ASHRAE Technical Committee 1.4

Meeting Minutes

TC 1.4 Control Theory and Application
http://tc14.ashraetcs.org/
Tuesday, January 31, 2017 1:00 – 3:30 pm
Augustus III/IV (EMP)
Las Vegas, NV

TC1.4 Control Theory & Application	Tuesday 1:00-3:30p	Augustus III/IV (EMP)
TC 1.4 YEA/Education	Sunday 2:00-3:00p	Sicily (EMP)
TC 1.4 Control Components and Applicatior	Sunday 3:00-4:00p	Sicily (EMP)
TC 1.4 Program	Sunday 4:00-5:30p	Sicily (EMP)
TC 1.4 Research	Monday 2:30-4:30p	Siena (PRO)
TC 1.4 Handbook	Monday 4:30-6:30p	Siena (PRO)
TC 1.4 1746-RP	Monday 6:30-8:00p	Siena (PRO)
TC 1.4 Executive	Tuesday 7:00-8:00a	Sicily (EMP)

Seminar 20: *Fresh Insights on Building Automation: A Seminar by the YEA Group*	Monday 8:00-9:30a
Seminar 28: *When Good Valve Sizing Goes Bad*	Monday 9:45-10:45a
Seminar 27: *Specifying IoT, Cyber Security and Advanced BAS Sequences and Applications: The Future of Guideline 13*	Monday 9:45-10:45a
Seminar 7: *Designing for the Future – Planning Today's Buildings for Tomorrow's Policies*	Sunday 9:45-10:45a
TC 1.4 Seminar: *Want a Cutting Edge Career? Be in Controls!*	Tuesday 1:00-1:30p

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1) Call to Order

2) Introduce Members, Guests, and Liaisons

3) Roll Call (Quorum)
a) Jeff Stein
b) Jim Coogan
c) Mike Pouchak
d) Marcelo Acosta
e) Chad Moore
f) Joe Kilcoyne

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 Pouchak motion.

b) Jeff Stein seconds.

c) Voting Members: 5 Quorum (5-0)

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

a) Mike P motion to approve

b) Jeff Stein seconds

c) Approved (5-0)

7) Announcements

a) Section Meeting announcements
b) TAC
c) RAC
d) YEA

8) OLD BUSINESS

a) PROJECT COMMITTEE AND ONGOING RESEARCH REPORTS

i) SSPC 135 (BACnet)

(1) Carol. New addenda are under public review. Due in February.

(2) Proposing a second standard for TAGs. Look for this to be out for public review.

ii) SGPC 13 (Specifying Building Automation Systems) – Dave Kahn

(1) SGPC 13 is actively looking for new members for those interested.

iii) GPC 36 (High Performance Sequences of Operation for HVAC Systems) – Mark Hydeman

(1) GPC 36 has received a number of comments for public review and the Committee is on track to review these comments by June.

iv) 1746-RP (Validation of RP-1455 Advanced Control Sequences for HVAC Systems – Air Distribution and Terminal Systems – Chad Moore

(1) PI is in task 3. Implementation of sequences into building controllers. Report submitted right before this meeting so it has not yet been reviewed.
(2) Sequences have been implemented, but data is not available at this time.
(3) Per Steve, they're supposed to implement a functional test per the work statement.
(4) They are developing functional tests and will deliver to commissioning agent.
(5) Trends are not acceptable. The functional test's purpose is such that non-live buildings can use this test in the future.

b) SUB-COMMITTEE REPORTS

i) Executive – Chad Moore

(1) Finding new members for rolling off members

ii) Control Components and Applications – Barry Bridges

(1) System graphics for building automation and the different issues of integrating multiple control networks together into one package presentation.
(2) BAS security. This is being addressed by BACNet and GPC13.

iii) Program – Frank Shadpour

(1) TC 1.4 had (5) presentations in Las Vegas
(2) We are submitting (10) programs for Annual Conference in Long Beach.

iv) Education – Marcelo Acosta

v) YEA – Joseph Kilcoyne

(1) Combined YEA and Education
(2) Putting videos up online
(3) Wikivursity Webpage is set up and Marclo is looking to add content.
(4) TC1.4 organized YEA members to present at Las Vegas.
(5) Requested how control diagrams end up in a GUI.

vi) Handbook – James Del Monaco

(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.
(2) Handbook Liaison to receive chapter edits by July 31, 2018.
(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.
(4) The Handbook Team recommends using schematics and language from GP36.
(5) Chapter 47 has been split up between several reviewers who will present in Long Beach on their portion of the chapter.

vii) Research – Kim Barker

(1) Steve presented for Kim.
(2) Very few RTARs and work statements were presented. We need to start working on getting our work statements going as there's an opportunity.
(3) RP1747: CO2 DCV for multi-space systems. Project is extended until August 2017. Mostly complete. Need to finish simulation to see if C02
(4) RP1711: This is being re-bid in spring 2017.
(5) RP1661: Getting contractor on board in a few weeks.

viii) Standards – Steve Taylor

(1) 90.1 addendum in public review for occupied standby controls.

ix) Webmaster – James Del Monaco / Mike Pouchak

(1) Webmaster had to step down after St. Louis. James will be taking over to upload meeting minutes online.

c) COMMITTEE LIASION REPORTS

i) TC 1.5 (Computer Applications) – Mike Pouchak

(1) Discussed urban scale modeling and big data.

(2) 5 programs submitted and accepted in LV.

ii) TG 2 HVAC Security – Kim Barker
(1) Carol Monaco stepped in for Kim.
(2) Report will be out for review. Focuses on extraordinary events
(3)

iii) TC 5.6 (Control of Fire & Smoke) – No one present

iv) TC 6.1 (Hydronic Systems) – Dave Kahn
(1) Co-sponsored seminar with TC1.4 in LV.

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) Working on a laboratory method for testing FDD for commercial air-cooled package equipment

viii) TC 7.6 (Systems Energy Utilization)

ix) TC 7.9 (Building Commissioning) – David Bornside
(1) Barry. 0.2 and 1.2 subcommittees are looking for editorial changes over the next 6 weeks.

x) TC 9.10 (Laboratory Systems) – Jim Coogan
(1) Seminar on airflow control and performance is co-sponsored.
(2) Will link seminar with SPC-95

xi) TC 9.11 (Clean Rooms) – Jim Coogan
(1) No updates at this time.

xii) SSPC 62.1 (Ventilation and Acceptable IAQ) – Len Damiano
(1) Steve Taylor provided the update. Presented information that off-gassing would require ventilation to go up. Might sponsor reason to move quicker to fix.

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) SPC 195 Method of Test for Air Terminal Controls – Jim Coogan
(1) Want to promote its use. Currently not used as most don't know it exists.

xx) MTG Occupant Behavior in Buildings – Kim Barker

d) SOCIETY COMMITTEES – No updates at this time.

9) New business

10) Upcoming Deadlines

a) For Annual Meeting in Long Beach, CA June 24 – 28, 2017

i) February 6, 2017 Seminar, Forum and Workshop Proposals Due
ii) February 10, 2017 Revised Conference Papers/Final Technical Papers Due

iii) February 20, Conference and Technical Paper Final Accept/Reject Notifications

iv) **Long Beach Conference Tracks**

- Track 1: Fundamentals and Applications
- Track 2: HVAC&R Systems and Equipment
- Track 3: Refrigeration
- Track 4: Building Life Safety Systems
- Track 5: Controls
- Track 6: Commissioning: Optimizing New and Existing Buildings and their Operation
- Track 7: Net Zero Energy Buildings: The International Race to 2030
- Track 8: Residential Buildings: Standards, Guidelines, and Codes
- Track 9: Research Summit

11) Next Meeting – Long Beach, CA June 27, 2017

12) Adjourn

a) Jeff moves to adjourn

b) Marcelo Seconds

c) Vote 6-0 (Note: Marcelo Acosta came in late, as such earlier votes were at 5-0).

PLEASE SIGN IN "X" AND RETURN TO CHAIR			Sun			Mon		Tues	
Name	**Position**	**Affiliation**	YEA / EDUCATION	Components and Applications	Progams	Research	Handbook	Executive Breakfast	**Main Committee**
Voting Members									
Chad Moore	Member, Chair	Engineering Resource Group, Inc.	X	X	X	X	X	X	X
Marcelo Acosta	Member, Vice Chair	S.A. Armstrong, Ltd	X	X	X	X	X	X	X
Gaylen Atkinson	Member	Atkinson Electronics Inc							
Jeff Stein	Member	Taylor Engineering LLC							X
Jim Coogan	Member	Siemens			X				X
Joseph Kilcoyne	Member, Chair YEA	SC Engineers	X	X	X			X	X
Kristopher Kinney	Member	KECG	X	X	X	X			X
Mike Pouchak	Member	Honeywell International	X	X	X				X
Ron Bernstein	Member	Ron Bernstein Consulting		X	X				
Non-Voting Officers									
Barry Bridges	Chair, Control Components	Sebesta Blomberg & Associates	X	X	X	X	X	X	X
Charles Coward	MTG.EAS, Alternate	Waddell Engineering							
James M Del Monaco	Chair, Handbook	P2S Engineering				X	X	X	X
Frank Shadpour	Chair, Programs	SC Engineers, Inc.	X	X	X			X	X
Steve Taylor	Chair, Standards	Taylor Engineering				X			X
Kimberly Barker	Chair, Research	Siemens							
Corresponding Members									
Dave Kahn	CM	Denver, CO	X	X	X		X		X
Al Garza	CM	LNV							
Anthony Bruno	CM	Trane	x	X	x	X			
Boggarm Setty	CM	Setty & Associates Ltd							
Brent Eubanks	CM	Taylor Engineering							
Carol Lomonaco	CM	Johnson Controls Inc							X
Carol Qing Li	CM	Stantec							X
Chariti Young	CM	Automated Logic Corp		X	X	X	X		X
Christopher Frank Benson	CM	Total Building Commissioning							
Christopher Miller	CM	P2S Engineers Inc.							
Curtis Klaassen	CM	Energy Systems Engineering							
Darryl DeAngelis	CM	Belimo Americas							
David Bornside	CM	Siemens Building Technologies Inc							
David Branson	CM	Compliance Services Group, Inc.							
David Underwood	CM	CERL							
Dennis Stanke	CM, Standard Liaison								
Donald Hardin	CM	Enviromatic Systems							
Dr. Wangda Zuo	CM	University of Miami							X
Gregor Henze	CM	Univ of Colorado, Boulder							
Gregory Dobbs	CM								
Heejin Cho, Phd	CM	Mississippi State University				X			
James Gartner	CM	Four Seasons Environmental Inc							
Jim Tello	CM	San Diego Gas & Electric							
Jin Wen	CM	Drexel University				X			X

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John Fordemwalt	CM	Baseline, Inc.							
John House	CM	Johnson Controls Inc				X			X
John Kettler	CM	Kettler Control Consultants							
John Zhou	CM	The Trane Company							
Kevin Kerr	CM	Skyline Automation							
Larry Felker	CM	Belimo Americas	X						
Larry Fisher	CM	(Retired)							
Len Damiano	CM	EBTRON, Inc.							
Lindell Davidson	CM	Professional Design Quality							
Mark Hydeman	CM	Google				X			X
Mashuri Warren	CM	A S I Controls							
Michael Monahan	CM	Burns & McDonnell							
Michael Newman	CM	Cornell University							
Michael Schell	CM	AirTest Technologies							
Michael Wetter	CM	Lawrence Berkeley Lab				X			
Mike Gibson	CM	Pi Shape Incorporated							
Min Chien Tsai	CM	Alpha Tech							
Nemat Lotfi	CM	Energy Facility							X
Nicholas Gayeski	CM	KGS Buildings							
P Reid Hart	CM	Pacific Northwest National Labs							
Pankaj Kalore	CM	Miller Electric							
Paul Wacker	CM	Honeywell							
Peter Armstrong	CM	Masdar Institute				X			
Philip Haves	CM	Lawrence Berkeley Lab		X	X				
Raj Daswani	CM	Arup							
Richard Franseen	CM	Honeywell Inc							
Robert Coleman	CM	Trane Company							
Ryan Tanner	CM	C.U. Boulder							
Sean Graham	CM	DLB Associates							
Sharon Dinges	CM	Valent Air							
Shui Yuan	CM								
Steve Linn	CM	Siemens Infrastructure and Cities							
Steven Bushby	CM	NIST							
Steven McCloskey	CM	Delta							
Verle Williams	CM	Utility Services Unlimited Inc							
Xiaohui (Joe) Zhou	CM	Iowa Energy Center ERS DMACC							X
Xinlei Wang	CM	University of Illinois							X
Yan Chen	CM	Penn State							
Provisional Corresponding Members									
Aaron Smith	PCM	M&R Engineerinig							
Brian Bozell	PCM	ESD							
Bryan Rasmussen	PCM	Texas A&M University							
Charles A Miltiades	PCM	Mitsubishi Electric							

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Name	**Position**	**Affiliation**	YEA / EDUCATION	Components and Applications	Progams	Research	Handbook	Executive Breakfast	**Main Committee**
Christopher Amundson	PCM	Johnson Controls	X	X	X	X			X
Daniel Rollins	PCM	Michael Baker International							
Dario Petric	PCM	KLG LLC							
David John Pritchard	PCM	Arup							
Hailey Capps-Mick	PCM	IMI, plc							
Jia Chang Huang	PCM	PG&E	X						
John Murphy	PCM	Trane							
Michael Haas	PCM	AEI							
Zheng O'Neil, PHD	PCM	University of Alabama				X			X
ASHRAE Staff									
Bass Abushakra	2017 HB Fundamentals	Milwaukee School of Engineering							
Bryan Holcomb	2019 HB Applications	Environmental Air Systems							
Cameron Labunski	ALI/PDC	Tom Green and Company Engineers							
Christopher Phelan	Chap Tech Transfer Chair	Thermco							
Michael Vaughn	Staff Liaison	ASHRAE							
Nadar Jayaraman	Section 1 Head	Enbridge Gas Distribution, Inc.							
Shinsuke Kato	Research Liaison	University of Tokyo							
Thomas Lawrence	TAC Chairman	University of Georgia							
Guests (Please fill in Name and Affiliation)									
Alexander Dietrich	Guest	Ryerson Univ.	X						
Kevin Summers	Guest	Boiler Equipment Company	X	X	X				
Christoph Rebramon	Guest	Belimo	X	X	X				
Alyse Falconer	Guest	Interface Engineering	X						
Israa Ajam	Guest	NV5	X	X	X				
Chris Perng	Guest	ACEEE	X	X	X				
Akash Bhalia	Guest	Tecumseh Product Company	X	X	X				
Alex Scambos	Guest	Murphy Company	X	X	X				
David Shadpour	Guest	SC Engineers	X	X	X				X
Michelle Shadpour	Guest	SC Engineers	X	X	X				X
Mahroo Eftekhari	Guest	Loghborough Univ.	X	X	X	X			X
Dan Burns	Guest	Mitsubishi Electric Research Labs		X	X				
Tapan Patel	Guest	Corps of Engineers		X					
Riad Assaf	Guest	Lebanese Chapter		X	X	X			X
Reece Kiriu	Guest	Taylor Engineering		X					X
Jim Dong	Guest	ORNL	X	X		X			X
Lance Brown	Guest	Google	X	X	X	X			X
Jason Beu	Guest	RMH Group		X	X				X

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Name	**Position**	**Affiliation**	YEA / EDUCATION	Components and Applications	Progams	Research	Handbook	Executive Breakfast	**Main Committee**
Joe Furman	Guest	Automated Logic		X					
Adam Williams	Guest	Taylor Engineering		X	X				
Sidd Goyal	Guest	PNNL		X		X			
Katie Homstrom	Guest	Trane				X			
Paul Ehrlich	Guest	PNNL				X			
Bill Cerradzi	Guest	Stantec				X			
Joon-Ho Choi	Guest	Univ. of Southern California				X			
Ran Liu	Guest	China Building Design				X			

ASHRAE Technical Committee 1.4

Chad E. Moore, P.E., LEED
Chair, TC1.4

Reply to: **Engineering Resource Group**
350 Edgewood Terrace Drive
Jackson, MS 39206-6216
Tel: 601.362.3552
Fax: 601.366.6418
cmoore@ergms.com

TC1.4 Executive Subcommittee Meeting

Meeting Date: January 31, 2017
Sicily (EMP)

Agenda:

1. Briefing on each subcommittee

- YEA/Education – Continue for Long Beach? Yes, we will keep the 2 pm to 3 pm schedule on Sunday for Long Beach.
- Control Components and Applications. Discussed extending the committee meeting beyond an hour, however it was decided to leave it at one hour.
- Programs. TC 1.4 had 5 seminars at this meeting (a new record). The subcommittee plans on having 10 submissions for long beach.
- Research, Need volunteers to help develop RTAR's and WS's for potential research projects we have identified.
- Handbook, Applications Chapter 47, was broken into 5 sections and review captains assigned.

2. Roster Discussion

Marcelo Acosta – Chair.
James Del Monaco – Vice Chair.
Joe Kilcoyne - Secretary.

Voting Members:

- Jim Coogan 6/18
- Mike Pouchak 6/18
- Joseph Kilcoyne 6/19
- Ron Bernstein 6/19
- Issra Ajam – (new voting member after Long Beach)

- Chariti Young – (new voting member after Long Beach)
- Jin Wen – (new voting member after Long Beach)
- Mark Hydeman – (new voting member after Long Beach)

Subcommittee Chairs:

- CCA: Chad Moore agreed to be the new sub-committee chair.
- YEA: Nominated Michelle Shadpour
- Education: Marcelo Acosta
- Program: Frank Shapour
- Research: Kimberly Barker
- Handbook: James Del Monaco

New Business

- Email ballots, we need 100% participation.
- TC Activity Form.

Adjourn

TC 1.4 – PROGRAM SUBCOMMITTEE
ASHRAE WINTER MEETING
LAS VEGAS - JANUARY, 2017

The subject meeting was held on Sunday, January 29, 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 Chair and active members of TC 1.4.

Programs Presented in Las Vegas: **Jan. 28 - Feb. 1, 2017**

1. Seminar: **Designing for the Future –Planning Today's Buildings for Tomorrow's Policies**
   Seminar 7
   Sunday, January 29, 9:45 AM-10:45 AM
   Track: Effects of Climate Change on HVAC&R
   Chair: Joseph Kilcoyne

2. Seminar: **Fresh Insights on Building Automation: A Seminar by the YEA Group**
   Seminar 20
   Monday, January 30, 8:00 AM - 9:30 AM
   Track: Building Operation and Performance
   Chair: Joseph Kilcoyne

3. Seminar: **Specifying IoT, Cyber Security and Advanced BAS Sequences and Applications: The Future of Guideline 13**
   Seminar 27
   Monday, January 30, 9:45 AM - 10:45 AM
   Track: HVAC&R Systems and Equipment
   Chair: Kristopher L Kinney

4. Seminar: **When Good Valve Sizing Goes Bad**
   Seminar 28
   Monday, January 30, 9:45 AM - 10:45 AM
   Track: Fundamentals and Applications
   Chair: Robert C. Walker

5. Seminar: **Want a Cutting Edge Career? Be in Controls! An Open Session for YEA Members**
   TC1.4 Seminar
   Tuesday, January 31, 1:00 PM - 1:30 PM
   Track: Fundamentals and Applications
   Chair: Chad Moore

Anticipated Programs for Las Vegas 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 1)**
   Chair: Dave Kahn

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

4. Seminar: **Cutting edge technologies in DDC Systems**
   Chair: Jim Coogan

5. Seminar: **Preventing headlines - Securing Building Automation Systems**
   Chair: Mike Pouchak (TC1.5 Cosponsor)

6. Forum: **Control Networking Protocols for Dummies!**
   Chair: Mike Pouchak (TC1.5 Cosponsor)

Programs Proposed for 2017 Long Beach Annual Meeting June 24 - June 28, 2017

1. Technical Paper: **Degradation of the Control Systems!**
   Chair: David Underwood

2. Seminar: **Can't we just get along? Controls projects Best Practices! (Part 1)**
   Chair: Kris Kinney

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

4. Seminar: **Using Nature, Keeping Control**
   Chair: Jim Coogan

5. Seminar: **Preventing headlines - Securing Building Automation Systems**
   Chair: Mike Pouchak (TC1.5 Cosponsor)

6. Workshop: **Are Millennials Ready for the Controls of the Future?**
   Chair: Marcelo

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

8. Forum: **Control Networking Protocols for Dummies!**
   Chair: Mike Pouchak (TC1.5 Cosponsor)

9. Seminar: **Smart Buildings Smart City!**
   Chair: Joseph Kilcoyne

10. Debate: **BAS Graphics – Integrating Multiple Masters, Who is the Boss?**
    Chair: Chariti Young

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 2017 Long Beach Annual Meeting **June 24 - June 28, 2017**

Track 1	Fundamentals and Applications
Track 2	HVAC&R Systems and Equipment
Track 3	Refrigeration
Track 4	Building Life Safety Systems
Track 5	Controls
Track 6	Commissioning: Optimizing New and Existing Buildings and their Operation
Track 7	Net Zero Energy Buildings: The International Race to 2030
Track 8	Residential Buildings: Standards Guidelines and Codes
Track 9	Research Summit

Long Beach 2017 Annual Conference Deadlines:

01/02/17: Website opens for seminar, forum, and workshop proposals
01/16/17: Conference Paper Accept/Revise/Reject Notifications Due
02/06/17: Seminar, Forum and Workshop Proposals Due
02/10/17: Revised Conference Papers/Final Technical Papers Due
02/20/17: Conference and Technical Paper Final 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, Las Vegas and beyond*
4. *Disclosures will be required for future presenters*
5. *104 seminars submitted for Atlanta – 66 were accepted*
6. There are 89 TC's with 66/89 averages .74 seminars per TC
7. Marcelo Acosta's Seminar from Seattle is being used for LEED Training

Upcoming Meetings:

2017	Summer	Long Beach, CA
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, January 29, 2017.

Submitted by: Frank Shadpour, PE
TC1.4 Program Subcommittee Chair
frank@scengineers.net

TC 1.4 Control Theory and Applications
Research Subcommittee (RSC) Activities **Las Vegas – Jan 30 2017**

RSC Meeting Minutes:

1. Announcements

a) Tech Council
- RAC to look into more "Applied" Research
- Evaluate the concept of allocating Research funds for post project processing that will produce tools, presentations, etc. that add value to the membership and society (not just ASHRAE, but aligns with our mission)
  (1) Could be a second bid package for the post "data" research project to perform "applied research to make the tool.
  (2) Could be a line item budget for hiring outside services to "finish" the holistic research project not just Work Plan scope.

b) Updates
- Updated Research Manual will be posted after St. Louis. New milestones for PMS and other changes.
- Training material is being reviewed for placement on ASHRAE website
- RAC will place emphasis on PMS training (Chairs & committee) with new milestones.
- Research database is online with about 250 projects with more to follow.

c) Stats
- RTARs: 3 Accepted, 0 Rejected
- WSs: 1 Conditionally accepted, 3 Returned

d) Honors & Awards – need to submit nominees
- Service to ASHRAE Research – Sept 1st
- Homer Addams Award – Graduate Student with published paper – Dec 15.
- New Investigators Award – Dec 1st. One was just awarded from 16 nominations.
- Grant-in Aid – Mar 1st

e) Web-based Training Modules for RTAR, WS, PES and PMS.

f) WS and TRP's must have milestone chart and associated costs for each milestone as a percent of total project cost. Bidders may propose a different milestone chart with associated costs than suggested in the RFP. A questionnaire will be sent to PMS Chair at each milestone level to obtain project status. Payments at each milestone level will be made to the contractor only after approval of each milestone deliverables by the PMS.

g) Reminder:
- RTARs and WSs should be reviewed by liaison prior to submission to RAC. TC 1.4 Research Liaison is Shinsuke Kato RL1@ashrae.net and Art Giesler RACvchair@ashrae.net

2. Active Project Status:

Name	Project	PMS	Status
RP 1746	Field Validation of RP1455 Sequences	Chad Moore Kim Barker Kevin Ng Chariti Young	PMS met Monday. Some site limitation issues not allowing full implementation of FPTs.
RP-1747 **TC 4.3 w/1.4 Co-Sponsor**	Implementation of RP-1547 CO2-based Demand Controlled Ventilation for Multiple Zone HVAC Systems in Direct Digital Control Systems	Stanke, chair Len Damiano Raj Daswani Heejin Cho	PMS meeting to be held in Feb via conference call. Field testing complete. Energy simulations and final report all that is left. No cost extension to Aug 31 approved by TC 4.3.
RP-1711	Advanced Sequences of Operation for HVAC Systems – Phase II Central Plants and Hydronic Systems	Barry Bridges Marcelo Acosta Michael Hass Xiaohui Zhou Jason Atkisson Hooman Daneshmand	1 bid received from WS author. Re-bid project in spring 2017 with expanded recommended bidders list.

3. Pending Research Project Status:

Status	Project	Champion	Remarks
WS-1661 **TC 4.7 w/1.4 Co-Sponsor**	Development of Modelica Models for Evaluation of Supervisory Control Strategies	Michael Wetter Wangda Zuo Jeff Stein	Jeff Stein and PES met via conference call and selected a contractor. To be affirmed by TC 4.7.

4. Possible Research Project Status:

Status	Other TCs	Project	Champion	Remarks
RTAR-1805		Optimizing TES control with weather forecasts	Marcelo Acosta Heejin Cho	Returned rejected will revise and resubmit.
WS	Co-sponsor TC 6.1	Selecting Control Valves	Steve Taylor	Work statement under development.
IDEA	TC7.5	Applied Performance of Control Loops (RP-1587 Part !!)	Kim Barker Zheng ONeill	Need to develop RTAR
IDEA	TC5.3	Optimized control of Active Chilled Beam and Vav Cooling Terminal	Kim Barker	Need to develop RTAR
IDEA		Reset of space setpoints seasonally or using online daily forecast	Kim Barker Gwelen Paliaga	Determine if comfort and efficiency are improved by using seasonal space temperature setpoint reset or using next-day forecast obtained via internet. Also using forecast for pre-cooling strategies. Could start with simulation followed by real-building studies. {NEED RTAR]
IDEA		Effectiveness of Night Setback and Optimum Start	Barry Bridges Peter Armstrong Zheng O'Neill	B.Bridges (Champion). My need call-in meeting to discuss content of RTAR.
IDEA		Optimized Supply Air Temperature Reset Strategies	Steve Taylor Joe Zhou Jim Coogan Mike Pouchak	WS developed, needs review/comment by TC1.4 members. R.Chair to send WS out to members for review,
IDEA		Object Based HVAC Control & Advanced alarm strategies	Brent Eubanks Mark Hydeman Joe Zhou Kim Barker	Extend what GPC-36 has done with hierarchal alarms to reduce nuisance alarms, ensure critical alarms are not ignored.
IDEA		Controlling HVAC using effective temperature (ET)	Joe Zhou	Does using ET instead of drybulb temperature reduce energy efficiency? Simulation followed by field test. Joe looking for grad student to develop this.

Status	Other TCs	Project	Champion	Remarks
IDEA		Coordinating control of hybrid radiant and air systems for maximum efficiency	Phil Haves	Applies primarily to hybrid systems but also could apply to DOAS with respect to supply air temperature control.
~~**IDEA**~~		~~Open Generic Language for Control Systems – Phase I Proof of Concept~~	~~Michael Wetter~~ ~~Phil Haves~~ ~~Joe Zhou~~	
IDEA		Develop conventional sequences from MPC optimized sequences	Phil Haves	Near-optimum sequences developed from model predictive controls that are too cumbersome to work in realtime control systems.
IDEA		DOAS supply air temperature reset for VRF and WSHP systems	Steve Taylor Joe Zhou Jim Coogan	Reset logic is not straight forward due to heat recovery that occurs between interior and exterior zones.
IDEA		%kW vs, %CFM and %GPM curves for real systems	Steve Taylor Joe Zhou Jim Coogan	Real variable flow systems do not have ideal parabolic system curves because of closing dampers/valves. DP setpoint reset helps but actual and simulated performance don't match.
IDEA	7.9	Cost & benefits of commissioned building controls	David Underwood	When does building performance start to degrade. What are top ten items to look at on scheduled basis?
IDEA	7.5?	Mixed-Mode Building Control Sequences	Kim Barker	What is the current state of mixed-mode control sequences? What are people doing? What is recommended? Literature search,
IDEA		Dashboards II	Marcelo Acosta	What people need for GUI? How effective are they in terms of identifying faults, energy degradation, etc.
IDEA		Auto loop tuning??		Comparison of CQF for different manufacturer's implementation?? May be commercialism issue.
IDEA		Common GUI system graphics	Barry Bridges	

5. Research RTARs and WS Deadlines:

- March 15 for spring meeting
- May 15 for June meeting
- August 15 for fall meeting
- December 15 for January meeting

6. Adjourn:

7. In Attendance: See attached sheet.

MINUTES

TC 1.4 Handbook Subcommittee

January 30, 2017 / 4:30 – 6:30
Caesar's Palace – Siena

1. **CALL TO ORDER**
2. **REPORT FROM APPLICATIONS HANDBOOK LIAISON**
   - 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 Liaison to receive chapter edits by July 31, 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. Marcelo Starts at beginning and ends at the start of cooling systems.
   - 3.6. Chad will do cooling systems
   - 3.7. James Del Monaco will start on Air Systems and proceed until Constant Volume (CV) Systems
   - 3.8. Dave Kahn will start at CV systems and work up until Humidity Control.
   - 3.9. Barry to take Humidity control up until Special Design Considerations.
   - 3.10. JDM to take from Special Design Considerations until the end of the Chapter.
   - 3.11. Dave Kahn to work on References/Bibliography.
   - 3.12. Dave recommends update the index and keywords. Cross reference between the TC 1.6 Terminology.
   - 3.13. Chariti will review edits by others.
4. **NEXT MEETING AND SCHEDULE**
   - 4.1. 4:30-6:30 Monday June 26, 2017 Annual meeting in Long Beach, CA.
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

ASHRAE Technical Committee 1.4

TC 1.4 Control Theory and Applications

YEA / Education Subcommittee Meeting Summary **Las Vegas – January 31, 2017**

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1) Young Engineers in ASHRAE (YEA) attendance included approximately five YEA members, one YEA Regional Chair (YRC) and approximately 20 TC 1.4 non-YEA committee members.

2) After introductions, an overview was given of each subcommittee, active TC activities, and areas where interested YEA members could get involved.

3) 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) ASHRAE Conference presentations performed by YEA members. The seminar presented in Las Vegas titled ‘Fresh Insights In Building Automation - A Seminar By The Yea Group’ was very successful.

4) The YEA members in attendance requested the following from TC 1.4.

   a) Access to available control system graphical user interface demonstration sites in order to get a look and feel of the end product.

   b) Training that compares control diagrams and the resulting GUI graphics.

ASHRAE TC 1.4 Control Theory and Application

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.

Announcement: TC1.4: Programs at WAM2017: Seminar in TC Tues 1:00PM

Discussion Topics

Good dashboards know what to present and how to do it. Control companies can present dashboards, but it's not their typical product. There are Software companies that provide presentations of HVAC data. In either case the owner needs to ask for it. RP 1633 related to building interfaces and presentation of system data (aka the dashboard project).

BAS system Graphics from control providers were part of their product, but now it is decoupled and a third party makes the presentation. The values are linked into the graphic from multi-vender networks. With BACnet it is possible that various building system types except irrigation can communicate, but how to show it is an issue.

Integration issues for presentation when there are multiple control networks. A sole source manufacturer's 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.

Write **spec for any vendor to provide a uniform presentation** may limit bidders but none would have an advantage. Specifying a third party to create a graphic set for the systems means that company would need to capture objects from the various vendors. An alternate path would be for the owner to accept each vendor present their data and system specific graphics by way of individual IP addresses, leaving the owner to work multiple systems differently but from one to have several presentations via website search engines.

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 thee 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 to avoid graphics from scratch. The spec would require using the graphics library that is the owners property transferred for use in the project and could be a simple schematic or 3D in CAD. The team would review the template for modifications appropriate for each project. This would have an accepted platform for object presentation at the beginning. Anything missed in the review would need a change order.

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.
Use of a critical but unique dP sensor intended for industrial appllication at $1000 specifically selected for its persistent rugged accuracy provides the stability not provided by a $35 item VE alternative. In another example the BAS has limited speed and future expansion due to VE reduction of spare capacity.

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 spec collaboration** not the means and method. Better design statements spec and drawings are a critical first start. A good control spec is the best starting point. **GL 13** does not address collaboration but is a starting point for roles and responsibility for program control collaboration. Key concerns to integrate are the perspectives for the owner, designer and CxA.

Commissioning professionals consider **team collaboration** as their responsibility. It is important to know what systems, how they are expected to or actually will, interact and then write an FPT that will **truly challenge the system**. As the test is described, it becomes clear where there are issues of clarity or discontinuities in operation. It would be useful not only to know the general Cx process (as in GPC 0, 1), but also the **best practice specifics for the coordination of design and submittal into a practical FPT**.
.
The designer should not specify more than what they know and instead defer to the folks who are the experts i.e. the control provider. A clear design statement provides a place to correct for the next time. Value engineering without experience of unintended consequences may result in a system with limited expansion for the future and small capacity may have slow communication on completion of construction.

Manufactured/packaged control typically has limited flexibility and BAS can only do a limited adjustment because the optimized package includes safety/system protection that may not allow energy 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.

BAS Security: Kris Kinney spoke about a guideline 13 concern to include program integration and security to get more visibility. GPC 13 is looking for case study implementation that improved design. BAS Security (Keith Wintraoub) for military application, UFC unified facility criteria, applies for federal buildings, to protect from 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.

Security is not specified, but expected as best practice by the party of installation. Should TC 1.4 request a web-poll to find the interest or requirement to use **GL 13 and GL36** when designing control systems?

Cyber security used to be easy with physical boundaries, but now not only does data travel on potentially public IP, but even 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 alarm report of unauthorized intrusion or attempt to access. The goal would be to get 90% of vendors inside the security stack, <the whole system security fails if you give away your Pw>

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.

Previous Topics

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.

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.