1. HM COASTGUARD TRAINING, USE OF SIMULATION AND PLANS FOR THE FUTURE
The “Who, why, when, what and how?” usage of simulation within Bristow Helicopters, particularly with regard to Search and Rescue Operations in the United Kingdom. The nature of our business and what we do - what our operations are. How we use our simulators, the good points and shortcomings. The importance of teaching technical and non-technical skills in the synthetic environment. What we train in simulators now, and what we would like to do in the future. How we would like to develop the training of a four person crew in the synthetic environment, in order to provide a more integrated solution.

2. REDEFINING ROTORWING SIMULATION TO ENHANCE HEMS OPERABILITY
Flight simulation for Commercial Air Transport Rotorcraft operators is mandatory in all but the rarest cases. The mandatory elements of this training combined with the expense of the simulators, travel time and costs incurred by losing employees off the line lead to an under utilisation of this critical element of flight safety. In this lecture we briefly examine the current mandatory elements of rotorcraft simulation and seek to understand how legislation could be altered to ensure that operators utilise simulation to better prepare flight crews for the myriad of threats that exist during day to day helicopter operations. Recent EASA and EHEST accident data highlight a worrying perpetuation of avoidable accidents amongst commercial rotary operators despite use of flight simulation. We examine how this technology could be better exploited to mitigate against the most common standard problem statements identified as casual factors in rotorwing incidents and how simulation without the presence of the entire flight crew could be construed as negative training.

3. JOINT HELICOPTER COMMAND
Nailing the User Requirement.

4. THE NEED FOR GREATER USE OF SIMULATION IN CIVIL HELICOPTER TRAINING
Information not available at time of print.

5. THE NEED FOR EXTENDING THE ENVELOPES OF ROTORCRAFT SIMULATORS
Information not available at time of print.

6. DESIGN AND DEVELOPMENT OF MODELLING AND SIMULATION TOOLS TO INFORM SHIPHELICOPTER DYNAMIC INTERFACE RESEARCH
The Flight Science and Technology research group at the University of Liverpool (UoL) has been at the forefront of the academic research to develop high-fidelity helicopter-ship simulation environments since 2003, including efforts to quantify the overall fidelity of rotorcraft simulators for use in design, development, training and qualification. The research to be presented in the conference will cover the recent developments carried out in two longer-term projects initiated in 2016 at the UoL, aimed at following objectives: a) Preparation and analysis for high-fidelity flight simulations; which includes computation and modelling of airflow around naval ships, modelling of ship motion and their integration into the flight simulation loop. Development and use of modelling and simulation tools, such as Virtual AirDyn and SIMSHOL for offline ship-helicopter operational analysis. b) Structured examination and optimization of modelling and simulation elements integrated into the helicopter-ship dynamic interface simulation environment, i.e. the visual and vestibular motion cues, and the flight dynamics model, aimed at defining and establishing simulation fidelity requirements that are needed to inform the “real-world” clearance trials.

7. ACHIEVING REALISTIC ROTARY WING FLIGHT PERFORMANCE THROUGH COMBINED SYSTEMS INTEGRATION
The rotorcraft simulation industry has achieved a higher level of realism in simulator performance by combining primary and secondary motion systems with advanced aerodynamic and vibrations modeling techniques. Pairing the advanced models with a dual 6 degree of freedom motion system provides the ability for extended simulator performance ranges and increases the capabilities of flight training to encompass more complex training scenarios.

8. NEVER MIND THE REGULATIONS, WHAT ARE THE TRAINING ISSUES WE NEED TO SOLVE?
Information not available at time of print.

9. ROTORCRAFT SIMULATION CAPABILITIES AT RNAS YEOVILTON
The presentation will provide an overview of Rotorcraft Simulation Capabilities at RNAS Yeovilton, used for both AW159 Wildcat and Merlin Mk4 MLSP Training. It will explore. Capabilities provided to the UK MOD; including
successes & lessons identified, Planned and future opportunities for both expanding & improving training delivery. Potential for the introduction of new technologies within Training simulation. Benefits derived for FSTDs delivered with the a/c OEM as prime. Contrast of the MAA Approval for Use against EASA/FAA type certification regimens”

10. EFFECTIVE TRAINING TECHNOLOGIES FOR HELICOPTER AIRCREWS
The rapid increase in the fidelity of visual systems and the computational speed of computer can provide an opportunity to produce aircrew systems capable of addressing a wider variety of training requirements. The challenge is in picking the correct technology for the task the aircrew is to master. This presentation will address the opportunities and challenges associated with the development of requirements as well as the implementation of helicopter aircrew training systems for a variety of military utility helicopters.

KEYNOTE - THE ON-DEMAND FUTURE OF FLIGHT
The presentation will address on-demand mobility using powered lift aircraft to move people, goods and data from point A to point B - when you want and where you want it. We will look at the Nexus and APT air vehicle configurations and technologies (including more electric propulsion, advanced flight controls, and autonomy), as well as discuss the ground, air, and general mobility infrastructure necessary to unlock this mode of transportation for everyday use.

11. FURTHER DEVELOPMENT OF SYNTHETIC ENVIRONMENTS TO SUPPORT THE EARLY EVALUATION OF UNMANNED ROTARY WING VEHICLES
The presentation will describe the work that was carried out creating and integrating the elements that build up the synthetic environment representing a rotary wing unmanned system operating in the ship dynamic interface.

12. THE USE OF HIGH FIDELITY MODELING AND SIMULATION FOR THE STUDY OF FUTURE MOBILITY NETWORKS
The future mobility ecosystem has generated intense interest from innovators, investors, and regulators alike. While the potential of disruptive aviation technologies and new business models is exciting, the operational considerations to make them safe and successful have yet to be fully explored and understood by most stakeholders. Boeing NeXt, a Boeing Company business unit building the future of urban, regional, and global mobility, has developed a high fidelity modeling and simulation environment that underpins and empowers our research into this new realm. Built upon more than a century of operational aeronautical experience, and decades of operations analysis using Boeing-developed high fidelity simulation, NeXt’s digital twin research environment addresses the vehicular, environmental, regulatory, and business factors that will ultimately determine success.

13. URBAN AIR MOBILITY AND UNMANNED VEHICLES - DO WE NEED THE SAME OR DIFFERENT TRAINING MODELS TO ENSURE THE SAFETY OF OUR SKIES?
Information not available at time of print.

14. FLIGHT DATA GATHERING FOR HELICOPTER FSTD DEVELOPMENT AND VALIDATION
Before an FSTD can be approved for training, it must be qualified as meeting Authority Standards, including its validation against flight data obtained from the real aircraft. The quality of the flight dataset (parameters and test conduct) is therefore critical to the outcome, since the dataset is the formal baseline against which defined FSTD objective tests are judged. Depending upon the type and level of FSTD, such tests may focus upon all or some of the flight performance and handling qualities, controls, and visual, motion, vibration and sound cueing models. This presentation focuses upon the methodologies, issues and advantages of flight data gathering from recent test campaign experience, done specifically for FSTDs to provide data for the highest qualification levels. Topics include test scope, planning, test techniques and in-flight data monitoring primarily for validation data gathering, but also to support subjective tests and system model development.

15. DEVELOPMENT OF A FULL FLIGHT SIMULATOR: CHALLENGES, SOLUTIONS AND LESSONS LEARNED
This paper will present Airbus Helicopters’ methods for creating highly representative flight-loop simulations, discuss the challenges faced in the qualification process and highlight the evolving training needs for modern helicopters.

16. TRAINING DEVICES - ORIGINALS AND REPLICATIONS - BOTH SIDES OF THE COIN
Training forms an essential part of an aircrew’s professional life and provides the foundation for all flight safety. Training encompasses a wide range of activities to be performed on various training devices. The availability and quality of these training devices heavily relies on the data of the helicopter’s characteristics to provide realistic training. Where are the sources for this data? This is a question, simulation industry is often confronted with. There is, of course, always the option to use real aircraft equipment and software models. Training benefit and availability may limit the use of original equipment. Alternatively, the regulatory standards allow the use of third party data as source for replicated equipment and behavioural models. Where real equipment is unavailable for various reasons like security or safety, replica equipment can step in. Where behavioural models of the helicopter’s flying characteristics are not provided, a third party data gathering offers an alternative data source. This paper discusses alternative data sources for the development of aircrew training devices from technical, regulatory and other aspects and presents proven solutions.

17. DRIVING ROTARY SIMULATOR EFFECTIVENESS THROUGH IMPROVING STANDARDS
The increasing complexity of aircraft, combined with the cost savings achievable through use of synthetic training, mean
the relative impact of simulation fidelity within pilot training programmes is likely to increase over time. Nova Systems has extensive experience in testing of Full Flight Simulators, during which the shortcomings of current EASA and FAA Level D standards and their effect on simulation fidelity - and therefore training effectiveness - has been noted. This presentation will highlight some of those shortcomings with a focus on rotary wing simulation, illustrating their effect on simulation fidelity and resultant quality of training. Changes to the standards will also be proposed which the presenter believes would provide significant benefits in terms of simulation fidelity and overall training output.

18. QUANTIFYING LIVE VS SYNTHETIC TRAINING
Information not available at time of print.

19. CHINOOK SHIP AIR INTEGRATION SIMULATION APPROACH
Aim to describe the approach taken by the ChDT in the development of the Boeing Chinook Engineering Simulator to support Chinook SAI development. Approach has included the inclusion of the SEA Ltd Ship Air Interface Framework (SAIF) system and development of advanced Airflow/Air Pattern (AFAP) data.

20. ROTORCRAFT FLIGHT MODEL VALIDATION, COMMONALITIES BETWEEN FLIGHT CONTROL SYSTEM DESIGN AND TRAINING SIMULATOR DEVELOPMENT
In Flight Control System Design the validation of the aircraft mathematical model is a mandatory step of the design process. A frequency based technique is introduced to complement conventional time based validation methods. Flight data are collected adopting ad-hoc maneuvers to carry out Rotorcraft Dynamics Identification. The "gap" among identified and physical models is measured in the frequency domain in the control bandwidth adopting the Vinnicombe metrics in a Multi Input Multi Output fashion. The approach provides a robust evaluation of the mathematical model both for direct control response and for coupled dynamics. Carrying out the validation within the frequency domain guarantees a structured evaluation of the model differences that cannot be achieved with time-based validation techniques. Moreover, focusing the validation onto the control bandwidth guarantees that model representativeness for the control task is adequate. Commonalities with development of the rotorcraft mathematical model for a Simulator are illustrated.