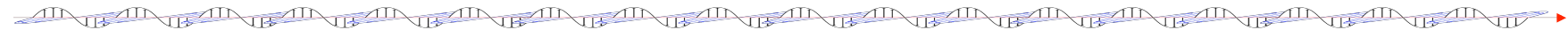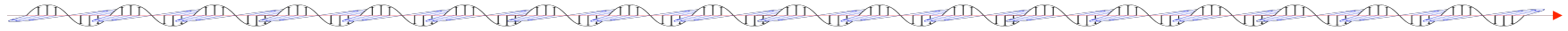# 802.3 Closing Report

IEEE 802.3bm
## 40 Gb/s and 100 Gb/s Fiber Optic Task Force

Dan Dove

Applied Micro

Orlando, FL – 21 March 2013

Overview

- **March Plenary Meeting highlights**
  - 98 People signed the attendance sheet
  - 23 Presentations from various contributors
  - 2½ days of meetings

- **Baseline Proposals**
  - A baseline proposal for CAUI-4 chip to chip was adopted
  - Two baselines tentatively remain (MMF at least 20m, SMF at least 500m)

- **Working Documents**
  - A modification to our PAR was approved to address optional EEE support and is pending 802.3 and EC approval.
    - Revised this week to address 802.11 comments. (removal of vestigial content)
  - An Informal Communication to OIF was approved to address CEI-VSR-28G and CEI-28G-MR
    http://www.ieee802.org/3/bm/public/mar13/IC_802p3bm_oif_0313_optx.pdf

- **Motions & Straw Polls**
  - 4 Motions and 10 Straw Polls were held
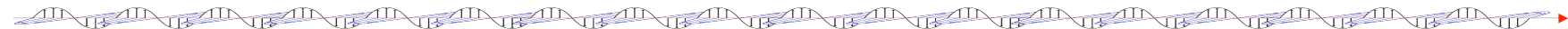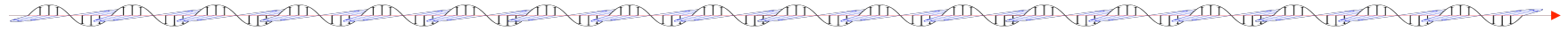
Response to Comments on PAR revision

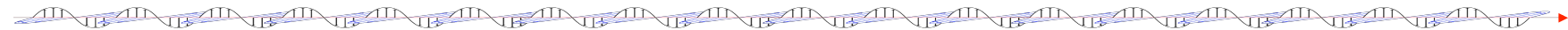http://www.ieee802.org/3/bm/P802_3bm_PAR_0113.pdf
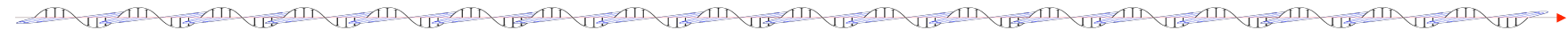
Comments on PAR 802.3bm

✔ Remove first item #5.2 from 8.1 not necessary for a PAR modification (similar to the discussion we had last November with the two PARs 802.3 submitted. This will cause confusion with the NesCom review.

✗ 5.2 Scope of Standard states that it is for "twisted pair PHY types". If you are changing the Scope of the project, would you not want to change the scope of the resulting Standard?

≈ 5.2.b – What is Energy Efficient Ethernet (EEE) really pointing to in IEEE Std 802.3-2012?

≈   What is the real difference between this and 802.3az?

≈   Is this a marketing term? Is this a reuse of MAC functions to put the PHY to sleep?

Jon Rosdahl, CSR Technology Inc.

Responses

- Comment #1 accepted
- Comment #2 – The stated scope of 802.3 includes the provision of **power** over selected twisted-pair cables. We aren't changing that capability and it will remain within scope. We request the comment be withdrawn.
- Comment #3 – EEE is specified in Clause 78 and affects numerous points within IEEE Std 802.3-2012. Our plan is to use the existing EEE protocol and extend it to support fiber-optic interfaces with minimal changes to existing clauses.
- Comment #4 – The changes to IEEE 802.3 introduced by 802.3az did not address how to communicate EEE capability and state on fiber-optic cables. Our plan is to specify that with minimal change to existing specifications.
- Comment #5 – EEE is specified in Clause 78 of IEEE Std 802.3-2012 and may also be used as a marketing term by those implementing it. EEE also describes capability that spans numerous 802.3 clauses. It is not technically a MAC function, but rather is specified in the Management, Reconciliation Sub-layer, PCS, PMA and PMD clauses.

P802.3bm

Submitter Email: david_law@ieee.org
Type of Project: Modify Existing Approved PAR
PAR Request Date: 09-Jan-2013
PAR Approval Date:
PAR Expiration Date:
Status: Unapproved PAR, Modification to a Previously Approved PAR for an Amendment
Root PAR: P802.3bm **Approved on:** 30-Aug-2012

1.1 Project Number: P802.3bm
1.2 Type of Document: Standard
1.3 Life Cycle: Full Use

2.1 Title: Standard for Ethernet Amendment: Physical Layer Specifications and Management Parameters for 40 Gb/s and 100 Gb/s Operation Over Fiber Optic Cables

Changes in title: ~~IEEE~~ Standard for Ethernet Amendment: Physical Layer Specifications and Management Parameters for 40 Gb/s and 100 Gb/s Operation Over Fiber Optic Cables

3.1 Working Group: Ethernet Working Group (C/LM/WG802.3)
Contact Information for Working Group Chair
  Name: David Law
  Email Address: david_law@ieee.org
  Phone: +44 131 665 7264
Contact Information for Working Group Vice-Chair
  Name: Wael Diab
  Email Address: wael.diab@gmail.com
  Phone: 4154468066

3.2 Sponsoring Society and Committee: IEEE Computer Society/LAN/MAN Standards Committee (C/LM)
Contact Information for Sponsor Chair
  Name: Paul Nikolich
  Email Address: p.nikolich@ieee.org
  Phone: 857.205.0050
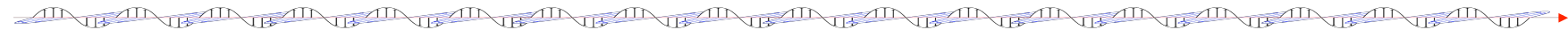**Contact Information for Standards Representative**
  Name: James Gilb
  Email Address: gilb@ieee.org
  Phone: 858-229-4822

4.1 Type of Ballot: Individual
4.2 Expected Date of submission of draft to the IEEE-SA for Initial Sponsor Ballot: 07/2014
4.3 Projected Completion Date for Submittal to RevCom: 02/2015

5.1 Approximate number of people expected to be actively involved in the development of this project:

5.2.a. Scope of the complete standard: This standard defines Ethernet local area, access and metropolitan area networks. Ethernet is specified at
selected speeds of operation; and uses a common media access control (MAC) specification and management
information base (MIB). The Carrier Sense Multiple Access with Collision Detection (CSMA/CD)
MAC protocol specifies shared medium (half duplex) operation, as well as full duplex operation. Speed specific
Media Independent Interfaces (MIIs) provide an architectural and optional implementation interface to
selected Physical Layer entities (PHY). The Physical Layer encodes frames for transmission and decodes
received frames with the modulation specified for the speed of operation, transmission medium and supported
link length. Other specified capabilities include: control and management protocols, and the provision
of power over selected twisted pair PHY types.

5.2.b. Scope of the project: This project is to specify additions to and appropriate modifications of IEEE Std 802.3 to add 100 Gb/s Physical Layer (PHY) specifications and management parameters, using a four-lane electrical interface for operation on multimode and single-mode fiber optic cables, and to specify optional Energy Efficient Ethernet (EEE) for 40 Gb/s and 100Gb/s operation over fiber optic cables. In addition, to add 40 Gb/s Physical Layer (PHY) specifications and management parameters for operation on extended reach (>
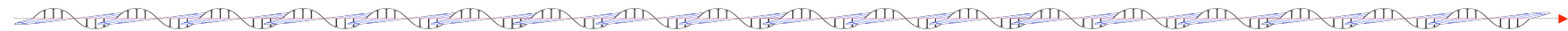
Changes in scope of the project: This project is to specify additions to and appropriate modifications of IEEE Std 802.3 to add 100 Gb/s Physical Layer (PHY) specifications and management parameters, using a four-lane electrical interface for operation on multimode and single-mode fiber optic cables, and to specify optional Energy Efficient Ethernet (EEE) for 40 Gb/s and 100Gb/s operation over fiber optic cables. In addition, to add 40 Gb/s Physical Layer (PHY) specifications and management parameters for operation on extended reach (>

1

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10 km) single-mode fiber optic cables.

5.3 Is the completion of this standard dependent upon the completion of another standard: No
5.4 Purpose: This document will not include a purpose clause.

10 km) single-mode fiber optic cables.

Changes in purpose:

5.5 Need for the Project: Rapid growth of server, network, and internet traffic is driving the need for higher data rates, higher density, lower cost fiber optic solutions, especially in the data center space. Advances in technology now allow the specification of new 100 Gb/s Physical Layer types with reduced lane count, addressing these needs. IEEE Std 802.3 does not currently define a 100 Gb/s four-lane electrical interface between host ICs and optical modules, nor does it define an extended reach solution for 40 Gb/s on single-mode fiber beyond 10 km.

5.6 Stakeholders for the Standard: Stakeholders that have been identified to date include, but are not limited to: users and producers of systems and components for servers, network storage, networking systems, data centers, high performance computing, and telecommunications carriers.

Intellectual Property
6.1.a. Is the Sponsor aware of any copyright permissions needed for this project?: No
6.1.b. Is the Sponsor aware of possible registration activity related to this project?: No

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7.1 Are there other standards or projects with a similar scope?: No
7.2 Joint Development
  Is it the intent to develop this document jointly with another organization?: No

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8.1 Additional Explanatory Notes (Item Number and Explanation): ~~Item# 5.2. The resulting standard will comply with IEEE Std 802, IEEE Std 802.1D, and IEEE Std 802.1Q.~~

Item# 5.2b: The scope has been expanded to allow the addition of optional Energy Efficient Ethernet (EEE) for 40 Gb/s and 100 Gb/s operation over fiber optic cables.

Modified PAR
As found at

http://www.ieee802.org/3/bm/P802_3bm_PAR_0313.pdf

P802.3bm

Submitter Email: david_law@ieee.org
Type of Project: Modify Existing Approved PAR
PAR Request Date: 15-Feb-2013
PAR Approval Date:
PAR Expiration Date:
Status: Unapproved PAR, Modification to a Previously Approved PAR for an Amendment
Root PAR: P802.3bm **Approved on:** 30-Aug-2012

1.1 Project Number: P802.3bm
1.2 Type of Document: Standard
1.3 Life Cycle: Full Use

2.1 Title: IEEE Standard for Ethernet
Amendment: Physical Layer Specifications and Management Parameters for 40 Gb/s and 100 Gb/s Operation Over Fiber Optic Cables

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3.1 Working Group: Ethernet Working Group (C/LM/WG802.3)
Contact Information for Working Group Chair
   Name: David Law
   Email Address: david_law@ieee.org
   Phone: +44 131 665 7264
Contact Information for Working Group Vice-Chair
   Name: Wael Diab
   Email Address: wael.diab@gmail.com
   Phone: 4154468066

3.2 Sponsoring Society and Committee: IEEE Computer Society/LAN/MAN Standards Committee (C/LM)
Contact Information for Sponsor Chair
   Name: Paul Nikolich
   Email Address: p.nikolich@ieee.org
   Phone: 857.205.0050
Contact Information for Standards Representative
   Name: James Gilb
   Email Address: gilb@ieee.org
   Phone: 858-229-4822

4.1 Type of Ballot: Individual
4.2 Expected Date of submission of draft to the IEEE-SA for Initial Sponsor Ballot: 07/2014
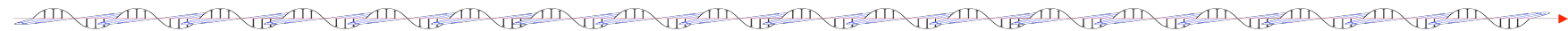**4.3 Projected Completion Date for Submittal to RevCom:** 02/2015

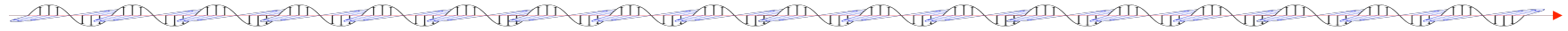**5.1 Approximate number of people expected to be actively involved in the development of this project:** 108

5.2.a. Scope of the complete standard: This standard defines Ethernet local area, access and metropolitan area networks. Ethernet is specified at selected speeds of operation; and uses a common media access control (MAC) specification and management information base (MIB). The Carrier Sense Multiple Access with Collision Detection (CSMA/CD) MAC protocol specifies shared medium (half duplex) operation, as well as full duplex operation. Speed specific Media Independent Interfaces (MIIs) provide an architectural and optional implementation interface to selected Physical Layer entities (PHY). The Physical Layer encodes frames for transmission and decodes
received frames with the modulation specified for the speed of operation, transmission medium and supported link length. Other specified capabilities include: control and management protocols, and the provision of power over selected twisted pair PHY types.

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Changes in scope of the project: This project is to specify additions to and appropriate modifications of IEEE Std 802.3 to add 100 Gb/s Physical Layer (PHY) specifications and management parameters, using a four-lane electrical interface for operation on multimode and single-mode fiber optic cables, and to specify optional Energy Efficient Ethernet (EEE) for 40 Gb/s and 100Gb/s operation over fiber optic cables. In addition, to add 40 Gb/s Physical Layer (PHY) specifications and management parameters for operation on extended reach (> 10 km) single-mode fiber optic cables.

5.3 Is the completion of this standard dependent upon the completion of another standard: No

5.4 Purpose: This document will not include a purpose clause.

5.5 Need for the Project: Rapid growth of server, network, and internet traffic is driving the need for higher data rates, higher density, lower cost fiber optic solutions, especially in the data center space. Advances in technology now allow the specification of new 100 Gb/s Physical Layer types with reduced lane count, addressing these needs. IEEE Std 802.3 does not currently define a 100 Gb/s four-lane electrical interface between host ICs and optical modules, nor does it define an extended reach solution for 40 Gb/s on single-mode fiber beyond 10 km.

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Intellectual Property

6.1.a. Is the Sponsor aware of any copyright permissions needed for this project?: No

6.1.b. Is the Sponsor aware of possible registration activity related to this project?: No

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7.1 Are there other standards or projects with a similar scope?: No

7.2 Joint Development
  Is it the intent to develop this document jointly with another organization?: No

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8.1 Additional Explanatory Notes (Item Number and Explanation):

Item# 5.2b: The scope has been expanded to allow the addition of optional Energy Efficient Ethernet (EEE) for 40 Gb/s and 100 Gb/s operation over fiber optic cables.
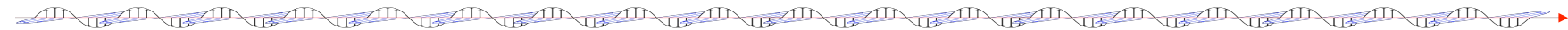
Task Force Motions & Polls

Task Force Straw Polls
March - 2013

Straw Poll # 1

I would support a baseline proposal for a SMF PMD based on:

a) CWDM

b) C-BAND

c) DMT

d) PSM4

e) PAMn

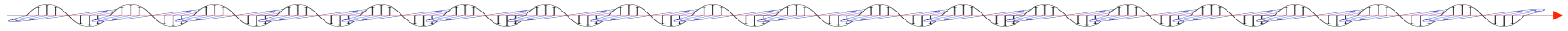f) none of the above - rely on LR4 with CAUI-4.

Pick one of the above only

a) 15   b) 0   c) 8   d) 25   e) 12   f) 11

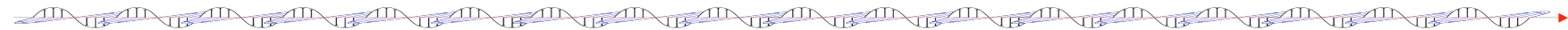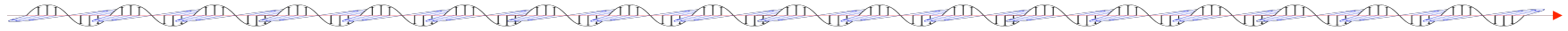Room count = 98

Straw Poll # 2

I would support a baseline proposal for a SMF PMD based on:

a) CWDM

b) C-BAND

c) DMT

d) PSM4

e) PAMn

f) none of the above - rely on LR4 with CAUI-4.

- **Chicago Rules**
- a) 26 b) 0   c) 20   d) 36   e) 22   f) 37

Straw Poll # 3

I would NOT support a baseline proposal for a SMF PMD based on:

a) CWDM

b) C-BAND

c) DMT

d) PSM4

e) PAMn

f) none of the above - rely on LR4 with CAUI-4.

- **Chicago Rules**

- a) 25   b) 60   c) 35   d) 23   e) 30   f) 5
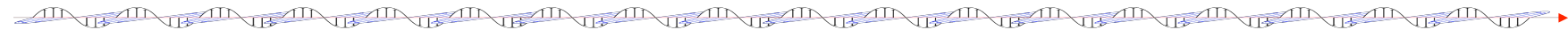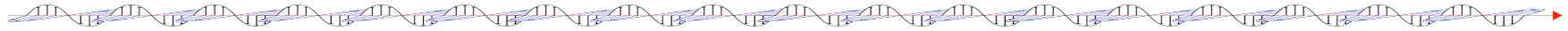
Straw Poll # 4

- Do you believe this proposal is technically feasible:

a) CWDM   Y: 55   N: 4

b) DMT   Y: 18   N: 38

c) PSM4   Y: 59 N: 0

d) PAMn   Y: 19 N: 38
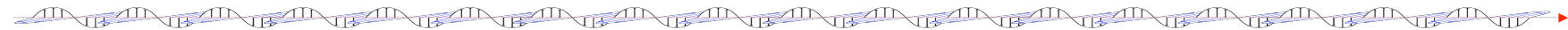
Straw Poll # 5

- Do you believe this proposal is economically feasible:

a) CWDM   Y: 26   N: 21

b) DMT   Y: 12   N: 35

c) PSM4   Y: 47   N: 8

d) PAMn   Y: 18   N: 32

e) LR4   Y: 26   N: 22

Straw Poll # 6

- Do you believe this proposal has broad market potential :

a) CWDM   Y: 23   N: 27

b) DMT   Y: 11 N: 27

c) PSM4   Y: 32 N: 24

d) PAMn   Y: 18 N: 29

e) LR4   Y: 24 N: 20
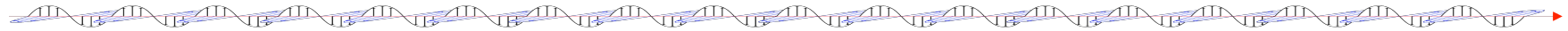
Straw Poll # 7

- I believe that the 20 m PMD proposal discussed in king_01a_0313_optx meets the requirements for:

a) Technical feasibility   Y: 19   N: 2

b) Economic feasibility   Y: 11   N: 6

c) Broad market potential   Y: 12   N: 12

d) Distinct identity   Y: 10   N: 12
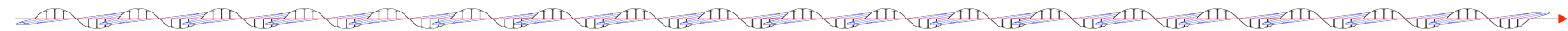
Straw Poll # 8

- If a 20m PMD proposal were to be adopted, it would have to be interoperable with the 100m PMD for reach < 20m
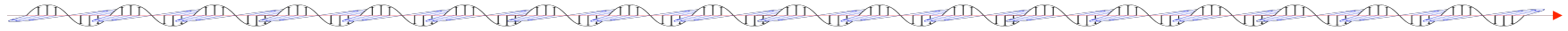
- Y: 21
- N: 2
- A: 38

Straw Poll # 9

- Would you support a 20m un-retimed FEC-enabled MMF PHY based upon king_01a_0313_optx
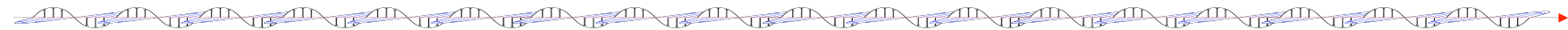

- Y: 13
- N: 6
- A: 42
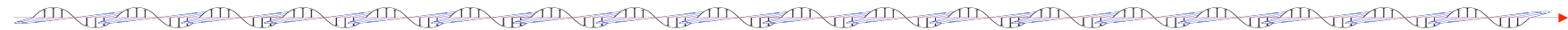
Straw Poll # 10

- I plan to attend 802.3bm at the following meetings

- May 2013 – Victoria, BC   __57___
- July 2013 – Geneva, CH   __52___
- Sept 2013 – York, UK   __48___
- Nov 2013 – Dallas, TX, USA   __61___

Task Force Motions
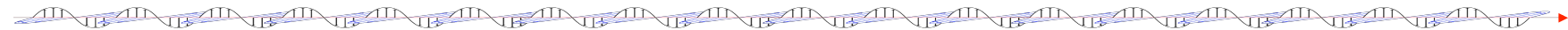# March - 2013

Motion # 1

- Move to adopt the response to OIF liaison letter "IC_802p3bm_oif_0313_optx.pdf"

- Mover: Dan Dove   Seconded: John Abbott
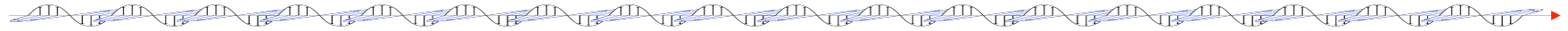
- Procedural 50%

- Passes by voice, without opposition

Motion # 2

- Move to adopt the response to 802.11 PAR review comments "PAR_Response_01_0313_optx.pdf" and amend our PAR as described on page 6, then resubmit that PAR "P802_3bm_PAR_0313.pdf" to 802.3 and the 802 EC for approval at the March 2013 meeting.

- Mover: Dan Dove   Seconded: Pete Anslow

- Technical >= 75%
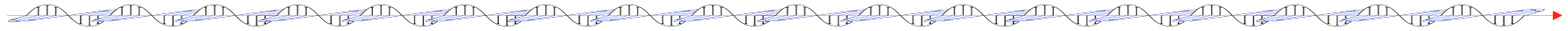
- Yes: 61   No: 0   Abstain: 5
- Passes

Motion # 3

- Move to adopt the proposal in slides 4 to 10 of latchman_02_0313_optx as the baseline for "a re-timed 4-lane 100G PMA to PMA electrical interface for chip to chip applications" (with the insertion loss listed as To Be Confirmed)

- Mover: Ryan Latchman Seconded: Mike Dudek
- Technical >= 75%
- Yes: 49   No: 0   Abstain: 20
- Passes

- (Room count = 93)
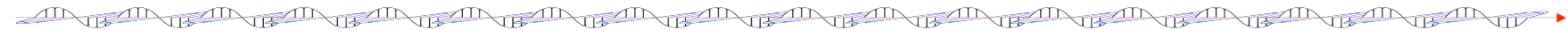
Motion # 4

- Move to adopt the changes to CAUI naming on slide 5 of anslow_02_0313_optx

- Mover: Pete Anslow   Seconded: John D'Ambrosia

- Technical >= 75%

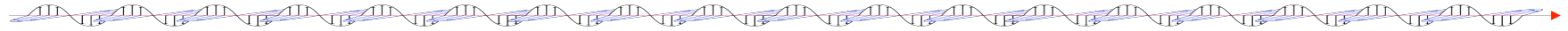- Yes: 67   No: 2   Abstain: 11
- Passes
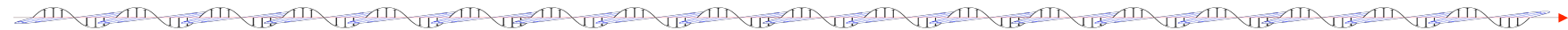
Working Group Motions
March - 2013

802.3 WG Motion # 1

- Move that 802.3 Working Group
  - approve the amended P802.3bm PAR

  http://www.ieee802.org/3/bm/P802_3bm_PAR_0313.pdf

- Mover: Dan Dove   Seconded: Pete Anslow

- Technical ≥ 75%

- Yes: No: Abstain: