# *Innovations in Next Generation Networks*

*ITU-T Kaleidoscope*

# *Professional Societies Serving the Global Industry*

***Alexander D. Gelman, Ph.D.***

*Director of Standards, IEEE Communications Society*

*Member of Standards Board, IEEE Standards Association*

***May 12, 2008***

IEEE COMMUNICATIONS SOCIETY

IEEE

# *IEEE Mission Statement*

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

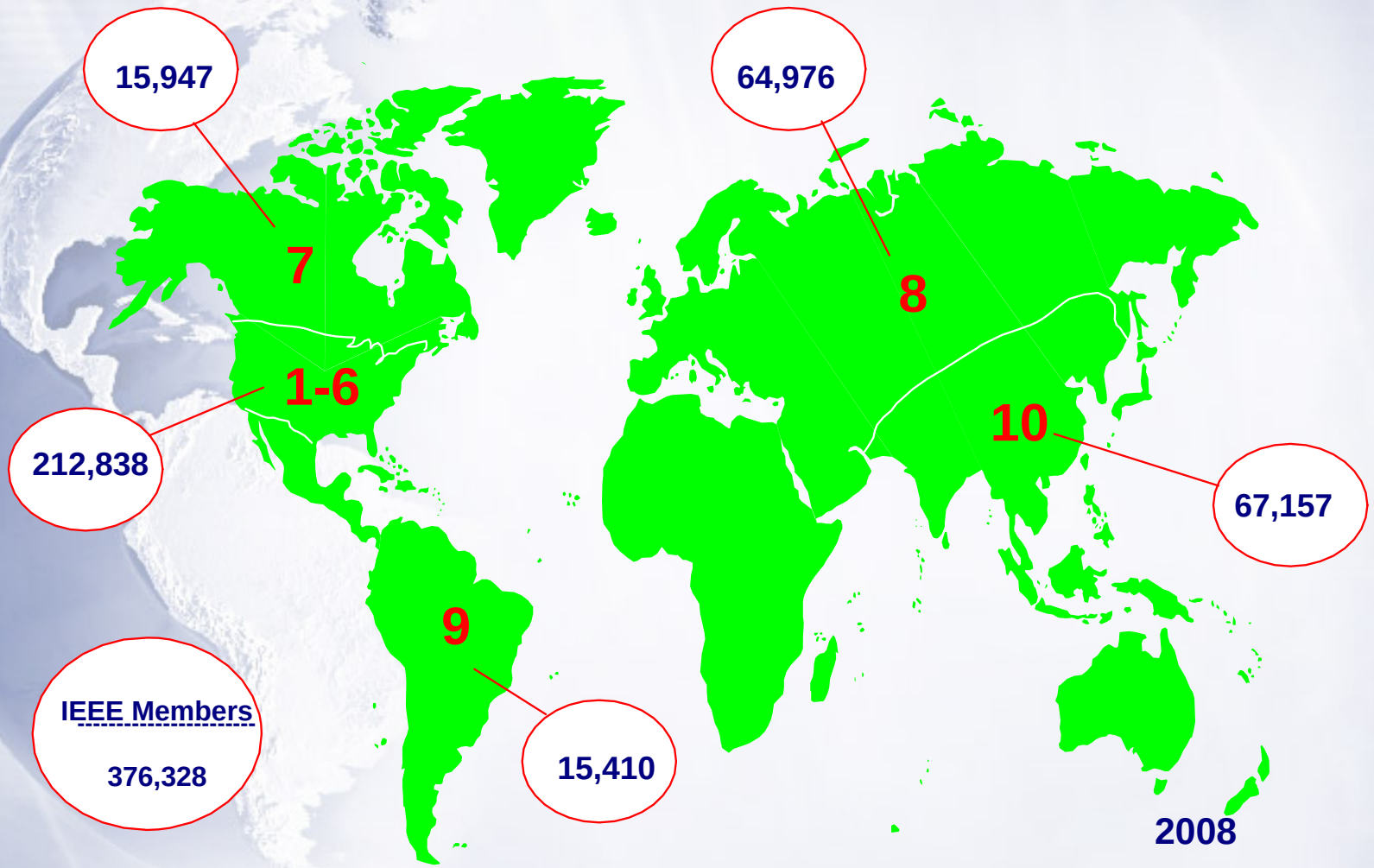
# *IEEE - the Prologue*

**Setting:** TAB reception in Luisville 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?"
**Curtsi Siller:** "Board of IEEE"
**Waiter Chris:** "You mean IEEE as in IEEE802.11b ?"

***Quoted with permission of Curtis Siller and waiter Chris***

# *IEEE Global Membership*

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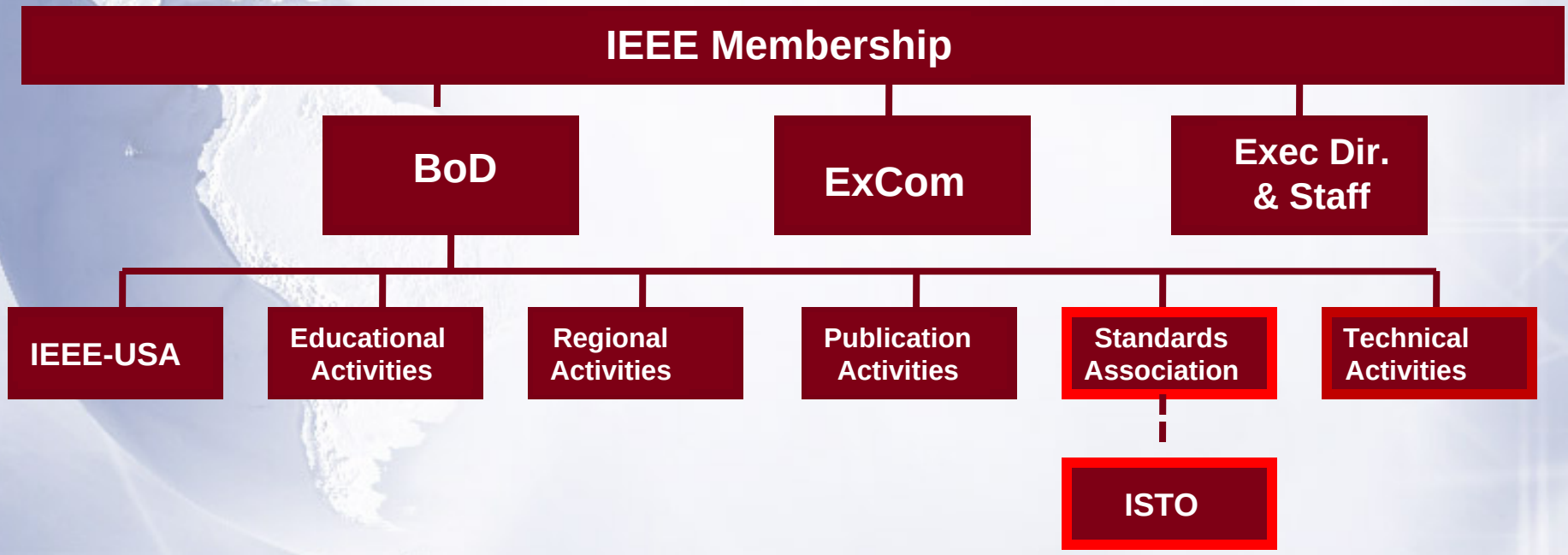
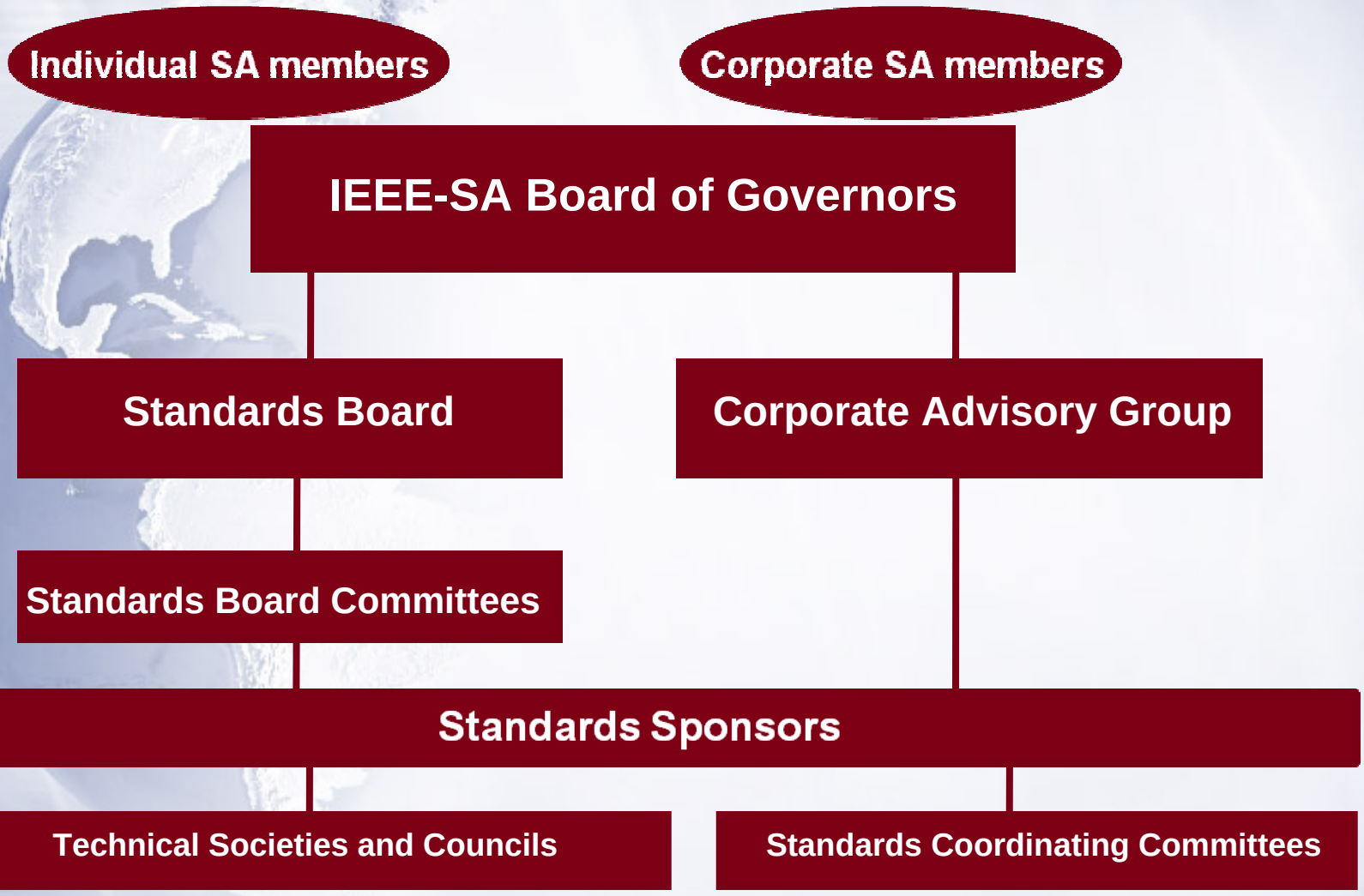
# *IEEE at a Glance*

- 376,328 members
- 10 division, 1780 chapters
- 41 Technical Societies and Councils
- 30% of world's literature in electro- and info-technology
- Over 325 technical conferences per year
- 800 published standards



# *IEEE Standards Development Infrastructure*

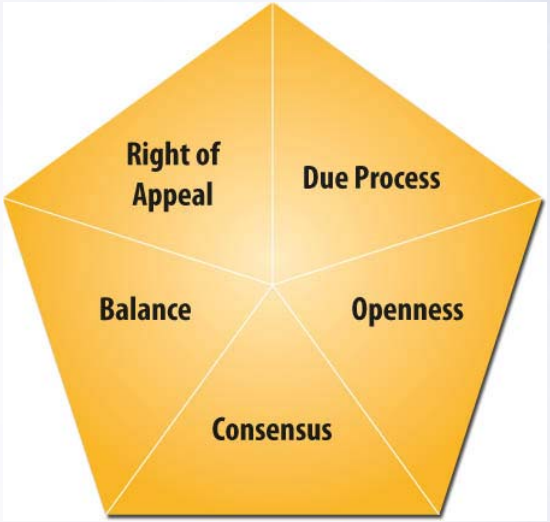
## *IEEE Standards Association (IEEE-SA)*



# *IEEE Standards Association (IEEE-SA)*

- ***800 published standards***
- ***400 standards under development***
- ***Individual and Corporate membership***
- ***Individual and entity (one company – one vote) projects***

**Guiding Principles:**




**Standards Development Lifecycle:**

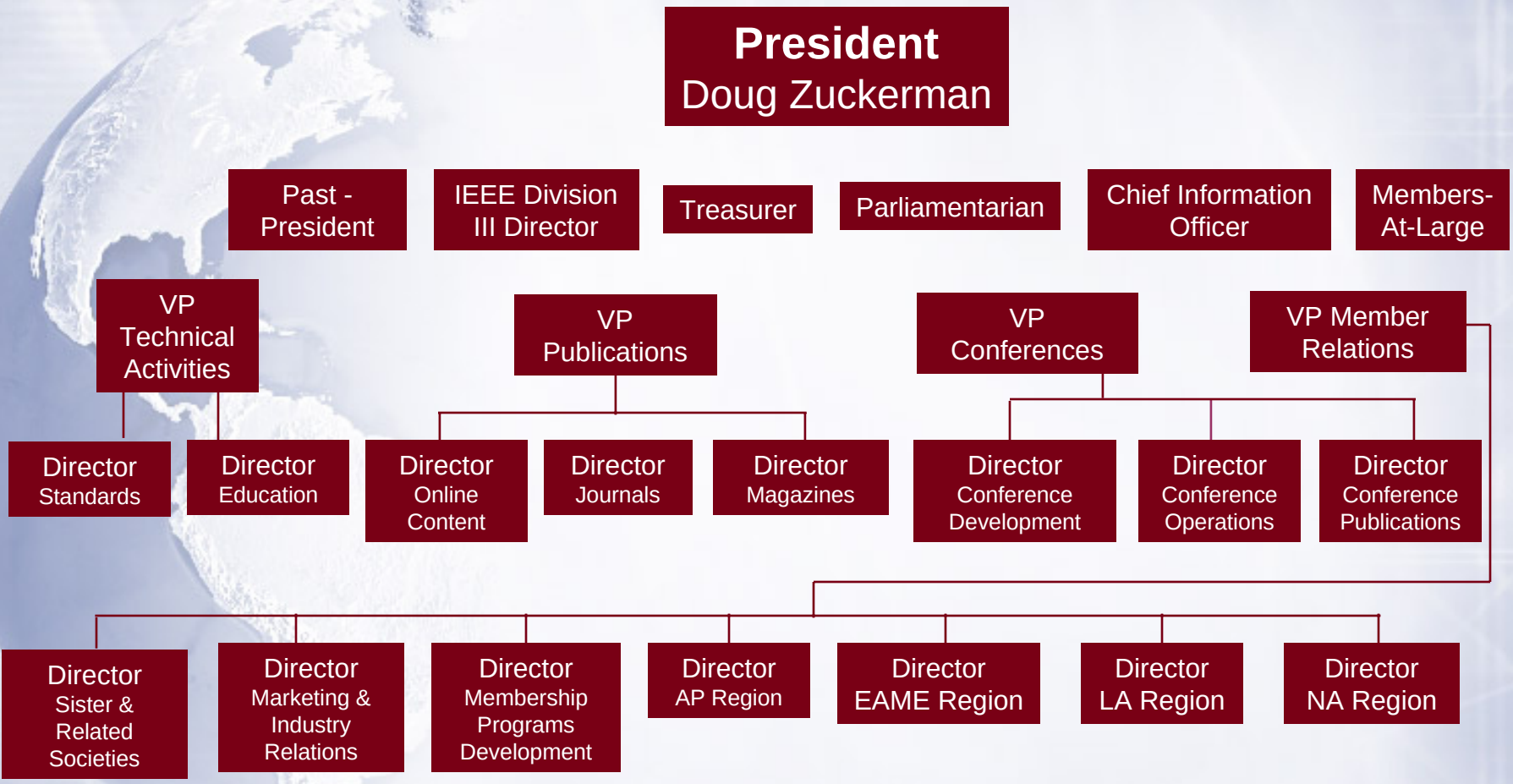
1. Form a study Group (optional)
2. Prepare a Project Authorization Request
3. Find a sponsor
4. Form the working group
   - Establish Working Group P&Ps
   - Elect Officers
   - Begin Standard Development
5. Reach Consensus in Working Group
6. Ballot draft standard
7. Approval and Publication

***The key to success of IEEE in Standards Development is the superb eco system provided by IEEE Standards Association and the wealth of expertise represented by the IEEE Technical Societies***

# *Communications Society 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.***

# Board of Governors

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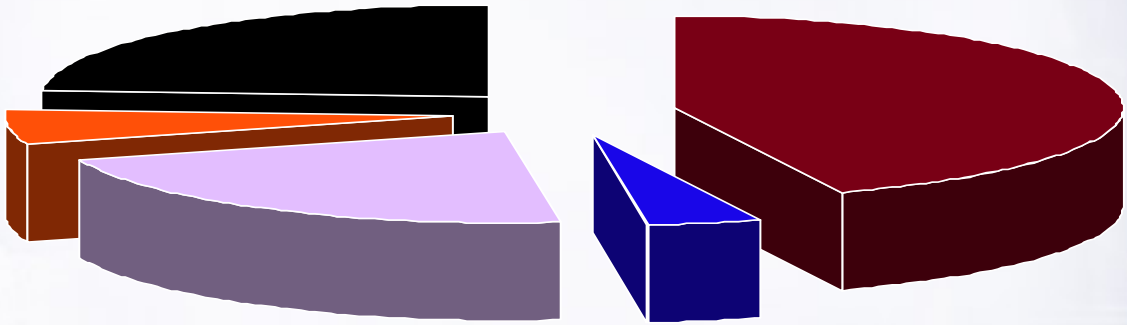
# *Where Members Live*

**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%**

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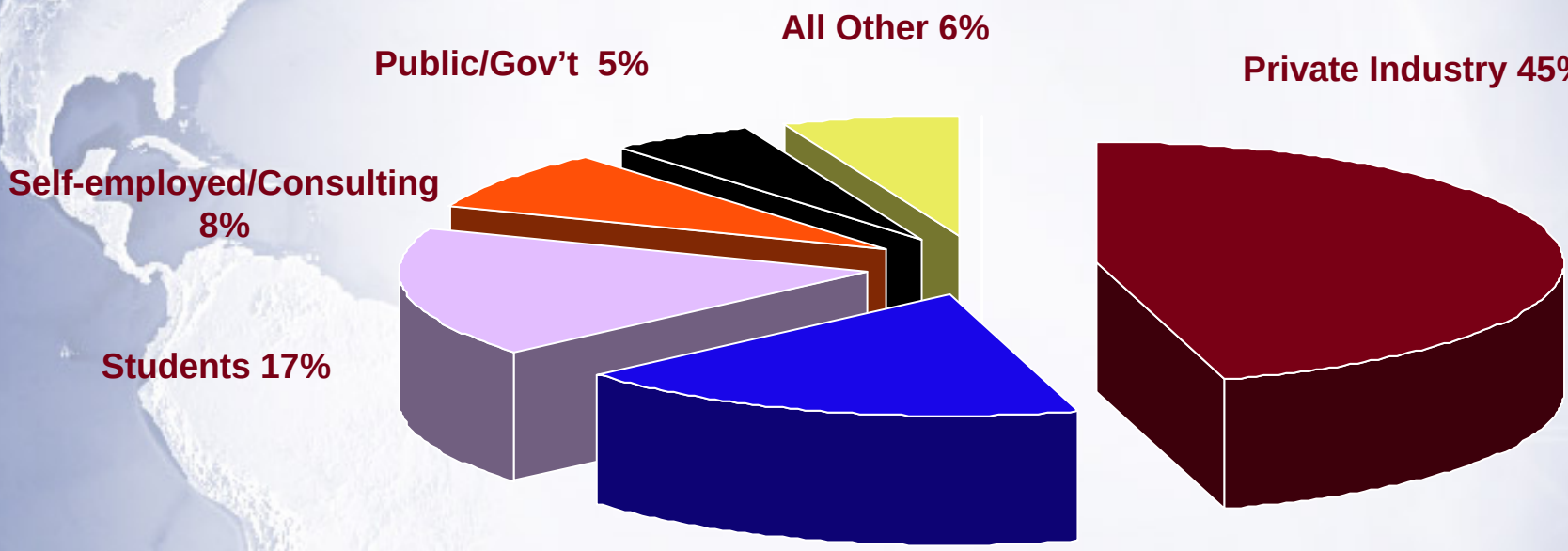
# *Member Employment*




All Other includes retired and unemployed.

# *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*

# *Publications*

***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***

# *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**

# *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.**


# *Sister Societies & Related Societies*

**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

**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 Scienfific & 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-China (CIEE)**
Chinese Institute of Electrical Engineering

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

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

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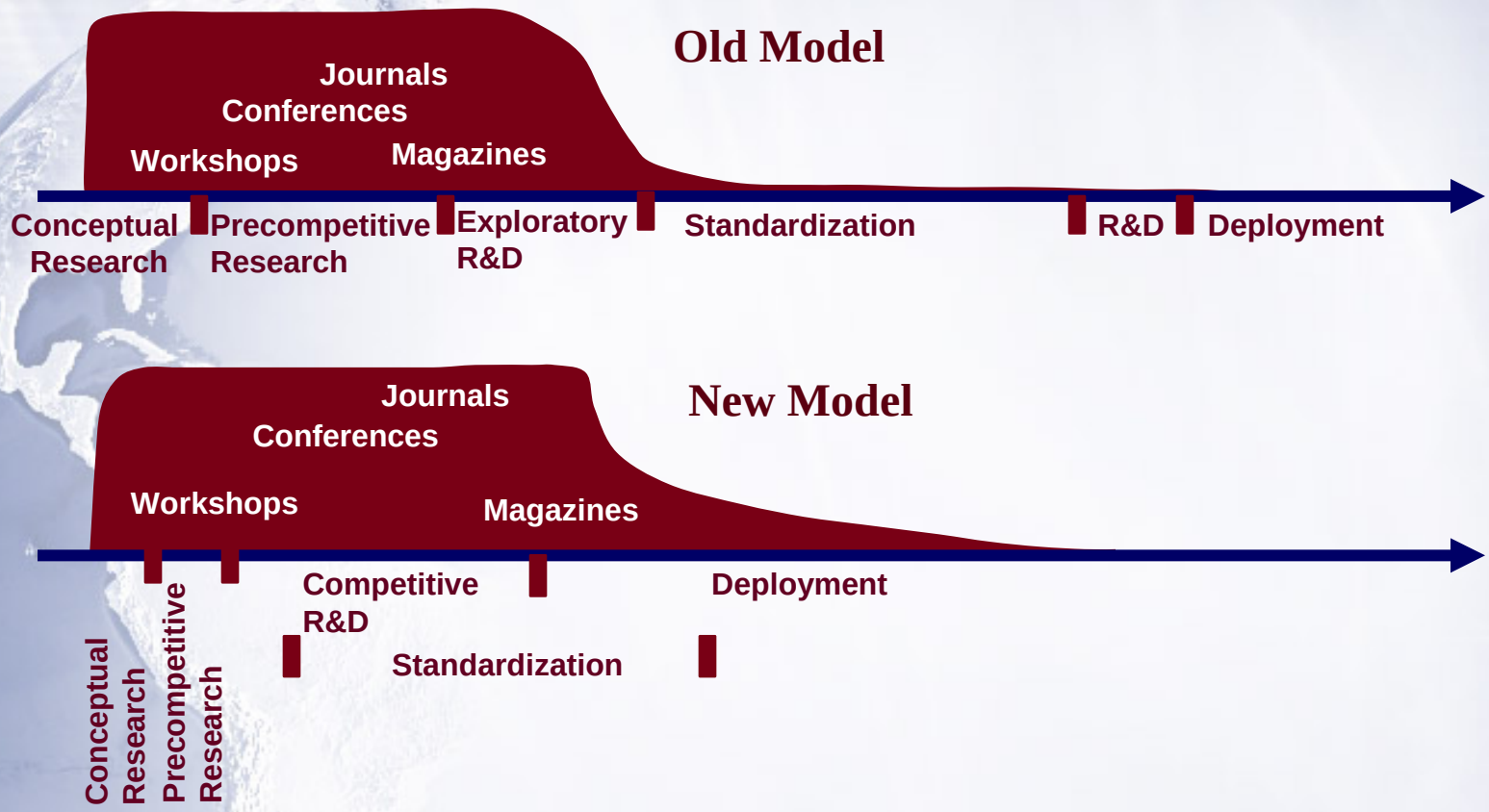
# *Global Telecom Standardization Landscape*


**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**
**ITU is the forum for achieving the "supreme consensus"**

# *Evolution of ComSoc's Comfort Zone*




**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 – (5-10$^{+}$) 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$^{-}$-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

## ***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

*The nice thing about standards that there are so many of them to choose from" Andrew S. Tanenbaum, IEEE Fellow*

- Intellectual property is being created in conjunction with standards- Just-In-Time Inventions
- Conferences and publications can also serve as a mechanism for IPR positioning
- For development of high quality standards it is critical harmonize research and standardization
- Bringing industrial and academic researchers into standards Working Groups can be a challenge

# *Academia, Industry, and Standardization*

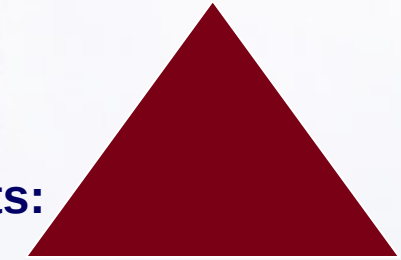
## *What Makes it Work*

- Individual representation in Working Groups
- Inclusion of standardization component in private industry's 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

# *ComSoc's Standards Portfolio and Methodology*

- 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

# *Past Generation Network*

1876

1896

1937

1947

1964

2007

**Capacity, “intelligence”, and sophistication of the network didn’t prevent it from becoming a bottleneck to applications. And besides…., most people on the planet could not afford to use it**

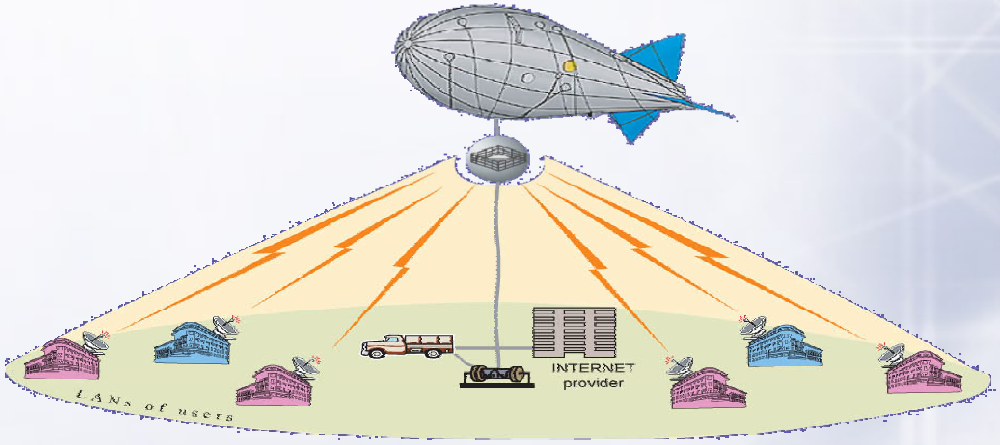
# *Fighting Communications Hunger*

A WiFi Tree in Laos

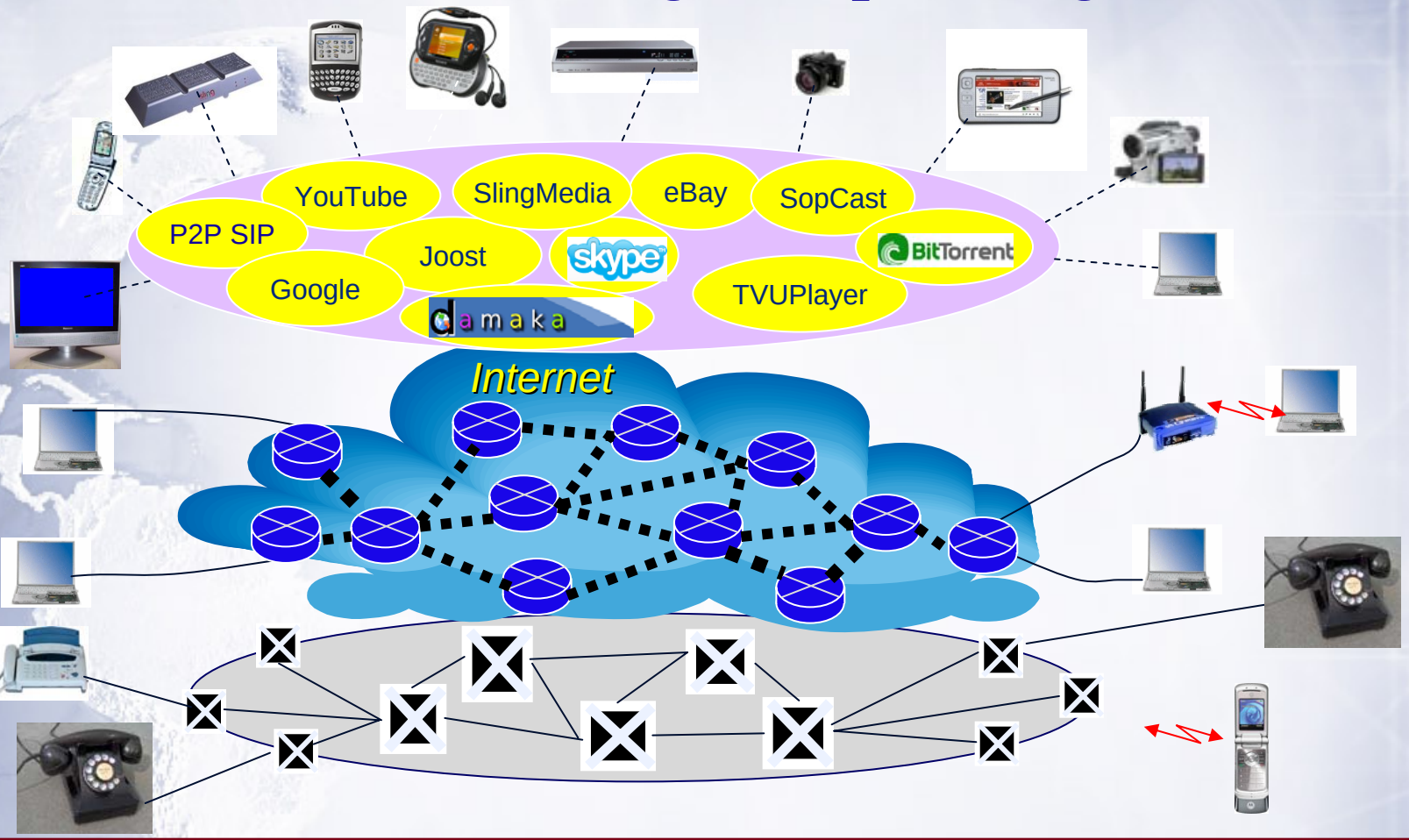
Access Point Antenna Raising in Nepal

Native American Tribal Network

Russian Rapira System Based on 802.11g



# *Next Generation Networking – Empowering the User*






- **Next Generation Networking needs to utilize the OPPORTUNITY to provide consumer grade communications for all – like air and "like water"…..**
- **Competition in the access, support applications market, flexible business models**

# *The Two Worlds Converge*

- Kaleidoscope Event is a manifestation of the modern Industry dynamics, of the trend to bring innovation to market as soon as possible

- Time to market for standards impacts same for products

- Key to success: R&D harmonized with standardization

- Scholarly Professional Societies move into standards arena, while standards development organizations desire to engage scholars

- IEEE Communications Society is eager to cooperate with ITU in bringing industrial and academic researchers into standards activities

**Let's work together !!!**

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