

AGENDA & MINUTES (Unconfirmed) - IEEE 802 LMSC EXECUTIVE COMMITTEE MEETING

Monday, 5-July-1999- 8:00 a.m.

Queen Elizabeth, Montreal, PQ

5 1. MEETING CALLED TO ORDER

Jim Carlo called the meeting to order at 8:07am. Members in attendance were:

	Jim Carlo	- Chair, IEEE 802 LAN / MAN Standards Committee
	Paul Nikolich	- Vice Chair, IEEE 802 LAN / MAN Standards Committee
10	Buzz Rigsbee	- Executive Secretary, IEEE 802 LAN / MAN Standards Committee
	Howard Frazier	- Recording Secretary, IEEE 802 LAN / MAN Standards Committee
	Bill Lidinsky	- Chair, IEEE 802.1 - HILI Working Group
	Dave Carlson	- Chair, IEEE 802.2 - Logical Link Control Working Group
	Geoff Thompson	- Chair, IEEE 802.3 - CSMA/CD Working Group
15	Bob Love	- Chair, IEEE 802.5 - Token Ring Working Group
	Chip Benson	- Chair, IEEE 802.8 - Fiber Optic TAG
	Vic Hayes	- Chair, IEEE 802.11 - Wireless LANs Working Group
	Bob Grow	- Treasurer LMSC
	Robert Russell	- Chair, IEEE 802.14 - Cable TV Protocol Working Group
20	Bob Heile	- Chair, IEEE 802.15 WPAN Working Group
	Roger Marks	- Chair, IEEE 802.16 BWA Working Group

Approximately 5 IEEE 802 Working Group members and several guests including Rona Kershner, Susan Tatiner, attended the meeting

25 Peter Dahl made brief remarks concerning use of an 802.11 compliant wireless network to facilitate the 802.11 and SEC meetings. SEC members were encouraged to meet with Peter to install the PC Card wireless NIC.

2. APPROVE OR MODIFY AGENDA

FINAL AGENDA - IEEE 802 LMSC EXECUTIVE COMMITTEE MEETING

Monday, 5-July-1999 - 8:00 a.m.

Queen Elizabeth Hotel, Montreal, PQ

30	1.	MEETING CALLED TO ORDER	-CARLO	1	08:00 AM
	2.	APPROVE OR MODIFY AGENDA	-CARLO	4	08:01 AM
	3. *	APPROVE / MODIFY MINUTES OF PREVIOUS ME	-CARLO	5	08:05 AM
	4.	TREASURER'S REPORT	-GROW	10	08:05 AM
35		Category (* = consent agenda)			
	5.1	ME	-	0	08:15 AM
	5.2	ME PAR - 802.16a- Coexistence	-Marks	5	08:15 AM
	5.3	ME Status on P802	-Lidinsky	5	08:20 AM
	5.4	ME Sponsor ballot pools and SA membership	-Carlo	10	08:25 AM
40	5.5	ME	-	0	08:35 AM
	5.6	ME	-	0	08:35 AM
	5.7	ME	-	0	08:35 AM
	5.8	ME	-	0	08:35 AM
	5.9	ME	-	0	08:35 AM
45	5.10	ME	-	0	08:35 AM
		Break	-	15	08:35 AM
	5.20	MI Meeting fee for wireless network volunt	-Hayes	5	08:50 AM
	5.21	MI	-	0	08:55 AM
	5.22	MI	-	0	08:55 AM
50	5.30	MI	-	0	08:55 AM
	5.31	MI	-	0	08:55 AM

5.32	MI	-	0	08:55	AM
5.33	MI	-	0	08:55	AM
5.34	DT	Chair's guidelines: ballot pools, numbe	-Carlo	15	08:55 AM
5.35	DT	Privacy of Ballot Groups	-Nikolich	15	09:10 AM
5	5.36	DT	IEEE 802 Tutorial Process	-Carlo	10 09:25 AM
	5.37	DT	802 Numbering policy	-Carlo	10 09:35 AM
	5.38	DT	Liaison Requests from TIA TR41 and TIA	-Thompson	20 09:45 AM
	5.39	DT	When to retire 802exec@hepnrc.hep.net r	-Lidinsky	5 10:05 AM
	5.40	DT	Registering *802*.* domain names	-Frazier	10 10:10 AM
10	5.41	II	802.1w PAR approval	-Lidinsky	5 10:20 AM
	5.42	II	802.15 Update	-Heile	15 10:25 AM
	5.43	II	802.16 Update	-Marks	15 10:40 AM
	5.44	II	802.3ab Summary	-Thompson	5 10:55 AM
	5.45	II	JTC1/SC6/SC25 meeting summary	-Carlson	10 11:00 AM
15	5.46	II	JTC1/SC6/SC25 Liaison status	-Carlo	10 11:10 AM
	5.47	II	IEEE SA and ISTO Update	-Tatiner	20 11:20 AM
	5.48	II	IEEE 802 Tutorials	-Carlo	10 11:40 AM
20		ME - Motion, External	MI - Motion, Internal		
		DT- Discussion Topic	II - Information Item		

No changes to the agenda.

Motion to Liaivoe agenda

M: Love

25 **S: Carlson**

SEC vote: 12/0/0 Passed @ 8:15 am

3.0 Approve/Modify Minutes of Austin Meeting

Approved as part of consent agenda

4.0 Treasurer's Report

30)

Didn't buy projectors. March meeting resulted in net change of -\$1,554 in operating reserve.

5.1 skipped

5.2 ME PAR 802.16a Coexistence

35 Pointer to PAR was distributed > 30 days before today's meeting. This project was mentioned in the original PAR for 802.16. PAR was approved by 802.16 WG 39/0/0 in May, 1999. Document will be a Recommended Practice.

Carlo asked WG chairs what they need from Roger. Roger will be available to meet with WG.

Roger will make hard copies of PAR presentation material available to WG chairs.

5.3 Status on P802

40 Carlo asked Lidinsky whether 802.11 would submit a new PAR for approval at this meeting. Lidinsky not sure, will check, and if so, will make copies of PAR and 5 Criteria available to WG chairs. The PAR is 802.1x. Hardcopy of material in folders.

SEC ATTENDANCE

- MEETING ABSENT
 - 3/97 Vaman
 - 7/97 -
 - 11/97 Eastman, Mollenauer, Russell
 - 3/98 Eastman, Vaman
 - 7/98 Eastman, Mollenauer,
 - 11/98 Frazier, Alonge, Russell,
 - 3/99 Alonge, Vaman, Thaler, Mollenauer
 - 7/99 Thaler,
- Presence at both Monday and Thursday SEC meetings is required for attendance credit
- Eastman is no longer voting member of SEC.



**IEEE Project 802
Statement of Operations
March 1999 Meeting**

open	6 Mar 1999 Operating Reserve	49,480	
Mar 1999 Meeting Income:		Actual	Budget
187 Registrations@	\$300	56,100	
228 Registrations@	\$275	62,700	
0 Registrations@	\$100	0	
Subtotal		118,800	118,800
Deadbeat Registrations			97,750
A/G Copy Comissions		0	
Bank Interest		263	
Copying Income		0	
Other		0	
plus	TOTAL Income	119,063	97,750
Mar 1999 Meeting Expenses:		Actual	Budget
Audio Visual Rentals		4,208	3,000
Bank Charges		1	
CCI Mar 99 Meeting Administration		36,302	27,200 *
Copying		4,819	7,500
Credit Card Discounts		3,383	2,786 *
International Program Fee		37,400	30,600 *
Phone & Electrical		822	500
Refreshments		15,814	12,000
Shipping		2,248	2,500
Social		9,596	8,500
Supplies		-----	0
Other		1,100	0
minus	TOTAL Meeting Expense	115,693	94,586
minus	Equipment Expense	4,924	5,000
equals	4 July 1999 Operating Reserve	47,926	
Net Change in Operating Reserve		(1,554)	

* Actual charges are based on registration, budget is based on registration forecast.

Is P802 Overview and Architecture out for sponsor ballot? IEEE staff not sure. Lidinsky is member of ballot group, has not seen ballot yet.

5.4 Sponsor ballot pools and SA membership

5 see file (carlofoils.pdf)

SEC Motion

Recommend to the IEEE: All members of 802 ballot pools be verified once each year.

New pool members must be SA members at time of application to pool.

M: Hayes

10 **S: Love**

SEC vote

13/0/0 passed at 8:52 am

5.5 empty agenda item

5.6 empty agenda item

15 5.7 empty agenda item

5.8 empty agenda item

5.9 empty agenda item

5.10 empty agenda item

Break

20 **5.27 MI Meeting fee for wireless network volunteer**

Note: Peter Dahl is not attending any of the WG meetings this week.

Motion:

To thank Peter Dahl for volunteering to assist us in setting up the wireless network at the Montreal meeting and to waive the payment of the registration fee

25 **M: Hayes**

S: Love

SEC vote

11/1/1 passed 8:56

5.28 empty agenda item

30 5.29 empty agenda item

Sponsor Ballot Group and Pool

- After a draft standard is approved by the WG, then the WG followed by the SEC approve forwarding the draft to Sponsor Ballot.
- Ballot Pool - The Group of individuals who are solicited with an invitation from the IEEE-SA standards office to vote on a specific draft.
 - Application forms on WEB or at IEEE 802 meeting.
- Ballot Group - The Group of **qualified** individuals who have elected to participate in the vote on a specific draft.
 - Membership requires IEEE-SA membership.



Ballot Pool Qualification Proposal

- All members of the IEEE 802 Balloting Pool are verified once each year (in April after the IEEE renewals have been completed) that they are both IEEE members and IEEE-SA members.
 - If they are not IEEE-SA members, then a letter is sent to them that they will be removed from the IEEE 802 balloting pools if they do not become IEEE-SA members. They are given one month to register and if they have not registered are removed from the ballot pool.
 - Thus all IEEE 802 Balloting Pool members will be IEEE-SA members. We will not have the confusion of individuals who erroneously think they are members and feel they are on the balloting group.
- To join a Balloting Pool, the individual must first join the IEEE-SA and then request to join the appropriate Balloting Pools by sending an EMAIL to the balloting service.



5.30 empty agenda item

5.31 empty agenda item

5.32 empty agenda item

5.33 empty agenda item

5 **5.34 Chair's guidelines: ballot pools, roster availability**

see file (carlofoils.pdf)

Carlo received action item to add a guideline concerning the publication of the "List of Contributors to a standard" to the chairs guidelines document.

5.35 Privacy of Ballot Groups

10 regarding publication of the list of WG and sponsor ballot voter's names and email addresses, Bob Grow stated that the list of voters and email addresses is really only needed for "hound dogging". Geoff Thompson also added that we don't need yet another compilation of the WG and sponsor ballot membership in machine readable form. Consensus is to not publish any more lists than we already have.

5.36 IEEE 802 Tutorial Process

15 Rigsbee states that we need a more formal guideline for scheduling tutorials.

Thompson is concerned that we are creating an overly complex system for tutorials, which are supposed to be informal.

Lidinsky says that WG chairs should take greater care in sponsoring tutorials.

Carlo and Rigsbee agree to review and revise chair's guideline for tutorials. Carlo wants WG chairs to copy him on all requests for tutorial slots. Rigsbee is the manager of the tutorial agenda.

20 **5.37 802 Numbering policy**

see file (carlofoils.pdf)

On the issue of one or multiple standards within a WG, Lidinsky, Russell, and Rigsbee felt that several WGs have multiple standards within their scope. Thompson states that in fact 802.3 has only one standard, and that allowing multiple standards within a working group (other than 802.1) is a substantial change from past practice, and needs to be done carefully.

25 Nikolich says that a separate meeting needs to be held on this topic.

4-5 pm Tuesday "Numbering"

5-6 pm Tuesday "WGs owning more than one standard"

St. Charles meeting room.

5.38 Liaison Request from TIA TR41 and TIA TR42

30 Thompson - life and liaisons are getting more complicated. Premises cabling has been split off into TIA TR42. Currently working with two groups in TR41.

TR42 is cabling systems group, fiber and copper, residential and commercial. Very active work in fiber area. A lot of work going on in twisted pair, in particular, new standards for category 6, nominally spec'd ~ 250 MHz. Cabling industry very excited. We (802) don't currently have any project which makes use of category 6.

IEEE 802 Approval Guidelines

ITEM	WG	WG Chair	SEC	SEC Chair
PAR Submittal (New)	YES	YES	YES(3)	YES
PAR Revision	YES	YES	YES	YES
PAR Extension	YES	YES	YES	YES
WG Chair change PAR change		YES	INFO	YES
WG Study Group	YES	YES	YES	
EC Study Group			YES	
Standard Renewal Date Extension	INFO	YES	INFO	
LMSC Ballot (New Standard, Revision)	YES	YES	YES	
LMSC Ball (Re-Affirmation)	INFO	YES	INFO	
LMSC Ballot Pool Constitution		YES		YES
LMSC Recirculation	INFO	YES	INFO	
All Standards Board Submissions	YES	YES	YES	
US TAG Submissions (JTC1/ITU)	INFO	YES	YES(2)	YES(2)

- (1) The SEC chair may override in order to avoid issues which would negatively impact the process for IEEE 802 standards.
- (2) Either SEC or SEC chair should approve submission to the US TAG.
- (3) Requires 30 day draft submission to SEC.



Jim Carlo - Texas Instruments July-1999

SEC Business Meetings

TIME	Purpose	Who	Location
MON			
TUES			
1:00			
2:00			
3:00			
4:00			
5:00			
WED			
10:00			
1:00			
3:00	Internationalization	Jeffree	
4:00	Internationalization	Jeffree	
5:00			



Jim Carlo - Texas Instruments July-1999

Industry Centric Standard Process

- PAR Form now has a checkbox for "Individual or Entity Standards Development"
- A single type of balloting group for a standard, based on the type of sponsorship, shall be initially recommended at the time of PAR or TPAR approval and officially approved prior to the formation of a balloting group. A statement of the type of balloting membership to be used shall be included in all versions of the draft standard and the final approved standard.
- Need to evaluate process for IEEE 802.



SEC Motion 11Mar99

- Moved: _____ Seconded: _____
- Adopt the following policy regarding Internationalization of IEEE 802 standards.

- 1) Initiate application from IEEE 802 to be a Cat A Liaison organization to ISO/IEC JTC1 SC6 or other SC as appropriate with possible N&I reorganization. Reasons for Cat-A is to be able to submit NP's and Fast Track documents.
Jim Carlo - By 1999. SC6 Approved - JTC1 In Process

- 2) Initiate the following balloting process within 802:
 - A) Send electronic liasions to SC6 on PAR approval, IEEE 802 draft WG ballots, IEEE Sponsor ballots.
 - B) Request comments directly to ballot pointer within IEEE ballot time period.
 - Tony Jeffree - Process through 802 - July 1999 Plenary
 - Robin Tasker - Process through SC6 - June SC6 Meeting

- 3) After standard board approval of the IEEE 802 document:
 - A) IEEE publish with IEEE designation.
 - B) SC6 publish as an update to a Technical Report. That technical report catalogues previously published joint JTC1/IEEE standards and IEEE standards that it has endorsed.
 - C) IEEE 802 believes that ANSI designation is not a market requirement for IEEE 802 standards and may be a detriment for Internation Recognition.

- 4) Identify SC6 Technical Liaison from IEEE 802.
- Tony Jeffree recommended for Initial liaison. -DONE



Jim Carlo - Texas Instruments July-1999

Chair's Guidelines - Submissions to RevCom

- Per IEEE 802 operating rules, the SEC has the responsibility to:
 - 3.1.j)Oversee formation of sponsor ballot groups and sponsor ballot process.
- Per IEEE Operating rules,
 - "The Sponsor shall submit the required number of copies of the entire proposed standard, together with all required documentation in accordance with the most current version of the IEEE-SA Standards Board Working Guide for Submittal of Proposed Standards to the Secretary of the IEEE-SA Standards Board at least 40 days before the IEEE-SA Standards Board meeting."
- Translating this into practice, I suggest the following.
 - The Working Group Chair or designated reporter (the name of the person who signed the PAR form on file at the IEEE office), must sign the RevCom submittal form. RevCom verifies that the signature of the submitter matches the signature on the PAR form. The SEC chair can sign the submittal form in rare cases.
 - The SEC must approve the submission to RevCom by either EMAIL ballot or approval motion at the SEC meeting or conditional approval motion. Normally, what is needed for this approval motion is for the WG chair to show the Sponsor Ballot Results, detail any no votes, and show the results of the ballot resolution group (and possibly WG) decision to submit to RevCom.
 - The sponsor chair of IEEE 802 LMSC (Jim Carlo) may remove or add an item to the RevCom agenda for good cause (I have an obligation to insure integrity. In such cases, I will immediately inform the SEC/Working Group Chair.
 - All pre-submittals to RevCom before SEC approval, require me being informed, so that I may initiate and insure action by SEC on the RevCom submission.



Jim Carlo - Texas Instruments July-1999

802 PAR Numbering-1

- PAR Types
 - b1 -[] New Standard
 - b2 -[] Revision of existing standard {number and year} []
 - b3 -[] Amendment (Supplement) to existing standard {number and year} []
 - b4 -[] Corrigenda to existing standard {number and year} []
- 1) Standard 802 provides the basic architecture for 802 standards. As such, there is no number or letter suffix. There is currently a revision PAR, 802Rev1 that is updating this standard.
- 1.2) Examples
- 1.2a) 802 - This is the IEEE 802 Standard: Overview and Architecture



802 PAR Numbering -2

- 2) Working Groups will utilize PAR numbers as 802.nx where:
 - n - the number assigned to the Working Group
 - x - a lower case letter assigned to each supplement or corrigenda.
- 2.1) Notes:
 - 2.1a) After x goes to z, the next PAR is 802.naa, 802.nab, etc.
 - 2.1b) In general, the base working group standard, 802.n eventually includes all supplements and corrigenda.
 - 2.1c) Revisions are numbered as 802.nRevm, where m is the revision update sequence number. In some cases, a Revision is started as a supplement, then becomes a revision, so the initial letter designation holds.
- 2.2) Examples
 - 2.2a) 802.5v - This is a supplement to 802.5 Token Ring MAC standard.
 - 2.2b) 802.3ab - This is a supplement to 802.3 CSMA/CD MAC standard.
 - 2.2c) 802.5Rev2 - Second revision to 802.5 Token Ring Mac standard.



802 PAR Numbering -3

- 3) In the case of 802.1, which is for higher layer protocols above the MAC, multiple separate standards and associated supplements are produced. There is no standard, 802.1. The method to identify whether a project is a supplement or a standard is under study, as the lower/upper case designation has been confusing.
- 3.1) Notes
- 3.1a) In the past, a lower case letter was assigned to a supplement or corrigenda and an upper case letter was assigned to a standard. This small and capital letter use is VERY confusing and a better method is under study since some computer type fonts do not distinguish between capitalization.
- 3.2) Example:
 - 3.2a) 802.1D - MAC Bridge Standard
 - 3.2b) 802.1p - Supplement to 802.1D for Priority Control operation.
 - 3.3) The following are the separate standards within 802.1:
 - 802.1B - LAN/MAN Management
 - 802.1D - MAC Bridges
 - 802.1E - System Load Protocol
 - 802.1F - Common Def. and Procedures for IEEE 802 Management Information
 - 802.1G - Remote MAC Bridging
 - 802.1H - Rec Practice for MAC Bridging on Ethernet Ver 2.0 in 802 LANS
 - 802.1Q - Virtual LANS



802 PAR Numbering - 4

- 4) In some cases, where the project will be a supplement of 802.1D or 802.1Q, but the project deals totally with a single MAC protocol, the project number is 802.nx, as defined in the relevant working group.
- 4.1) Notes:
- 4.2) Examples:
- 4.2a) 802.5x - Supplement to 802.1Q for Token Ring MAC (802.5) VLANs.



Privacy of Balloting Group

- 1) The list of contributors to a standard (to appear in the frontpiece) within IEEE 802 WG should normally be included with the document during the Sponsor Ballot Period. This list will be used to determine which WG members and other experts will receive a copy of the standard when approved by the Standards Board.
- 2) The list of WG voters and their EMAIL addresses on a WG draft should be made available during the WG ballots on the same secure site as the WG draft. This list shall not be used for any commercial purposes.
- 3) The list of IEEE Sponsor Ballot group voters and their EMAIL addresses on an IEEE Sponsor Ballot should be made available during the IEEE Sponsor Ballot on the same secure site as the Sponsor Ballot draft. This list shall not be used for any commercial purposes.



Marks: who defines "category ?"

5 Thompson: Either TIA or SC6. Basic agreement between the two standards bodies. There have been some requests to specify gigabit Ethernet over category 6. Most of 802.3 WG interested in fiber, or 1000BASE-T, which works over category 5. TR41.5 was approached to see if they were interested in doing a gigabit Ethernet over Cat 6, was turned down. "Call for Interest" tomorrow in 802.3 on the subject of gigabit Ethernet over category 6.

Lidinsky: what would be advantage over 1000BASE-T?

Thompson: Potential for lower silicon cost.

TR41.4 working on IP telephone set. One of their problems is how to provide power. Another call for interest in 802.3 on MDI power. TR41.4 has decided to say that it is non-compliant to provide power over the MDI until 802.3 gets a project started.

10 Carlo reads liaison letter from TR41

(see file TR41letter.pdf)

Letter concerns TIA41's interest in developing a standard for gigabit Ethernet over category 6 cable. Discussion of why 802.3 may or may not want to do such a project. There will be a call for interest in 802.3. Liaison report will be presented this afternoon.

15 Carlo reads liaison letter from TR42. Also concerns category 6 cable. Asks that IEEE consider category 6 cabling in the development of new applications.

(see file TR42letter.pdf)

Carlo asks 802.3 to develop response letters.

20 Love observes that a generic response that says "if you are interested in working on such standards, here's how you join 802, come on down and join us".

5.39 When to retire "802exec" reflector

Lidinsky asks when we should retire hepnrc reflector?

Frazier suggests removing all names form hepnrc and pointing 802exec reflector to stds-802-sec reflector, and decommissioning 802exec reflector at November meeting. General agreement.

25 **5.4 Registering "*802*.*" domain names**

802.net, 802.org, 802.com already taken. ieee802.org available. Will register it. Will make an alias for grouper.ieee.org so that <http://www.ieee802.org/> points to <http://grouper.ieee.org/>

5.41 802.1w PAR approval

Lidinsky: 802.1v and 802.1w both approved by NESCOM.

30 **5.42 802.15 Update**

Bob Heile

(see file 802_15_sec_rep.pdf)

5.43 802.16 Update

Roger Marks

COMMITTEE CORRESPONDENCE

Standards Project: TIA TR-41
Subject: Liaison to IEEE 802
Date: May 21, 1999
To: Jim Carlo, Chair IEEE 802

We are very happy to learn that the 1000BASE-T standard developed by IEEE 802.3ab is near completion. TIA and IEEE have worked together to generate cabling system requirements for several successful applications and want to maintain this important working relationship for the future. It is with this objective in mind that we are supporting the proposal of an IEEE member to develop a gigabit Ethernet standard tailored to the characteristics of emerging category 6 cabling systems.

Cabling systems have made significant progress over the last few years since the initial introduction of Category 5 in 1991 and the publication of EIA/TIA 568-A in 1995. Currently in TIA TR-42 and ISO/IEC JTC 1 SC25 WG3, a new generation of high bandwidth cabling is under development and is anticipated to be balloted by the end of 1999. Some users may elect to adopt these higher performing cables if they anticipate that data rates will continue to increase.

We would like to support the initiation of a project in IEEE 802.3 to develop a 1 Gb/s physical layer specification that will operate over 100 meters of Category 6 balanced cabling. Category 6 provides increased bandwidth, less attenuation and reduced crosstalk compared to Category 5 or 5E. The reduced level of crosstalk, combined with the fact that there are only two NEXT disturbers, means that adequate margin can most likely be obtained without the need for NEXT, or FEXT, cancellers. The opportunity is to develop a PHY that is much simpler, cheaper, and requires less power to operate over a category 6 cabling system.

We hope that you will consider undertaking this important work effort that will take advantage of category 6 cabling's superior transmission characteristics and provide end users with a less complex gigabit solution. If IEEE 802.3 does not elect to take on this work, TR-41.5 may be interested in developing the standard if sufficient technical support can be found and would like the support of IEEE 802.3 for this project. We want to continue the working relationship between IEEE and TIA to facilitate this effort and look forward to your response.

Thank you for consideration.



TR42.1 - Subcommittee on Commercial and Industrial Building Cabling

Date: May 20, 1999
To: Jim Carlo, Chair IEEE 802
cc: Geoff Thompson, Chair IEEE 802.3
From: John Siemon, Chair TR-42.1; Paul Kish, Chair TR-42
Subject: Liaison to IEEE 802

We are very happy to learn that the 1000BASE-T standard developed by IEEE 802.3ab is completed. TIA and IEEE have worked together to generate cabling system requirements for several successful applications and we wish to maintain this important working relationship for the future.

Cabling systems have made significant progress over the last few years since the initial introduction of category 5 in 1991 and the publication of TIA/EIA-568-A in 1995. In TIA TR-42 and ISO/IEC JTC 1/SC 25/WG 3, category 6 cabling is under development that provides increased bandwidth, less attenuation and reduced crosstalk compared to category 5. Category 6 will be backward compatible with the categories defined in TIA/EIA-568-A. For category 6, the modular jack interface shall be maintained at the telecommunications outlet connector in the work area. If different category components are to be mixed with category 6 components, then the combination will at least meet the transmission requirements of the lower performing category. This standard is anticipated to be balloted by the end of 1999.

Improved cabling has begun to replace category 5 in new installations for users who anticipate increased data rates and want to install a cabling system with extended bandwidth to support future applications. Recently there has been interest in application support to take advantage of the better transmission characteristics of category 6 cabling.

We respectfully request that IEEE consider category 6 cabling in the development of new applications.

Best Regards,

John Siemon
Chair TR-42.1

Paul Kish
Chair, TR-42

Regards,



Charles Berestecky
Chair TR-41

CC:

Jim Romlein, Chair TR-41.5
Geoff Thompson, Chair IEEE 802.3

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P802.15 Working Group Status

*Presentation to IEEE 802
Standards Executive Committee
July 5, 1999*

Bob Heile, Chairman

P802.15 Working Group Presentation

- Activity Since March 1999
 - getting the word out
 - meetings
 - liaison activity
- Objectives/Missions/Timelines
- Objectives for July Plenary

Getting the Word Out

- Press Release-March 1999
- Articles:
 - 802 Perspectives Column-July 1999
 - Special Edition of Personal Communications Magazine-Dec 1999
- Web Site
- Liaison Letter
- Speaking Engagements
 - MMAC/PC ---Chiba, Japan May 1999
 - Bluetooth99 Developers Conference ---London, June 1999
 - IETF45, MobileIP WG ---Oslo, Norway, July 1999
 - RAWCON ---Denver, August 1999
 - ISWC ---San Francisco, October 1999
- Public Reflector

Summary of WG Meetings

- Weekly Telecons for the Advisory Committee
- Ad Hoc WGAC Meeting in Chiba, Japan (with 802.11), May 1999
 - Finalized draft of 802.15 rules and document structure, reviewed Marcom activities, set liaison agenda, established meeting schedule and proposed project timeline.
- Ad Hoc WGAC Meeting in London,UK, June 1999
 - Reviewed gameplan for July plenary, established meeting objectives for joint session with Bluetooth, finalized Call for Proposal
- Joint Meeting with Bluetooth in London, UK, June 1999
 - Review standards process and agree on a proposed working relationship/timeline

Liaison Objectives

- Promote the IEEE P802.15
- Promote the IEEE as a Value Add

Liaison Status

Letters were sent to:

- Bluetooth Special Interest Group
- Home Radio Frequency Working Group (HRFWG)
- Internet Engineering Task Force (IETF)
- Wireless Access Protocol (WAP) Forum
- Wireless Data Forum
- ATM Forum Wireless ATM (WATM) Working Group
- ETSI Broadband Radio Access Networks (BRAN) Project
- Infrared Data Association (IrDA)
- Wireless LAN Alliance (WLANA)
- Department of Transportation, Federal Highway Agency and Intelligent Transportation Systems
- Dedicated Short Range Communications Task Group

Liaison Negotiations

- Bluetooth SIG
 - Continue ongoing liaison
 - Resolve IPR and Copyright
 - Draft a mutual timeline, circulate to SIG for approval
 - Structure plan to recast version 1.0 L2CAP and below into a draft standard format
- HomeRF HRF-Lite
 - Continue ongoing liaison
 - Next Meeting Date July, 1999

Thoughts on Objectives/Missions/Timelines

Success means:

- To be recognized by companies as the place to go for WPAN functionality in their products
- To have users demand P802.15 compliance as a minimum requirement of product functionality

Thoughts on Objectives/Missions/Timelines

- Need a sponsor ballot approved standard sooner than later-target should be Nov 00
- Needs to be recognized by Bluetooth, HomeRF and 802.11
- Good enough(meets market need for functionality) vs perfect is an acceptable trade-off for speed in delivery of a standard.
- Absolutely need coexistence
- Have more flexibility on interoperability solutions
- Additional PARs are likely for
 - HomeRF/Kodak
 - Ultra low power/low cost/low data rate requirements
 - Bridging
 - Interoperability

Objectives for July Plenary

- Monday- set the stage, review the gameplan for the week, point attendees to the web or flash card for copies of draft rules and other documents for review ahead of time.
- Tuesday- detailed presentations on WG objectives, proposed operating rules and liaison activities
- Wednesday- Review project action plan and call for proposals, joint meeting with .11, review draft standard outline, organize committees for first draft, review BT spec
- Thursday- Begin formal voting on Officers and rules, hear submissions, if any, in response to the CFP.

P802.15 Proposed Rules

- Base is common with revised 802.11, which is based on 802.3
- Streamlined a few procedures to make meetings go more smoothly
- Added recommended procedures as guidelines

Kick-off Process

- To obtain voting rights at the Thursday morning session of this meeting, you must attend at least 5 of the six sessions Monday, Tuesday, and Wednesday and the session on Thursday morning.
- If you are planning on attending at least 75% of the sessions and becoming a voting member, please declare it during sign-in on Monday or Tuesday morning. You will be eligible to receive the Standards CD on Wednesday after 2pm.
- Formal voting will begin on Thursday morning. At sign-in you will receive a voting token.

IEEE 802.16
Working Group on
Broadband Wireless Access
(BWA)

SEC Report

July 5, 1999

Montreal, Quebec, Canada

Roger B. Marks

BWA Industry Issues

- Major changes since March
- Important companies changed hands
- Big interest by financial community
- Still no “private” competition for 802.16
- We are “wanted”
 - Two trade associations want to be associated with us
 - Commercial conferences want us to co-locate meetings
 - Many requests to give talks

Followup to March Meeting: PAR

- 54 people at second (and final) Study Group Meeting in Austin (no deadbeats)
- Submitted Interoperability PAR
 - Approved by 802 (99/03/11)
 - Approved by IEEE (99/03/18)
 - Standard due to RevCom on 2001/01/31

Followup to March Meeting: WG

- Working Group 802.16 created 99/03/11
- Interim Chair thru 7/9/99: Roger Marks
 - Submitted required employer letter
- Press Release requested by SEC
 - Issued through IEEE Standards
 - Much other publicity
 - inc. “802 Perspectives” in *IEEE Network*
 - 4 IEEE MTT Distinguished Lectures
- SEC requested charter for 802.16
 - On agenda for this week

802 Web Site

- Subset of 802 Site at IEEE
- Includes:
 - BWA Study Group, Final Report
 - Detailed meeting info (old and upcoming)
 - Document Submission Template
 - Task Group Areas
 - Call for Contributions; Contribution Index
 - Liaison Areas
 - ...
- Password-protected directory available
 - Not currently used

802.16 Email Reflector

- For 802.16 Official Business
- Not confidential
 - Open submission policy
 - Open subscription policy
 - Publicly-available archives on web site
- Asked IEEE to turn off “who”
 - No reply
- 101 messages so far

Contribution-Driven Process

- Each TG issues “Call for Contributions”
 - Specific issues for next meeting
 - Includes deadlines
 - Widely publicized (inc. outside the WG)
- Since March Plenary:
 - Sys Req: 24 contributions
 - Editor posted draft Sys Req document
 - Coexistence: 10 contributions
 - PHY: 1 contribution (outline)
 - MAC: 1 contribution (1 review, 1 novel)

802.16 Meeting #0

- Boulder, May 10-12
- 55 people
- Not the “first Working Group Meeting”
- Meeting of 2 Task Groups
 - Coexistence
 - Wrote PAR for SEC approval this week
 - System Requirements
 - Worked on document
 - To define requirements for MAC & PHY
- Voted (tentatively) for open policy

802.16 Meeting #1 - July 6-8

- **Registration as of 10 am Monday:**
 - 104 primary
 - 6 secondary
 - 7 tertiary

802.16 Meeting #1 - July 6-8

- Detailed agenda & voting rules distributed
- “Voting Rights”: attend 5/6 meetings (>75%)
- Opening Plenary Tuesday (no voting)
- Closing Plenary Thursday
 - Voting: Chair Election; approve coexistence
PAR; Rules; Sys Req Doc?, etc.
- Task Groups
 - System Requirements & Coexistence
 - PHY & MAC: getting started
- CD-ROM: how to distribute?
- Leadership Meeting Monday

802.16 Meeting #2 - August 5-6

- Denver, Colorado
- Finish the System Requirements Document?
- Begin MAC and PHY seriously
- After 1999 IEEE Radio and Wireless Conference (RAWCON'99)

IEEE RAWCON'99

- Denver, Colorado, August 1-4
- Roger Marks, General Chair
- 75 Technical Talks
- Panels, including:
- **Broadband Wireless Access Operator's Forum**
 - CTO, Formus Communications, Inc.
 - Director, Technology Development, Teligent, Inc.
 - Senior Director, Network Architecture, WinStar

RAWCON'99 Panel Session

- **Wireless Standardization:
Players, Stakes, and Opportunities**
- Tuesday, August 3
- Panelists:
 - 802.11 Editor
 - 802.15 Chair
 - 802.16 Chair
 - ITU-R JRG 8A/9B Co-Chair
 - Chair, T1P1
 - Chair, UMTS Forum Operator's Group

RAWCON'99 Workshop

- **Wireless Personal Area Networks:
An Overview**
 - Monday, August 2
 - Organizer and Chair:
Dr. Robert F. Heile, Chair, 802.15
 - Similar to WPAN tutorial at March 802
Plenary (4 hours long)

Liaisons

- ETSI BRAN
 - Paul Khanna
- ITU-R JRG 8A-9B
(Wireless Access Systems)
 - José Costa (8A-9B Co-Chair)
 - Meeting July 12-16, Ottawa
- National Spectrum Manager's Assn.
 - Erol Yurtkuran
- ARIB
 - possible translation of Japanese docs

802.16 Issue: Meeting Finances

- IEEE Microwave Theory and Techniques Society (MTT) co-sponsors 802.16 PARs
 - Cosponsors WG too?
- MTT guaranteed hotel contract for Meeting #0
- MTT agreed to subsidize 802.16 mtgs.
- Meeting #0 was cheap (\$50 reg fee)
- Still ran \$350 surplus
- MTT agreed to hold surplus for 802.16
- We will continue this arrangement
 - Will aim for \$350 loss at next meeting

802.16 Issue: PAR Numbering

- Conventional
 - 802.16 is the Working Group
 - 802.16 is the first PAR
 - 802.16a is the second PAR
- This is confusing
 - Scope of WG exceeds that of first PAR
- Our preference
 - 802.16 is the Working Group
 - 802.16a is the first PAR
 - “a” = “air interface”
 - 802.16c is the second PAR
 - “c” = “coexistence”

802.16 Issue: ITU Relationship

- 802.16 will internationalize via ITU rather than ISO/IEC
- Primary ITU Members are national governments
- ITU has relationships with certain Standards Developing Organizations
- IEEE or 802 should be one of these
- Need to work on this

Chairman's Presentations on 802.16

- European Institute Roundtable, 5/6/99
 - Talked on “Cooperative International Wireless Standardization”
- Panelists:
 - Dr. Bernd Eylert, Chair, UMTS Forum
 - Susan Ness, Commissioner, U.S. Federal Communications Comm.
 - David Hendon, Chairman of the Board, ETSI
 - Mark MacGann, VP of Strategic Affairs, SkyBridge
 - Roger Marks, NIST
 - Lawrence Williams, VP, Teledesic
 - Paola Tonelli, Chair, Operator's Group, UMTS Forum
- help from Geoff Thompson

Chairman's Meetings on 802.16

- April 7: Dale Hatfield
 - Chief, Office of Engineering and Technology
 - U.S. Federal Communications Commission
 - In his office
- discussed BWA standardization
- open to hearing industry concerns
- FCC is intent on removing regulatory barriers, giving wireless an equal opportunity in broadband access
- confident that the FCC will not mandate BWA interoperability standards
- No need to facilitate standardization, due to 802.16

Chairman's Presentations on 802.16

- U.S. National Science Foundation
 - “Last Mile” panel, 4/8/99
 - Panel tasked to report on the “Last Mile” problem of broadband access
 - Marks submitted “Broadband Wireless Access for the First Mile” (<http://nwest.nist.gov>)

(see file sec_rpt_16.pdf)

5.44 802.3ab Summary

see file (8023ab_cover.pdf)

Thompson: 802.3ab was approved by RevCom and the Standards board at the June, 1999 meeting.

5 Should be available for sale July 24th.

5.45 JTC1/SC6/SC25 meeting summary

Carlson provides SC6 summary:

10 ISO SC6 8802-1 letter ballot issued, will close before November meeting. 8802-2 ballot revealed 3 typos, corrigenda. copies of SC6 11216 Ethernet over SDH/SONET available, sent out for comment. SC6 is forwarding to JTC1 a request for category C liaison to the LMSC.

Carlo has scheduled an SEC business meeting to discuss internationalization. Wednesday afternoon 3-4 pm

802.3 has approached SC6/WG3 with a proposal similar to Robin Trasker's

SC25 has also proposed a category C liaison to the LMSC.

5.46 JTC1/SC6/SC25 Liaison status

15 covered under item 5.45.

5.47 IEEE SA and ISTO update

Susan Tatiner

(see file tatinerfoils.pdf)

5.48 IEEE 802 Tutorials

20 Carlo reviews tutorial schedule. One tonight, one tomorrow night.

The meeting was adjourned at 12:00pm.

AGENDA & MINUTES(Unconfirmed) - IEEE 802 LMSC OPENING PLENARY MEETING

Monday, 5-July-1999- 12:00 noon

25 Queen Elizabeth, Montreal, PQ

1. MEETING CALLED TO ORDER at 12:00 noon

Chair's opening remarks

(see file carlofoils.pdf)

Jim Carlo introduces tutorials, including IEEE Patent Policy, which will be given tonight by the IEEE's IPR attorney.

30 Jim Carlo describes where patent policy information can be found.

LOCAL AND METROPOLITAN AREA NETWORKS

802.3

SUPPLEMENT

IEEE Standard for

**Carrier Sense Multiple Access
with Collision Detection
(CSMA/CD) Access Method and
Physical Layer Specifications**

**Physical Layer Parameters and
Specifications for 1000 Mb/s
Operation Over 4-Pair of
Category 5 Balanced Copper
Cabling, Type 1000BASE-T**

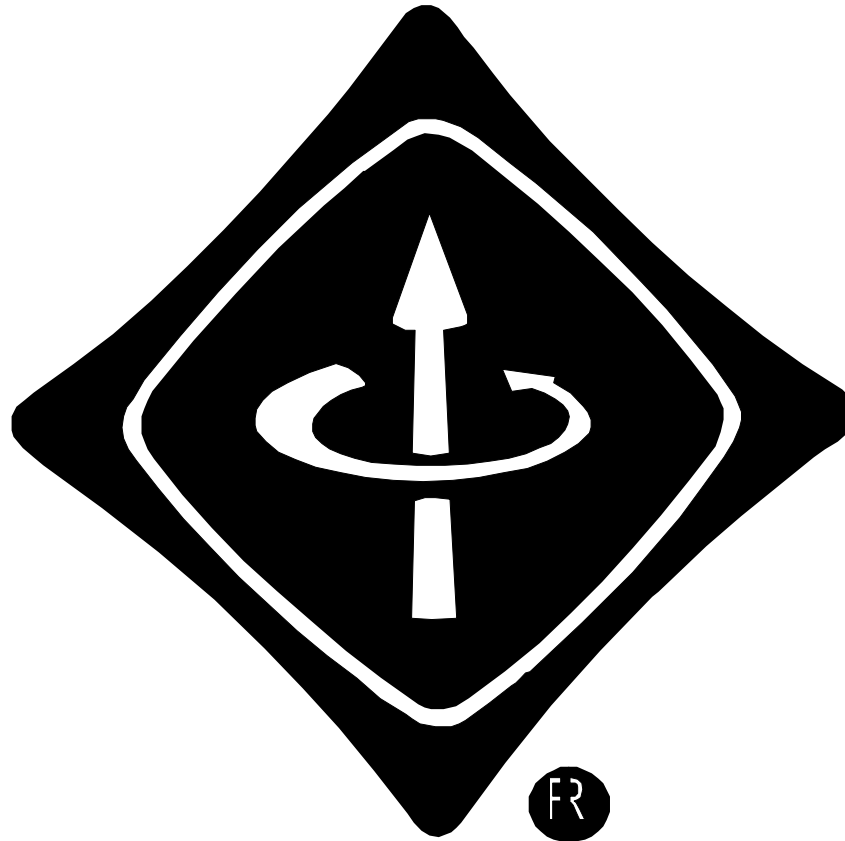


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SH94754

26 July 1999

This supplement is an approved IEEE Standard. It will be incorporated into the base standard in a future edition.



IEEE

Networking the World™

IEEE Standards Association

Overview and Update for IEEE 802 Committee

Susan Tatiner

Montreal

July 1999



Contents

- Historical Perspective
- IEEE Standards Association: Some Basics
- 1999 Strategic Initiatives
 - Globalization
 - Relationships with IEEE Societies
 - New Products and Services
 - Membership
- Future



Historical Perspective

A century+ of IEEE Standards activity

- 1890 Established the Henry-practical unit of self-induction
- 1898 First dedicated effort toward standardization of electrotechnology in US
- 1912 Institute of Radio Engineers formed its first standards committee
- 1958 Joint Standards Committee of AIEE and IRE
- 1963 Merger of AIEE and the IRE
- 1973 Establishment of the IEEE Standards Board
- 1998 IEEE Standards Association
- 1999 IEEE Industry Standards and Technology Organization



IEEE Standards Association: Some Basics

- **Created in January 1998**
- **To keep pace with the changing environment**
 - **Decentralization of the power industry**
 - **Competition in the global marketplace**
 - **Need for fast-track processes in the IT industry**
 - **Erratic and decreasing industry support**
 - **Proliferation of consortia**
 - **Rapidly emerging technologies**
- **To enable IEEE to offer standards programs beyond the legal authority of the Standards Board**
- **To have standards management elected by a constituency of active standards developers**



Key Driving Principles

- **Maintain the current consensus process as a primary means of standards development**
- **Provide alternative methods to process and disseminate specifications “just in time”**
- **Build funding mechanisms that are not totally dependent upon the sale of standards**
- **Recognize change in time to adapt to it**
- **Allow broader participation by creation of new member categories (e.g., corporation, government)**



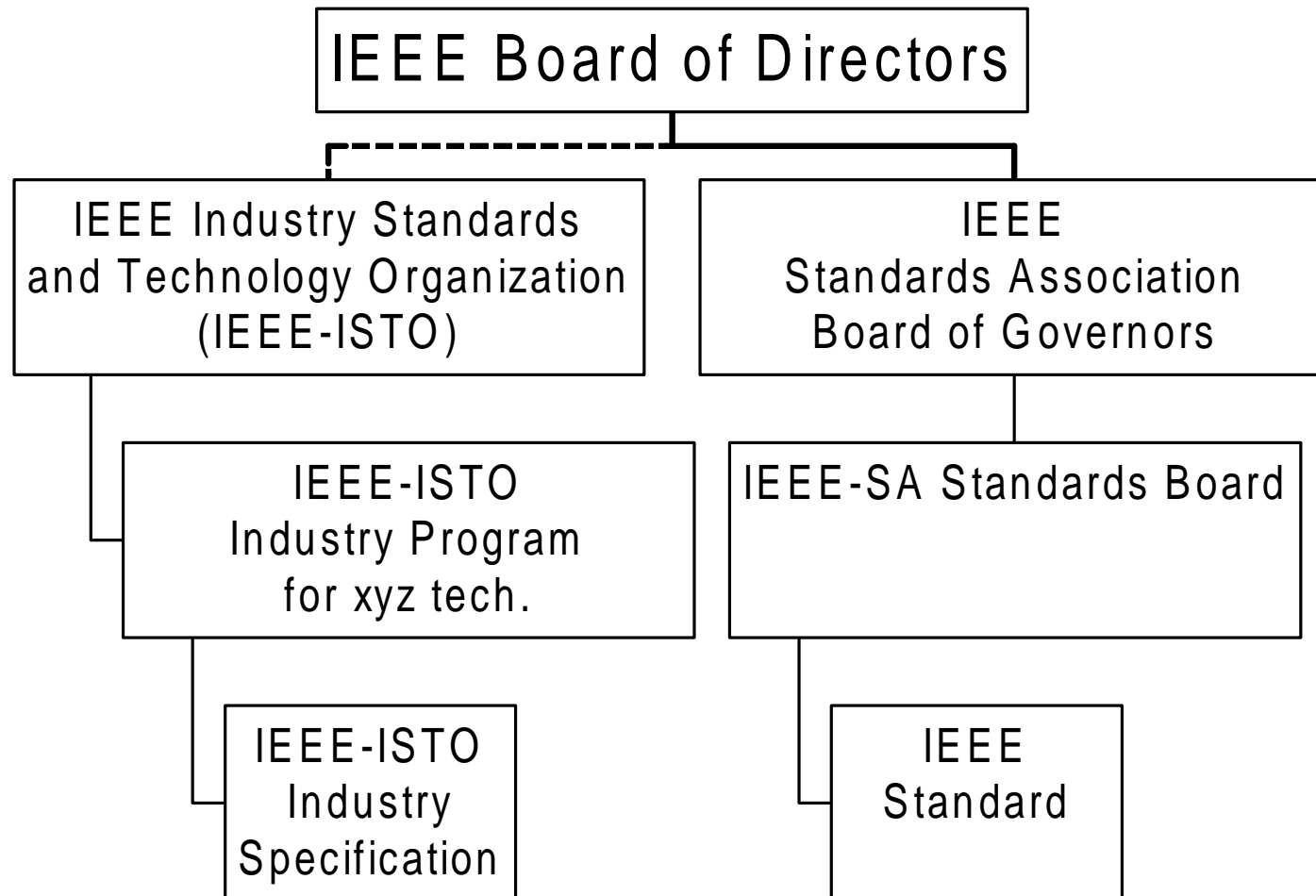
Infrastructure

- **13-member Board of Governors**
 - business strategy, finance, and policy matters
 - forward-looking and visionary
- **26-member Standards Board**
 - initiation, approval, and adjudication of the consensus process
- **A formal voting membership**
 - assure SA responsiveness to its members

🏠 ***IEEE Industry Standards and Technology Organization: an affiliated organization***



Overview of the IEEE-SA



Major SA Milestone: 1 January 1999

- **Launching of the IEEE Industry Standards and Technology Organization**
 - **complement to the IEEE-SA**
 - **extends and completes the menu of IEEE services available to industry**
 - **pre- and post-development activities**
 - **not-for-profit: 501(c)(6)**
 - **enables developers to define unique rules and procedures**



Major SA Milestone 2: January 1999

- **Entity Balloting approved**
 - **Allows IEEE-SA Corporate Members to create, develop, and ballot IEEE Standards**
 - **For now, method is by entity only (no individual IEEE-SA members can participate)**
 - **Mixed balloting proposal (both individual and entity members) to be balloted by Standards Board in mid July**



1999 Strategic Initiatives

- **Globalization**
- **Outreach to IEEE Societies**
- **Improved products & services**
- **Membership**
 - individual and corporate



Globalization

- **Mission: Proactively solicit recognition - from IEEE members and customers and from external organizations - of IEEE's value as an international standards developer**



Globalization

- **Parallel, multiple approaches**
 - Recognition of IEEE contribution by international standards organizations
 - Increased guidance to IEEE committees
 - Clarifying our affiliations and relationships with national, regional, and international organizations
 - Integrating IEEE-SA into the global fabric of IEEE
 - Other options as they emerge



Globalization: Status

- **IEEE has several formal liaison relationships with IEC committees**
- **22 IEEE standards are the official International Standard in the world AND CARRY THE IEEE LOGO**
- **6 standards have been adopted by non-US national bodies**
- **19+ committees with 20%-30% international participation**
- **20%-30% of IEC standards are based on or identical to IEEE standards**
- **ISO is working on a pilot with our EMBS standards group: goal is to improve IEEE's visibility and business advantages**
- **All research points to the need for industry-sector specific strategies**



Globalization: 1999 Actions

- **Work global fabric of IEEE**
 - **Set up two pilots for IEEE country standards activities**
- **Negotiate with ISO and IEC principals**
- **Communicate and work more closely with IEEE Societies and their committees**



Outreach to IEEE Societies

- **Mission: Encourage relationships between the IEEE Standards Association and IEEE Societies through:**
 - **proactive communications programs**
 - **the right services for the new millennium**
 - **clearly articulated benefits**



Outreach to IEEE Societies

- **Staff and volunteers attending Society and other meetings to present updates on the SA**
- **Opportunities identified to publicize SA activities**
- **Perform research to determine services needed for the future**
- **Streamline development process**
- **Educate on and promote use of ISTO as a complementary process**



New Products and Services

- **Mission: To identify long-term and short-term goals and strategies leading to the development of products and services that provide value and revenue to support the standards activity.**

New Products and Services

- **Encourage development of market-relevant standards**
- **Conduct collaborative product development with the Societies**
- **Enter into mutually beneficial agreements with International SDOs**
- **Heighten awareness of IEEE as an industry-responsive SDO**
- **Shift revenue streams from sale of standards to providing value-added products and services related to standards**



Membership

- **Mission: To identify strategic goals that support efforts to have a global, broad-based individual and corporate/entity membership in the IEEE-SA.**

Membership

- Increase awareness of the IEEE-SA
- Increase the sense of community
- Expand and retain membership

Future

- **Market-relevancy of all products and services**
- **Well-orchestrated internationalization program for all IEEE sectors**
- **An acknowledged international status**
- **A customer-driven information delivery environment that is cross-organizational**
- **Continuous processing of standards...**
- **In a streamlined environment**
- **We'd welcome your ideas!**



In conclusion...

Please give us feedback.

Susan Tatiner

Director, IEEE Standards Publishing Programs

1 732 562 3830

s.tatiner@ieee.org



IEEE802 Monday Plenary Agenda

- 1:00 Welcome and Introductions Carlo
- 1:10 New Member Introduction Frazier
- 1.15 Voting Rules and IEEE 802 Operating Rules Nikolich
- 1:20 Treasurer's Report Grow
- 1:25 Review of Monday Morning Executive Meeting Carlo
- 1:30 IEEE-SA and ISTO Update Tatiner
- 1:35 QOS EC Study Group Amer
- 1:40 IEEE Project Editors Status Report Tatiner
- 1:45 802.1 Management/VLANs Lidinsky
- 1:55 802.3 CSMA/CD Thompson
- 2:05 802.5 Token Ring Love
- 2:10 802.8 Fiber Optic TAG Benson
- 2:15 802.10 Security Alonge
- 2:20 802.11 Wireless Hayes
- 2:30 802.14 CATV Modem Russell
- 2:40 802.15 WPAN Heile
- 2:45 802.16 BBAS Marks
- 2:50 Tutorials, Meeting Arrangements Rigsbee
- 3:00 ADJOURN

<http://grouper.ieee.org/groups/802/>



Jim Carlo - Texas Instruments July-1999

Plenary

Jim Carlo - IEEE 802 Chair

- EMAIL: jcarlo@ti.com
- Phone: 214-693-1776 (Cellular)
- Fax: 214-853-5724
- Texas Instruments, Dallas, TX

- Goals for IEEE 802 -1999
 - Enable IEEE802 to develop consensus standards that benefits the World Wide Networking Society.
 - Maintain the imperative principals of due process, consensus, openness, balance and rights of appeal.
 - Electronic distribution of standards.



IEEE 802 Chair's (Jim Carlo) Principals

- IEEE 802 standards benefit our Information Society
 - Greater use of standards provides greater product deployment
 - LAN standards benefit the industry
 - What we work on has relevance to the marketplace
- IEEE 802 standardization MUST follow due process
 - All viewpoints must be heard and addressed
 - No shortcuts allowed that violate due process
 - We modify rules then change process not visa-versa
- Consortiums
 - Consortiums provide a valuable specification development process
 - Establish marketplace and create market pull
 - Work to bring consortium specs into IEEE 802 / IEEE process
- Continually seek for new areas for standardization



IEEE 802 Outlook

- Large financial impact of some decisions on specific entities
 - Choice of solutions in DSP technologies affects investor value
 - Increasing emphasis on IPR, Royalties and Legal Protection
- Competition from Consortia to develop specifications
 - Value of consensus process versus small industry leaders group
 - Consortium viewpoint is greater speed, less “small voice” interference
 - Different IPR policies
- Opposing viewpoints on what to standardize
 - New standards may disrupt established industries
 - Marketplace win with proprietary solutions versus standards
 - One solution to a given problem versus marketplace confusion
 - Role of standardization in limiting market diversity



IEEE Patent Policy

TUTORIAL TONIGHT - 6:30PM

- IEEE-SA Standards Association Bylaws (Jan 1999)
- IEEE-SA Standards Association Operations Manual (Jan 1999)
- Standards Companion
 - Patent Request and Patent Response Letters (Appendix A)
 - Other information on Patents is Out-of-date
- WG Chairs should review patent policy at each meeting
- When evaluating alternative technologies:
 - Patent letters can be requested and tabulated for each technology
 - Terms and Conditions NOT appropriate (Violates cost discussions)
 - All patent claims may not be visible at time of tabulation



Patents -IEEE-SA Standards Board Bylaws (Jan 1999)

6. Patents

IEEE standards may include the known use of patent(s), including patent applications, if there is technical justification in the opinion of the standards-developing committee and provided the IEEE receives assurance from the patent holder that it will license applicants under reasonable terms and conditions for the purpose of implementing the standard. This assurance shall be provided without coercion and prior to approval of the standard (or reaffirmation when a patent becomes known after initial approval of the standard). This assurance shall be a letter that is in the form of either

- a) A general disclaimer to the effect that the patentee will not enforce any of its present or future patent(s) whose use would be required to implement the proposed IEEE standard against any person or entity using the patent(s) to comply with the standard or
- b) A statement that a license will be made available to all applicants without compensation or under reasonable rates, with reasonable terms and conditions that are demonstrably free of any unfair discriminations.

Patents - IEEE-SA Standards Board Operations Manual (Mar 1999)

6.3 Patents

The patent policy is set forth in clause 6 of the *IEEE-SA Standards Board Bylaws*.

Patent holders shall submit letters of assurance to the IEEE Standards Department (to the attention of the Staff Administrator, Intellectual Property Rights) before the time of IEEE-SA Standards Board review for approval. The IEEE will provide contact information about the patent holder upon request.

6.3.1 Public notice

The following notice shall appear when the IEEE receives assurance from a known patent holder prior to the time of publication that a license will be made available to all applicants either without compensation or under reasonable rates, terms, and conditions that are demonstrably free of any unfair discrimination. Attention is called to the possibility that implementation of this standard may require use of subject matter covered by patent rights. By publication of this standard, no position is taken with respect to the existence or validity of any patent rights in connection therewith. The IEEE shall not be responsible for identifying patents for which a license may be required by an IEEE standard or for conducting inquiries into the legal validity or scope of those patents that are brought to its attention. A patent holder has filed a statement of assurance that it will grant licenses under these rights without compensation or under reasonable rates and nondiscriminatory, reasonable terms and conditions to all applicants desiring to obtain such licenses. The IEEE makes no representation as to the reasonableness of rates and/or terms and conditions of the license agreements offered by patent holders. Further information may be obtained from the IEEE Standards Department. If the IEEE has not received letters of assurance prior to the time of publication, the following notice shall appear: Attention is called to the possibility that implementation of this standard may require use of subject matter covered by patent rights. By publication of this standard, no position is taken with respect to the existence or validity of any patent rights in connection therewith. The IEEE shall not be responsible for identifying patents for which a license may be required by an IEEE standard or for conducting inquiries into the legal validity or scope of those patents that are brought to its attention.

6.3.2 Submittal

Through the working group, the Sponsor chair shall request that known patent holders submit a statement either that the patent does not apply to the standard or that licenses will be made available without compensation or under reasonable rates, terms, and conditions. This assurance shall be obtained without coercion and submitted to the IEEE at the earliest practical time prior to the approval of an IEEE standard. The IEEE encourages early disclosure to the working group of patent information that might be relevant to the standard. While standards may include the known use of patents if there is technical justification, the working group should not attempt to determine whether or not a patent applies. The working group shall accept the view of the patent holder.

6.3.3 Disclaimer

The IEEE shall not be responsible for identifying all patents for which a license may be required by an IEEE standard or for conducting inquiries into the legal validity or scope of those patents that are brought to its attention.



IEEE 802 ORGANIZATION

LMSC SPONSOR

CHAIR
Jim Carlo

WORKING GROUP CHAIRS

802.1
BRIDGING/ARCH
Bill Lidinsky

802.3
CSMA/CD
Geoff Thompson

Active

802.5
TOKEN RING
Bob Love

802.8
FIBER TAG
Chip Benson

802.10
SECURITY
Ken Alonge

Active

802.11
WIRELESS
Vic Hayes

802.14
CABLE-TV
Robert Russell

802.15
WPAN
Bob Heile

802.16
BBAS
Roger Marks

Hibernation

802.2
LLC
Dave Carlson

802.4
TOKEN BUS
Paul Eastman

802.6
DQDB WAN
Jim Mollenauer

802.7
BROADBAND
(802.14 Res)

802.12
DEMAND PRIORITY
Pat Thaler

802.9
ISLAN
Dhad. Vaman

EXEC OFFICERS

VICE CHAIR
Paul Nikolich

RECORDING SEC
Howard Frazier

EXECUTIVE SEC
Buzz Rigsbee

TREASURER
Bob Grow



Jim Carlo - Texas Instruments July-1999

CD ROM Handout

- CD ROM contains all PDF files for IEEE 802 standards
- Expect yearly production and handout at each plenary meeting
- Some 1998 CD ROM's had defect
- To Receive new CD ROM
 - To receive replacement, must turn in old CD ROM
 - Alternatively send bad CD ROM to Jim Carlo
 - New Working Group Voting Member at Jul1999 Plenary Meeting
- Handout will occur starting 2:00pm on Wednesday
- License: YOUR PERSONAL USE ONLY - Will initial receipt of CD
- What to do with last CD ROM? This is also licenced to reciever only and not transferrable. Keep for records or destroy.
- Exceptions: See Jim Carlo



IEEE 802 WEB PAGES

- IEEE 802 WEB Pages Now On-Line and Operational
- Responsibilities as follows:
 - Howard Frazier - Main WEB page
 - Paul Nikolich - Operating Rules and 802 Documents
 - Buzz Rigsbee - LMSC Plenary Meetings
 - 802.1 Sundar Subramaniam
 - 802.3 David Law
 - 802.5 Neil Jarvis/John Messenger
 - 802.10 Richard McAllister
 - 802.11 Vic Hayes
 - 802.14 Robert Russell
 - Denise Pribula - IEEE page pointers



IEEE 802 WG Voting Rules

5.1.3 Membership

All persons participating in the initial meeting of the Working Group become voting members of the Working Group. Thereafter, voting membership in a Working Group is established by participating in the meetings of the Working Group at two out of the last four Plenary sessions, and (optionally) a letter of intent to the Chair of the Working Group. Membership starts at the third Plenary session. One duly constituted interim Working Group or task group meeting may be substituted for the Working Group meetings at one of the two Plenary sessions (See 5.1.3.5 Meetings and Participation).

Members of the Working Group who have not achieved voting status are known as observers. Liaison members are those designated individuals who provide liaison with other working groups or standards bodies.

IEEE 802 Meeting Fees

- MAR 1999
 - Pre-Registration - \$275
 - On-Site Registration - \$300

- July 1999
 - Pre-Registration - \$250
 - On-Site Registration - \$300



- **5.3 Study Groups**
- Study groups are formed when enough interest has been identified for a particular area of study such as a new access method or modified use of an existing access method. Two types of Study Groups are specified:
 - 1. An Executive Committee Study Group (ECSG) is initiated by vote of the Executive Committee and the ECSG Chair is appointed and approved by the Executive Committee. The ECSG Chair has the same responsibilities as a Working Group Chair as specified in 5.1.4.1 but does not have Executive Committee voting rights.
 - 2. A Working Group Study Group (WGSG) is initiated by vote of the Working Group or TAG and approved by the Executive Committee. The WGSG Chair is appointed and approved by the Working Group or TAG.
- The Study Group shall have a defined task with specific output and a specific time frame established within which they are allowed to study the subject. It is expected that the work effort to develop a PAR will originate in a ECSG or WGSG. A Study Group shall report its recommendations, shall have a limited lifetime, and is chartered meeting-to-meeting. After the Study Group recommendation(s) has been accepted by the parent body, the Study Group will be disbanded no later than the end of the next Plenary Session.
- The decision of whether to utilize an existing Working Group or TAG, or to establish a new Working Group or TAG to carry out work items recommended by a Working Group shall be made by the Executive Committee with due consideration of advice from the Study Group.

1:10 New member introduction. Howard Frazier, covers org chart, CD ROM distribution, web page

1:15 Voting rules and operating rules. Paul Nikolich reviews voting rules, and tells where to find operating rules

1:20 Treasurer's report. Robert Grow presents report from Austin meeting, shows change of -\$1,554 in operating reserve. Encourages people to pre-register. Reviews changes to pre-registration procedure.

5 (see file montreasrep.pdf)

1:25 Review of Monday morning executive committee meeting. Jim Carlo reviews actions from Monday SEC meeting, including sponsor balloting, use of wireless network. Asks for a moment of silence in memory of Valerie Zelenty.

1:30 IEEE-SA and ISTO Update. Susan Tatiner - Publishing Director, IEEE Standards. Presents IEEE Standards Association milestones and strategic initiatives for 1999.

10 1:35 QoS EC Study Group. Khaled Amer states that reflector and web site are being set up at the University of California - Riverside. New reflector and web site information will be posted to the stds-802-qos-fc reflector.

1:40 IEEE Project Editor's Status Report. Susan Tatiner. 802.3ab-1999 will be published this month.

1:45 802.1 Management/VLANs Bill Lidinsky reviews status of 802.1 projects

Plaques presented to Bill Lidinsky, Tony Jeffree, Mick Seaman for 802.1Q

15 (see file 802_1_mon_plen_rep.pdf)

1:55 802.3 CSMA/CD Geoff Thompson reviews status of 802.3 projects

(see file 802_3_mon_plen_rep.pdf)

Major Activities:

802.3ab/1000BASE-T approved by Stds Board 6/25/99. draft is at printer

20 802.3ad/Link Aggregation expected to go to WG ballot this week

802.3 HSSG (10 Gigabit Ethernet) working on objectives, start PAR work

Call for Interest - DTE power via MDI

Call for Interest Gigabit Ethernet over cat 6 UTP

Liaison reports

25 Contact information

2:05 802.5 Token Ring Bob Love reviews status of 802.5 projects

(see file 802_5_mon_plen_rep.pdf)

2:10 802.8 FOTAG Chip Benson reports on status of 802.8

30 We have formulated a response to each comment on the Recommended Practice for Fiber Optic Local and Metropolitan Area Networks" sponsor ballot and have drafted letters to the three negative voters.

One negative comment was withdrawn at the March Plenary.

**IEEE Project 802
Statement of Operations
March 1999 Meeting**

open	6 Mar 1999 Operating Reserve	49,480	
Mar 1999 Meeting Income:		Actual	Budget
187 Registrations@	\$300	56,100	
228 Registrations@	\$275	62,700	
0 Registrations@	\$100	0	
Subtotal		118,800	118,800
Deadbeat Registrations			97,750
A/G Copy Comissions		0	
Bank Interest		263	
Copying Income		0	
Other		0	
plus	TOTAL Income	119,063	97,750
Mar 1999 Meeting Expenses:		Actual	Budget
Audio Visual Rentals		4,208	3,000
Bank Charges		1	
CCI Mar 99 Meeting Administration		36,302	27,200 *
Copying		4,819	7,500
Credit Card Discounts		3,383	2,786 *
International Program Fee		37,400	30,600 *
Phone & Electrical		822	500
Refreshments		15,814	12,000
Shipping		2,248	2,500
Social		9,596	8,500
Supplies		-----	0
Other		1,100	0
minus	TOTAL Meeting Expense	115,693	94,586
minus	Equipment Expense	4,924	5,000
equals	4 July 1999 Operating Reserve	47,926	
Net Change in Operating Reserve		(1,554)	

* Actual charges are based on registration, budget is based on registration forecast.

802.1

Areas of Activity

Internetworking, architecture, network management, ...

Current Activities

802: Overview and Architecture (revision)

In sponsor ballot

802.1r GPRP - GARP Proprietary (Attribute)

Registration Protocol

Balloted in 802.1 prior to this meeting

Comment will be reviewed this week

802.1s - Multiple Spanning Trees

Supplement to 802.1Q

802.1t - 802.1D maintenance

In progress

802.1

Current Activities (continued)

PAR 802.1u - 802.1Q maintenance

PAR 802.1v - VLAN Classification by Protocol and Port?

Approved by NESCOM at June 99 meeting

Supplement to 802.1Q

PAR 802.1w - Rapid Reconfiguration

Approved by NESCOM at June 99 meeting

Supplement to 802.1D

PAR 802.1x - Port-based Network Access Control

Circulated to SEC over a month ago

Will likely ask to go to IEEE for PAR approval at this meeting

Interim meeting in early June

802.1

Other

Liaison to other standards organizations

e.g., Positions on SC6 agenda items
802.15 liaison

Other issues broadly affecting all of 802

e.g., Positions on other 802 working group items

Technical Plenary - Wednesday mornings

Held on an as needed basis

So far no items have been scheduled for this meeting

802.1

This week

Full 802.1 Working Group plenary session

Mon: 3:00pm - 5:30pm

Thursday: 1pm - 5pm

802.1 Task Group and editing sessions

Tuesday: all day;

Wed: afternoon;

Thursday: morning

Agendas defined this afternoon in 802.1 plenary

802.1 Technical Plenary??

Wednesday morning

802.3 CSMA/CD Working Group Status

Major Activities:

**802.3ab/1000BASE-T APPROVED by Stds Board,
draft is a printer**

802.3ad/Link Aggregation

Expected to go to WG Ballot this week

802.3 HSSG (10 Gigabit Ethernet)

Working on objectives, Start PAR work

Call for Interest DTE Power via MDI

Call for Interest Gigabit Ethernet over Cat 6 UTP

Liaison reports: FO-2.2, TR-41, TR-42, SC25, SC6

802.3 CSMA/CD Working Group Officers

802.3 Chair: Geoff Thompson

(Geoff_Thompson@baynetworks.com)

802.3 Vice Chair: David Law (davel@pdd.3Com.com)

802.3 Secretary: Bob Grow (bob@xInt.com)

802.3 ab, 1000BASE-T: George Eisler

(geisler@aol.com)

802.3ad, Link Aggregation: Steve Haddock

(shaddock@extremenetworks.com)

10 Gigabit Ethernet: Jonathan Thatcher

(jonathan@picolight.com)

Call For Interest contacts:

DTE Power via MDI: David Law (davel@pdd.3Com.com)

Gigabit Ethernet over Cat 6: Terry Cobb

802.3 CSMA/CD Web site

Information is always available on our web site

<http://grouper.ieee.org/groups/802/3/index.html>

**WE WILL MEET IN THIS ROOM AFTER THE
PLENARY
START at 3:30 PM**

802.5: Token Ring Working Group

- This week's Meetings to be held in **Gatineau** starting at 3:15pm today

This Week:

- High Speed Token Ring (HSTR)
 - 802.5t (100 Mbit/s HSTR)
 - IEEE Standards Board Approved pending the closure of Patent Issues
 - 802.5v (1000 Mbit/s HSTR)
 - Working Group Recirculation Completed.
Resolution of comments against Draft 1.1
- Token Ring maintenance
 - 802.5w (Errata) - Ready for LMSC Ballot
- Token Ring Link Aggregation -802.5z
 - Working towards initial draft

Last Interim Meeting

- Copenhagen Meeting Hosted by Olicom
 - May 10 - 12th
 - Gigabit Token Ring
 - Link Aggregation

Officers

- Chair
 - Robert D. Love (rdlove@us.ibm.com)
- Vice-chair
 - John Messenger (John.Messenger@8025.org)

E-Mail and WWW

- 802.5 E-Mail Reflector
 - *stds-802-5@mail.ieee.org* for messages
 - *majordomo@majordomo.ieee.org* for subscription
 - *subscribe stds-802-5 <your e-mail address>*
 - *unsubscribe stds-802-5 <your e-mail address>*
- 802.5 Web Site
 - *http://grouper.ieee.org/groups/802/5/*
which links to
 - *http://www.8025.org/*

Primary tasks this week:

- a) Approve comment responses
- b) approve letters to negative voters
- c) authorize recirculation ballot

5 Meetings start 1:00 pm Wednesday in Saquenay next to registration. Schedule depends on 802.3 HSSG meetings

2:15 802.10 Security. No report from Ken Alonge.

2:20 802.11 Wireless LAN Vic Hayes presents current status of 802.11 projects

(Vic's .ppt file was not in a readable format)

2:30 802.14 CableTV Robert Russel reports on current status of 802.14 projects

10 (Need file from Robert Russell)

2:40 802.15 Bob Heile reports on the status of projects in 802.15

(see file 802_15_mon_plen_rep.pdf)

Thanks Vic Hayes and 802.11 for all of their efforts to get the 802.15 WG started up.

2:45 802.16 BWA Roger Marks reports on the status of projects in 802.16

15 (see file 802_16_mon_plen_rep.pdf)

2.50 Meeting Arrangements Buzz Rigsbee

Describes tutorial agenda Monday night regarding patent issues and IPR. Tuesday night concerning multi-level analog signaling (MAS) techniques for 10 Gigabit Ethernet by Rich Taborek and Bob Dahlgren from Transcendata Corp.

Wednesday night social will have a "little different" menu from what we have had before. Bring your appetite.

20 Reviews schedule for future meetings. Going to Hyatt Regency Kauai in November 8-12.

Meeting adjourned at 2:30 pm

Respectfully Submitted,
Howard M. Frazier, Jr.
Recording Secretary

25

1st Session of meetings of the IEEE P802.15 Working Group for Wireless Personal Area Networks

July 5-9, 1999
Queen Elizabeth Hotel
900 Rene-Levesque Blvd. West
Montreal, PQ H3B 4A5 CANADA

Summary of WG Meetings

- Weekly Telecons for the Advisory Committee
- Ad Hoc WGAC Meeting in Chiba, Japan (with 802.11), May 1999
 - Finalized draft of 802.15 rules and document structure, reviewed Marcom activities, set liaison agenda, established meeting schedule and proposed project timeline.
- Ad Hoc WGAC Meeting in London,UK, June 1999
 - Reviewed gameplan for July plenary, established meeting objectives for joint session with Bluetooth, finalized Call for Proposal
- Joint Meeting with Bluetooth in London, UK, June 1999
 - Review standards process and agree on a proposed working relationship/timeline

Overall Objectives of the Meeting

- Formalize Working Group Leadership and Structure
- Organize committees for initial drafts

Daily Objectives for July Plenary

- Monday- set the stage, review the gameplan for the week, point attendees to the web or flash card for copies of draft rules and other documents for review ahead of time.
- Tuesday- detailed presentations on WG objectives, proposed operating rules and liaison activities
- Wednesday- Review project action plan and call for proposals, joint meeting with .11, review draft standard outline, organize committees for first draft, review BT spec
- Thursday- Begin formal voting on Officers and rules, hear submissions, if any, in response to the CFP.

Kick-off Process

- To obtain voting rights at the Thursday morning session of this meeting, you must attend at least 5 of the six sessions Monday, Tuesday, and Wednesday and the session on Thursday morning.
- If you are planning on attending at least 75% of the sessions and becoming a voting member, please declare it during sign-in on Monday or Tuesday morning. You will be eligible to receive the Standards CD on Wednesday after 2pm.
- Formal voting will begin on Thursday morning. At sign-in you will receive a voting token.

Archive, Mailing List, URLs

- Archives
 - <ftp://ftp.flexipc.com/wearablesgroup/>
 - <http://grouper.ieee.org/groups/802/11/index.html>
- Mailing List
 - stds-802-wpan@majordomo.ieee.org
- Bluetooth Special Interest Group
 - <http://www.bluetooth.com/>
- Home RF Working Group
 - <http://www.homerf.org/>

To add your name to IEEE mailing list please send an e-mail to Ian Gifford giffordi@amp.com

IEEE 802.16
Working Group on
Broadband Wireless Access
(BWA)

SEC Report

July 5, 1999

Montreal, Quebec, Canada

Roger B. Marks

BWA Industry Issues

- Major changes since March
- Important companies changed hands
- Big interest by financial community
- Still no “private” competition for 802.16
- We are “wanted”
 - Two trade associations want to be associated with us
 - Commercial conferences want us to co-locate meetings
 - Many requests to give talks

Followup to March Meeting: PAR

- 54 people at second (and final) Study Group Meeting in Austin (no deadbeats)
- Submitted Interoperability PAR
 - Approved by 802 (99/03/11)
 - Approved by IEEE (99/03/18)
 - Standard due to RevCom on 2001/01/31

Followup to March Meeting: WG

- Working Group 802.16 created 99/03/11
- Interim Chair thru 7/9/99: Roger Marks
 - Submitted required employer letter
- Press Release requested by SEC
 - Issued through IEEE Standards
 - Much other publicity
 - inc. “802 Perspectives” in *IEEE Network*
 - 4 IEEE MTT Distinguished Lectures
- SEC requested charter for 802.16
 - On agenda for this week

802 Web Site

- Subset of 802 Site at IEEE
- Includes:
 - BWA Study Group, Final Report
 - Detailed meeting info (old and upcoming)
 - Document Submission Template
 - Task Group Areas
 - Call for Contributions; Contribution Index
 - Liaison Areas
 - ...
- Password-protected directory available
 - Not currently used

802.16 Email Reflector

- For 802.16 Official Business
- Not confidential
 - Open submission policy
 - Open subscription policy
 - Publicly-available archives on web site
- Asked IEEE to turn off “who”
 - No reply
- 101 messages so far

Contribution-Driven Process

- Each TG issues “Call for Contributions”
 - Specific issues for next meeting
 - Includes deadlines
 - Widely publicized (inc. outside the WG)
- Since March Plenary:
 - Sys Req: 24 contributions
 - Editor posted draft Sys Req document
 - Coexistence: 10 contributions
 - PHY: 1 contribution (outline)
 - MAC: 1 contribution (1 review, 1 novel)

802.16 Meeting #0

- Boulder, May 10-12
- 55 people
- Not the “first Working Group Meeting”
- Meeting of 2 Task Groups
 - Coexistence
 - Wrote PAR for SEC approval this week
 - System Requirements
 - Worked on document
 - To define requirements for MAC & PHY
- Voted (tentatively) for open policy

802.16 Meeting #1 - July 6-8

- **Registration as of 10 am Monday:**
 - 104 primary
 - 6 secondary
 - 7 tertiary

802.16 Meeting #1 - July 6-8

- Detailed agenda & voting rules distributed
- “Voting Rights”: attend 5/6 meetings (>75%)
- Opening Plenary Tuesday (no voting)
- Closing Plenary Thursday
 - Voting: Chair Election; approve coexistence
PAR; Rules; Sys Req Doc?, etc.
- Task Groups
 - System Requirements & Coexistence
 - PHY & MAC: getting started
- CD-ROM: how to distribute?
- Leadership Meeting Monday

802.16 Meeting #2 - August 5-6

- Denver, Colorado
- Finish the System Requirements Document?
- Begin MAC and PHY seriously
- After 1999 IEEE Radio and Wireless Conference (RAWCON'99)

IEEE RAWCON'99

- Denver, Colorado, August 1-4
- Roger Marks, General Chair
- 75 Technical Talks
- Panels, including:
- **Broadband Wireless Access Operator's Forum**
 - CTO, Formus Communications, Inc.
 - Director, Technology Development, Teligent, Inc.
 - Senior Director, Network Architecture, WinStar

RAWCON'99 Panel Session

- **Wireless Standardization:
Players, Stakes, and Opportunities**
- Tuesday, August 3
- Panelists:
 - 802.11 Editor
 - 802.15 Chair
 - 802.16 Chair
 - ITU-R JRG 8A/9B Co-Chair
 - Chair, T1P1
 - Chair, UMTS Forum Operator's Group

RAWCON'99 Workshop

- **Wireless Personal Area Networks:
An Overview**
 - Monday, August 2
 - Organizer and Chair:
Dr. Robert F. Heile, Chair, 802.15
 - Similar to WPAN tutorial at March 802
Plenary (4 hours long)

Liaisons

- ETSI BRAN
 - Paul Khanna
- ITU-R JRG 8A-9B
(Wireless Access Systems)
 - José Costa (8A-9B Co-Chair)
 - Meeting July 12-16, Ottawa
- National Spectrum Manager's Assn.
 - Erol Yurtkuran
- ARIB
 - possible translation of Japanese docs

802.16 Issue: Meeting Finances

- IEEE Microwave Theory and Techniques Society (MTT) co-sponsors 802.16 PARs
 - Cosponsors WG too?
- MTT guaranteed hotel contract for Meeting #0
- MTT agreed to subsidize 802.16 mtgs.
- Meeting #0 was cheap (\$50 reg fee)
- Still ran \$350 surplus
- MTT agreed to hold surplus for 802.16
- We will continue this arrangement
 - Will aim for \$350 loss at next meeting

802.16 Issue: PAR Numbering

- Conventional
 - 802.16 is the Working Group
 - 802.16 is the first PAR
 - 802.16a is the second PAR
- This is confusing
 - Scope of WG exceeds that of first PAR
- Our preference
 - 802.16 is the Working Group
 - 802.16a is the first PAR
 - “a” = “air interface”
 - 802.16c is the second PAR
 - “c” = “coexistence”

802.16 Issue: ITU Relationship

- 802.16 will internationalize via ITU rather than ISO/IEC
- Primary ITU Members are national governments
- ITU has relationships with certain Standards Developing Organizations
- IEEE or 802 should be one of these
- Need to work on this

Chairman's Presentations on 802.16

- European Institute Roundtable, 5/6/99
 - Talked on “Cooperative International Wireless Standardization”
- Panelists:
 - Dr. Bernd Eylert, Chair, UMTS Forum
 - Susan Ness, Commissioner, U.S. Federal Communications Comm.
 - David Hendon, Chairman of the Board, ETSI
 - Mark MacGann, VP of Strategic Affairs, SkyBridge
 - Roger Marks, NIST
 - Lawrence Williams, VP, Teledesic
 - Paola Tonelli, Chair, Operator's Group, UMTS Forum
- help from Geoff Thompson

Chairman's Meetings on 802.16

- April 7: Dale Hatfield
 - Chief, Office of Engineering and Technology
 - U.S. Federal Communications Commission
 - In his office
- discussed BWA standardization
- open to hearing industry concerns
- FCC is intent on removing regulatory barriers, giving wireless an equal opportunity in broadband access
- confident that the FCC will not mandate BWA interoperability standards
- No need to facilitate standardization, due to 802.16

Chairman's Presentations on 802.16

- U.S. National Science Foundation
 - “Last Mile” panel, 4/8/99
 - Panel tasked to report on the “Last Mile” problem of broadband access
 - Marks submitted “Broadband Wireless Access for the First Mile” (<http://nwest.nist.gov>)