Abstracts and speakers' biographies (in order of presentations)

1) KEYNOTE SPEECH - "HELICOPTER INDUSTRY. DOES IT CONCERN OUR POLITICIANS?"

Jaime ARQUÉ – European Helicopter Association, Chairman

Jaime´s speech will refer to the relation of helicopters with the EU Aviation Strategy, the new EASA Advisory Bodies including Rotorcraft Sectorial Committee and the Helicopter Operators interaction with their National Authorities.

Jaime Arqué *- is the Chairman of the European Helicopter Association and President of the Spanish Helicopter Operators Association (AECA Helicopteros). In the last 35 years, Jaime, with a Degree in Aeronautical Engineering from 1975, has been in senior management positions in the helicopter business in different companies, as MBB, Eurocopter Spain, Helicsa Helicopteros, Daimler Benz Aerospace, Gestair Group, Inaer Helicopteros Spain, Inaer Helicopter France and Helidax. In 2010-2011 he was also president of EHOC (European Helicopter Operators Committee) and from 2010 to 2014 member of the EHAC Board (European HEMS and Air Ambulance Committee).*

2) EUROPEAN VISION OF BIRD STRIKE THREAT – ARAC

Herdrice HERESON – EASA, Structures Expert, Rotorcraft Department

Bird strike requirement has been in force for more than 20 years on large rotorcraft and is not endorsed on small rotorcrafts although bird strike threat exist on both types and still generate important damages on rotorcraft. Several accident reports are encouraging for bird strike protection on small rotorcraft. What is the reality of the bird trike threat? Is the current requirement sufficient? What are the on-going certifications authorities efforts to address the concern? This presentation will address those questions with some considerations for emerging source of damages like drones.

Herdrice Hereson *- has been working for 10 years as Structures Expert in the Certification Directorate of the European Aviation Safety Agency. Prior to joining EASA, Herdrice worked as Structures Certification expert for the French Civil Aviation Authority (DGAC). She has been involved on several Rotorcraft projects such as Airbus Helicopters Dolphin and Squirrel families, Sikorsky S76D and on Large Aircraft projects such as Airbus A380 and ATR 42/72. In 2014, she has completed the certification of the Airbus Helicopters H175. Today, she is actively following the continuing airworthiness on most of these projects and is involved in the ARAC working group on bird strike.*

3) SET OF BIRD STRIKE SIMULATION TECHNOLOGIES AND TECHNIQUES FOR CERTIFICATION

Charles L. BARKLEY Jr. – Bell Helicopter, Engineer V/ EFUM, Airframe Structures

The threat to rotorcraft by bird strike presents unique engineering design challenges as well as direct and indirect costs for repair and lost productivity. Over the last decade, Bell Helicopter Textron Inc. (BHTI) has developed a robust set of bird strike simulation technologies and techniques. These techniques have been validated against multiple rotorcraft structural tests in metallic, composite and transparent materials for both rotating and non-rotating components. The validated tools are now aiding in guiding both new design type certification projects and post-TC safety enhancement projects. By providing accurate and timely analyses early in the design process, structures can be optimized for bird strike tolerance with minimized impact to other design objectives. Likewise, the ability to simulate multiple conditions to determine criticality, can focus the subsequent physical test campaign and increase the likelihood of first-pass test success. The net result improves the certification process by focusing resources towards the most critical components while enabling a path towards certification by analysis.

Charles L. Barkley Jr. *– has enjoyed a 31-year career at Bell Helicopter, participating in programs across both military and civilian product lines. As an Airframe and Landing Gear Structures specialist, he has served as a Technical Resource Specialist, FAA Designated Engineering Representative and is currently an Engineering Unit Member of Bell's Certification Organization Designation Authorization (ODA).*

4) UPDATE ON FAA RULEMAKING

Jim GRIGG – FAA, Manager, Safety Management Group, ASW-112

The Federal Aviation Administration's (FAA) major rulemaking efforts are focused on occupant protection and bird strike protection. Both of these efforts are currently in the Aviation Rulemaking Advisory Committee (ARAC) working groups. In addition to these major efforts, the FAA is updating several rotorcraft airworthiness standards that have required issuance of recurring FAA Special Conditions (SC), Equivalent Level of Safety Findings, and Means of Compliance Issue Papers.

Jim Grigg *- is the Manager of the Rotorcraft Safety Management Office. His office is responsible for Rotorcraft continued operational safety, tracking rotorcraft fleet safety, performing risk assessments and, when necessary, issuing airworthiness directives. Mr. Grigg joined the FAA in 1997 following a career in the US Air Force.*

5) FAA AIRCRAFT CERTIFICATION SERVICE (AIR) TRANSFORMATION AND CERTIFICATION

Lance T. GANT – FAA, Manager, Rotorcraft Directorate, Aircraft Certification Service (AIR)

The Federal Aviation Administration's (FAA) Aircraft Certification Service (AIR) is our comprehensive approach to becoming more efficient and effective certification authority. AIR is committed to identifying and implementing process and organizational improvements. AIR Transformation seeks to move from incremental and independent changes to a comprehensive approach to proactively address the Drivers of Change; growth of the aviation industry, globalization of aviation, heightened expectations, and the velocity of change.

Lance T. Gant– *is the FAA's Rotorcraft Directorate manager. He joined the directorate in 1990 as a rotary wing flight test engineer after working in private industry. He is responsible for all matters involving rotorcraft regulations, policies and continued operational safety. His office directs the certification functions/standardization for all domestic manufactured rotorcraft and validation functions for foreign manufactured rotorcraft. His office also administers type and production certification activities for the five-state southwest region.*

6) EYE TRACKING

François LASSALE, HELIOFFSHORE, Operations Director

An interactive session with HeliOffshore Operations Director, Francois Lassale. Participants will learn about the many opportunities to benefit from, and contribute to, global safety activities in the offshore helicopter industry.
Francois will describe the recent phase 1 eye tracking research carried out by HeliOffshore and its members. He will share the latest results and future plans from a uniquely collaborative pilot eye-tracking research programme, the data from which will inform future pilot training, design philosophy and standard operating procedures.
These results from the baseline for further research in the field, and HeliOffshore has committed to phase 2 of this program, which will further enhance training, design and standard operating procedures.
Francois will describe collaborative efforts that led to this study and why it is so important and how this research will feed into the other collaborative work HeliOffshore in doing in Approach Path Management,

Evidence Based Training (EBT) and Line Operations Safety Audit (LOSA) programs. The industry-wide development and sharing of this research will deliver recommended practices and guidance material, which will have global reach and a positive impact on the frontline.

François Lassale *- is the Operations Director for HeliOffshore, an organisation working with the Offshore Oil and Gas helicopter transport industry enhancing safety through collaboration on areas that make the biggest difference on the front line. Before joining HeliOffshore Francois was the Managing Director for a firm in the USA bringing turnkey solutions to the industry. Francois has a military background in the South African army and Royal Air Force flying both fixed wing and rotary wing. Since leaving the military he flew in airline, freight, VIP and Head of State operations. François has been an instructor, TRI, TRE and CRMI and has been on the Flight Safety Foundation business aviation board for more than ten years. He serves as Vice Chairman of the European Helicopter Association, Vice Chairman of the International Association of Aeronautical Flight Auditors and is a certified IS-BAO auditor.*

7) REVIEW OF CURRENT PRACTICES FOR OFFSHORE HELICOPTER OPERATIONS

John SPOUGE, DNV-GL, Senior Principal Consultant

In 2015 EASA commissioned DNV GL to develop a comprehensive knowledge base of current practices for offshore helicopter operations in North Sea. The purpose was to help EASA improve its knowledge of operating practices, since a better-informed regulator is to the benefit of the industry as a whole. The knowledge base was required to consist of structured documentation of different practices, together with an evaluation of their benefits and limitations, and a set of recommended practices for widespread application.
The study has been completed within a year as planned, and the knowledge base, review and set of recommended practices have been delivered to EASA. This presentation explains how DNV GL approached the study, acknowledges the level of stakeholder participation that was obtained, and outlines the study results.

John Spouge *- is a Senior Principal Consultant in DNV GL's London office, specialising in quantitative risk assessment, cost-benefit analysis, causal modelling and hazard identification. He has analysed risks in diverse fields, including offshore platforms, petrochemical facilities, waste disposal, road transport, ships, airports and helicopters.*

8) HEALTH AND COGNITION IN OLDER HEMS PILOTS – RESULTS FROM THE EXTENDED AGE 60 STUDY

PD Dr. phil. Britta HERBIG, Dipl.-Psych. - Medical center University of Munich, (Hans Bauer & Dennis Nowak), Institute and Outpatient Clinic for Occupational, Social, and Environmental Medicine, WHO Collaborating Centre for Occupational Health, Research Unit ‚Applied Medicine and Psychology at Work'

***study funded by and conducted in cooperation with European HEMS & Air Ambulance Committee (EHAC)**

Introduction

The so-called Age 60 rule enacted in EU Regulation 1178/2011 (FCL.065) forbids pilots age 60 and over to fly an aircraft engaged in single-pilot commercial air transport due to safety concerns about the potentially increased risk of sudden incapacitation in older pilots. Moreover, flight performance might decrease and pose a risk for flight safety as cognitive functioning is subject to age-related decline. The projects extends previous studies and (a) investigates the relation between age, health, cognitive demands, and flight performance, (b) tries to determine if and how the current age limit can be raised without a significant increase in safety risks.

Methods

The study uses a multi-method approach. Simulator performance in specific age-sensitive tasks as well as liability damage data are used to assess flight-relevant cognitive functioning in different age groups. Longitudinal data from aeromedical examinations from the preceding 10 years are used to investigate changes

in health and risk factors. Modern cardiovascular risk score methodology as well as methods to determine biological aging are used to analyze developments in medical risk. Cluster analyses of parameters of health, subjectively experienced strain and simulator flight performance are employed.

Results
HEMS pilots from Poland, the Czech Republic, Germany and Austria participated in the study with an oversampling of pilots in the critical age range. 72 pilots completed the simulator tasks. The pooling with data from previous studies allows for the analyses of about 170 measurements of flight performance. For so far 63 pilots longitudinal medical data are available including approximately 850 independent aeromedical examinations. Analyses and reporting are ongoing and will be finished at the end of November 2016.

Discussion
Results on medical risks, changes in health and cognitive performance are discussed regarding their potential to compromise flight safety in HEMS. Implications for policy-making are outlined.

Britta Herbig *- diploma in psychology from the University of Hamburg; doctorate at the Technical University Munich; habilitation at the medical faculty of the Ludwigs-Maximilians-University Munich, LMU; currently senior researcher and team leader of the research group "Applied Medicine and Psychology at Work" at the Institute and Outpatient Clinic for Occupational, Social and Environmental Medicine, LMU.*

9) BELL 525 DITCHING FLOTATION STABILITY

Charles L. BARKLEY Jr. – Bell Helicopter, Engineer V/ EFUM, Airframe Structures

The Bell 525 Relentless Super-Medium helicopter will be certified to the latest amendment levels for ditching and flotation stability as required for FAR Part 29 Transport Category rotorcraft. This paper presents the design work and testing that was accomplished in support of Type Certification to these requirements. Scale model testing has demonstrated successful and stable water entry per the ditching requirements of §29.563 and §29.801(c) for wave conditions equivalent to Sea States 0, 4 and 6. Likewise, two scale model test campaigns have established the flotation stability of the helicopter for regular waves equivalent to Sea States 4 and 6. With a degraded float system, stability was demonstrated equivalent to Sea States 2 and 3. Additionally, the rotorcraft was shown to be stable in a Sea State 5 irregular wave environment. Data gathered during these three scale model test campaigns shows that the Bell 525 will provide exceptional ditching and flotation stability characteristics and will meet all applicable regulatory requirements for certification.

10) FLOATABILITY: THE USE OF SIMULATION FOR THE HELICOPTER SEAWORTHINESS (CASE STUDY)

Andrea BIANCHI – AeroSekur, Airborne Division Product Manager

The emergency ditching is, for an helicopter, a critical event. The helicopter is not thought to perform as a boat (and typically it's a very bad boat due to its mass distribution); otherwise survivable events resulted in fatalities (see NPA 2016-01). Restrictive actions have been put in place by the CAA (see CAP 1145) to mitigate the risks of the offshore operations, with effects on costs and transportation capabilities of the operators. The EASA established a Rulemaking (RMT0120) team to review the Certification Specifications for what concerns the helicopters ditching, recognizing that the certification practices can be improved to increase the safety. NPA 2016-01 has been published in March. The seaworthiness of the helicopter, equipped with emergency floats, in the sea conditions for which the aircraft is certified, is generally demonstrated by pool tests performed on scaled models, with regular waves up to the desired sea state. Aero Sekur and Leonardo worked

together to apply an innovative computational approach, based on correlation with towing tank tests performed on the AW189, in order to:

- achieve the certification of a different version of the helicopter ("under-belly fuel tanks")
  and
- remove limitations, demonstrating that it was due to a non-representative configuration of the helicopter during tests.

The topic will address this activity and results, describing the issues related to the seaworthiness of helicopters, proposing the approach and the forthcoming advantages of the simulation, especially when correlated with pool tests properly performed.

In particular, the development of simulation for this purposes may:

- provide the industry with a flexible and reliable tool to design and optimize the safety equipment
- provide the Agency with a new/alternative certification approach, which a wider number of fully recordable information, remarkably improved adherence to the real event and capability to represent all the parameters without any physical or geometrical limitation.

Andrea Bianchi– graduated in Aerospace Engineering, Andrea is the Aero Sekur's Airborne Division Product Manager. He joined the company in 2004 as a design engineer, spending more than 10 years in design and qualification of emergency equipment for helicopters (floatation and external life rafts) and covering different roles (from design to program management). From 2008 to early 2016 he has also been the company Production Engineering Manager for EASA Part21 products.

11) DESIGNING ADVANCED NAVIGATION & APPROACH FUNCTIONS WITH SAFETY IN MIND

Davide FERRARO – Leonardo Company, AW149/AW189&AW169 Avionic Principal System Engineer

The advanced functions for navigation and approach are designed, besides an advanced FMS RNP Monitoring & Alerting function and flight sensors with coasting capability, taking account any means necessary to guarantee and improve a complete situation awareness and safety during RNP operations and approach. The flight test results achieved during the RNP 0.3 showed a fully maturity level for RNP 0.3 by helicopter equipped with advanced navigation capabilities to provide several benefits. Thanks to the narrower en-route width, allowed by the use of RNP 0.3, the helicopter routes will be able to be fit in dense and complex airspace typical in major European areas. In order to provide a safety enhancement in high dense airspace, with helicopter able to reach high lateral performance, a new RNP 0.1 navigation specification should be updated. Regarding the approach LHD is developing a type approach able to guarantee the same CAT-I Accuracy/Integrity using a differential GPS "Instant-on" portable system that can be deployed everywhere on fixed-earth landing site or moving platform. The navigation and approach capabilities should be integrated with OWS and EVS/CVS systems on PFD or HMD necessary to guarantee a significant safety increased and situation awareness to move to "All Weather Conditions" operations.

***Davide Ferraro** - is Avionic Principal System Engineer and GPS&FMS (Flight Management System) Specialist at Leonardo Helicopters. He received M.Sc. degree in Telecommunication Engineering at "Politecnico di Milano" (PoliMi) University in 2005. From 2005 to 2008 he has been involved as research assistant at DEI (Department of Electronics and Information) of PoliMi in Antennas & Space RF Propagation.*

12) HOISTING MISSIONS, A SAFETY JUMP IS POSSIBLE

David FIGOUREUX – HELISAR, Project Manager

For several years, rotorcraft hoisting missions have grown in number and in diversity. Initially dedicated to rescue in the military and para-public sectors, hoists are also used today in a lot of missions realized by civil operators on new missions (harbor pilots, maintenance of off-shore windfarms…).
During past few years, users had to face to many safety issues. And it is time to make a huge effort to increase the technical answers to these problems.
There is an opportunity today to solve the problems with the new standards AS6342 - Minimum Operation Performance Standard for Helicopter Hoist. This process is supported by the SAE with the support of EASA, FAA, and hoists and helicopters manufacturers, mission operators and other people involved in this subject. Beyond these requirements, we are convinced that some functions can be developed today for the safety of the future hoisting missions.

This is the challenge taken by our company which is currently analysing mission risks and associated incidents in order to develop a new helicopter hoist.

Building on their 70-year old experience in complex lifting systems in critical environment, our company is considering the following technical challenges:

- Cable concerns: damage onto cable can lead to a cable break and a release of people hooked on the hoist. An answer can be found with a high strength cable and a reliable winding solution able to avoid any damage. Furthermore, some investigations have to be performed with regards to the external protection of the cable and on the means to detect impact.
- Electro-static discharge concerns: Some injuries are due to ESD phenomenon during operations. A new system with associated operational procedure would have to ensure protection to the people during ground approach and during entry into helicopter cabin.
- Overload system protection: the challenge is to allow a fast and safe detection of an overload occurrence and a controlled reeling out of the cable in case of emergency.
- Human factors during maintenance: to avoid problem during maintenance operation due to complex adjustment needs, new maintenance concepts can be found involving easily exchangeable parts and more advanced ground support equipment.

As a conclusion, the up to date technology allows us to provide a hoist able to be safe, hoist manufacturers, regulation authorities and operators all together have now to turn the corner.

David Figoureux *– a French mechanical Engineer, He started his career in the automotive industry before becoming manager of the design office in a hoist manufacturer company for the industry market. He then joined Airbus Helicopters to be responsible for the integration of mission equipment dedicated to Human and non-Human external loads. He left Airbus Helicopters to start the HELISAR project within the REEL Company and he is now responsible for the business line "airborne equipment".*

13) IMPROVING THE SAFETY OF HOISTING OPERATION ON ROTORCRAFT THROUGH DESIGN, TRAINING AND MAINTENANCE

Nick DEMOGINES – Goodrich Hoists, UTC Aerospace Systems, Engineering Site Manager

The industry is developing ways to mitigate risks to hoisting operations. Improving the safety of hoist operations cannot be singled out to one area, but rather needs to be looked at from a holistic perspective. Today's hoisting operations involve a well-trained crew depending on highly functioning equipment that is properly maintained for readiness at all times. In terms of hoist design, the industry is focusing on a new hoist standard that will help align expectations of hoist manufacturers, aircraft manufacturers, and regulatory agencies. New hoist designs incorporate lessons learned from past hoist operations. Mission-specific training,

both on-aircraft and through simulations, can ensure that rescue crews are ready for the wide variety of events they may encounter. Another key area to consider from a safety standpoint is maintenance. Improvements in maintenance of the hoist and ancillary hoist equipment are essential to increasing overall safety. This includes frequent maintenance training, regular updates to component maintenance manuals, and technology improvements such as on-condition maintenance. Improvements in hoist designs, higher-fidelity training with particular focus on crew communication and scenario-based activities, and attention to detail during maintenance activities lead to improved safety for all hoisting activities. Advancements in these three key focus areas of design, training and maintenance result in safer hoisting operations.

Nick Demogines – *has 19 years experience in the aerospace industry. He obtained his B.S. Degree in Aeronautical Engineering from Cal Poly San Luis Obispo, and an MBA from the University of Southern California. He has held progressively advanced positions throughout his career, with Boeing, Sikorsky, Moog, and UTC Aerospace Systems.*

14) THE ROTORCRAFT SAFETY CONTINUUM AND HOW RESULTANT EFFECTS ON CERTIFICATION

Andy SHAW – FAA, Avionics & Electrical Systems & Equipment

This presentation will highlight a recent policy initiative the Rotorcraft Directorate has developed for normal-category helicopters. The Safety Continuum seeks to remove barriers in the certification process and embrace innovative solutions. The presentation describes the rational and benefits of developing separate “classes” for normal-category rotorcraft, and how those classes are applied to create a tiered approach to the SAE APR-4754A certification standards for systems and equipment.

Andy Shaw – *joined the FAA in 2006 to work in the Special Certification Office. He subsequently transferred to the Rotorcraft Certification Office and later was promoted to an electrical systems position in the Rotorcraft Standards Staff. Before joining the FAA, Mr. Shaw worked for Raytheon Aircraft Services as a senior avionics electrical systems engineer. He served as an electrical systems and equipment designated engineering representative (DER) and worked on numerous avionics installation certification projects.*

15) ENHANCING ROTOR AND TRANSMISSION SAFETY: THE CRITICAL CHALLENGES AND THE POTENTIAL OPPORTUNITIES

Andy EVANS – Aerossurance Limited, Director

This presentation will discuss the increasingly intolerant public reaction to Part 29 helicopter accidents, especially in an environment were fixed wing commercial transport accidents have become rarer. It will present an analysis of failures rates that demonstrates the challenge that manufacturers will have both with new helicopters that accidents early in their life and as fleet experience builds.

This presentation will highlight the significance of rotor and transmission system failures in past fatal Part 29 helicopter accidents and compare Part 27 helicopters to Part 29. It will review a number of studies conducted in the 1980s and 1990s on helicopter rotor and transmission safety and then consider what has changed. It will then examine some key characteristics of reliable and resilient rotor and transmission systems and why it is important to focus on improving the right characteristics.

Finally the presentation will show that the opportunities are less to do with major new rulemaking but more to do with enhancing design practices, tougher design objectives, more collaboration with users throughout the design process and enhanced continuing airworthiness. It will highlight that customers may have to accept some loss of aircraft payload/range capability in order to achieve greater reliability and resilience. In return for that acceptance, manufacturers will need to share more technical data with their customers and their customers will need to be smarter in order to interpret that.

Andy Evans´ - career has developed from design into safety regulation, aircraft certification, air operator safety management, human factors, safety investigation and safety leadership development. Andy is a Fellow of the RAeS and a Chartered Engineer. He is a member of the ADS Airworthiness Board and the FSF's European Advisory Committee. He was awarded the IMechE Astridge Award for Aerospace Safety in May 2003 for work on HUMS and was Industry Co-Chair of the European Helicopter Safety Analysis Team.

16) HOW CAN WE FURTHER IMPROVE ROTORCRAFT TRANSMISSIONS?

Michael WEIGAND – Vienna University of Technology, Univ.-Prof. Dipl.-Ing. Dr.-Ing.

Although Rotorcraft Transmissions are developed and qualified according to mature EASA standards like CS-27 and CS-29 a number of helicopter incidents happened in recent years involving especially the main transmissions of large helicopters.

New technological solutions that can improve transmission performance for example concerning suitable lubricants and loss-of-lubrication behavior are presented and discussed. Dedicated transmission lubricants are compared to the widely used turbine oils. New tribological developments and technologies are presented that can improve efficiency and loss-of-lubrication performance of rotorcraft transmissions.

Furthermore a look is taken at the design and development process, at the FMECA (Failure Mode, Effects and Criticality Analysis) and improved design and calculation tools:
The article discusses how the FMECA can be integrated best in the design and development process and continued product monitoring, using modern software support.
A dedicated look is taken at the design of rotorcraft transmissions concerning loss-of lubrication. It will be discussed whether it is possible to predict the loss-of-lubrication behaviour in an earlier stage of the development process and how a trade-off between high power density and low weight on one side and optimal loss-of-lubrication behavior on the other side can be realized in an earlier stage of the development process. Today the loss-of-lubrication performance can only be evaluated with tests on dedicated test stands using first transmission prototypes. Research and approaches to predict the loss-of-lubrication performance in the early design phases are presented and discussed.

Finally a short look is taken at modern test stand technology as well as education and research for the the design and development of transmissions for aviation and especially rotorcrafts at TU Wien.

Michael Weigand -
Born: 17.04.1960 – Age: 56
1979 – 1985*: Technical University Darmstadt – Diploma in Mechanical Engineering in 1985*
1985 – 1990*: Technical University Darmstadt – Scientific Assistant/Employee - PhD (Dr.-Ing.). Thesis about Keyed Shaft-Hub-Connections*
1990 – 1995*: Engineer (Design/Development) at P.I.V. in Bad Homburg - Design and Development of new Bevel-/Helical industrial gearboxes - 1993 – 1995 Leader of working group "Shaft-Hub-Connections" of the scientific foundation "Forschungsvereinigung Antriebstechnik (FVA)"*
1996 – 2002*: Manager Engineering at Taprogge Ges. m.b.H. in Wetter (Ruhr) - Design and Development of Cooling Water Filters and Condensor Tube Cleaning Systems for Power Stations and Seawater Desalination Plants*
2002 – 2007*: Manager Products at ZF Luftfahrttechnik GmbH in Kassel-Calden - Design, Development and Production of Helicopter Transmissions and Turn-Key Projects of Test Stands for Helicopter Transmissions and Rotor Blades*
Since 2008*: Professor at Vienna University of Technology - Machine Design and Rehabilitation Engineering - Helicopter Transmissions - Rehabilitations Engineering (among others project in Mars 500 Space Program) - Air rescue - Organizer of the Working Group Aviation at Vienna University of Technology - Representing*

Austria in IFAR (International Forum for Aviation Research) - Leading the IFAR-Initiative "Vertical Lift" in which 15 nations discuss future rotorcraft applications.

17) SAFETY CONSIDERATIONS IN THE DESIGN AND ARRANGEMENT OF THE 525 RELENTLESS DRIVE SYSTEM

Scott POSTER – Bell Helicopter, Manager Drive System Engineering & Associate Tech Fellow Mechanical Systems

Bell Helicopter's 525 Relentless, the first commercial fly-by-wire helicopter, was developed with unparalleled safety at the forefront of the design. The goal of safety lead to the unique layout and configuration of the aircraft's drive system, which incorporates unique features and system separation to protect primary aircraft systems from the most common drive system failures. The drive system has also been designed to maximize the operational capability in the event of an uncommon failure such as loss of lubrication.

Scott Poster - *is currently serving as the Drive System IPT Leader for the Bell 525 Relentless program. In this role, he leads the Drive System Design, Manufacturing Support, Bench Test, and Flight Support teams through development and certification efforts for the 525 - the world's most advanced civil rotorcraft.*
In addition to his current role as 525 Drive System IPT Lead, Scott also supports many production and development programs as Associate Tech Fellow for Mechanical Systems. He is also instrumental in the hiring, education, and career development of the Drive System Engineering team serving as the Drive System Talent Focal for Bell Helicopter.
Previously, Scott has served as IPT leader and lead Drive System design projects for the V-22 Osprey, BA609, and various helicopter models and research projects.

18) ROTORS AND TRANSMISSIONS DESIGN ASSESSMENT: REGULATORS

Alastair HEALEY – EASA, Senior Expert Transmission, Rotorcraft Department

An assessment of risk can identify known quantifiable risks, which can then be protected against, and known risks which cannot be quantified but are thought to be acceptable and adequately controlled. On top of these risks there may also be some "unknown unknown" risks which are more challenging to guard against. This presentation will review the role of safety analysis in the design process and also consider its limitations with respect to risk which cannot be reliably quantified or predicted.

In order better understand how these different types of risk relate to Part 29 helicopter rotor and rotor drive systems a review of 12 accidents has been performed. We then examine how many accidents could be prevented by better application of safety analysis processes, and how were unforeseeable.

The objective of this review is firstly to look at the limitations of the safety analysis process and then to consider what design steps can be taken to reduce the risk of all three types of failure. Potential methods of risk reduction may include;

- Use of flaw tolerant, damage tolerant design
- Potential for improving rotor and drive system architecture
- Improved procedures for design and in-service monitoring of Critical Parts
- Design to facilitate improved condition monitoring
- Role of design assessment / safety assessment

These potential design steps can then be considered against the future safety objectives of the helicopter industry for Part 29 helicopters.

Hopefully this presentation will provoke discussion regarding opportunities to improve future rotor and rotor drive system designs. We can consider if there may be worthwhile potential benefit from improved regulations or industry standards and whether customers may have to accept some loss of aircraft payload/range capability in order to achieve greater reliability and resilience.

***Alastair Healey** – is a British national. In 1983 Alastair started work as a Student Apprentice with the Dowty Group based in Cheltenham, England. Since leaving Salford University in 1987, Alastair has worked for Dowty Fuel Systems, Lucas Aerospace and CAA-UK. Following the transfer of design responsibility from the EU national authorities to EASA, Alastair joined EASA in 2005 as a Rotor Drive System Expert. This position involves working primarily on helicopter transmission initial design and continuing airworthiness issues.*

19) DISCUSSION FORUM

Moderator Alastair HEALEY – EASA, Senior Expert Transmission, Rotorcraft Department

- What steps can industry take to reduce the gap in safety levels between rotary and fixed wing aircraft?
- Design assessment process: How can this be optimized specifically for Rotor and Drive System designs?
- The way forward: Can cross industry bodies and Regulator coordinate initiatives to further Rotor and Drive System safety through better design guidance or standards?

20) FATIGUE AND FLAW TOLERANE APPROACH DURING EC175 EASA CERTIFICATION

Mélanie HERMAN - AIRBUS HELICOPTERS, Specialist in fatigue and flaw tolerance, Airframe Stress Department
Jean-Marc BESSON (co-writer) AIRBUS HELICOPTERS - Senior Expert, Dynamic Systems Department

The current airworthiness regulations require that a fatigue tolerant design is accomplished for metallic Principal Structural Elements (PSE). The goal is to avoid catastrophic failure due to fatigue cracking during the operational life of the rotorcraft, taking into account the effects of environment, flaws or accidental damage. Airbus Helicopters successfully certified its EC175 aircraft with EASA in 2014. This aircraft is compliant with the fatigue and flaw tolerance requirements of CS29. The substantiation of airframe fatigue tolerant design was achieved with combination of Safe-Life and Flaw tolerance methodologies. It leads to the definition of retirement times and/or inspection intervals for metallic PSE.
This paper presents this approach developed by Airbus Helicopters on each metallic PSE and presents the different aspects of this mean of compliance with fatigue and damage tolerance requirements.
It describes first the airworthiness regulations requirements regarding the fatigue and flaw tolerance for rotorcraft components. Then it details the methodology applied on EC175 airframe PSE leading to determination of retirement time and inspection interval. Flaw tolerance analysis is leading to evaluation of design regarding different flaws that may be experienced in service, as e.g. corrosion, impacts or scratches.

***Mélanie Herman** - 38, Mechanical Engineer (Ecole Centrale Marseille), post-graduate diploma in Mechanics of Solids. 15 years in Airbus Helicopters Stress Departments: 7 years in Rotor Stress Department (composite hubs, light helicopters), 2 years in Airbus Helicopters Canada, 6 years in Airframe Stress Department (H160 development). Specialist in fatigue and flaw tolerance.*

21) UPDATE ON THE ROTORCRAFT OCCUPANT PROTECTION WORKING GROUP

Martin CRANE – FAA, Aerospace Engineer - Structures & Mechanical Systems

The Federal Aviation Administration's (FAA) requested the Aviation Rulemaking Advisory Committee's (ARAC) to provide recommendations to improve the likelihood of survival in a helicopter accident. The ARAC accepted

the tasking and formed a Rotorcraft Occupant Protection Working Group (ROPWG). This presentation will provide a high-level update on the ROPWG's progress to date.

Martin Crane– *is a Structures and Mechanical Systems Engineer in the FAA.He joined the FAA in 2008 in the Fort Worth Rotorcraft Certification Office. In 2014, he was promoted to the Rotorcraft Standards Staff. Prior to joining the FAA, Martin was a Consultant Structures DER for Part 27 and 29 Rotorcraft for ten years. Martin has a Bachelor of Science and Master of Science Degree in Aerospace Engineering from the University of Texas at Arlington.*

22) ROTORCRAFT AIRBAGS - HOT TO IMPROVE THE CRASHWORTHINESS

Giacomo GIOVANGROSSI – Aero Sekur, Chief Engineer

A new technology is presented with the aim to improve significantly the occupants survivability, following a rotorcraft crash event. This technology is based on the use of an external "vented" airbag concept, already developed by Aero Sekur for space exploration programs. The novelty of the concept is based on the active control of the airbag gas venting, in a way that not only the rotorcraft kinetic energy is absorbed, but also the rotorcraft attitude during the crash is controlled. The active control is achieved by using an avionic system controller that executes a dedicated software, based on an algorithm covered by patent. A preliminary case study has been carried out implementing the above mentioned technology on the A109 rotorcraft. The results obtained using numerical models (LS-Dyna software) have shown that the application of this technology can significantly improve the rotorcraft crashworthiness.

Giacomo Giovangrossi – *achieved the Mechanical Engineering Degree in 1995; he started working in the R&D department of Companies in the oil and gas sector. In 2002 he reached Aero Sekur following projects, as senior engineer initially and as Chief Engineer up to date, in the aerospace business.*

23) EASA PIA FOR ROTORCRAFT OCCUPANT PROTECTION (ARAC)

Laurent PINSARD – EASA, Senior Structures Expert, Rotorcraft Department

In the 1980s and 1990s, Fuel tank crashworthiness and occupant protection have been incorporated in the regulation for normal and transport category rotorcraft. However rotorcraft that are designed and certified before these dates (and their derivatives that maintain the original certification basis) have not been required to meet these improved occupant protection regulations and many are still in production today. This has resulted in a low incorporation rate of occupant protection features into the current rotorcraft fleets.

In this context, the FAA has first assigned the Aviation Rulemaking Advisory Committee (ARAC) a new task to provide recommendations regarding occupant protection rulemaking in normal and transport category rotorcraft for older certification basis type designs that are still in production.

This presentation describe the actions taken by EASA in the context of rulemaking activity (Preliminary Impact Assessment) and the Safety recommendations concerning the incorporation of the requirements for Crash Resistance Fuel System (CRFS) and Crash Resistant Seat and Structure (CRSS).

Laurent Pinsard– *is Senior Structures Expert for Rotorcraft and General Aviation since 2014. He has been working for more than 12 years as Structures Expert in the Certification Directorate of the European Aviation Safety Agency. Prior to joining EASA, Laurent worked as Structures Certification expert for the French Civil Aviation Authority (DGAC). He has been involved on major rotorcraft Airbus Helicopters and Agusta projects and on large and small Aircraft projects.*

24) AH/ SMS IMPLEMENTATION IN FLIGHT TEST FOR THE FLIGHT OPERATIONS

Gilles BRUNIAUX - Airbus Helicopters, Vice President Aviation Safety

Following Airbus Helicopters "zero accident" vision Airbus Helicopters (AH) has launched in the frame of their transformation a group wide project for deploying an Aviation Safety Management System (SMS). This deployment follows a corporate standard, is targeting all approved organizations and is going beyond regulatory requirements.
Risk identification and risk management is one of the main pillars of a SMS and is linked in AH to the companies Enterprise Risk Management (ERM). Within this integrated process of managing risks from technical, operational, flight-test-specific up to enterprise perspective, AH would like to share in that presentation the special requirements and conditions related to risk management in flight test specific operations.
Concrete means for already implemented pre-flight risk assessments will be presented, which also focus on flight test specific characteristics by considering Human Factors, too.

Gilles Bruniaux *– currently Vice President Aviation Safety of Airbus Helicopters reporting to the Airbus Helicopters CEO, Gilles Bruniaux, aerospace engineer, former flight tests engineer and professional helicopter pilot is a Director of the IHST Excom as well as cochair of the EHEST, the European Branch of IHST. He is also the Airbus Helicopters representative at the EHA and at the IOGP ASC and the natural AH focal point for HeliOffshore.*

25) HELICOPTER ANTI RESONANCE VIBRATION GROUND & FLIGHT TESTING

Riccardo FROLLO – EASA, Flight Test & Human Factor Expert, General Aviation & Remotely Piloted Aircraft Sys. (RPAS)

As a follow up from previous EASA experience with Applicants for external camera installations, it was established the need of dedicated guidance on what EASA would expect from Applicants on external load vibration testing. Based on previous military and civil experience, it is reported a current overview of what are the available sources of information around vibration testing to be done on helicöpters when installing external loads, including some tips of best practice. The presentation has the main aim to provide an overview for those who are unaware or do not deal every day with external loads.

Riccardo Frollo *- born 1968 , Naples (Italy) Graduated the Italian Air Force Academy in 1992, Aeronautical engineer. 1994 EPNER French Flight Test Engineer (FTE) Diploma. 1992-2001 Italian Flight Test Center in Pratica di Mare, for domestic rotorcaft projects and the NH90 helicopter. 2001-2002 flight test engineer in Piaggio Aero Industries in Genova (Italy). 2002-2005 Flight Analyst in ASW170 FAA Rotorcraft certification office in Fort Worth (Texas) worked on various STCs, on AW609, Bell 210 TC and the Sino Swearingen SJ30 business jet TC. 2005 to present EASA Project Certification Manager for rotorcraft, currently flight test enginner on general aviation, Airships and rotorcaft. Specialized on Night Vision Image System certification and helicopter external loads certification. He holds a PPL on piston engine airplanes and flew as FTE around 700 experimental flight hours on various aircraft. He is married and has two children.*

26) CERTIFICATION OF THE ROTORCRAFT IN ICING CONDITIONS/ TECHNOLOGICAL AND ECONOMICAL CHALLENGES

Vincenco BRANDI – EASA, Icing & ECS Expert, Rotorcraft Department

All weather operations is becoming a strong demand for helicopter operators in all the relevant commercial sector, from the oil & gas market, up to Search and Rescue (SAR) operation. Indeed, European market-leader operators are more and more requested to carry on missions within geographic region where known ice conditions prevail for the majority of the year. Therefore, in many instances a full icing certification reached within reasonable time delay after basic Type Certification is a formidable appeal for the helicopter manufacturer to be able to offer to the market an efficient product at an affordable and competitive price. Sometime the development & certification costs to secure the full icing certification may reach very high financial commitments especially due to extensive and expensive flight test campaign in searching for the

adequate natural icing conditions; this would also turn into a significant delay in getting the approval and make the helicopter not "icing fit" at the right time.
If the burden related to reach the "full icing" certification may not be affordable for the manufacturer and the time-to-market is the "key-point", a possible alternate solution is to clinch a preliminary "limited" icing clearance; this would be remarkably a chance only for European operators since FAA does not "recognise" this approval.
Without pretending to be fully exhaustive, based on recent experience from icing certification exercise, the presentation will look at the helicopter icing certification process focusing on the differences between the "full icing" and the "limited icing" approval with regard to the applicable requirements and the compliance findings activities. It will also attempt to provide some "lessons learnt" or "tricks & tips" to make fully benefit from the various available means of compliance to demonstrate safe flight into known icing conditions.

Vincenco *Brandi - has been working with EASA as Icing & ECS expert since 2006. He is today in the Rotorcraft Department responsible for the icing & ECS certification of the main European rotorcraft. He also keeps similar responsibility for large airplane and engine for both commercial & business jet market segment. Before joining EASA he has been a researcher for more than 10 years with the Italian Aerospace Research Center (Capua, Italy) in the icing & aerodynamic domain. In this capacity he mainly contributed to enhancements into numerical icing simulation on aircraft. He is co-author of about 15 conference/journal papers and has been leader of European collaborative project on icing/aerodynamic research. Vincenzo Brandi holds a "Magister Laurea" Degree (Master level) in Aeronautical Engineering from the University of Naples "Federico II".*

27) CLEAN SKY ACTIVITIES ON ROTORCRAFT

Andrej PODSADOWSKI – EU Clean Sky JU, Project Officer of Green Rotorcraft ITD and Fast Rotorcraft IADP

This presentation introduces to Clean Sky activities in the field of rotorcraft technologies.

Objectives as well as main area of activities are highlighted in order to facilitate understanding of Memorandum of Cooperation signed off between those two European institutions.
The presentation would allow European participants to understand opportunities emerging from that cooperation between EASA and Clean Sky JU.

Andrej Podsadowski *– is currently employed by Clean Sky JU as Project Officer of Green Rotorcraft ITD and Fast Rotorcraft IADP. His work for Clean Sky JU started in July 2009. Prior to work for CSJU, he was employed by PZL Mielec (1980-2000) and has worked in the areas of aerodynamics, flight physics, sizing of an aircraft (fixed wing a/c) and certification. In terms of positions within the company structure his professional career spanned from research engineer through head of unit, chief designer up to board director. He has also worked for General Electric Company Polska, branch Engineering Design Centre (2000-2004) an affiliate to GE Aircraft Engines) on the position of Managing Director. After short period of work for Warsaw Institute of Aviation he started work for DG RTD/H-3. Aeronautics as National Seconded Expert in 2005.*

28) HELICOPTER MODE (STEPS IN USING THE AUTOMATION)

Capt. Edwin TASMA – ECA, Piloting Safety (presented by Thomas RÜDER, ECA)

The use of automatism is becoming more and more common in many helicopter operations like Oil & Gas support or SAR. Although the use of the upper modes of autopilots, with their risk and benefits, are quite similar to the ones used of our colleagues in the fix wing world, some helicopter automatism features give the opportunities to perform in very unique scenarios. The SAR modes for example can take you from your cruising altitude to as low as 50ft AGL, including a fully automatic "circuit pattern" into the wind, to a point in the middle of the sea (waves included) with absolutely no visual references. Of course that is a great advantage and increases the operational capabilities of many emergency and transport operations. Nevertheless we are no free of risks.

Accidents/incidents statistics reveal that there have been a number of events related to the incorrect use or misuse of the automatism. On one hand the architectures of the system itself, the way of data presentation or when a failure or decoupling appears - could lead the crew to a loss of situation awareness aggravated by the very low height and time for the crew to react. On the other hand, operation with this complex equipment can only be possible with a great level of understanding of the system derived from a complete training program, and from mature Sop's developed by the company. In fact this idea was the forerunner of the EBT concept, one of the EASA priorities also in helicopters, probe by the establishment of the RMT.0599.

So the presentation will have the following keystones:

- Highlight the benefits of the "helicopter modes" of AP.
- Be aware of the risk associated to these operational modes.
- Training and training syllabus as a key element in safety performances, focussing in EBT/CBT training strategies.
- Collaboration between manufactures and pilots for development of a friendlier human interface.
- SMS as means to take care of automatism as a source of risk.
- Dangers of complacency and situational awareness.

As pilot association we should continue be part of working groups and forums to describe our operational experiences in order to collaborate for safer environments to our crews.

Capt. Edwin Tasma *- is an aeronautical engineer and has worked for the Fokker Aircraft company in the past. He has been flying helicopters for the last 23 years. He flew ship pilot service for Dutch harbours and for the offshore industry in the North Sea. Capt. Tasma has been a leader of the internal investigation team within an international helicopter company in the offshore industry, where he was involved in the introduction of the Flight Data Monitoring system. Altogether he has over 30 years of experience in communicating safety.*

Thomas Rüder *– is a German HEMS pilot. He started his aviation career in the German Army, worked as a flight instructor and examiner during his civil aviation career. For more than 5 years Thomas has been leading the German Helicopter WG of the German Pilots association VC, as well as participating in the helicopter WGs of the international pilots associations (ECA and IFALPA). He is a specialist for (H)FTL, the ECA Hel representative in the RMT 0.346 (H)EMS FTL at EASA. During his work for the associations he focused in particular on the topic of mid-air collision risks between helicopters and birds or UAV`s.*

29) ONGOING RULEMAKING TASKS IN THE AIR OPERATIONS DOMAIN

Eric BENNETT – EASA, Air operations rulemaking officer, Air Operations Dept. - Air Operations Regulations Sec.

1. Helicopter offshore operations

Rules have been published and will be applicable on 1.7.2018.
Former commercial air transport (CAT) rules are extended to non-commercial-complex (NCC) and specialised operations (SPO). New requirements ensure that industry best practice are enshrined in the rules.
Modernisation of airborne radar approaches will continue with the 'all weather operations' rulemaking task.

2. Aerial work

Operational rules no longer to require certification of simple personnel carrying device systems (PCDS), for consistency with certification specifications.
Practical training to be better defined and rules to be simplified for Helicopter external sling load and human external cargo operations (HESLO/HEC).

3. Fuel regulations

A procedure for refuelling with rotors turning will be introduced. Last minute comments to Notice of Proposed Amendment (NPA) can still be sent by email until 15.12.2016.

4. Evidence based training

A performance based approach is to be introduced for crew training and checking, in order to optimise the use of simulator time and adapt training to operators specific risks and pilots individual needs.

5. Future rulemaking

To address helicopter emergency medical services (HEMS) issues, single engine helicopter performance issues and consider mandating helicopter terrain awareness warning systems (HTAWS) for CAT and offshore operations.

Eric Bennett –
1995-2015 OPS inspector with the French Authority (aeroplanes and helicopters)
2006 + training of OPS inspectors in France and within the frame of twinning programmes
2010 joined EASA OPS standardisation teams
2015 joined EASA as Air operations regulations officer for helicopters
CPL/IR on single engine aeroplanes

30) AIR OPERATIONS STANDARDISATION INSPECTIONS

Bas van der Weide – EASA, Air Operations Team Leader - Coordinator Helicopter Operations, Air OPs Dept. - Air OPs Standardisation Sec.

This presentation will provide feedback on the results of standardisation inspections. It will provide two examples on where those inspections have identified problem areas with the implementation of the Air Operations Regulations, namely:

1. Compliance Monitoring Systems; and
2. Operations Manuals.

The presentation will address the intent of the requirements and the reason why it is important to tailor these to the actual operations.
It will further give examples that should clarify the expectations from the regulator concerning the compliance monitoring system and the need for an operations manual (i.e. appropriate procedures).

Bas van der Weide– *a Dutch National, joined EASA in 2007, initially as a rulemaking officer, but since 2009 he has been overseeing the implementation and application of Union Law by National Aviation Authorities.*
He worked for the Dutch CAA and for several operators, both in fixed wing and helicopter operations. He also served in the Air Traffic Control squadron of the RNLAF.

31) PHASE 2 - SOP´S IN AERIAL WORK: THE SWISS WAY

Christian MÜLLER – NGFT Consulting and Patrick FAUCHÈRE – Heli-Glaciers SA

At last years conference the two speakers announced that the Swiss Helicopter Industry under the guidance of the Swiss Helicopter Association would develop SPO manuals for the Swiss and European industry. The working group under the leadership of Patrick Fauchère, NPFO of Air Glaciers, has finished the task to write manuals for more than 30 different operations covering all types of aerial work operation. Members of this working group have more than 40’000 hours of experience in all types of operation mostly in the challenging Swiss environment. This set of documents is currently being made available after final sign-off from FOCA. By

introducing these standardized SOP's, the group expects to increase safety while reducing complexity and costs. The transition to the new regulation (entry into force in April 2017) is expected to be both smoother and more coordinated, limiting the efforts required by each individual company. The presentation at the symposium will introduce the approach, document structure, missions covered and approach to train all personnel involved.

Christian Müller –

- *44 Years, Master of Arts*
- *Owner of Next Generation Flight Training (CH ATO.0299)*
- *10 Years as Senior Consultant in International Financial Institutions*
- *4 Years as Head of Training of Helicopter Pilot School*
- *Member of the Board of Swiss Helicopter Association*
- *Member of RAeS*
- *Member EHEST*
- *FI (A/H) EASA/FAA*

Patrick Fauchère –

- *52 years old / 10'500 flight hours/ 3'500 rescue*
- *Flight Operations Manager Air-Glaciers SA*
- *President of the Air Rescue Commission of the international commission for alpine rescue ICAR*
- *Board Member of the Swiss Helicopter Association (SHA)*
- *Board member of the European Helicopter Association (EHA)*
- *Participation in EASA WG (Part SPO, HEMS, PCDS)*

32) PBN IMPROVEMENT OF RELIABILITY AND AVAILABILITY OF HEMS OPERATIONS

Arrigo AVI – PAT NUCLEO ELICOTTERI VVF

PAT NUCLEO ELICOTTERI VVF is a small helicopter company inside firefighting and civil protection service, entitled by local government to ensure HEMS capability in entire territory administrated.
Service is performed by two AW139 and one AS365N3, two AS350B3 are for aerial work only. Typical local areas are not so easy for HEMS purpose due to roughness of territory. In particular lots of mountain and tight valleys could obstacle flying, introducing so an high risk level in order to guarantee HEMS capabilities through 24H. In every valleys there is at least one night HEMS helipad, managed by Società Aeroporto Caproni(local airport public company) flyable only with VFR rules due to lack of navigational aid. In order to improve availability of HEMS service, SOCIETÀ AEROPORTO CAPRONI Spa in conjuction with PAT NUCLEO ELICOTTERI VVF won a GSA call for the development of new PBN route and upgrade two AW139. Our project aim to demonstrate the power of PBN navigation with satellite navigation for improvement of reliability and availability of HEMS service through mountain areas with GSA procurement funding mechanism. The two main goals are:

- upgrade AW139 Primus Epic avionics to Phase 7 in order to reach RNP 0.3 capability
- develop and certify a new PBN route between Trento Airport and Cles hospital helipad.

For our administration is a strong challenge to implement all objectives in one year only due to very demanding performance required (aircraft hardware and software, SPO approval, route certification, GSA funding mechanism).

Arrigo Avi *- is passionate about rotary-wing aircraft. He works as firefighters and, with aerospace engineering background, collaborate to continuing airworthiness management of helicopters. He has developed knowledge about unmanned aerial vehicle and he trusts in a new era of unmanned & manned aviation.*

33) AW 609 TILTROTORS VS THE OPERATIONAL RULES

Gianfranco CITO – Leonardo Company, AW609 Tiltrotor Project Pilot at Leonardo Helicopter Division

Leonardo helicopter division (LHD), former AW, took over the 609 Program in 2011. After a long period of development, it is planned to reach the FAA Baseline certification in mid-2018, and first production delivery at the end of the same year.
In order to prepare the operational use of the first civilian Tiltrotor, LHD has put in place initiatives to support timely regulation for Power Lift /Tilt-rotor (PL/TR) entry into service.
Working groups have been created to review regulations with FAA and EASA, taking into account the differences already in place in the two systems. The commonality of the two LHD working groups is their composition of specialists, with Test and Training Pilots, training and maintenance quality, customer representative (Bristow, ERA), airworthiness representative and subject matter experts. Each of the LHD working group has a counterpart within the authorities. With EASA the Rule making task process was started the 1st of July of 2016 with a meeting in Cologne. Scope of the meeting was to familiarize the EASA team on the project, defining the rules of engagement for the process in Europe having a broad discussion on the current rules versus the 609 entry into service. As a consequence of that meeting an EASA panel has been created and a Rule Making Task 2017-2021 foreseen.
LHD activity is not only limited to collaborating with EASA and FAA to prepare the background for the Tiltrotor entry into service, but since 2014 LHD has been focused to prepare the rules background at ICAO level. Italian Government has seconded an expert at ICAO since 2015. In March 2015, the ICAO Air Navigation Commission (ANC) approved a job card to develop the guidance material for the introduction of Tiltrotor operations with focus on Annexes 6 - Operation of Aircraft, 8 - Airworthiness of Aircraft, 1 - Personnel Licensing, 11 - Air Traffic Services, 14 - Aerodromes, 16 - Environmental Protection. To support this activity, a Tiltrotor sub-group has been created with the task to review the guidance material prepared by the LHD experts and the Italian Government seconded to the Air Navigation Bureau (ANB). After a peer review of the guidance material, the Tiltrotor sub-group will submit it to the FLTOPSP for comment, any additional input and ratification. This process will be closed by November 2017, with the object to have a smooth entry into service of the first civilian Tiltrotor.

Gianfranco Cito - *born 1968. Joined the Italian Air Force in 1987. Graduated as fighter pilot in Sheppard Air Force Base Texas (Euro Nato Joint Jet Pilot Training) class 92/07. Trained in Cottesmore (UK) and assigned to the 156th Tornado Squadron in "Gioia del Colle" Italy, participated to TASMO and CAS missions over the Former Yugoslavia. In 1996 joint the Test Center. In 1998 graduated Experimental Test Pilot in Pax River (MD), USNTPS class 113 (Rotary Wing Curriculum). As an experimental test pilot flown more than 60 different types of aircrafts for more than 8000 FH, including fixed wing and rotary wing aircrafts. Worked in "Pratica di Mare", Italian Test Center from 1996 to 2007. Major programs during military activities:*

- *C130J: Chaff and flares testing, unprepared surfaces testing, paratroopers testing, ocean SAR testing and NVG testing;*
- *NH90: Helmet Mounted Display testing, performance and handling qualities testing;*
- *TORNADO: Midlife update, including weapon testing;*
- *AW139: EASA pilot for the Civilian certification of the helicopter;*
- *BA609: EASA pilot for the Civilian certification of the new tilt rotor.*

Chief Experimental Test Pilot from 2005 to 2007.
Since 2007 working for AgustaWestland as Experimental Test Pilot. Major programs:

- *A119: single engine helicopter High altitude envelope expansion (24000 ft Hp);*
- *AW139 Full Icing system;*
- *T129 Combat helicopter (Chief Project Pilot);*

- *AW 609 (Tilt Rotor) project pilot;*
- *Certification and Verification Engineer for Flight department under EASA regulations for AW 189, HMI;*
- *EASA Type Rating Instructor and Examiner for the following helicopters: A119, A109, AW109, A139, A189, A169.*

Licenses: EASA(A)-(H) FCL with experimental test pilot (Class I) rating; FAA Airline Transport Pilot.

34) NEWLY CERTIFIED MEDIUM-TO-HEAVY CLASS TRANSPORT CATEGORY HELICOPTER MI-38

Maxim ANDREEV – Mil Moscow Helicopter Plant, JSC Chief Designer on Mi-38 helicopter modification
Alexander TARASOV – Mil Moscow Helicopter Plant, JSC Chief Designer – Head of Airworthiness
Dmitry PRASLOV – Mil Moscow Helicopter Plant, JSC Certification Department Chief Expert.

Mi-38 is newly certified Mil Moscow Helicopter Plant, JSC (Russian Helicopters, JSC) transport category multipurpose rotorcraft medium-to-heavy class (TOW up to 15600 kg). Mi-38 is ready to perform aerial work in adverse weather conditions in wide temperature range.
This helicopter passed all necessary certification tests according to Russian airworthiness standard АП-29 (harmonized with CS 29/FAR-29) and already set 5 FAI registered world records (E-1h category). Helicopter design contains many safety features like energy absorbing landing gears, crashworthy fuel system (Zodiac Aerosafety Systems), main gearbox which is able to run dry for more than 30 min and more.
Mi-38 product line is to be extend with passenger, offshore, executive, SAR and other special versions in the near future – certification process is already in progress.

Maxim Andreev– *Mil Moscow Helicopter Plant, JSC Chief Designer on Mi-38 helicopter modification.*
Graduated Moscow Aviation Institute (Technical University) 2004 with honors degree as engineer, specialization Automatic Spacecrafts and boosters. Since 2009 worked for Mil Moscow Helicopter Plant as Manager and Designer in Mi-38 Project Direction. Leaded Mi-38 certification process by the Design Bureau. After the end of Mi-38 Type Certification Stage, become Chief Designer on Mi-38 Modification and nowadays leads Mi-38 product line extending process.

Alexander Tarasov *– Mil Moscow Helicopter Plant, JSC Chief Designer – Head of Airworthiness.*
Graduated Moscow Aviation Institute (Technical University) 2006 as aircraft engineer, specialization is aircraft certification.
Graduated Delft University of Technology (Huygens Scholarship Program, The Netherlands) 2006.
Since 2006 worked for Engineering Centre Airbus in Russia (ECAR, JSC) as stress engineer. Work projects are A330-200GMF, A320 serial activity, A350XWB.
In 2010 started to work for Mil Moscow Helicopter Plant as stress certification engineer. Today – Head of Airworthiness.
Since 2016 – ICAO expert of Regional Aviation Safety Group.

Dmitry Praslov *– Mil Moscow Helicopter Plant, JSC Certification Department Chief Expert.*
Graduated Moscow Aviation Institute (Technical University) 2006 as engineer, specialization Helicopters Design.
Since 2003 worked for Mil Moscow Helicopter Plant as Leading Flight Test Engineer Assistant, since 2006 as Flight Test Engineer. Took part in Mi-38 First flight program.
In 2010 moved to Russian Helicopters, JSC to work in Certification Service, in 2016 moved back to Mil Moscow Helicopter Plant to enforce its Certification Department.

35) CERTIFICATION OF UNMANNED AIRCRAFT SYSTEMS (UAS) USING A RISK BASED APPROACH

James BLYN – FAA, **Aerospace Engineer - Propulsion**

The Federal Aviation Administration (FAA) has developed a risk-based decision making process for use in design, production, and airworthiness certification of UAS. This process uses risk to define requirements for type certification and the level of involvement from the FAA. The result is the applicable design requirements and means of compliance are scalable, based on the class of UAS, the intended mission, and area of operation.

This presentation will briefly cover the FAA's approach to UAS certification using this risk based approach and introduce the 21.17(b) certification method to include an overview of the proposed risk classes and how this approach meets the objectives of the FAA's Safety Continuum.

James Blyn *– joined the FAA in 2010 to work in the Rotorcraft Certification Office. He was subsequently promoted to the Rotorcraft Standards Staff as a propulsion systems specialist in the Regulations & Policy Group. Shortly thereafter, Mr. Blyn was assigned the duties of UAS Focal and Project Officer for all Rotorcraft UAS projects. Prior to joining the FAA, Mr. Blyn spent 12 years working in the aviation and aircraft certification industry, most recently with Bell Helicopter.*

36) LET THE DRONES FLY

Jens ROSENOW – CEO Aeromedia Publishing

Drones are still assumed to be the biggest threat to helicopters. They fear crews in the air but also operators on the ground. 61 airspace drone incursions at German airports in 2016 so far.
This development was quite foreseeable, because the drone sector grew – and still does – in an uncontrolled manner. And it is very versatile. That is one reason, why the manned rotorcraft sector loses business opportunities to the UAS sector day by day. While the drones benefit among others from a very new regulating freedom, the manned rotorcraft branch is still faced with lots of traditional approaches and challenges. There is just one thing that the rotorcraft sector has an advantage over the drones: it is knowledge and experience. Could this be the leading and mind changing way to new businesses for helicopters?

Jens Rosenow *– 41 years old, holder of a private EASA FCL and publisher of both 4ROTORS magazine and the German speaking DROHNENMAGAZIN. He is also founder of the UAS sector initiative DROHNENZENTRALE and board member of the European drone association UAV DACH e.V.*

37) DRONES - REGULATOR VIEWS

Stefan RONIG – EASA, RPAS, VLA, Glider, LSA, Balloons & Airship Section Manager, General Aviation & Remotely Piloted Aircraft Sys. (RPAS)

In August 2016 EASA published a 'prototype' regulation for to the operation of unmanned aircraft in the 'open' and 'specific' categories. The presentation will explain the background and the main principles for the proposed European regulatory framework; how safety should be ensured in the "open category" and the concept of the specific category. The actual points of the discussion and the next steps will be presented.

Stefan Ronig *- joined EASA 2006. Since 2014 RPAS, VLA, Glider, LSA, Balloons & Airship Section Manager and manager of the EASA internal drone project. Participating at international activities on RPAS (JARUS, ICAO).*