

TRACK 5: AVIATION TRAINING / MRO**“IMMERSIVE TECHNOLOGIES IN A VIRTUAL
AIRCRAFT MAINTENANCE TRAINING ENVIRONMENT”**

BY

MR CHRISTOPHER P. GIORDANO, MR STEPHEN A. JACKSON
AND MR CHRISTOPHER G. VAN DUYNE
THE DISTI CORPORATION – ORLANDO, FL, USA

ABSTRACT

Significant research has been conducted relating to how making 3D virtual environments more immersive might benefit the training outcome, including student acceptance, training effectiveness, and life cycle cost. This research has included the use of game controllers, avatars, intelligent tutors, haptic feedback, motion capture devices, and helmet mounted displays. As the use of virtual maintenance trainers have gained wide acceptance in both military and civil industries, the tendency has been to consider the use of these immersive technologies as automatically beneficial to virtual maintenance training. This paper focuses on the applicability and implications of using Head Mounted Displays (HMD) in modern aviation Virtual Maintenance Trainers (VMT). The paper catalogs the common training objectives and types of interactions of typical VMTs. It also enumerates the basic types of immersion and how they apply to these objectives and interactions. The relevance of the HMD for the different types of immersion needed in VMTs is then addressed. The paper also discusses the training effectiveness, training throughput, physiological issues (i.e., simulator sickness), and life cycle support issues associated with use of HMDs versus desktop displays. As an alternative technology to HMDs, the paper explores the potential of using head tracking systems, combined with desktop displays, to offer a suitably immersive training environment without the HMD's limitations.

BIOGRAPHY OF SPEAKERS

Since 1997, Mr Christopher P. Giordano has worked in the Training & Simulation industry starting at the University of Central Florida Simulation laboratory conducting simulator sickness studies for the U.S. Navy. Mr Chris came to DiSTI in 1998 as an application developer for the GL Studio visual interface software. He became a Lead Engineer and Program Manager for 48 different visual programs including dozens of airframes such as the F-18, F-15, F-16, F-35, AH-64, UH-60 and CH-47 to name a few.

Mr Chris went on to be the Product Manager for all of DiSTI's commercial Human Machine Interface products and has over 15 years of experience in developing high fidelity, high performance visual interfaces and currently manages all of DiSTI's International Business. Mr Chris is a Committee Member for the European ITEC Conference where he is the chair for the Virtual Maintenance Training theme and Deputy Chair for the Conference. Mr Chris holds a Bachelor of Science degree in Finance from the University of North Carolina at Wilmington and a second Bachelor of Science degree in Computer Engineering from the University of Central Florida.



Mr Steve has worked in the Training and Simulation industry for over 39 years in a wide range of capacities, including engineering, training, business development, program management, and marketing. Mr Steve came to DiSTI in 2008 as the Vice President of Business Development and has played key roles in the capture and execution of numerous virtual maintenance trainer programs, for platforms including the F/A-18E/F, EA-18G, CH-147F, F-16, F-15, AH-64D, and LCAC. In addition to his business development activities, Steve has performed as the Program Manager and Program Director on several key programs, including the F/A-18E/F and EA-18G Virtual Maintenance Trainers for the RAAF and U.S.Navy. Mr Steve's experience prior to DiSTI includes working for industry leading companies, including Link Simulation and Training, Reflectone, BAE Systems, CAE USA, and Thales Training and Simulation. Prior to his work in the training and simulation field, Mr Steve was a satellite communications specialist serving in the U.S Army, and worked as a satellite controller for NASA at the Goddard Space Flight Center.



Since 1993, Mr Christopher G. Van Duyne has worked in the Training & Simulation industry starting at Environmental Tectonics Corporation where he was instrumental in the delivery of man-rated centrifuges, Virtual Fire Fighting Command & Control trainers, and an Integrated Avionics Maintenance Trainer. Mr Chris came to DiSTI in 1998 and oversaw much of the development of the DiSTI GL Studio toolkit, an industry standard for object-oriented graphical application design. Later, as the lead engineer and system architect on numerous projects, he shaped the much of the design and implementation of the Virtual Maintenance Trainers (VMT) that have made DiSTI the leader in the industry. The Virtual Maintenance Trainer projects included training a wide variety of platforms, including the F/A-18C, F/A-18E, and EA-18G for the U.S. Navy, CH147 for Canada, F/A-18E for the Royal Australian Air Force, and F-18C for the Finland Air Force. Recent non-aviation programs have included a VMT for an undersea remotely operated vehicle and an automotive virtual training system. At present, Mr Chris is DiSTI's Chief Engineer and is responsible for overseeing all the technical aspects of the projects and services, as well as the overall technical direction of the company. Mr Chris holds a Bachelor of Science degree in Electrical Engineering from the University of Central Florida.