The MITRE Corporation
invites you to explore our research

Innovation Exchange 2008

May 6, 2008
8:30 a.m. – 4:30 p.m.

and

May 7, 2008
8:00 a.m. – 4:00 p.m.

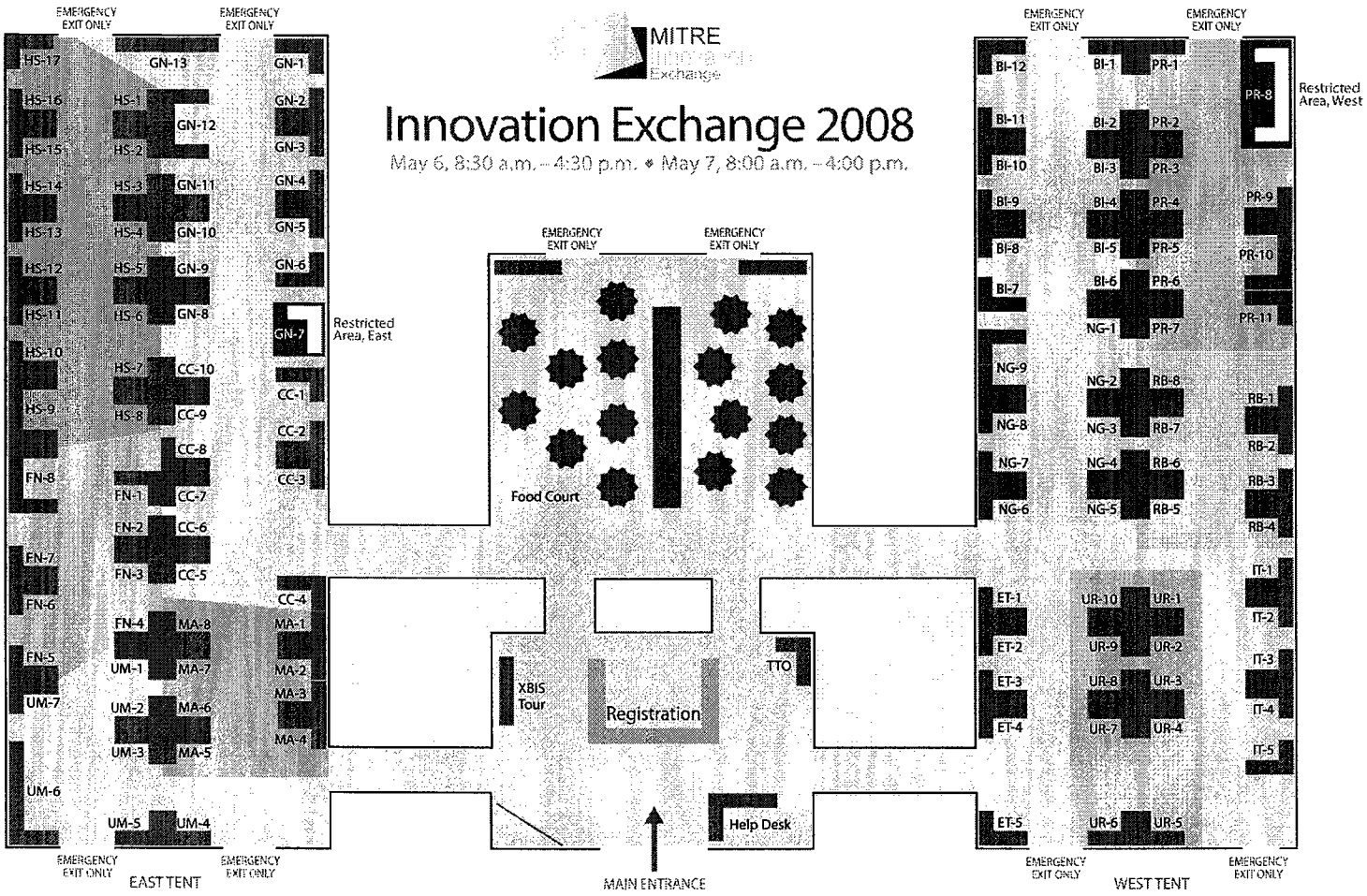
hosted by

Dr. Stephen D. Huffman
Vice President & Chief Technology Officer
The MITRE Corporation
7515 Colshire Drive, McLean, Virginia

Please RSVP by April 18, 2008
http://www.mitre.org/exchange08

For additional information, email
innovation@mitre.org

MITRE P.O.C. _____



Exhibitor Key

- BI: Biosecurity
- CC: Composable Command & Control
- ET: Emerging Technologies
- FN: Finding the Needle in the Information Haystack
- GN: Globally Networked Capabilities
- HS: Homeland Security
- IT: Innovation in Operational (IT) & Knowledge Management
- MA: Mission Assurance
- NG: NextGen
- PR: Persistent & Responsive Intelligence, Surveillance, & Reconnaissance
- RB: Removing Barriers to Enterprise Transformation
- UR: Unraveling the Network, Enhancing Analysis for Modern Threats
- UM: Unmanned Systems
- Restricted to Cleared Personnel Only

MITRE CELEBRATING 50 YEARS

MITRE Innovation Exchange 2008

- Biosecurity
- Composable Command & Control
- Emerging Technologies
- Finding the Needle in the Information Haystack
- Globally Networked Capabilities
- Homeland Security
- Innovation in Operational IT & Knowledge Management
- Mission Assurance
- NextGen: The Future of Air Traffic Management
- Persistent & Responsive Intelligence, Surveillance & Reconnaissance
- Removing Barriers to Enterprise Transformation
- Unraveling the Network: Enhancing Analysis for Modern Threats
- Unmanned Systems

MITRE Grounds, Washington

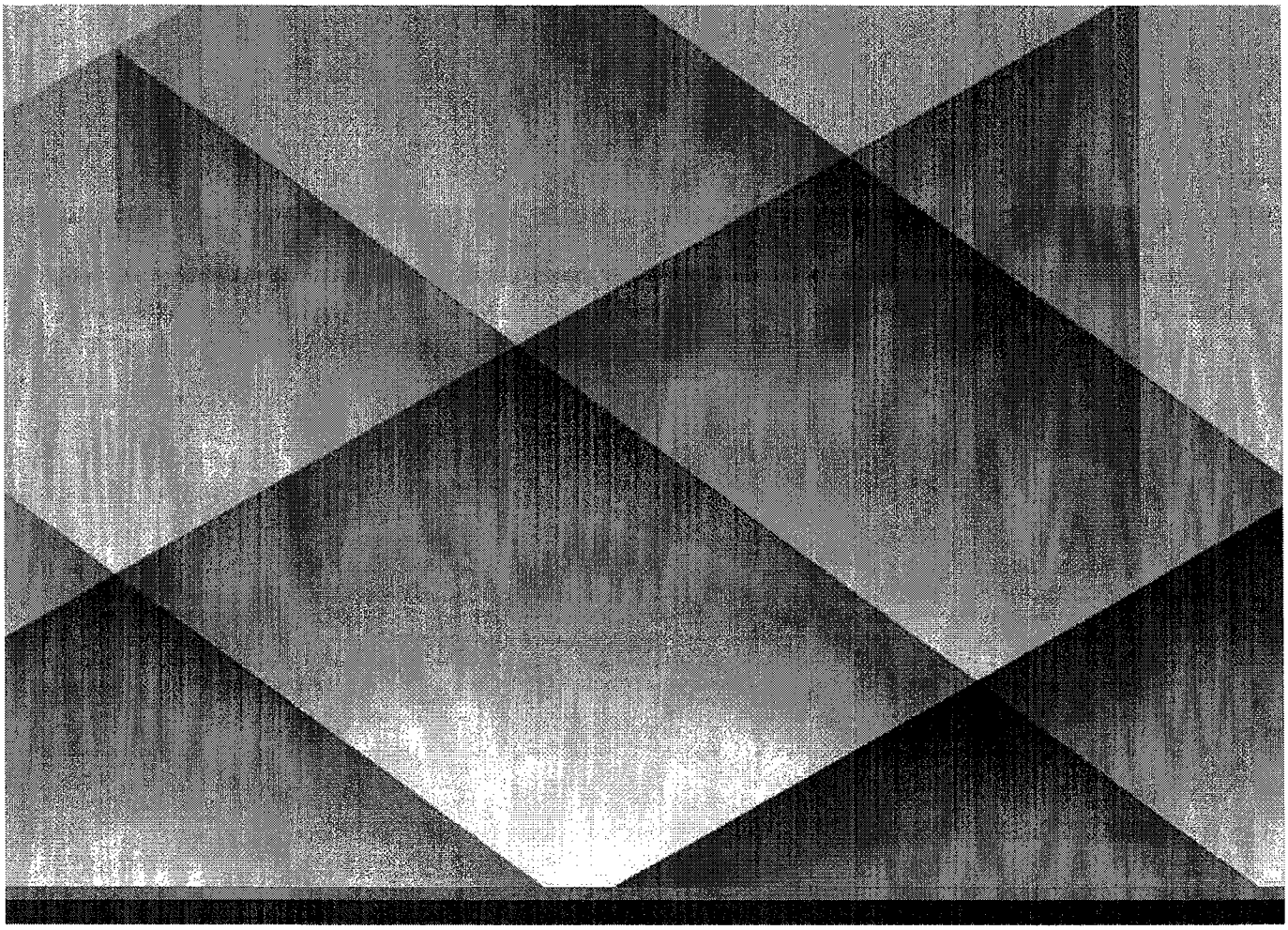
May 6
8:30 a.m. – 4:30 p.m.

May 7
8:00 a.m. – 4:00 p.m.

Hanscom AFB, Bedford

May 21
8:30 a.m. – 4:30 p.m.

MITRE Innovation Exchange



2008

MITRE Innovation Exchange

Welcome!

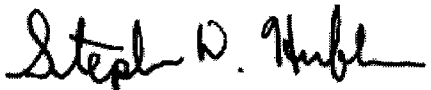
The Innovation Exchange promotes discovery and discussion within MITRE and between MITRE and the broader community. The Innovation Exchange provides a forum for visitors and staff members to hear about the innovative work being conducted within the MITRE Innovation Program (MIP), including MITRE Sponsored Research (MSR) and Mission Oriented Investigation and Experimentation (MOIE).

The MIP seeks to address the nation's most pressing challenges through open technological innovation. The MIP complements MITRE's direct work program by striving to see these challenges in fundamentally new ways, thereby inspiring innovative—and sometimes radical—solutions. The program promotes research and development to advance and apply new and emerging technologies to our sponsors' highest priority mission problems. We want to identify areas in which advanced and emerging technology can dramatically improve mission performance, or enable fundamentally new concepts of operations.

The MIP also serves as MITRE's primary mechanism for generating, gathering, and sharing relevant technical knowledge. MIP researchers develop collaborative relationships with academia, industry, and government laboratories to identify promising sources of technology. In addition, MITRE's Technology Transfer Office connects the new technologies with our collaborators and commercial companies who can make them available to our sponsors and the public as supported, affordable technology.

By combining the best of external and internal ideas, we try to find the most promising solutions to our sponsors' problems. The knowledge we gain and share yields direct benefits to MITRE, our sponsors, our staff, and industry.

I hope that you will find the Innovation Exchange both informative and enjoyable, and I encourage you to take advantage of the opportunity to meet the leaders of MIP projects and discuss how their work might apply to your own activities.



Stephen D. Huffman, Ph.D.
Vice President and Chief Technology Officer

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Sponsors Meet Solutions at MITRE's Innovation Exchange

This year, as MITRE celebrates its 50th year, the company is introducing the Innovation Exchange. The new name reflects the interactive nature of the event as well as the company's commitment to not only creating new technologies, but to applying existing tools and technologies in innovative ways to deliver value to our sponsors.

MITRE's annual Innovation Exchange (previously known as the Technology Symposium) provides an opportunity for sponsors and colleagues to come together and hear about MITRE's innovative research initiatives. Through live, hands-on demonstrations, sponsors and other guests explore innovative solutions being developed at MITRE to address some of their most pressing needs.

Since 1994, when the first symposium took place, the event has evolved from an internal presentation for senior management to an annual company milestone benefiting MITRE's sponsors, researchers, employees, and invited guests. The number of exhibits has expanded as well—from just a few dozen to well over 100 today. At the same time, MITRE's collaboration and innovation with sponsors and colleagues have grown exponentially.

More than a decade's worth of symposia has helped the company introduce some of the best cutting-edge and innovative tools in technology. Many collaborative relationships among MITRE researchers and academia, industry, and government—as well as with other colleagues—have developed through the open sharing of technological innovations at the forum. Often, these partnerships have resulted in integrated solutions used across government and industry.

Biosecurity

Challenges facing the biosecurity enterprise include countless numbers of natural and intentional threats and the need for an efficient enterprise response to an unknown number of threats from unknown sources. Assuring a coordinated system of federal biosecurity partners to secure the homeland from these security threats is critical. MITRE is conducting research in a number of related areas, including sensor development, sensor networks, bioinformatics, situational awareness, modeling and simulation, and decision support.

The following projects provide hands-on information and demonstrations related to this theme area:

- A Universal Bio-Sensing Program
- Camelid (Llama glama) Immunomolecules for Advanced Biosensing
- Detection of Viruses by Fluorescence Generated from Artificial RNA Constructs
- End-to-End Model for Evaluating Planned Responses for Pandemic Influenza
- Genomics for Bioforensics
- Human Monoclonal Antibodies for Neutralization and Diagnosis of H5N1
- Mathematical Modeling of Early Detection of Infectious Disease Outbreaks: Toward Real-Time Surveillance
- Mathematics for Pathogenomics
- MEG: Mapping Epidemic Growth
- Synthetic Biology: Engineering at the Sub-Cellular Level
- The Application of Intelligence Analytic Tools (ChronoSkope) to the Progression of H5N1 Avian Influenza Viruses Across Asia
- Virulence Factor Ontology for Biosecurity

Composable Command & Control (C2)

Global challenges facing our military continue to increase in variety and complexity. To manage these effectively, military C2 capabilities of the future will need to demonstrate unprecedented flexibility. This will require an agile response to unanticipated threats; dynamic integration of new assets and resources; and effective collaboration across joint, multinational, and civilian organizations. MITRE is engaging in innovative research that will enable rapid integration, adaptation, and reconfiguration of C2 capabilities to support these increasingly complex mission challenges facing military decision makers.

The following projects provide hands-on information and demonstrations related to this theme area:

- Biologically Inspired Cognitive Models for Advancing the Design of C2 Systems
- Cross-Mission Business Process Management
- Effectively Using Meteorologist-Oriented Web Services for Warfighter-Oriented Use Cases
- Flexible Data Management
- IM-PLUS: Information Management with Privacy, Lineage, Uncertainty, and Security
- Predictable End-to-End Timeliness in Network Centric Warfare Systems
- Rapid Agile Integration to Reduce the DA ASAT Threat
- Resources for Early and Agile Capability Testing (REACT)
- Spatio-Temporal Analysis for Rapid Tasking (START) II
- Web Mashup and Metadata Scripting Language (WMSL)

Emerging Technologies

New technologies can dramatically change the way we do business. While most technology advances allow for incremental improvements, occasionally a technology will come along that fundamentally changes the landscape by creating an entirely new or widely relevant capability. MITRE has selected several research topics that have the potential to cause disruptions. Initial research into these areas is positioning us to better understand how these technologies can be used, both for and against us.

The following projects provide hands-on information and demonstrations related to this theme area:

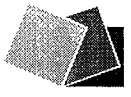
- Nanosystems Modeling and Nanoelectronic Computers
- Nanotechnology-Enabled Energy Storage for Portable Electronic Systems
- Nanotubes for Small Antennas
- Quantum Information Science
- Soldier Warrior Technology

Finding the Needle in an Information Haystack

The United States faces asymmetric threats from state and non-state actors. Even when observable, many of these threats are difficult to recognize and understand amid vast quantities of military, civilian, and governmental communications and data. In addition, recognizing and understanding subtle, significant, and/or anomalous behaviors by friendly and neutral entities poses a similar challenge. These problems require the ability to discern events of interest, rapidly and reliably attribute actions to entities, and convey this information to commanders in a comprehensible manner. MITRE is seeking to develop powerful means to provide commanders with timely knowledge and insight about the enemy they confront and the health and status of the systems and information under their command.

The following projects provide hands-on information and demonstrations related to this theme area:

- Collaborative Decision Making for Net-Centric Warfare in Time-Critical Situations
- Counterinsurgency (COIN) Sandbox for Decision Support (CISADS)
- Evaluating Behavioral Indicators for Maritime Domain Awareness
- Improved BDA for Efficient ISR Management
- ISR Forensics
- Sensor Data and Analysis Framework
- SezHoo: Using Reputation to Increase the Trustworthiness of Information
- Tagged and Geotemporal Reporting (TAGR)



Globally Networked Capabilities

Net-centricity can be achieved when an environment—including its infrastructure, systems, processes, and people—is globally networked. This allows for a completely different approach to warfighting and business operations. The foundation for net-centricity is the Global Information Grid (GIG), which is a globally interconnected, end-to-end set of information capabilities, associated processes, and personnel. It is used for collecting, processing, storing, disseminating, and managing information on demand to warfighters, defense policymakers, and support personnel. Many mission-based integration and interoperability issues need to be addressed so the network can be strategically and tactically enabled and managed.

The following projects provide hands-on information and demonstrations related to this theme area:

- Advanced Signal Processing for Wireless Communications
- Airborne Network QoS Management
- Applications of Network Coding in Military Wireless Networks
- Bi-Directional Forwarding Detection for Airborne HAIPE Internet Protocol Networks
- Commercial Communications at the Tactical Edge for the Dismounted Soldier: CCTE(DS)
- Electromagnetic Band Gap (EBG) Surfaces for Antenna Applications
- Emerging Technologies for VLSI Applications
- Envisioning the Ether: The Battle Commander Spectrum Planner
- Fleet Wireless Network Stability
- Multiple Access Channel Coding for Interference-Limited Communications
- Network Theoretic Approaches for Wireless Systems
- TCAP: Transforming Commercial-off-the-Shelf (COTS) Routers for Airborne Platforms
- WhatsUp Gold for Services-Based Architectures

Homeland Security

As the scope of America's Homeland Security mission has expanded, so has the need for greater connectivity and an integrated approach across multiple mission partners and domains. In response to this need, MITRE is conducting research to enable cross-cutting support for the overall success of key Homeland Security mission areas: Border Security and Immigration; Information Sharing; Protection of Critical Infrastructure; Screening and Credentialing; Preparedness, Response, and Recovery; Management Transformation; Mission Assurance; Intelligence Analysis, and BioSecurity.

The following projects provide hands-on information and demonstrations related to this theme area:

- A Secure Biotoken for Border Management
- Anonymized Target List Expansion for Name Vetting
- Bio-Threat Aircraft Warning System
- Closed Loop Link Mining of Textual Data
- Common Ground Agile Information Sharing
- Data Discovery Using Digests
- Identity Matching Lab
- IM-PLUS: Information Management with Privacy, Lineage, Uncertainty, and Security
- Method for Prioritizing Suspicious Behavior
- Miniaturized Hybrid Sensor for Multiple Threat Detection
- Natural Language Processing for Anonymization
- Pervasive Personal Navigation
- Protected Sharing of Controlled Information
- Risk Model for Dynamic Aviation Security
- Service-Oriented Architecture (SOA) Performance Measures Expression in Performance-Based Service Acquisition (PBSA) Vehicles
- The 3x2 Fingerprint Challenge

Innovation in Operational IT & Knowledge Management

IT organizations are constantly required to balance cost, operational excellence, and innovation to provide more value to the business. Differentiated value comes from empowering knowledge workers with innovative capabilities and supporting them with a reliable, mission-focused, cost-efficient infrastructure. MITRE is piloting programs in social and semantic software, applying Web 2.0 technologies for building future anticipatory knowledge discovery and delivery needs. To apply integrated IT/KM capabilities, MITRE is addressing on-demand training needs with multi-media modules, computer- and web-based as well as traditional classroom instruction.

The following projects provide hands-on information and demonstrations related to this theme area:

- New Methods for Information Technology Training
- Showcasing Social Software (Onomi, Radar)
- Site Architecture
- System Monitoring and Reporting
- Wiki Integrated Quality Index (WIQI)

Mission Assurance

Awareness of the prevalent threat model of highly sophisticated and well-funded cyber adversaries is growing. To address this, information systems must be designed, built, and operated with the expectation that system components may contain unknown vulnerabilities that may be unknowingly compromised. MITRE is developing information assurance techniques that meet mission objectives and operate effectively even when working with vulnerable cyber systems under sophisticated life-cycle attacks. MITRE is using a multi-pronged risk management approach to reduce cyber vulnerabilities and mitigate consequences from any remaining threats.

The following projects provide hands-on information and demonstrations related to this theme area:

- Host-Based Firewall with Dynamic Encryption Capability
- Information Sharing via Trusted Intermediaries
- Low-Cost Anti-Tamper Technology
- Malware Phylogenetics
- Mission Assurance via Resilient Systems
- Mission Aware Reporting of Information Assurance for Airborne Networks (MARIAAN)
- Rapid Trusted Video Stream Dissemination
- TRIDENT (Trust Research in Distributed and Emerging Network Technology)

NextGen: The Future of Air Traffic Management

There is a growing consensus within the aviation community on the key conceptual elements of the Next Generation Air Transportation System (NextGen). However, uncertainty remains on how to get there. To enhance our understanding of NextGen needs and expedite the evolution to NextGen, MITRE is conducting research in a number of critical areas. These include: capacity enhancement, air/ground integration, analysis of roles and responsibilities, modeling and simulation, network-enabled traffic flow management, unmanned systems, visualization, safety, and security.

The following projects provide hands-on information and demonstrations related to this theme area:

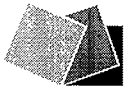
- Application of Cognitive Agents to NAS Models and Real-Time Simulations
- Exploration of Algorithms for the NextGen Collision Avoidance System
- Integrated Departure Route Planning
- Integrated Economy-Wide Modeling
- Integrated Equivalent Visual Operations
- Multi-Purpose Cockpit Display of Traffic Information
- Net-Enabled TFM
- Virtual Air Traffic Simulation Capability
- Visualization Service Bus

Persistent & Responsive Intelligence, Surveillance, and Reconnaissance (ISR)

With the advent of asymmetric warfare, persistent and responsive ISR is needed to provide military commanders with reliable, accurate, and timely information about operational environments. To achieve this capability, diverse data and information must be collected, relevant target and background phenomenology must be understood, and diverse information products to support analyses from multiple perspectives must be developed. MITRE is currently researching capabilities in the areas of sensing, sensor processing, and multi-sensor fusion.

The following projects provide hands-on information and demonstrations related to this theme area:

- Bistatic Radar: Processing, Exploitation, and Systems
- Coherent Tracking via Keystoning
- Distance-Based Approaches for Classification
- Generic Transformational Scalable Modular Affordable RF Transceiver
- Interactive ISR Data Exploitation and Sensor Operation
- Montage: Exploiting UAV Video in Mission Context
- Optically Sensed Tags
- Pixel Registered, Stacked, Multi-Band Compact Imager
- Sensor Layer Prototype
- Structured ISR Fusion
- Unconventional Optics for Imaging Sensors



Removing Barriers to Enterprise Transformation

As governments transform and modernize, social, political, organizational agencies, and technical barriers to success arise. The focus of this research is to develop systematic methods for understanding enterprise dynamics, the key challenges of transformation initiatives, and charting a course to successfully manage them. Our research addresses cooperation across agencies, sector boundaries, levels of government, and nations ... an increasingly prevalent challenge for government leaders.

The following projects provide hands-on information and demonstrations related to this theme area:

- Automatic Electronic Transcription of Handwritten Forms
- Enterprise Dynamics: An Architecture-Based, Decision-Driven Approach
- Enterprise Systems Acquistion Using Venture Capital Concepts
- Key Success Indicators of Integrated Project Teams in Civil Agencies
- Laika EHR Testing Framework
- Multimodal Medical Data Capture and Representation
- Simulating Human Response
- Social Contexts of Enterprise Systems Engineering

Unraveling the Network, Enhancing Analysis for Modern Threats

MITRE's sponsors need to assess and monitor threats to the nation. Greater global complexity combined with more available information, less confidence in its trustworthiness, and less time to deal with it, presents an enormous challenge. Threats come from across the world in the form of nation states, tribal and religious groups, and individuals. Agencies charged with analysis have experienced both rapid staff growth and loss of experienced personnel, while having to work in new areas with unfamiliar languages and cultures, as well as savvy adversaries with knowledge of our intelligence collection approaches. MITRE is working within this context to unravel the technological, economic, and political intentions of nations, groups, and actors.

The following projects provide hands-on information and demonstrations related to this theme area:

- Closing the Semantic Gap
- Content Extraction and Duplicate Analysis and Recognition (CEDAR)
- Embedded Machine Translation for Operations and Intelligence Applications
- Live Hotspotting of VoIP
- Machine Translation for Foreign Language Science and Technology Analysis
- Modeling Phase Change Behavior
- Scientometric Methods and Analysis of Scientific Literature for Science and Technical Intelligence
- Social Network Services for Intelligence Community Professionals
- Spatio-Temporal Information Extraction and Reasoning from Natural Language
- Understanding (Arabic) Nonverbal Behavior

Unmanned Systems

Unmanned vehicles are reducing the number of lives put at risk in Iraq and Afghanistan and enabling significant increases in the information available to the warfighter. Consequently, future military plans call for increased use of unmanned ground, air, and marine vehicles. A host of civil government applications for unmanned vehicles exist as well, such as border patrol, infrastructure protection, law enforcement, forest fighting, and weather research. Commercial applications include airborne photography, agriculture monitoring, land surveying, and perhaps one day even unmanned cargo carriers. While the vehicles themselves are unmanned, humans remain in control of the vehicles and the mission. MITRE's work with unmanned systems mainly centers upon ground and air vehicles. To fully exploit this promising technology, MITRE is working closely with our sponsors to improve unmanned systems technology.

The following projects provide hands-on information and demonstrations related to this theme area:

- 3D SLAM: Simultaneous Localization and Mapping in 3D
- Advanced Perception for Unmanned Ground Vehicles
- Disposable Walking Robots
- Lightweight Beacon System for UAS and Other Aviation Applications
- Sense and Avoid for Small Unmanned Aircraft
- UGV Leader-Follower
- Vision for Estimating Terrain Traversability

Coming Attractions

At future Innovation Exchanges, you can look forward to learning more about projects currently in the investigation stage. Highlights include:

- Application of Complex Systems Science to Army Acquisition
- Automated Query Formulation for the Detection of Disease Outbreaks
- Combinatorial Auctions for Emission Permit Markets
- Creating a Dynamic Incident Management Enterprise
- Cyberspace Operations and Battle Management
- Detection of Otherwise Missed Emitters (DOME)
- Diagnosis of a Bio-Warfare Agent
- EA-Driven Requirements
- Exploring Culture through Language
- Exploring Mechanisms to Capture Innovation
- File Format Identification
- FMS 4D Trajectory Downlink for Arrival Management
- Ingest of Large-Scale Textual Content
- Investigating Intentions and Motivations Behind the Use of Chemical and Biological Weapons
- Label-Free, Single-Molecule Detection of Biochemical Targets
- Language of Deception
- Modeling Biofuel Enterprise and Multi-Agency Program Performance
- Multi-INT Upstream Processing
- Privacy Enhanced Architecture and Laboratory
- Reducing the Effects of Phishing on Tax Administration
- Secure Software Development

Coming Attractions, Continued

- Signal Extraction with Improved Time-Frequency Assignment
- Smart Jamming Teams to Defeat Radio-Controlled IEDs
- Tailorable Implementation Plan for Improving Federal IT Investment Management
- Teleporter
- Vulnerabilities and Model Driven Architecture

Notes

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