In This Issue - Technically

Smart Test Program Set (TPS)

Several research and development efforts focused on improving interoperability of the test station with other external systems as well as the interoperability within the test station itself. This includes integrating UUT data, test set-up, test execution, test results, repair and replace actions with other systems to provide a "closed-loop" system. One example of the "closed-loop" system is a non-intrusive tool referred to as Smart TPS (Test Program Set). Smart TPS will provide informational services to the user that reduce diagnostic test times and provide an ordered list of replacement actions based on historical data. Where possible, data is exchanged via the Automatic Test Markup Language (ATML).

Network Centric Interoperability

Clearly demonstrated in the recent military deployments in Afghanistan and Iraq, one of the most significant challenges now facing the warfighter is how to seamlessly interface the myriad of disparate stand-alone Situational Awareness (SA) and Close Air Support (CAS) systems into the DoD's Network Centric Warfare (NCW) infrastructure. This point was recently highlighted in the Secretary of Defense's testimony to the Senate Armed Services Committee. Referring to mission critical shortfalls that occurred during the IRAQ deployment, the Secretary discussed the state of the current warfighting environment [1]. Although tremendous progress has been made in the integration of new and emerging technologies and their applications on the battlefield, there is still a significant lack of interoperability between various communication systems.

This addresses the systems and software issues encountered during a successful demonstration of CAS battlespace connectivity. This presentation also discusses lessons learned during product development from both a systems and a software engineering perspective.

The Network Centric Test System

Network topology is an important choice for the test system designer. There are several to choose from and each has benefits. A comparison of topologies is made based on the benefits and drawbacks for various usage situations. Some of the topologies of interest are: Placing the instrumentation and the controller on the corporate intranet; Using switching hubs for traffic isolation; Using a second LAN connection in the test system controller as a private network for instrumentation; Placing a router between the intranet and the test system controller; and Widely distributing test assets.

Test asset visibility to the rest of the network has both security and test integrity implications. Trading off the benefits of ready access and observation (which promotes collaboration) against system visibility needs to be carefully examined. Several use cases are presented for examination: Simply Connected user; Semi-Automated test; Fully Automated test; and Remote Collaboration for system problem-solving.

Evaluation of a Facial Recognition Algorithm Across Three Illumination Conditions

An evaluation of the performance of a commercially available face recognition algorithm for the verification of an individual's identity pertaining to three enrollment illumination levels. Existing facial recognition technology from still or video sources is becoming a practical tool for law enforcement, security, and counter-terrorist applications despite the limitations of the current technology. Facial recognition has been implemented in limited applications, but has not been exhaustively studied in adverse conditions, which has initiated continuing study aimed at improving algorithms to compare images or representations of images to recognize a suspect [1]. This evaluation examined the influence of variations in illumination levels on the performance of a face recognition algorithm, specifically testing the significance between verification attempts and enrollment conditions with respect to factors of age, gender, ethnicity, facial characteristics, and facial obstructions. The results showed that for low and medium illuminance enrollments, there was a statistically significant difference between verification attempts made at low, medium, and high illuminance. However, for the high illuminance enrollment, there was no statistically significant difference between verification attempts made at low, medium, or high illuminance. Furthermore, this evaluation showed that the enrollment illumination level is a better indicator of the verification rate than the verification illumination level.

Choosing Software & Replacing ATE: Lessons Learned

When tasked to ensure the Minuteman Intercontinental Ballistic Missile system remains fully operational and supportable through 2020, the Air Force realized that the support capability of its legacy Automated Test System for the operational ground support electronics subsystem would need to be completely replaced. The legacy test system, while fully operational, was rapidly becoming non-supportable. Unless replaced with new hardware and upgraded test program sets, the needed long-term support could not be provided to the weapon system. To address this issue within the scope of available program funding constraints, the Air Force selected an approach of combining the technical and programmatic expertise of the weapon system Prime Contractor, the program control responsibilities of the weapon system Program Office, and the technical capability of an Air Force technical organization. The program was divided into two phases: a Prototype phase and a Production/Rehost phase. This gives an overview of the program and presents valuable lessons learned during the Prototype phase.