

# School of Aeronautics and Astronautics

## The AAE Spring 2011 Colloquium Series

## On Evaluating System of Systems Architectures

#### Prof. Alexander H. Levis

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> Thursday, April 28, 2011 3:00 p.m. ARMS 1109

### **Abstract**

A goal of an agile System of Systems (SOS) is to be able to adapt its structure to changing operating environments so it can provide the <u>multiple</u> capabilities that enable mission accomplishment. A challenge for the system of systems designer is that while the SOS is being developed, the operating environment it was designed for changes. This situation causes significant uncertainty as to whether the SOS will meet the needs of the organization when finally deployed. To mitigate this uncertainty, SOS architectures should by assessed early for their ability to deploy in more than one configuration. Past architecture assessments and performance characteristics are primarily system focused and do not address the dynamics of the interacting constituent systems of the SOS. Several measures for assessing and comparing SOS architectures for their ability to adapt to the different operating environment and to provide multiple capabilities concurrently are presented and a procedure for evaluating these measures is illustrated

### **Biographical Sketch**

**Dr. Alexander H. Levis** is University Professor of Electrical, Computer, and Systems Engineering and heads the System Architectures Laboratory at George Mason University, Fairfax, VA. He was educated at MIT (BS, MS, MechE, ScD) with control systems as his area of specialization. From 2001 to 2004 he served as the Chief Scientist of the U.S. Air Force. He currently serves on the Dept. of Homeland Security Science and Technology Advisory Committee; he chairs the Avionics, Software and Cybersecurity subcommittee of the NASA Advisory Council, and he is a member of the Panel on Nuclear Engagement and Global Strike of the USSTRATCOM Strategic Advisory Group. Dr. Levis is a Life Fellow of IEEE and past president of the IEEE Control Systems Society; a Fellow of AAAS and INCOSE, and an Associate Fellow of AIAA. For the last fifteen years, his areas of research have been organization architecture design and evaluation, adaptive architectures for command and control, adversary modeling for behavioral analysis, and methodologies for architecture comparison and evaluation. He has over 260 publications documenting his research, including the three volume set that he co-edited on *The Science of Command and Control*.

An informal coffee & cookie reception will be held prior to the lecture at 2:30 p.m. in the AAE/ARMS undergraduate lounge (directly in front of ARMS  $3_{rd}$  floor elevators)