

DHS Science & Technology: Biometrics & Identity Management

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Department of Homeland Security

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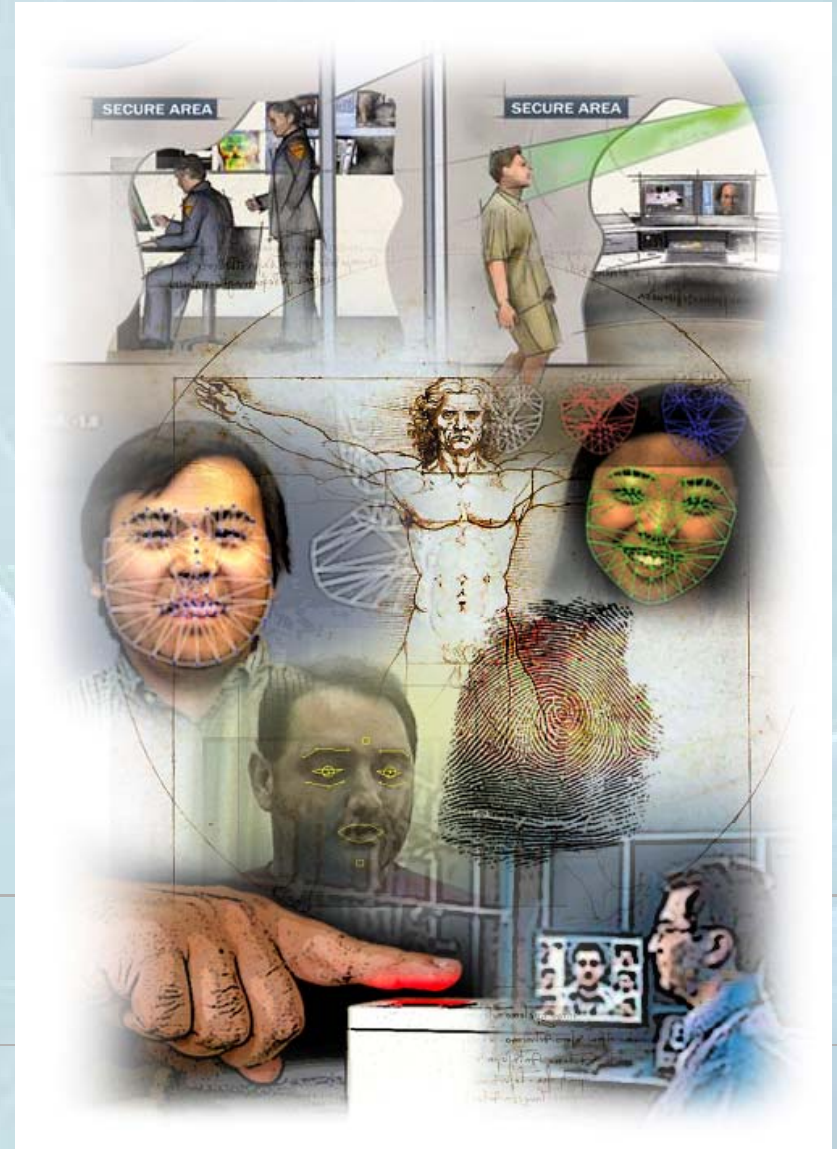
Vision:

A safer, more resilient nation that incorporates the human dimension into homeland security analysis, operations and policy development.

Mission:

We will advance national security by developing and applying the social, behavioral, and physical sciences to improve identification and analysis of threats, to enhance societal resilience, and to integrate human capabilities into the development of technology.

DHS Customer Components: TSA, US-VISIT, USCIS, ICE, SCO, USSS, FEMA, OI&A, USCG, State & Local, S&T Divisions



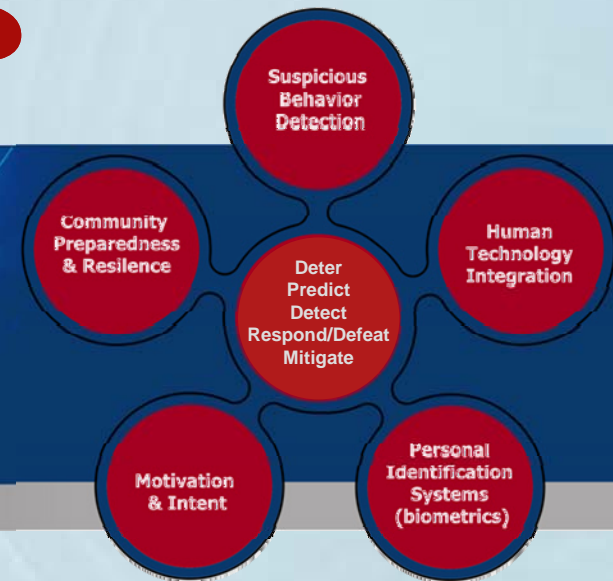
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Know our enemies, understand ourselves: put the human in the equation



Motivation & Intent

Enhance the capability of the Department to analyze and counter terrorist motivation, intent, and behavior.

Suspicious Behavior Detection

Improve screening by providing a science-based capability to identify unknown threats indicated by deceptive and suspicious behavior.

Personal Identification Systems (Biometrics)

Improve screening by providing a science-based capability to identify known threats through accurate, timely, and easy-to-use biometric identification and credentialing validation tools.

Community Preparedness & Resilience

Enhance preparedness and mitigate impacts of catastrophic events by delivering capabilities that incorporate social, psychological and economic aspects of community resilience.

Human Technology Integration

Enhance safety, effectiveness, and usability of technology by systemically incorporating user and public input.



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Drivers for the DHS Biometrics S&T Program

Prevent terrorists from operating effectively against U.S.

- Know who they are and what they are planning to do
- Impede their ability to recruit, train, obtain finances, acquire weapons (CBRNE), communicate and travel
- Disrupt their activities – surveillance, staging, rehearsal, attack – at all levels of the homeland security enterprise
- Remove dangerous people

Developing capabilities to consistently and positively identify those seeking entry into the U.S. is vital to this effort



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Drivers for the DHS Biometrics S&T Program

Prevent illegal entry of people, weapons or contraband into U.S.

- Deter those who would enter the country illegally or import contraband
- Encourage legal immigration and lawful, secure commerce
- Impede ability to cross border except at designated ports of entry
- Prevent admission of dangerous people while facilitating legitimate travel

Developing capabilities to consistently and positively identify those seeking entry into the U.S. is vital to this effort



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Drivers for the DHS Biometrics S&T Program

Protect continuity of systems fundamental to societal stability and security

- Impede the ability to disrupt or weaponize critical infrastructure
- Implement a cascading Federal/State/community/individual system of resilience through preparedness and integrated emergency management
- Ensure resiliency of functions critical to public health and safety, government and essential services

Developing capabilities to consistently and positively identify those seeking entry into the U.S. is vital to this effort

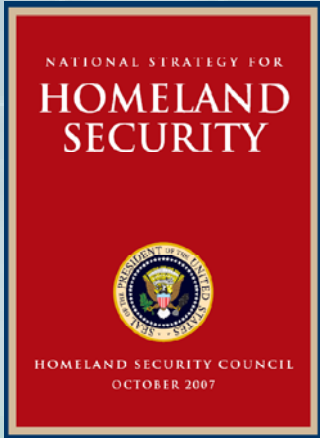


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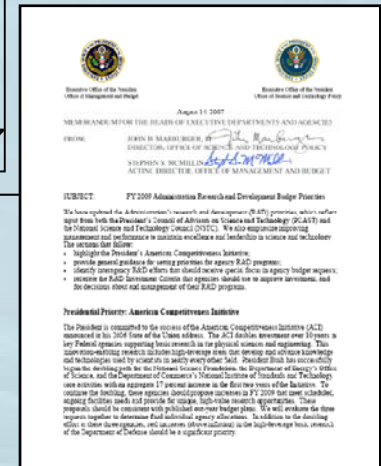
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Drivers for the DHS Biometrics S&T Program



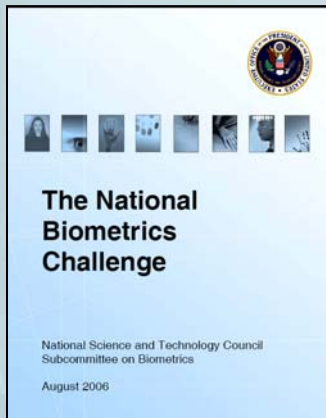
“In the face of resourceful terrorists, however, we must continue to expand the US-VISIT program’s biometric enrollment from two fingerprints to ten fingerprints, as well as leverage science and technology to enable more advanced multi-modal biometric recognition capabilities in the future that use fingerprint, face, or iris data.”

- National Strategy for Homeland Security, Homeland Security Council, October 2007

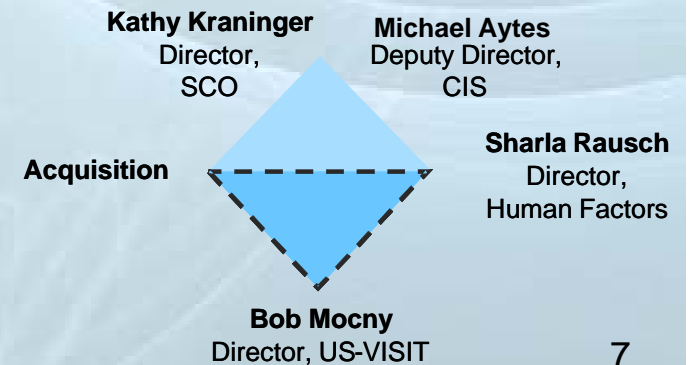


“...agencies are to place emphasis on the priorities outlined in The National Biometrics Challenge and the resulting agenda developed by the NSTC Subcommittee on Biometrics and Identity Management.”

- OMB and OSTP FY2009 R&D Budget Priorities (www.ostp.gov)



DHS People Screening IPT



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Biometrics: *DHS's Unique Challenges*

- DHS has some unique Biometric challenges for screening operations
 - Scale and diversity of screening sites
 - Accommodation of existing DHS practices
 - Workload, wait times and throughput
 - Harsh lighting and environmental factors
 - Extreme Outdoor Mobile Conditions
 - Non-cooperative users
 - Field-collected samples of mixed quality
 - Real-time access to match results across the DHS enterprise and interoperability with mission partners
- These challenges must be addressed for widespread deployment of biometrics



San Ysidro Border Crossing



Poker Creek Border Crossing



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Compelling Need for Biometrics

US-VISIT Program:

- More than 100 Million immigrant visit records
- Protecting 300 U.S. ports of entry
- 500 Million border crossings each year
- 9 Million visa applications and 50,000 asylum requests each year
- 30,000 immigration benefits applications processed each day

Statutory and Regulatory Biometric Mandates:

- Freezing identity & searching watch lists
- Conducting criminal background checks & reducing fraud
- Improving border and transportation security
- Granting benefits and credentials

Support to other Federal, State and First Responders



A U.S. Customs and Border Protection officer demonstrates how an international visitor should place her fingers on the scanner during the entry process.



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The *Hard* Sciences in Biometrics & Identity Management

Chemistry/Biology:

Low Cost and Rapid DNA

Mathematics:

Multi-Biometric Fusion

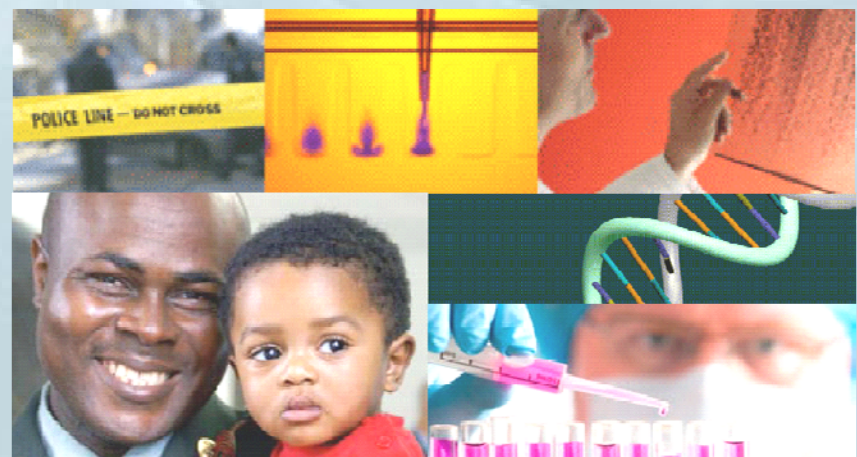
Performance Modeling

Physics:

Mobile 10-print Slap Capture

Robust Face/Iris Capture

Contactless Fingerprints



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The *Hard* Sciences in Biometrics & Identity Management



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The *Harder* Sciences in Biometrics & Identity Management

Usability:

Biometric Quality Assessment

Standards:

InterNational Committee for IT Standards (INCITS) M1 Tech. Comm.

International Organization for Standards (ISO) JTC 1/SC 37

Acceptability:

Community Perceptions of Technology Panel

M1.6 and SC37/WG-6: Cross Jurisdictional and Societal Issues

Test and Evaluation:

Multi-Biometric Grand Challenge (MBGC) and Experiment (MBE)

National Voluntary Laboratory Accreditation Program (NVLAP)



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Biometrics and Identity Management

DHS Biometrics Coordination Group



Mobile Biometrics

Multi-Modal Biometrics

USCG Mona Pass

TSWG

Biometric Detector

Improve screening by providing a science-based capability to identify *known* threats through accurate, timely, and easy-to-use biometric identification and credentialing validation tools.

Remote Biometrics Capture

DoD DDR&E



Commercial Data Sources

Next Generation Ten-Print Capture



Center for Identity Technology Research

Rapid and Low-Cost DNA

NIST

NSTC Biometrics and Identity Management Subcommittee

KEY

HFD Core

Innovations

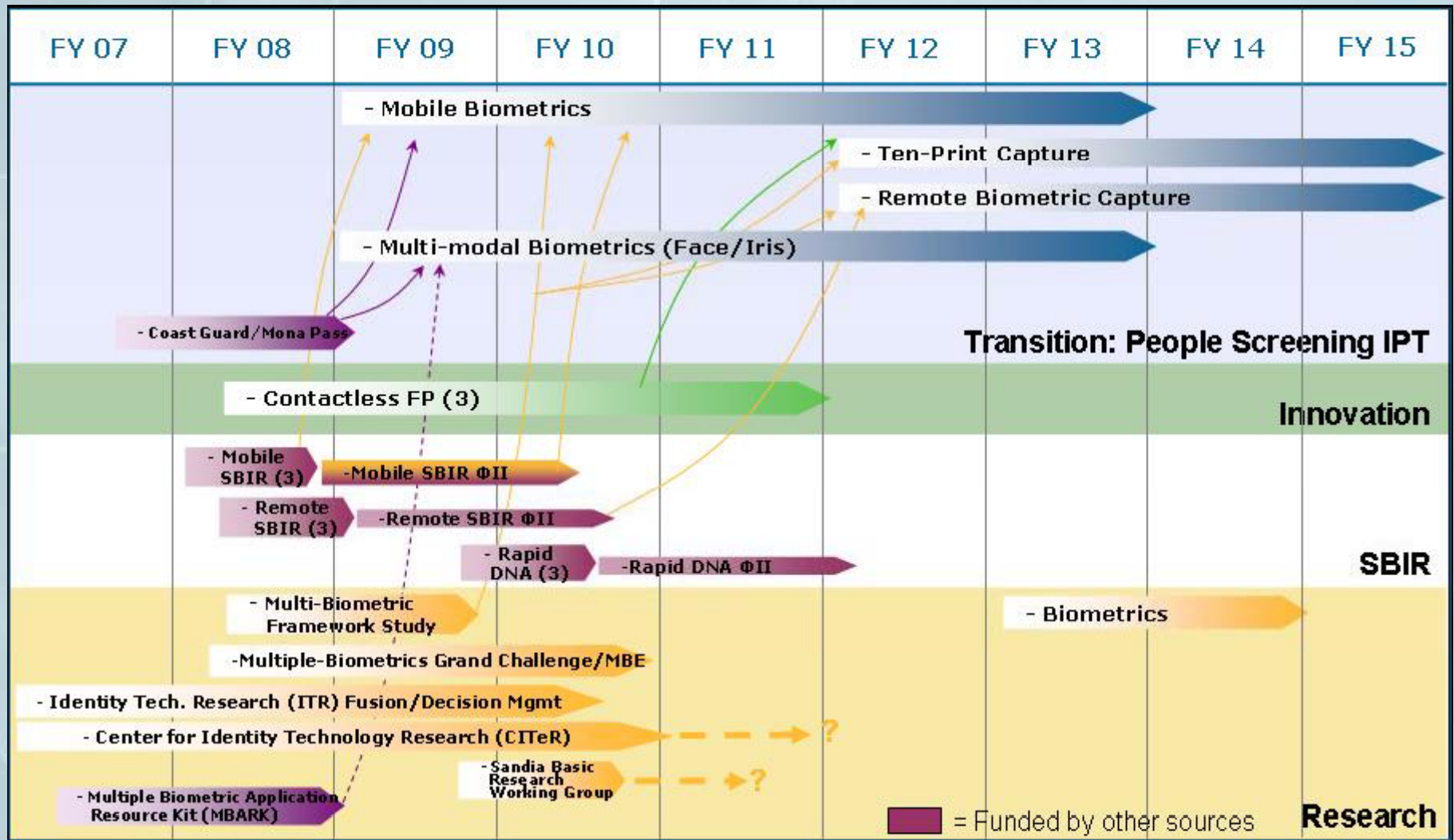
SBIR

Coast Guard



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DHS S&T Biometrics Program Timeline



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Indispensable Resources

www.Biometrics.gov

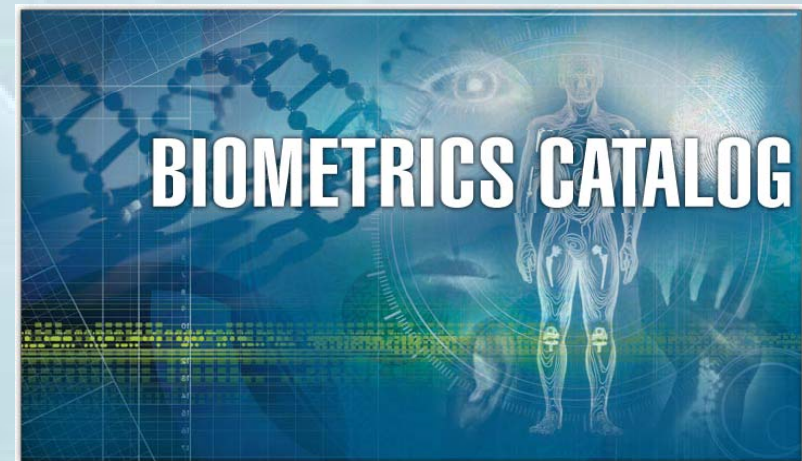
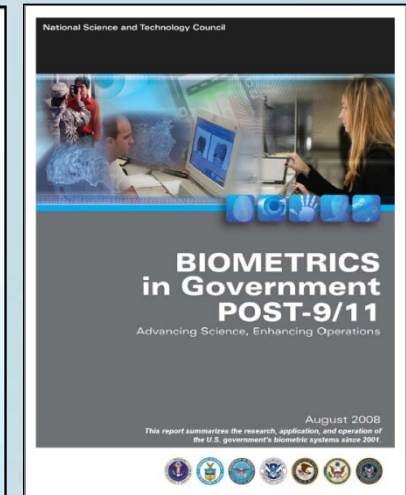
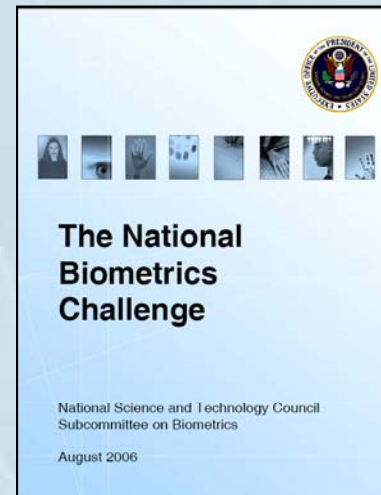
Central source on Federal government biometrics-related activities

www.BiometricsCatalog.org

U.S. Government-sponsored database of public information about biometric technologies kept current by its users, who add information as it becomes available – Free to use and update

www.Biometrics.org

Biometrics Consortium web site with free discussion bulletin board and annual conference news



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Biometrics.gov



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Backup Slides



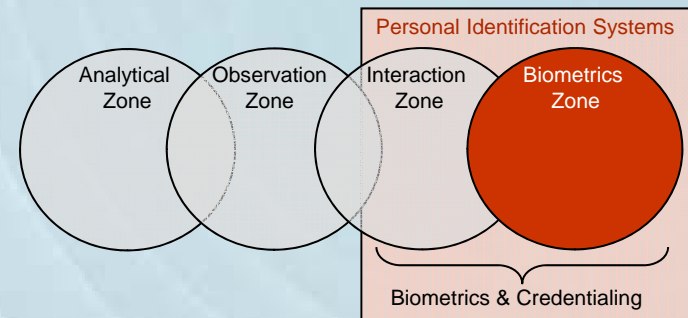
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Multi-modal Biometrics: *Using the Full Range of Identification Tools*

Goal:

- Develop Multi-modal biometric tools (fingerprint, face, and iris) to accurately and rapidly identify known terrorists
- Develop a framework to facilitate the integration of biometric technologies across the DHS operational mission space.



Approach:

- Support development of interoperable biometrics tools and technologies
- Develop multi-modal biometrics collection capability suitable for use in DHS operational environments
- Develop fusion technologies to synthesize identity matches from DHS field-collected (non-ideal quality) multi-biometric data

Payoff:

- Improved biometrics-based identification of known terrorists
- Increase throughput of lawful travel across U.S. borders



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Mobile Biometrics: *Biometrics on the Front Lines*

Goal:

- Spiral development of mobile multi-modal biometric sensors and technologies to provide accurate identification capabilities anywhere in the DHS area of responsibility

Approach:

- Collaborate with DHS components to identify and document requirements for mobile biometrics new and existing DHS operations
- Develop technologies, sensors, and components for integration in future multi-modal mobile biometrics collection systems
- Leverages activities of DHS S&T, USCG (Mona Pass), CBP, CIS, ICE, TSA, and USVISIT

Payoff:

- Biometric screening can occur at non-fixed sites beyond U.S. borders, between ports of entry, and within secure sites/facilities



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Mobile Biometrics – Accomplishments

Handheld Biometric System Pilot in the Mona Pass

Goal:

- Real-world operational pilot of Coast Guard maritime mobile biometrics technologies in the Mona Pass.
- The pilot identified strengths and shortfalls associated with the use of mobile biometrics.



S&T and Homeland Security Payoff:

- Timely identification of interdicted immigrants to determine if they are on a watch or wanted list. 90% of all yolas have at least one hit against IDENT.
- 100% conviction rate since the implementation of biometrics.
- Results of pilot informs S&T's FY09 Mobile Biometric transition project of specific real-world operational shortfalls that exist with the use of mobile biometrics devices.



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Mobile Biometrics – Accomplishments

Handheld Biometric System Pilot in the Mona Pass

Metric	Number Encountered	% of total possible
Biometrics Collected	2598	99% of persons encountered
Database Matches	639	25% of records collected
Prosecutions	330	52% of matches

~ Data as of September 2009



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DHS S&T Innovations Project: Biometric Detector *Touchless Fingerprints*

Goal:

- Develop technologies for efficient, high quality, contactless acquisition of fingerprint biometric signatures

Payoff:

- Ergonomic and user-friendly design provides significantly improved throughput and signal quality
- A fingerprint acquisition device that can be transitioned for implementation across DHS operational mission space
- Customers - US-VISIT, USCIS, CBP, ICE, TSA



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Small Business Innovation Research Projects

Remote Biometrics:

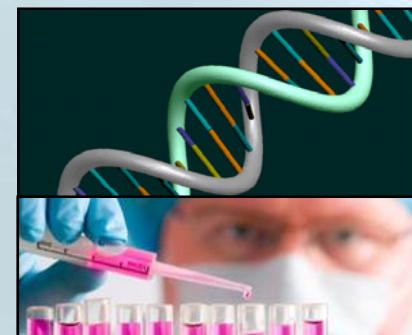
- Three Phase I and one Phase II effort to assess the maximum standoff ranges for capture of multiple biometrics while accurately identifying an individual

Mobile Biometrics:

- Three Phase I and two Phase II efforts to analyze DHS needs; conduct a technology risk assessment; and develop a prototype mobile multi-biometric device and communications gateway

Rapid DNA-based Biometrics:

- Three Phase I efforts to analyze DHS needs; conduct a technology risk assessment; and ultimately demonstrate an automated desktop prototype device that verifies identity or kinship within an hour from DNA (deoxyribonucleic acid) samples



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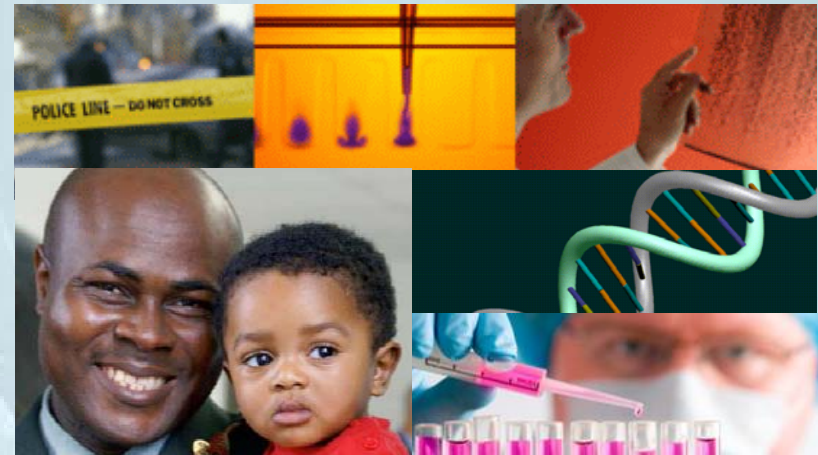
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Rapid DNA-Based Screening: *Reducing Immigration Fraud*

Goal:

- Develop rapid DNA-based screening technology to verify family relationships (kinship) and identity of those seeking asylum or immigration into the United States; children put up for overseas adoptions; and mass-casualty identifications



Approach:

- Definition of DHS metrics and evaluation of potential small business approaches through the DHS SBIR program
- R&D to automate and integrate DNA processing steps
- Collaborative program with DoD, TSWG and DOJ to create a desktop prototype system in 18 months

Payoff:

- DNA screening for kinship is reduced from weeks to under an hour, from \$500 to \$100 per sample, and conducted in-house vs. external labs



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Technology Acceptance and Integration Program: *Incorporating Community Perspectives into Technology Development*

Goal:

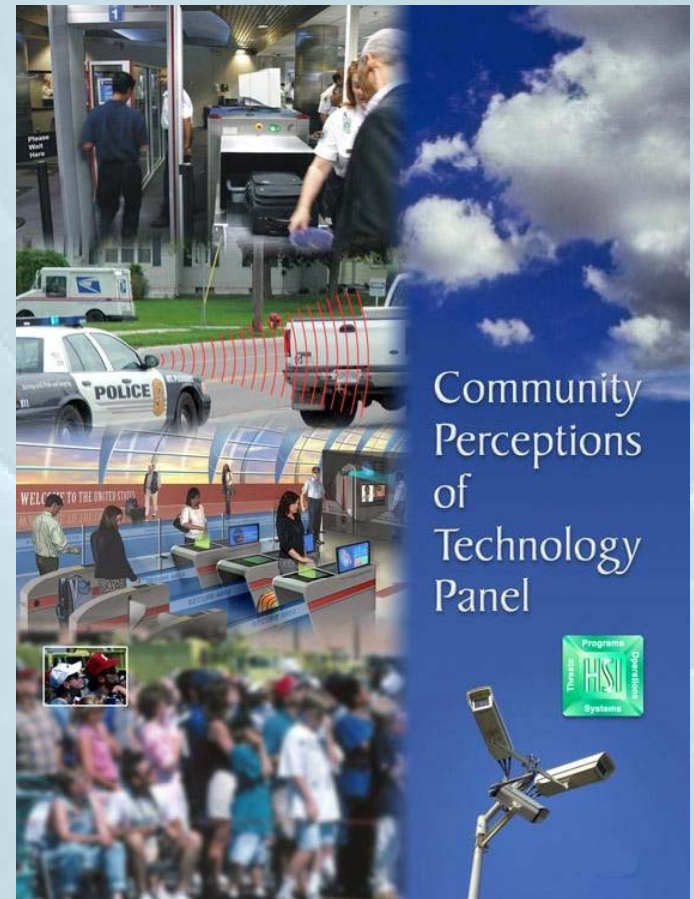
- To successfully develop and adopt application specific, publicly acceptable technologies and processes.

Approach:

- Community Perceptions of Technology (CPT) Panel focuses on a selected technology/process.
- Experts selected from industry, public interest, and community-oriented organizations to participate.
- Qualitative data collected is used to inform operational processes, to develop and deploy technology, and to guide the design of additional research tools.



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Incorporating Community Perspectives into Technology Development

CPT Panels 2008:

- February 2008: Microwave Vehicle Stopping
- May 2008: Raman Spectroscopy- IED Standoff Explosive Detection
- August 2008: Mobile Biometric Technology
- December 2008: Nonlinear Acoustic IED Standoff Threat Detection

CPT Panels 2009:

- March 1-3: Northern Border Technology- Radio-Frequency Identification (RFID) Registration and Low Resolution Imaging Technology
 - Joint panel with the Canadian Government
- August 5: Imaging Technology
- TBD: Biometrics
 - Joint panel with the UK



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