Minutes
Control Protocols Working Group
14 October 2020
via WebEx

Presiding working group leader: Michael Lay; Candela Controls

Recording secretaries: Richard Nix & Karl G. Ruling; ESTA

Members attending:
   Bill Ellis; Candela Controls, Inc.; P; DR
   Bill McIntyre; Show Distribution Group, Inc.; P; CP
   Chris Kennedy; Chauvet Lighting; O; MP
   Daniel Murfin; Royal National Theatre; P; U
   Edwin S. Kramer; I.A.T.S.E. Local 1; P; U
   Eric Bloom; Westview Productions; P; DR
   Gary Douglas; Phospec Industries, Inc.; P; MP
   Hans Lau; I.A.T.S.E. Local 728; P; U
   Jason Potterf; Cisco; P; MP
   Jeremy Powell; Vectorworks, Inc; O; CP
   Jim Love; Tait Towers Manufacturing LLC; P; MP
   John David (Javid) Butler; Moda Light; P; MP
   John Valus Jr.; Lex TM3; P; CP
   Karl G. Ruling; ESTA; exf; G
   Marcus Bengtsson; disguise; P; MP
   Mark Primrose; Kino Flo, Inc.; P; MP
   Matt Didon; ON LX Limited; P; CP
   Maya Nigrosh; Sonos; P; MP
   Michael Karlsson; LumenRadio AB; P; MP
   Michael Lay; Candela Controls, Inc; A; DR
   Milton Davis; Doug Fleenor Design, Inc.; P; MP
   Mitch Hefter; USITT; P; U
   Nick Harper; Nick Harper; O; G
   Paul Beasley; Walt Disney Company; P; U
   Paul Kleissler; City Theatrical, Inc.; P; MP
   Peter Willis; Howard Eaton Lighting Ltd.; P; CP
   Rene Berhorst; MA Lighting; P; MP
   Richard J. Nix; ESTA; exf; G
   Rob Love; Insight Lighting; O; MP
   Robert Bell; Acuity Brands Inc.; A; MP
   Robert Goddard; Goddard Design Co.; P; MP
   Sam Kearney; Electronic Theatre Controls, Inc.; P; MP
   Scott M. Blair; Megapixel; P; CP
   Shawn Silverman; Lighting Infusion LLC; P; DE
   Simon Newton; Open Lighting Project; P; G
   Stijn Geysen; Luminex Lighting Control Equipment; P; MP
   Tucker Downs; Tucker Downs; O; G
   Ulrich Kunkel; E3 Engineering & Education for Entertainment GmbH; P; U
   Vangelis Manolis; AtlaBase Ltd.; O; CP
   Wayne David Howell; Artistic Licence Holdings; P; DE

Visitors:
   Dan Nguyen; LynTec
   Jason Marin; IATSE Local 1

1 Opening remarks
Michael Lay called the meeting to order at 10:04. He thanked people for attending and reminded people to mute their microphones when not speaking. He also asked people to silence their cell phones during the meeting.

2 Anti-trust and patent statements

2.1 Reading of the anti-trust statement
The following statement was read aloud to the assembly by Michael Lay:
ESTA and its members take seriously their obligation to comply with all applicable antitrust laws. Therefore, during this meeting and during all ESTA events, all discussions will be limited to those subjects that are permitted by the antitrust laws. All members should refrain from any discussion or mention of competitively sensitive subjects such as the current or future prices charged for any member product or services, current or future marketing plans or strategies, and current or future costs, including employee salaries. There also must be no agreement on the suppliers or customers that members will or will not do business with or the markets in which members will conduct business.

Violations of the antitrust laws can have serious consequences. If you have any questions or concerns about anything that is discussed at an ESTA meeting, please bring your concern to ESTA management. An easy to read pamphlet describing the antitrust laws is available from the ESTA staff.

Karl Ruling held a copy of the pamphlet in front of his webcam. No restraint of trade issues were reported.

2.2 Reading of the call for patents
The following statement was read aloud to the assembly by Michael Lay:
ESTA intends not to publish any standard that contains protected intellectual property, unless that information can be licensed by anyone for a reasonable fee. ESTA uses a process of open patent and copyright disclosures to implement its intent. ESTA does not conduct patent or copyright searches and does not warrant that its standards contain no protected intellectual property.

In keeping with the open disclosures policy, I ask if anyone present wishes to notify this working group of the existence of a patent, patent application, copyright, or other protected intellectual property that might protect material in a standard being developed by this working group. You need not be the holder of the patent or copyright to notify this working group of its existence.

Nothing was revealed.

3 Attendance and Membership

3.1 Requirements for membership
The following statement was read aloud to the assembly by Michael Lay:
Membership is open to all parties who are affected by the work of the group; membership in ESTA is not a requirement, but there is a $100/person/year participation fee to help fund the costs of running the Technical Standards Program. Voting members are required to attend meetings and vote on letter ballots. Any principal member and alternate that both miss three consecutive meetings or that miss three consecutive letter ballots will have their membership status changed to observer. This action will be taken at the beginning of the first meeting after such inaction and will be recorded in the minutes of that meeting.

Richard Nix said that the fee reminders had been sent out recently. He asked people to please respond. Pay the fee if owed. If they have already paid it, please report this so we can correct our records.

3.2 Introduction of attendees
Michael Lay introduced himself. Then Milton Davis introduced himself and read the list of participants, asking each to introduce himself/herself.

3.3 Determination of a quorum
Membership as of 23 September is 34 voters, which sets a quorum at 12, and the minimum number needed for

a supermajority vote at 18.

Michael Lay asked for a count of voting members. He asked people to use the raise hand function to indicate they are voters, and those on the phone (no raise hand function) to identify themselves by voice.

Richard Nix said that more than 18 voters were present.

Michael Lay said that the votes would be taken primarily by asking for opposition or abstentions, with consent being assumed otherwise.

3.4 Processing of new membership and status change requests

3.4.1 Changes to observer status
Due to lack of attendance, the following will be moved to observer status if this meeting is also missed:
    Peter Willis; Howard Eaton Lighting Ltd.; CP
    Simon Newton; Open Lighting Project; G

Both were present. No status change were made.

3.4.2 New applications
Richard Nix confirmed that there were no new applications to process.

3.5 Consensus body during the meeting

Delegate	Representing	Voting status	Int. cat.
Robert Bell	Acuity Brands Inc.	A	MP
Kevin Loewen	Acuity Brands Inc.	P	MP
Maurits van der Hoorn	Acuity Brands Inc.	A	MP
Pete Borchetta	Altman Lighting	P	MP
Wayne David Howell	Artistic Licence Holdings	P	DE
Bill Ellis	Candela Controls, Inc.	P	DR
Brent Boulnois	Candela Controls, Inc.	A	DR
Jim Ohrberg	Candela Controls, Inc.	A	DR
Michael Lay	Candela Controls, Inc	A	DR
Jason Potterf	Cisco	P	MP
Paul Kleissler	City Theatrical, Inc.	P	MP
Marcus Bengtsson	disguise	P	MP
Milton Davis	Doug Fleenor Design, Inc.	P	MP
Ian Campbell	Doug Fleenor Design, Inc.	A	MP
Ulrich Kunkel	E3 Engineering & Education for Entertainment GmbH	P	U
Steve Terry	Electronic Theatre Controls, Inc.	A	MP
Sam Kearney	Electronic Theatre Controls, Inc.	P	MP
Robert Goddard	Goddard Design Co.	P	MP
Peter Willis	Howard Eaton Lighting Ltd.	P	CP
John Huntington	I.A.T.S.E. Local 1	A	U

Delegate	Representing	Voting status	Int. cat.
Edwin S. Kramer	I.A.T.S.E. Local 1	P	U
Alan M. Rowe	I.A.T.S.E. Local 728	A	U
Matthew Ardine	I.A.T.S.E. Local 728	A	U
David Kane	I.A.T.S.E. Local 728	A	U
Hans Lau	I.A.T.S.E. Local 728	P	U
Mark Primrose	Kino Flo, Inc.	P	MP
Jim Bogdanowicz	Kino Flo, Inc.	A	MP
John Valus Jr.	Lex TM3	P	CP
Shawn Silverman	Lighting Infusion LLC	P	DE
Michael Karlsson	LumenRadio AB	P	MP
Stijn Geysen	Luminex Lighting Control Equipment	P	MP
Rene Berhorst	MA Lighting	P	MP
Leroy "Tripp" Oliver, III	Mainstage Theatrical Supply, Inc.	P	DR
Scott M. Blair	Megapixel	P	CP
John David (Javid) Butler	Moda Light	P	MP
Matt Didon	ON LX Limited	P	CP
Simon Newton	Open Lighting Project	P	G
Gary Douglas	Phospec Industries, Inc.	P	MP
Daniel Murfin	Royal National Theatre	P	U
Bill McIntyre	Show Distribution Group, Inc.	P	CP
Jon Hole	Signify	P	MP
Maya Nigrosh	Sonos	P	MP
Jim Love	Tait Towers Manufacturing LLC	P	MP
Julian Hoare	Tait Towers Manufacturing LLC	A	MP
Mitch Hefter	USITT	P	U
Paul Beasley	Walt Disney Company	P	U
Eric Bloom	Westview Productions	P	DR

Voting Status key: P = Principal voter, A = Alternate voter, I = Individual voter
Interest Category key: MP = Mass-market producer, CP = Custom-market producer,
   DR= Dealer or rental company, U = User, G = General interest, DE = Designer

Total votes possible	34	
	5	CP
	2	DE
	3	DR
Interest categories subtotals	1	G
	17	MP
	6	U

4 Approval of the minutes from the last meeting
See CPmin07-2020_DRAFT.pdf

Eddie Kramer moved to approve the draft minutes of the last meeting as written. The motion was seconded. The motion carried, with two abstentions and no objections.

5 Approval of agenda
Jason Potterf asked for adding an update at the end about IEEE activity with single-pair Ethernet. He suggested this be a standing agenda item.

Scott Blair moved to accept the agenda with this addition The motion was seconded. The motion was approved.

6 Old Business

6.1 Standards, Guides & Recommended Practice Maintenance
This is a placeholder in the agenda, so we don't forget to maintain them. Documents prefaced with an asterisk (*) are on the agenda elsewhere for reports or action.

ANSI E1.3 – 2001 (R2016), Entertainment Technology - Lighting Control Systems - 0 to 10V Analog Control Specification & Application Guide For ANSI E1.3 – 2004 Lighting Control Systems 0 to 10V Analog Control Specifications. (Revision, reaffirmation or withdrawal by 17 February 2021)

ANSI E1.11 – 2008 (R2018), Entertainment Technology - USITT DMX512-A, Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories. (Revision, reaffirmation, or withdrawal by 31 May 2023)

ANSI E1.17 – 2015 (R2020) Entertainment Technology - Architecture for Control Networks (ACN) (Revision, reaffirmation, or withdrawal by 23 March 2025)

*BSR E1.20 - 20xx, Remote Device Management over USITT DMX512. (In public review cycle)

ANSI E1.27-1 – 2006 (R2016), Entertainment Technology - Standard for Portable Control Cables for Use with USITT DMX512/1990 and E1.11 (DMX512-A) Products. (Revision, reaffirmation or withdrawal by 8 April 2021)

ANSI E1.27-2 – 2009 (R2019), Entertainment Technology - Recommended Practice for Permanently Installed Control Cables for Use with ANSI E1.11 (DMX512-A) and USITT DMX512/1990 Products. (Revision, reaffirmation or withdrawal by 21 July 2024)

ANSI E1.30-1 – 2010 (R2016), EPI 23, Device Identification Subdevice. (Revision, reaffirmation or withdrawal by 17 February 2021)

ANSI E1.30-3 – 2009 (R2019), EPI 25, Time Reference in ACN Systems Using SNTP and NTP. (Revision, reaffirmation or withdrawal by 21 July 2024)

ANSI E1.30-4 – 2010 (R2015), EPI 26, Device Description Language (DDL) Extensions for DMX512 and E1.31 Devices. (Revision, reaffirmation, or withdrawal by 25 September 2020)

ANSI E1.30-10 – 2009 (R2019), EPI 32, Identification of Draft Device Description Language Modules. (Revision, reaffirmation or withdrawal by 21 July 2024)

ANSI E1.30-11 - 2019, EPI 33, Transport of root PDUs over TCP (Published on 25 June 2019. Revision, reaffirmation or withdrawal by 22 March 2024)

ANSI E1.31 - 2018, Lightweight streaming protocol for transport of DMX512 using ACN (Revision, reaffirmation, or withdrawal by 31 August 2023)

*ANSI E1.33 – 2019, Transport of ANSI E1.20 (RDM) in an E1.31 environment (Revision, reaffirmation or withdrawal by 28 May 2024)

ANSI E1.37-1 – 2012 (R2017), Additional Message Sets for ANSI E1.20, Remote Device Management. (Revision, reaffirmation, or withdrawal by 18 May 2022)

*ANSI E1.37-2 - 2015, Additional Message Sets for ANSI E1.20 (RDM) – Part 2, IPv4 & DNS Configuration Messages. (Revision, reaffirmation, or withdrawal by 25 September 2020)

*BSR E1.37-4 – 201x, Remote Device Management over DMX512 Networks – File Transfer Control with Firmware Upload capabilities.(currently in public review cycle)

*BSR E1.37-5 – 20xx, General Purpose Messages for ANSI E1.20 RDM (currently in public review cycle)

ANSI E1.37-7 - 2019, Additional Message Sets for ANSI E1.20 (RDM) - Gateway and Splitter Configuration (Published on 05 July 2019. Revision, reaffirmation or approval by 04 May 2024)

*BSR E1.59 – 20xx, Object Transform Protocol

*BSR E1.63 Network Advertisement of Entertainment Protocols

*BSR E1.68 Recommended Practice to address DMX512 compliance and interoperability

Application Guide for ANSI E1.3 - 2001, Lighting Control Systems 0 to 10V Analog Control Specification

Recommended Practice for Ethernet Cabling Systems in Entertainment Lighting Applications

Supplement to the Recommended Practice for Ethernet Cabling in Entertainment Lighting Applications

Withdrawn standards
E1.45 - 2013 (W2015), Unidirectional Transport of IEEE 802 data frames over ANSI E1.11 (DMX512A)

E1.30-7 - 2009 (W2016), EPI 29, Allocation of Internet Protocol Version 4 Addresses to ACN Hosts

6.2 BSR E1.20 – 201x, Remote Device Management over USITT DMX512
Wayne Howell/Scott Blair: progress report.

Wayne Howell reported that the task group has decided on the direction of the comment resolutions, but they need to draft some text to implement the resolutions to four of them. The task group is targeting the January meeting to present comment resolutions and an updated draft to the working group. Wayne Howell thanked the team for their work.

6.3 ANSI E1.33 – 2019, Transport of ANSI E1.20 (RDM) in an E1.31 environment
Scott Blair/Sam Kearney: errata sheet progress report.

Scott Blair had no report. Sam Kearney said that there have been no additions to the errata sheet. There was discussion of having this errata sheet available for the working group to review in January 2021.

6.4 ANSI E1.37-2 - 2015, Additional Message Sets for ANSI E1.20 (RDM) – Part 2, IPv4 & DNS Configuration Messages, reaffirmation project
Public review and letter ballot both run through October 19.

Three people have not returned ballots, yet, reported Karl Ruling. Maya Nigrosh has cast an objection, which will trigger a recirculation and a lengthened ballot period. There was a discussion of Maya Nigrosh's objections and how to resolve them. Ruling urged voters to clearly decide and vote accordingly. What we don't want is the consensus of opinion to be that Nigrosh is correct in that the document is seriously flawed, but leave the supermajority of votes as Yes, to reaffirm it as is.

6.5 BSR E1.37-4 – 201x, Remote Device Management over DMX512 Networks – File Transfer Control with Firmware Upload capabilities
The last public review ended 9 April 2018. Peter Willis is the task group leader. Comment resolution progress report.

Peter Willis said that he had been out of circulation due to the COVID-19 pandemic. However, Willis reported that there is a task group meeting scheduled for this coming Friday (October 16), during which they will attempt to finish the draft resolutions for distribution at the next meeting.

6.6 BSR E1.37-5 – 201x, General Purpose Messages for ANSI E1.20 RDM
Scott Blair/Simon Newton: comment resolutions progress report.

Scott Blair reported that they have been meeting, with good progress. He hopes to have a draft document ready for public review in time for consideration at the January meeting.

6.7 BSR E1.59 - 201x, Object Transform Protocol
Dan Murfin reported that there were no public review comments. The task group has met and agreed that the document is ready for approval.

Dan Murfin moved that the draft standard be accepted as an ANS. Maya Nigrosh seconded the motion. The question shall be decided by letter ballot.

6.8 BSR E1.63 Network Advertisement of Entertainment Protocols
Jason Potterf/Kevin Loewen: progress report.

No report, reported Jason Potterf.

Shawn Silverman asked to be added to the task group. Michael Lay made it so.

6.9 BSR E1.68 Recommended Practice to address DMX512 compliance and interoperability
Javid Butler/Wayne Howell: progress report.

Javid Butler reported that there was a good task group meeting Friday, October 9. He reported that he has drafted testing procedure language. The task group will restart regular task group meetings. Lots of participants are in Europe, so they have to pick times that work for the span of time zones. He said he hopes to have a document to consider for public review in January.

6.10 Next Gen Transport study group
Jason Potterf/Maya Nigrosh: progress report.

Jason Potterf said that the task group is working on a requirements document to list what features are needed. Maya Nigrosh thanked the task group members for their research on the other protocols that exist now.

Tucker Downs asked if this is ready for a formal ANSI project proposal. Jason Potterf said it's not yet.

Michael Lay suggested that the work done so far be distributed to the working group so those who are not on the task group can learn what has been done.

6.11 Next Gen Luminaire Libraries study group
Dan Murfin/Sam Kearney: progress report.

Sam Kearney reported on lots of serious activity and name for the project is emerging: Universal Device Representation (UDR). Sam Kearney said that they are about ready to file a formal proposal, but they need to actually write the proposal. The proposal probably will presented at the January 2021 meeting.

6.12 Next Gen Study Group (Overall)
Jason Potterf/Maya Nigrosh: progress report.

Jason Potterf reiterated the prior reports. Michael Lay asked if this item needed to remain on the agenda. Jason Potterf suggested it should be at the front of the Next Gen agenda items list.

6.13 Protocol Security study group
Task group consists of Kevin Loewen (Co-leader), Paul Beasley (Co-leader), Daniel Murfin, Jason Potterf, Javid Butler, Jim Love, Marcus Bengtsson, Mark Primrose, Maya Nigrosh, Michael Karlsson, Michael Lay, Robert Bell, Sam Kearney, Shawn Silverman, Wayne Howell, and Matt Didon The task group is to evaluate our existing standards and current projects and make recommendations to the CPWG on how to meet these new legislative requirements. Kevin Loewen or Paul Beasley: progress report.

Paul Beasley reported that legislation on this matter is moving forward in many jurisdictions. There was a table drawn up on which of our protocols are the greatest exposure risk. The Ethernet-based protocols are obviously the most vulnerable. There is discussion but no conclusion yet on whether these protocols need to be changed or whether security can be provided by a standard describing a security wrapper, an add-on to the messages.

6.14 GitHub study group
GitHub study group: Jason Potterf (chairperson), Maya Nigrosh, Shawn Silverman, Scott Blair, Sam Kearney, Dan Murfin, Nick Harper, and Javid Butler. Progress report.

Jason Potterf gave a presentation of a draft PPT deck about GitHub repositories that will be presented at the next TSC meeting. There was discussion. Tucker Downs recommended GitLab. Sam Kearney said that GitLab had been considered. Kearney said they are similar, but GitHub was preferred.

After a long discussion, Michael Lay declared a 10-minute recess.

6.15 Task group leader coordination
Scott Blair is the official scheduling liaison between the CPWG task groups and Frances Thompson. At this time, no face-to-face events are planned.

> *BSR E1.20: Scott Blair and Wayne Howell*
> *BSR E1.37-2: Simon Newton*
> *BSR E1.37-4: Peter Willis*
> *BSR E1.37-5: Scott Blair and Simon Newton*
> *BSR E1.37-6: Simon Newton*
> *BSR E1.59: Dan Murfin and Maya Nigrosh*
> *E1.37-x: Video Walls Scott Blair*
> *E1.61 NAEP: Jason Potterf and Kevin Loewen*
> *E1.68: Javid Butler and Wayne Howell*

IPv6 Task Group: Jason Potterf
Next Gen Study Group: Jason Potterf and Maya Nigrosh
Plugfest Marketing Task Group: Michael Lay
NAMM Education Task Group: Milton Davis
Next Gen Transport study group: Maya Nigrosh and Jason Potterf
Next Gen luminaire library study group: Sam Kearney and Dan Murfin.
Protocol Security study group: Kevin Loewen and Paul Beasley
GitHub study group: Jason Potterf

7 New business

7.1 IEEE report on single-pair Ethernet
Jason Potterf reported that IEEE 802.3cg exists, and it provides two flavors of Ethernet over single twisted-pair cabling:
    10BASE-T1L: long 1 km, 18 AWG
    10BASE-T1S: short reach 15 to 25 m, 24-26 AWG
[A tutorial about it is at https://grouper.ieee.org/groups/802/3/cg/public/Jan2019/Tutorial_cg_0119_final.pdf.]

There are limitations as currently implemented. There is a new project, 802.3da, to make a more useful version of this single-twisted pair Ethernet. Jason Potterf says this looks possibly very useful for our industry. DMX512 cabling and the DMX512 network topology should work. Jason Potterf said he is very active in this project and is pushing our industry as a possible use case. PLCA would allow us to determine latency. (It's kind of like Token Ring.)

This will be a standing agenda report.

7.2 Other new business
None.

8 Other business and announcements

8.1 National Electrical Code (NEC) update
Mitch Hefter reported that the December/January Code Panel meetings will be virtual. He said that the Correlating Committee wants the definitions unique to each article in the NEC to be moved to the front of the NEC. That worries some people because it will require people looking at a definition in Article 100 to note the specific article to which it applies. There are proposals for PoE lighting in Article 700, Emergency Systems, and a proposed rewrite of Article 530 made by Alan Rowe, Steve Terry, Eddie Kramer, et alia.

Jason Potterf reminded the assembly that he is on Code Panel 18 representing ESTA. He will provide updates as appropriate.

8.3 Illuminating Engineering Society of North America (IESNA) update
Bill Ellis reported no news from the theatre or museum committees, or from the controls committee.

Mitch Hefter reported that the IES on-line library has been delayed, but it should be live at the end of this month (October).

8.3 Plugfests

8.3.1 Europe
Peter Willis reported that there are discussions for next year, but it is fairly sure it will not be face-to-face. It still will be an opportunity to introduce the work of the CPWG to a larger audience.

Wayne Howell reported that there is a move to make the European Plugfest be more of an educational conference.

8.3.2 USA
Michael Lay said that we are likely to move to an educational format, too, given that the probability of being able to safely meet in a room to plug equipment together is low for the foreseeable future.

8.4 Above & Beyond Awards
Information on the Above & Beyond Awards is at http://tsp.esta.org/tsp/news/award_recipients.html. Michael Lay reminded everyone to consider submitting a nomination.

8.5 NAMM "Believe in Music"
Karl Ruling reported that NAMM has cut our presentation time down considerably but discussions are still active about subject matter.

9 Schedule for future meetings
The meeting schedule may be found at http://www.esta.org/ESTA/meetings.php. There are no future meetings there now, but Karl Ruling said he was sure there will be.

10 Adjournment
Michael lay said that he and Milton Davis thank all the members of the working group for their participation. The number of volunteer hours is unmeasurable. He also thanked ESTA staff.

Scott Blair moved that the meeting adjourn. The motion was seconded. Hearing no objections, Michael Lay declared the meeting adjourned at 12:06.

Delegate	Representing	Voting status	Int. cat.
Cameron Affleck	Cameron Affleck	O	U
Christian Allabauer	Christian Allabauer	O	G
Matthew Ardine	I.A.T.S.E. Local 728	A	U
Tim Bachman	Altman Lighting	O	MP
Nick Ballhorn-Wagner	Electronic Theatre Controls, Inc.	O	MP
Robert Barbagallo	Solotech Inc.	O	U
Tom Barthel-Steer	Electronic Theatre Controls, Inc	O	MP
Paul Beasley	Walt Disney Company	P	U
Robert Bell	Acuity Brands Inc.	A	MP
Marcus Bengtsson	disguise	P	MP
Justin Bennett	University of the Incarnate Word	O	U
Rene Berhorst	MA Lighting	P	MP
Andrew Berry	X-Laser	O	MP
Scott M. Blair	Megapixel	P	CP
Eric Bloom	Westview Productions	P	DR
Jim Bogdanowicz	Kino Flo, Inc.	A	MP
Pete Borchetta	Altman Lighting	P	MP
Brent Boulnois	Candela Controls, Inc.	A	DR
Justyn Butler	JBOTS	O	CP
John David (Javid) Butler	Moda Light	P	MP
Ian Campbell	Doug Fleenor Design, Inc.	A	MP
Jean-Francois Canuel	A.C. Lighting Ltd.	O	CP
Steve Carlson	High Speed Design, Inc.	O	MP

Delegate	Representing	Voting status	Int. cat.
Yongzhi Chen	Guangzhou Haoyang Electronic Co., Ltd.	O	CP
Anthony Chiappone	Chauvet Lighting	O	MP
Martin Chisnall	Martin Chisnall	O	U
Jon Chuchla	Audio Visual Systems, Inc.	O	G
Gareth Conner	Creative Conners, Inc.	O	MP
Fraser Connolly	Obsidian Controls	O	DE
Chris Conti	PRG	O	DR
Milton Davis	Doug Fleenor Design, Inc.	P	MP
Jeremy Day	Lumenpulse Group	O	MP
Steve Denim	Electronic Theatre Controls, Inc.	O	MP
Larry Dew	W.A. Benjamin Electric Co.	O	DE
Matthew Dews	Electronic Theatre Controls, Inc	O	MP
Matt Didon	ON LX Limited	P	CP
Rich Dionne	Purdue University	O	DE
Gary Douglas	Phospec Industries, Inc.	P	MP
Tucker Downs	Tucker Downs	O	G
Hamish Dumbreck	James Embedded Systems Engineering	O	MP
James Eade	ABTT	O	G
Bill Ellis	Candela Controls, Inc.	P	DR
Paul K. Ericson	Stantec	O	DE
Trevor Forrest	Helvar Lighting Control	O	MP
Mike Garl	Mike Garl Consulting LLC	exf	
Stijn Geysen	Luminex Lighting Control Equipment	P	MP

Delegate	Representing	Voting status	Int. cat.
Robert Goddard	Goddard Design Co.	P	MP
Nicolas Goerg	Rosco Laboratories	O	CP
Sean Goossen	LiteGear, Inc.	O	MP
Jerry Gorrell	Theatre Safety Programs	O	G
Erin Grabe	ESTA	exf	G
Matt Halberstadt	Electronic Theatre Controls, Inc	O	MP
Sean Harding	Port Lighting Systems	O	G
Nick Harper	Nick Harper	O	G
Robert Haycock	UC Berkeley	O	U
Mitch Hefter	USITT	P	U
Bill Hewlett	ImageCue LLC	O	MP
Julian Hoare	Tait Towers Manufacturing LLC	A	MP
Jon Hole	Signify	P	MP
Maurits van der Hoorn	Acuity Brands Inc.	A	MP
Wayne David Howell	Artistic Licence Holdings	P	DE
John Huntington	I.A.T.S.E. Local 1	A	U
Leroy "Tripp" Oliver, III	Mainstage Theatrical Supply, Inc.	P	DR
Rob Johnston	Interactive Technologies, Inc.	O	MP
John Valus Jr.	Lex TM3	P	CP
David Kane	I.A.T.S.E. Local 728	A	U
Michael Karlsson	LumenRadio AB	P	MP
Sam Kearney	Electronic Theatre Controls, Inc.	P	MP
Chris Kennedy	Chauvet Lighting	O	MP

Delegate	Representing	Voting status	Int. cat.
Bill Kirby	Crescit Software, Inc.	O	G
Paul Kleissler	City Theatrical, Inc.	P	MP
Lucas Korytkowski	Insight Lighting	O	MP
Edwin S. Kramer	I.A.T.S.E. Local 1	P	U
Christian Krueger	Blizzard Lighting LLC	O	MP
Ulrich Kunkel	E3 Engineering & Education for Entertainment GmbH	P	U
Jason Kyle	JPK Systems Ltd.	O	MP
Hans Lau	I.A.T.S.E. Local 728	P	U
Michael Lay	Candela Controls, Inc	A	DR
Hans Leiter	Electronic Theatre Controls, Inc.	O	MP
Jon Lenard	Applied Electronics	O	MP
Kevin Loewen	Acuity Brands Inc.	P	MP
Jim Love	Tait Towers Manufacturing LLC	P	MP
Rob Love	Insight Lighting	O	MP
Vangelis Manolis	AtlaBase Ltd.	O	CP
David McCulloch	David McCulloch	O	U
Bill McIntyre	Show Distribution Group, Inc.	P	CP
John Mehltretter	Lehigh Electric Products Co.	O	MP
Daniel Murfin	Royal National Theatre	P	U
John Musarra	John Musarra	O	U
Simon Newton	Open Lighting Project	P	G
Maya Nigrosh	Sonos	P	MP
Richard J. Nix	ESTA	exf	G

Delegate	Representing	Voting status	Int. cat.
Jim Ohrberg	Candela Controls, Inc.	A	DR
Jaxon Patterson	Insight Lighting	O	MP
Soren Sterdorff Peglau	Brother, Brother and Sons	O	MP
Jason Potterf	Cisco	P	MP
Jeremy Powell	Vectorworks, Inc	O	CP
Mark Primrose	Kino Flo, Inc.	P	MP
Gary Pritchard	LSC Lighting Systems PTY Ltd	O	MP
Charles Reese	Production Resource Group	O	DR
Alan M. Rowe	I.A.T.S.E. Local 728	A	U
Karl G. Ruling	ESTA	exf	G
Yngve Sandboe	Sand Network Systems, Inc.	O	MP
Nicolai Gubi Schmidt	Nicolai Gubi Schmidt	O	U
Larry Schoeneman	Larry Schoeneman	O	DE
Ford Sellers	Chauvet Lighting	O	MP
Shawn Silverman	Lighting Infusion LLC	P	DE
Bart Swinnen	Luminex Lighting Control Equipment	O	MP
Steve Terry	Electronic Theatre Controls, Inc.	A	MP
Richard Thompson	Electronic Theatre Controls, Inc	O	MP
Christopher B. Tilton	About the Stage, LLC	O	DE
Robert Timmerman	Signify	O	MP
Tracy Underhill	Triple C Lighting & Controls	O	G
Carlo Venturati	Clay Paky S.P.A.	O	MP
Will Wagner	Carallon Ltd.	O	MP

Delegate	Representing	Voting status	Int. cat.
Colin Waters	TMB	O	DR
Ralph Weber	ENDL Texas	O	G
Peter Willis	Howard Eaton Lighting Ltd.	P	CP
Loren Wilton	Showman Systems	O	CP
David Yellin	Sumolight GmbH	O	MP
Jeong Sik Yoo	Ghost LX	O	DE

Voting Status key: P = Principal voter, A = Alternate voter, I = Individual voter; O = Observer (non-voter); exf = ex officio
Interest Category key: MP = Mass-market producer, CP = Custom-market producer, DR= Dealer or rental company, U = User, G = General interest,
DE = Designer