ICAO & LACAC UAS Seminar
For Caribbean + South America Regions
Lima, Peru - 18-20 April 2012

Session Chairs:
Marcelo Ureña, ICAO & Peter van Blyenburgh, UVS International

DAY 1 - Wednesday 18 April 2012

00 08.30 - 08.45 Welcome & Opening Remarks

01 08.45 - 09.00 Roadmap on UAS for the SAM Region
Oscar Quesada, ICAO - International Civil Aviation Organization

Bio data: Oscar Quesada Carboni (47) national of Costa Rica, has an education in Electronics Engineering in the University of Costa Rica (1982-1986), in 1987 he started his career in aviation as Avionics Engineer in COOPESA R.L. in Costa Rica, where he worked in carrier aircraft maintenance and carried out jobs of major modifications of avionics equipment. In 1988 he carried out Master studies in Avionics and Flight Dynamics at the Aeronautical School of the Cranfield Technological Institute in Bedford England and a specialization course in aviation accident investigation.
In 1992, Mr. Quesada was hired by ICAO as assistant to the Director and Deputy Director at the South American Regional Office and returned in 1999 as Airworthiness Expert and International Coordinator of ICAO Technical Cooperation project in Bolivia. In April 2001 he is hired by ICAO as Technical Cooperation Regional Coordinator of the ICAO South American Regional Office until 30 June 2007. Among the most important projects he coordinated is the Regional Safety Oversight Cooperation System (SRVSOP).
In July 2007, he assumed the post of Flight Safety Regional Officer at the ICAO South American Regional Office and since March 2010 he is the Deputy Director of this Office.

Abstract: The presentation will establish the need to develop a roadmap in the CAR/SAM Regions for addressing the different ICAO provisions for UAS. The challenges the Region should confront in the development of a regulatory framework will be addressed, as well as the need to set dates and establish priorities. The use of State Safety Programs (SSP) will be emphasized, which should be part of the regulatory development policies. It will be explained that in the development of UAS-related regulations, safety mitigation strategies based on data on UAS operation should be considered and the following queries will be mentioned: How to address the planning of developing regulations if no UAS safety statistics are available? And which would be the right balance for implementing regulations for UAS for the sake of safety without affecting the development of this new technology?
Oscar's presentation will place this questions as a way of encouraging States to begin addressing and also to use the seminar as the starting point for finding answers as to how, when and who.

Session 1 Standards

02 9.00 - 10.00 International regulatory framework for Remotely Piloted Aircraft Systems
Leslie Cary, ICAO - International Civil Aviation Organization

Bio data: Leslie Cary is a Technical Officer in the Air Traffic Management Section of the Air Navigation Bureau at the International Civil Aviation Organization (ICAO) and is Secretary of the ICAO Unmanned Aircraft Systems Study Group. As Secretary, she is responsible for coordinating all developments related to unmanned aircraft systems within the ICAO framework. This includes working with Technical Panels, Study Groups and relevant external bodies on development of Standards and Recommended Practices which will establish the basis for global interoperability and harmonization of UAS. Prior to joining ICAO in mid 2006, Ms. Cary was with the U.S. Federal Aviation Administration (FAA). She spent 14 years as an air traffic controller at Anchorage Air Route Traffic Control Center and 6 years at FAA headquarters facilitating implementation of various international ATM and CNS initiatives.

Abstract: This presentation will address on-going activities at ICAO to develop a regulatory framework that will allow remotely piloted aircraft to be integrated alongside manned aircraft in non-segregated airspace. The presentation will provide background on the establishment of the Unmanned Aircraft Systems Study Group (UASSG), its composition and terms of reference. It will then describe the constraints emanating from the Convention on International Civil Aviation clarifying why certain decisions have been taken regarding the development of international standards for UAS. These decisions affect not just the use of new terms such as 'remotely piloted aircraft system', but how certification and licensing requirements, approvals and authorizations will be advanced.

03 10.00 - 10.30 UAS operation in the ATS airspace
Celso Figueiredo, ICAO - International Civil Aviation Organization

Bio data: Celso Figueiredo is the Air Traffic Management and Search and Rescue Services, Officer since 23 May 2011. Mr. Figueiredo has a Specialized Master in Aeronautical Operations and ATM at ENAC, France, and has graduated in Automation Technology. He studied at the Technical School, obtaining the title of Air Traffic Controller. He has worked as ATM Expert in Thales Air Systems, France, where he was responsible for the

Air Traffic Management– Operational Support for Air Traffic Products in Thales. He also worked as Air Traffic Controller in Brazil over 20 years, and also acted as instructor of approach control radar. He is a private airplane pilot and has obtained, among others, the Military Silver Medal, and the Military Medal Bartolomeu de Gusmão.

Abstract: This presentation provides an overview of the regional activities in the field of UAS and how to ensure safe operations in the ATS system. It also addresses regional coordination between States and other stakeholders relative to UAS operations during natural disaster events. It finally explains the future challenges of inserting UAS into the ATM system.

10.30 - 10.45 Panel Discussion
10.45 - 11.30 Coffee & Refreshment Break

Session 2 Standards

04 11.30 - 12.00 Current status of work in the field of UAS-related standards in the USA
John Walker, The Padina Group (on behalf of RTCA SC203), USA

Bio data: John has over 47 years of aviation experience in a career rich in air traffic control, airspace management, flight navigation and airport development skills. John's aviation career includes 34 years with the United States Federal Aviation Administration (FAA) as well as four years served in the United States Air Force. His last Senior Executive Service assignment was served as the FAA's Program Director of Airspace Management. In this position John was responsible for the management of all civil airspace within the United States. He also provided leadership for initiating the FAA's National Airspace Redesign program, intended to transform both integration and design of America's airspace for space based operations. Prior to his assignment in Washington, DC, John was the FAA's Air Traffic Division Manager in New York City, responsible for all air traffic operations in the Northeast Corridor. John believes that our global airspace is one of the last un-tapped resources remaining in the world today and is dedicated to further his vision and passion for modernizing global airspace use. John is the co-chairperson of RTCA Special Committee 203, developing industry recommended performance standards for Unmanned Aircraft Systems (UAS). He also serves on the ICAO UAS Study Team in Montreal, Canada. He resides in Lancaster County, Pennsylvania, USA with his wife Darlene and two children, Elisabeth and Andrew.

Abstract: Establishing harmonized standards for Unmanned Aircraft Systems that will ensure routine access to global airspace is of great importance for the safe integration with manned aircraft. RTCA Special Committee is committed to this goal and has established a close working relationship with other standards organizations including EUROCAE and the ICAO UAS Study Group. This presentation will describe how RTCA has established a methodical process in developing Minimum Aviation System Performance Standards (MASPS) for Unmanned Aircraft Systems.

05 12.00 - 12.30 Current status of work in the field of UAS-related standards in Europe
Tore Kallevig, AVINOR (on behalf of EUROCAE WG73), Norway

Bio data: Tore B. Kallevig (36) works for Avinor, the Norwegian Air Navigation Service Provider. He started out his career as Officer in the Royal Norwegian Navy, but in 1994 aviation caught his interest and he started in Luftfartsverket (now Avinor). After completing his ATCO training at Serco IAL, Bailbrook College, Bath, England in 1996 he worked both Tower and Approach Control in several parts of Norway. Since 1997 he has worked Area Control, and for the last six years, he held the position as Chief Air Traffic Controller at Stavanger Air Traffic Control Centre in the south western part of Norway. Mr. Kallevig was also responsible for the operational implementation of a new automated radar control system for 8 ATS units in 2004, as well as the training of relevant operational staff. Amongst other positions he held, he has also been the Centre's Head of Training and Procedures Specialist. Mr. Kallevig is the newly elected chairman of EUROCAE Workgroup 73 UAS, and he is also representing Avinor in the NEAP project NEFAB. NEFAB is the North European Functional Airspace Block with member states Denmark, Estonia, Finland, Iceland, Latvia, Norway and Sweden. NEFAB is organised under the umbrella of North European ANS Providers (NEAP) and is one of the improvement initiatives in the NEAP ATM Master Plan. Mr. Kallevig is a member (observer) of the UVS International Board of Directors.

Abstract: One might say that the UAS Standards Development for some time now has moved forward at a slow although firm pace, just like a glacier. In the wake of the now published Concept Document (Deliverable 3), which identifies the main topics and the possible conceptual ways to address them, the past year's activities were mostly dedicated to defining and agreeing on realistic and affordable medium term WG73 objectives to establish the corresponding Work Plan and to organize and start the related tasks. Transatlantic discussions with RTCA Special Committee 203 leadership team (the US WG73 counterpart) helped defining a common global perspective, thus establishing further cooperative and collaborative activities in order to maintain progress and to enhance harmonization of outputs of the two standards groups. Discussions also took place

during the last year to identify the most efficient way to progress towards recommendations and standards for Visual Line Of Sight (VLOS) flight operations with an 'external pilot' controlling the unmanned aircraft using his own eyes, taking into account the request from the European Commission to consider establishing a separate group working on small UAS. Indeed VLOS operations with small UAS are identified as a short term promising market.

12.30 - 12.40 Panel Discussion
12.40 - 14.00 Lunch

Session 3 Standards

06 14.00 - 14.30 Defining standards for Light RPAS
Peter van Blyenburgh, UVS International

Bio data: Peter van Blyenburgh, a Dutch national residing in Paris, France, was born in The Netherlands ('48), educated in Canada, the Netherlands Antilles and The Netherlands, studied in Switzerland (Business Administration) and has held various management positions with a number of industrial and service supplying corporations in the USA, Europe and the Middle East. He has been involved with unmanned systems since 1987 and has supplied advisory services in this field to corporate and/or governmental entities in Europe, the Middle East, the Far East and North America. In 1995 he instigated, and in 1997 founded, EURO UVS, which changed its name to UVS International in January 2004; he is currently in his 8th two-year term as president of this internationally operating non-profit association registered in Den Haag, The Netherlands, which deploys its activities out of offices in Paris, France and is dedicated to the promotion of unmanned systems.
He is the founder and chief executive of Blyenburgh & Co (B&C), a company registered in Paris, France, to which the UVS International Board of Directors has contractually entrusted the association's administration, as well as the organization of its unmanned system-related conferences, symposia and workshops. He is the editor and publisher of the internationally recognized annual UAS yearbook (UAS: The global Perspective), and co-founder of and contributing editor to UAS Vision, a free daily electronic information service totally dedicated to international UAS-related information. He is member of the European Commission UAS Panel, an active participant in several UAS-related international working groups, including the ICAO UAS Study Group, the ICAO Civil/Military ATC Coordination Initiative Team, and the International Coordination Council. He is honorary member of the European Group of Institutes of Navigation (EUGIN), The European Institute, Washington, DC, USA, UAS Norway, UVS France, and a member of the Air Traffic Control Association (ATCA) & RTCA SC203, USA.

Abstract: This presentation will give an overview of the budding working group on Light RPAS, its structure, objectives & desired deliverables, participation & membership, work packages & expected time lines, work methodology and how the work method has been specifically adapted to small & medium sized enterprises and industries (SMEs/SMIs), external consultation, information flow. An explanation will be given on how interested companies and organizations in Latin America can contribute, and the benefits they can reep by doing so.

07 14.30 - 15.00 NASA's UAS Integration in the National Airspace System Project
John Walker, The Padina Group (on behalf of NASA), USA

Bio data: John has over 47 years of aviation experience in a career rich in air traffic control, airspace management, flight navigation and airport development skills. John's aviation career includes 34 years with the United States Federal Aviation Administration (FAA) as well as four years served in the United States Air Force. His last Senior Executive Service assignment was served as the FAA's Program Director of Airspace Management. In this position John was responsible for the management of all civil airspace within the United States. He also provided leadership for initiating the FAA's National Airspace Redesign program, intended to transform both integration and design of America's airspace for space based operations. Prior to his assignment in Washington, DC, John was the FAA's Air Traffic Division Manager in New York City, responsible for all air traffic operations in the Northeast Corridor. John believes that our global airspace is one of the last un-tapped resources remaining in the world today and is dedicated to further his vision and passion for modernizing global airspace use. John is the co-chairperson of RTCA Special Committee 203, developing industry recommended performance standards for Unmanned Aircraft Systems (UAS). He also serves on the ICAO UAS Study Team in Montreal, Canada. He resides in Lancaster County, Pennsylvania, USA with his wife Darlene and two children, Elisabeth and Andrew.

Abstract: This presentation will discuss NASA's Unmanned Aircraft System Project. The project is intended to provide technical data that will assist decision makers in eliminating some key barriers to routine access to national airspace in the United States. The project will be focusing in four areas; Separation Assurance/Sense and Avoid, Communications, Certification, and Human Systems Interaction. The specific areas of emphasis within each of these broad areas will be identified. The objective of the project is to validate progress in each

of these areas through flight demonstrations. This project is being conducted in close cooperation with the Federal Aviation Administration and the standards organization RTCA.

15.00 - 15.10 **Panel Discussion**
15.10 - 16.55 **Coffee & Refreshment Break**

Session 4 Standards

08 16.55 - 16.25 **European approach to UAS Integration**
Mike Lissone, UAS ATM Integration Manager, Eurocontrol, Belgium

Bio data: Mike Lissone was with the Netherlands Air Force from 1979 to 1999. From 1999 to 2004 he was employed by a UK based Consultancy Company (Stasys) in where he was involved in several studies regarding sense and avoid requirements and provided expertise to UK industry bodies regarding UAS. He also ran several projects under the 6th Framework (MA-AFAS) regarding New Airspace and Navigation applications. In 2001 he joined Eurocontrol as a senior Navigation and Airspace specialist responsible for P-RNAV implementation in ECAC. He also was responsible for validating Navigation applications (concept development, training and project management). In 2004 Mike joined Eurocontrol as an ATM Instructor at the Institute in Luxemburg. Specialties: AIS, Airspace, NAV, Controller tools, Future concepts. In 2006 Mike returned to Brussels HQ to join the Navigation Domain. He continued to run the P-RNAV programme and took charge of the TMA 2010+ project (advanced arrival manager concept supported by P-RNAV). Mike was also responsible for several Airspace design projects with Eurocontrol member States. Last project was P-RNAV Implementation in Warsaw 2009. Mike was co-developer of the PBN Airspace Concept workshop that has been held in 4 locations around the world on behalf of ICAO. Mike was also one of the presenters. Currently Mike is the UAS ATM Integration manger for Eurocontrol and continues to provide his support to Airspace design projects (TMA) and A-RNP specification validation.

Abstract: This presentation provides an overview of Eurocontrol activities and mission statement in relationship to UAS. It clarifies how the UAS activity is integrated into the five business objectives; Safety, Capacity, Efficiency, Security and Environment. It shows what activities have been undertaken and are still ongoing to ensure a transparent and safe integration into the present and future ATM environment. The presentation addresses how Eurocontrol is coordinating the present integration support to States and how the UAS activity is coordinated with other international bodies to ensure a harmonized global approach. Finally the way forward is explained in where Eurocontrol's commitment to UAS ATM integration is set.

09 16.25 - 16.55 **JARUS: Light UAS International Regulation Harmonization - An Introduction**
Roberto José Silveiro Honorato, ANAC, Brazil (on behalf of JARUS)

Bio data: Roberto Honorato is manager of Airworthiness Standards and Process (GTPN) for ANAC - the Brazilian Civil Aviation Agency. The GTPN is responsible for the development of requirements, guideline material, international agreements and procedures related with airworthiness. He holds degrees in Electronic and Telecommunications engineer and is a post-graduate in Civil Aviation Management. Before joining ANAC, he worked for ten years with avionics, maintenance and supplemental type certification. He has been actively involved in UAS rulemaking in Brazil.

Abstract: This paper describes the efforts of National Aviation Authorities in defining a harmonised set of airworthiness, operational and airspace requirements for (Light) UAS. The CAA of The Netherlands initiated an international coordination group called JARUS (Joint Authorities for Rulemaking on Unmanned Systems). This group intends to discuss and harmonise the requirements and limitations for Light UAS certification and operation. The output of the panel will consist of a single set of draft airworthiness, operational and airspace requirements accepted by a significant number of European NAAs, as well as EASA and Eurocontrol. At the same time, an effort is being made to harmonise the requirements with a number of non-European Union countries such as the Australia, Brazil, Canada, South Africa and the US. In the first years of operation, the group has drafted documents on system safety requirements, flight crew licensing requirements and certification specifications for light unmanned rotorcraft systems. During the presentation a short overview of the organisational structure of the group, the draft airworthiness documents delivered and the remaining work schedule will be presented. It is intended to attract the attention of Latin America CAAs to join this group.

10 16.55 - 17.25 **Defining non-military RPAS strategy: The European Approach**
Peter van Blyenburgh, UVS International

Bio data: Peter van Blyenburgh, a Dutch national residing in Paris, France, was born in The Netherlands ('48), educated in Canada, the Netherlands Antilles and The Netherlands, studied in Switzerland (Business Administration) and has held various management positions with a number of industrial and service supplying corporations

in the USA, Europe and the Middle East. He has been involved with unmanned systems since 1987 and has supplied advisory services in this field to corporate and/or governmental entities in Europe, the Middle East, the Far East and North America. In 1995 he instigated, and in 1997 founded, EURO UVS, which changed its name to UVS International in January 2004; he is currently in his 8th two-year term as president of this internationally operating non-profit association registered in Den Haag, The Netherlands, which deploys its activities out of offices in Paris, France and is dedicated to the promotion of unmanned systems.
He is the founder and chief executive of Blyenburgh & Co (B&C), a company registered in Paris, France, to which the UVS International Board of Directors has contractually entrusted the association's administration, as well as the organization of its unmanned system-related conferences, symposia and workshops. He is the editor and publisher of the internationally recognized annual UAS yearbook (UAS: The global Perspective), and co-founder of and contributing editor to UAS Vision, a free daily electronic information service totally dedicated to international UAS-related information. He is member of the European Commission UAS Panel, an active participant in several UAS-related international working groups, including the ICAO UAS Study Group, the ICAO Civil/Military ATC Coordination Initiative Team, and the International Coordination Council. He is honorary member of the European Group of Institutes of Navigation (EUGIN), The European Institute, Washington, DC, USA, UAS Norway, UVS France, and a member of the Air Traffic Control Association (ATCA) & RTCA SC203, USA.

Abstract: This presentation will give an overview of the current Light RPA (<150 kg) market, as well as current & future non-military Light RPA applications. The presentation will highlight the regulatory problems being encountered and the required international co-ordination & co-operation relative to taking the necessary steps to insert UAS into non-segregated airspace, as well as the work ongoing in this area in Europe. It will focus on the opportunities this situation brings with it, in particular for Light RPA for non-military applications, and will give an overview of the European approach to regulating non-military RPA.

17.25 - 17.40 Panel Discussion

DAY 2 - Thursday 19 April 2012

Session 5 National UAS Regulations

11 09.00 - 09.30 Brazilian airworthiness regulation perspectives on UAS
Roberto José Silveiro Honorato, ANAC - National Civil Aviation Agency - Brazil Airworthiness Standards and Process Manager

Bio data: Roberto Honorato is manager of Airworthiness Standards and Process (GTPN) for ANAC - the Brazilian Civil Aviation Agency. The GTPN is responsible for the development of requirements, guideline material, international agreements and procedures related with airworthiness. He holds degrees in Electronic and Telecommunications engineer and is a post-graduate in Civil Aviation Management. Before joining ANAC, he worked for ten years with avionics, maintenance and supplemental type certification. He has been actively involved in UAS rulemaking in Brazil.

Abstract: As in most countries, in Brazil in accordance with national law, every airplane must have an Airworthiness Certificate (CofA) in order access the airspace. Type certification is one of the requirements to issue a CofA. The safety requirements regarding the emission of the type certificate (TC) and the CofA are established based on the Regulamentos Brasileiros de Aviação Civil - RBAC. The current regulation isn't ready to adequately deal with UAS airworthiness certification. In terms of regulation and permissions ANAC's airworthiness team has considered three stages. The first, addressing experimental purposes (research and development) is possible due to requirements already existent. The second stage, in which a Special RBAC will be proposed, the UAS operation will take place under a special permit to fly. The third (long term) stage is to consider the issue of requirements for UAS type certification, harmonized with international standards. This presentation explores how ANAC's team has handled UAS airworthiness subject.

12 09.30 - 10.00 RPA Regulation in Brazil
Cristiano Bichara Leal, Gerente Técnico de la Aviación General - ANAC, Brasil
Wanthuyr José Zanotti Filho - Civil aviation specialist - ANAC, Brazil

Bio data 1: Cristiano Bichara Leal, graduated in Aeronautical Sciences from the University of Veiga de Almeida, Tijuca, Rio de Janeiro, Brazil. He has a post graduate higher education diploma from the University of Estácio de Sá, Rio de Janeiro, Brazil. He works in the Civil Aviation field since 1998, initiating as air traffic controller (trained by the Brazilian Air Force). He works as operations instructor in the airports of Marte y Congonhas (São Paulo) and Galeão (Rio de Janeiro International Airport). In 2008 he joined the ANAC as operations inspector, and since 2010 he holds the position of General Aviation Technical Manager, applying the continuous oversight to operators RBHA 91 (LAR 91) and RBHA 135 (LAR 135).

Bio data 2: Wanthuyr José Zanotti Filho, a Brazilian national, holds the position of civil aviation regulation specialist at ANAC-Brazil since 2007, acting as civil aviation inspector. Prior to that, he had worked for the Civil Aviation Department, former civil aviation authority. Since his childhood Wanthuyr has always been an aviation enthusiast and, in 1999, he became an air sport pilot, flying ultra-light aircraft, performing a couple of years later as a flight instructor. Furthermore, since 1992 he is an active flight simulator user, also a founding-member of 'AERO Virtual', the largest reference on the Web, for many years, for the flight simulation community in Brazil. His interests nowadays mainly include aviation safety, training and operations of jetliners.

Abstract: The technological development of control electronic equipment, including remote control, gave space to the development of remotely controlled aircrafts, capable of flying the same range of distance and altitude than commercial airlines in their flights for passenger's transportation or cargo.
The International Civil Aviation Organization – ICAO, worried by the operational safety of this aircrafts and their influence in the commercial airspace around the world, formed a working group, in which Brazil participates, with the purpose of establishing operational limits and requirements to warranty the operational safety of private and commercial aircrafts. However, the ICAO working group considered that, due to its complexity, the elaboration of any proposal related to the operation of these devices should be issued after 2014. However, the Federal Police of Brazil has purchased remotely controlled aircrafts for their public security operations, and has expressed to ANAC and to the Department of Airspace Control – DECEA the same concern of establishing the necessary requirements to ensure operational safety.
In a joint effort, ANAC, Federal Police and DECEA presented a draft text for RPA regulation in Brazil, including the definition of new concepts and requirements for these aircrafts, based on the situation of Brazil. Considering that the Federal Police is the only organism in Brazil with experience on this kind of operations, and recognizing the need to establish specific requirements for the operation of this kind or aircrafts as stated by the ICAO working group, ANAC's standard proposal is to, first, satisfy the needs of existing UAS operators (Federal Police) and then benefit future UAS operators. This proposal will be based on international recommendations and will be addressed to all commercial and private UAS operators in Brazil.
Brazil's presentation, within this context, will offer a brief recount of the reasons for elaborating RPA regulations, the process for the elaboration of the RPA regulations, and the general process for the approval of civil aviation standards by the ANAC. In this sequence, the Federal Police of Brazil certification process will be presented as well as the perspective of RPA regulation in Brazil.

13 10.00 - 10.30 Unmanned aircraft Systems Access to Brazilian airspace
Jerônimo Inácio Nunes, DECEA, Brazil

Bio data: Captain Jerônimo Inácio is a 46 years old Brazilian who works as Air Traffic Controller, in Brazilian Air Force, since 1984 and has also large experience concerning Air Defense, AWACS and Rules of the Air. At this moment he is in charge of Brasilia Area Control Center (ACC-BS), one of the most busy air traffic control agencies in South America. Captain Jerônimo Inácio has attended to several events related to UAV since 2010 as a DECEA (Department of Airspace Control) representative and is one of the specialists responsible for writing the rules concerning to UAV operations in the Brazilian Air Space.

Abstract: This presentation will be an opportunity to outline the legal and operational structure, which supports the operational employ of civil and military UAS in Brazil. The speaker will also list the advances concerning to the growth of the UAS industry and the needs the country still demands towards specific legislation which intends to facilitate the safe access of UAS into the national controlled air space. Cooperation with other nations in tasks related to UAS will be also one of the topics briefly mentioned during the presentation.

10.30 - 10.45 Panel Discussion
10.45 - 11.15 Coffee & Refreshment Break

Session 6 National UAS Regulations

14 11.15 - 11.45 RPAS regulatory matters in South Africa - Development & Challenges
Albert Velaphi Msithini, Civil Aviation Authority, South Africa

Bio data: Joined the South African Civil Aviation Authority (SACAA) in October 1998 as an airworthiness inspector (specializing in avionics, electrical and instruments). Activities include conducting routine and ad hoc inspections and audits in the various local and international organizations and their operators. Aircraft inspections and audits – modifications installation, dedicated test and calibration laboratories for various avionic, electrical and instrument equipment. Other duties included reviewing and amending legislations and applicable technical standards. Through growth and development within the SACAA, went up from inspector, senior inspector, principal inspector and eventually ended in the position of Manager – Technical Audits in the airworthiness division from 2005 to 2008. From 2008 to 2010 June was doing training duty – as manager technical training. This involved research and training newly recruited inspector on the SACAA

policies and procedures and various engineering skills. Participated briefly as project leader for the SACAA 2009/2010 decentralization project to Cape Town and then joined the newly formed Unmanned Aircraft Systems Programme Office (UASPO) in July 2010 as a specialist. Currently holding the post of Manager Unmanned Aircraft Systems. Prior to joining the SACAA worked as hangar and line maintenance engineer, specializing in avionics, electrical and instruments, including flight engineer duties. Held various positions at various organizations outside South Africa thus; Avionic foreman/supervisor, chief inspector and engineering manager. Trained, type-rated and worked on various old & new generation aircraft from DC3/C47, Vickers Viscount, B707/720, F28 and F100. Total aviation experience will be 32 years in July 2012.

Abstract: This presentation will address the on-going activities within the SACAA to amend, develop a regulatory framework that will allow the integration of remotely piloted aircraft into civil airspace. South Africa has been highly successful in the development and application of remotely piloted aircraft systems for military operations. In recent years demand for their use for civil operations has increased steadily. South Africa, for example, is one of the first countries that has successfully used remotely piloted aircraft systems for civilian missions such as monitoring the 1994 Democratic Elections using the Seeker II. This is one reason that led to the SACAA developing a dedicated unit in the certification engineering division – Aircraft Safety, namely the Unmanned Aircraft Systems Programme Office (UASPO) in 2008. This office has been tasked with all activities pertaining to remotely piloted aircraft systems in South Africa and world developments. The objective/aim and focus is to review/amend existing laws & technical standards in consultation with stakeholders, developing interim technical guidance material, formulating RPAS policy, participating at international forums, conducting regular industry consultation forums. This process is on-going despite the fact that due to internal challenges at the agency, there has been no real movement until early this year where the first seminar was held with industry. This will ensure the Authority's mission of promoting and maintaining the highest standards of safety, security and environmental protection in the Republic is maintained allowing the gradual evolution of RPAS.

15 11.45 - 12.15 Unmanned Aircraft Systems Regulatory Development in Australia
Jim Coyne, Civil Aviation Safety Authority (CASA), Australia

Bio data: Jim has a depth of experience in aviation technology, particularly in unmanned aircraft systems. Jim holds a Bachelor of Engineering in Electronics and Communications from the Queensland University of Technology, Australia and a Master of Science in Aerosystems Engineering from Loughborough University of Technology, UK. Jim has spent the past 20 years with the Civil Aviation Safety Authority commencing as an airworthiness engineer and later as the Section Head of Aircraft Systems and New Technologies in the Airworthiness Branch. He commenced working with unmanned aircraft systems in 2005. Jim took up his appointment as the manager of the Future Technology and Regulatory Trends Branch in mid-2009, where one of his roles is to ensure CASA looks proactively into what is ahead for aviation. This 'future' function will anticipate the impact of new technologies and approaches to safety regulation on CASA and the Australian aviation industry. Unmanned aircraft systems are a key new technology coming into this category and are therefore a current focus for Jim. Jim is also the Chair of the International Civil Aviation Organization Unmanned Aircraft Systems Study Group, having taken up that position in February 2010.

Abstract: The Civil Aviation Safety Authority (CASA) is a world leader in UAS having published the first set of operational regulations in the world in 2002, i.e., Civil Aviation Safety Regulation (CASR) Part 101, "Unmanned Aircraft and Rocket Operations". While these regulations have in the past provided the framework under which all classes of UAS can be operated in Australian airspace, the advances in technology and the rapid increase in activity levels have shown them to be outdated. Consequently, CASA has established a project to review these regulations and to provide more comprehensive guidance to Industry on the regulatory requirements and approval processes for commercial operations of UAS in Australia. The guidance will consider the long term integration of UAS into normal aviation operations in all classes of airspace. The project is being undertaken in two phases. Phase 1 will involve the development of a suite of guidance material aimed at operators, remote pilots, manufacturers and maintainers of UAS in the operation, construction and maintenance of UAS and the means whereby they may be safely and legally operated. Phase 2 will consist of a review and where necessary amendment of CASR Part 101. The Regulations will have to include issues relating to the maintenance and manufacture of UAS, licensing, security, and the use of airspace. Industry and public education relating to risk management of UAS within the aviation and the general community will be imperative to ensure that everyone understands the safety issues relating to UAS operations.

12.15 - 12.25 Panel Discussion
12.25 - 14.00 Lunch

Session Chairs:
Marcelo Ureña, ICAO & Peter van Blyenburgh, UVS International

Session 7 National UAS Regulations

16 14.00 - 14.30 Lighter-than-Air Unmanned Aircraft Systems - Civil and military applications
Crnl. Fredy Robles & Capt. Jara Olmedo Anibal Lenin, Air Force, Ecuador

Bio data 1: Crnl. Fredy Robles is an Intelligence Officer of the Ecuadorian Air Force with rank of Technical Staff Colonel, his basic academic education is Geographical Engineering, with Master in Intelligence Development; High Technical Studies in Remote-detection, Remote sensors, Geographical Information Systems, Satellite Images Processing. He has performed as Project Officer in the Aerospace Development Direction of the FAE and as part of the CLIRSEN Special Investigations Team. His principal research interests are addressed to Unmanned Air Platforms, Defense Remote Sensing and Remote Detecting in the airspace.

Bio data 2: Capt. Jara Olmedo is an Electronics Officer of the Ecuadorian Air Force with Rank of Technical Captain; his academic education is Engineer in Electronics and Telecommunications, with Master degree in Engineering in Telecommunications of the University of York, UK. He works in the Research and Development Centre of the FAE as researcher in the areas of Telecommunications, Sensors and Maincomputer; he has participated in different projects, such as the Ray Project and the Modernization of T-34 aircraft, presently in Unmanned Aircrafts. His principal interests are addressed to the research line of unmanned air platforms, data links, communications relay, antennas and sensors.

Abstract: Since 2008, the State of Ecuador is making incursions into technological research of Unmanned Airships, with the support of the High Education, Science, Technology and Innovation National Secretariat, the Air Force, universities and public institutions. The objective of this entrepreneurship is the development of a lighter-than-the-air unmanned air platform, which should have the capacity of developing applications in the areas of telecommunications and earth observation with the purpose of supporting the country's development, risk management and defense. One of the major achievements of this project has been the creation of synergy among civil and military institutions with one only purpose: to overcome the technological challenges presented in the project development. The issue of lighter-than-the-air aircrafts is not new; however, during the last years the interest of important international corporations for this aircrafts has been increasing. New perspectives, such as persistence and autonomy, make these platforms very important for different uses of human daily work. The market of this type of aircrafts, however, is still at the expectative of the first results to be obtained from the validation of their operation, presently under development by CIDFAE. Regarding the military market, envisioned to the future, this is presently projected towards the support systems for the procurement of information for military use, through platforms equipped with different types of sensors covering the ample electromagnetic range, which constitutes an important tool for operations planning and decision making. However, culture for traditional weapon systems heavier than the air, supports skepticism. Results obtained by the civil use of this aircrafts, visualized in costs, will provide in the near future for the opening to the operation of these air devices.

17 14.30 - 15.00 Legal regime for the use of UAS
Com. Carlos Walter Agostinelli, Air Force, Argentina

Bio data: Commodore Carlos Walter Agostinelli is a lawyer. He is the Director of the National Institute of Aeronautical and Aerospace Law and, for several years, he has been the Project Chief for UAS use legislation development.

Abstract: The purpose of this lecture is to present the first conclusions of the research being developed by the National Institute of Aeronautical and Aerospace Law on the UAS use legislation. In this regard, applications presently under operation in the following fields have been taken into account: public safety; coast and borders surveillance; monitoring of vehicles and road transit; evaluation of major transit accidents; search and rescue at sea and mountains; support to civil protection activities; damage control in humanitarian disasters (flows, tsunamis, earthquakes, hurricanes, etc.); agriculture and environment; support to large controlled burns; monitoring of crops and pests; early warning systems for frosts, storms and floods detection; surveillance and monitoring of fire; damage control in accidents and/or environmental disasters; aquifers surveillance; atmospheric studies; airfield easements surveillance; inspection of high voltage power lines, mobile communications and Internet: operating as communications nodes or HUB´s relieving or complementing satellite networks; houses and premises monitoring: security companies. The research also covers aeronautical capabilities and certifications, necessary for the use of UAS. Problems such as air circulation and controlled air space embedded devices are specially tackled. Likewise, other issues as UAS denomination and nature of activities and application are treated. Last, the unmanned air vehicles operator legal frame is explained.

15.00 - 15.10 Panel Discussion
15.10 - 16.00 Coffee & Refreshment Break

Session Chairs:
Marcelo Ureña, ICAO & Peter van Blyenburgh, UVS International

Session 8 National UAS Regulations

18 16.00 - 16.30 DAN 151 – Requirements for the operation of remotely piloted aircraft systems (RPAS)
Wladimir Fernandez, DGAC, Chile

Bio data: Wladimir was born in San Felipe, Chile, in 1949. Education: High School degree in Biology from the San Felipe and Los Andes Lyceum, (1966). Languages: English command and French and Portuguese basic knowledge. Technical Studies: Architecture Technical Drawer from the Architecture Faculty of the University of Chile; and Soil Mechanics Lab Technician, Roads Technical School of the Ministry of Public Works. University Studies: Bachelor of Arts in Psychology, University of Arts, Sciences and Communications; and Law Studies, University of the Republic (not concluded). Diplomas: Adults Neuropsychology and Neuropsychiatry, the Catholic University of Chile and the University of Chile (2010). Clinical Interventions, UNIACC University (2009). Security and Defence, ANEPE (National Academy of Political and Strategic Studies) (1985). Postgraduate: Master in Educational Psychology, University of Development UDD (2011). Other Specializations: From the Air Force of Chile: Official War Pilot (1968-1975) with Specialization in Aero-photogrammetry. From the Directorate General of Civil Aeronautics: Air Operations Inspector Pilot (Since 1975) and Researcher of Aviation Accidents. As Pilot in Command: PIC with a total of 8.735 flying hours. As Sport Pilot: Free Balloon Pilot, Ultra-light Pilot, Gliding Pilot, Sport Parachutist (232 jumps). As Flight Instructor in Conventional Airplanes and Turbo Propellers: Instruments Flight Instructors (IVI), with a total of 4.170 hours as instructor. Aeronautical Licenses: Pilot of Transportation Airline Nº 345, Commercial Pilot Nº 654, Private Pilot Nº 5923, Mechanic of Aircraft Maintenance (up to 12.500 lbs.), Flight Engineer of Boeing 727, Free Balloon Pilot, Sport Parachutist No. 37. Wladimir has 32 years working in the DGAC of Chile, as Chief of Flights Standards Department, Chief of NAVAIDs Flight Inspections Department, DGAC Antarctic Coordinator and Aviation Medicine Section Psychologist. Presently, he is the Operations Standards Analyst of the Standards Section of DSO, DGAC Chile.

Abstract: Background: What is a Remotely Piloted Aircraft (RPA)? (Video, 5 min. duration) Standard definitions and application. General Regulation: General aspects of aircraft categories, and their use scope, operations certification and supervision requirements. Use limitations: General and operative. Flight operations: Operational control aspects in national and international operations. Services and facilities for operations. Demand for operations manual. Obligations of a remote pilot in command and crew. Composition of a remote crew. International airspace operations. RPA operations under IFR conditions and regulations to be applied to IFR RPAS flights. Regulations to be applied to RPA IFP flights within controlled airspace. Instrumental procedures. Alternative aerodromes. Approval for the autonomous mode use. Access to flight controls, Sense-and-avoid procedures. Requirements for long distance RPA flights. Requirements for commercial operations. Flight minimum altitudes and aerodrome utilization minima. Fuel and oil registration. Flights preparation. Meteorological conditions and fuel and oil stock. Procedures during the flight and flight hazard conditions. Collision prevention. Nationality and enrolment marks: Classification of aircrafts, markings positioning. Special cases of remotely piloted air systems. Marks size, identification plate, aircraft enrolment, enrolment cancelation and removal of markings. Instruments, equipment and remote piloting stations. Detect and avoid equipment, control and command system. RPA communications equipment. Operations communications and navigation requirement for RPA operations in controlled airspace. RPAs communications in IFR flights. RPAs communications in VFR flights under VLOS conditions. Airworthiness requirements: Airworthiness certification and maintenance. Operations personnel licence requirements. Physical and mental medical demands for flight personnel. Instruction requirements in human factors (RCMR). Qualifications and suitability of the remote pilot. Aerodromes requirements. Aerodromes procedures responsibilities. Accidents and incidents: RPAS accidents investigation conditions. Meteorological planning responsibility. Meteorological information procurement. Routing meteorological conditions reports and trail turbulence precautions. Search and rescue: Coordination of executing units (non dependant of the DGAC) and operators own means. RPA personnel licences: Licences new modality.

19 16.30 - 17.00 Ground-based Detect & Avoid: Experience & lessons learned
Mike Lissone, Eurocontrol, Belgium (on behalf of Skyguide, Switzerland)

Bio data: Mike Lissone was with the Netherlands Air Force from 1979 to 1999. From 1999 to 2004 he was employed by a UK based Consultancy Company (Stasys) in where he was involved in several studies regarding sense and avoid requirements and provided expertise to UK industry bodies regarding UAS. He also ran several projects under the 6th Framework (MA-AFAS) regarding New Airspace and Navigation applications. In 2001 he joined Eurocontrol as a senior Navigation and Airspace specialist responsible for P-RNAV implementation in ECAC. He also was responsible for validating Navigation applications (concept development, training and project management). In 2004 Mike joined Eurocontrol as an ATM Instructor at the Institute in Luxemburg. Specialties: AIS, Airspace, NAV, Controller tools, Future concepts. In 2006 Mike returned to Brussels HQ to join the Navigation Domain. He continued to run the P-RNAV programme and took charge of the TMA

2010+ project (advanced arrival manager concept supported by P-RNAV). Mike was also responsible for several Airspace design projects with Eurocontrol member States. Last project was P-RNAV Implementation in Warsaw 2009. Mike was co-developer of the PBN Airspace Concept workshop that has been held in 4 locations around the world on behalf of ICAO. Mike is also one of the presenters. At present Mike is the UAS ATM Integration manger for Eurocontrol and continues to provide his support to Airspace design projects (TMA) and A-RNP specification validation.

Abstract: Civil - Military integration: Skyguide completes its first decade. It was on 18 August 1999 that Swiss ministers of defence and transport resolved to integrate Switzerland's civil and military air navigation services into a single organisation. Switzerland became the first country in Europe to entrust all its air traffic management - including the tactical command of its military jets - to a company organized under private law. In its first ten years, skyguide has invested substantially in expanding the existing capacity; and, as a result, the company has reduced the numbers of delays attributable to air traffic management by a sizeable 80%.
Since 2002, skyguide and the Swiss Air Force have enshrined their collaboration in a bilateral services agreement which is revised and adapted each year. The approach has proved its worth, providing both greater cost transparency and a better appreciation of the quality of the services provided. The close collaboration between Switzerland's civil and military air navigation services has also proved its worth, enabling various airspace protection missions to be flown smoothly and without incident every year (during the Davos World Economic Forum, for instance) and as and when required (such as during the 2008 European Soccer Championships, the G-8 summit in Geneva or the Francophonie Summit in Montreux).
Some of the following questions are going to be answered during the presentation:
- What has the integration brought to airspace users & what is the most significant outcome of the integration?
- How has the integration changed the relationships between civil and military air traffic controllers and what was the impact on the overall relations between the Swiss Air Force and the air navigation services?
- Has the integration being completed or, if it is to go further, where will the building sites be in the future?

UAS operations in Switzerland: Switzerland is currently in the process of integrating the Swiss Air Force RPA «RANGER» into unsegregated civil airspace class C and D. Operational deployment is foreseen for early summer 2012, even though the national air navigation service provider Skyguide is faced with multi-faceted challenges in this endeavour. Skyguide's focus is obviously on safety and identifying any risks associated with the operation of RPA in unsegregated airspace. The key factor, as in any large scale RPA operation, is the lack of a sufficient sense-and-avoid-capability of the airborne component and the associated contingency procedures in case of a data link failure. The development of robust and yet straightforward rules is greatly facilitated by employing JAR-CPL/ATPL certified pilots and the Ranger's sophisticated equipment, e.g. double data link, Mode S Transponder, parachute recovery system and a fully recognized air picture fed by civil/military primary/secondary radar sites. Skyguide is also providing familiarization training for the air traffic control officers, which includes on-site visits to the Swiss Air Force RPA Squadron to gain hands-on experience in the daily operation of the Ranger. Given the long-standing excellent cooperation with its military partner and the profound experience in providing ATS-Service to unmanned aircraft, Skyguide is confident to push for the most significant step in safe and efficient RPA operations in unsegregated airspace.

20 17.00 - 17.30 Performance-based navigation for UAS
Eduardo Carrillo, Boeing Research & Technology Europe, Spain

Bio data: Eduardo is the Boeing Research & Technology Europe (BR&TE) Business Development Deputy Director. In this position, he is responsible for identifying business opportunities for the center in Europe. Developing solid and long term relations with the main stakeholders in Europe within the research arena, is also one of his responsibilities. He has devoted almost all his professional experience to the consultancy business. In 1996, he Joined SIF (Services Improvement), a Spanish consulting firm in the airports and air transport business. In 2002 he joined ALG (Advanced Logistics Group), ALG is one of the top Spanish transport and logistics consulting firms, as a senior manager. In 2004 he joined BR&TE. Eduardo was born in Madrid, Spain. He holds a Bachelor of arts in economics, University Complutense of Madrid, and a Executive MBA, Instituto de Empresa Business School.

Abstract: BR&TE is working in different technologies related to UAS performance and operation. Aircraft intend description language (AIDL) aims to provide an alternative for the automation of air traffic seamlessly applicable to all aircraft operations, including conventional aviation, civil and military UAS, VLJ operations and the futuristic personal air transport systems. BR&TE is working on different applications of this technology in the short term. The integration of fuel cells in UAS is another of our research priorities, as well as Solar-based autonomous H2 refueling systems for UAS.

17.30 - 17.45 Panel Discussion

DAY 3 - Friday 20 April 2012

Session 9 Operations

21 09.00 - 09.30 Policies of the regulation of unmanned aircraft systems (UAS) certification and operation project in Colombia
Andrés Parra, UAEAC, Colombia

Bio data: Academic Education: Engineer in Electronics (Javeriana Pontifical University); Specialist in Aeronautics Administration (Nueva Granada Military University); Avionic Specialist (University of San Buenaventura). Experience and professional profile: Presently he has duties of Air Safety Inspector in the Civil Aviation Authority Safety Secretariat of Colombia, where he is involved in the application and elaboration of regulations and orientation documents related to major alterations and repairs, elaboration of national policy regarding unmanned systems, and in the certification process of national operators for special PBN operations. Andrés has more than 7 years of experience in the aeronautical sector working as university professor and as consultant in engineering issues related to major alterations and repairs certification for civil operators and State aviation.

Abstract: The UAS design implementation is presently a concern of academic institutions and private enterprises around the world and, naturally, in Colombia. Some require the development of procedures and guideline for their elaboration and operation during test flights as part of research trials. The designs are intended to be commercialized for funding purposes. However, presently Colombia does not have regulation nor technical or operative infrastructure that makes possible the certification of this equipment nor their use. Additionally, ICAO in its Cir. 328 A/N190 encourages States to contribute to the elaboration of ICAO policy on UAS. Taking into account the above explained, UAEAC (CAA of Colombia) considers as a priority the need to generate a project to define national policies for the creation of regulation, infrastructure and procedures that can be used as a base for granting an airworthiness certification, as well as for the production and operation of UAS. UAS operations should be as safe as those of crewed aircrafts, especially when this would not represent more hazards for people or goods, in the earth or in the air, than that caused by aircrafts of equivalent class or category. In general, UAS should be managed according to the rules governing the crewed aircrafts flights and satisfying equipment requirements applicable to the class of airspace where the aircraft intends to fly. UAS should be able to comply with the ATC instructions. For this reason, it is necessary to carry out a study, in coordination with universities, state institutions and the private enterprise, to evaluate the viability of creating operations and certification standards for the surveillance and control of these vehicles, in terms of production and operations, which will be projected into a State policy, issue that is the concern of this presentation.

22 09.30 - 10.00 UAS for precision farming and mining applications
Erik de Badts, Aurea Imaging, Argentina

Bio data: Erik de Badts is an engineer from Wageningen University in the Netherlands. Although ecology was his main subject, he redirected his studies towards cartography and GIS at the Polytechnic University of Valencia in Spain, including a thesis on the monitoring of vegetation regeneration after wildfire with remote sensing techniques. Since 2001 he has gathered professional remote sensing experience (1) at the Mexican Conabio public institute on fire management, developing an early-warning tool for wildfires using satellite imagery and being involved in several monitoring projects; (2) at a Belgian GIS company as a project manager for agricultural application projects with the European Joint Research Centre (JRC) and the European Spacy Agency (ESA); (3) and at a Spanish topography company as a manager.
Today, he is active in Belgium and Argentina for Aurea Imaging, being a cofounder of the company. His activity focuses on agricultural and mining applications using different remote sensing data sources. As a manager in the company, he is leading a team of GIS and Remote Sensing analysts and UAS pilots. He has also gathered experience as a UAS pilot and is envolved in UAS operation and maintenance. Combining UAS and remote sensing expertise, he is developing advanced geo-information products for precision farming purposes.

Abstract: The presentation is a portfolio of the Aurea Imaging activities in Latin-America. Aurea Imaging is specialized in the production and analysis of geographic information. We use the GIS and Earth Observation technologies to produce 3 dimensional models and geographic databases in order to analyse our changing environment. Our main application fields are the natural resource management in agriculture, forestry and mining, 3D cartography and 4D modeling. Our solutions use imagery generated by Unmanned Aircraft Systems (UAS), satellite and airborne imagery, field survey data and specialized image processing software and Geographic Information Systems (GIS). For precision farming purposes, the UAS has become a key instrument for the acquisition of sharp remote sensing data when and where necessary. Aurea Imaging is using multispectral and thermal sensors onboard the UAS for the collection of vegetation data. We translate the remote sensing

data into the information that the farmer is needing. As an example, ready to use data are produced for applications such as variable rate spraying, fertilization, biomass monitoring. In the mining sector, Aurea Imaging produces sharp digital elevation models of open pit mines and quarries using UAS. The company was created in April 2008 and is mainly active in Argentina, Belgium, the Netherlands and Spain, but has done projects in other Latin-American and European countries as well.

23 10.00 - 10.30 Small UAS for precision farming
Juan Sainz, IDETEC Unmanned Systems, Chile

Bio data: Juan Sainz is Bachelor of Sciences in Engineering & Industrial Civil Engineer, from the University of Chile. He is Project Manager at IDETEC Unmanned Systems for the Stardust I and II small UAS. He has high teamwork and leadership skills, adaptability to face new circumstances and challenges. He is a qualified external and internal UAS pilot for surveillance missions, meteorological surveys, flight testing (UAS Development Program), including night missions. He has conducted several mission at high altitudes in the Chilean desert (Atacama's Desert). He has knowledge of normal and emergency procedures, FAA regulations and UAS maintenance (piston and electric engines). He is a private pilot with more than 600 hours of flight time, RC pilot for more than 20 years (airplanes and helicopters).

Abstract: Small aerial system is a new and important tool to support precision agriculture processes. Using multispectral images, taken from small unmanned vehicles, is possible to detect problems in crops, like irrigation, fertilization and diseases in early stages of appearance. The complete system to support precision agriculture not only consists in the aerial vehicle and ad-hoc payload. Also, it's required GIS platform and agriculture focused software. It's important to consider user-friendly computer systems and high definition aerial images, like the ICAS (INIA Canopy Analysis System). The advantage in the use of SUAS for precision agriculture has been tested and proven by the INIA (Instituto de Investigaciones Agropecuarias) in Chile. Principal advantages of the system are: High precision IMU+GPS information, High quality multispectral images and Flexible operation. Complete system proposed by INIA include: Small UAS Stardust equipped with Tetracam ADC Lite, Ensomosaic UAS GIS and ICAS. Presentation will include early results of the system, including images with NDVI (Normalized Difference Vegetation Index) and related information.

10.30 - 10.45 Panel Discussion
10.45 - 11.15 Coffee & Refreshment Break

Session 10 Applications & Navigation

24 11.15 - 11.45 MidCas : European detect & avoid study
Johan Pellebergs, Saab (on behalf of MidCas Consortium), Sweden

Bio data: Johan Pellebergs works for Saab in Sweden since 1990 and holds an MSc in Mechanical Engineering. He started his career as a Flight Mechanics engineer working mainly with Gripen development and flight testing. In 1998-1999 he was the Saab Chief Engineer on the X-31 VECTOR collaboration research program on thrust vectoring stationed at Boeing, Long Beach. Since 2000 he has been involved in different collision avoidance projects, starting with the joint Swedish-US Ground Collision Avoidance System (Auto-GCAS) project followed by similarly joint Mid-air Collision Avoidance project (Auto-ACAS) demonstrating last instant collision avoidance capability on fighter aircraft during air combat manoeuvring. This led into a Saab internal Sense & Avoid Technology Demonstration project using non-cooperative sensors to develop and demonstrate detect and avoid capability in collision scenario flight tests. During 2004-2009 he was manager for Aerodynamics and Flight Mechanics department at Saab. He is currently Project Leader for the European MIDCAS project since 2009.

Abstract: MIDCAS (Mid-air Collision Avoidance System) is the European Sense &Avoid program gathering most European groups active on the topic with the purpose to identify and agree adequate technology, contribute to standardization and demonstrate a S&A system for UAS able to fulfill the requirements for traffic separation and collision avoidance in non-segregated airspace. The intention is to demonstrate by actually flying a UAS equipped with a demonstrator S&A system in non-segregated airspace at the end of the project, where the process of approval for such a flight will be one of the contributions to the standardization work.
The project is conducted in close cooperation with European regulatory bodies to provide the technical background for them to establish S&A standards, hence standards and solutions need to progress in parallel. The project uses an incremental design approach and has an interactive dialogue with major stakeholders to inform about the progress of the work and ensure stakeholder feedback which is key to the iterative approach, in close connection with the works of standardization groups like EUROCAE.
The project logic is to a large extent based on the development of a safety case which in turn will be supported by simulations. Data from performed demonstrations and flight tests, both manned and UAS, will be used

to correlate the simulations for confidence. Performing the development and standardization for future S&A technology in parallel is considered a key contribution for integration of manned and unmanned aviation flying routinely in non-segregated airspace.

25 11.45 - 12.15 Views on UAS developments & applications
Kalinka Castelo Branco, University of Sao Paulo, Brazil

Bio data: Kalinka Regina Lucas Jaquie Castelo Branco has a degree in Technology in Data Processing from the Foundation Paulista of Technology and Education (1995), a Master in Computer Science from the University of São Paulo (1999) and a Ph.D. in Computer Science from the University of São Paulo (2004). She is currently an Assistant Professor at the Institute of Mathematics and Computer Science - ICMC - USP, working in the department of Computer Systems. She has experience in Computer Science, with emphasis on Embedded Systems, Distributed Computing Systems and Parallel Computer, working mainly in the following areas: distributed systems, computer networks, security, performance evaluation, critical embedded systems. She is a member of the Brazilian Computer Society.

Abstract: The idea is to present technical details of the development of unmanned aircraft. The new features like MOSA concept (Mission Oriented Sensor Array), the corresponding interface (SSI - Smart Sensor Interface) and protocol (SSP - Smart Sensor Protocol), which provide plug-and-play capability to ease the utilization of a range of payloads and the new one IFA (In-Flight-Awareness) are also presented. The key idea is to discuss the development of new categories of unmanned aircraft with sensors and heuristics to replace the capabilities of the missing on-board human pilot.

12.15 - 12.25 Panel Discussion
12.25 - 13.50 Lunch

Session 11 Applications

26 13.50 - 14.20 UAS for homeland security applications
Jean Caron, EADS Cassidian, France

Bio data: Jean Caron is in charge of UAS product policy and is Programmes Director for Tactical UAV within EADS CASSIDIAN. It has begun to work for defence and aerospace within Aerospatiale Company in 1982, with design and test of radar and remote control equipments and signal processing units for missiles. He was then specialized for several years in stealth technology studies and tests for cruise missiles and then in guidance and navigation for anti-air and anti-ballistic missiles, before managing systems studies in counter-WMD systems and in national security concepts. During the two following years, he participated to the launch of the newly created UAV department of EADS he started to work within pure UAV domain with an electronic warfare UAS prototype and designed himself several UAV system from 10 to 1000kg either fixed wings or rotary wings. This long experience is currently used by customers and authorities to support CONOPS or regulations studies and Jean is giving lectures for highschool students on UAS.

Abstract: The presentation will give an overview of the currents concepts of use of various type and size of UAS for homeland security applications and the impact on regulations at ground and in the air as well as the benefits for local economy and development. The presentation will cover a comprehensive understanding of homeland security which is not limited to border security, but encompasses public safety aspects and national assets aspects. small and very small UAS will be examined as well, as the most rapidly growing market and the most risky, less controlled, but probably also less dangerous UAS domain. A large part of the presentation could be a Question & Answer session with the members.

27 14.20 - 14.50 Small UAS: Photogrammetry applications & airspace integration
Camilo Puig, IKOM (on behalf of Gatewing, Belgium)

Bio data: Not Received.

Abstract: Gatewing makes very accessible, UAS for surveying and mapping local areas ranging from a few hectares to many square kilometers in a matter of hour(s). The Gatewing X100 system consists of a fully automatic, bird-sized and low impact UAS and automatic vision software for creating mapping products or data for sophisticated further processing. It is designed for professionals without expertise in remote control, photogrammetry (making measurements from photographs) or piloting (e.g surveyors). Current end-users include surveying companies, construction companies, agro-industry and research institutes engaged in cultural heritage preservation, archeology, vegetation monitoring and geology. The mapping technology serves the commercial market, but is also an enabling technology for social benefits unable to be delivered economically (or at all) today. Examples of projects that are or will be conducted with the X100 are: mapping of the tsunami disaster (Japan) for documenting and reconstruction, 3D mapping of volcanoes for eruption

prediction (Japan), mapping of Easter Island to preserve cultural heritage (Chile) and mapping (and such activities as counting) of endangered species (Africa). Commercial and societal benefits intersect when precision farming can be improved using geospatial data of crop health. Current technologies are - in many cases - not available or too expensive to be used. The Gatewing X100, with its near-infrared imaging system, can be used to determine general plant health; future sensor packages will be able to detect individual diseases. This impacts not only the cost structure of farmers (as fertilizers and insecticides are driving their costs), but also the environment, as it can help to minimize soil and ground water contamination (e.g. nitrates, phosphates, etc.). In Europe it can actually bring large parts of the agricultural market out of its downward profitability cycle and upward subsidizing cycle to a competitive world market. Gatewing has been actively involved in helping to define guidance documentation for the use of small UAS (EuroCAE WG73) to support and enable the growing community of very small and minimal risk UAS stakeholders. Unfortunately, economy and technology is currently far ahead of the legal framework, and this situation adversely impacts all UAS manufacturers and potential users. Service providers and end-users are - in many cases - unable to proceed with this new technology although safety is safe-guarded through careful design and operational parameters, third-party liability insurances are in place and business plans indicate the commercial and societal benefits.

28 14.50 - 15.20 UAS with flexible wings: Applications & benefits
Michel Lallement, Flying Robots, Switzerland

Bio data: Graduate in International Commerce, Michel Lallement founded in Spain an air spectacles firm using UAS with flexible wings, which he managed for 10 years. Enthusiast for an air transport project with flexible wings, Michael created in 2004 Flying Robots, supported by a team of junior engineers. At the end of 2011, the transition between the research and development phase and the industrialization phase was finished; the application of Flying Robots was concreted by a new investor from Switzerland. Michel is the Honorary President of Flying Robots SA.

Abstract: Airspace, reserved for militaries, captures all its importance when talking about unmanned aircrafts. Between military and civil pilots, understanding is wide. But the issue of integration of military unmanned air vehicles and military or civil airspace constitutes one of the most delicate issues. At the war field, the use of UAS can be more easily explained, and is accepted by all partners involved; but in the merely civil field, this is very different. However, civil missions carried out by UAS can result to be very useful, particularly equipment and structure surveillance. Flying Robots currently proposes a wide range of civil missions with their own UAS, and explains safety integrated to their products, which have already been framed and tested not only in military missions, but also in civil security operations, as well as in for transportation of material in recurrent routes. These systems (integrated equipment, improved software, redundant security) are capable of demonstrating that the integration of unmanned aircraft within civil airspace, whether segregated or not, is certainly possible “in an open sky for all” as soon as political will is there.

15.20 - 15.35 Panel Discussion
15.35 - 16.00 Coffee & Refreshment Break

Session 12 Panel Discussion

16.00 - 16.30 Panel Discussion & Conclusions
16.30 - 16.40 Closing Remarks