Interview with Fernando Podio – Chair of ISO/IEC JTC 1 SC 37 – Subcommittee on Biometrics

In addition to his chairmanship of SC37, Mr. Podio is a member of the Computer Security Division of the Information Technology Laboratory at the US National Institute of Standards and Technology (NIST), is chair of the M1 technical committee on biometrics within the International Committee on Information Technology Standards (INCITS) and co-chair of the Biometrics Consortium. He was kind enough to be interviewed for Planet Biometrics – Standards in Focus.

Interviewed by: Catherine Tilton, Standards Editor

Q: How do countries work together to develop SC37 standards?

SC 37 is a Subcommittee of the Joint Technical Committee 1 of ISO and IEC (ISO/IEC JTC 1/SC 37). The Subcommittee operates under the principles of international standards development based on three key ISO principles which are: consensus, industry wide representation and voluntary standards. Under these principles the standards are developed using a consensus-building process and the views of all interests are taken into account: manufacturers, vendors and users, consumer groups, testing laboratories, governments, engineering professions and research organizations. The goal of this process is the development of standards that support global solutions to satisfy industries and customers worldwide. International standardization is market driven and therefore based on voluntary involvement of all interests in the market-place.

The standards are developed following a precise process established by ISO which includes several pre-defined stages from the proposal of a new standard to its approval and publication. A simplified and brief description of the three standard development phases follows:

1. The need for a standard is communicated usually via national member body.
2. If agreement is reached on a new standard and the scope of it, countries negotiate the detailed specifications within the standard.
3. This phase comprises the formal approval of the resulting draft International Standard

JTC 1/SC 37's scope of work is the standardization of generic biometric technologies pertaining to human beings to support interoperability and data interchange among applications and systems. Excluded from the work are standards related to the application of biometric technologies to cards and personal identification which are developed in another JTC 1 Subcommittee (JTC 1/SC 17 - *Cards and personal identification*) and standards related with the work of JTC 1/SC 27 – *IT Security Techniques.*

Almost since its inception, the Subcommittee work was divided into six Working Groups (WG) that address different aspects of standardization. An article published by Planet Biometrics depicts these

areas and WGs[1]. JTC 1/SC 37 has been operating on an approximately six-month cycle between WG meetings and twelve-month cycles between Plenary meetings. After the upcoming Plenary meeting in July 2012, the meeting cycle will be extended to nine-months between WG meetings and eighteen-months between Plenaries.

The countries participating in the work appoint "National Body" delegations to the Subcommittee Plenary as well as expert delegations to the WGs and again, through a consensus–building process, the standards are developed and approved following several stages (from base documents and working drafts until consensus is reached on their content and they are approved for publication). These stages are: (a) New Work Item Proposal (NWIP); (b) Working Draft (WD); (c) Committee Draft (CD); (d) Draft International Standard (DIS); (e) Final Draft International Standard (FDIS); and (f) International Standard (IS).

JTC 1/SC 37's membership has grown to twenty-six member countries and thirteen observer member countries. A number of Liaison organizations participate in the development of the standards. An average of one-hundred and twenty National Body experts and Liaisons participate in the Subcommittee's WG activities.

▯ **Q: Since its inception in 2002, how many standards have been published by SC37?**

Including amendments and technical corrigenda, sixty-two International standards and six Technical Reports have been published. The portfolio of biometric international standards continues to grow. Overall, at the time of the writing, the Subcommittee has sixty-five active projects (International standards and Technical Reports). Twelve new projects were initiated in the last year.

▯ **Q: What changes have you seen in biometric standards during this time?**

The establishment of JTC 1/SC 37 offered the IT community and end–users an international venue to accelerate and harmonize formal international biometric standards. The Subcommittee quickly and successfully brought together a wide range of interests among IT organizations, the biometric industry, security experts and end-users of multiple biometric-based identification and verification applications. These experts collaborated in developing in a timely fashion an initial portfolio of standards meeting the customers' needs. This initial set of standards is what we call the "first generation" or "1G" (e.g., biometric data interchange formats for a number of biometric modalities, biometric technical interfaces and performance testing methodology standards). Since then, a number of these standards were expanded to new parts, and revision projects were initiated due to feedback from standards implementers, organizations responsible for conducting related biometric performance and conformance test programs, technology innovations, and new customers' needs. Customers for the Subcommittee standards are industry, end-users and other standards organizations.

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[1] Planet Biometrics – Standards – Getting Started, Catherine J. Tilton,
http://www.planetbiometrics.com/creo_files/upload/article-files/getting_started_-_biometric_standards_-_v2_(sep2011).pdf

Q: What's left to be done?

We are currently working on the "second generation" ("2G") of standards which include, for example, revisions of the biometric data interchange formats, new biometric technical interface standards, biometric sample quality standards, new performance testing-related standards, and new application profiles and technical reports. Additional projects include support for new modalities (e.g., DNA and voice biometric data interchange formats) and XML encoding formats. Many of the "2G" biometric data interchange format standards have been published (on the late part of 2011 and early 2012). Standards projects not included in the "1G" portfolio include, for example, a standard on anti-spoofing and liveness (e.g., a common data format for conveying the type of approach, common definitions, principles and methods for performance assessment of suspicious presentation), testing of multi-modal biometrics, pictograms, icons and symbols for use with biometrics systems, use of mobile biometrics for personalization and authentication and code of practice for the implementation of a biometric system. In addition, the first edition of a standardized biometric vocabulary has been completed and it is in the last stage of standards development.

A significant number of projects have been initiated and are considered for the near term development. They include the development of conformance testing methodologies for level 3 (semantic conformance testing) for the data interchange formats and development of new parts for the biometric sample quality standard. A project that specifies biometric icons and symbols for different modalities may be expanded to support other modalities.

Object Oriented BioAPI is under development. The project currently consists of three parts: Part 1, Architecture, Part 2, Java implementation and Part 3, C# implementation. Biometric Identity Assurance Services being specified defines biometric services used for identity assurance that are invoked over a services-based framework. It provides a generic set of biometric and identity-related functions and associated data definitions to allow remote access to biometric services.

The development of two Technical Reports was recently initiated. They will describe guidance for biometric enrolment and passenger processes for biometric recognition in automated border crossing systems. Potential areas of additional biometric profile development include physical access control for travelers; verification of customers at points-of-sale; and physical/logical access control for employees in manufacturing and service sectors such as healthcare, education, transportation, finance and government.

Other ongoing representative projects include the development of a multi-part standard that specifies machine readable test data for biometric testing and reporting and the development of two additional Technical Reports. The first one will provide guidance for specifying performance requirements to meet security and usability needs in applications using biometrics, and the second report will address the characterization and measurement of difficulty for fingerprint databases for technology evaluation.

The Subcommittee recognizes the need to identify developments, new requirements and technologies that may not be amenable to performance testing using the current test processes. Such areas include testing of behavioral aspects of biometric technologies related to behavioral biometrics and behavioral elements of biological biometrics. There is also a perceived requirement for a standard, or minimally a

Technical Report, specific to identification system testing. The current versions of the ISO/IEC 19795 multi-part standard address identification metrics and methodologies, but not the full range of considerations specific to identification systems (e.g., ingestion, queuing, and hardware optimization).

☐ **Q: What do you feel are the greatest achievements of SC37?**

The standards developed by the Subcommittee support the mass market adoption of biometric technologies. The major achievement of the Subcommittee is the adoption of a number of the standards by large international and national organizations. The rapid development of a portfolio of technically sound consensus standards is viewed as significantly contributing to the timely deployment of standards-based systems. The biometric standards often impact related standards efforts such as token-based, security and telecommunication standards developments.

☐ **Q: Who has adopted SC37 standards?**

A number of international and national organizations have adopted or are considering adopting many of the biometric standards developed by the Subcommittee. The International Civil Aviation Organization (ICAO), for example, selected facial recognition as the globally interoperable biometric for machine-assisted identity confirmation for Machine Readable Travel Documents (MRTD). ICAO requires conformance to the face recognition standard developed by JTC 1/SC 37. Other ICAO requirements for the Subcommittee standards are the fingerprint data interchange formats, the iris recognition interchange format, and an instantiation of the Common Biometric Exchange Formats Framework (CBEFF). The International Labour Office of the UN (ILO)'s requirements for the Seafarers' ID Card include the use of two fingerprint templates to be stored in a barcode placed in the area indicated by the ICAO's 9303 standard. ILO's requirements specify the use of some of the standards approved by JTC 1/SC 37, specifically finger minutiae and finger image data interchange formats (published as International Standards in 2005). The adoption of these standards is a significant contribution to the customer and the biometric and ID management industries, and will significantly impact the use of biometrics for MRTD in the countries represented within ICAO.

The European Union (EU) password specification working document[2] describes solutions for chip enabled EU passports, based on EU's Council Regulation on standards for security features and biometrics in passports and travel documents issued by Member States[3]. The specification relies on international standards, especially ISO/IEC standards and ICAO recommendations on MRTDs, and includes specifications for biometric face and fingerprint identifiers; thus the specifications are underpinned by ISO/IEC standards resulting from the work of the Subcommittee. A number of standards are referred to in this EU document including an ICAO New Technology Working Group's Technical Report[4] as well as the ISO/IEC 19794-4:2005 and ISO/IEC 19794-5:2005 standards developed by ISO/IEC JTC 1/SC 37.

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[2] "Biometrics Deployment of EU-Passports", The EUpassword specification working document (EN) – 28 June, 2006.
[3] Council Regulation (EC) No 2252/2004 of 13 December 2004 on standards for security features and biometrics in passports and travel documents issued by Member States. Official Journal of the European Union, L 385/1.
[4] Biometrics Deployment of Machine Readable Travel Documents", ICAO NTWG, Technical Report, Version 2.0, 05 May 2004

Several countries represented in the Subcommittee are also adopting the Subcommittee standards. For example, in Spain two official documents store biometric data using these standards. The electronic national identity card (DNIe) includes personal information of the citizen, details of electronic certificates and the biometric information. The image of the face is stored following ISO/IEC 19794-5 and ICAO standards. Finger minutiae are stored using the ISO/IEC 19794-2 standard. In addition, the biometric data included in Spanish e-Passports is the image of the face based on ISO/IEC 19794-5 and ICAO standard compliant stored in JPEG2000 format (ISO 15444)[5]. In the United States of America, several organizations require selected biometric data interchange standards and some of the ongoing biometric testing programs use some of the performance testing methodology standards both developed by the Subcommittee. The Registry of U.S. Government Recommended Biometric Standards developed by the National Science and Technology Council Subcommittee on Biometrics and Identity Management is an example[6]. It recommends some of the data formats specified in biometric standards: the finger minutiae, face image and iris image data interchange formats as well as the BioAPI specification and its companion conformance testing methodology standard. Two parts of the multi-part performance testing methodology standard developed by the Subcommittee are also included in the Registry. (The identical versions of the international standards adopted by the InterNational Committee for Information Technology Standards (INCITS) are recommended).

Another example is the JTC1/SC 37 standards recommended by the Planning Commission of the Unique Identification Authority of India. After reviewing international standards and current national recommendations, the Committee concluded that the ISO 19794 series of biometrics standards for fingerprints, face and iris developed by JTC 1/SC 37 were the most suitable. According to the current plan India would issue over one billion biometrically de-duplicated unique identity numbers. The Indian project called "Aadhaar" uses the same three standard data formats utilized in ePassports (fingerprint, face and iris image standards), and in addition it uses the fingerprint minutia standard (ISO/IEC 19794-2) for authentication purposes and the CBEFF standard ISO/IEC 19785 (Common Biometric Exchange Formats Framework) to encapsulate the biometric data proving a standard structure and metadata as well as a security block.

▪ **Q: What would you like people to know about SC37 or its work?**

JTC 1/SC 37 is rising to the challenge of technology innovations and new customers' needs and is addressing new projects to address these challenges. Standards are effective only when they are developed with the participation of all stakeholders including those who will use them. JTC 1/SC 37's work and success is an example of that. The highly technical discussion topics addressed during the development of these standards are conducted under a friendly environment by technical experts from industry, the user communities including government and related organizations, research organizations, and academia creating a successful partnership for standards development. Participation has been excellent. The intensified level of work and the technical challenges presented by the development of the second generation of biometric standards are being successfully addressed but new projects and

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[5] Communication from Dr. Angel L. Puebla, president of AEN CTN71/SC37 (Spanish Subcommittee of Biometric Identification), Economic and Technical Coordination Division of the Spanish Main Directorate of the Police and the Civil Guard, July 2007.

[6] Registry of USG Recommended Biometric Standards, Version 3.0 February 2011, National Science and Technology Council Subcommittee on Biometrics and Identity Management: http://www.biometrics.gov/Standards/Registry_v3_2010_12_02.pdf

ideas for future development leads to the need of still wider participation. The Subcommittee welcomes further involvement to address the next generation of biometric standards. For more information on the status of the JTC 1/SC 37 portfolio of standards, on how to get involved, to contribute to the development of these standards and/or to propose new projects, email to the Subcommittee chair at: fernando.podio@nist.gov.

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Biography

Fernando L. Podio is a member of the Computer Security Division of the Information Technology Laboratory at the National Institute of Standards and Technology (NIST). Mr. Podio has worked in different aspects of IT development, research, measurements, and standards for over thirty-five years. For the past thirteen years he has been involved in biometrics testing, research, and standardization. He is leading biometric standards activities including efforts to accelerate the development of biometric standards and associated conformity assessment and the development of conformance test architectures and test suites for testing implementations of biometric data interchange formats. He is currently the Chairman of ISO/IEC Joint Technical Committee 1 (JTC 1)/Subcommittee 37 (SC 37) – Biometrics and he also chairs the InterNational Committee for Information Technology Standards (INCITS) Technical Committee M1, Biometrics. Mr. Podio is the co-chair of the Biometric Consortium. He has received national and international awards for his work in biometrics including INCITS 2011 Exceptional International Leadership Award, INCITS 2006 Gene Milligan Award for Effective Committee Management, a shared 2003 U.S. Dept. of Commerce Gold Medal Award for Distinguished Achievement in Federal Service, and NIST's 2000 William P. Slichter Award for "Outstanding Achievement in building or strengthening ties between NIST and industry".