



# Taking Today's Biometrics to Meet Tomorrow's Needs

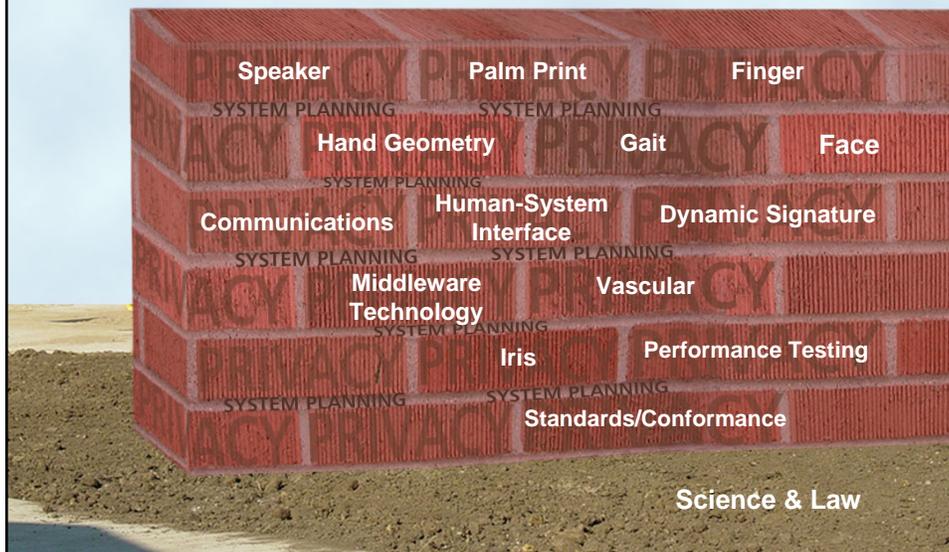
*Meeting the Challenge Together*

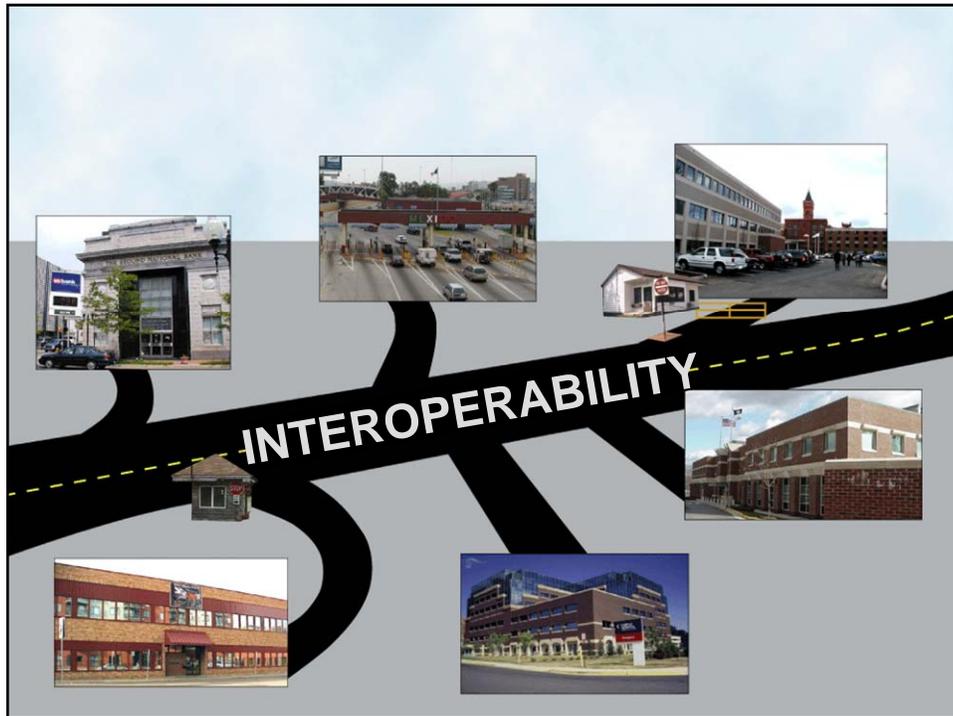
Duane Blackburn  
Office of Science & Technology Policy

September 19, 2006



## Requirements/operating environment





## NSTC Subcommittee on Biometrics

- National Science & Technology Council
  - Cabinet-level Council is the principal means within the executive branch to coordinate S&T policy across the diverse entities that make up the Federal R&D enterprise.
- Subcommittee on Biometrics
  - Develop and implement multi-agency investment strategies that advance biometric sciences to meet public and private needs;
  - Coordinate biometrics-related activities that are of interagency importance;
  - Facilitate the inclusions of privacy-protecting principles in biometric system design;
  - Ensure consistent message about biometrics and government initiatives when agencies interact with Congress, the press and the public;
  - Strengthen international and public sector partnerships to foster the advancement of biometric technologies.

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## Subcommittee Coordination Areas

- Fingerprint Recognition ICP (Miles/NIJ)
- Face Recognition ICP (Phillips/NIST)
- Iris Recognition ICP (Lively/DHS S&T)
- Multi-biometrics ICP (Grother/NIST)
- Next Generation Biometrics ICP (Swann/FBI)
- Test and Evaluation ICP (DoD BFC & Newton/NIST)

Technical Co-Chair  
Miles/NIJ

- Human-System Interface ICP (Wing/US-VISIT)
- Standards & Conformity Assessment ICP (Lang/BTF)
- Biometric Identity Assurance Services
- Large System Updates/Integration

Applications Co-Chair  
Wing/US-VISIT

- Social/Legal/Privacy ICP (Sand/DHS Privacy)
- Communications ICP (Weissman/US-VISIT)
- Research Agenda ICP (Hogan/NIST & Dennis/DHS S&T)

Policy Co-Chair  
Blackburn/OSTP



## Taking Today's Biometrics to Meet Tomorrow's Needs

*Meeting the Challenge Together*

Chris Miles  
Technical Co-Chair  
National Institute of Justice

September 19, 2006



## Advancing Technology

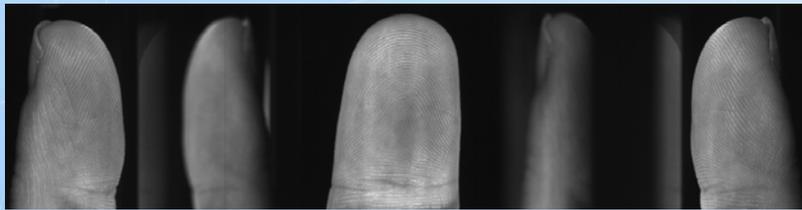
- NSTC Subcommittee on Biometrics works cooperatively to advance:
  - Fingerprint Recognition
  - Face Recognition
  - Iris Recognition
  - Next Generation Biometrics
  - Multi-Biometrics
  - Test and Evaluation of Biometrics



## Technology Successes

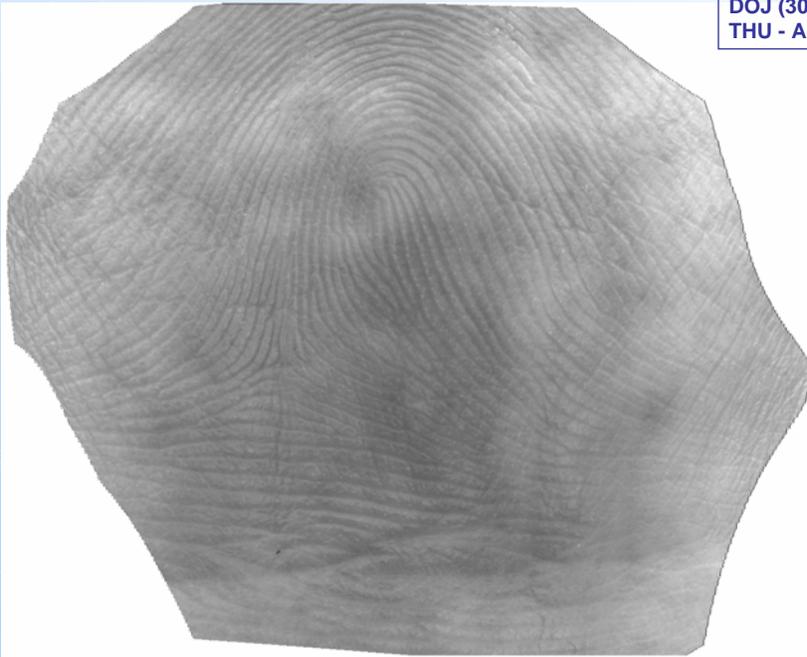
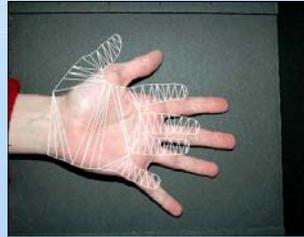
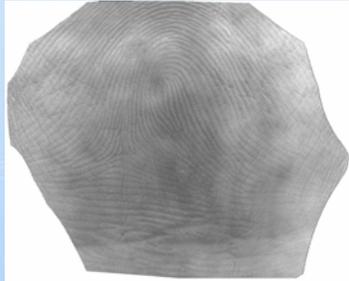
DOJ (308)  
THU - AM

- Fast Rolled-Equivalent Fingerprints
  - Highly cooperative, joint effort of Departments of Justice, Homeland Security, Defense, and State
  - Requirements represent a major step forward in finger and palm print capture technology:
    - » Capture of 10 rolled-equivalent fingerprints in <15 seconds
    - » Capture of both palms in 1 minute or less
  - Four R&D efforts underway to produce prototype devices in 18 months to 2 years

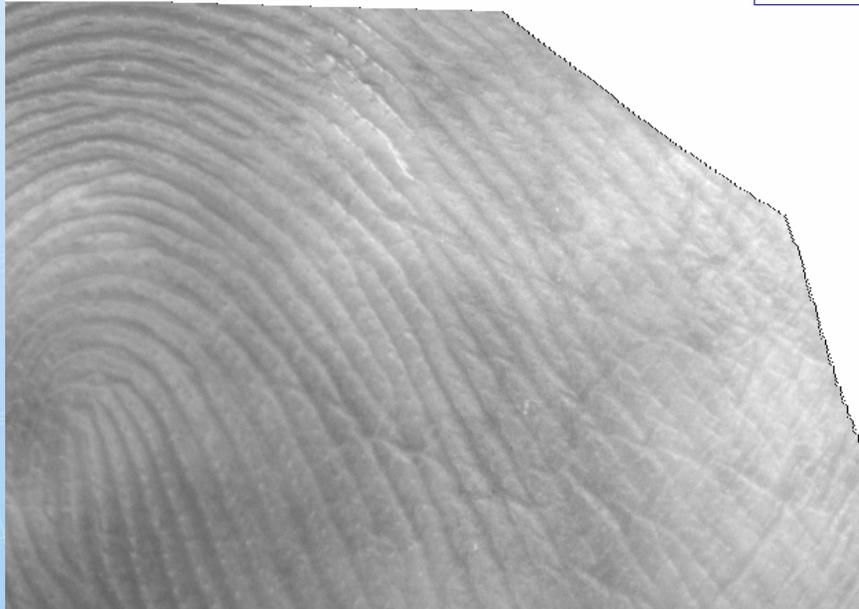


# Technology Successes

DOJ (308)  
THU - AM



DOJ (308)  
THU - AM



## Technology Successes

- Fast 10-print Slap Capture of Fingerprints
  - Joint Federal government user group issued an industry challenge via RFI in Sep. 2005
  - The Challenge called for industry to provide:
    - » 10-print flat capture devices and software
    - » < 6 inch x 6 inch x 6 inch size
    - » < 5 lbs. weight
    - » < 15 seconds capture time
  - CrossMatch announced LScan Guardian in April, 2006
  - Identix announced TouchPrint™ Enhanced Definition 4100 Slap & Roll Live Scan in June, 2006



Identix TouchPrint 4100 \*



Cross Match LScan Guardian\*

\* does not imply endorsement

# Technology Successes

NIST (308)  
TUE - PM

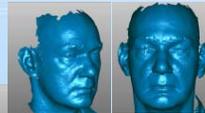
- Face Recognition Grand Challenge
  - Goal is to advance still and 3D face recognition algorithm development creating an order of magnitude performance improvement
  - 17 participating organizations and 53 experiments completed in Version 2.0
  - Datasets to 144 organizations worldwide
  - Best self-reported algorithms performed better than 98% verification (False Acceptance Rate = 0.001)
  - Executed by NIST. Sponsored by many USG partners



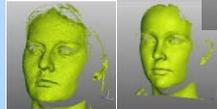
Single Still



Multiple Stills



3D Full Face



3D Single view

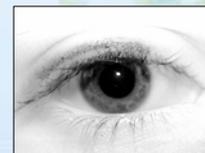


Outdoor/  
Uncontrolled

# Technology Successes

NIST (308)  
TUE - PM

- Iris Challenge Evaluation
  - Goal is to facilitate iris recognition technology development and to assess iris algorithm performance
  - ICE 2005 was a challenge problem and had 9 participating organizations and 15 algorithms submitted
  - Executed by NIST. Sponsored by many USG partners
  - Best self-reported algorithms performed better than 99% verification (FAR=0.001)
  - ICE 2006 is an independent evaluation of technology that began on June 15, 2006 and has 8 participants from 6 countries



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## Technology Successes

- Multimodal Biometric Application Resource Kit
  - MBARK reduces the complexity and costs of implementing modern biometric applications
  - Creates flexible XML clients with respect to changes in sensors, workflow, configuration, and responsiveness
  - Public domain source code may be leveraged to develop next-generation biometric and personal identity verification applications
  - Supports face, iris and finger (rolled and flat)
  - Developed at NIST; sponsored by the DHS S&T Directorate



## Technology Successes

NIST (308)  
TUE – PM

- BioAPI 1.1 Conformance Test Suite
  - The Biometrics Application Programming Interface (ANSI INCITS 358-2002) is a cornerstone standard for multi-component biometric system architectures
    - » Interchangeability of biometric system components
    - » Independence from vendor's implementations
    - » Simplified implementation of multiple biometric modalities
  - In February, 2006 the DoD BMO and NIST ITL released conformance test suites to verify software compliance.
  - Provides confidence that biometric products correctly and consistently implement the BioAPI Specification and that BioAPI-based products and systems will be interoperable
  - Test suites have been cross-validated with vendor BSPs

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## Outstanding Technology Needs

- **Better biometric sensors:**
  - Rapid collection of face, finger and iris in mobile and harsh environments while still meeting technical, safety and quality standards
  - Quality collection of biometric data of non-cooperative users at distances
  - Quality collection of biometrics data in relaxed conditions
  - Next generation and Multi-biometric sensors
- **Better biometrics templates:**
  - Can be revoked and replaced to uniquely represent the source individual should that individual's template become compromised

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## Focus for Biometric Research

- **Biometric Sensors that:**
  - Automatically recognize the operating environment and communicate with other system components to automatically adjust settings to deliver optimal data
  - Have virtually no failures-to-enroll
  - Are low cost
  - Are easy to use (intuitive to end-users)
  - Provide standards-based data
  - Can be easily integrated into existing systems
  - Incorporate liveness detection
  - Are rugged (varying operating temperatures, waterproof and UV-resistant)
  - Collect standards-quality imagery from a distance

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## Focus for Biometrics Research

- Fingerprint Sensors that provide:
  - Rapid and intuitive collection (less than 15 seconds) of rolled-equivalent fingerprints from cooperative users
  - Contactless and/or self-sterilizing contact fingerprint sensors
- Middleware techniques/standards that will permit biometric sensor “plug-and-play” capability
- Conformance testing suites/programs for data quality and middleware standards
- Scenario and performance testing to assure that equipment will meet intended performance metrics for specific applications
- Transformed revocable and replaceable biometric templates created at time of capture

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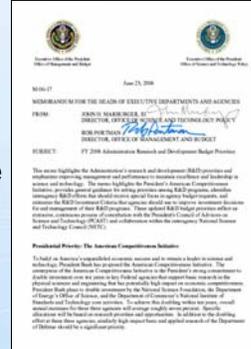
## Anticipated Benefits

- Rapid collection of biometrics data in uncontrolled situations for accurate, rapid, safe and easy comparison and addition to national-level screening systems
- Real-time comparison of first-time foreign visitors to terrorist/criminal databases
- Single identity of individuals across law enforcement enterprise (field, police station, court, jail, etc.)
- Fiscal viability of biometrics in enterprise-security and financial transactions
- System capabilities unaffected by changes in sensors
- Biometrics templates that protect against biometric identity theft without degrading system performance

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# Future is Promising

- FY 2008 Administration Research and Development Budget Priorities
  - Memorandum for the Heads of Executive Departments and Agencies
  - Released June 23, 2006 by the Office of Science and Technology Policy and the Office of Management and Budget
  - “Agencies should place increased emphasis on R&D efforts that support: ... biometric recognition of individuals for border security, homeland security, and law enforcement purposes in a rapid, interoperable, and privacy-protective manner ....”



[www.ostp.gov](http://www.ostp.gov)

[Biometrics.gov](http://Biometrics.gov)



## Taking Today's Biometrics to Meet Tomorrow's Needs

*Meeting the Challenge Together*

Brad Wing  
Department of Homeland Security

September 19, 2006



## Interagency Data Sharing

- **DoD** and **DHS** exchanging biometric information on persons captured in Iraq
- **DOJ** and **DoD** linking fingerprint systems to check records on persons detained by the military
- **State** and **DHS** sharing data to perform background checks on visa applicants
  - Fingerprints checked against DHS IDENT and FBI IAFIS databases

DoD (308)  
WED - AM

DoD (308)  
WED - AM

DHS (308)  
WED - PM

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## Interagency Data Sharing

- **NIST** and **DoD**, **DHS**, **DOJ**, **State** formed Interagency Project Team
  - Purpose: Streamline exchange of biometric and biographic information used to establish identity
- **DOJ** and **DHS** moving towards full interoperability of IDENT and IAFIS
- **DOJ**, **DHS** and **State** planning for ten fingerprint capture

DHS (308)  
WED - PM

DHS (308)  
WED - PM

DOJ (308)  
THU - AM

DHS (308)  
WED - PM

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## International Data Sharing

- **DHS** and **INTERPOL** exchanging fingerprint data on internationally wanted criminals
- **DHS** sharing lookout records with other countries on terrorists and major criminals, gang-related records, and deportee records
- **State, DHS** and **international partners** working on Enhanced International Travel Security (EITS) program

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## E-Passport Validation Process

- Visa Waiver Program (VWP) e-Passport Requirement
  - As of October 26, 2006, any passport issued on or after this date by a VWP country must be an e-Passport for VWP travelers to be eligible to enter the United States without a visa.
- Validation process
  - Test e-Passports for compliance with the U.S. standard and U.S. e-Passport readers
  - Discovered several potential problems which the VWP nations corrected prior to implementation
  - Ensures interoperability of VWP e-Passports and U.S. e-Passport readers

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## Biometric Standards Support

- Government and industry working together to develop national and international biometric standards
  - NSTC coordinates consistent US-Government approach
  - Standards for technical interfaces, data interchange formats, application profiles, testing and reporting
  - Over last five years, 7 international and 22 national biometric standards have been approved\*
  - More than 75 standards projects under development\*

*\*As of April 19, 2006*

## Biometric Standards Support

- Community-wide work to define common standards and formats for the Personal Identity Verification card for government and contractors (HSPD-12/FIPS 201)
  - Requirements, testing and approval procedures for the Approved Product List
- Development of new standards to meet emerging needs
  - Biometric Identity Assurance Services for web-based biometric applications (BIAS)
  - Biometric sample quality

## Biometric Studies and Testing

- Goats study on hard to match fingerprints
  - Claim: Certain percentage of people (2% widely used) cannot be fingerprinted
  - Finding: None of the subjects had fingers that were *a/ways* hard to match and many were particularly easy to match
- Biometric middleware survey
  - Definition: Application framework that supports the integration of biometrics hardware, software and algorithms
- BioToken study
  - Definition: Device that captures biometrics for authentication without physical connection to another system

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## Biometric Studies and Evaluations

- 10-Print scanner evaluation
  - Follow-up activity to 10-print capture RFI
  - Evaluation of hardware and software is underway
- Slap Fingerprint Segmentation Evaluation
  - Assessed accuracy of algorithms to segment slap fingerprint images into individual fingerprint images
  - Conducted by NIST for the Department of Justice IDENT/IAFIS integration project

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## Long Term Needs

- Improved biometrics sensors
  - Rapid collection
  - Quality collection
  - Cameras and sensors that dynamically adjust to changing circumstances
- Biometrics systems interoperability
  - Fully-interchangeable components
  - Authenticity and data use restrictions
  - Enterprise-wide implementations

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## Long Term Needs – Cont'd

- More efficient and effective large-scale biometrics systems
  - High recognition accuracy
  - Automated quality assessment
  - Determinations of which system components are most appropriate for given applications
  - Intuitive interfaces
  - Remote, unattended enrollment and recognition
  - Return on investment (ROI) models for various applications

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## Long Term Needs – Cont'd

- Biometric middleware
  - Support for multiple modalities, algorithms, and devices
  - Standard methods for communication with biometric databases
  - Methodologies and technologies to enable rapid and efficient searching and matching
- Product testing and validation
  - Biometric data and system interoperability for information sharing
  - Conformance and performance test programs structured to remove redundancies, reduce cost and provide maximum benefit for government programs

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## Closing

- Government is working together to address biometrics issues and applications through the NSTC and other groups
- Many issues have been addressed and systems have been implemented
- New and more difficult challenges present opportunities for collaboration
- What is the impact of this increased data sharing among agencies?

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## After the Break

- Overviews of communications and privacy activities
- Introduction of *The National Biometrics Challenge*
- Discussion/Q&A on all session topics

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## Taking Today's Biometrics to Meet Tomorrow's Needs

*Meeting the Challenge Together*

Duane Blackburn  
Policy Co-Chair  
Office of Science & Technology Policy

September 19, 2006



## Communications & Biometrics

- The biometrics community has reached a tipping point where a *unified* message that stresses the utility, safety and convenience of biometrics, as well as the technical and operational issues, is necessary
- Outreach activities flow through many channels and are heard by interested and disinterested constituencies that have varying degrees of familiarity with the subject matter

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## Sharing Information

- [www.biometrics.gov](http://www.biometrics.gov)
  - Central USG site for information about biometrics
    - » Overview of biometrics
    - » Federal activities
  - *New website!*
- [www.biometricscatalog.org](http://www.biometricscatalog.org)
  - Repository of public biometrics information
    - » Commercial products, research and test reports
    - » News and calendar of events
  - *Maintained by its users*
- [www.biometrics.org](http://www.biometrics.org)
  - Homepage of the Biometric Consortium
    - » Annual conference
    - » Bulletin Board Discussions
  - *1000+ attendees at annual conference*

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- Biometrics.gov provides basic information and links to specific biometric activities in the Federal government. The site includes three main “rooms”:
  - Biometrics Reference
  - NSTC Subcommittee on Biometrics
  - Media

- The Biometrics Reference Room was developed to provide an accurate understanding of the technology and related government programs, and includes the following areas:
  - Federal Programs - information, and web links, for major federal programs using biometrics
  - Biometrics & Privacy - a Subcommittee paper which seeks to connect privacy and biometrics at a structural level so that both fields can be understood within a common framework
  - Introduction to Biometrics - introductory-level material on biometrics, including a glossary and FAQ

# Foundational Understanding of Biometrics

- INTRODUCTION

- Biometrics Overview
- Biometrics FAQ
- Biometrics Glossary
- Biometrics History

- TECHNOLOGIES

- Dynamic Signature
- Face Recognition
- Fingerprint Recognition
- Hand Geometry
- Iris Recognition
- Palm Print Recognition
- Speech Recognition
- Vascular Pattern Recognition



- CROSS-CUTTING TOPICS

- Biometrics Standards
- Biometrics Testing and Statistics

## Biometrics.gov

Home Biometrics Reference Room NSTC Subcommittee on Biometrics Room Media Room Partner Sites

- Subcommittee Overview
- Presentations
- Publications
- Additional Technical Information
- Related Information

- The NSTC Subcommittee on Biometrics Room provides information about Subcommittee activities, and includes the following areas:

- Subcommittee Overview - provides an overview of the subcommittee and agency participants
- Presentations - provides a representative sample of subcommittee-related presentations
- Publications - official documents produced by the subcommittee
- Additional Technical Information - links to external websites that provide more detailed information about individual activities
- Related Information - links to external activities that may be of interest to visitors of Biometrics.gov

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Home Biometrics Reference Room NSTC Subcommittee on Biometrics Room Media Room Partner Sites

Press Releases  
Press Contacts  
Images  
Fast Facts

- The Media Room provides information useful for members of the press, such as press releases, graphics and fast facts
  - Press Releases - a listing of recent biometrics-related press releases from Federal agencies
  - Press Contacts - a listing of agency press
  - Images - biometrics-related images that can be used in news articles
  - Fast Facts - interesting statistics and information for news articles

# BIOMETRICS CATALOG

Home Newsroom Government Documents Research Reports Biometrics Privacy Additional Resources Contact Us

- Online repository of freely-available public biometric documents
- Free to use, user supported
  - Items in the catalog have been added by previous users
- Averaging over 800 unique visitors per day
  - 18 months ago: ~200 unique visitors
  - Vast majority of visitors are from the US

<u>Area</u>	<u>Total</u>
Government Documents	108
Legislative Reports	565
Federal Solicitations	228
Newsroom	8,536
Conference Presentations	640
Research Reports	5,151
Evaluation Reports	31
Commercial Vendors	191
Consultant/Analyst	25
Biometrics Event Calendar	72
Privacy Documents	41

Current as of 09/05/2006

**the biometric CONSORTIUM** [www.biometrics.org](http://www.biometrics.org)

- BC 2006
- Intro. to Biometrics
- Bulletin Board
- Meetings & Events
- Government Activity
- Standards Activity
- Biometric Resources
- Past BC Conferences
- Links

- Homepage of the Biometric Consortium
  - Information on upcoming and past biometric events
  - Bulletin Board for discussing biometric technologies, events and programs
    - » Special Forum for Biometrics.gov related items
  - Standards Activities

## Other Communications Activities

- Biometric Solicitation Reviewer
  - Register your potential willingness to serve on a USG source selection panel
    - » <https://www.biometriccatalog.org/bsr/review.asp>
- Venture Capitalist Workshops
  - Participated in 3 biometrics-based workshops in the past 18 months with the VC community to discuss federal needs for biometrics

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## Privacy and Biometrics

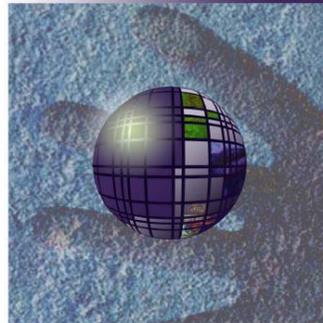
- Formulation and subsequent widespread acceptance of privacy-protection policies for biometric-based systems not only increases system acceptability but often improves system operation as well.
- Individuals have varied understandings, and place varied importance, on privacy and privacy protection.

## Privacy & Biometrics Building a Conception Foundation

Provides a general overview of both privacy and biometrics and offers a perspective through which to view the convergence of both.

- Biometrics Overview
  - Privacy Overview
  - Application of Privacy to Biometric Technology
  - Value of Privacy Protective Biometric Systems

### Privacy & Biometrics Building a Conceptual Foundation



National Science and Technology Council (NSTC)  
Committee on Technology  
Committee on Homeland and National Security  
Subcommittee on Biometrics



## Privacy?

- What is Privacy?
  - Most conceptions of secrecy assert that once the secret is revealed it is available for any public use
  - Privacy claims can cover information and activities involving others, such as medical records, bank accounts, etc.
  - In biometric context, privacy protection governs the use of personal information that is shared
    - » Personal Information: **ANY Information that COULD be used in ANY way to identify an INDIVIDUAL.**
- Biometrics community must implement policies and processes that govern the appropriate use of data, individually and in its aggregate
  - Used Appropriately: **Founded in law/policy, Clearly & Previously Articulated, Related to Initial Collection.**
- These policies should be clearly communicated to all affected constituencies

## Integration of Architectures

### Biometrics

1. Collection
2. Conversion
3. Storage
4. Comparison
5. Decision

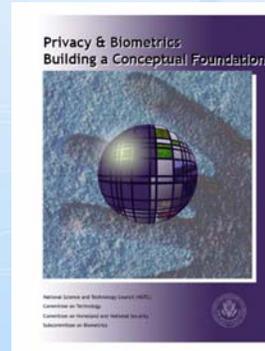
### Privacy

1. Status
2. Documentation
3. Purpose & Success
4. Data
5. Function
6. Other Technologies
7. Audit & Access

## Privacy & Biometrics Building a Conception Foundation

For more information

- Online
  - [http://www.biometrics.gov/refs\\_privacy.html](http://www.biometrics.gov/refs_privacy.html)
- Biometric Consortium Conference 2006
  - Privacy & Policy Session
    - » 2pm today, room 310



## Privacy & Biometrics

- Additional Privacy Material
  - Biometrics Catalog Privacy Page
    - » <http://www.biometriccatalog.org/biometrics/privacy.aspx>
- Feedback
  - Biometric Consortium Bulletin Board
- Next Steps for the Subcommittee
  - Putting the framework to action
  - Updating and improving
- 2<sup>nd</sup> International Workshop on Biometrics and Ethics

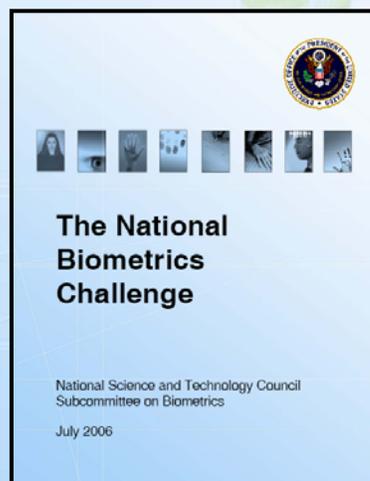
## Taking Today's Biometrics to Meet Tomorrow's Needs

- Government and industry have a common challenge in today's global society to provide more robust identity management tools, and identity governance principles on how to deploy these tools intelligently, to meet national and international needs.
- Meeting these needs will require biometrics technology enhancements, adjustments of commercial business practices and system designs, and development of consensus on social, legal, privacy and policy considerations.
- Collaboration among the biometrics community – government, industry and academia – on these common challenges is essential.

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## The National Biometrics Challenge

- Developed by the NSTC Subcommittee on Biometrics
- Describes the major challenges that must be addressed by the biometrics community
- By working together to overcome these challenges, the community will meet evolving operational requirements while being supported by a robust biometrics industry



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## “Challenge” Document Structure

- Why Biometrics?
- Primary Driving Forces
  - National Security
  - Homeland Security and Law Enforcement
  - Enterprise and E-Government
  - Personal Information & Business Transactions
- Communications & Privacy
- Biometrics Challenges, Research Focus and Benefit
  - Biometric Sensors
  - Biometric Systems
  - Biometric Systems Interoperability
  - Communications and Privacy
- USG Role in Biometrics Advancement

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## “Challenge” Document Structure

- The NSTC Subcommittee on Biometrics recognizes that the future of the biometrics community will be shaped by four primary driving forces:
  - National security (NS);
  - Homeland security and law enforcement (HS/LE);
  - Enterprise and e-government services (E);
  - Personal information and business transactions (P).
- Within each (Section 3) is discussion on:
  - Mission
  - Needs
  - Applications

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## “Challenge” Document Structure

- These driving forces present four preeminent challenges for the biometrics community:
  - Improve collection devices; [biometrics sensors](#)
  - Develop more efficient and effective large-scale operational capabilities; [biometrics systems](#)
  - Establish standards for plug-and-play performance; [biometrics systems interoperability](#)
  - Enable informed debate on why, how and when biometrics should be used; [biometrics communications and privacy](#)
- Within each (Section 5) is discussion on:
  - Description of Challenge
  - Focus for Biometrics Research
  - Benefits

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## Example Challenge Communications & Privacy (5.4)

- Description of Challenge
  - Fundamental understanding of biometrics technologies, operational requirements and privacy principles to enable beneficial public debate on where and how biometrics systems should be used (NS, HS/LE, E, P)
  - Embed privacy functionality into every layer of the architecture, from the sensor through the system to the interoperable biometrics network (NS, HS/LE, E, P)
  - Privacy-protective solutions that meet operational needs, enhance public confidence in biometrics technology and safeguard personal information (NS, HS, E, P)

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## Communications & Privacy (5.4)

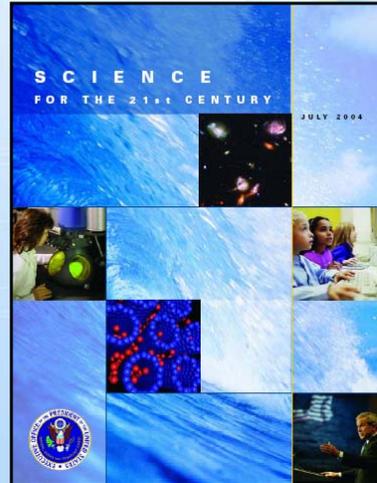
- Focus of Research
  - Develop a consistent, accurate and understandable message across the biometrics community
  - Engage in proactive outreach when designing systems and policies
  - Study how best to relay information and/or facilitate discussion with varying groups
  - Create enhanced guidelines and informative examples of integrating privacy and biometrics technology
  - Develop best practices for operating biometrics systems and interfacing with end-users

## Communications & Privacy (5.4)

- Benefits
  - A scientifically educated and aware public that can serve as a partner in making appropriate decisions about the nation's biometrics investments, guiding their adoption and debating the societal implications of biometrics systems
  - Goodwill among various constituencies
  - The demystification of biometrics technologies and their fundamental operations
  - Deployments appropriate to the scale and purpose of the intended applications

## Role of Government in Meeting the Challenge

- The four major responsibilities of the federal science enterprise are to:
  - Promote discovery and sustain the excellence of the Nation's scientific research enterprise;
  - Respond to the Nation's challenges with timely, innovative approaches;
  - Invest in and accelerate the transformation of science into national benefits;
  - Achieve excellence in science and technology education and in workforce development.



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## Role of Government in Meeting the Challenge (6)

- Assist in the identification of priority cross-community needs for biometrics;
- Invest in cutting-edge basic research that produces new discoveries that can advance biometrics and other technologies in the future;
- Describe government needs in as specific terms as possible so that industry and academia can devote resources to solving real problems;
- Where appropriate, provide resources and/or guidance to overcome those obstacles that the community is unable to provide on its own;
- Maximize efficiency and effectiveness of the federal research, development, testing and evaluation enterprise by:
  - Planning biometrics activities across the federal government to meet interagency needs;
  - Selecting activities through competitive, peer-reviewed award and review processes;
  - Ensuring activities meet scientific and privacy-rights standards;
- Participate in biometrics open standards development, standards adoption, conformance test tool development, conformity assessment system development, and harmonization of biometrics, security and authentication standards;
- In support of first, second and third-party testing, perform testing and evaluation for biometrics performance, interoperability, collection and maintenance of data, and development of large databases;
- Assist in the promotion of a scientifically literate population and a supply of qualified technical personnel commensurate with national needs;
- Strengthen international partnerships in order to foster the advancement and standardization of biometrics technologies.

## Why a Challenge Document?

- In development, an outstanding learning and discussion exercise
- Establishes USG consensus on priority topics, thus directing future USG activities
- Identifies “real” topics for industry and academia to concentrate on
- Promotes structured, thought-through, feedback to government agencies
- Promotes national and international cooperation

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## Next Steps

- Community-wide discussion on how to meet the challenges
- Action!

***The community met its initial post-9/11 challenge. Now let's work together to meet tomorrow's needs.***

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# Discussion

