IEEE
A Brief Overview

ITU Forum:
Bridging the ICT Standardization and Development Gap in Developing Countries
Kigali, Rwanda

Dr. Bilel Jamoussi
4 October 2007

Presented by John Visser, P.Eng.
IEEE Member for 26 years

IEEE

IEEE—A Global Organization

- **IEEE: world's largest professional organization**
  - **Independent and non-profit**
  - **Vision to advance global prosperity**
  - **Emphasis on technical innovation**
- **Members drive the IEEE's work**
  - **367,000 members in 150+ countries**
  - **67% have a post-graduate degree, 29% have PhD**
  - **50% from industry, 20% from academia, 10% from government**
  - **68% from Americas, 17% from Asia, 15% from EMEA**

IEEE Fosters Technical Innovation

- Made up of Societies that bring together experts in 44 specific fields
- Over 350 conferences, workshops, tutorials that attract 100,000 people each year
  - Also 3000 annual technical meetings, symposia and local events
- Publications that provide 30% of the world's literature in its fields
  - High-quality: 18 of top 20 cited publications in electrical and electronics engineering and computing
- Over 900 active, published standards
  - 400 standards currently in development
- Recognition of engineering professionals
  - From student paper awards to IEEE Fellow

IEEE & Africa

IEEE Membership

- over 2,000 IEEE members in Africa

IEEE Sections

- **Kenya**
- **Morocco**
- **Nigeria**
- **South Africa**
- **Tanzania**

IEEE Africon 2007, *26 - 28 September 2007*

- ***Peer-reviewed conference***
- ***Papers spread across the following tracks:***
  - ***Engineering Management***
  - ***Applications of Electromagnetics in Electronic Engineering***
  - ***Computational Semiotics***
  - ***Engineering in Medicine and Biology***
  - ***Education***
  - ***Communication and Signal Processing***
  - ***Measurement and Automation***
  - ***Electron***
  - ***Devices and Circuits, incorporating Micro-Electro-Mechanical Systems (MEMS)***
  - ***Energy and Power Systems***
  - ***Power Electronics and Drives***
  - ***Control & Automation***
  - ***Computer and Information Systems***

IEEE STANDARDS ASSOCIATION

An international membership organization serving today's industries and the public with a complete portfolio of standards programs

IEEE

Mission

The IEEE Standards Association provides a standards program that serves the global needs of industry, government, and the public. It also works to assure the effectiveness and high visibility of this standards program both within the IEEE and throughout the global community.

- **Increasing visibility and usage of IEEE Standards worldwide**
- **Promoting reliance on IEEE standards as a source of technical information for international, regional and national standards bodies**
- **Encouraging worldwide participation in IEEE Standards**

IEEE-SA's Global Approach

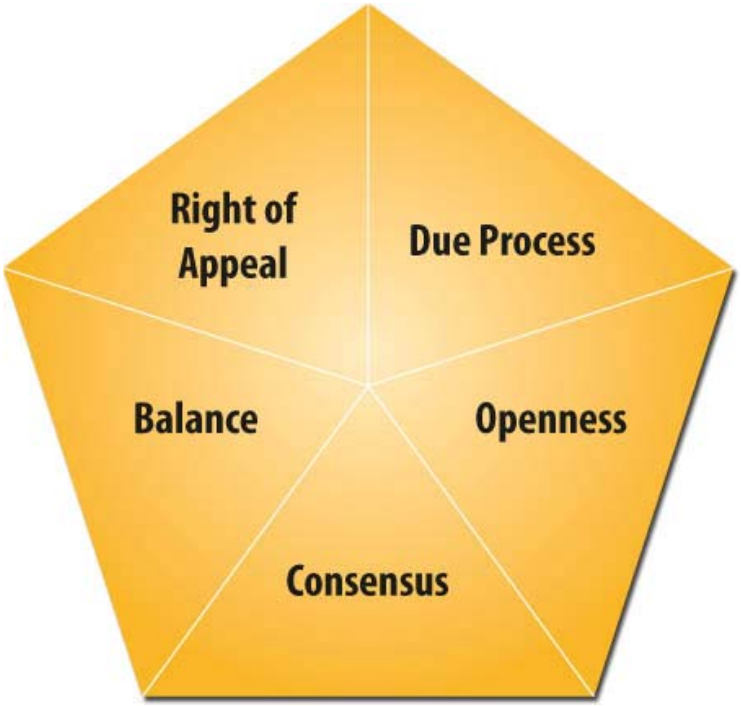
- Economics and technology span borders
- Advance technology to benefit global society
  - Cost-effective development
  - High-quality results
- One standard, one test worldwide

IEEE Standardization: Emphasis on technical excellence

- Collaboration with IEEE's technical Societies/Councils
  - Sponsorship
  - Participation
- Robust standards development process
  - Based on five principles
  - Proven development process
- Flexibility in participation
  - Individual and corporate balloting methods
  - Face to face meetings and electronic/telecon participation
- Global adoption and international cooperation
  - Many IEEE standards adopted globally (e.g., Ethernet)
  - 30% of IEC library based on IEEE standards
  - 25 years of adoption of IEEE standards by JTC1
  - Sector Member of ITU-T, ITU-R and ITU-D

IEEE-SA Standards Development

Guided by five principles



Ensuring integrity and wide acceptance for IEEE standards

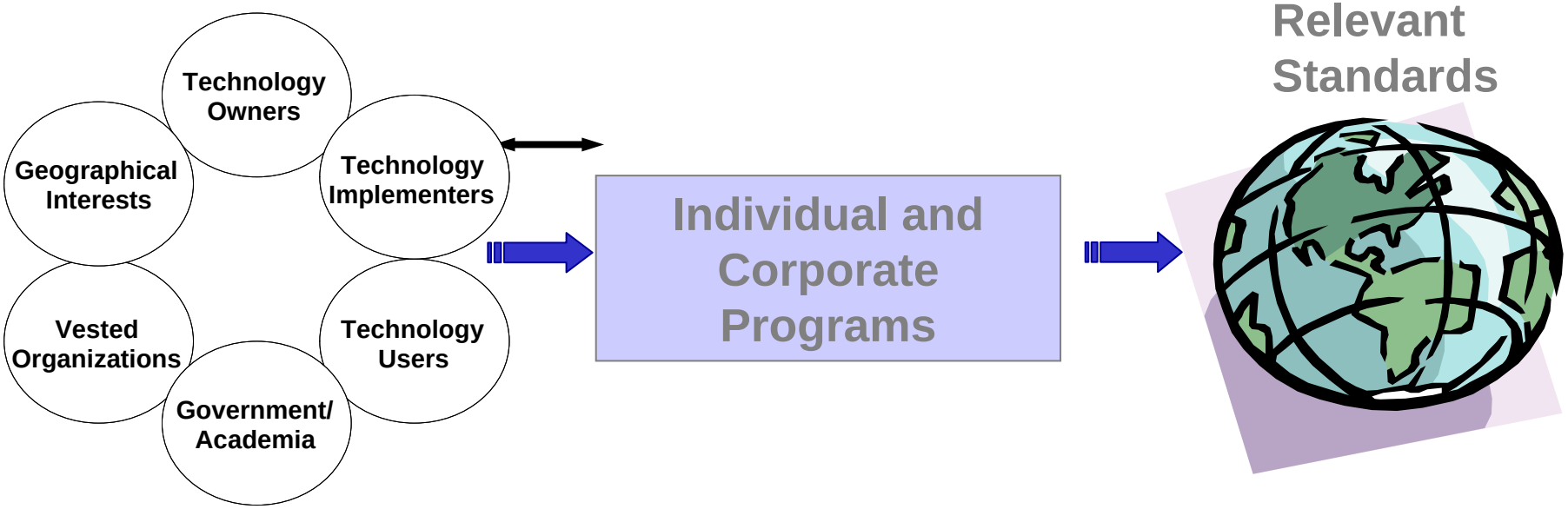
IEEE

IEEE Standards Are Pervasive

- **Aerospace Electronics**
- **Bioinformatics**
- **Broadband Over Power Line**
- **Broadcast Technology**
- **Electromagnetic Compatibility & Safety**
- **Information Technology**
- **Medical Device Communications**
- **Nanotechnology**
- **National Electrical Safety Code**
- **Organic Components**
- **Portable Battery Technology**
- **Power Electronics**
- **Power & Energy**
- **Radiation/Nuclear**
- **Reliability**
- **Transportation Technology**

- *115 year history of IEEE standards development*
- *900 active standards*
- *400 projects in progress*
- *15 000 volunteers*

Globally Support Standards Development Constituents



Global Involvement and Technical Expertise

Partnering with the international community

- Create a standards development environment that brings together all constituents
- Deliver economically relevant global standards to the international community

IEEE 802 Summary

- 802.1—Bridging and Architecture
  - Interworking (AB-REV, AC, ag, ah, aj, ak, ap, aq)
  - Security (af, AR)
  - Audio/Video bridging (AS, at)
  - Congestion management (au)
- 802.3—Wired Ethernet
  - Backplane Ethernet (ap)
  - Congestion management (ar)
  - Frame expansion (as)
  - Power management (at)
  - 10Gb/s PHY for EPON (av)
- 802.11—Wireless LAN
  - Radio resource management (k)
  - High throughput (n)
  - Vehicular environment (p)
  - Fast roaming (r)
  - Mesh networking (s)
  - Performance prediction (t)
  - Interworking with external networks (u)
  - Network management (v)
- 802.15—Wireless Personal Area Networks
  - Millimeter wave alternative PHY (.3c)
  - Wireless mesh topologies (.5)
- 802.16—Broadband Wireless Access
  - Mobility enhancements (i)
  - License exempt (h)
  - Relay stations (j)
  - Cellular layer requirements (m)
- 802.20—Mobile broadband wireless access
  - MAC/PHY layers
  - Below 3.5 GHz
  - Optimized for IP-data transport

"Get 802": free download of IEEE 802 standards

http://standards.ieee.org/getieee802/index.html

IEEE

IEEE P1901, Draft Standard for Broadband over Power Line Networks: Medium Access Control and Physical Layer Specifications

- **Project scope**
  - **Develop a standard for high speed (>100 Mbps at the physical layer) communication devices via alternating current electric power lines**
  - **Use transmission frequencies below 100 MHz**
  - **Be usable by all classes of BPL devices**
  - **Focus on the balanced and efficient use of the power line communications channel by all classes of BPL devices**
  - **Address the necessary security questions**
  - **Limited to the physical layer and the medium access sub-layer of the data link layer, as defined by the ISO OSI Basic Reference Model**
- **Entity-based participation**
- **Baseline standard expected to be completed end of 2007**
- **Interested parties should contact the P1901 Project Manager:**

  Noelle Humenick +1.732.562.3818 n.humenick@ieee.org
- **http://grouper.ieee.org/groups/1901/index.html**

IEEE

IEEE P1900.4, Draft standard for architectural building blocks enabling network-device distributed decision making for optimized radio resource usage in heterogeneous wireless access networks

- **Project scope**
  - **Define the building blocks comprising network resource managers, device resource managers, and the information to be exchanged between the building blocks, for enabling coordinated network-device distributed decision making**
  - **Optimize radio resource usage, including spectrum access control, in heterogeneous wireless access networks through architectural and functional definitions**
  - **Improve overall composite capacity and quality of service of wireless systems in a multiple Radio Access Technologies (RATs) environment**
- **New activity, started in December 2006**
- **Entity-based participation**
- **Contacts**
  - **Chair: Soodesh Buljore: soodesh.buljore@motorola.com**
  - **Vice Chair: Patricia Martigne: patricia.martigne@orange-ftgroup.com**

IEEE International Collaboration

- ISO/IEC JTC1
  - 25+ years of adoption of IEEE network, operating systems, microprocessor, and software engineering standards
- IEC
  - 30% of existing IEC library built on IEEE standards
  - Current Dual Logo agreement facilitates rapid adoption: Power, Energy, Design Automation
- ISO
  - Joint project with medical devices standards
- ITU
  - Formal international recognition from radio and telecommunications sectors

Harmonization between IEEE and ISO/IEC Joint Technical Committee 1/Subcommittee 7 (Software Engineering)

Successes (1 of 2)

- Since 1996, IEEE has adopted several SC7 standards
  - 1462 (was ISO/IEC 14102), CASE Tool Evaluation and Selection
    - [SC 7 is revising]
  - 1465 (was ISO/IEC 12119), SW Package Quality
    - [adoption of 25051 revision is planned]
  - 12207.0 (was ISO/IEC 12207), SW LC Processes
    - [coordinated revision underway]
  - 14143.1 (was ISO/IEC 14143-1), Functional Size Measurement
    - [SC 7 has prepared a Corrigendum]
  - 15288, System Life Cycle Processes
    - [coordinated revision underway]

Successes (2 of 2)

- SC7 has adopted IEEE standards
  - 16085 (was IEEE 1540), Risk Management Process
  - 19759, SWEBOK Guide
  - 2006 23026 (was IEEE 2001), Web Site Practices
  - 2006 25961 (was IEEE 1471), Architecture Description
    - [Awaiting publication; coordinated revision underway]
  - 2006 26702 (was IEEE 1220), Systems Engineering Process
    - [Awaiting publication; coordinated revision anticipated]
- We have jointly revised one shared standard
  - 2006 16085, Risk Management Process
    - [Both ISO and IEEE have published.]
- Some standards have been merged
  - 2006 14764 (with IEEE 1219), SW Maintenance
    - [Both ISO and IEEE have published.]
- Other projects are underway

IEEE

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

IEC/IEEE
Dual Logo Agreement

- Approved IEEE Standards are eligible for submission
  - IEC adoption takes about six months
- Documents submitted to the IEC Standardization Management Board (SMB) for consideration
- The appropriate IEC TC review document (FDIS ballot)
  - No revisions can be made
- Both organizations agree on the designation (standards number)
- IEC national members will have the same rights regarding adoptions as with other IEC standards
- Example technical areas
  - Design Automation
  - Microprocessors
  - Switchgear

- *ISO PSDO Agreement*
  - *Development of new copyright agreements*
  - *Identify technical areas for future collaboration*
    - *Intelligent transportation*
  - *Point-of-care medical device standards to be published:*
    - *Nomenclature*
    - *Domain information model*
    - *Application profile - Base standard*
    - *Transport profile – Cable connected*
    - *Transport profile - Infrared*

ITU & IEEE Relationship

- The IEEE-SA, on behalf of IEEE, is a Sector Member of the ITU-R and ITU-T
- The IEEE-SA, on behalf of the IEEE, has been accepted for sector membership in the ITU-D
- Example technical areas
  - Radio regulatory activities
  - Mobile broadband wireless access
  - NGSN

ITU & IEEE Relationship

Joint workshop on Carrier-Class Ethernet

- 31May-1 June 2007, Geneva
- Over 250 participants
- Equal mix of IEEE and ITU participants
- Identified areas for future collaboration

Participate in IEEE Standards Development

- **Check working group websites**
  - http://grouper.ieee.org/groups/index.html
- **If not listed, or if you want to start a new project:**
  - Contact IEEE-SA Staff
    - http://standards.ieee.org/people/liaisons.html
  - Through IEEE Project Search
    - http://standards.ieee.org/db/status/index.shtml
- **Join IEEE Sponsor ballots**
  - http://standards.ieee.org/db/balloting/ballotform.html
- **Find out more about how to participate**
  - http://standards.ieee.org/resources/development/ wg_dev/index.html
  - http://standards.ieee.org/guides/companion/index.html