



IEEE 802.3

Backplane Ethernet Study Group

Agenda and General Information

Vancouver, BC

January 12, 2004



Agenda

- Welcome and Introductions
- Appoint/Volunteer Recording Secretary
- Goals for this Meeting
- Reflector and Web
- Ground Rules
- IEEE
 - Structure
 - Bylaws and Rules
 - Call for Patents
 - IEEE Standards Process
- Presentations
- Future Meetings
- Motion Madness



Goals for this Meeting

- Hear presentations concerning:
 - Scope of a Backplane Ethernet Project
 - Justification in terms of the 5 Criteria
 - Goals and Objectives for the Project

- Build consensus on:
 - Project Authorization Request (PAR) Scope and Purpose
 - Responses to the 5 Criteria
 - Backplane Ethernet Objectives



Reflector and Web

- To subscribe to the Backplane Ethernet Study Group reflector send an email to:

majordomo@ieee.org

with the following in the body of the message:

[subscribe stds-802-3-blade <your email address>](#)

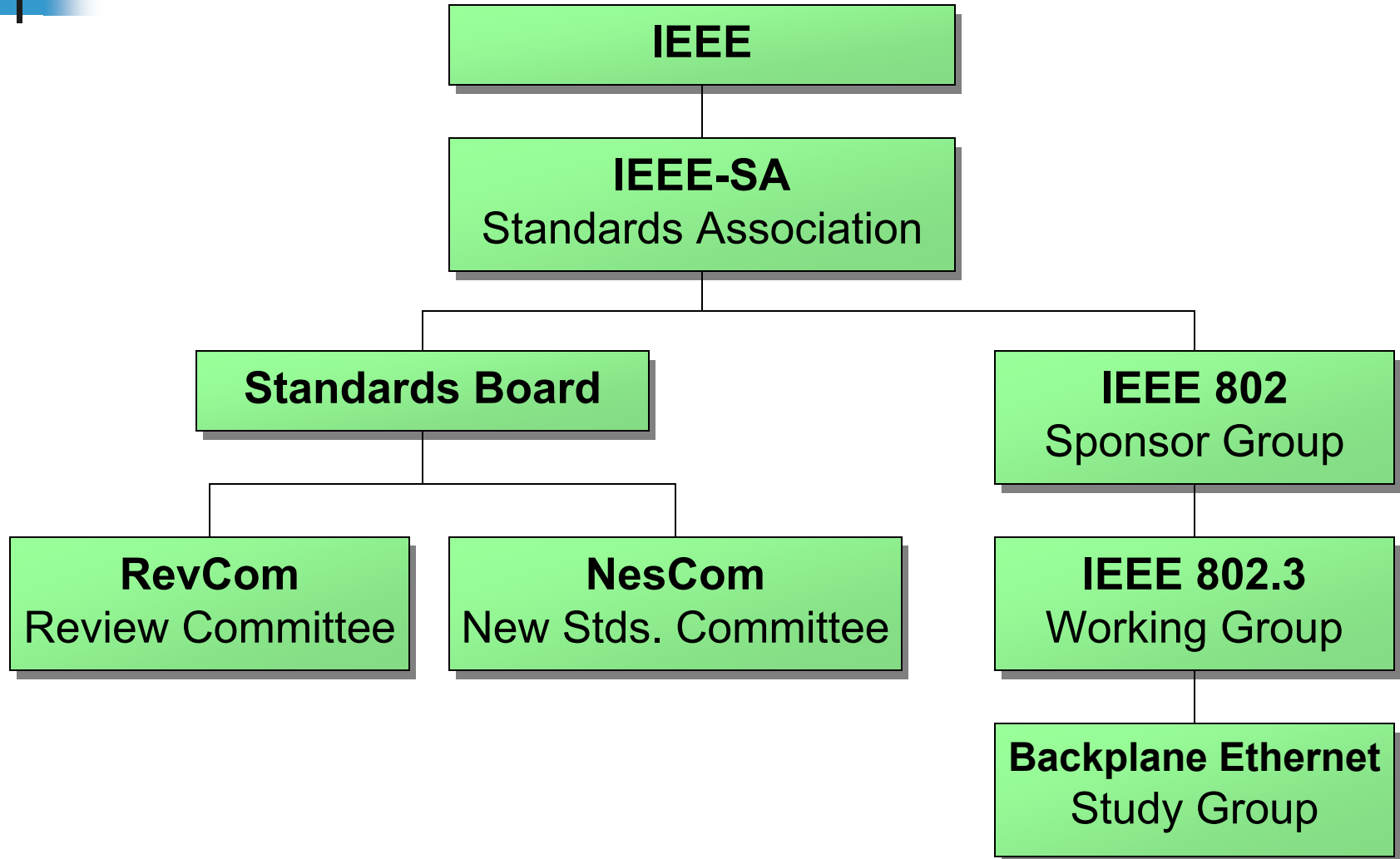
- Ethernet Backplane Study Group web page URL:
<http://www.ieee802.org/3/bladesg/>



Ground Rules

- 802.3 Rules apply
 - Foundation based upon Robert's Rules of Order
- Anyone in the room may speak
- Anyone in the room may vote
- **RESPECT**... give it, get it
- NO product pitches
- NO corporate pitches
- NO prices!!!
 - This includes costs, ASPs, etc. no matter what the currency
- NO restrictive notices

IEEE Structure





Bylaws and Rules

- Bylaws of the IEEE Standards Association (IEEE-SA):
<http://standards.ieee.org/sa/sa-bylaws.pdf>
- Bylaws of the IEEE-SA Standards Board:
<http://standards.ieee.org/guides/bylaws/sb-bylaws.pdf>
- IEEE LAN/MAN Standards Committee (LMSC)
Operating Rules:
<http://www.ieee802.org/rules.pdf>
- IEEE 802.3 Working Group Operating Rules:
<http://www.ieee802.org/3/rules/>



IEEE-SA Standards Board Bylaws on Patents in Standards

6. Patents

IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of 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 without compensation or under reasonable rates, with reasonable terms and conditions that are demonstrably free of any unfair discrimination

This assurance shall apply, at a minimum, from the date of the standard's approval to the date of the standard's withdrawal and is irrevocable during that period.

Approved by IEEE-SA Standards Board – December 2002



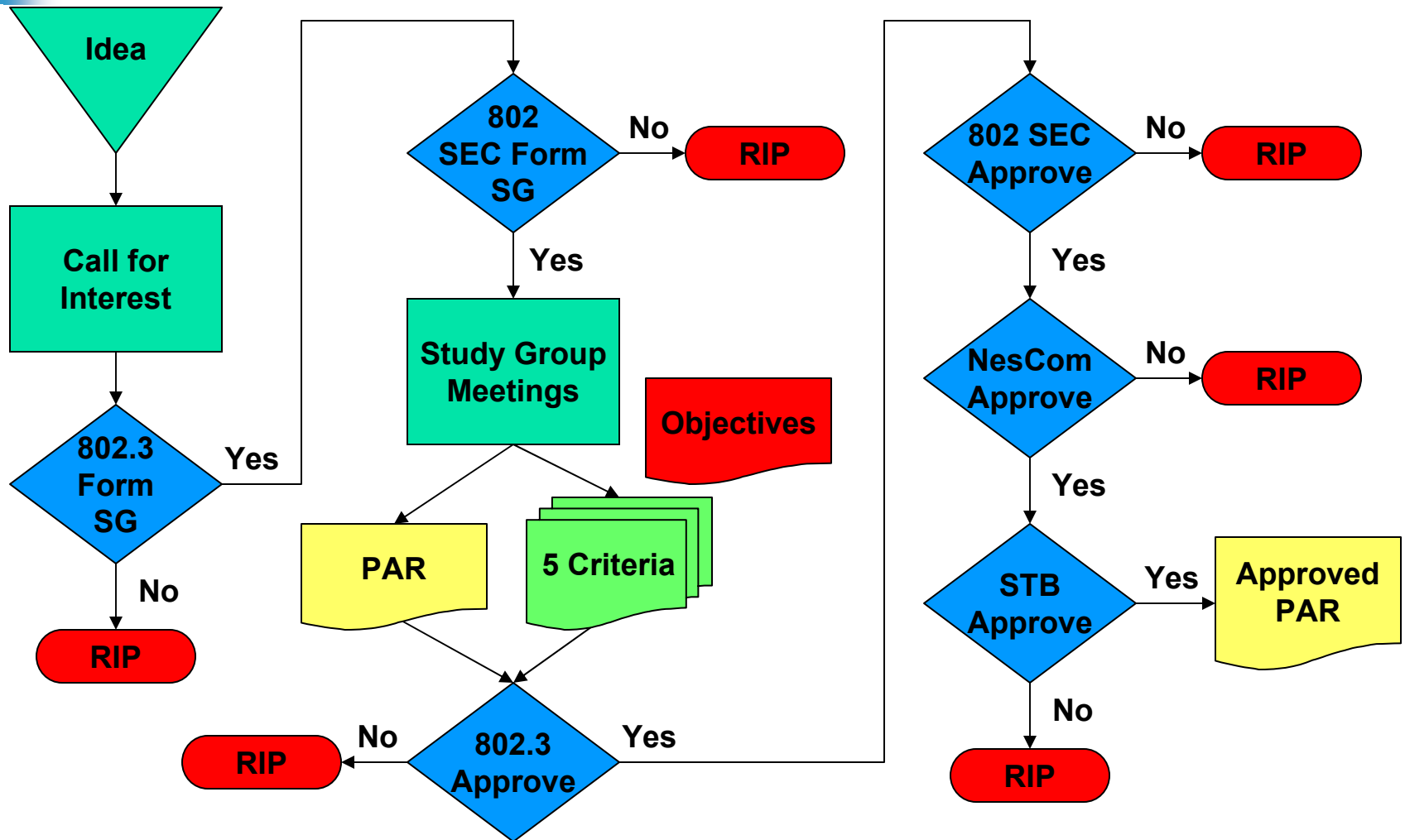
Inappropriate Topics for IEEE WG Meetings

- Don't discuss licensing terms or conditions
- Don't discuss product pricing, territorial restrictions or market share
- Don't discuss ongoing litigation or threatened litigation
- Don't be silent if inappropriate topics are discussed... do formally object.

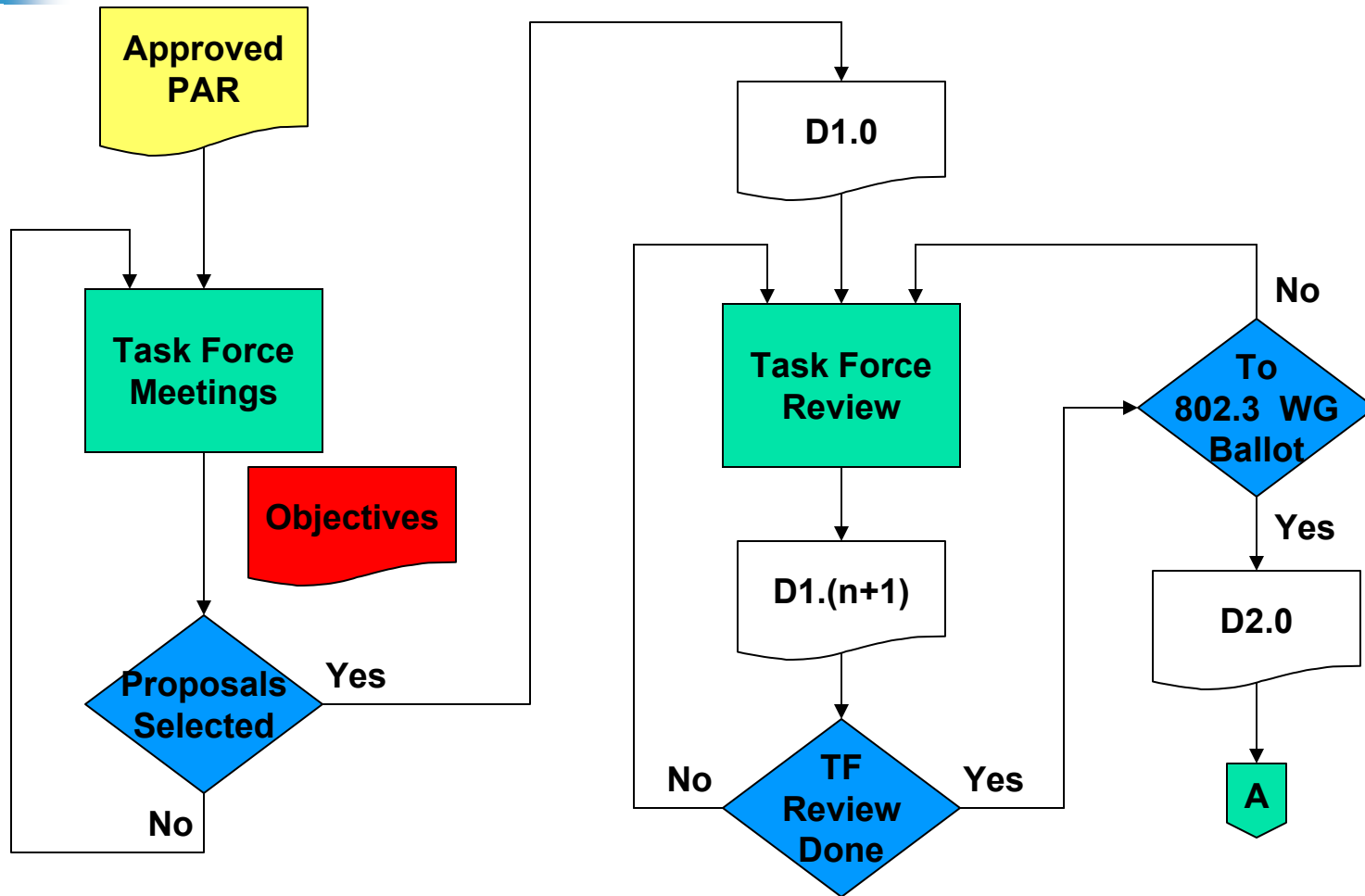
If you have questions, contact the IEEE Patent Committee Administrator at patcom@ieee.org

Approved by IEEE-SA Standards Board – December 2002

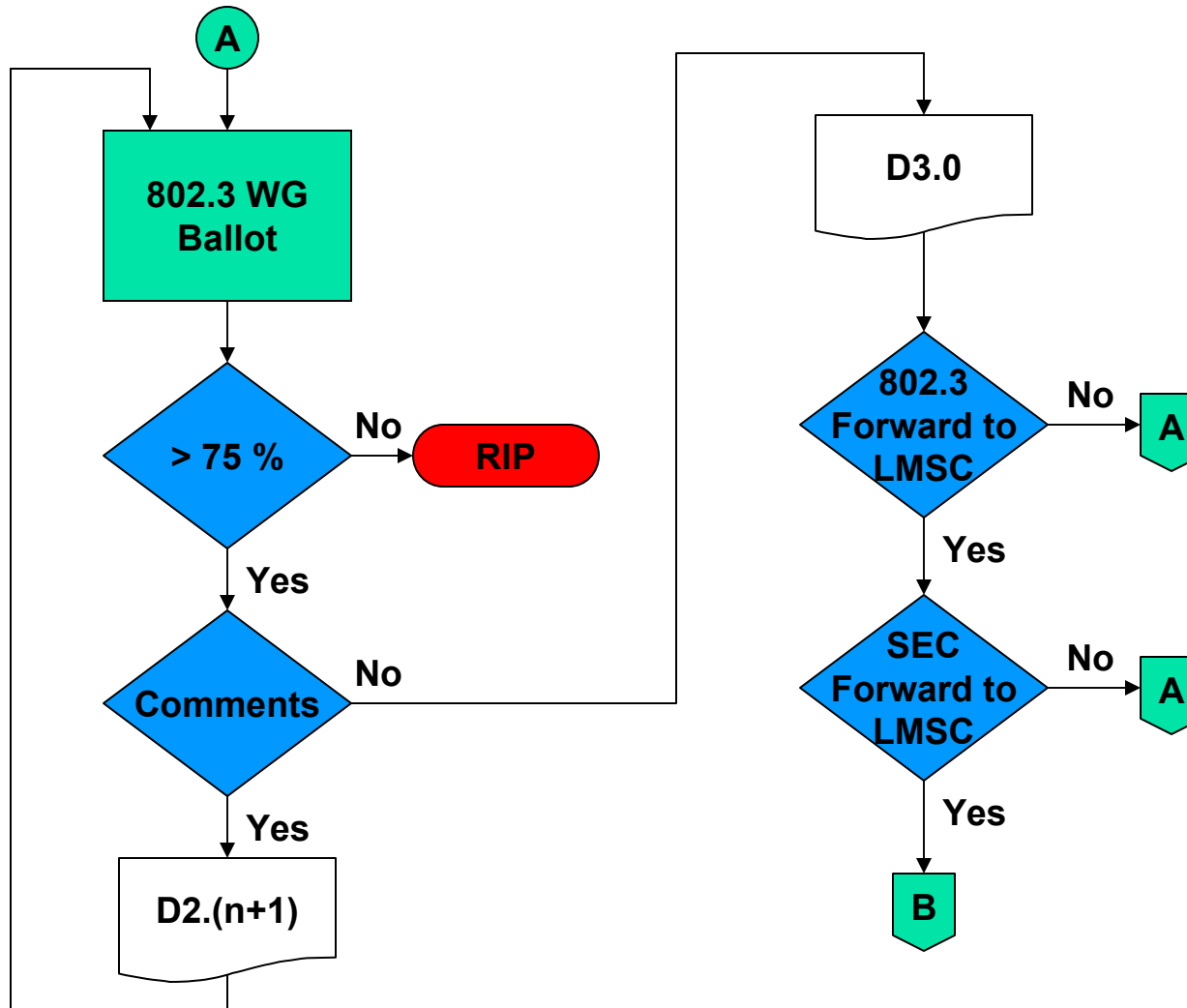
IEEE Standards Process



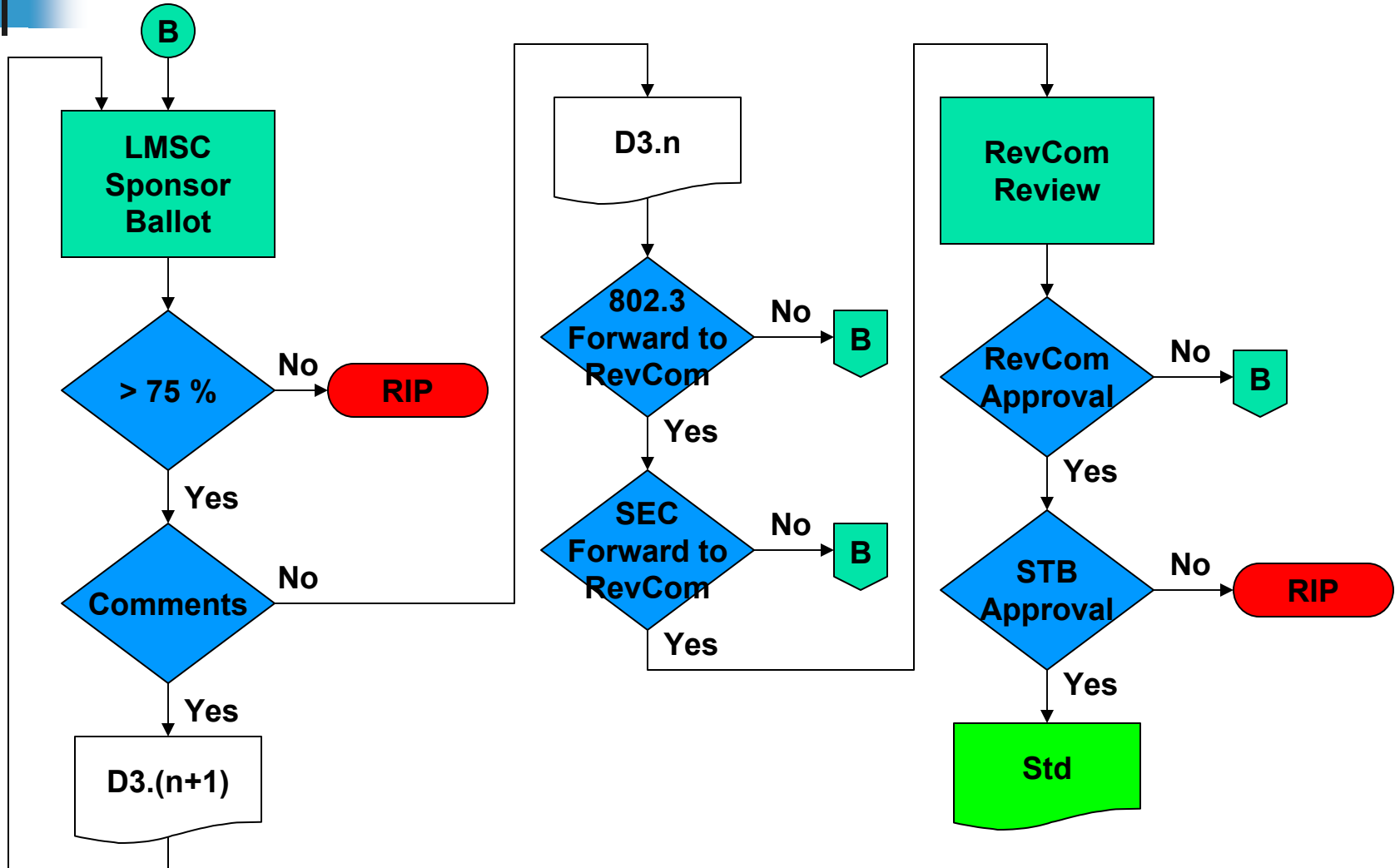
IEEE Standards Process (cont.)



IEEE Standards Process (cont.)



IEEE Standards Process (cont.)





Study Group

- Function is to draft a PAR and 5 Criteria
- Gain approval at WG 802.3, 802 SEC, IEEE NesCom and IEEE Stds. Board
- SG only exists for 6 months
 - Extensions can be requested... voted on by 802.3, ratified by SEC
- Development of Objectives helps set the goals for the Task Force
- Developing consensus
 - Education helps build consensus
 - Consensus (> 75%) required to move forward



PAR

- Title
 - What are we calling this
- Scope
 - The focus: Ethernet as a Fabric
- Purpose
 - Why do we want to do this



5 Criteria

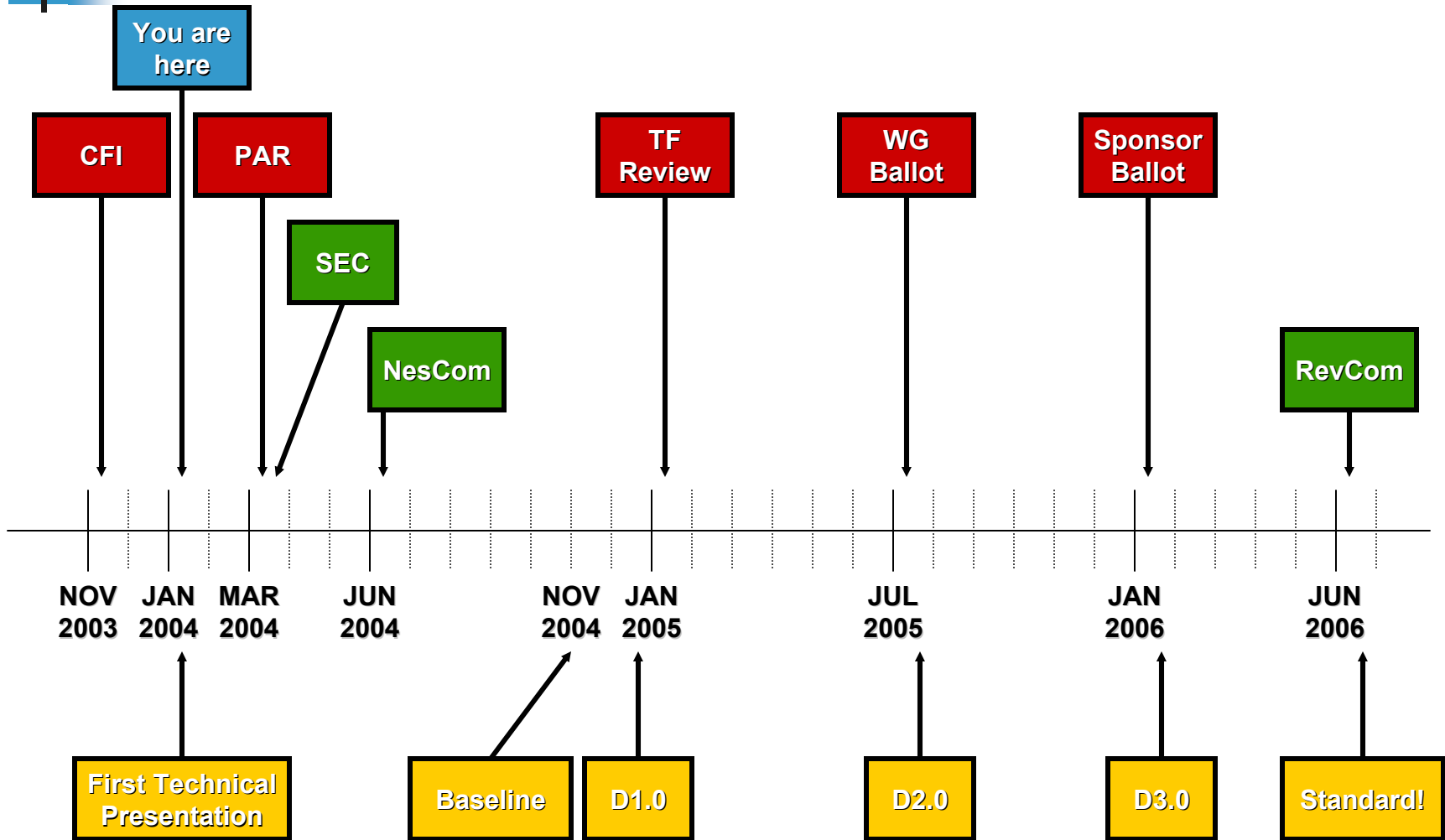
- Broad Market Potential
 - Broad set(s) of applications
 - Multiple vendors, multiple users
 - Balanced cost (LAN vs. attached stations)
- Compatibility with IEEE Std. 802.3
 - Conformance with CSMA/CD MAC, PLS
 - Conformance with 802.2
 - Conformance with 802 Functional Requirements
- Distinct Identity
 - Substantially different from other 802.3 specifications
 - One unique solution for problem
 - Easy for document reader to select relevant spec



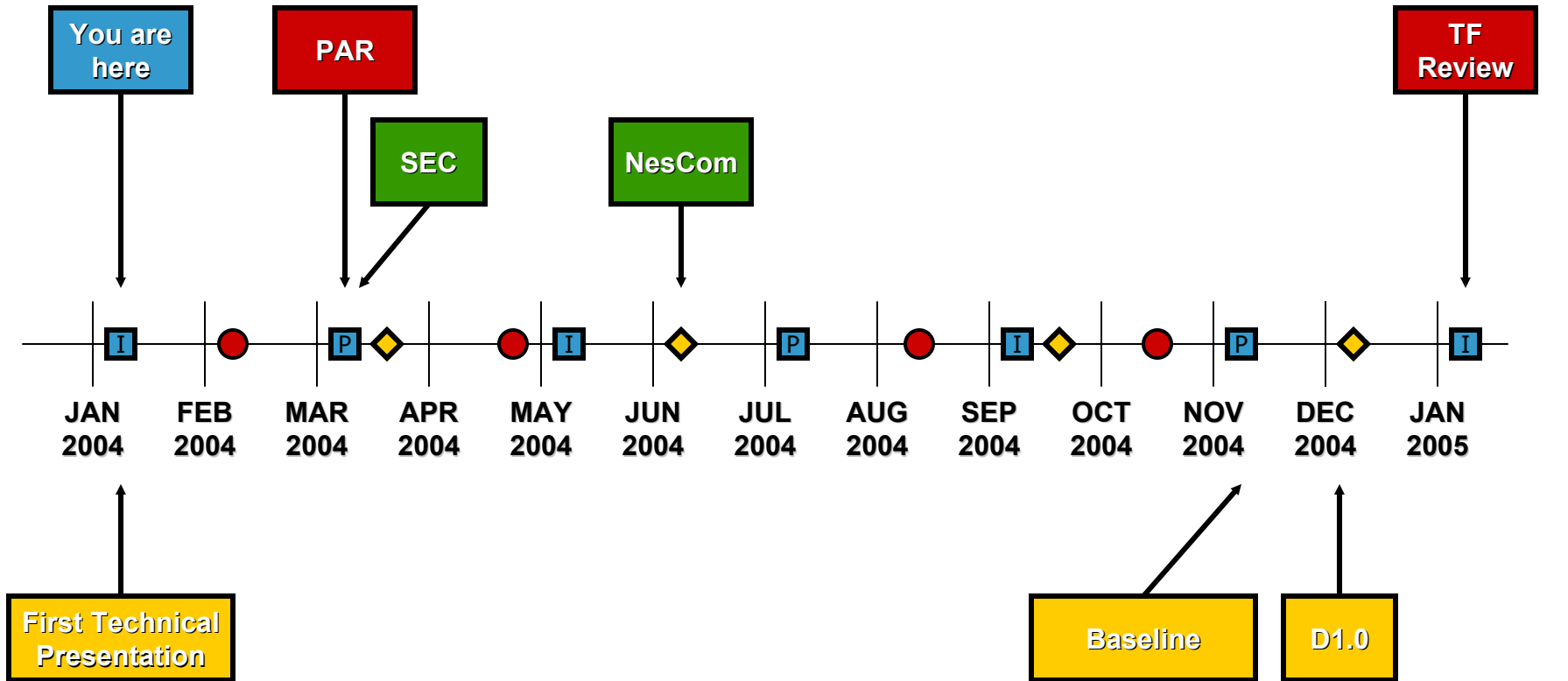
5 Criteria (cont.)

- Technical Feasibility
 - Demonstrated system feasibility
 - Proven technology, reasonable testing
 - Confidence in reliability
- Economic Feasibility
 - Cost factors known, reliable data
 - Reasonable cost for performance
 - Total installation costs considered

Possible Backplane Ethernet Timeline



Timeline Detail



- PAR Submission Deadline
- ◆ Standards Board Meeting
- Meeting (P = Plenary, I = Interim)



Presentations

- Mike Lerer, “The OIF CEI Project”
- Mike Lerer, “Suggestions PAR & Criteria for Backplane Ethernet Study Group”
- Gopal Hegde, “Modular Platforms -- Market demand & next generation platform and customer requirements”
- Yong Kim, “Objectives, goals, non-goals, and considerations”
- Ali Ghiasi, “What we learned from XAUI and how to apply it to Ethernet in the Backplane”
- John D’Ambrosia, “Channel Performance Insights”
- Bill Hoppin, “Technical Feasibility 10GE serial per backplane pair across 40” average grade FR4 and two connectors”
- Tom Palkert, “UXPi Technical Specification Overview”
- Brian Seemann, “Demonstration of 10Gbps Backplane Technical & Economic Feasibility”



Scope and Purpose

- Title

- Information technology -- Telecommunications and information exchange between systems -- Local and metropolitan area networks -- specific requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications Amendment: Ethernet Operation Over Electrical Backplanes

- Scope

- The scope of this project is to specify additions to and appropriate modifications of IEEE Std 802.3 to specify operation at 1000 Mb/s and 10 Gb/s across an electrical backplane leveraging the existing MAC.



Scope and Purpose (cont'd)

- Purpose

- The purpose of this project is to provide standards based Ethernet interconnection of server and telecommunication blades over a modular platform backplane. Industry trends for LAN, SAN and other applications are migrating to backplane interconnects, and this project will optimize Ethernet operation for backplanes.



IEEE 802.3 BESG Objectives

Proposal #1 – Single PHY that achieves the following -

1. Rate - 1 Gb/s and / or 10 Gb/s
2. Distance – Total 40”
3. Connectors – 4
4. Single Lane
5. FR-4 or better

Proposal #2 – Single PHY that achieves the following -

1. Rate - 1 Gb/s and / or 10 Gb/s
2. Distance – Total 36”
3. Connectors – 2
4. Lanes - ?
5. FR-4 or better

Proposal #3 Single PHY that achieves the following -

1. Rate – 10 Gb/s
2. Distance – Total 40”
3. Connectors – 2
4. Lanes - 2
5. FR-4 or better



Straw Poll #1

- Define minimum # of connectors
 - 2 connectors – 19
 - 4 connectors – 15



Straw Poll #2

- Define minimum total interconnect distance
 - 36 inches – 5
 - 40 inches – 33



Straw Poll #3

- Define number of lanes for 10Gb/s operation
 - 1 – 18
 - 2 – 4
 - Both – 12



Objectives Discussion

- Support operation over a single lane across 2 connectors over copper traces on FR-4. **[approved without opposition]**
- Define a single lane 1 Gb/s PHY that would support links consistent with lengths up to at least 40 inches of FR-4. **[approved without opposition]**
- Define a single lane 10 Gb/s PHY that would support links consistent with lengths up to at least 40 inches of FR-4. **[approved without opposition]**
- **Define a dual lane 10 Gb/s PHY that would support operation across 2 connectors over copper traces on FR-4 with lengths up to at least 40 inches. [not approved: Y – 5, N – 17, A – 12]**



Objectives Discussion (cont'd)

- Preserve the 802.3/Ethernet frame format at the MAC Client service interface [approved without opposition]
- Preserve min. and max. frame size of current 802.3 Std. [approved without opposition]
- Support full duplex operation only [discussion tabled]
- Support star, dual-star, and full mesh topologies using point-to-point links [discussion tabled]
- Support point-to-point only links with full duplex [discussion tabled]
- Preserve the current 802.3 MAC with no modifications [discussion tabled]
- Support existing media independent interfaces [approved without opposition]
- Consider auto-negotiation [approved without opposition]
- Meet CISPR/FCC Class A [approved without opposition]
- Support BER of 1E-12 [approved, Y – 32, N – 3, A – 1]



Broad Market Potential

Broad set(s) of applications

Multiple vendors, multiple users

Balanced cost (LAN vs. attached stations)

- **Ethernet has become widely deployed as a preferred backplane solution. Examples include Modular Servers and Enterprise and Telecom Network Equipment. Quantitative presentations have been made to the 802.3 Backplane Ethernet Study Group indicating significant market opportunities for these applications.**
- **Rapid growth of network and internet traffic is driving the need for higher performance over backplanes. Currently, IEEE 802.3 does not address this application with a formal standard.**
- **156 participants attended the Ethernet Over Backplane call-for-interest, representing at least 33 companies, and indicated that they plan to participate in the standardization of Ethernet Over Backplane. This level of commitment indicates that a standard will be developed by a large group of vendors and users.**
- **A standardized Ethernet interface on blades will maintain the balanced cost for backplane applications.**

Approved without opposition



Compatibility with IEEE Std. 802.3

Conformance with CSMA/CD MAC, PLS

Conformance with 802.2

Conformance with 802

- **The proposed standard will conform to the 802.3 MAC, and therefore will be consistent with 802.1D, 802.1Q, and relevant portions of 802.1f.**
- **As was the case in previous 802.3 standards, new physical layers will be defined.**
- **The proposed standard will conform to the 802.3 MAC Client Interface, which supports 802.2 LLC.**
- **The proposed standard will conform to the 802.1 Architecture, Management and Interworking.**
- **The proposed standard will define a set of systems management objects which are compatible with OSI and SNMP system management standards.**
- **The proposed standard will conform to the requirements of IEEE Std 802-2001.**

Approved without opposition



Distinct Identity

Substantially different from other 802 and 802.3 specifications

One unique solution for problem

Easy for document reader to select relevant spec.

- **The current 802.3 specification does not explicitly cover backplane transmission. XAUI is for chip-to-chip applications. 10GBASE-CX4 is for box-to-box (cabling) applications. 1000BASE-X has no electrical specification, and 1000BASE-CX is specified for coaxial cable.**
- **The standard will define a single PHY for each speed of operation.**
- **The specification will be done in a format consistent with the IEEE document requirements thus making it easy for implementers to understand and design to.**
- **The proposed specification will use copper media similar to other high speed networking technologies (Fibre Channel, IB4X) but does so with the IEEE 802.3 MAC as the over-riding layer which will result in higher compatibility and lower cost for Ethernet systems.**

Approved without opposition



Technical Feasibility

Demonstrated system feasibility

Proven technology, reasonable testing

Confidence in reliability

- **Ethernet MAC and interfaces are being used in backplane applications today.**
- **Technical presentations, given to the Backplane Ethernet Study Group, have demonstrated the feasibility of using copper backplane topologies at data rates up to 10 Gb/s per lane using available technologies. Other organizations are developing specifications for backplane applications for similar data rates.**
- **The principle of extending higher speeds to copper media has been well established by previous work within 802.3. The Backplane Ethernet work will build on this experience.**
- **Vendors of higher speed components are building reliable products which operate at data rates up to 10 Gb/s per lane on backplanes, and meet worldwide regulatory and operational requirements.**

Approved without opposition



Economic Feasibility

Cost factors known, reliable data
Reasonable cost for performance
Total installation costs considered

- **The component costs will benefit from cost reduction associated with Moore's Law. Further integration of functionality will reduce cost.**
- **Costs for backplanes based on available materials and components are well known and reasonable.**
- **Ethernet backplane standardization will increase deployment and diversity of supply base to further reduce cost.**
- **Ethernet IP re-use will lower implementation cost.**
- **System design, installation and maintenance costs are minimized by utilizing Ethernet system architecture, management, and software.**

Approved without opposition



Motion

- Move that the BESG adopt the 5 Criteria as contained within this document.

- Moved – John D’Ambrosia
- Second – Schelto Van Doorn
- All Voters
 - Yes – 32
 - No – 1
 - Abstain – 5
- 802.3 Voters
 - Yes – 13
 - No – 0
 - Abstain - 2
- MOTION PASSES



Motion

- Move that he BESG forward the PAR, 5 Criteria, and Objectives to 802.3 for consideration at the March Plenary.

- Moved – Brad Booth
- Second – John Stonick
- All Voters
 - Yes – 29
 - No – 0
 - Abstain – 3
- 802.3 Voters
 - Yes – 15
 - No – 0
 - Abstain - 2
- MOTION PASSES

Future Meetings

- March 2004 Plenary:
 - Week of the 15th
 - Orlando, FL
 - Hilton Hotel @ Walt Disney World

- May 2004 Interim
 - ???





Adjourn

Thank You!