## TRACK 4: MISSION SYSTEMS / VIRTUAL TRAINING

## "AUTOMATIC GROUND COLLISION AVOIDANCE SYSTEM"

BY
MR EDWARD M GRIFFIN
LOCKHEED MARTIN AERONAUTICS

**ABSTRACT**

Controlled Flight into Terrain (CFIT) mishaps are leading killers in fighter aviation. United States Air Force (USAF) CFIT mishaps are the No. 1 cause of fighter pilot fatalities, the No. 2 cause of all fighter mishaps and accounts for 25% of all fighter mishaps. Historical CFIT mitigations such as advanced training, increased experience and warning systems did not show statically significant improvements over the past 40 years. To reduce CFIT rates, a technological solution was required - Automatic Ground Collision Avoidance System (Auto GCAS). It has been deemed the most significant safety system fielded in fighter aviation since the installation of the ejection seat. Many aviation professionals believe autonomy is emerging as the new frontier in aviation and Auto GCAS currently represents the leading edge of autonomy in man-rated platforms. Consisting of a series of complex collision avoidance and autonomous decision-making algorithms, the system utilises a precise aircraft navigation solution, current aircraft performance / state data and an on-board digital terrain system to command the aircraft flight controls system to automatically manoeuvre the aircraft to prevent a pending collision with the ground. Auto GCAS is currently fielded on over 600 USAF F-16s. Since Sep 2014, the USAF has confirmed that Auto GCAS has saved seven pilots and six F-16 aircraft.  The Auto GCAS Presentation will further highlight the immediate impact of this recently fielded system on the F-16, including a real-world Head-up Display video from a couple of the confirmed saves.

**BIOGRAPHY OF SPEAKER**

Mr Edward Griffin is a Senior Program Manager for Lockheed Martin Aeronautics, Advanced Development Programs, a.k.a Skunks Works, where he leads a multi-disciplined technical team in the development, maturation and demonstration of advanced fighter technologies and capabilities. During his 30 career at Lockheed Martin Aeronautics, he has executed over forty advanced fighter technology development programs, which included mission systems, sensor integration, weapon systems, datalinks, electronic warfare, automatic collision avoidance systems, simulation evaluation, flight testing and concept demonstrations on F-16, F-22, and F-35 platforms.