ASHRAE Technical Committee 1.4

Meeting Minutes

TC 1.4 Control Theory and Application
http://tc14.ashraetcs.org/
Tuesday, June 27, 2017 1:00 – 3:30 pm
102AB (LBCC-1)
Long Beach, CA

"Commitment to the ASHRAE Code of Ethics – In this and all other ASHRAE meetings, we will act with honesty, fairness, courtesy, competence, integrity and respect for others, and we shall avoid all real or perceived conflicts of interests. (See full Code of Ethics: https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics.)"

TC1.4 Control Theory & Application	Tuesday 1:00-3:30p	102AB (LBCC-1)
TC 1.4 YEA/Education	Sunday 2:30-3:00p	Nieto (R-2)
TC 1.4 Control Components and Applicatic	Sunday 3:00-4:00p	Nieto (R-2)
TC 1.4 Program	Sunday 4:00-5:30p	Nieto (R-2)
TC 1.4 Research	Monday 2:30-4:30p	Seaside 4B (LBCC-SS)
TC 1.4 Handbook	Monday 4:30-6:30p	Seaside 4B (LBCC-SS)
TC 1.4 1746-RP	Monday 6:30-8:00p	Seaside 4B (LBCC-SS)
TC 1.4 Executive	Tuesday 7:00-8:00a	Seaside 3B (LBCC-SS)

Workshop 2: *Are You Ready for 21st Century Building Automation*	Sunday 8:00-9:00a
Seminar 3: *Smart Buildings, Smart Cities*	Sunday 9:45-10:45a
Seminar 14: *The IoT for Better Building Operation and Control and Applications: The Future of Guideline 13*	Sunday 1:30-3:00p
Seminar 19: *Preventing Headlines: Securing Building Automation Systems*	Monday 8:00-9:30a
Debate 2: *Commissioning Agents for Smart Buildings: Whose Side Am I On?*	Monday 9:45-10:45a
Seminar 35: *Using Nature, Keeping Control*	Tuesday 8:00-9:30a
Seminar 52: *Control System Best Practices: How to Make Your Control System Project a Success Part 1*	Wednesday 9:45-10:45a

1) Call to Order

2) Introduce Members, Guests, and Liaisons

3) Roll Call (Quorum)

	Gaylen Atkinson, 6/30/17		X	Mike Pouchak, 6/30/18
X	Kris Kinney, 6/30/17		X	Marcelo Acosta, 6/30/18
	Jeff Stein, 6/30/17		X	Ron Berstein, 6/30/19
X	Jim Coogan, 6/30/18		X	Joe Kilcoyne, 6/30/19
X	Mike Pouchak, 6/30/18			

4) **TC 1.4 Scope**

   a) ASHRAE Technical Committee 1.4 is concerned with control theory, systems, and components (excluding refrigerant flow controls) for heating, ventilating, air conditioning, and refrigeration uses.

5) **Approve agenda**

   a) Mike motions to approve. Joe seconds.

6) **Approve minutes from previous meeting (posted on website)**

7) **Announcements**

   a) Section Meeting announcements
   b) TAC
   c) RAC
   d) YEA
   e) TC1.4 Member Awards
      i) Barry, Mike P., Steve T., Joe, and Lin received distinguished member awards.
      ii) Committee to recognize and award Dave Kahn as the awards chair. (4-0) approved.

8) **OLD BUSINESS**

   a) PROJECT COMMITTEE AND ONGOING RESEARCH REPORTS

      i) SSPC 135 (BACnet)

         (1) Chad to reach out to BACnet chair to request they provide updates to TC1.4 at future meetings as there is interest in the TC to receive updates.
      ii) SGPC 13 (Specifying Building Automation Systems) – Kris Kinney
         (1) Making YouTube videos to provide guidance on SGPC 13.
      iii) GPC 36 (High Performance Sequences of Operation for HVAC Systems) – Mark Hydeman
         (1) GPC 36 is in public review through July 10, 2017.
      iv) 1746-RP (Validation of RP-1455 Advanced Control Sequences for HVAC Systems – Air Distribution and Terminal Systems) – Chad Moore
         (1) Sequences are in operation in one of the buildings. PMS is assessing the commissioning test scripts and current state. Sequences appear to be working, but the product needs to be further reviewed. Looking to ensure the project objectives are met.
      v) 1711-TRP (Advanced Sequences of Operation for HVAC Systems – Phase II Central Plants and Hydronic Systems) – Barry Bridges
         (1) Evaluation subcommittee has scored the bids and is ready to present for award.
         (2) 1747-RP DCV Standard 62.
            (a) A draft of the final report has been issued for review. Looking to approve in August.

b) SUB-COMMITTEE REPORTS

i)   Executive – Chad Moore

   (1) Rosters to be updated.

   (2) TC1.4 recommends awarding RP-1711 to the contractor recommended by the PES.

      (a) Mike Motions, Kris seconds. Vote 6-0-0 in favor. Chair voted. No one present from bidding firm during vote.
ii)   Control Components and Applications – Barry Bridges
   (1) Expanded discussion on the standardization of BAS graphics.
iii)   Program – Frank Shadpour
   (1) Vote to recognize Frank for outstanding service to the Programs committee. (5-0)
iv)   Education – Marcelo Acosta
v)   YEA – Joseph Kilcoyne
vi)   Handbook – James Del Monaco
vii)   Research – Kim Barker
viii)   Standards – Steve Taylor
ix)   Webmaster – Josepth Kilcoyne / Mike Pouchak

c) COMMITTEE LIASION REPORTS

i)   TC 1.5 (Computer Applications) – Mike Pouchak
ii)   TG 2 HVAC Security – Kim Barker
   (1) Guideline 29 will be presented for draft soon.
iii)   TC 5.6 (Control of Fire & Smoke)
iv)   TC 6.1 (Hydronic Systems) – Dave Kahn
v)   TC 6.7 (Solar Energy Utilization) – Gaylen Atkinson
vi)   TC 7.3 (Operations & Maintenance Management)
vii)   TC 7.5 (Smart Building Systems) –John House
   (1) People were inquiring about interest for a demand response guideline.
viii)   TC 7.6 (Systems Energy Utilization)
ix)   TC 7.9 (Building Commissioning) – David Bornside
x)   TC 9.10 (Laboratory Systems) – Jim Coogan
   (1) Looking to develop a lab control diagram to supplement the lab design guide recently issued.
xi)   TC 9.11 (Clean Rooms) – Phil Naughton should be the liason
   (1) Upcoming guide book is delayed.
xii)   SSPC 62.1 (Ventilation and Acceptable IAQ) − Len Damiano
xiii)   SSPC 90.1 (Energy Efficient Design of New Buildings) – Steve Taylor
xiv)   SSPC 202 (Commissioning Process for Buildings and Systems) – Barry Bridges
xv)   TC 1.6 (Terminology) – David Bornside
xvi)   SGPC 0.2 & 1.2 (The Commissioning Process) – David Bornside
xvii)   SPC134 (Graphic symbols for HVAC systems) – David Bornside
xviii) SPC 189 Design of High Performance Building – Bogi Setty

xix)   MTG Occupant Behavior in Buildings – Kim Barker

d) SOCIETY COMMITTEES

9) New business

a) **None noted.**

10) TC1.4 Roster Update

a) Marcelo Acosta – Chair
b) James Del Monaco – Vice Chair
c) Joseph Kilcoyne – Secretary
d) Chad Moore – CCA Sub-Committee Chair
e) Israa Ajam – Voting Member
f) Mark Hydeman – Voting Member
g) Jin Wen – Voting Member
h) Chariti – Voting Member

Chad (5-0) voted to recognize for extra year of service.

11) Upcoming Deadlines

a) For Winter Meeting in Chicago, IL January 20 – 24, 2018

i)   July 7, 2017 Final Conference Papers Submitted for Review.
ii)   July 24, 2017 Conference Paper accept/reject notifications.
iii)   August 1, 2017 Seminar, Forum and Workshop Proposals Due.
iv)   August 7, 2017 Revised Conference Papers/Final Technical Papers Due.
v)   August 21, Conference and Technical Paper Final Accept/Reject Notifications.
vi)   September 6, 2017 Seminar, Forum, Workshop Accept/Reject Notifications.
vii)   **Chicago Conference Tracks**

* Track 1: Systems and Equipment
* Track 2: Fundamentals and Applications
* Track 3: Standards, Guidelines and Codes
* Track 4: Earth, Wind & Fire
* Track 5: Transportation IAQ and Air Conditioning
* Track 6: Tall Buildings
* Track 7: Modeling Throughout the Building Life Cycle
* Track 8: Heat Exchange Equipment
* Track 9: Refrigerant Mini Track @ Expo
* Track 10: Residential Mini Track @ Expo

12) Next Meeting – Chicago, IL January 23, 2018

13) Adjourn

1) Young Engineers in ASHRAE (YEA) attendance included approximately seven YEA members, and approximately fifteen TC 1.4 non-YEA committee members.

2) Marcelo Acosta gave a brief overview of each subcommittee, active TC activities, and areas where interested YEA members could get involved.

3) YEA members then introduced themselves and provided a reason for why they are interested in control theory and applications.

   - Charlotte- P2S: Interested in waterside controls.

   - Andrew- Appalachian State: Interested in training material for a program for operations side. " More than a technical degree, less than a BS"

   - Jason- Hospital in NM: Interested in expanding knowledge base.

   - John- Nortek: Located in Toronto with computer science background.

   - Janetter- Nortek: Interested in expanding knowledge base.

   - Israa- Ecosystem: Interested in expanding knowledge base.

   - Michelle:-SC Engineers: Interested in expanding knowledge base.

4) The YEA/Education subcommittee is currently working on the following activities and is seeking YEA member participation:

   a) TC 1.4 YouTube Channel Video- involves filming, editing, and posting ASHRAE conference TC 1.4 special seminars as well as interviews of TC 1.4 members. The intent is to stream these videos directly from the TC 1.4 webpage.

   b) The Wikiversity Building Automation website set up by Marcelo Acosta still requires a lot of input to populate the various topics.

   c) A TC 1.4 Instagram account with short interview clips, exciting new technologies, high performing building highlights, etc. to attract younger engineers to the field.

5) Action items include:

   - Preliminary work for the Instagram

   - Content review for the YouTube and compilation by Ron Bernstein

Sub-committee: Control Components and Applications

Meeting Agenda: Sunday 29 January 2017

Meeting: 1500-1600, Sub Committee Chair Barry Bridges

SCOPE Includes: Components (Sensors, Actuators, Controllers, OWS), Networks, Control Applications Loops, Building management reporting

Components and Control Application "brainstorming session" lets TC 1.4 members and guests talk openly about issues and hot topics without being subjected to budgets or due dates.

Introductions Around the Room: Those in attendance verbally around the room and written on the attendance form provided with Name, Business affiliation. 27 :Attended.

Recognize Chad Moore who will be chairing this subcommittee.

Announcement: TC1.4: Programs at SAM2017: **Workshop 2** Are you ready for 21 century building automation? Sunday 0800 ; **Seminar 3** Smart Buildings, Smart Cities, Sunday0945. **Seminar 15** The IoT for better building operation and control, Sunday 1330; **Seminar 20** Preventing headlines: securing building automation systems, Monday 0800; **Seminar 36** Using Nature, Keeping control Tuesday 0800. **Seminar 53** Control System Best Practice How to make your control system project a success, Wednesday 0945

Discussion Topics Hot Topics from the last meeting

Data delivery interoperability infrastructure both the physical and software app need more uniform method to connect to various systems just how many apps should it take: one for lights inside, a different app for street lights, and a third for traffic lights; one for hvac, another for irrigation….you get the picture. Simalarly, is the issue for physical and data link infrastructure in cities.

Smart buiildings very young industry that has a lot of potential to integrate with smart cities. What is emerging is the advanced control but with vendors selling independent proprietary systems that require unique infrastructure. As a result the low bid phase one is different than phase two and the result is one vendor of half the city another for the other half, each has its own infrastructure Cities need to own their own infrastructure but there isn't a standard that would be a requirement for vendors to meet. Cities need TC 1.4 and GL 13 to help lead, because there is no existing path for the network itself, but there are infrastructure device requirements. For example the "Cobra head" street light itself has two standard connector plug configurations for the attachment of special function sensor on top of a pole.

Apps on a smart phone for IoT smart devices allow a home device to connect to phone, but if registered to a particular phone or ipad with several different devices each using several different apps dedicated to that device means multiple unique log ins to get to access a specific control

IoT means that what can be detected can be sent to a server for data analysis. Can we get connection from phone to the device to an analytic server to work in parallel for commercial BMS/BAS.

6

New user interface is neat for a single device, but more powerful if multiple devices can talk to each other or a common server for integrated presentation. Cloud implementation now is a tool for a manufacturer to connect to as simple a device as a toothbrush only so they can send reminder it is time to buy a new brush head.

Millennial "Vetted" Instagram 2 minute bursts of excitement: The intent is to create communication idea exchange; expand horizons of understanding; and develop interest in more details. The basic topic would be clearly presented and vetted to be accurate. Related discussion would naturally follow. Challenge to Marcelo and Michelle to execute on their promise to disseminate the presentation and generate interest in action they made in their Sunday Workshop "Are you ready for 21st century bldg automation"

Millennial case studies, as a real time Instagram discussion to be held by ASHRAE. Individuals would be encouraged to post a project or present something cool and then discuss. Michelle to attempt to set up some trials that are about a minute to read text, a two minute skype, or a 3 minute video.

Instagram is between friends not a formal ASHRAE exchange. But it needs to be technically credible at the start. The initial topicis a vetted presentation that may be ASHRAE involvement to make it accurate. A possible resource would be the speakers and programs at this conference. An interview of the author, and a couple of key slides would not be giving away the ASHRAE conference material, but rather create a teaser, to generate interest and energy. Social media to consider the YEA Facebook as a resource or Instagram as lead into a bigger audience.

Consider changing the nature of the CCA subcommittee (this meeting) to use the ongoing real time Facebook/Instagram a challenge as a topic generator for committee discussion. The challenge in the next 6 months is to experiment using an interview of Marcelo and Michelle and details from their workshop 2 "Are you ready for 21st century bldg automation" as starter.

Presentation of BAS information on GUI for the operator and dashboards.
GUI Good dashboards know what to present and how to do it. Background:
BAS system Graphics Control providers have done this as part of their product, but now decoupled as a third party BAS values link to graphics of multi-vender networks. There are **Integration issues for presentation** when there are multiple control networks. A sole source manufacturer's unique presentation creates difficulties with other control networked data, If a 3rd party provides graphics all control vendors have the same specification for integration to the graphic presentation. A graphics-visualization-team contract could have graphics built first and included in bid pack with the control vendors providing the objects to link.

A subtopic includes the need to have a graphic spec and resource library Need a BACnet like standard to tie it together. Is a BACnet workgroup for graphics possible or is it a new committee?…Is there a standard graphic for general application for all vendors equally. A New York city schools despite having open procurement however had a lead vendor with the default product that tied to existing accepted graphic formats. No other vendor could compete because they

needed to create the graphic from scratch. Consider splitting the product to have one bid for building automation and a different one for integration and presentation.

Graphics are not so important It is what the owner administration or maintenance user needs to see that makes the difference. Doing a storyboard of presentation examples is a way to get the owner involved.

There are now 158 or so existing functional HVAC profiles, that would allow all providers to have a same platform for integration. Perhaps there needs to be a GL 13.1 just for library of graphics, for the user to specify an M&O or energy manager view for each key user group. The vendor may may need to locate the same values or calculate special virtual points on graphics that look different for each needed view.

More than just a growing library of HVAC configuration is a defined format/theme/style the context for presenting data. The design drawing engineering could then import that description of context into the specification as a graphic requirement.

The memory provided in a device controller could house the manufacturers data and its graphic. The spec then would need to define the platform of how the material are presented. Will the inherent default be an IP based internet style? The Platform is perhaps easier to discuss as it has clear technical descriptions whereas the graphic is more of an art form and subjective interpretation. Invariably time and cost is involved in the artistic presentation at the end of the project.

The specification for integration of multi-vendor systems via BACnet is at present unclear. Should this be a working group for BACnet? Graphics may include other visual aids like trend logs or statistical analysis of alarm frequency.

The quality of the presentation may not be measured by attractive 3D animation, but by the density and diagnostic comparability of text-based tables. The specification may require the addition of a design floor plan from CAD as a bitmap background to provide locations and links to system details. The owner or design team could develop a graphics library, no graphics from scratch. If GPC 36 can define best of class controls, then why not best of class BAS graphics to provide an accepted platform for object presentation at the beginning. Anything missed in the review would need a change order.

Previous Topics
Design Install Collaboration Challenge Improved collaboration would include a **Specified preprogram meeting** (i.e. before code writing) to clear up issues before code is written or know the criticality of sensor/device selection. (a rugged dP sensor is worth more than a cheap first cost)

Integrated project delivery or design build are pathways that tend to be more collaborative then the separated-by-spec-section design bid build project. Project delivery is the **people, plan and specification collaboration** not the means and method. A good control spec is the best starting point.

GL 13 does not address collaboration but is a starting point for roles and responsibility

Commissioning professionals consider **team collaboration** as their responsibility. How are systems expected to interact and then write an FPT that will **truly challenge the system**. Test description identifies issues of clarity or discontinuities in operation. A clear design statement provides a place to correct for the next time. Value engineering without experience of unintended consequences may result in limited future expansion and little capacity with slow communication on completion of construction.

Manufactured/packaged control typically has limited flexibility and BAS can do limited adjustment because the optimized package includes safety/system protection that may not allow BAS adjustments for efficiency. A unit that is "digital ready" may have sensors with a wiring demark or a micro processor with a long list of potential parameters not all of which are active for a given product.

TC 1.4 "theory" to incorporate "model predictive control" a design tool to simulate different control strategies for a given system based on the assumptions of design. Use real data of actual installation to compare and improve the simulation or detect issues with actual construction.

Writing the perfect specification: Guideline 13, and 36 takes the mystery out of a ambiguous designer's intent as the Sequence of Operation. If not detailed enough then the Control Contractor interpretation is needed and might shift from manageable understandable words into difficult to comprehend program code.

An alternate pathway would be to provide an interpretation of common language that describes a sequence of operation that can translate the statements into actionable control code. Review of the code should show what was ambiguous. There is a DOE and Calif sponsored Tech Advisory Group, to pursue "open building controls" looking for volunteers.

BAS Security: Guideline 13 to include program integration and security? BAS Security for military and for federal buildings application, uses unified facility criteria, (UFC) to protect digital access to control system. **Guideline 13 to expand on cyber security requirements.** DoD Information Assurance Certification and Accreditation Process (DIACAP) requirements are shifting to RMF, risk management framework. TC 1.4 to do a web-poll of interest for **GL 13 and GL36** for control systems?

Cyber security used to be easy with physical boundaries, but now data travels on potentially public IP, and wireless: Army core of engineers and Navy are looking at ITP standard ISA 62443-3-3 data security, and addressing HVAC control philosophy with IT need for security Encryption, authorization, authentication, Certification, Trust worthiness, and report unauthorized intrusion or attempt to access.

GPC 13: is discussing the addition of cyber security. The plan will add consulting engineers template of the topics to cover when considering the design of BAS. 1.5 Task force on cyber security reviews the risk assessment and overlap in the industry. Consider ISA industrial certification for building model.

Irrigation *Control part of the building environment with complex sensors and sequence of operation, but not part of BAS. BAS should consider all building subsystem not just energy.*

Self-learning Self-healing software to modify daily strategies especially setting the temperature of the floor slab over night for radiant cooling and to predict annual GSHP bore field strategy.

Magic Sensors in hospital detect infection in rooms. Microbial sensors provide instant reading and identification of the microbe. Measured c**ontaminants in the lab space** to minimize air required.

TC 1.4 Handbook Subcommittee

June 26, 2017 / 4:30 – 6:30
Long Beach Convention Center – Seaside 4B

1. **CALL TO ORDER**

2. **REPORT FROM APPLICATIONS HANDBOOK LIAISON (Bryan Holcomb)**

    2.1. TBD

3. **NEW BUSINESS**

    3.1. The next deliverable for TC1.4 is the editing of Applications Chapter 47 Design and Application of Controls. **James Del Monaco** Our goal is to approve the chapter edits by July 1, 2018. After the conclusion of Las Vegas, we have (3) meetings available to review and comment.

    3.2. HB edits approved and sent to liaison by March 1, 2018.

    3.3. Edits to the Chapter will be done using the ASHRAE Authoring Portal (AAP). The link to the portal is as follows: www.portal.ashrae.org. Internet Explorer and Microsoft Edge are the only compatible browsers. During a test run, several users had issues logging in.

    3.4. Recommend using schematics and sequence language from GP36 to be used in Chapter 47.

    3.5. Add section on single-zone VAV controls.

    3.6. Address the control of fan arrays.

    3.7. Steve Taylor will provide CAD drawings of the GPC 36 schematics.

    3.8. May need to define Rogue Zones and coordinate with TC1.6 and GPC 36.

    3.9. Marcelo Starts at beginning and ends at the start of cooling systems.

    3.10. Chad will do cooling systems

    3.11. James Del Monaco will start on Air Systems and proceed until Constant Volume (CV) Systems

    3.12. Dave Kahn will start at CV systems and work up until Humidity Control.

    3.13. Barry to take Humidity control up until Special Design Considerations.

    3.14. JDM to take from Special Design Considerations until the end of the Chapter.

    3.15. Dave Kahn to work on References/Bibliography.

    3.16. Dave recommends update the index and keywords. Cross reference between the TC 1.6 Terminology.

    3.17. Chariti will review edits by others.

4. **NEXT MEETING AND SCHEDULE**

ASHRAE Technical Committee 1.4

4.1. 4:30-6:30 Monday January 22, 2018 Winter meeting in Chicago, IL.

5. **Adjourn**

Adjourn at 6:30

TC 1.4 Handbook Subcommittee Attendance List

Present	Name	
X	James Del Monaco	
X	Barry Bridges	
X	Chariti Young	
X	Dave Kahn	
	Kim Barker	
X	Chad Moore	
	Ryan Tanner	
	Gary Cole	
X	Marcelo Acosta	
	Chris Benson	
	Mike Poucheck	
Liaisons		
	Holcomb	Applications Handbook Liaison
	Bob Walker	Liaison from TC 6.1 Valves
	Bass Abushakara	Fundamentals Handbook Liaison

TC 1.4 – PROGRAM SUBCOMMITTEE
ASHRAE SUMMER MEETING
LONG BEACH - JUNE 2017

The subject meeting was held on Sunday, June 25, 2017 starting at 4:00 PM following the Components and Control Applications Subcommittee meeting. The attendees remained. The sign-in sheet is attached. Special thanks to the active members of TC 1.4.

Programs Presented in Long Beach: June 24 - June 28, 2017
1. Workshop 2: Are You Ready For 21st Century Building Automation?

Chair: Marcelo Acosta,
Sunday, 8:00 AM - 9:00 AM, Room: 101B
2. Seminar 3: Smart Buildings, Smart Cities

Chair: Joseph Kilcoyne
Sunday, 9:45-10:45 AM, Room 201A
3. Seminar 14: The IoT for Better Building Operation and Control (Cosponsored TC 7.5)

Chair: Michael Brambley
Sunday,1:30 PM - 3:00 PM, Room: 202AB
4. Seminar 19: Preventing Headlines: Securing Building Automation Systems

Chair: Michael Pouchak
Monday, 8:00 AM - 9:30 AM, Room: 103AB
5. Debate 2: Commissioning Agents for Smart Buildings: Whose Side Am I On?

Chair: Frank Shadpour
Monday, 9:45 AM - 10:45 AM, Room: 203AB
6. Seminar 35: Using Nature, Keeping Control

Chair: James Coogan
Tuesday, 8:00 AM - 9:30 AM Room: 102AB
7. Seminar 52: Control System Best Practices: How to Make Your Control System Project a Success

Chair: Kris Kinney
Wednesday, 9:45 AM - 10:45 AM, Room: 201A

Anticipated Programs for Long Beach That Did Not Take Place:
1. Technical Paper: **Degradation of the Control Systems!**

Chair: David Underwood
2. Seminar: **Can't we just get along? Controls projects Best Practices! (Part 2)**

Chair: Michelle Shadpour
3. Workshop: **Air Flow Control Performance – Defining and Measuring**

Chair: Jim Coogan (Cosponsor TC 9.10)
4. Forum: **Control Networking Protocols for Dummies!**

Chair: Mike Pouchak (TC1.5 Cosponsor)
5. Debate: **BAS Graphics – Integrating Multiple Masters, Who is the Boss?**
Chair: Chariti Young

Programs Proposed for 2018 Chicago Annual Meeting Jan 20 - Jan 24, 2018
1. Seminar: **Can't we just get along? Controls projects Best Practices! (Part 2)**
Chair: Marcelo Acosta

2. Seminar: **Air Flow Control Performance – Defining and Measuring**
Chair: Jim Coogan (Cosponsor TC 9.10)

3. Workshop: **How do we control the pressurization is Hospitals?**
Chair: Chad Moore (Cosponsor 9.6)

4. Forum: **Marry the Mission, Date the Method? Making ASHRAE Relevant to Millennials!**
Chair: Michelle Shadpour (TC7.5 Cosponsor)

5. Debate: **BAS Graphics – Integrating Multiple Masters, Who is the Boss?**
Chair: Marcelo Acosta

6. Seminar: A**dvance sequences are optimal – Getting there, Not so much!**
Chair: James Del Monaco

7. Seminar: **Field Vs. Factory program control – How do you specify both?**
Chair: Charity Young

8. Seminar: **Integrating BAS data into the IoT.**
Chair: Joseph Kilcoyne

ASHRAE Technical Committee 1.4

Program "Pipeline" for Future Meetings:
1. "Be Alarmed at what your BAS is not Telling You: Is no news really good news?"

2. Web-Services. XML, SOAP: How Do I Get Non-Traditional BAS Information and Use It for My Building Automation.

3. Controls, Fuel cells, Cogeneration and Micro-cogeneration

4. Data Analytics… What interesting information can be derived from BAS data?

5. Special Sensors: Contaminants and Microbial Sensors

Proposed Tracks for 2018 Chicago Winter Conference January 20 - January 24, 2018
1. Track 1: Systems and Equipment

2. Track 2: Fundamentals and Applications

3. Track 3: Standards, Guidelines and Codes

4. Track 4: Earth, Wind and Fire

5. Track 5: Transportation IAQ and Air Conditioning

6. Track 6: Tall Buildings

7. Track 7: Modeling Throughout the Building Lifecycle

8. Track 8: Heat Exchange Equipment

9. Track 9: Refrigerant Mini Track @ Expo

10. Track 8: Heat Exchange Equipment

Chicago 2018 Winter Conference Deadlines:
6/2/2017 Website opens for Technical Program proposals
7/7/2017 Final Conference Papers Due
8/1/2017 Technical Program proposals due
9/6/2017 Technical Program Accept/Reject Notifications
Presentations and Guidelines:
1. Conference Paper vs. Technical Paper: Conference paper is limited to eight (8) pages, the timeline is shorter and the review process less rigorous than the technical papers currently presented in the Technical Paper Sessions.
2. Seminar and Forum Submissions: For Seminar submissions, they should include six (6) Learning Objectives and ten (10) Questions and Answers for the session.
3. Seminar Program Submission: 60 minutes (1-2 speakers) or 90 minutes (3-4 speakers).

Special Notes:
1. Up to five paid guest speakers
2. Submit presentations in dual units
3. TC 1.4 should make suggestions for tracks
4. Disclosures will be required for future presenters
5. Long Beach Seminars: 121 submitted, 61 presented
6. Long Beach Workshops: 13 submitted, 9 presented
7. Long Beach Forums: 11 submitted, 4 presented

Upcoming Meetings:
2018 Winter Chicago, IL
2018 Summer Houston, TX
2019 Winter Atlanta, GA
2019 Summer Kansas City, MO

Reminder:
✦   *Conference Paper vs. Technical Paper:* Conference paper is limited to eight (8) pages, the timeline is shorter and the review process less rigorous than the technical papers currently presented in the Technical Paper Sessions.
✦   *Seminar and Forum Submissions:* For Seminar submissions, they should include six (6) Learning Objectives and ten (10) Questions and Answers for the session.
✦   *Seminar Program Submission:* 60 minutes (1-2 speakers) or 90 minutes (3-4 speakers).

✦   ASHRAE Announcement: Conference, presentations will be REQUIRED to be uploaded before the conference opening onsite. If a presentation is not uploaded, the presenter will be assessed a strike, within our 3 strike program. If a presenter collects three strikes, he/she will not be selected to present at another ASHRAE conference.

These minutes stated herein were approved by TC1.4 program subcommittee on Sunday, June 25, 2017.
Submitted by: Frank Shadpour, PE
TC1.4 Program Subcommittee Chair
frank@scengineers.net