

# NIST Biometric Standards Program

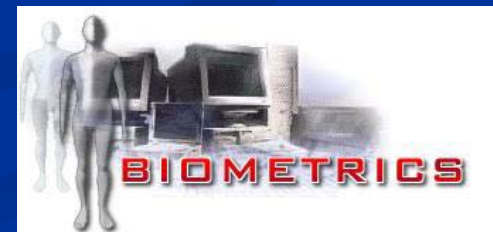
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# Overview

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- Need for Biometric Standards
- Legislative Mandates
- NIST History in Biometric Standardization
- NIST Strategy and Tactics
- Standards Snapshot
- Impacts

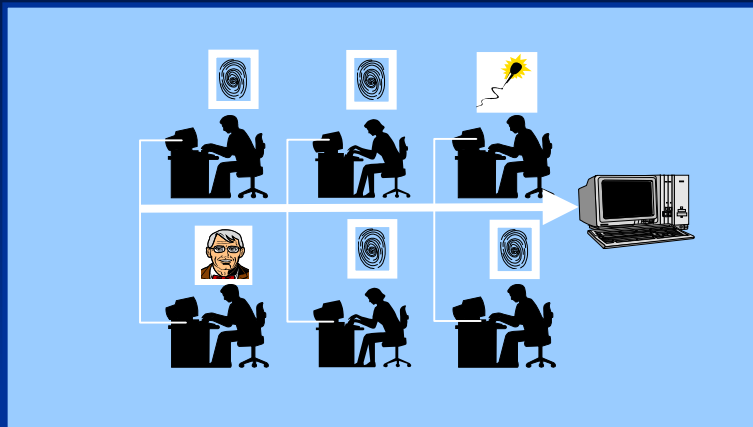


# Caveats

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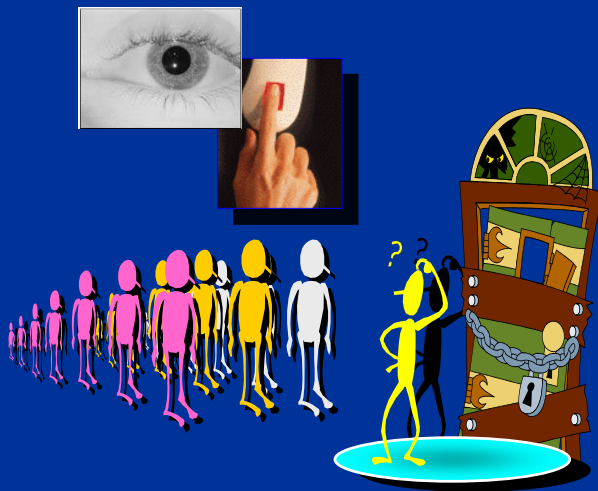
- *Warning!!* Much standards jargon will follow.
- Glossary of *some* of this jargon is listed at the end of presentation.
- More on biometric standards will be covered tomorrow at 8:30 am session:
  - “What Are Those Standards Guys Up To Now?”
  - Moderator: Mrs. Cathy Tilton, Director, Integrated Solutions Group, SAFLINK Corporation
- Sample of jargon - Mrs. Tilton is the M1 IR and US HOD to ISO/IEC JTC 1 SC 37.

# Why consensus based standards?

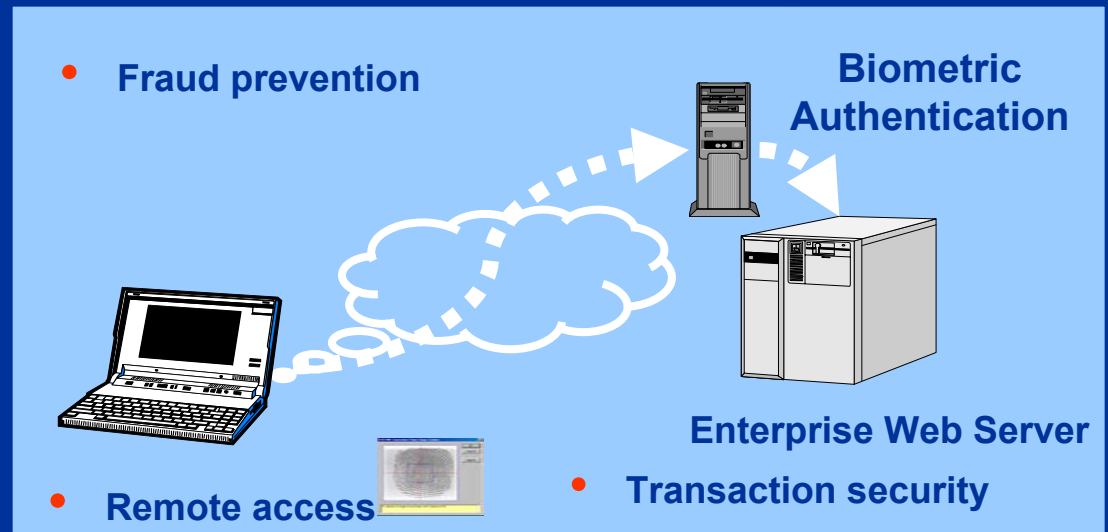


*Enterprise systems & applications based upon consensus biometric standards are more likely to be interoperable, scalable, usable, reliable, secure, and economical than proprietary systems.*

## Support for different architectures



Protection of critical infrastructure



Prevention of ID Fraud

# National Technology Transfer and Advancement Act (NTTAA)

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- Signed into law on March 7, 1996. Public Law 104-113
- It requires that federal agencies adopt private sector standards, ***particularly those developed by standards developing organizations (SDOs)***, wherever possible in lieu of creating proprietary, non-consensus standards.
- It requires that ***NIST "coordinate Federal, State, and local technical standards activities and conformity assessment activities***, with private sector technical standards activities and conformity assessment activities with the goal of eliminating unnecessary duplication and complexity in the development and promulgation of conformity assessment requirements and measures."
- See: <http://ts.nist.gov/ts/htdocs/210/nttaa/nttaa.htm>

# Computer & Homeland Security Legislative Mandates

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- Computer Security Act of 1987 (Public Law 100-235)
- Section 5131 of the Information Technology Management Reform Act of 1996 (Public Law 104-106)

## *Post September 11, 2001*

- Homeland Security Act of 2002 (Public Law 107-296)
- Cyber Security R&D Act (Public Law 107-305)
- Federal Information Security Management Act of 2002 (Title III of E-Gov) (Public Law 107-347)
- USA PATRIOT Act of 2001 (Public Law 107-56)
- Aviation and Transportation Security (Public Law 107-71 )
- Enhanced Border Security and Visa Reform Act (Public Law 107-173)

# NIST History in Biometric Standardization

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- For decades, NIST has been involved with the law enforcement community in biometric testing and standardization.
  - *ANSI/NIST-ITL 1-2000 Data Format for the Interchange of Fingerprint, Facial, & Scar Mark & Tattoo (SMT) Information*
- In the past five years, NIST has intensified its work in biometric standardization working with consortia and other fora.
- After 9/11, NIST championed the successful establishment of formal national and international biometric consensus standards development bodies (i.e., M1, SC 37) as the best environments to support deployment of standards-based solutions.

# NIST Biometrics Standards Program

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- NIST Biometrics Standards Program Manager
  - Fernando L. Podio
- Goal is to accelerate the development of high priority biometric standards.
- NIST program is targeted to support and work in collaboration with:
  - Other government agencies (e.g., DoD Biometric Management Office, NSA, DHS)
  - Standards community (e.g., INCITS, JTC 1)
  - Biometrics industry (e.g., IBIA)
  - Biometric Standards Incubators (e.g., Biometric Consortium and the National Biometric Security Project)

# NIST's Strategy & Tactics to Accelerate Biometrics Standards Development

## ***User requirements:***

- Need strong personal authentication for Homeland Defense (in the US and abroad) and other applications (e.g., commercial, government)
- High performance, interoperable systems
- Comprehensive set of data interoperability, performance & conformance standards
- Time is a compelling factor (later migration from proprietary systems to standards-based solutions will be prohibitively difficult and expensive)



## ***Strategy:***

- International standards are the ultimate goal
- National standards can usually be developed faster – do so
- Organize & lead dedicated standards groups (INCITS M1 & JTC 1 SC 37)
- Graceful migration from national to international standards is the goal
- Experimental implementations in support of interoperability, data interchange and conformance testing methodology standards



## ***Tactics:***

- Support fast processing of consortia specifications
- Leverage from work of biometric standards “incubators” (e.g., Biometric Consortium)
- Push the envelope on speed
- Work with industry and users
- Select good officers, technical editors

# NIST Biometrics Standards Program

## -- Leadership --

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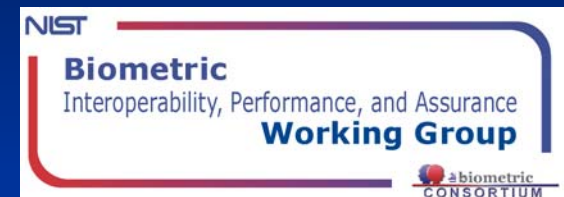
- Provide the Chair and Secretariat for ISO/IEC JTC 1 SC 37, Biometrics.
- Provide the Convener and Secretariat for JTC 1 SC 37 WG 4, Biometric Functional Architecture and Related Profiles.
- Provide the Chair for INCITS Technical Committee M1, Biometrics.
- Provide the Chair for INCITS M1 Task Group M1.4, Biometric Profiles.
- Provide technical experts to serve as project editors for finger image and performance testing standards projects in INCITS M1 and JTC 1 SC 37.
- Many technical contributions to the M1 and SC 37 standards projects.

# NIST Biometrics Standards Program

## -- Consortia Work --

### ■ Common Biometric Exchange Formats Framework (CBEFF), NISTIR 6529-A

- Describes a set of data elements necessary to support biometric technologies in a common way.
- Spearheaded by NIST and NSA.
- Developed by the NIST/BC Biometric WG in coordination with consortia and other organizations



[www.nist.gov/biometrics](http://www.nist.gov/biometrics)

### ■ BioAPI - ANSI INCITS 358 - 2002

- A biometric Application Programming Interface standard that defines a generic way of interfacing to a broad range of biometric technologies.
- Developed by the BioAPI Consortium (over 100 organizations)
- NIST is a member of the Steering Committee
- [www.bioapi.org](http://www.bioapi.org)



BioAPI  
Consortium

# Biometric Profiles

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- Biometric profiles are a crucial level of standardization to ensure *biometric interoperability*.
- Biometric profiles specify:
  - What base standards apply.
  - What options and ranges of values in those base standards are necessary and sufficient to ensure *biometric interoperability* for a particular set of application functions.

# Conformance & Interoperability Testing

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- Users/developers need to determine whether an implementation conforms to a biometric standard.
- Conformance testing captures the technical description of a specification in a standard and measures whether an implementation faithfully implements the specification.
- Users/developers need to determine system interoperability for biometric data.
- Interoperability testing consists of the testing of one implementation (product, system) with another to establish that they can work together properly.

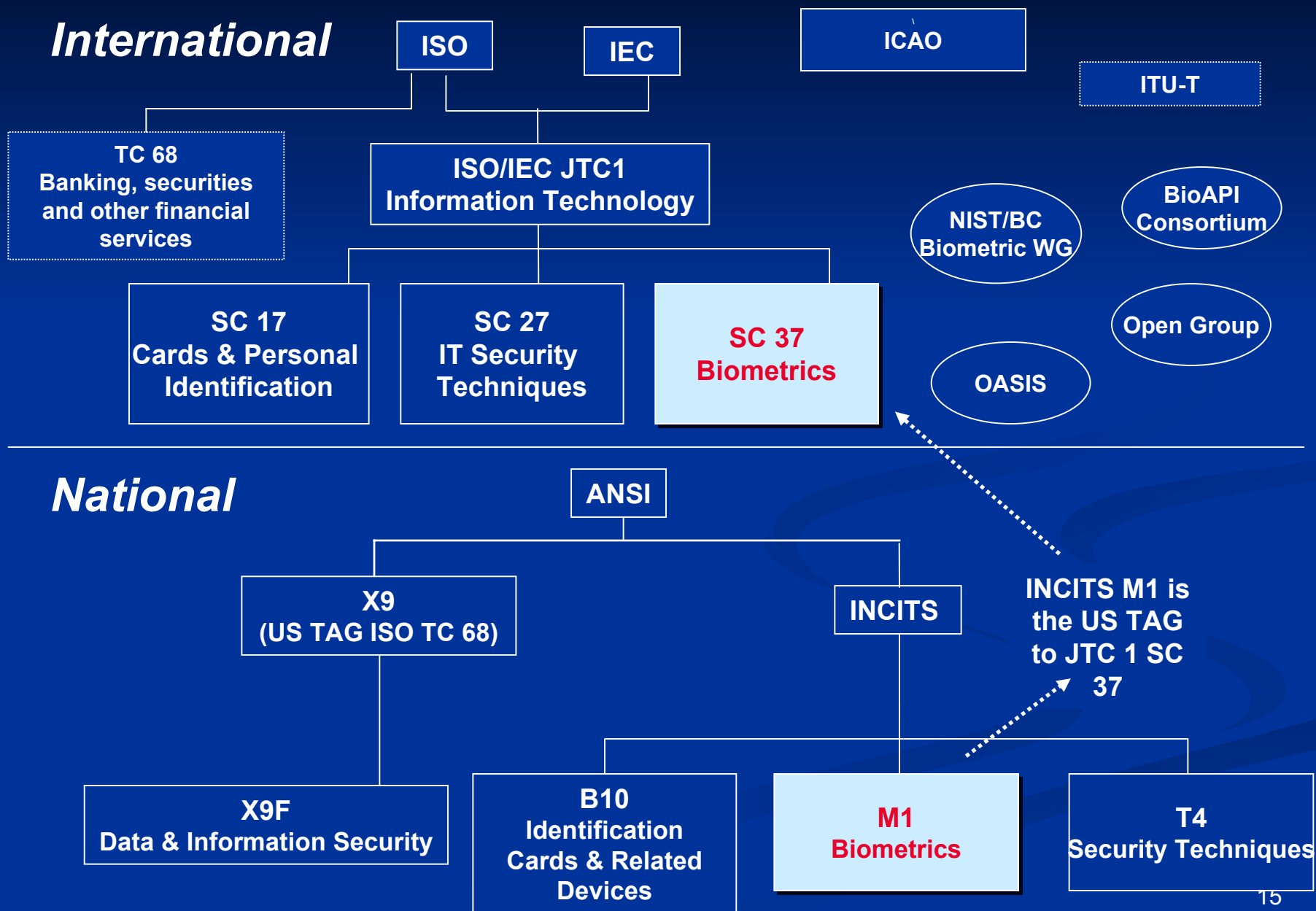
# Conformance & Interoperability Testing

## -- NIST Strategy --

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- Development of standard testing methodologies (through standards bodies such as INCITS M1 and JTC 1 SC37)
- Development of Experimental Conformance/System Interoperability Test Beds (e.g., BioAPI/CBEFF) in support of the development of documentary standards.
- Lead efforts to harmonize testing by different organizations/conformity assessment efforts (e.g., equivalent test tools lead to consistent test results).

# Biometrics Standards Activities – Who is Doing What?



# M1 Standards Program

**Approved!**

- \* **Finger Minutiae Format For Data Interchange**
- \* **Finger Pattern-Based Interchange Format**
- \* **Face Recognition Format for Data Interchange**
- \* **Iris Recognition Format for Data Interchange**
- \* **Finger Image Format for Data Interchange**

- \* Signature/Sign Image Based Interchange Format
- \* Hand Geometry Interchange Format
- \* Biometric Sample Quality

## **Conformance testing methodologies for:**

- \* ANSI/INCITS 358 – BioAPI
  - Finger Image & Finger Minutiae
  - Iris

## **Biometric Profiles for:**

- \* **Verification & Identification of Transportation Workers**
- \* Personal identification for Border Management
- \* Point of Sale Biometric Identification
- \* DoD implementations
- \* Commercial Biometric Physical Access Control

- \* **Performance Testing & Reporting Standards (Technology, Scenario & Operational Testing)**

*Via INCITS Fast Track*

\* BioAPI V1.1  
ANSI/INCITS 358\*

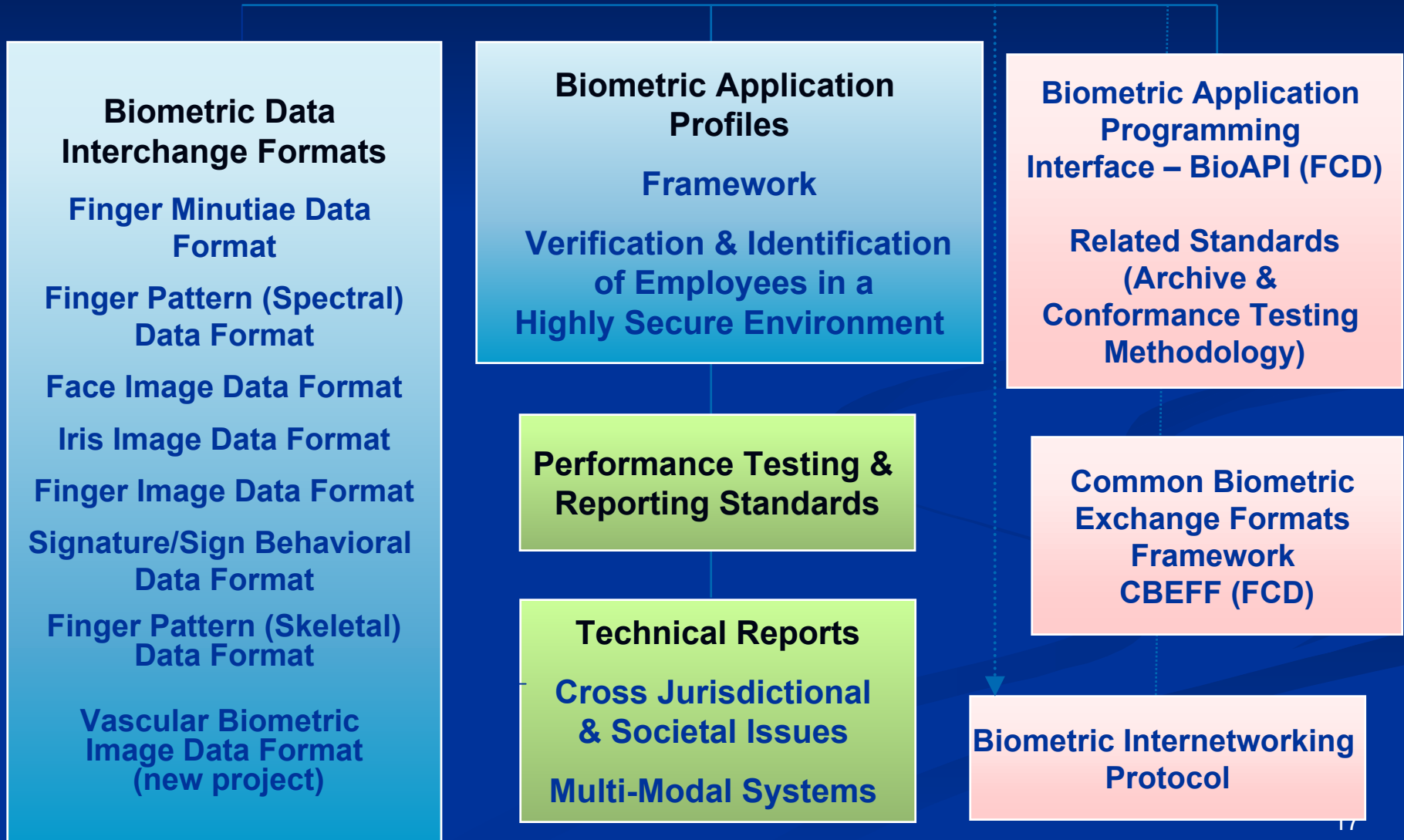
*Under INCITS Fast Track*

\* Revised CBEFF  
NISTIR 6529-A

**Expedited Process**

**ISO/IEC JTC 1  
SC 37**

# JTC 1 SC 37 Standards Program



# NIST as a Catalyst - BioAPI

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- Led successful harmonization efforts of different API activities by consortia in the late 1990s.
- Helped fast track the BioAPI Consortium BioAPI Specification (Version 1.1) through INCITS.
- Arranged briefing on BioAPI Specification (Version 1.1) to INCITS in July 2001.
- Approved by INCITS and ANSI in February 2002.
- ANSI INCITS 358: 2002
- ANSI INCITS 358 now being fast processed internationally by JTC 1 SC 37.

# NIST as a Catalyst - CBEFF

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- In collaboration with NSA, spearheaded and led the successful development of CBEFF.
- NISTIR 6529-A
- CBEFF provides a standard biometric data structure so that different biometric devices and applications can exchange information efficiently.
- “Rosetta Stone” for biometric information.
- CBEFF is now being fast processed in M1 and SC 37.
- CBEFF is a requirement for conformance to all of the biometric data interchange format standards.

# NIST as a Catalyst - Biometric Profiles

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- NIST briefed the concept of profiling the base biometric standards for interoperability of applications at the first meetings of:
  - INCITS M1 - January 2002
  - JTC 1 SC 37 - December 2002
- M1.4 and SC 37 WG were subsequently established to develop biometric profiles.
- ANSI INCITS 383: 2004 - Application Profile- Interoperability and Data Interchange - Biometrics-Based Verification and Identification of Transportation Workers

# NIST as a Catalyst - Conformity Assessment

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- NIST initiated actions to help get all of the stakeholders in M1 "up to speed" on Conformity Assessment (CA).
- Briefings by NIST CA experts (e.g., from the NIST National Voluntary Laboratory Accreditation Program).
- Proposed an M1 Ad-Hoc Group to review issues on harmonizing CA to biometric standards.
- Proposed initiating standards work on conformance testing methodologies for the INCITS M1 standards.
- Four projects recently approved:
  - Finger image – INCITS 381 (NIST/DoD BMO)
  - ANSI INCITS 358-2002, BioAPI (NIST/NBSP/DoD BMO/SAFLINK/TBF)
  - Finger Minutiae – INCITS 378 (CrossMatch Technologies)
  - Iris format – INCITS 379 (Iridian Technologies)

# NIST as a Catalyst - Conformity Assessment

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- At its second Plenary meeting (2003 September), SC 37 established a Rapporteur Group (RG) on Conformity Assessment (CA) chaired by NIST
  - Develop guidance for SC37 on the relationship of various CA policies and reference documents to SC 37's standards development activities.
  - Major conclusion: ***It is most appropriate for SC 37 to develop conformance testing methodology standards.***
- SC 37 testing methodology projects underway:
  - BioAPI Conformance Testing Methodology – Part 1: Methods and Procedures
  - BioAPI Conformance Testing Methodology – Part 2: Test Assertions
  - US is very active in this project (e.g., DoD BMO)

# Adoption of Biometric Standards

## International Civil Aviation Administration (ICAO)

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- Adopted a global, harmonized blueprint for the integration of biometric identification information into passports and other Machine Readable Travel Documents (MRTD)
- Requires conformance to SC 37 standards
  - *Facial recognition* was selected as the globally interoperable biometric for machine-assisted identity confirmation with MRTD
  - Other requirements: *CBEFF, Finger Interchange Formats and Iris Interchange Format*

# Adoption of Biometric Standards

## International Labor Office of the United Nations Seafarer's ID Card

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- ISO and JTC 1 are assisting ILO regarding the use of biometrics for a Seafarer's ID card.
- Two fingerprint templates will be stored in a barcode which will be placed in the area indicated by ICAO 9303.
- ILO Technical Report SID-002 (Approved March 2004) specifies the use of some of the standards under development in SC37 (*finger minutiae, finger image and CBEFF*).

# Adoption of Biometric Standards

US Department of Homeland Security / Transportation Security Administration  
Transportation Worker Identification Credential (TWIC) Program

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- System-wide common credential to be used across all transportation modes for all personnel requiring unescorted physical and/or logical access (to secure areas of the national transportation system).
- Phase III - Prototype Phase – Biometric Requirements: INCITS biometric standards, as applicable, such as *INCITS 383 Information technology - Application Profile - Interoperability and Data Interchange - Biometric Based Verification and Identification of Transportation Workers*

# Adoption of Biometric Standards

## US Department of Defense

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- DoD IT Standards Registry (DISR)
- Applicable biometric standards in the DISR
  - *INCITS 358-2002, BioAPI Specification*
  - *CBEFF*

# Additional Information

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# More Information on INCITS, INCITS M1, and JTC 1 SC 37

- INCITS

<http://www.incits.org/>

- INCITS M1–Biometrics

[http://www.incits.org/tc\\_home/m1.htm](http://www.incits.org/tc_home/m1.htm)

- ISO/IEC JTC1

[www.jtc1.org](http://www.jtc1.org)

(select Subcommittee 37 – Biometrics)

# Glossary of Some Terms

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- ANSI – American National Standards Institute
- BioAPI – Biometric Application Programming Interface
- CBEFF - Common Biometric Exchange Formats Framework
- ICAO – International Civil Aviation Organization
- IEC – International Electrotechnical Commission
- INCITS – InterNational Committee for Information Technology Standards
- ISO – International Organization for Standardization
- ITU-T - ITU Telecommunication Standardization Sector
- JTC 1 – Joint Technical Committee 1 (of ISO/IEC)
- SC – Subcommittee
- TC – Technical Committee
- TC 68 – ISO Technical Committee 68 (banking, securities and other financial services)
- ASC X9, Inc. – ANSI Accredited Standards Committee X9 (financial services)