KEYNOTE: THE EVOLUTION OF FLIGHT SIMULATION ENGINEERING - JAMES TAKATS
How Flight Simulation Engineering has changed throughout the years.

1. THE DEVELOPMENT OF SYNTHETIC ENVIRONMENTS TO SUPPORT THE DEVELOPMENT AND TESTING OF UNMANNED ROTARY WING VEHICLES - ADRIAN ALFORD
This presentation will describe the development and testing of a maritime and urban synthetic environment. These environments will be used by Leonardo Helicopters to support the development and testing of various unmanned rotary wing vehicle configurations. The maritime environment is challenging due to its combination of ship motion and ship air wake. The urban environment is challenging due to the extreme turbulence and confined space associated with a collection of tall buildings.

2. USE OF TRAINING SIMULATIONS FOR AIRCRAFT DEVELOPMENT AT LOCKHEED MARTIN - DAN MORRISON
Lockheed Martin uses our training simulation products to enhance our aircraft development environment, both to enhance System Integration Labs (SILs) and to reduce usage demand on SILs. We are working to blur the line between engineering and training simulation, improving both domains and providing additional customer value.

3. THE CHALLENGES OF USING PILOT-IN-THE-LOOP SIMULATION IN THE TEST AND EVALUATION OF HELICOPTER HANDLING RELATED TASKS - ADRIAN NEVE
QinetiQ are actively involved in the assessment of military helicopter flight training simulators to ensure they are suitable for the military training need. QinetiQ are also highly experienced in the flight testing of helicopter handling related tasks (such as landing in low visibility environments and on ships) to ensure that they can be safely and effectively achieved. To date, the use of pilot-in-the-loop simulation to aid or replace flight testing in these areas has been limited. This presentation draws on QinetiQ’s experience of military flight training simulators and identifies the challenges that need to be overcome before pilot-in-the-loop simulation can be reliably used for the assessment of the safety and effectiveness of helicopter operational handling tasks.

4. STANDARDISING THE HARDWARE-IN-THE-LOOP SIGNAL PATH WITH SLSC - JEREMY TWAITS
For years, test engineers have taken advantage of the lower price, outsourced risk and easy upgradability of commercial off-the-shelf (COTS) components for data acquisition. Until now, however, they’ve lacked good solutions for the other half of their test challenge: switches, loads and signal conditioning. SLSC is the first open architecture designed to deliver all these benefits while supporting the integration of custom circuitry and load plates by being fully open. Learning how SLSC is helping companies focus on their domain expertise, building and testing next-generation vehicles, rather than on building and maintaining data acquisition systems will be presented.

5. SLSC OPEN STANDARD FOR SIGNAL CONDITIONING IN HARDWARE-IN-THE-LOOP SIMULATION OF AIRCRAFT SYSTEM - ANDERS TUNSTRÖMER
The zeros and ones in a computer simulation need to be converted to real electrical signals that is suitable for the Device-Under-Test (DUT) in Hardware-In-The-Loop (HIL) simulation to make it believe that it is included in an aircraft. All DUTs have their specific need of stimulation, in this case focus on electrical stimulation. With the open platform SLSC, the design and construction of an HIL simulation is simpler and take less time. The SLSC ecosystem offer you to buy modules available on the market but let you also design your own functionality in-house or incorporate modules developed in cooperation with other partners.

6. THE EVOLUTION OF SIMULATION - INCREASING THE USE OF MODELLING & SIMULATION FOR PRODUCT DEVELOPMENT - JASON WILKES
This presentation will look at how OSAs and MOSAs are breaking the stove pipe areas of aerospace development and providing a more fluid and reusable technology base starting with concept development for new aircraft and concluding with a filed training system for the certified aircraft. It will provide the focus of a dynamic and changing 40 years of one career.

7. ENHANCING MODEL INTEROPERABILITY IN AIRCRAFT SYSTEM SIMULATION USING THE FUNCTIONAL MOCK-UP INTERFACE STANDARD - DR MAGNUS EEK
Efficient integration and co-simulation of models originating from different tools and languages is a central challenge in
Aircraft system simulation. This presentation provides an overview of the Saab-led ITEA3 research project OpenCPS focusing on standards and open source tools for efficient large-scale model-based development of Cyber-Physical Systems (CPS). An open source tool "OMSimulator" enabling co-simulation based on the Functional Mock-up Interface (FMI) standard is presented, along with experiences from FMI-based model integration and aircraft system simulation at Saab.

8. HOW OPEN SYSTEM ARCHITECTURES ARE CHANGING AEROSPACE TECHNOLOGY DEVELOPMENT - LAWRENCE KERMON
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9. DEVELOPING A610 FUNCTIONALITY FOR COMPUTER CONTROLLED AIRCRAFT SIMULATION - A LOOK AT DIFFERENT WAYS OF SIMULATING AVIONICS AND THEIR ADVANTAGES AND DISADVANTAGES - BERNARD MATTOS
Digital avionics boxes were fitted to civil aircraft from the early 1980s and their development since then has led to parallel developments in simulation. From the start, it was realised that the use of aircraft boxes in simulators would lead to difficulties with specific simulator functions. This led to the development of the ARInc 610 guidelines for avionics in 1985 and has been regularly updated ever since. The increasing volume of software onboard aircraft, and similarly increasing availability of processor power on simulators, has led to alternative solutions to meet A610 requirements, as well as to meet the needs of lower-level training devices where the use of real aircraft avionics was prohibitive. This was foreseen by versions of A610 as early as the 1990s. This presentation looks at some of the main methods used, their advantages and disadvantages and touches on some of the commercial issues which led to those choices.

10. TYPHOON SIMULATOR RECORD AND REPLAY DEBRIEF FACILITY - DUNCAN PORTEOUS
Military operations are increasingly complex due to the fact that missions are typically performed in an environment with a mix of platforms and with many different actors, including military and civilian players. In order to prepare for these missions, advanced training, in which the warfighters are immersed in such complex environments, is required. (Distributed) simulation has been recognized by NATO as a solution to support this type of training and the concept of "Mission Training through Distributed Simulation" (MTDS) is currently developed by several nations and aligned under the umbrella of the NATO Modelling and Simulation Group (NMSG). A common technical framework for MTDS provides simulation interoperability and thus allows better exploitation of M&S capabilities and more reuse of assets and tools. The NMSG has the mandate in NATO w.r.t. simulation interoperability standards. There are many interoperability aspects that need to be addressed: datamodels, federation agreements, terraindata, infrastructure data, scenario's, human behaviour models, trainee data, technical aspects regarding network architecture and systems etc. Developing a so-called Reference Architecture (RA) for MTDS is one of the main objectives of ongoing NMSG research. The generic RA and its specific solution elements will offer a flexible approach for rapid implementation of an exercise environment that meets the mission training needs. This presentation will discuss some of the challenges for MTDS in a coalition context and provide an overview of the specific solutions that are being developed and implemented as a NATO MTDS capability.

11. BRIEFING ON NETWORKED SIMULATION - STEFEN SANDBERG
Not available at time of print.

12. MISSION TRAINING THROUGH DISTRIBUTED SIMULATION IN A NATO CONTEXT - WIM HUISKAMP
Military operations are increasingly complex due to the fact that missions are typically performed in an environment with a mix of platforms and with many different actors, including military and civilian players. In order to prepare for these mission, advanced training, in which the warfighters are immersed in such complex environments, is required. (Distributed) simulation has been recognized by NATO as a solution to support this type of training and the concept of "Mission Training through Distributed Simulation" (MTDS) is currently developed by several nations and aligned under the umbrella of the NATO Modelling and Simulation Group (NMSG). A common technical framework for MTDS provides simulation interoperability and thus allows better exploitation of M&S capabilities and more reuse of assets and tools. The NMSG has the mandate in NATO w.r.t. simulation interoperability standards. There are many interoperability aspects that need to be addressed: datamodels, federation agreements, terraindata, infrastructure data, scenario's, human behaviour models, trainee data, technical aspects regarding network architecture and systems etc. Developing a so-called Reference Architecture (RA) for MTDS is one of the main objectives of ongoing NMSG research. The generic RA and its specific solution elements will offer a flexible approach for rapid implementation of an exercise environment that meets the mission training needs. This presentation will discuss some of the challenges for MTDS in a coalition context and provide an overview of the specific solutions that are being developed and implemented as a NATO MTDS capability.
13. DOTC AIR - CAPT MARK ‘BRITVIC’ GORRINGE
Not available at time of print.

14. THE ROLE OF SIMULATION IN SUPPORT OF F-35B/ QEC AIRCRAFT-SHIP INTEGRATION - DR STEVEN HODGE
This presentation will describe how BAE SYSTEMS are exploiting the latest Simulation technology to support the integration of the F-35B Lightning II with the UK’s new Queen Elizabeth Class aircraft carriers. The presentation will describe the simulation facilities employed in this work and discuss the modelling and simulation techniques which are critical to developing a high-fidelity simulation of the aircraft-ship environment, particularly the ship airwake or ‘burble’. The presentation will close by outlining some typical applications of the simulation and will look ahead to the future.

15. CAN WE LEARN FROM CROSS-PLATFORM GAMING? ANDREW FAWKES
This presentation will look at the requirements for networked flight training and explore whether the flight simulation community can learn from cross-platform games such as Fortnite both in terms of interoperability and the supporting ecosystem.

16. DESIGN OF TARGETED FIDELITY TRAINING DEVICES USING GAMING TECHNOLOGY AND STANDARDS BASED INFRASTRUCTURE - STEFAN SANDBERG
Information not available at time of print.

17. PRODUCT FAMILY ENGINEERING CHALLENGES AND SOLUTIONS IN THE DEVELOPMENT OF AIRCRAFT SIMULATORS - ROBERT LINDOHF
The benefits of establishing a Product Line approach in a development organisation includes higher productivity, higher quality, shorter delivery times and lower labour needs. This presentation takes you through the challenges and benefits of applying the Product Line Engineering approach to the development of fighter aircraft simulators at Saab. The Product Line Engineering approach supports the development organisation, and the whole company, with long-term solutions that spans over several projects and even over the life-time of individual product variants. You will never need to do the same thing twice using product lines. In the end, the question is: Will you focus on making successful projects, or successful products? Which one do you believe the customers and markets care for the most?

18. VIRTUAL REALITY: HOW IT FITS INTO LVC SIMULATION - FERNANDO PETRUZZIELLO
This presentation provides a summary of available display technologies for Live Virtual Constructive (LVC) synthetic environments and summarises the advantages and disadvantages of head mounted displays (HMD) and fully immersive 3D display solutions. However, recent advancements in virtual reality bring many new opportunities for innovative training solutions. But do these succeed in the transfer of learning? This presentation will explain why virtual reality has fallen far short of expectations. In addition, it will present evidence and show how a subtly-different approach using virtual imaging, could deliver an improved immersive training environment designed for maximum realism. The presentation will summarize the challenges that have to be overcome with regard to optical configuration technology optimization to be able to accurately represent the perceived depth of objects at distances greater than a few feet without the use of headwear or head tracking devices typically used today. Finally, suggestions on how this increased realism and features of such a developed product could be used to support applications in civil aviation training, as well as other industries.