

FEATURED PROGRAMS

Cyber

Active Authentication: Active Authentication is developing novel ways of validating the identity of information systems users. For Demo Day, the program is demonstrating several biometrics-based approaches to authenticate users of desktop computers and mobile devices.

Automated Program Analysis for Cybersecurity (APAC): APAC is developing techniques to keep malicious code out of DoD Android-based application marketplaces. For Demo Day, APAC is demonstrating automated techniques for security validation of mobile apps.

Clean-Slate Design of Resilient, Adaptive, Secure Hosts (CRASH): CRASH is creating new computer system designs and architectures designed to be highly resilient to cyberattack. For Demo Day, CRASH is demonstrating technologies to enable computer systems to resist attacks and to continue to provide useful services after successful attacks.

Crowd Sourced Formal Verification (CSFV): CSFV seeks to make formal program verification more cost-effective by reducing the burden on subject matter experts through the development of enhanced, nontraditional formal verification processes. For Demo Day, CSFV is demonstrating game-based crowdsourced technologies for performing formal verification.

Cyber Genome: Cyber Genome is developing technologies to protect information infrastructure from malware and other cyber threats. For Demo Day, Cyber Genome is demonstrating new automated analysis techniques for rapidly extracting useful intelligence from large volumes of malware and a new routing protocol that uses introductions and reputation to protect participants from network attacks.

Cyber Fast Track (CFT): The CFT program promoted the rapid and cost-effective development of nontraditional technical approaches across the spectrum of cyberspace operations. For Demo Day, CFT is demonstrating technologies designed to identify, analyze and address little-known but potentially serious cyber threats.

Cyber Grand Challenge (CGC): The Cyber Grand Challenge is a competition that aims to create automatic defensive systems capable of reasoning about flaws, formulating patches, and deploying them on networks in real time. For Demo Day, CGC is reviewing the current state of the art and describing the technical challenges the competition plans to address.

High-Assurance Cyber Military Systems (HACMS): Today, cyber-physical systems such as unmanned air vehicles (UAVs) and automobiles are relatively easy to remotely take over and reprogram using cyberattacks. The HACMS program is developing technology to construct IT systems that are functionally correct and satisfy appropriate safety and security properties, with the goal of making such remote cyberattacks ineffective. For Demo Day, HACMS is demonstrating semi-automated synthesis of secure code.

Integrated Cyber Analysis System (ICAS): ICAS is developing technologies to make IT system information readily useful for attack forensics and tactical cyber defense. For Demo Day, ICAS is demonstrating techniques for integrating multiple sources of network data to provide cyber defenders with a complete, current picture of their IT environment.

Mission-oriented Resilient Clouds (MRC): MRC is addressing security challenges inherent in distributed and cloud computing. For Demo Day, MRC is demonstrating technologies to detect, diagnose and respond to cyberattacks on cloud computing systems to help ensure mission effectiveness.

Plan X: Plan X is a foundational cyberwarfare program developing platforms for the DoD to plan, conduct and assess cyberwarfare in a manner similar to kinetic warfare. For Demo Day, Plan X is demonstrating prototype technologies for cyber situational awareness.

Programming Computation on Encrypted Data (PROCEED): PROCEED is a research effort that seeks to develop methods that allow computing on encrypted data without first decrypting it, enabling more secure computation in untrusted environments. For Demo Day, PROCEED is demonstrating the first fully secure VOIP teleconferencing service over untrusted infrastructure.

Safer Warfighter Communications (SAFER): SAFER is developing technologies for assured and trustworthy Internet communications in untrusted and adversarial communications environments. For Demo Day, SAFER is demonstrating technologies to enable military users to send and receive content on the Internet in ways that defeat adversary efforts to deny, locate or corrupt communications.

Big Data

Anomaly Detection at Multiple Scales (ADAMS): ADAMS is developing technology to detect and characterize anomalies in massive data sets. For Demo Day, ADAMS is demonstrating technologies for detecting insider threats to information systems.

Autonomous Real-time Ground Ubiquitous Surveillance—Infrared (ARGUS-IR): ARGUS-IR is a persistent wide-area high-resolution infrared surveillance system that provides high-resolution imagery to enable tracking of vehicles and dismounted warfighters over a wide area. For Demo Day, ARGUS-IR is demonstrating the current status of the infrared sensor and associated image processing system and the technical challenges they address.

Big Mechanism: Big Mechanism aims to develop techniques to enable computers to read journals and other traditional sources of knowledge and build and maintain explanatory, actionable models of complicated systems such as cancer, economic systems and the brain. For Demo Day, Big Mechanism is reviewing the current state of the art and describing the technical challenges the program plans to address.

Detection and Computational Analysis of Psychological Signals (DCAPS): DCAPS aims to develop techniques to help health care professionals assess the health status of individuals, focusing on indicators of mental distress. For Demo Day, DCAPS is demonstrating tools that analyze "honest signals" from a wide variety of data sources, including nonverbal cues such as facial expression, posture, movement patterns, online behaviors and spoken and written communication.

DARPA Open Catalog: The DARPA Open Catalog organizes publicly releasable material from DARPA programs, including DARPA-sponsored software and peer-reviewed publications. For Demo Day, the DARPA Open Catalog is showing current holdings.

ENGAGE: DARPA created the ENGAGE program to enable the development of education and training systems that are better, faster, continuously optimized, and massively scalable. For Demo Day, ENGAGE is demonstrating game-based education and training approaches that harness the power of large user populations to optimize instruction.

Insight: Insight is developing technology to integrate disparate “stovepiped” intelligence, surveillance and reconnaissance (ISR) information into a unified picture of the battlefield. For Demo Day, Insight is highlighting capabilities to identify threats using advanced pattern analysis, data fusion and threat-force-detection algorithms.

Mining and Understanding Software Enclaves (MUSE): MUSE seeks to make significant advances in the way software is built, debugged, verified, maintained and understood by integrating ideas from big data analytics, data mining and program analysis. For Demo Day, MUSE is reviewing the current state of the art and describing the technical challenges the program plans to address.

Probabilistic Programming for Advancing Machine Learning (PPAML): PPAML is developing probabilistic programming techniques for rapidly creating machine learning applications. For Demo Day, PPAML is demonstrating initial capabilities in selected problem domains.

Social Media in Strategic Communication (SMISC): SMISC is developing tools to support human operators in countering adversary misinformation or deception campaigns. For Demo Day, SMISC is demonstrating techniques to model patterns of information flow and to detect the spread of sentiment or opinion through social media.

Visual Media Reasoning (VMR): VMR is developing a software system that lets users quickly query large collections of photos and videos to find people, locations, objects and their spatial relationships without relying on metadata or human tagging. For Demo Day, VMR is demonstrating the ability to search photos and videos using three specific capabilities: free-form clustering, keyword combinations and visual examples.

XDATA: XDATA is developing computational techniques and software tools for processing and analyzing large, imperfect and incomplete data. For Demo Day, XDATA is demonstrating scalable analytics and Web-based human-computer interaction tools that can be rapidly customized to different missions.

Language

Broad Operational Language Translation (BOLT): BOLT is developing technologies to enable foreign-language translation of informal genres of text and speech common in online and in-person communications. For Demo Day, BOLT is demonstrating translation of Chinese and Arabic informal genres.

Deep Exploration and Filtering of Text (DEFT): DEFT is developing natural-language processing technology to automatically extract operationally relevant information that is implicitly, not explicitly, expressed in text. For Demo Day, DEFT is demonstrating techniques for combining text-based information from multiple sources and discovering indirect but actionable insights contained in those texts.

Robust Automatic Transcription of Speech (RATS): RATS is developing algorithms and software for processing speech-containing signals received over extremely noisy and/or highly distorted communication channels. For Demo Day, RATS is demonstrating speech activity detection, language identification, speaker identification and keyword spotting.

Warfighter Apps

Revolutionizing Prosthetics: The Revolutionizing Prosthetics program is part of DARPA's brain research portfolio. It has created two advanced prosthetic arm systems and is exploring methods to provide near-natural movement and control of the arms to users. The goal is to offer Service members and Veterans with upper-limb loss the chance to lead more fully active lives.

For Demo Day, monitors are displaying several research participants using the arm systems in activities of daily living and demonstrating direct control from the users' brains in clinical settings. In addition, we are honored to have Mr. Fred Downs share his experience as an amputee who has extensively tested the DEKA Arm System, which the U.S. Food and Drug Administration recently approved. Finally, the Johns Hopkins University Applied Physics Laboratory (APL) is displaying the Modular Prosthetic Limb, a research-grade arm that enables study of next-generation dexterous movement control not possible with conventional prostheses.

Transformative Apps (TransApps): TransApps has delivered a combat-proven ecosystem for tactical mobile platforms to enable ground troops to collect, access and share any tactical data needed in the field—from high-resolution map imagery and unit positions to mission plans and medical evacuation procedures. For Demo Day, TransApps is demonstrating a suite of warfighter applications configured for multiple mission types.

Urban Leader Tactical Response, Awareness and Visualization (ULTRA-Vis): ULTRA-Vis is developing a prototype tactical augmented reality system for use by warfighters in the field. For Demo Day, ULTRA-Vis is demonstrating a lightweight, low-power, holographic see-through display with integrated position and orientation tracking and full-color iconographic overlays.