represents UAS Norway in the International Coordination Council (ICC) of UVS International. He is a member of the Board of Directors of UVS International.

Abstract The presentation will give an update and overview of non-military RPAS operations in Norway, an introduction to UAS Norway, achievements, status and challenges ahead. The BLOS Week and the Nordic UAS conference organized by UAS Norway. Furthermore, the criteria and procedures to become an “authorized” RPAS operator in Norway will be explained. An update on VLOS & BLOS operations and the required insurance will be explained. In addition, an overview of the current operators in Norway, the type of RPAS used within different flight envelopes and the missions flown will be highlighted. A high level overview of the RPAS industry in Norway will also be presented.

32 09.30-09.40 **The Danish RPAS Situation**
Michael Larsen, UAS Denmark, Denmark - Chairman

Bio Data Current position: Project Manager RPAS at Hans Christian Andersen Airport and UAS Denmark. 14 years of experience with local and regional development, investment promotion, retention and attraction of companies, development of public business service, development of networks between research and business etc.
Education: Master of Business Administration, International Marketing, University of Southern Denmark, 1993.

Abstract The status of RPAS operations in Denmark, including plans for a national UAS centre: UAS Denmark - a fast growing newcomer, regulatory status, market overview, UAS Test Centre Denmark, status on work with a Danish Roadmap.

09.40-10.00 Panel Discussion on the Way Forward

10.00-10.45 Refreshment Break

Session 8 **Panel on RPAS Operators & Operations - National Views on the Current RPAS Operations Status Expressed by National Associations**

Moderator: Peter van Blyenburgh, UVS International, Board of Directors - President

33 10.45-10.55 **The French RPAS Situation**
Emmanuel de Maistre, FPDC-Fédération Professionnelle du Drone Civil, France - President

Bio Data Emmanuel de Maistre is the co-founder and current President of the Professional Civilian RPAS Association in France (FDPC, Fédération Professionnelle du Drone Civil). The FDPC has been founded in June 2013, after the Paris Air Show 2013. The association has grown very fast and has now more than 270 members including Civilian RPAS operators and RPAS constructors, as well as clients, insurrers or medias. The FPDC is actively collaborating with the French Civil Aviation Authority (DGAC) to promote and profesionnalize the industry. Emmanuel de Maistre is also CEO at Redbird, a civilian RPAS operator he co-founded in 2012. Redbird operates 4 types of light RPAS (fixed and rotary wings) and works for large industrial clients in various industries such as Oil&Gas, Power transportation, Construction, Mining, Agriculture. Redbird operates its RPAS in VLOS, E-VLOS and also BVLOS («S4 scenario»). Emmanuel has other entrepreneurial experiences in biotechnology and e-commerce. Since 2008, he founded or co-founded three companies. Emmanuel graduated from the Ecole Normale Supérieure Paris (ENS Ulm) and from HEC School of Management (#1 business school in Europe). He's a private aircraft pilot.

Abstract In April 2012, the French Civil Aviation Authority (DGAC) published a new regulation for civilian RPAS up to 150 kg. Since then, RPAS below 25 kg can be used by commercial operators on a routine basis. Four predefined scenarios are described, addressing VLOS / BVLOS condition and flight over populated / non populated areas. France is therefore one of the very rare examples in the world where an operator can send a RPAS beyond visual line of sight on long distances (> 10-20 km). In only 18 months, the number of French RPAS operators exploded, reaching 350 in Oct. 2013. They own around 600 registered RPAS. 80% of the operators are active in the media/communiation sector for photos/videos purposes. The remaining 20% are focusing on the industrial sectors : transportation, energy, construction, topography, inspection, and also agriculture. With 350 registered operators and 20 manufacturers, France is at the forefront of civilian RPAS market in Europe. In July 2013, after the Paris Air Show, manufacturers, operators, and some clients decided to create the French Professional Civilian UAS Association : Fédération Professionnelle du Drone Civil (FPDC). The association has 280 members and is now an important player to support the growth of this innovative industry. Emmanuel de Maistre, President of the FPDC, will give an overview of the French RPAS market including the regulation, the main markets, relevant examples, and market statistics.

34 10.55-11.05 **The German RPAS Situation**
Bernhard von Bothmer, UAV-DACH, Germany - President

Bio Data Bernhard von Bothmer was in the Germany Army up to Sept 2000. Since Oct. 2000 he is the chairman UAV DACH.

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Abstract The following points will be briefly touched on in this presentation:

a) the current regulatory status;
b) quantity of operators & pilots & RPAS approved by national aviation authority;
c) quantity of RPAS operators in Germany operating outside your country;
d) quantity of RPAS flown categorized by MTOM;
e) percentage of electric-powered RPAS;
f) possible interest of having/using a qualified entity;
g) pilot training schools;
h) type of commercial & non-commercial RPAS operations (VLOS, BVLOS);
i) categorization of current RPAS operations (photogrammetry, aerial monitoring, agriculture, infrastructure inspection, aerial photography, broadcasting, forestry, etc);
j) governmental non-military RPAS operations;
k) time required to obtain a permit to fly;
l) duration of the validity of a permit to fly;
m) problem of illegal RPAS operators;
n) quantity of RPAS manufacturers in your country.

35 11.05-11.15 **The Italian Regulated RPAS Market**
Paolo Marras, ASSORPAS, Italy - President

Bio Data Paolo Marras is the President of ASSORPAS, the Italian Light RPAS association, which was born with the aim to give a unique voice to the whole Light RPAS market sector in Italy versus relevant institutions, primarily the Italian CAA ENAC. He strongly worked for the association build up and now coordinates the ASSORPAS Board of Directors. At the 2013 UVS International general assembly he was elected to member of the Board of Directors and now represents the Italian Light RPAS community in this important association.
Since 2007, he is co-founder, President and Chief Technical Officer of Aermatica, a leading company in the RPAS civil market and the only one in Italy that has obtained a Permit to Fly for an RPA in Non Segregated Airspace. In Aermatica he led the ANTEOS RPAS design and certification process. After graduation, he began his professional experience in a little software embedded company, taking part

in interesting short projects in different applicative sectors. Then he decided to face a new professional challenge, beginning an experience in a start-up company becoming co-owner of it in 2003, starting to take part in projects in the aerospace area as Software Engineer, then creating and leading an ASI (Italian Spatial Agency) financed project related to the development of autonomous and intelligent mobile robots. Later on as Team Leader he was involved in many international projects in the aerospace and telecommunication field, and then as R&D Manager he guided the design and setup of the competence management department of the company at its sites in Italy.

Abstract — An introduction of ASSORPAS, the Italian Light RPAS association: its members, why it was founded and how it is operating, the recent success of a national RPAS event in Rome.
The Italian RPAS state-of-the-art, the current regulation process & market, and an explanation of how the Regulated Market is starting up.

36 11.15-11.25 **The Road to Sywell: The Varied and Valuable Background of the New Generation of RPAS Operators**
Philip Tarry, Sub 20 Group, UK - Acting Chairman

Bio Data — Philip Tarry has had a long association with aviation. His father was an airline pilot for British Airways, and encouraged Philip to take an interest in the industry. He has flown radio controlled aircraft as a hobby and is now in the process of becoming a professional small UAS pilot and operator under the trading name The Drone Guys. His interest in this emerging industry has spurred him on to taking on the Acting Chairman role for the Sub 20 Organisation from the beginning of October 2013. Even though he has only been in this role a short time he has already gained significant recognition for Sub 20 within the UK RPAS Industry and with the UK regulators.

Abstract — The objective is to present a good news story of newcomers to the UK commercial RPAS field who, although not from an aviation background, bring another level of professionalism to the industry. These people come predominately from a background in data acquisition, be it film and photography or surveying and mapping, and came into this industry as a means of adding extra value to their range of services. Whilst training up in aviation safety and RPAS operations and technology, this group bring with them a valuable appreciation of the safety issues pertinent to operation in close proximity to the ground, and coordination with specific industrial and creative clients, in a way that aviators might not.
Most recently, over 250 members of this community attended an ESP KTN event orgainsed with the BBC at Sywell Aerodrome in Northamptonshire. The format and agenda for the conference were both very progressive, as were some of the outcomes. As a result Sub 20 Organisation is looking to collaborate with the ESP KTN RAS (Robotics and Autonomous Systems) SIG on another conference that will address the future needs of the full spectrum of the UK RPAS industry.

11.25-11.45 Panel Discussion on the Way Forward

11.45-12.00 Conclusions & Conférence Closure

REMOTELY PILOTED AIRCRAFT SYSTEMS CIVIL OPERATIONS

THE EUROPEAN RPAS OPERATORS' FORUM

ORGANIZED BY

BLYENBURGH & CO
FRANCE

IN COOPERATION WITH

ROYAL MILITARY
ACADEMY, BELGIUM

WITHIN THE FRAMEWORK OF

AN INITIATIVE BY
UVS INTERNATIONAL