Tuesday, July 18 – Morning Tutorials   **8:00 a.m. to 12:00 p.m.**

Cloud Adoption Strategies

Dr. Michael Soltys, GBL Systems

Cloud computing refers to the delivery of computing services, including servers, storage, databases, networking, software, and analytics, over the Internet or "the cloud." Instead of hosting these services on a local server or personal computer, they are provided and managed by third-party cloud service providers, such as Amazon Web Services, Google Cloud Platform, or Microsoft Azure. Thus, cloud computing is often called other people's computers. Cloud computing provides a range of benefits including: scalability, cost-efficiency, accessibility, reliability and security. However, Cloud computing has potential drawbacks, including cost, security concerns and vendor lock-in. This workshop will discuss both the benefits and the potential drawbacks, and provide a demonstration of interacting with the cloud.

Laser System Test & Evaluation Atmospheric Challenges

Douglas H. Nelson, Senior Combat Systems Engineer, Teknicare, Inc.
& Mark Stevens, Systems Engineering Department, NPS

An introduction to the challenges of testing and evaluating Laser Systems in various atmospheric conditions. An overview of the basic physics and terminology of these systems is included. The unique effects of Laser Systems are also discussed to provide a foundation for test objectives. Test and evaluation needs for Laser Systems including required diagnostic beam propagation and atmospheric measurements are briefly examined.

T&E as a Part of Agile Development

Robin Poston, Dean of the Moody School of Graduate and Advanced Studies, Southern Methodist University and Research Fellow with the Systems Testing Excellence Program FedEx Institute of Technology, The University of Memphis and Wayne Dumais - Deputy T&E, Department of Homeland Security (DHS)

To discuss T&E in support of agile development, we need to explore the sequence of the evolution of the agile methods, rationale for the application of different methods, compare traditional and agile software development approaches, discuss research conclusions regarding the agile method's impact on software performance, review benefits and challenges of agile, and appreciate the fit of agile methods with Systems Acquisition Life Cycle. Furthermore, in this tutorial we will also discuss when to use agile, the role of the tester on agile projects, and various kinds of testing applicable to agile software developments.

Analytics Training with CHEETAS
Dr. William Schneider, DELL EMC & Dr. Allen Gee, Senior Data Scientist, KBR

CHEETAS is an enterprise government-owned software platform designed to modernize the analysis of datasets currently processed by test ranges across the country. Actively enhanced and supported by TRMC with input from the test range community, this software suite facilitates the ingestion, management, exploration, query, and execution of analytic applications to enrich and derive insights from large data sets. This training will cover the full workflow for analysts using representative datasets as well as include representative analytic use cases. The training will focus on using Python as a language integrated with CHEETAS to implement these analytics, as it is a widely popular open-source tool for data manipulation and machine learning. Prerequisites include some familiarity with working with time series data as well as some knowledge of the python programming language. Machine learning will be covered from a fundamental level.

Introduction Machine Learning
Dr. Michael Soltys, GBL Systems

The last two decades of Machine Learning (ML) research have produced formidable technologies that are providing immense benefit to industry, government, and society. ML can now translate between languages, identify objects in images and video, streamline manufacturing processes, control cars and robots. The deployment of ML systems has not only created a trillion-dollar industry that is projected to quadruple in three years but has also exposed the need to make ML systems fair, explainable, trustworthy, and secure. ML systems, such as ChatGPT, will rightfully be expected to reason effectively about the world in which they (and people) operate, handling complex tasks and responsibilities effectively and ethically, engaging in meaningful communication, and improving their awareness through experience. (See A 20-Year Community Roadmap for Artificial Intelligence Research in the US.) This workshop will examine various aspects of ML development, including examples, explain ability, synthetic data and ethics. It will also provide a demonstration of a ML project.

MDO and Distributed Testing Solutions with TRMC
Gene Hudgins, TRMC JMETC/TENA

The Test and Training Enabling Architecture (TENA) was developed as a DoD CTEIP project to enable interoperability among ranges, facilities, and simulations in a timely and cost-efficient manner, as well as to foster reuse of range assets and future software systems. TENA provides for real-time software system interoperability, as well as interfaces to existing range assets, C4ISR systems, and simulations. TENA, selected for use in JMETC events, is well designed for its role in prototyping demonstrations and distributed testing.

Established in 2006 under the TRMC, JMETC provides readily-available connectivity to the Services' distributed test capabilities and simulations. JMETC also provides connectivity for testing resources in the Defense industry and incorporation of distributed testing and leveraging of JMETC-provided capabilities by programs and users has repeatedly proven to reduce risk, cost, and schedule. JMETC is a distributed LVC testing capability developed to support the acquisition community during program development, developmental testing, operational testing, and interoperability certification, and to demonstrate Net-Ready Key Performance Parameters (KPP) requirements in a customer-specific Joint Mission Environment.

JMETC is the T&E enterprise network solution for secret testing, and uses a hybrid network architecture – the JMETC Secret Network (JSN), based on the SDREN. The JMETC MILS Network (JMN) is the T&E enterprise network solution for all classifications and cyber testing. JMETC provides readily available connectivity to the Services' distributed test capabilities and simulations, as well as industry test resources. JMETC is also aligned with JNTC integration solutions to foster test, training, and experimental collaboration.

TRMC Enterprise Big Data Analytics (BDA) and Knowledge Management (BDKM) has the capacity to improve acquisition efficiency, keep up with the rapid pace of acquisition technological advancement, ensure that effective weapon systems are delivered to warfighters at the speed of relevance, and enable T&E analysts across the acquisition lifecycle to make better and faster decisions using data that was previously inaccessible, or unusable. BDA is the application of advanced tools and techniques to help quickly process, visualize, understand, and report on data. JMETC has demonstrated that applying enterprise-distributed BDA tools and techniques to T&E leads to faster and more informed decision-making that reduces overall program cost and risk.

TRMC has been working with Joint Staff and Air Force JADC2 Cross-Functional Teams (CFTs) regarding JADC2 and Multi-Domain Operations (MDO), to inform them on TENA/JMETC and other TRMC capabilities that could be leveraged to support the emerging Joint Staff Joint Domain Environment (JDE). Additionally, TRMC has been engaged with Army Futures Command (AFC) throughout the year in a number of areas including assessing TENA/JMETC Support coupled with Big Data Analytics (BDA), expanding OSD TRMC collaboration and cooperation to other mission areas including, but not limited to, Cyber, BDA, Knowledge Management (KM), Machine Learning (ML), and Artificial Intelligence (AI).

This tutorial addresses using the well-established TENA and JMETC tools and capabilities combined with BDA tools and techniques to reduce risk in an often-uncertain environment; regularly saving ranges time and money in the process.