# TELFOR'2008

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

## Alexander D. Gelman, Ph.D.

Director of Standards, IEEE Communications Society

Member of Standards Board, IEEE Standards Association

November 25, 2008

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# *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

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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 ?"

*Quoted with permission of Curtis Siller and waiter Chris*

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# IEEE Mission Statement

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

IEEE

# 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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# *Telecom Evolution and Standards*

Most of the telecom technologies were based on technical specifications produced by few major operators and their R&D organizations

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# Consumer Networking and Telecom Revolution
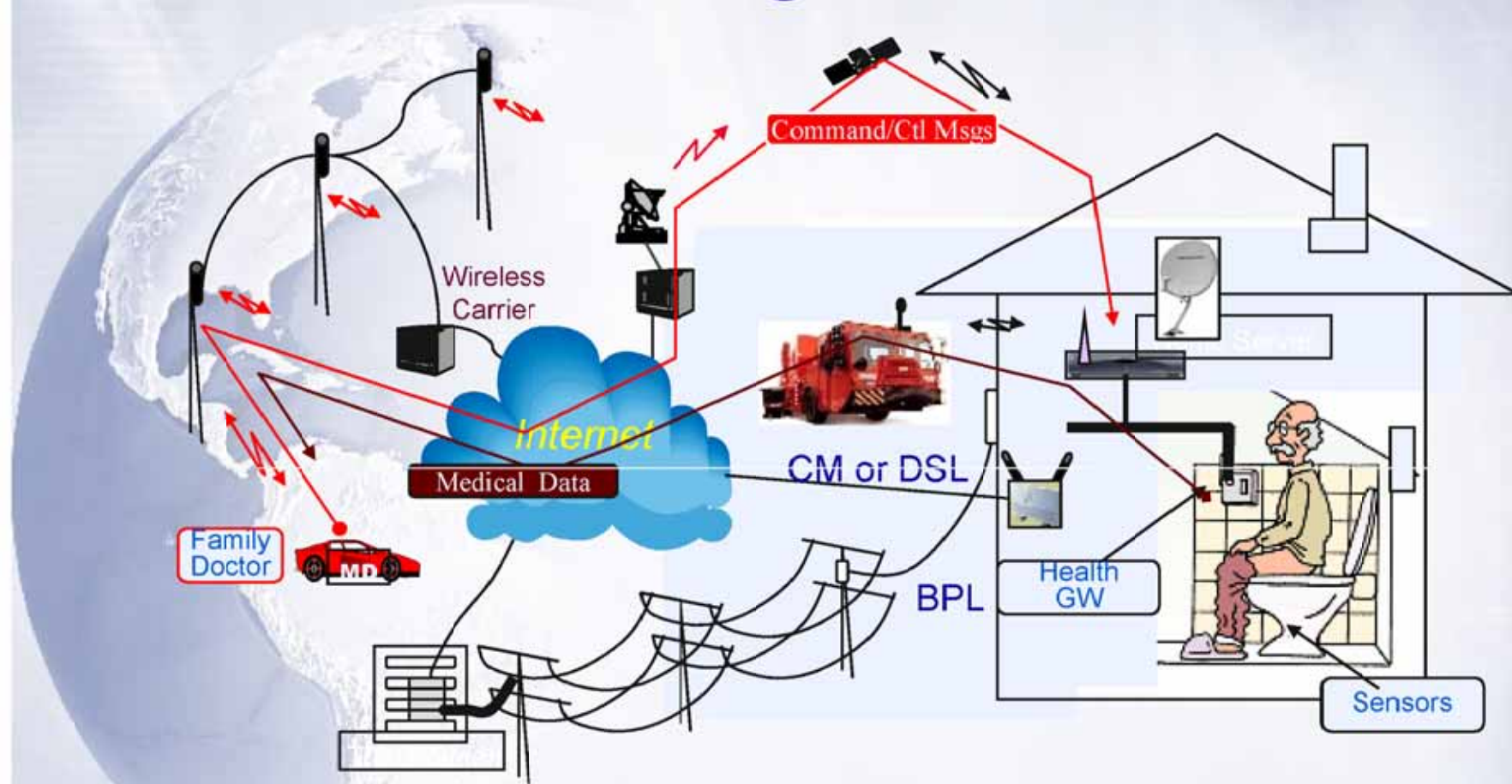
**Users tend to subscribe to applications and utilize the infrastructure opportunistically**

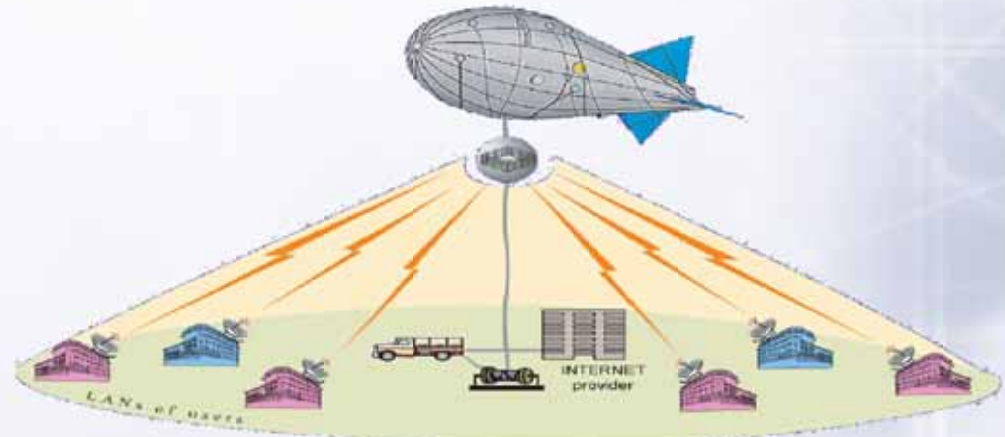# *Fighting Communications Hunger*

A WiFi Tree in Laos
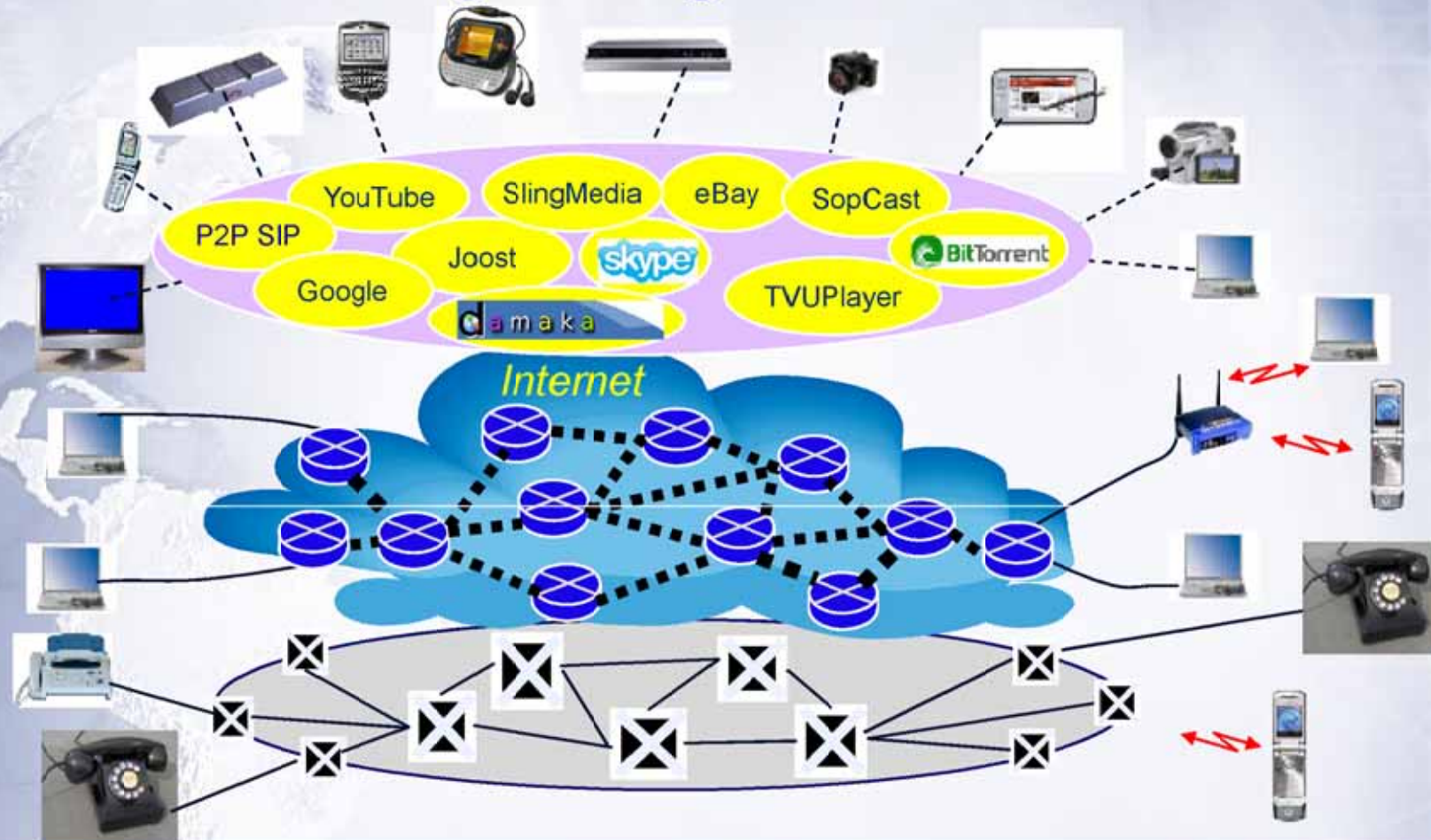
Access Point Antenna Raising in Nepal

Native American Tribal Network

Russian Rapira System Based on 802.11g

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# 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

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# 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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## IEEE Standards Association, IEEE-SA
## The 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

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# IEEE Standards Development Infrastructure

Individual SA members

Corporate SA members

**IEEE-SA Board of Governors**

**Standards Board**

**Corporate Advisory Group**

**Standards Board Committees**

**Standards Sponsors and their Working Groups (WG)**

**Technical Societies and Councils**

**Standards Coordinating Committees**

# *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
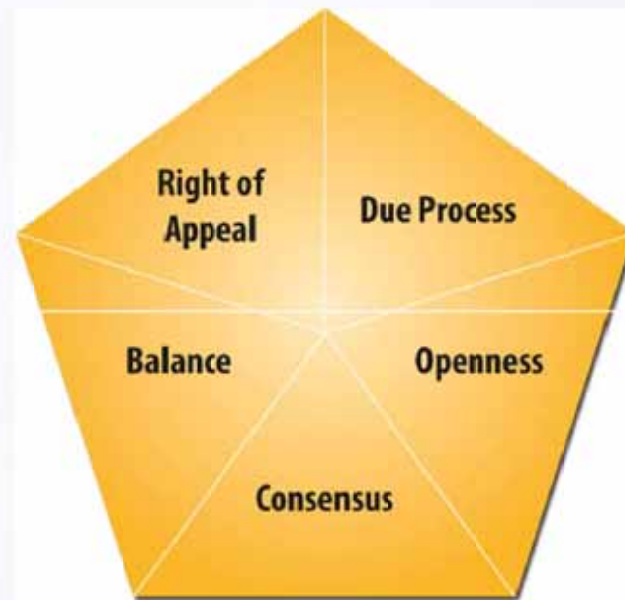
# High quality globally relevant processes
## Example – Patent policy

- 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

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# *More transparency earlier in process*

- Clear definitions of common terms
- Participants' obligations to disclose awareness of potentially essential patent claims
  - Must identity 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

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# 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

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# 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

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# 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

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# 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

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# 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

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# 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**

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# *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**

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# 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*

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# 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 Standards Association Operations Manual

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

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# 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.**

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# Communications Society: The Governance

## Board of Governors

### President
Doug Zuckerman

| Past - President | IEEE Division III Director | Treasurer | Parliamentarian | Chief Information Officer | Members-At-Large |

**VP Technical Activities**

**VP Publications**

**VP Conferences**

**VP Member Relations**

| Director Standards | Director Education | Director Online Content | Director Journals | Director Magazines | Director Conference Development | Director Conference Operations | Director Conference Publications |

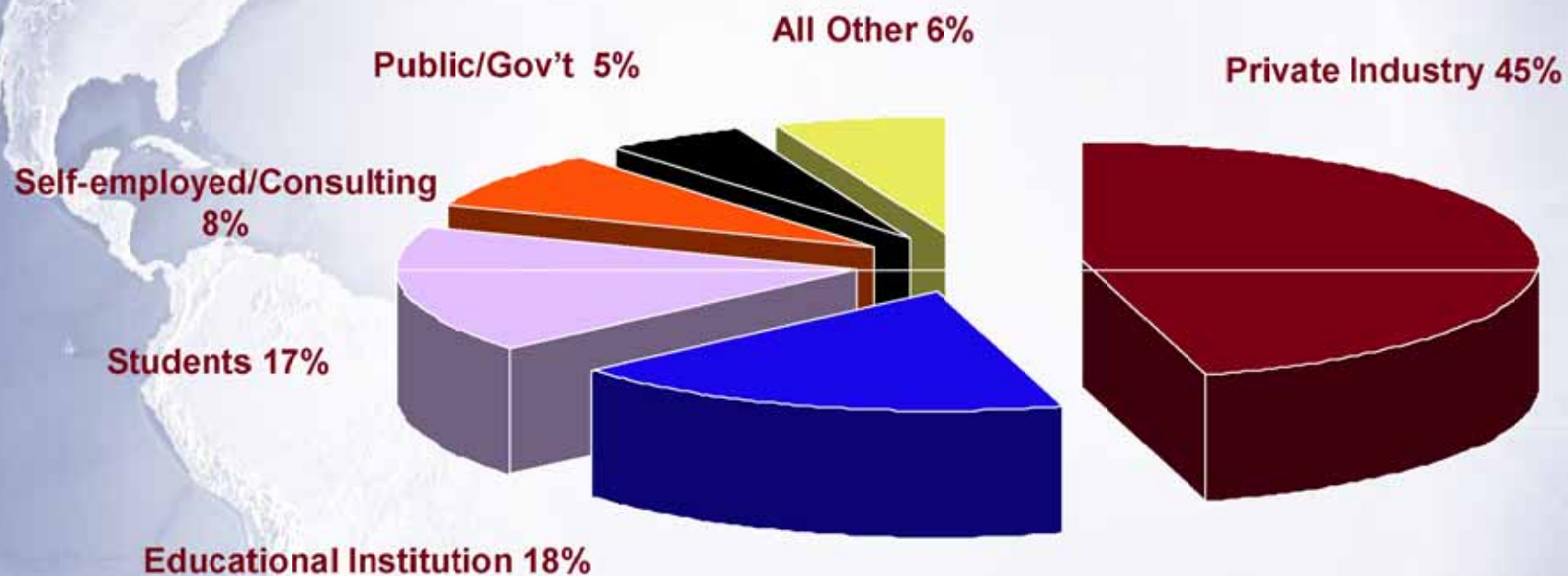| Director Sister & Related Societies | Director Marketing & Industry Relations | Director Membership Programs Development | Director AP Region | Director EAME Region | Director LA Region | Director NA Region |

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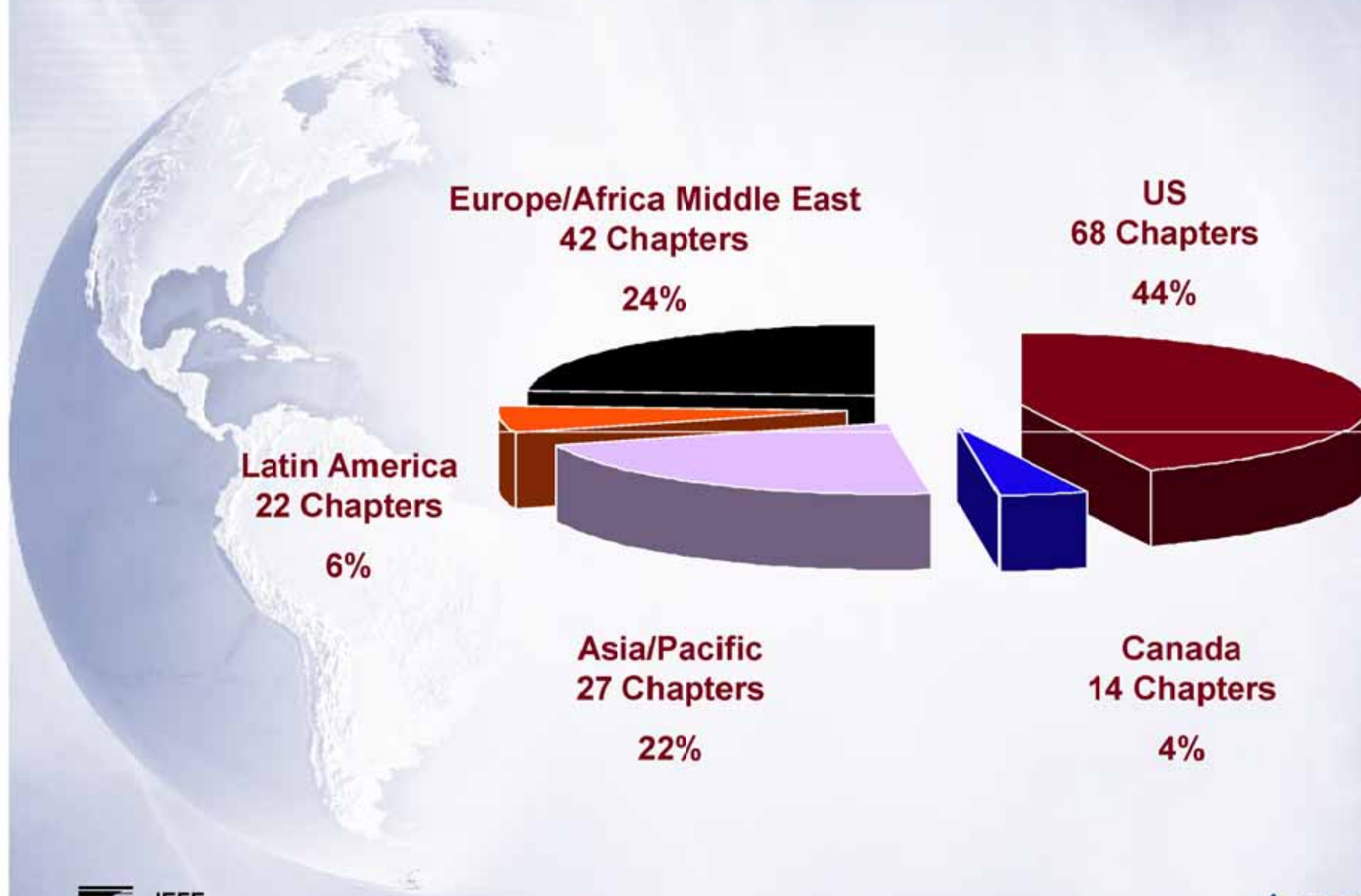
# Communications Society: Member Employment

All Other 6%

Public/Gov't  5%

Self-employed/Consulting 8%

Students 17%

Educational Institution 18%

Private Industry 45%

All Other includes retired and unemployed.

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# ComSoc Technical Committees

Ad Hoc & Sensor Communications & Networks –
    H. Mouftah

Communications Quality & Reliability -- K.
Mase

Communications & Information Security –
    S. Kartalopoulos

Communications Software -- A. Pakstas

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

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# 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**

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# 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**

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# 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.**

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# ComSoc's Sister Societies & Related Societies

**France (SEE)**
Société de l Electricité, de l Electronique et des Technologies de l Information et de la Communication

**Germany (VDE)**
Verband der Elektrontechik Electronik Informationtechnik

**Croatia (CCIS)**
Communications and Information Society

**Slovenia (EZS)**
The Electrotechnical Association of Slovenia

**Czech Republic/Slovakia (SR)**
Czech and Slovak Society for Radioengineering

**Hungary (HTE)**
The Scientific Association for Infocommunications

**Italy (AICA)**
Associazione Italiana per l'Informatica ed di Calcolo Automatico

**Italy (ACIT)**
Association for Information and Communications Technology

**Israel (SEEEI)**
Society of Electrical & Electronics Engineers in Israel

**Malta (CoE)**
Chamber of Engineers in Malta

**Arab (AIU)**
Arab Information Union

**Russia (POPOV)**
The Russian Scientific & Technical A.S. Popov Society for Radio Engineering, Electronics, and Communications

**Latvia (LITTA )**
Latvijas Informacijas Un Komunikacijus Technologijas Asociacijus

**China (CIC)**
China Institute of Communications

**China (CIE)**
The Chinese Institute of Electronics

**India (IETE)**
The Institute of Electronics and Telecommunications Engineers

**Malaysia (IEM)**
The Institution of Engineers, Malaysia

**Korea (KICS)**
Korean Information & Communication Society

**Japan (IEICE)**
The Institute of Electronics Information and Communication Engineers

**Taiwan (CIEE)**
Chinese Institute of Electrical Engineering

**Vietnam (REV)**
The Radio & Electronics Association of Vietnam

**Morocco (MAEECE)**
Moroccan Association of EE & CE

**Internet Society (iSOC)**
**Optical Society of America (OSA)**
**Association for Computer Machinery (ACM)**
**IEEE Societies**
**(CS,SPS, CAS, LEOS, PES, MTT)**
International

**Brazil (SBT)**
Socidade Brasileira de Telecomunicações

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# 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

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# 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**

Bulk Power

**Substations**

sensors
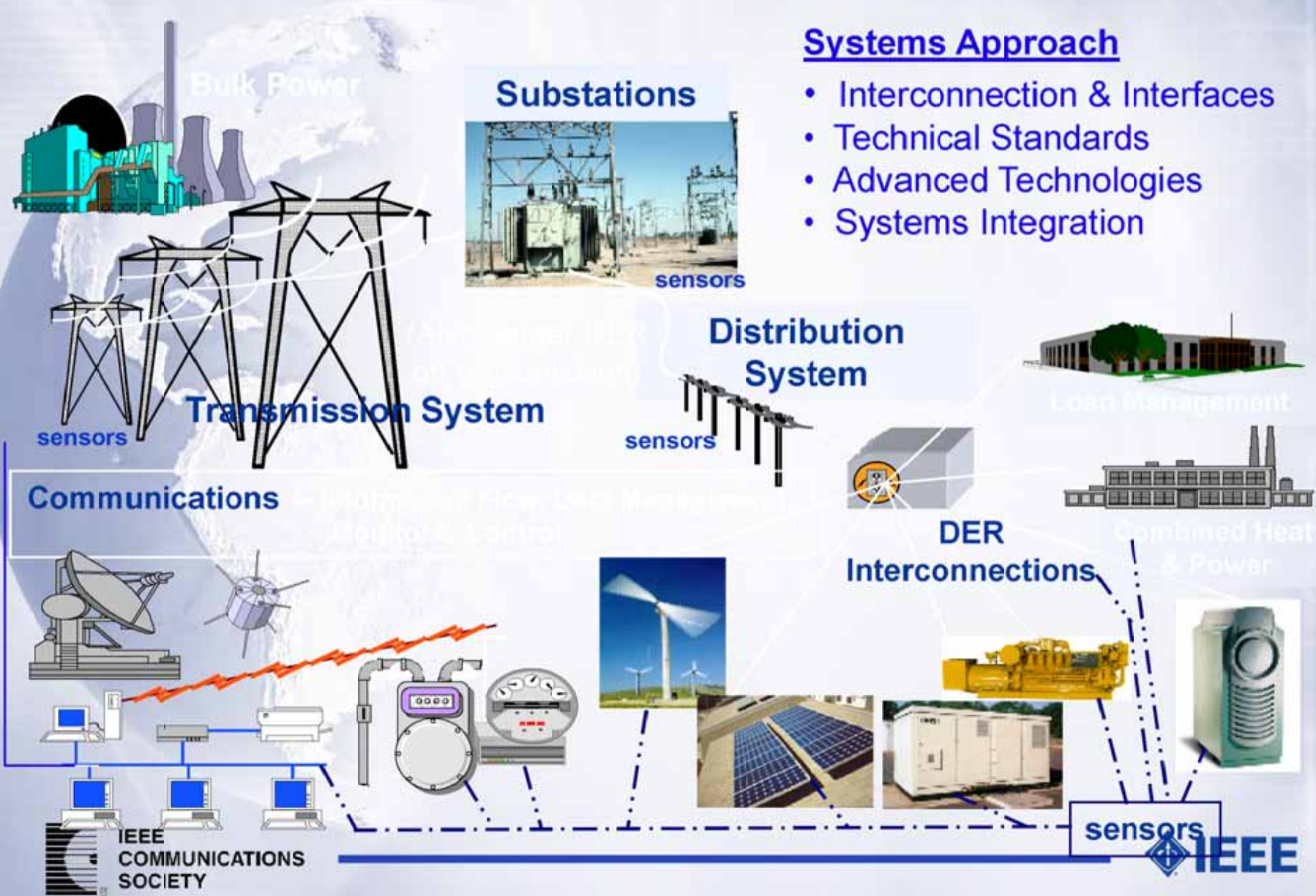
**Systems Approach**

- Interconnection & Interfaces
- Technical Standards
- Advanced Technologies
- Systems Integration

**Transmission System**

sensors

**Communications**

**Distribution System**

sensors

Load Management

**DER Interconnections**

Combined Heat & Power

sensors

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# V2G – Vehicle to Grid
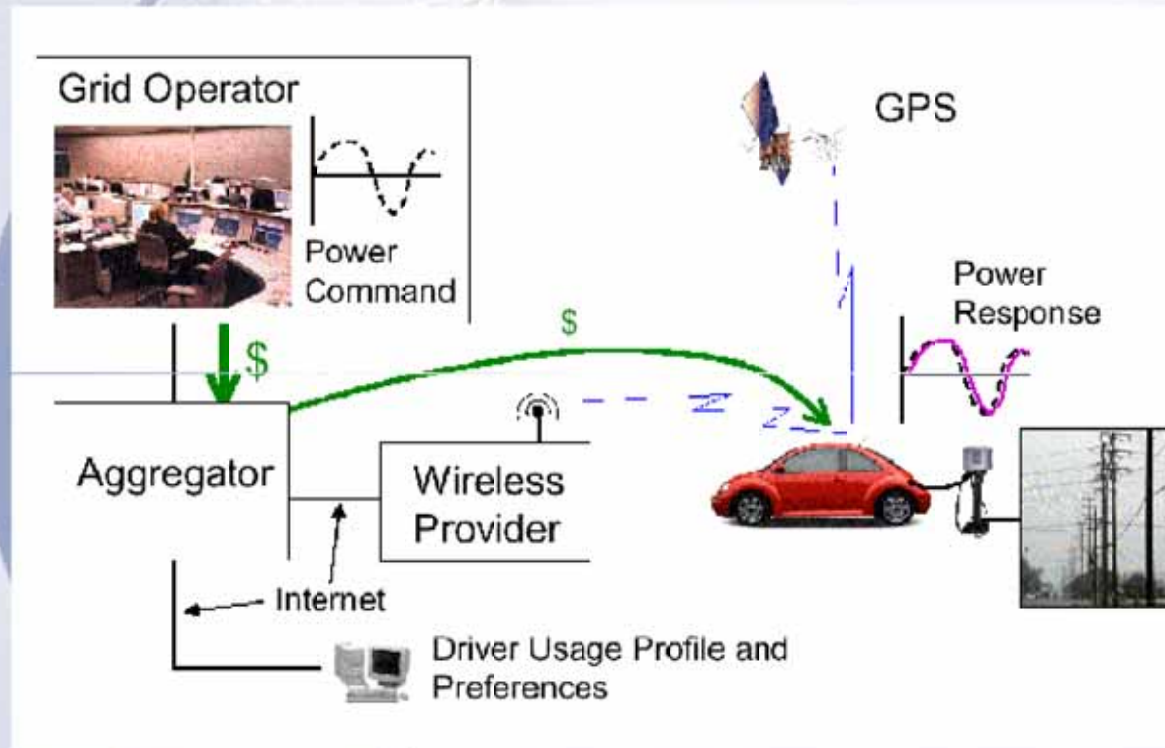


What needs to be done in this area:

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

**Key Enabler → Interconnection Standards**

# ComSoc Standards Board
## Sponsored Projects – Broadband over Powerline
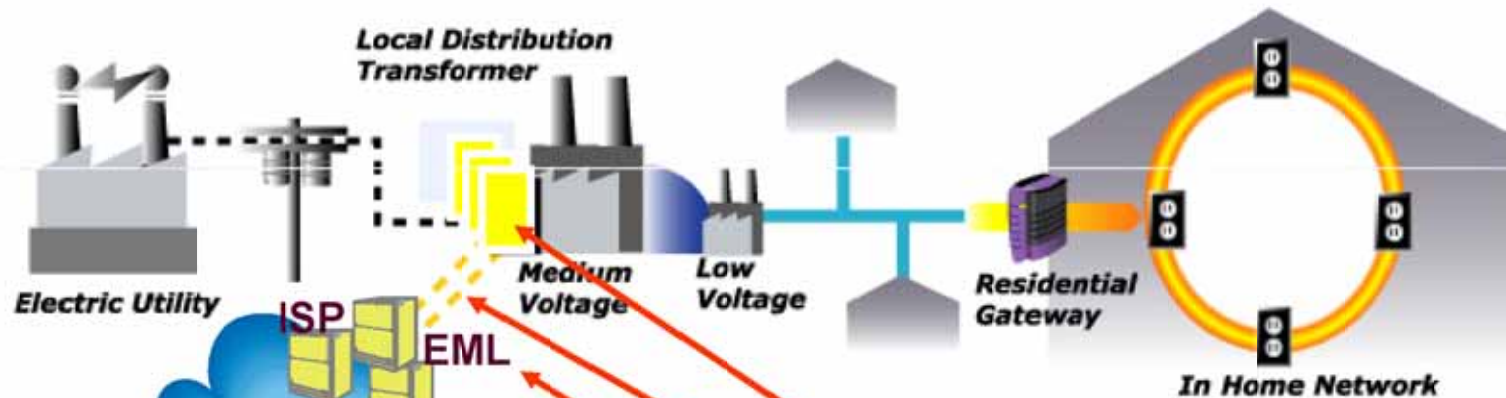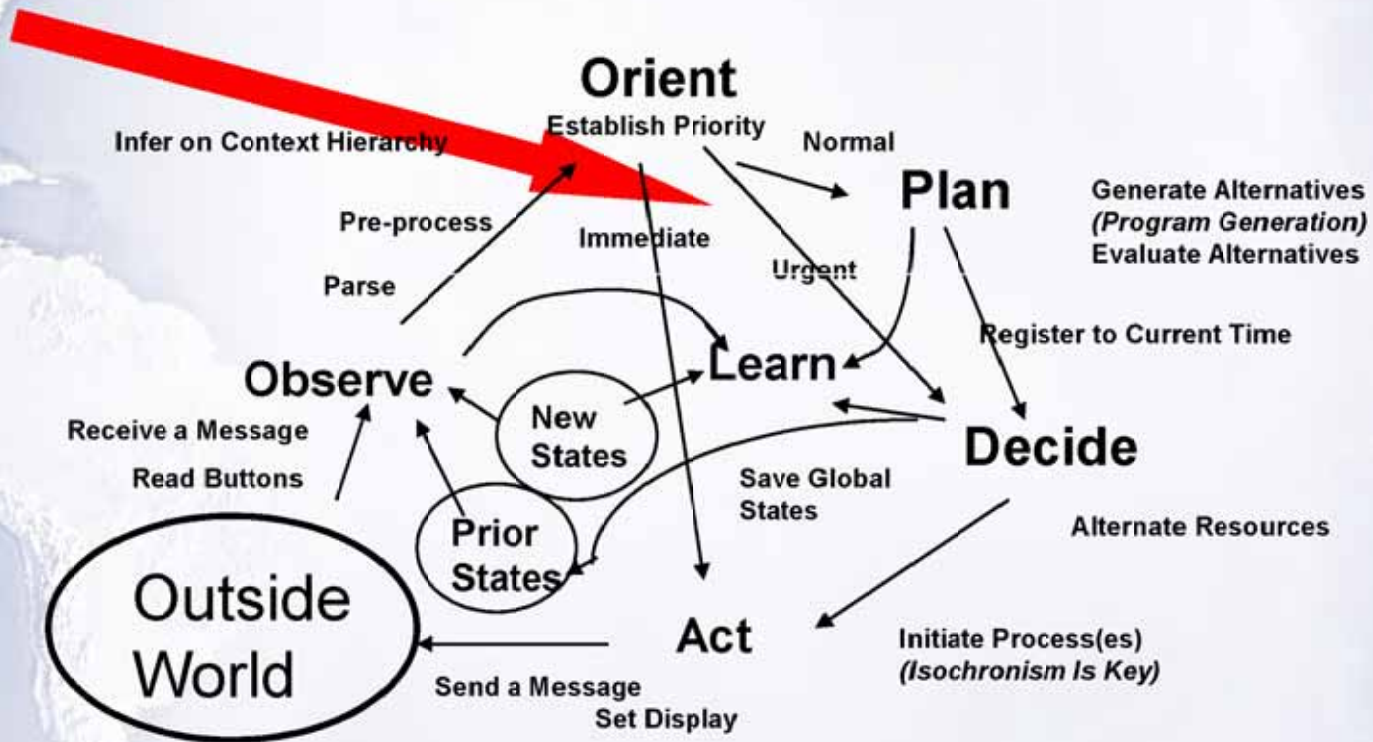
# IEEE/ComSoc Standards Board
## Sponsored Projects – DYSPAN

- **IEEE P1900.1**

Standard Terms, Definitions and Concepts for Spectrum Management, Policy Defined Radio, Adaptive Radio and Software Defined Radio

- **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
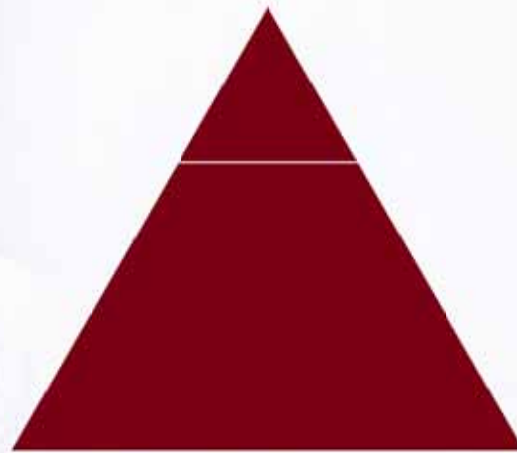
**IEEE P1900.6**

Spectrum Sensing Interfaces and Data Structures for Dynamic Spectrum Access and other Advanced Radio Communication Systems

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# IEEE/ComSoc Standards Board
## Active TAGs Networking Standard
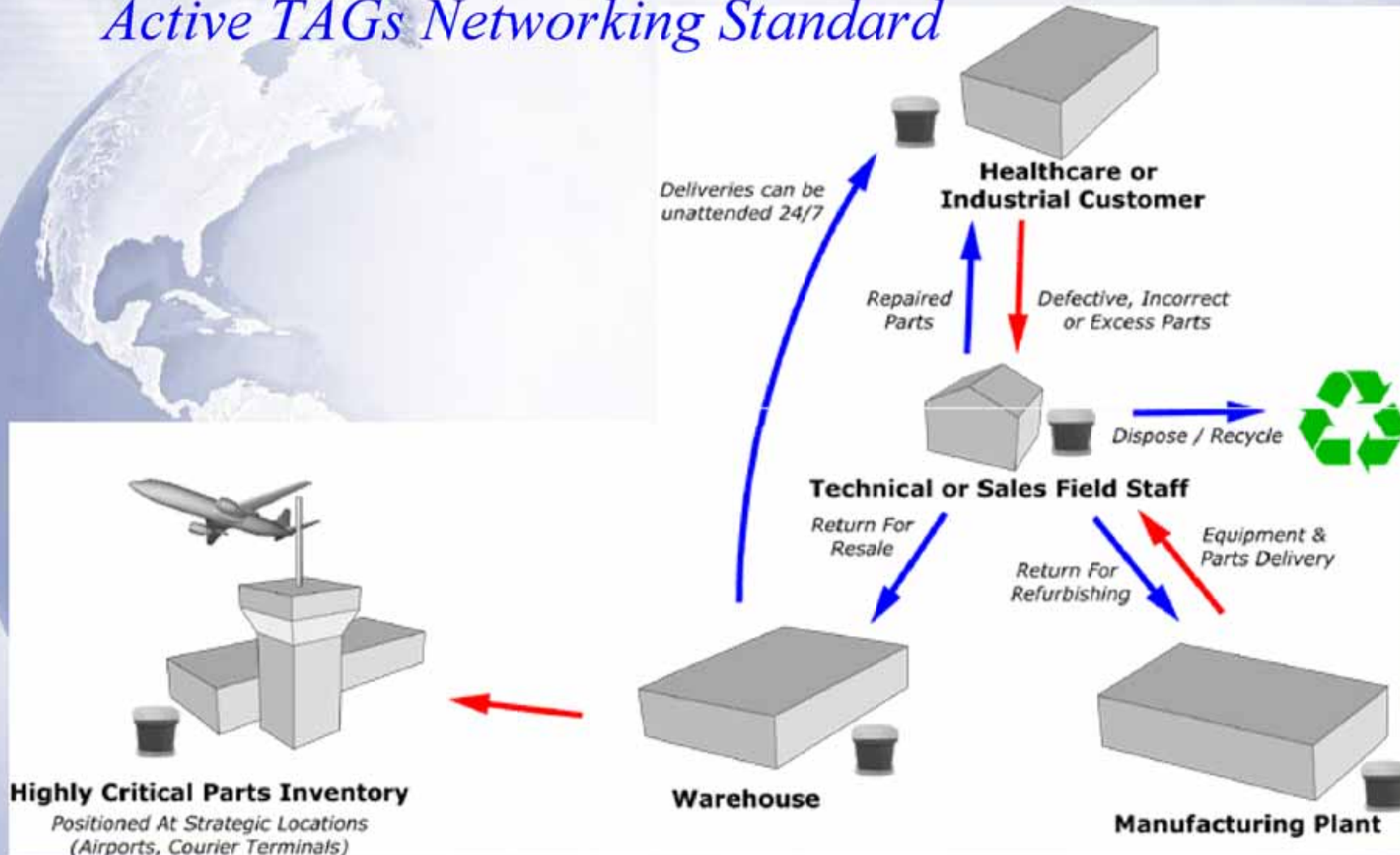
# IEEE/ComSoc Standards Board
# IEEE P1902.1

Champion Entity: Visible Assets

Dual-sponsorship: ComSoc and IEEE-SA/CAG

Corporate Entity based project
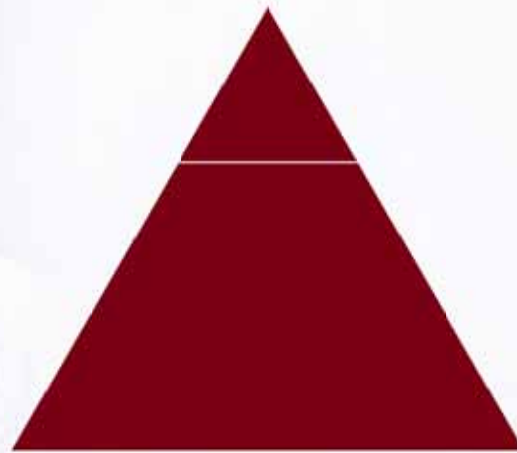
## Corporations

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
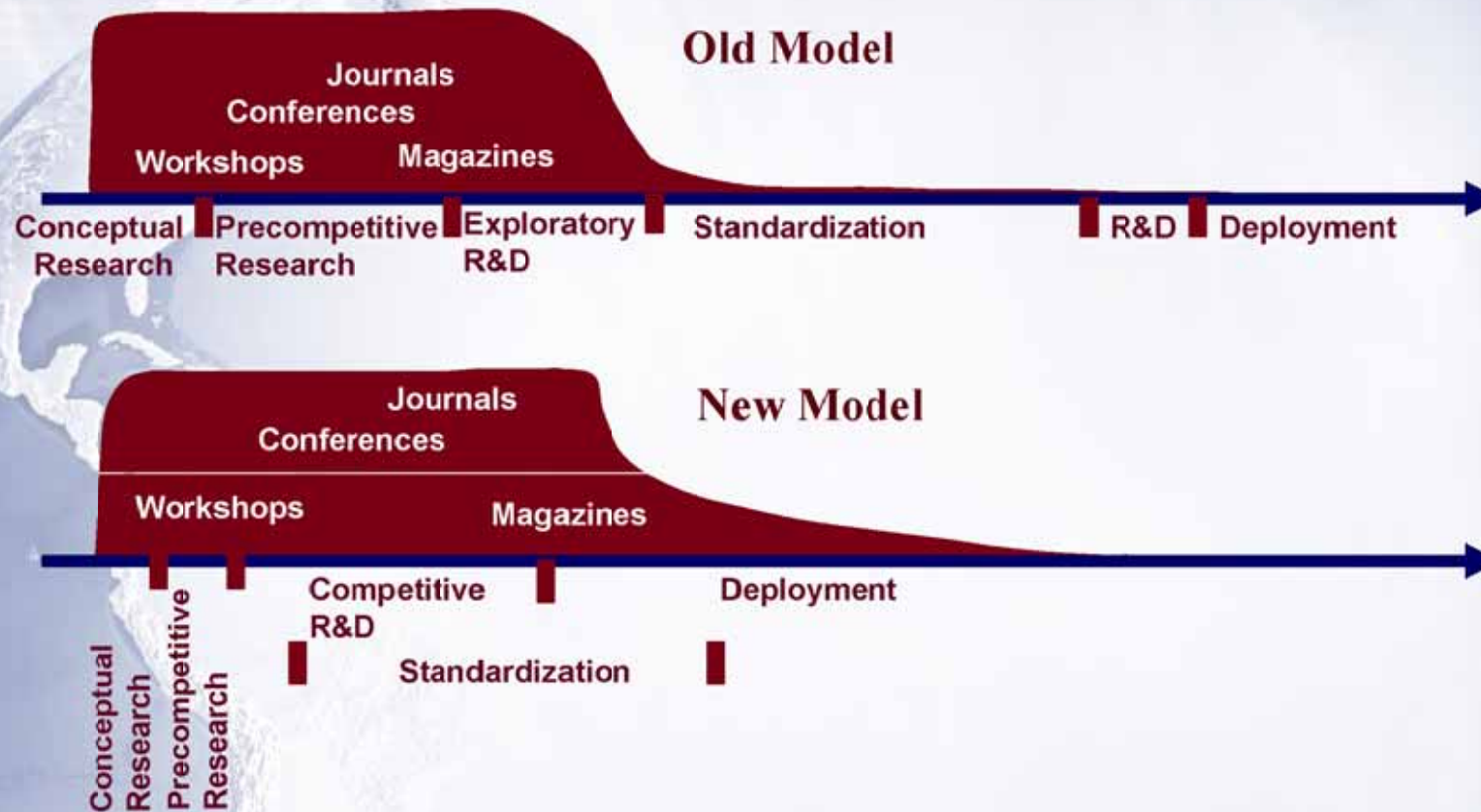- Designed to operate in "harsh" industrial environments

# *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**

# ComSoc and Standards
## Evolution of Intellectual Property Value Chain

**Old Model**

Journals
Conferences
Workshops    Magazines

Conceptual Research | Precompetitive Research | Exploratory R&D | Standardization | R&D | Deployment

**New Model**

Journals
Conferences
Workshops    Magazines

Conceptual Research | Precompetitive Research

Competitive R&D

Standardization

Deployment

**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**

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# Technical Support of Standards Development
## Standardization as Part of Industrial Competitive Research

**Pre-competitive Research**

- Long time to market – $(5\text{-}10^+)$ years

- More often of a Basic/Core Nature

- Broad, often fundamental Patents-strong, Intellectual Property

- Greater risk, speculative Intellectual Property

- Publications for discussion and prestige, e.g. "publish or parish"

**Competitive Research**

- Short time to market – $(2^-\text{-}4)$ years

- Applied nature, *often in conjunction with standardization*

- Narrower patents, often implementation-oriented

- Less risk, more relevant Intellectual Property

- Publications for information disclosure and company positioning

# 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

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# 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.

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# 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*

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# 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 !**

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