# 30th Anniversary Panel

**1980 → 2010 → 2020 → ?**

IEEE

# Standards Project Authorization

1. August 25, 1979
Date of Request

Project No 802
Approved: 3/13/80
Date
For Standards Committee Use Only

2. [X] New Standard
[ ] Revision of _____ Standard No
[ ] Reaffirmation of _____
[ ] Withdrawal of _____ Standard No

3. Project Title:
Local network for Computer Interconnection.

4. Scope and Purpose of Proposed Standard: The proposed standard will apply to Data Processing devices which need to communicate with each other at a moderate data rate (1 M bit/sec) and within a local area (physical data path up to 4 km). The purpose of the proposed standard is to provide compatibility between devices of different manufacture so that the hardware and software customization necessary for effective data communication is minimized or eliminated.

5. Sponsor:
Computer Standards
Technical Committee
Computer Society
Society

5a. Proposed ANSI Committee:
X3

ANSI Project #: _____
Date Approved: _____

6. Proposed Coordination:
Dr. Herbert Hecht Computer Society Representative to X3. Also coordination with IEC Committees will be undertaken. Minutes will be mailed to ANSI x 3 Secretary.

Method of Coordination:
Communications Society

Computer Stds. Committee (added by amendment 9/17/81 StB meeting)

7. Name of Group that will Write the Standard
Microprocessor Standards
Subcommittee
Local Network
Working Group

sentative to X3. Also coordination with IEC Committees will be undertaken. Minutes will be mailed to ANSI x 3 Secretary.

Communications Society

Computer Stds. Committee (added by amendment 9/17/81 StB meeting)

7. Name of Group that will Write the Standard

Microprocessor Standards (Subcommittee) — Local Network (Working Group)

8. Estimated Final Ballot Date:

December 1982 (To Technical Committee) — March 1983 (To Standards Board)

9. Person Delegated to Receive Communications and Conduct Liaison with Interested Bodies:

Maris Graube
Name

Tektronix, Inc.
Company

P. O. Box 500, M/S 58-188
Street address

Beaverton, OR 97077 (503) 644-0161 Ext. 6234
City State Zip Code Telephone

10. Submitted by:

Dr. Robert G. Stewart
Name

Stewart Research Enterprises
Company

1658 Belvoir Drive
Street address

Los Altos, CA 94022 (415) 941-6699
City State Zip Code Telephone

Form SF1-1A-1978

# IEEE 802 ORGANIZATION

## EXECUTIVE COMMITTEE (EC)

**CHAIR**
**Paul Nikolich**

### WORKING GROUP/TAG CHAIRS

| | | | |
|---|---|---|---|
| **802.1**<br>**BRIDGING/ARCH**<br>**Tony Jeffree** | **802.3**<br>**CSMA/CD**<br>**David Law** | **802.11**<br>**WLAN**<br>**Bruce Kraemer** | **802.18 TAG**<br>**Radio Regulatory**<br>**Mike Lynch** |
| **802.15**<br>**WPAN**<br>**Bob Heile** | **802.16**<br>**BWA**<br>**Roger Marks** | **802.17**<br>**ResPackRing**<br>**John Lemon** | **802.19 TAG**<br>**Coexistence**<br>**Shellhammer** |
| **802.20**<br>**MBWA**<br>**Mark Klerer** | **802.21**<br>**Handoff**<br>**Vivek Gupta** | **802.22**<br>**WRAN**<br>**Wendong Hu** | |

### APPOINTED OFFICERS

| | |
|---|---|
| **1st VICE CHAIR**<br>**Mat Sherman** | **2nd VICE CHAIR**<br>**Pat Thaler** |
| **EXECUTIVE SECY**<br>**Buzz Rigsbee** | **RECORDING SECY**<br>**James Gilb** |
| **TREASURER**<br>**John Hawkins** | **MEMBER EMERITUS**<br>**Geoff Thompson** |
| | **Emerg Svcs ECSG**<br>**Geoff Thompson** |

**HIBERNATION**

802.2 LLC (Dave Carlson)
802.12 Demand Priority (Pat Thaler)

**DISBANDED**

802.4 Token Bus
802.7 Broadband TAG
802.9 ISLAN
802.14 CATV
802.6 DQDB
802.8 Fiber Optic TAG
802.10 Security
802.5 Token Ring

# Agenda

- Introduction
- Pre-802: the environment before 1980
- 1980 to 1990: formation and growth
- 1990 to 2000: speed, range, mobility
- 2000 to 2010: mobility
- 2010 & beyond: what does the future hold?

# Panelists

- Gary Robinson;
  - 802 Founder, SDOs: IEEE, ANSI, ECMA, ISO, RAC; Co: DEC, SUN, EMC
- Jim Carlo;
  - 802.5 & 3rd 802 & SASB Chair, SA President; Huawei
- Bruce Kraemer;
  - 802.11n & 802.11 Chair: Marvell
- Bob Heile;
  - 802.15 Chair; Zigbee Alliance
- Roger Marks;
  - 802.16 Chair; WiMAX Forum
- Bob Grow;
  - 802 Treasurer, 802.3 & SASB Chair, SA BoG; Intel
- Geoff Thompson;
  - 802 Member Emeritus, 802.3 & Emergency Services Chair; consultant
- Contributors;
  - Buzz Rigsbee, 802 Exec Secy; Bob Metcalfe, Ethernet Inventor; Maris Graube 1st 802 Chair; Don Loughry 2nd 802 Chair
- Paul Nikolich;
  - 4th 802 Chair, SA BoG; volunteer

# Pre-802

a) what was the environment for data networking technology like pre-1980?

- Many proprietary systems
  - Aloha net-1970, HDLC, IBM SNA, ARC-net
- Speeds on the order of 50kbps, university apps, ARPA net
- Mainframe computers widely separated

b) What services that relied on an underlying data network infrastructure?

- Email: SNDMSG, File Transfer (remote login, FTP), Time sharing, Incestuous traffic (LAN!)

c) what were the drivers that caused network technology vendors to begin standardization discussions?

- Success stories: HP-IB, Xerox PARC vision, DEC microcomputers, Intel PMOS
- DEC, Intel, Xerox wanted to standardize Ethernet
- IC technology—enabled word processing—need to share and print documents

d) why was IEEE chosen as the SDO?

- Because of the IEEE-488 HP-IB success (Loughry chaired this project)

e) how was the formation of 802 perceived by industry leaders at the time

- DIX—good—a way for companies to collaborate
- IBM—threat response
- Datapoint (ARC-NET)– not interested

# 802 Formative & Growth Years 1980-1990

a) what were the principal drivers behind the evolving organization of 802 (from a single project to multiple Working Groups)?
- HILI, LLC, Enet, Tbus, Tring
- Irreconcilable differences
- Provided fertile market for 'LAN adapters'

b) what were the prevalent networking services at that time?
- Sharing word processing documents
- Personal computers proliferate—print and file sharing

c) what did the 'experts' at the time think would be the popular applications in the not-too-distant future?
- Office of the future (word processors, spreadsheets, PFMTS)

d) what was the earliest success and why?
- LAN—3Com ships SEP82, relatively mature, quickly evolving open system, unencumbered by restrictive IP licensing terms

e) did new technologies emerge within 802 projects
- Very early wireless—but technology was too big, too expensive, etc.
- Isochronous LANs
- Twisted pair media, star wiring

# 802 Expansion in Speed, Range & Mobility, 1990-2000

a) what were the drivers behind growth of 802's twisted pair and fiber optic media projects?
- decline of FDDI, ATM, and TR technologies
- Emergence of switching, low cost high speed

b) what were the drivers behind 802's wireless media projects?
- 802.11 slow growth
- Then comes Apple…with low cost 802.11 equipment

c) why did CATV (802.14/DOCSIS) and Broadband Over Powerline not get traction in 802?

d) as a result of new media functionality (TP, FO, Wireless)--what new services emerged? what markets and applications emerged?
- Portable PCs---drove wireless

e) how critical was development of the World Wide Web technologies?
- Extremely—graphical user interface made applications easy to use
- Lots of graphic based content

f) Jim's 5 points
- 802.12 and the ephemeral 802.30

# 2000-2010: The Mobility Decade

a) what network based applications and services are popular that were not anticipated in 1980? (e.g. facebook, location based services, others)?

- Video apps
- Mobile apps

b) which technologies, along with inexpensive broadband access fueled the growth of home networking and smart phone applications?

- WWW, Search, Social Networking, Everybody generates content, Wikipedia
- Unlicensed spectrum

c) mobile services became extremely popular--why?

- portable end devices
- Wireless reliability proven to be robust

# 2010-2020: emerging 802 technologies & applications

a) 802 projects continue to improve Speed, Range and Mobility

b) what other 'network characteristics' may become critical (e.g. low power consumption, intelligence, others?

- Reduce energy consumption becomes a major factor

c) drivers of more bandwidth, lower latency, greater mobility?

- Video, mobility, embedded
- Energy, health care, education
- Telepresence?, virtual reality?
- “move bits not bodies”
- “know your limitations”

d) Potential threats

- Global recognition
- Slowness of process
- Perception of dominance

e) Conclusions:

- Focus on the bottom two layers
- Packets are good enough to carry current and future content