IEEE and Standards: Serving the Membership, Global Industry, and Humanity

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Director of Standards, IEEE Communications Society
Member of Standards Board, IEEE Standards Association

November 25, 2008
Outline

- IEEE
- Telecom Industry and Standards
- IEEE Standardization Ecosystem - IEEE-SA
- Technical Sponsors of Standards—IEEE Technical Societies
  - IEEE Computer Society
  - IEEE Communications Society
- Academic/Industrial Research and Standards
Outline

- IEEE
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**IEEE - the Prologue**

**Setting:** TAB reception in Louisville, Kentucky, with wine, beer, lamb chops, cheese, etc. Waiter named Chris was in charge of salmon hours dourves.

**Waiter Chris to Curtis Siller (IEEE Division III director):**

> “What does TAB stand for?”

**Curtis Siller:** “Technical Activities' Board”

**Waiter Chris:** “Board of what company?”

**Curtis Siller:** “Board of IEEE”

**Waiter Chris:** “You mean IEEE as in IEEE802.11b?”

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*Quoted with permission of Curtis Siller and waiter Chris*
IEEE Mission Statement

IEEE's core purpose is to foster technological innovation and excellence for the benefit of humanity.
IEEE at a Glance

- 376,328 members
- 10 divisions, 1780 chapters
- 30% of world’s literature in electro- and info-technology
- Over 325 technical conferences per year
- 900 published standards
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Most of the telecom technologies were based on technical specifications produced by few major operators and their R&D organizations.
Consumer Networking and Telecom Revolution

Users tend to subscribe to applications and utilize the infrastructure opportunistically.

IEEE COMMUNICATIONS SOCIETY
Fighting Communications Hunger

A WiFi Tree in Laos

Access Point Antenna Raising in Nepal

Native American Tribal Network

Russian Rapira System Based on 802.11g
Modern Networking Paradigm

- Competition in the access as well as "everything over IP" and "IP over everything" changed the Telecom business and impacted the industry value chains
- Standards became key enablers for the Telecom Industry
Global Telecom Standardization Landscape

- Scholarly professional societies have a unique position in standards value chain
- The eco system attributes: neutrality, fair IPR policy, access to expert pool
- Best suited for standardization of core technologies
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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 Standards Development Infrastructure

- Individual SA members
- Corporate SA members
- IEEE-SA Board of Governors
  - Standards Board
  - Standards Board Committees
  - Standards Sponsors and their Working Groups (WG)
    - Technical Societies and Councils
    - Standards Coordinating Committees
  - Corporate Advisory Group
Global relevance

- Advance technology to benefit global society
  - High-quality, globally relevant standards are borderless
  - Cost-effective development
- As a global SDO the IEEE-SA’s policies must be globally relevant
  - Borderless in applicability
  - Applied consistently worldwide
  - Ensure a fair and balanced environment for all participants
- Partner with the international community
  - Create a standards development environment that brings together all constituents
  - Deliver economically relevant global standards to the international community
IEEE-SA Global Strategy

- Maintain a strong global standards perspective in IEEE
- Leverage IEEE expertise, competence, track record, and processes to achieve global standards goals
- Provide a forum to develop market-relevant standards
- Recognize and promote
  - Emerging technologies
  - Standards life cycle requirements
  - Regulatory harmonization
  - Society betterment
A Good Standards-Setting Process

- Recognizes importance of **balancing interests of all participants**
- Depends on spirit of **cooperation among competitors**
- Optimizes for a **consensus** outcome in a timely fashion
IEEE Standards Development

Five principles guide standards development

Ensuring integrity and wide acceptance for IEEE standards

IEEE standards reflect the standardization principles as stated by the WTO
High quality globally relevant processes

Example – Patent policy

- SDO’s patent policy should be designed to balance
  - Needs of those implementing a standard
  - Commitments of intellectual property owners of technology necessary to implement that standard

- IEEE-SA’s patent policy contributes to
  - Balance
  - Transparency earlier in process
  - Confidence in commitments
  - Global applicability
IEEE-SA Patent Policy
Basics & Baseline Similarities

- Basis of Patent Policy consistent with RAND-based policies of other organizations
  - Assurance required, not specific disclosure
  - RAND with reasonable terms and conditions
  - Inclusion of common terms in eventual license; such as reciprocity, choice of law, or arbitration in the eventual license
- IEEE-SA enhancements represent steps taken to improve balance for all stakeholders
More transparency earlier in process

- Clear definitions of common terms
- Participants’ obligations to disclose awareness of potentially essential patent claims
  - Must identify if holder is self, employer, or affiliate
  - Strongly encouraged to disclose third-party holders
- Allows disclosure of rates, terms, and conditions early in technology selection process
- Allows participants to be informed of assurances
  - Web-accessible letters of assurance are
    - Easy to find and understand
    - Available 24/7
- Specifically allows consideration of licensing costs as part of relative cost comparison activities during technology selection process
Increasing confidence in commitments

- Specifies applicability of assurance to affiliates
- Makes assurances irrevocable
- Clearly states duty of participants
- Establishes duty to update assurances
- Requires notification to assignees/transferees
- Ensures IP commitments are global
IEEE Patent Policy Support Materials

- Education and support material available at http://standards.ieee.org/board/pat/pat-material.html
- Tutorial
- Frequently asked questions (FAQs)
- Working group “call for patents” slides
- Sample letter requesting a Letter of Assurance
- Flow chart
IEEE Standards Are Pervasive

- Aerospace Electronics
- Bioinformatics
- Broadband Over Power Lines
- Broadcast Technology
- Clean Products
- Cognitive Radio
- Electromagnetic Compatibility
- Medical Device Communications
- Nanotechnology
- National Electrical Safety Code
- Networks
- Organic Components
- Portable Battery Technology
- Power Electronics
- Power & Energy
- Radiation/Nuclear
- Reliability
- Transportation Technology

- 900 active standards
- 400 projects in progress
- 15,000 volunteers
- 7,000 individual members
- 80+ corporate members
IEEE-SA Corporate Program

- Provides an environment where corporations come together to develop standards that
  - Open markets
  - Strengthen existing markets
  - Enhance global competitiveness
- Helps industry accomplish business objectives
- Fosters company-based standardization
  - Open, consensus process
  - Levels playing field -- one company/one vote
- Multi-industry/multi-national participation
- Leverages the unique technology base supported by the worldwide technical communities of the IEEE
- Provides a venue to nurture existing and emerging technologies
- Rapid path to global standardization
  - Support structure available for completion in 18- to 24-month target timeframe

**Corporate Program contact:**
Mary Lynne Nielsen  m.nielsen@ieee.org
Entity-Based Projects

Examples

- Batteries P1625, P1725
- Design Automation P1800, P1801, P1850, P1685
- Broadband Over Power Lines P1901
- Cognitive Radio P1900.4
- Test Technology P1149.7
- Next Generation Services Overlay Networks P1903
IEEE-SA Individual Program

- Cornerstone of IEEE standards development
  - Provides rich body of work to IT, communications, and power and energy industries worldwide
  - National, regional, and international standards bodies have adopted resulting products
- Each individual participant has one vote
- Individuals participate under several traditional sponsorship methods
  - A Technical Committee within an IEEE Society/Council
  - A Standards Coordinating Committee established by the IEEE-SA Standards Board
    - Encompasses multiple Societies
Examples: Individually-Based Projects

- Networks P802
- Broadband over Power Lines P1675, P1775
- Cognitive Radio P1900.1, P1900.2, P1900.3
- Bioinformatics P1953, P1953.1, P1953.2
- Nanotechnology P1650, P1670, P1690
- Organic Electronics P1620, P1620.1
- Clean Products P1680
IEEE International Collaboration

- IEC
  - 30% of existing IEC library built on IEEE standards
  - Current Dual Logo agreement facilitates rapid adoption: Power, Energy, Design Automation; Joint Development Agreement in progress
- ISO
  - PSDO Agreement in place for rapid adoption and joint development
- ISO/IEC JTC1
  - 25+ years of adoption of IEEE network, operating systems, microprocessor, and software engineering standards
- ITU
  - International sector membership in all three ITU sectors – Telecommunications, Radiocommunications, Development

International Activities:
Terry deCourcelle  t.decourcelle@ieee.org
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 have the same rights regarding adoptions as with other IEC standards
- Example technical areas
  - Design Automation
  - Microprocessors
  - Switchgear
ISO-IEEE PSDO Agreement

- Addresses adoptions and joint development work
- Covers work in the following areas:
  - ISO TC 204—Intelligent transportation
  - ISO TC 215—Point-of-care medical device standards
  - ISO/IEC JTC 1
    - SC 6—LAN/MAN
    - SC 7—Software Engineering
    - SC 22—POSIX
    - SC25—Microprocessors
    - SC36—Learning Technology
ITU & IEEE Relationship

IEEE is a Sector Member of the ITU-R, the ITU-T, and the ITU-D

- Example technical areas
  - Radio regulatory activities
  - Mobile broadband wireless access
- Joint workshops
  - June 2007—ITU-T/IEEE Workshop on Carrier-Class Ethernet
  - June 2008—ITU-T/IEEE Workshop on Next Generation Optical Access Systems
- ITU-T/IEEE ComSoc MOU: technical sponsorship by ComSoc of Kaleidoscope conferences and also publications activities
IEEE-SA & National Standards Bodies Agreements

- Canadian Standards Association (CSA)
- Standards Institute of Israel (SII)
- South Africa Standards Bureau (SABS)
- Discussions underway with other bodies
  - CESI - China
IEEE Standards Development

- IEEE has developed standards for 115+ years
  - IEEE catalog of standards contains long-established engineering practices and leading-edge technologies that drive the marketplace
- IEEE has three venues for complementary joint development and collaboration
  - Individual-consensus standards
  - Entity-consensus standards
  - Consortia specifications and support
- IEEE has a leading contemporary intellectual property policy
IEEE Standards Association (IEEE-SA)

Standards Development Lifecycle

1. Form a study Group (optional)
2. Prepare a Project Authorization Request - PAR
3. Find a sponsor
4. Form the working group
   - Establish Working Group P&Ps
   - Elect Officers
   - Begin Standard Development
5. Reach Consensus in Working Group
6. Ballot draft standard
7. Approval and Publication

The key to success of IEEE in Standards Development is the superb ecosystem provided by IEEE Standards Association and the wealth of expertise residing in the IEEE Technical Societies
IEEE Standards Development Infrastructure

Governing Documents In The Order of Precedence

New York State Not-for-Profit Law
IEEE Certificate of Incorporation
IEEE Constitution
IEEE Bylaws
IEEE Policies
IEEE Board of Directors Resolutions
IEEE-SA Board of Governors Resolutions
IEEE-SA Standards Board Bylaws
IEEE-SA Standards Board Operations Manual
IEEE-SA Standards Board Resolutions
IEEE Society’ (that Established the Sponsor) Constitution
IEEE Society’ (that Established the Sponsor) Bylaws
IEEE Society (that Established the Sponsor) Policies and Procedures
IEEE Society (that Established the Sponsor) Board of Governors Resolutions
IEEE Society Technical or Standards Committee (that Established the Sponsor) Policies and Operating Procedures

Sponsor Policies and Operating Procedures
Working Group’s Policies and Procedures
Robert's Rules of Order
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44 IEEE Technical Societies/Councils

- Aerospace & Electronic Systems
- Antennas & Propagation
- Broadcast Technology
- Circuits & Systems
- Communications
- Components, Packaging, & Manufacturing Technology
- Computer
- Computational Intelligence
- Consumer Electronics
- Control Systems
- Council on Electronic Design Automation
- Council on Superconductivity
- Dielectrics & Electrical Insulation
- Education
- Electromagnetic Compatibility
- Electron Devices
- Engineering in Medicine & Biology
- Geoscience & Remote Sensing
- Industrial Electronics
- Industry Applications
- Information Theory
- Intelligent Transportation Systems
- Instrumentation & Measurement
- Lasers & Electro-Optics
- Magnetics
- Microwave Theory & Techniques
- Nanotechnology Council
- Nuclear & Plasma Sciences
- Oceanic Engineering
- Power Electronics
- Power Engineering
- Product Safety Engineering
- Professional Communication
- Reliability
- Robotics & Automation
- Sensors Council
- Signal Processing
- Social Implications of Technology
- Solid-State Circuits
- Systems Council
- Systems, Man, & Cybernetics
- Technology Management Council
- Ultrasonics, Ferroelectrics, & Frequency Control
- Vehicular Technology
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Role Of Technical Societies in Standards Development

Computer Society and Standards

The Society is dedicated to advancing the theory, practice, and application of computer and information processing technology.

Computer Society has 12 Standards Sponsoring Committees under its Standards Activities Board (SAB):

- SAB
- Design Automation Standards Committee
- Foundation for Intelligent Physical Agents
- Information Assurance Standards Committee
- Learning Technology Standards Committee
- Local Area Networks/MAN Standards Committee (802)
- Microprocessor Standards Committee
- Portable Applications Standards Committee
- Simulation Interoperability Organization/SAC
- Software & Systems Engineering Standards Committee (Joining S2ESC)
- Storage Systems Standards Committee
- Test Technology Standards Committee
Computer Society and Standards
The 802 Committee

P802.3 Ethernet  Bob Grow  Intel Corporation
P802.11 WLAN    Stuart J. Kerry  NXP Semiconductors
P802.15 WPAN    Bob Heile  Wireless Comm Cons, LLC.
P802.16 BB Wireless Access  Roger Marks  Nextwave Broadband, Inc.
P802.17 Resilient Packet Ring  John Lemon  ADTRAN
P802.18 Radio Regulatory TAG  Mike Lynch  Nortel Networks
P802.19 Coexistence TAG  Steve Shellhammer  QUALCOMM Incorporated
P802.20 Mobile BB Wireless Access  Arnie Greenspan  AROSCO, Inc
P802.21 Media-independent Handover  Vivek Gupta  Intel Corporation
P802.22 Wireless Regional Area Networks Carl Stevenson  WK3C Wireless, LLC

Radio Regulatory Technical Advisory Group: “...monitoring of, and active participation in, ongoing radio regulatory activities, at both the national and international levels...”
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Communications Society: The Mission

The IEEE Communications Society promotes the advancement of science, technology and applications in communications and related disciplines. It fosters presentation and exchange of information among its members and the technical community throughout the world. The Society maintains the highest standard of professionalism and technical competency.
Communications Society: Where Members Live

- Europe/Africa Middle East: 42 Chapters, 24%
- US: 68 Chapters, 44%
- Latin America: 22 Chapters, 6%
- Asia/Pacific: 27 Chapters, 22%
- Canada: 14 Chapters, 4%
Communications Society: Member Employment

- Private Industry 45%
- Educational Institution 18%
- Students 17%
- Self-employed/Consulting 8%
- Public/Gov't 5%
- All Other 6%

All Other includes retired and unemployed.
ComSoc Technical Committees

Ad Hoc & Sensor Communications & Networks – H. Mouftah
Communications Quality & Reliability – Mase
Communications & Information Security – S. Kartalopoulos
Communications Software – A. Paktas
Communications Switching & Routing – W. Kabacinski
Communications Systems Integration & Modeling – N. Fonseca
Communication Theory – S. Miller
Computer Communications – B. Yener
Enterprise Networking – G. Jakobson
High-Speed Networking – C. Qiao

Information Infrastructure – R. Boutaba
Internet – M. Hofmann
Multimedia Communications – N. Fonseca
Network Operations and Management – J. Hong
Optical Networking – I. Tomkos
Personal Communications – C. Xiao
Power Line Communications – S. Galli
Radio Communications – H.-H. Chen
Satellite and Space Communications – M. Marchese
Signal Processing & Communications Electronics – T. Taniguchi
Signal Processing for Storage – A. Kavcic
Tactical Communications – K. Young
Transmission, Access & Optical Systems – M. Guizani
ComSoc Publications: Magazines and Journals

IEEE Communications Magazine (Includes Global Communications Newsletter and supplements – Optical Communications; Radio Communications)
IEEE Wireless Communications Magazine
IEEE Network: The Magazine of Global Internetworking
IEEE Transactions on Communications
IEEE Journal on Selected Areas in Communications
IEEE Communications Letters
IEEE Transactions on Wireless Communications
IEEE/ACM Transactions on Networking
IEEE Transactions on Network and Service Management
IEEE Transactions on Multimedia
IEEE Transactions on Mobile Computing
IEEE/OSA Journal of Lightwave Technology
ComSoc On Line Publications

- ComSoc Digital Library (and Digital Library Plus)
  (electronic access [pdfs/html] to ComSoc periodicals & proceedings;
  search & display metadata via the CommOntology, US Patent citations)

- IEEE Communications Interactive
  (electronic html edition of IEEE Communications Magazine)

- IEEE Wireless Communications Interactive
  (electronic html edition of IEEE Wireless Communications Magazine)

- IEEE Network Interactive
  (electronic html edition of IEEE Network Magazine)

- IEEE Communications Surveys and Tutorials
  (online only publication)

- IEEE Transactions on Network and Service Management (TNSM)
  (online only publication)

- ComSoc e-News
  (free monthly message to members and requesters)

- Tutorials Now
  (online full and half-day tutorials, originally presented at ComSoc conferences)

  Communications Society journals and transactions also available
  electronically through IEEE’s www site - Xplore
ComSoc Major Conferences

IEEE GLOBECOM
Global Communications Conference
(November/December) Attendance 1500-2000

MILCOM
Military Communications Conference (October)
Attendance 1000-1500

NOMS
IEEE/IFIP Network Operations and Management Conference -- even years (April) Attendance 500

IM
International Symposium on Integrated Network Management -- odd years (May)

SECON
Conference on Sensor and Ad Hoc Communications and Networks (October)

IEEE DYSPAN
Symposium on New Frontiers in Dynamic Spectrum Access Networks (April)

IEEE ICC
International Conference on Communications
(May/June) Attendance 1500-2000

OFC/NFOEC
Optical Fiber Conference/National Fiber Optics Engineering Conference
Joint with LEOS and OSA (Managing Partner)
(March) Attendance 15,000+

WCNC
Wireless Communications and Networking Conference
(March) Attendance 450

IEEE INFOCOM
Conference on Computer Communications
(May) Attendance 700

CCNC
Consumer Communications and Networking Conference (January) Attendance 300+

PIMRC
International Symposium on Personal Indoor and Mobile Radio Communications
(September)

In addition, ComSoc sponsors or cosponsors an average of 60+ conferences, symposiums and workshops each year.
ComSoc’s Standards Portfolio and Approach

- Telephony Standards
- Dynamic Spectrum Access Networks
- Sensor Networks
- Broadband over Power Line
- Next Generation Networks

Standards Project:
- Study Group
- Working Group

ComSoc Products:
- Publications
- Conferences
- Certification

Technical Committee:
- Expert Liaison
- Expert Review
- Research Task Groups

IEEE COMMUNICATIONS SOCIETY
IEEE’s role in smart grid standards

Numerous IEEE standards relate to the smart grid including diverse fields of digital information and controls technology, networking, security, reliability assessment, interconnection of distributed resources including renewable energy sources to the grid, sensors, electric metering, broadband over power line, and systems engineering. The standards are developed by a variety of expert groups within IEEE.
Example: Smart Grid - Interoperability - Distributed Energy Resources
Transmission and Distribution

Systems Approach
- Interconnection & Interfaces
- Technical Standards
- Advanced Technologies
- Systems Integration
V2G – Vehicle to Grid

What needs to be done in this area:

- Business Cases
- Hardware Requirements
- Communications/Metering/Billing
- Utility Contracts

Key Enabler → Interconnection Standards
ComSoc Standards Board
Sponsored Projects – Broadband over Powerline

- PowerLine Access Router - PLAR
- Fiber To The Transformer – FT³
- Element Management Layer
- Operations Support System
IEEE/ComSoc Standards Board
Broadband over Power Line Series

WG - IEEE1901, P1775

PUBs: ComMag FT,
JSAC PLC Special Issue
Ad-Hoc Channel Model Cmtee

Conference:

IEEE/ComSoc Standards Board
Sponsored Projects – DYSPAN

• **IEEE P1900.1**

• **IEEE P1900.2**
  Recommended Practice for Interference and Coexistence Analysis

• **IEEE P1900.3**
  Recommended Practice for Conformance Evaluation of Software Defined Radio (SDR) Software Modules

• **IEEE P1900.4**
  Architectural Building Blocks Enabling Network-Device Distributed Decision Making for Optimized Radio Resource Usage in Heterogeneous Wireless Access Networks

• **IEEE P1900.5**
  Policy Language and Policy Architectures for Managing Cognitive Radio for Dynamic Spectrum Access Applications

**IEEE P1900.6**
Spectrum Sensing Interfaces and Data Structures for Dynamic Spectrum Access and other Advanced Radio Communication Systems
IEEE/ComSoc Standards Board
Dynamic Spectrum Access Networks Standards Series

IEEE1900 Series – SCC41

ComMag: Feature Topic on Standards
Cognitive Networks TC

Conference: DySPAN
http://www.ieee-dyspan.org/
IEEE/ComSoc Standards Board
Active TAGs Networking Standard

Deliveries can be unattended 24/7

Healthcare or Industrial Customer

Repaired Parts

Defective, Incorrect or Excess Parts

Dispose / Recycle

Technical or Sales Field Staff

Return For Resale

Equipment & Parts Delivery

Manufacturing Plant

Highly Critical Parts Inventory

Positioned At Strategic Locations (Airports, Courier Terminals)

Warehouse
IEEE/ComSoc Standards Board

IEEE P1902.1

Champion Entity: Visible Assets
Dual-sponsorship: ComSoc and IEEE-SA/CAG
Corporate Entity based project

Corporations
Best Buy,
Visible Assets,
NS-Design Inc.,
Savi Networks,
Epson

Technology:
• Application: Networks of thousands of tags in peer-to-peer mode
• LW: under 450Khz
• Speed: 300-9600 baud
• Consumption: Few microamps in standby and less than 1 mA in active mode
• Designed to operate in “harsh” industrial environments
ComSoc Standards Board
IEEE P1902.1

Conference: - SECON
http://www.ieee-secon.org/

WG - IEEE1902

TC - Sensor Networks
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ComSoc and Standards
Evolution of Intellectual Property Value Chain

ComSoc Evolved from a pure scholarly group that tailors strictly to precompetitive research to a full service society that serves academic and industrial researchers, and industry practitioners.
Technical Support of Standards Development
Standardization as Part of Industrial Competitive Research

<table>
<thead>
<tr>
<th>Pre-competitive Research</th>
<th>Competitive Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Long time to market – (5-10\textsuperscript{+}) years</td>
<td>• Short time to market – (2-4) years</td>
</tr>
<tr>
<td>• More often of a Basic/Core Nature</td>
<td>• Applied nature, \textit{often in conjunction with standardization}</td>
</tr>
<tr>
<td>• Broad, often fundamental Patents-strong, Intellectual Property</td>
<td>• Narrower patents, often implementation-oriented</td>
</tr>
<tr>
<td>• Greater risk, speculative Intellectual Property</td>
<td>• Less risk, more relevant Intellectual Property</td>
</tr>
<tr>
<td>• Publications for discussion and prestige, e.g. “publish or parish”</td>
<td>• Publications for information disclosure and company positioning</td>
</tr>
</tbody>
</table>
Technical Support of Standards Development Process

- Conferences gain relevance by including standards-related program tracks and/or collocation with relevant Working Groups.
- Publications benefit from including Standards-relevant issues or series.
- Technical Committees can offer to WGs access to the global expert pool for participation in Study Groups, Working Groups, Balloting Groups.
- Sponsoring Committees can practice expert reviews in their Standards Development process.
- Technical Societies are well equipped to discover standardization opportunities in the area of their expertise, e.g. in emerging technologies.
- Technical Societies are well equipped to promote standardization projects to industry segments and to academia in their technical areas.
- Partnership between Technical Societies and IEEE-SA is the winning formula in promoting IEEE in various industry segments as the venue of choice for standardization of core technologies.
Some Observations on the Modern Standards Paradigm
A view from IEEE Communications Society

- No standards project is too early
- Evolution of technology leads to evolution of standards
- Redundancy in core technology standards is OK
- Intellectual property is being created in conjunction with standards-
  Just-In-Time Inventions.

_The nice thing about standards that there are so many of them to choose from_” Andrew S. Tanenbaum, IEEE Fellow

- Conferences and publications can also serve as a mechanism for IPR positioning
- For development of high quality standards it is critical to harmonize research and standardization
- Bringing industrial and academic researchers into standards Working Groups still remains a challenge
Academic Research and Standards

Why do it?

- If we examine societies’ technical activities and their impact on our industry, business and on our profession, standards stand out as generating most direct impact.
- Significant amount of research is performed in the form of analysis of existing standard mechanisms, algorithms, protocols.
- This analysis often comes too late to make a difference, to produce an impact.
- Participation of industrial and academic researchers in standards projects would make research relevant, produce direct impact, and certainly produce better standards.
- Early exposure to standardization projects allow industrial and academic researchers to identify relevant research problems that can have impact on standards.
- Technical Committees can provide direct technical support if requested by Standards Working Groups that may include participation in technical discussions, expert reviews, working out technical problems, providing tutorials, etc.
Academia, Industry, and Standardization

Bringing Researchers into Standards Activities

- Individual representation in Working Groups
- Inclusion of standardization component in private industry’s and governments’ research grants to academic institutions
- Patent activity in connection with industry-academia research contracts
- Favorable to the industry intellectual property agreements related to research grants
- Attribution of credit to individual contributors in standards documents
- Recognition of standards activities by scholarly professional associations
- Inclusion of standardization methodology in academic curricula
- Certification of standards development expertise

Academic and Industrial researchers capable of positioning research results in Standards and Specifications improve their marketability
**Rewarding Standards Work**

- Core technology standards (typical kind for IEEE) carry significant innovations, contain patented and disclosed (non-patented) inventions and often are treated by the scientific community as problem statements, i.e. trigger analytical research.
- Contributions to standards and/or specifications often produce an enormous impact on technology and its direction, on industry and on our profession.
- IEEE Societies should recognize impact of standardization and promote to fellow grade based on proven technical contribution to standards.
- IEEE-SA should be able to promote to fellow grade industry practitioners, who are prominent contributors to standards development process, experts in standardization theory, standardization process and methodologies.

**We solicit industry and academia to bring standardization opportunities to IEEE.**
IEEE can enable You to launch standards projects!
Fostering Technological Innovation and Excellence
For The Benefit Of Humanity

ХВАЛА !!!