

# Agenda and General Information

IEEE P802.3cg 10 Mbps Single Pair Ethernet  
Task Force

George Zimmerman (Chair)

CME Consulting, Inc.

Rosemont, IL, USA March 5-6, 2018

# Agenda

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- Appointment of Recording Secretary
- Welcome and Introductions
- Approve Agenda
- Approve Previous Task Force Minutes
- Goals for this meeting
- Big Ticket Items
- Reflector and Web
- Ground Rules
- IEEE
  - Structure, Bylaws and Rules
  - Call for Patents
  - IEEE Standards Process
- Liaisons and Communications
- Presentations
- Motions and Closing Business
- Future Meetings

# Task Force Decorum

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- An officer is permitted to make an audio or slideshow recording of this meeting exclusively for the purpose of generating minutes which shall not be copied or distributed. **IEEE 802.3 meetings do not use this option.** Recording of the proceedings by any other participant or observer, in part or in whole, via any means, is prohibited. (December 2017 IEEE-SA Standards Board Ops Manual 5.3.3.2)
- Press (i.e., anyone reporting publicly on this meeting) are to announce their presence (December 2017 IEEE-SA Standards Board Ops Manual 5.3.3.3)
- Cell phone ringers off
- Wear your badges at all times in meeting areas
  - Help the hotel security staff improve the general security of the meeting rooms
  - **PCs HAVE BEEN STOLEN** at previous meetings
  - **DO NOT** assume that meeting areas are secure
- Please observe proper decorum in meetings

# Goals for the meeting

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- Review Draft 1.1
  - Comment review
  - Hear presentations
  - Produce Draft 1.2
- Progress to technical completeness
  - Refine short reach & multi-drop PHY
  - Refine powering
- Hear and respond if necessary to liaisons

# Big ticket items

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- Progress draft to technical completeness
  - Identify remaining TBDs & missing pieces and work to fill in
  - Short reach: operational modes and mixing segment specification
- PLCA: refine specification

# Reflector and Web

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- To subscribe to the 10 Mbps Single-Pair Ethernet Task Force reflector, send an email to:

[ListServ@ieee.org](mailto:ListServ@ieee.org)

with the following in the body of the message (do not include “<>”):

*subscribe* STDS-802-3-10SPE-<yourfirstname> <yourlastname>

*end*

***THIS IS THE SAME REFLECTOR WE USED FOR STUDY GROUP – YOU DO NOT HAVE TO RE-SUBSCRIBE***

- Send 10 Mbps Single-Pair Ethernet Task Force reflector messages to:  
**STDS-802-3-10SPE @listserv.ieee.org**
- Task Force web page URL: (NEW WEB PAGE FOR TASK FORCE)  
[www.ieee802.org/3/cg](http://www.ieee802.org/3/cg)

# Task Force Private Area

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- PRIVATE AREA Defined
- URL: <http://www.ieee802.org/3/cg/private>
  - Username: <<>>
  - Password: <<>>
- Write it down...
- Note - The draft, and any other content, is posted for your review only, and neither the content nor access information should be copied or redistributed to others in violation of document copyrights.

# Ground Rules

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- Based upon IEEE 802.3 Rules
  - 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

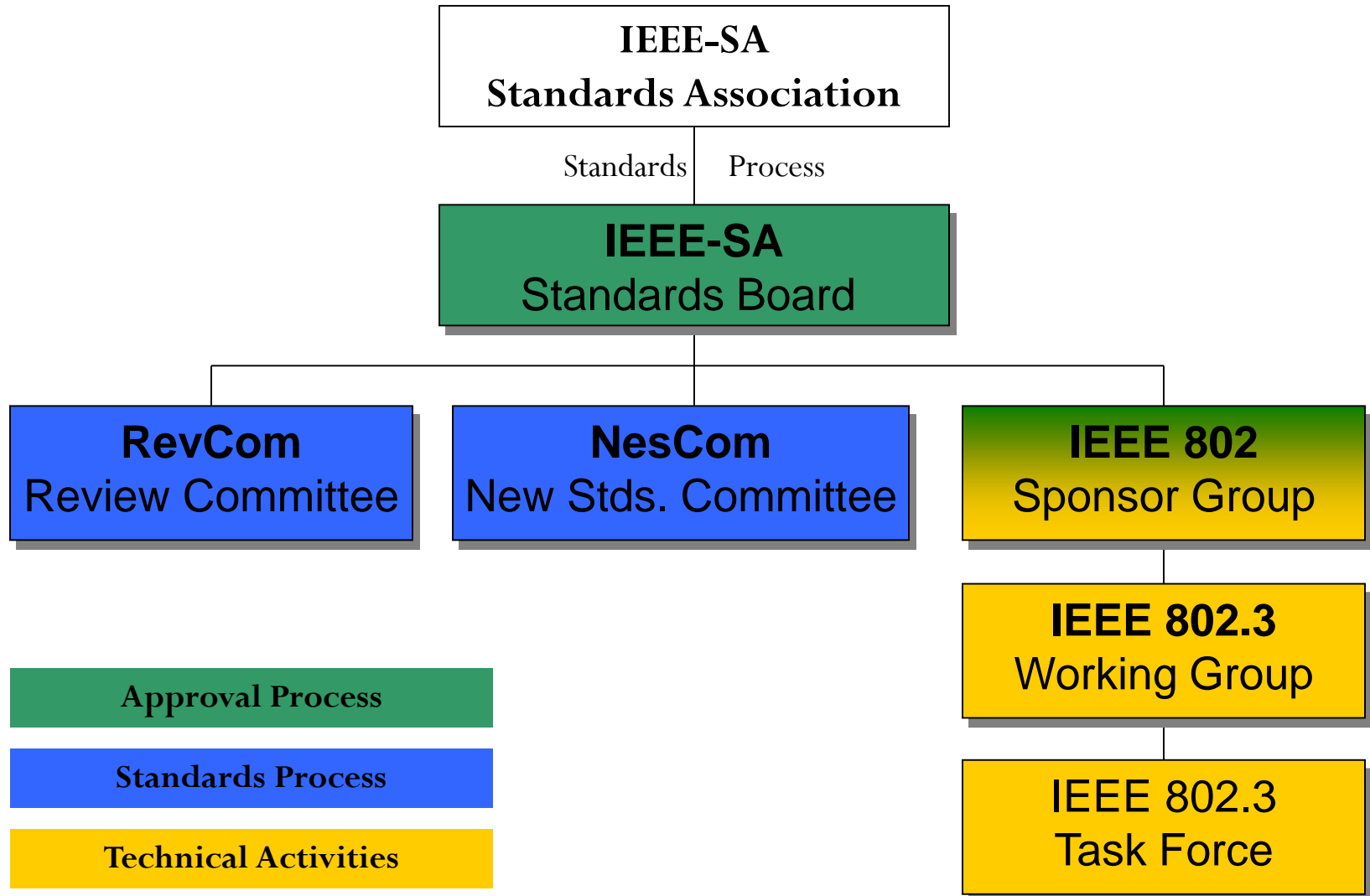


# Attendance

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- Tutorial Material on attendance tool
  - [http://ieee802.org/3/minutes/attendance\\_procedures.pdf](http://ieee802.org/3/minutes/attendance_procedures.pdf)
- Access details
  - URL: <http://imat.ieee.org/>

# IEEE Structure



# Important Bylaws and Rules

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- **IEEE-SA Operations Manual**  
[http://standards.ieee.org/develop/policies/sa\\_opman/](http://standards.ieee.org/develop/policies/sa_opman/)
- **IEEE-SA Standards Board Bylaws**  
<http://standards.ieee.org/develop/policies/bylaws/>
- **IEEE-SA Standards Board Operations Manual**  
<http://standards.ieee.org/develop/policies/opman/>
- **IEEE 802 LAN/MAN Standards Committee (LMSC) Policies and Procedures**  
<http://standards.ieee.org/about/sasb/audcom/pnp/LMSC.pdf>
- **IEEE 802 LAN/MAN Standards Committee (LMSC) Operations Manual**  
<http://www.ieee802.org/devdocs.shtml>
- **IEEE 802 LAN/MAN Standards Committee (LMSC) Working Group (WG) Policies and Procedures**  
<http://www.ieee802.org/devdocs.shtml>
- **IEEE 802.3 Working Group Operating Rules**  
[http://ieee802.org/3/rules/P802\\_3\\_rules.pdf](http://ieee802.org/3/rules/P802_3_rules.pdf)

# Instructions for the WG Chair

**The IEEE-SA strongly recommends that at each WG meeting the chair or a designee:**

- **Show slides #1 through #4 of this presentation**
- **Advise the WG attendees that:**
  - IEEE's patent policy is described in Clause 6 of the *IEEE-SA Standards Board Bylaws*;
  - Early identification of patent claims which may be essential for the use of standards under development is strongly encouraged;
  - There may be Essential Patent Claims of which IEEE is not aware. Additionally, neither IEEE, the WG, nor the WG Chair can ensure the accuracy or completeness of any assurance or whether any such assurance is, in fact, of a Patent Claim that is essential for the use of the standard under development.
- **Instruct the WG Secretary to record in the minutes of the relevant WG meeting:**
  - That the foregoing information was provided and that slides 1 through 4 (and this slide 0, if applicable) were shown;
  - That the chair or designee provided an opportunity for participants to identify patent claim(s)/patent application claim(s) and/or the holder of patent claim(s)/patent application claim(s) of which the participant is personally aware and that may be essential for the use of that standard
  - Any responses that were given, specifically the patent claim(s)/patent application claim(s) and/or the holder of the patent claim(s)/patent application claim(s) that were identified (if any) and by whom.
- The WG Chair shall ensure that a request is made to any identified holders of potential essential patent claim(s) to complete and submit a Letter of Assurance.
- It is recommended that the WG Chair review the guidance in *IEEE-SA Standards Board Operations Manual* 6.3.5 and in FAQs 14 and 15 on inclusion of potential Essential Patent Claims by incorporation or by reference.

Note: **WG** includes Working Groups, Task Groups, and other standards-developing committees with a PAR approved by the IEEE-SA Standards Board.

**(Optional to be shown)**

# Participants have a duty to inform the IEEE

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- Participants shall inform the IEEE (or cause the IEEE to be informed) of the identity of each holder of any potential Essential Patent Claims of which they are personally aware if the claims are owned or controlled by the participant or the entity the participant is from, employed by, or otherwise represents
- Participants should inform the IEEE (or cause the IEEE to be informed) of the identity of any other holders of potential Essential Patent Claims

**Early identification of holders of potential  
Essential Patent Claims is encouraged**

# Ways to inform IEEE

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- **Cause an LOA to be submitted to the IEEE-SA (patcom@ieee.org); or**
- **Provide the chair of this group with the identity of the holder(s) of any and all such claims as soon as possible; or**
- **Speak up now and respond to this Call for Potentially Essential Patents**

If anyone in this meeting is personally aware of the holder of any patent claims that are potentially essential to implementation of the proposed standard(s) under consideration by this group and that are not already the subject of an Accepted Letter of Assurance, please respond at this time by providing relevant information to the WG Chair

# Other guidelines for IEEE WG meetings

- **All IEEE-SA standards meetings shall be conducted in compliance with all applicable laws, including antitrust and competition laws.**
  - **Don't discuss the interpretation, validity, or essentiality of patents/patent claims.**
  - **Don't discuss specific license rates, terms, or conditions.**
    - Relative costs of different technical approaches that include relative costs of patent licensing terms may be discussed in standards development meetings.
      - **Technical considerations remain the primary focus**
  - **Don't discuss or engage in the fixing of product prices, allocation of customers, or division of sales markets.**
  - **Don't discuss the status or substance of ongoing or threatened litigation.**
  - **Don't be silent if inappropriate topics are discussed ... do formally object.**

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For more details, see *IEEE-SA Standards Board Operations Manual*, clause 5.3.10 and *Antitrust and Competition Policy: What You Need to Know* at <http://standards.ieee.org/develop/policies/antitrust.pdf>

# Patent-related information

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The patent policy and the procedures used to execute that policy are documented in the:

- ***IEEE-SA Standards Board Bylaws***  
(<http://standards.ieee.org/develop/policies/bylaws/sect6-7.html#6>)
- ***IEEE-SA Standards Board Operations Manual***  
(<http://standards.ieee.org/develop/policies/opman/sect6.html#6.3>)

Material about the patent policy is available at  
<http://standards.ieee.org/about/sasb/patcom/materials.html>

**If you have questions, contact the IEEE-SA  
Standards Board Patent Committee  
Administrator at [patcom@ieee.org](mailto:patcom@ieee.org)**



# Participation in IEEE 802 Meetings

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**Participation in any IEEE 802 meeting (Sponsor, Sponsor subgroup, Working Group, Working Group subgroup, etc.) is on an individual basis**

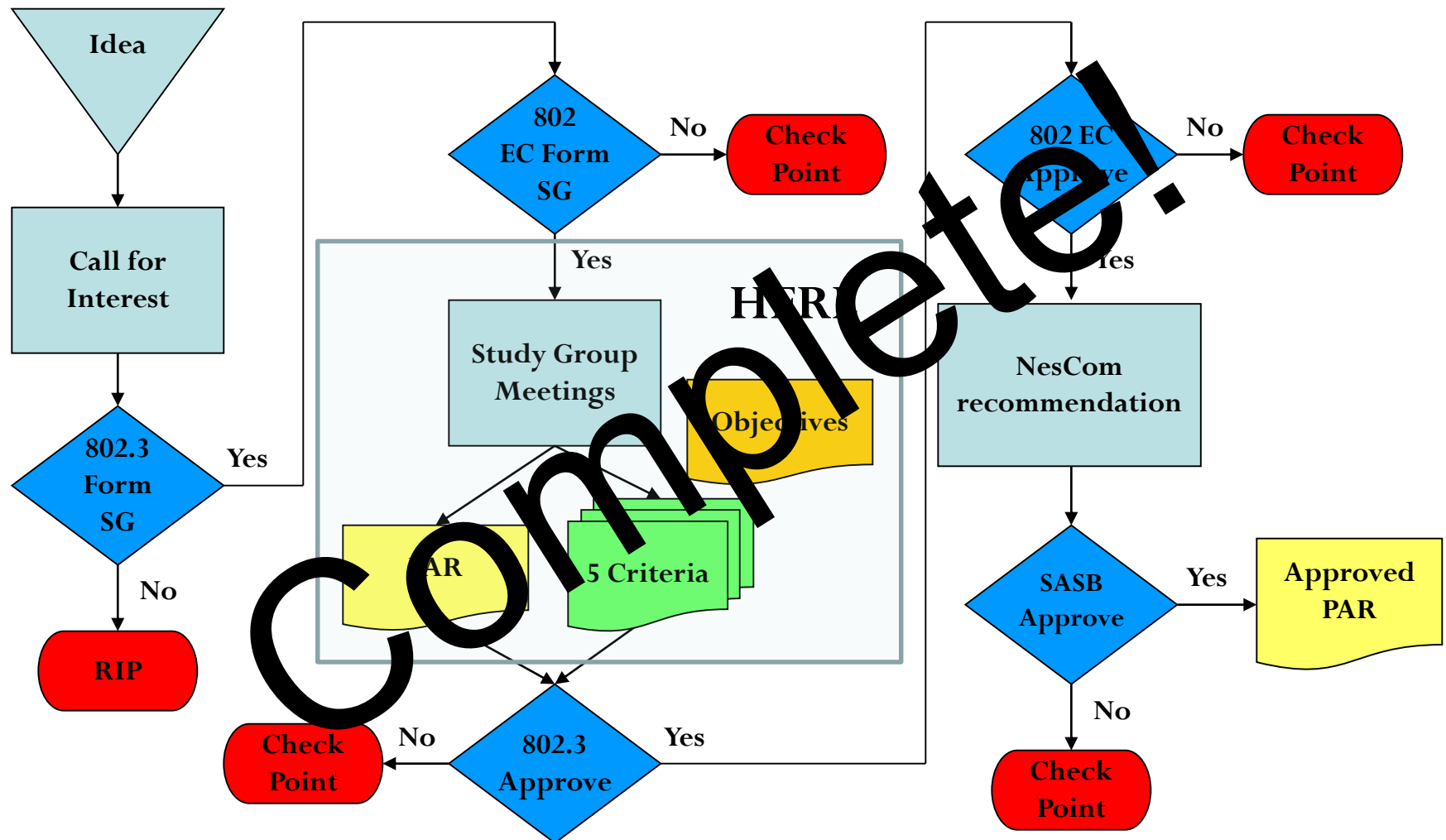
- **Participants in the IEEE standards development individual process shall act based on their qualifications and experience. ([https://standards.ieee.org/develop/policies/bylaws/sb\\_bylaws.pdf](https://standards.ieee.org/develop/policies/bylaws/sb_bylaws.pdf) section 5.2.1)**
- **IEEE 802 Working Group membership is by individual; “Working Group members shall participate in the consensus process in a manner consistent with their professional expert opinion as individuals, and not as organizational representatives”. (subclause 4.2.1 “Establishment”, of the IEEE 802 LMSC Working Group Policies and Procedures)**
- **Participants have an obligation to act and vote as an individual and not under the direction of any other individual or group. A Participant’s obligation to act and vote as an individual applies in all cases, regardless of any external commitments, agreements, contracts, or orders.**
- **Participants shall not direct the actions or votes of any other member of an IEEE 802 Working Group or retaliate against any other member for their actions or votes within IEEE 802 Working Group meetings, see [https://standards.ieee.org/develop/policies/bylaws/sb\\_bylaws.pdf](https://standards.ieee.org/develop/policies/bylaws/sb_bylaws.pdf) section 5.2.1.3 and the IEEE 802 LMSC Working Group Policies and Procedures, subclause 3.4.1 “Chair”, list item x.**

**By participating in IEEE 802 meetings, you accept these requirements. If you do not agree to these policies then you shall not participate.**

(Latest revision of IEEE 802 LMSC Working Group Policies and Procedures: <http://www.ieee802.org/devdocs.shtml>)

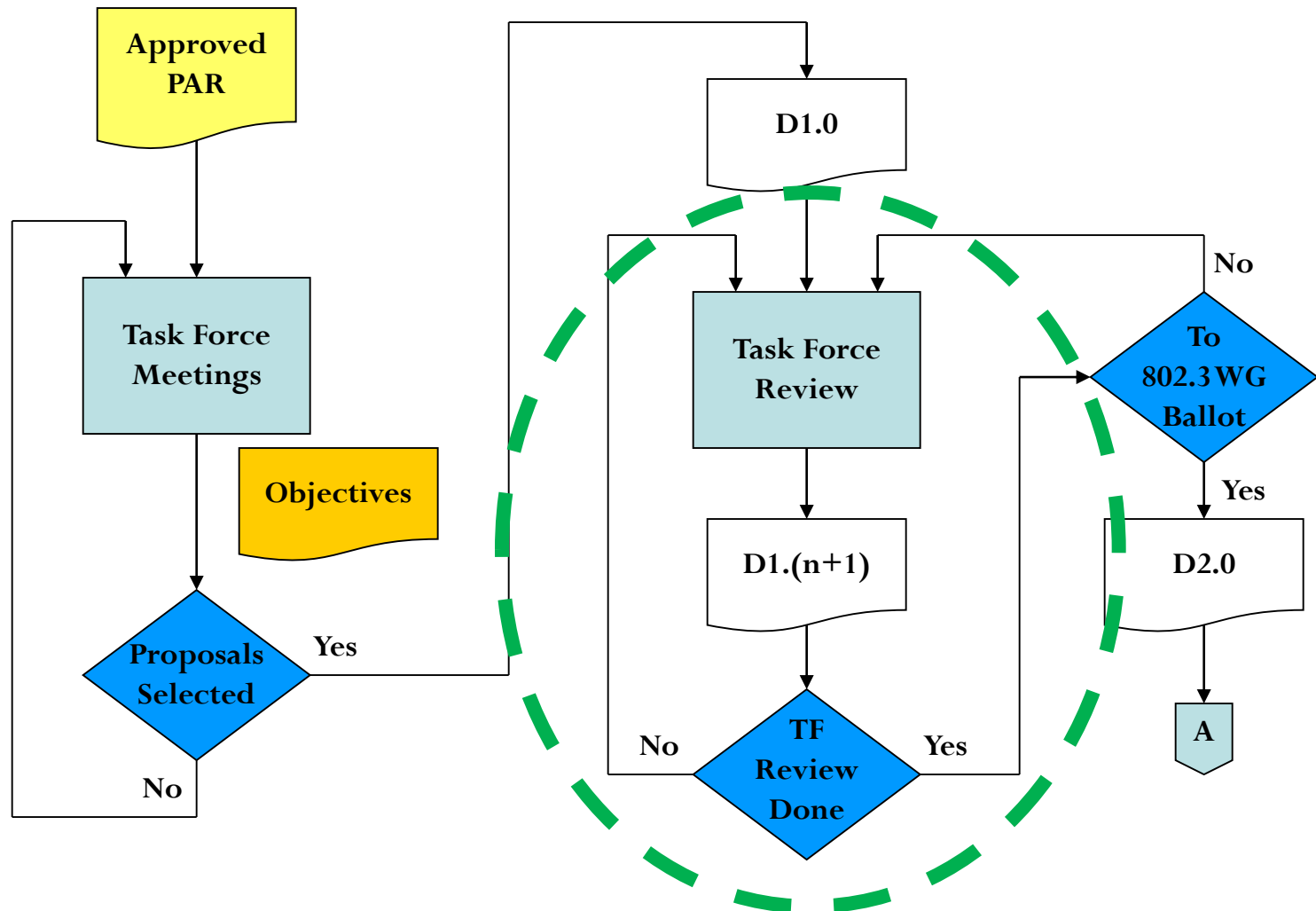
IEEE 802 Executive Committee

# Overview of IEEE 802.3 Standards Process (1/5)- Study Group Phase

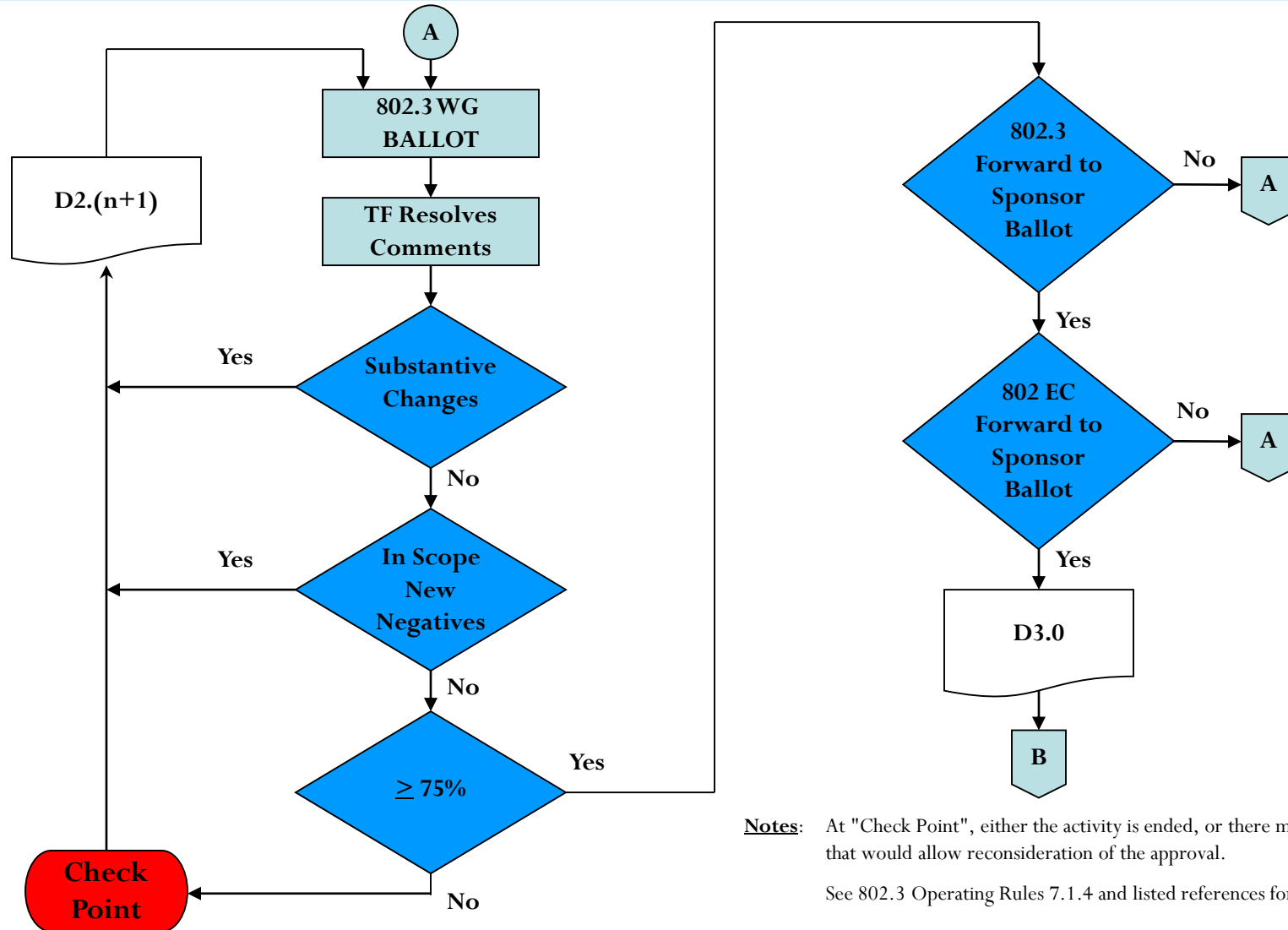


Note: At "Check Point", either the activity is ended, or there may be various options that would allow reconsideration of the approval.

# Overview of IEEE 802.3 Standards Process (2/5) – Task Force Comment Phase



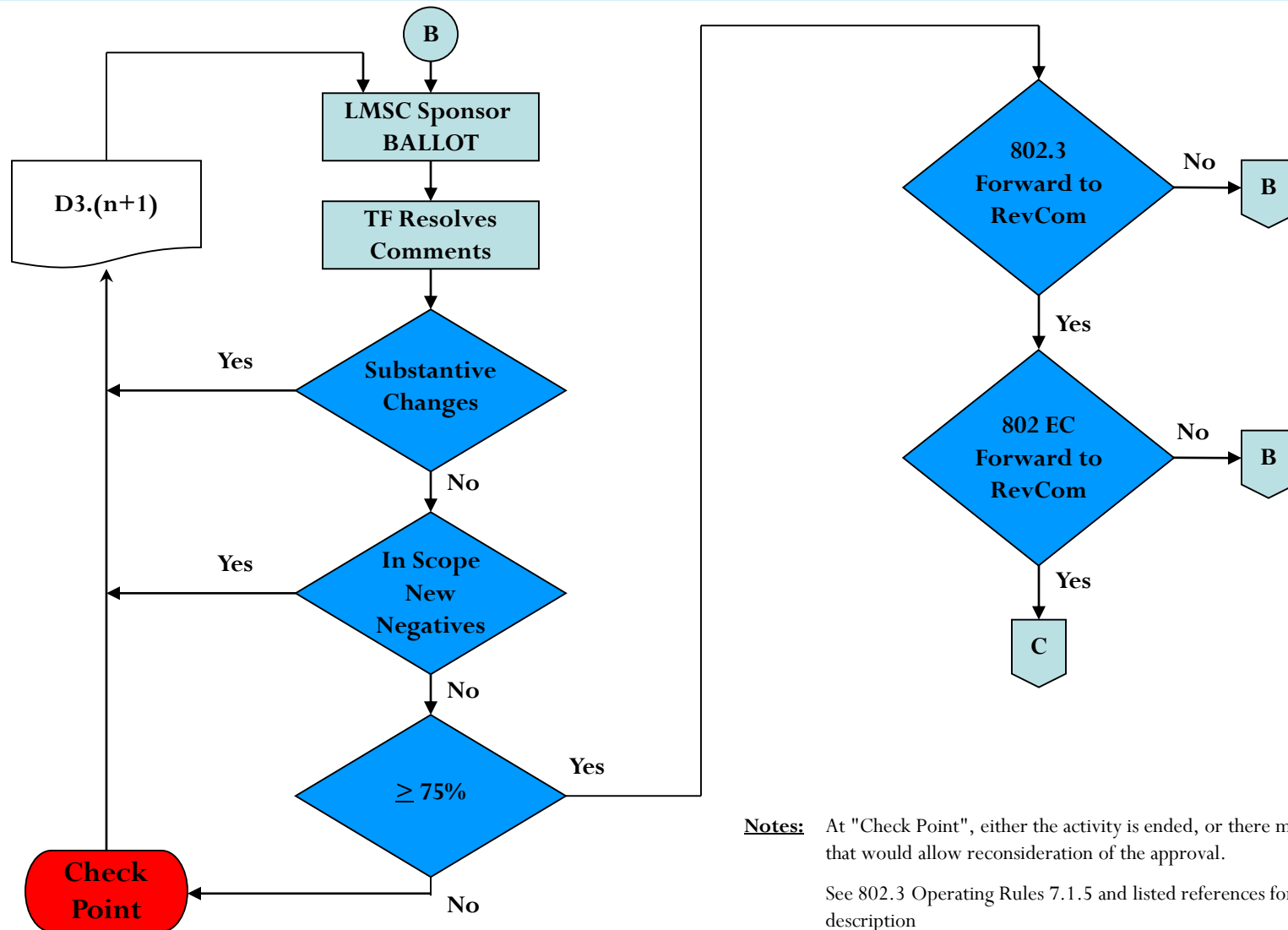
# Overview of IEEE 802.3 Standards Process (3/5) – Working Group Ballot Phase



**Notes:** At "Check Point", either the activity is ended, or there may be various options that would allow reconsideration of the approval.

See 802.3 Operating Rules 7.1.4 and listed references for complete description

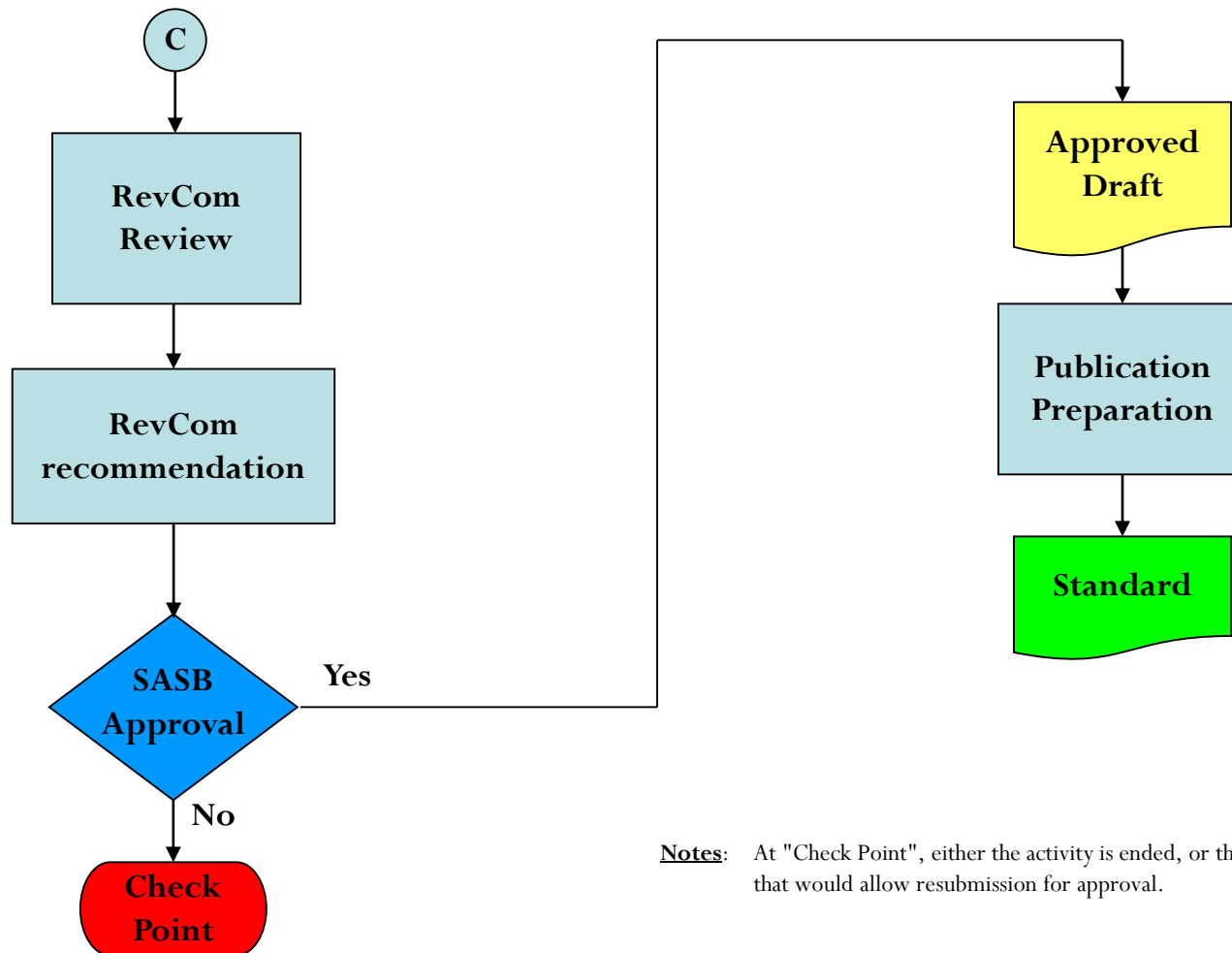
# Overview of IEEE 802.3 Standards Process (4/5)- Sponsor Ballot Phase



**Notes:** At "Check Point", either the activity is ended, or there may be various options that would allow reconsideration of the approval.

See 802.3 Operating Rules 7.1.5 and listed references for complete description

# Overview of IEEE 802.3 Standards Process (5/5) – Final Approvals / Standard Release



**Notes:** At "Check Point", either the activity is ended, or there may be various options that would allow resubmission for approval.

# Liaisons and Communications

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# IEEE P802.3cg 10Mbps Single-Pair Ethernet Approved Project Documents

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- PAR
  - [http://www.ieee802.org/3/cg/IEEE\\_P802\\_3cg\\_PAR\\_071216.pdf](http://www.ieee802.org/3/cg/IEEE_P802_3cg_PAR_071216.pdf)
- 5 Criteria
  - <https://mentor.ieee.org/802-ec/dcn/16/ec-16-0153-00-00EC-ieee-p802-3cg-draft-csd.pdf>
- Objectives
  - [http://www.ieee802.org/3/cg/objectives\\_10SPE\\_111016.pdf](http://www.ieee802.org/3/cg/objectives_10SPE_111016.pdf)



# IEEE P802.3cg Adopted Objectives

## Approved by 802.3 11/10/16 (1)

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1. Preserve the IEEE 802.3/Ethernet frame format at the MAC client service interface.
2. Preserve minimum and maximum frame size of the current IEEE 802.3 standard.
3. Support a speed of 10 Mb/s at the MAC/PLS service interface.
4. Do not preclude meeting FCC and CISPR EMC requirements
5. Support for optional single-pair Auto-Negotiation
6. Support optional Energy Efficient Ethernet
7. Support 10 Mb/s operation in automotive environments (e.g. EMC, temperature) over single balanced twisted-pair cabling.
8. Support 10 Mb/s operation in industrial environments (e.g. EMC, temperature) over single balanced twisted-pair cabling.
9. Do not preclude the ability to survive automotive and industrial fault conditions (e.g. shorts, over voltage, EMC, ISO16750)
10. Do not preclude working within an Intrinsically Safe device and system as defined in IEC 60079

# IEEE P802.3cg Adopted Objectives

## Approved by 802.3 11/10/16 (2)

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11. Define the performance characteristics of a link segment and a PHY to support operation over this link segment with single twisted pair supporting up to four inline connectors using balanced cabling for up to at least 15 m reach
12. Define the performance characteristics of a link segment and a PHY to support point-to-point operation over this link segment with single twisted pair supporting up to 10 inline connectors using balanced cabling for up to at least 1 km reach
13. Support fast-startup operation using predetermined configurations which enables the time from power\_on\*\*=FALSE to a state capable of transmitting and receiving valid data to be less than 100ms
14. Maintain a bit error ratio (BER) at the MAC/PLS service interface of less than or equal to  $10^{-10}$  on link segments up to at least 15m, and  $10^{-9}$  on link segments up to at least 1km
15. Specify one or more optional power distribution techniques for use over the 10 Mb/s single balanced twisted-pair link segments, in conjunction with 10 Mb/s single balanced twisted-pair PHYs, in the automotive and industrial environments

# Modified Objectives approved by Task Force, not yet by 802.3 (1 of 3)

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1. Preserve the IEEE 802.3/Ethernet frame format at the MAC client service interface.
2. Preserve minimum and maximum frame size of the current IEEE 802.3 standard.
3. Support a speed of 10 Mb/s at the MAC/PLS service interface.
4. Do not preclude meeting FCC and CISPR EMC requirements
5. Support for optional single-pair Auto-Negotiation
6. Support optional Energy Efficient Ethernet
7. Support 10 Mb/s **single-pair Ethernet** operation in automotive environments (e.g. EMC, temperature).
8. Support 10 Mb/s **single-pair Ethernet** operation in industrial environments (e.g. EMC, temperature ).
9. Do not preclude the ability to survive automotive and industrial fault conditions (e.g. shorts, over voltage, EMC, ISO16750)
10. Do not preclude working within an Intrinsically Safe device and system as defined in IEC 60079

# Modified Objectives approved by Task Force, not yet by 802.3 (2 of 3)

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## **11. Define performance characteristics of the following:**

- a. A link segment with a **single balanced pair of conductors** supporting up to 4 inline connectors for up to at least 15 m reach
- b. A mixing segment with a single balanced pair of conductors supporting up to at least 8 nodes, for up to at least 25 m reach**
- c. A link segment with a **single balanced pair of conductors** supporting up to 10 inline connectors for up to at least 1 km reach

## 12. Define a PHY:

- a. Supporting point-to-point half-duplex operation over the 15 m link segment**
- b. Optionally supporting full-duplex operation over the 15 m link segment**
- c. Optionally supporting half-duplex multi-drop operation over the 25 m mixing segment**

## 13. Define a PHY:

- a. Supporting point-to-point full-duplex operation over the 1 km link segment**

# Modified Objectives approved by Task Force, not yet by 802.3 (3 of 3)

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14. Support fast-startup operation using predetermined configurations which enables the time from power\_on\*\*=FALSE to a state capable of transmitting and receiving valid data to be less than 100ms
15. Maintain a bit error ratio (BER) at the MAC/PLS service interface of less than or equal to:
  - a.  $10^{-10}$  on link segments up to at least 15m
  - b.  $10^{-10}$  on mixing segments up to at least 25m***
  - c.  $10^{-9}$  on link segments up to at least 1000m
16. Specify one or more optional power distribution techniques for use in conjunction with 10 Mb/s single-pair Ethernet PHYs over one or more of the single-pair segments

# IEEE P802.3cg 10 Mb/s Single Twisted Pair Ethernet Adopted timeline

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- ✓ January 2017 – First Task Force meeting
- ✓ July 2017 – Objectives Finalized, Draft 0.1 (skeleton), all baselines presented
- ✓ September 2017 – Baselines selected, draft 0.9 for Task Force Review
- ✓ **November 2017 – Last features selected - Task Force Review D1.0**
  - Nov:D1.0, Jan:D1.1, ~~possible Feb 2018 extra off-cycle interim, D1.2~~
- March 2018 – **Complete Task Force Review(D1.2/1.3)**
- **May 2018 – Draft 2.0, enter working group ballot** (2 recircs: July:D2.1, Sept:D2.2) *[Probably at least July]*
- **Nov 2018 – D3.0 – enter Sponsor ballot** (2 recircs Jan'19:D3.1, Mar'19:D3.2)
- **June 2019 Standards Board approval**
  
- *[NOTE: only 1 meeting cycle slack spread between WG ballot and Sponsor Ballot]*

# Agenda (Multi-day)

Title	Presenters(s)	Affiliation(s)
Agenda	George Zimmerman, Chair, IEEE P802.3cg Task Force	CME Consulting/(ADI, APL Group, Aquantia, BMW, Cisco, Commscope)
802.3cg Ad Hoc Report	Peter Jones	Cisco
Liaison Reports: TIA TR42, ISO/IEC JTC1 SC25 WG3, ODVA	Valerie Maguire, TR42 Liaison James Withey, ISO/IEC Liaison David Brandt, ODVA Liaison	Siemon Company Fluke Networks Rockwell Automation
Review of 802.3cg Draft 1.1		
802.3cg Editor's Report	Valerie Maguire, Chief Editor	Siemon Company
COMMENT RESOLUTION (and presentations tied to comments)	Editorial Team	
Presentations Related to Comments		
Comment 19: PCS Receive State Diagram	Steffen Graber	Pepperl+Fuchs
Comment 43: MDIO Register Mapping	Steffen Graber	Pepperl+Fuchs
Comment 45: Clause 98 Timer Values	Steffen Graber	Pepperl+Fuchs
Comment 56: Intrinsically Safe Applications	Steffen Graber	Pepperl+Fuchs
Comments 71 & 72: 10BASE-T1L link segment return loss	Chris DiMinico	MC Communications/Panduit
Comment 74: Open issues on the 1000m link specification Draft 1.0 (12/20/17 adhoc, pp. 5-7)	Dieter Schicketanz	Reutlingen Univ.
Comment 74: Link Segment Mode Conversion	Chris DiMinico	MC Communications/Panduit
Comments 77, 99-101: Automotive Environmental Requirements (also to 802.3ch)	Natalie Wienckowski	GM
Comments 77 & 79: 10BASE-T1S MDI voltage tolerance and multi-drop powering	Chad Jones	Cisco Systems
Comments 111, 113-116, 121: Clause 147 figures	Piergiorgio Beruto	CanovaTech
Comment 134/135: Details for MDI connector specification according to IEC 61076-3-125	Matthias Fritsche	Harting
Comment 154: Figure 147-1	Conrad Zerna	Fraunhofer IIS

# Agenda (cont'd)

Title	Presenters(s)	Affiliation(s)
Presentations Related to Comments (cont'd)		
Comments 148, 149, 155: TX amplitude, PSD and Emissions	Conrad Zerna	Fraunhofer IIS
Comments 148, 149, 155: EMC/EMI measurements on 10BASE-T1S evaluation boards	Piergiorgio Beruto	CanovaTech
Presentations Not Related to Comments (as time permits)		
IEEE P802.3cg Mixing Segment Node Loading	David Brandt, Scott T. Griffiths	Rockwell Automation
10BASE-T1L Noise Test	Steffen Graber Marcel Medina	Pepperl+Fuchs Spirent
10Base-T1S Scrambler Analysis	Hongming An	MicroChip
10BASE-T1S Data-Rate Fairness	Sujan Pandey	NXP
Progressing the Draft, Motions and Task Force-only Business		
Motions and Straw Polls unrelated to PAR/CSD changes	All	
Editor's Report & Review	Valerie Maguire, Chief Editor 802.3cg	Siemon Company
Editor's wrap up - Motions and Straw Polls on draft	Valerie Maguire, Chief Editor 802.3cg	Siemon Company
Changes to PAR, CSD and Objectives (Tuesday Evening)		
Report on 802.3 10 Mbps Backplane Ethernet SG PAR/CSD modification comments received (10BPE SG to convene at this time)	Jon Lewis	Dell/EMC
Motions and Closing Business		
Motions and Straw Polls	All	
Discussion on path forward – action items	George Zimmerman, Chair 802.3cg	CME Consulting/ (various...)
Closing Business - Adjournment	All	



# Future Meetings

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- See: <http://www.ieee802.org/3/interims/index.html>
- May 802.3 Interim: Week of May 21, 2018
  - Pittsburgh, PA USA (Omni William Penn Hotel)
  - Schedule TBD, 802.3cg expected to be the end of the week, wed-fri
- July 802 Plenary: July 8-13
  - San Diego, CA USA (Manchester Grand Hyatt)
  - Schedule: Plenary meeting – expect to meet Monday - Thursday
- Anyone interested in hosting a interim meeting contact me or the IEEE 802.3 Executive Secretary [Steve Carlson](#).

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# Thank You!