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DRAFT

TC/TG/MTG/TRG MINUTES COVER SHEET

(Minutes of all Meetings are to be distributed to all persons listed below within 60 days following the meeting.)

TC/TG/MTG/TRG No. TC-1.4 DATE 06/22/2021

TC/TG/MTG/TRG TITLE Control Theory and Application

DATE OF MEETING Tuesday June 22, 2021 LOCATION Virtual

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
James Del Monaco	2019	Jin Wen	2017	Corresponding –
Chariti Young	2019			Provisional –
Brandon Gill	2018			Guests –
Larry Fisher	2018			
Chris Benson	2019			
Lotfi Nemat	2019			
Amanda Pertzborn	2019			

DISTRIBUTION: All Members of TC/TG/MTG/TRG plus the following:

TAC Section Head: Jennifer Leach, PE	SH1@ashrae.net
All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters (Research, Standards, ALI, etc.)	jkohler9@comcast.net ; ahmed.kashef@nrc-cnrc.gc.ca ; jatkisson@aeieng.com ; pharmeng@shaw.ca ; shammerling@ashrae.org
Steve Hammerling, Manager Of Research & Technical Services	MORTS@ashrae.net

Note: These draft minutes have not been approved and not the official, approved record until approved by the TC.



ASHRAE Technical Committee 1.4

Meeting Agenda

TC 1.4 Control Theory and Application

<http://tc0104.ashraetcs.org/>

Tuesday, June 22, 2021 1:00 – 3:30 pm EST Virtual Conference

“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>.)”

TC 1.4 Control Theory and Application	6/22/2021 1:00 PM
TC 1.4 YEA/Education	6/17/2021 1:00 PM
TC 1.4 Control Components and Applications	6/17/2021 2:00 PM
TC 1.4 Programs	6/17/2021 3:00 PM
TC 1.4 Research	6/18/2021 12:30 PM
TC 1.4 Handbook	6/18/2021 2:30 PM

Seminar 4	Solving BACnet/SC Management Challenges with Managed BACnet
Seminar 5	Impact of IoT on Building Controls
Seminar 17	Grid-Interactive Buildings: Impacts on Energy Use and Comfort
Seminar 22	Smoother Workflow for Controls Sequence Delivery: Standardizing and Digitizing the Process of Controls Sequences
Seminar 28	Application of Machine Learning in Future Proofing Building Operation
Seminar 29	Applying Machine Learning and AI Data-Driven Controls: Case Studies, Challenges and Lessons Learned
Seminar 49	Hands-On Demonstration: Automating Control Sequence Selection and Evaluation
Seminar 69	Strategies to Optimize Critical Exhaust Systems
Panel 1	Maintaining Control during a Pandemic: Lessons Learned from Adapting Building Automation Systems to Meet Changing Recommendations

1) Call to Order

2) Introduce Members, Guests, and Liaisons

3) Roll Call (Quorum)

X	James Del Monaco, 6/30/21
X	Christopher Benson, 6/30/23
X	Jin Wen, 6/30/21
	Larry Fisher, 6/30/22
X	Brandon Gill, 6/30/22

X	Chariti Young, 6/30/21
	Nemat Lotfi, 6/30/23
X	Amanda Pertzborn, 6/30/23

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) Amanda Pertzborn motions to approve. Brandon Gill seconds. Approved 5-0.

6) New business

- i) Executive Committee to Propose New Subcommittee for Consideration
 - (1) Focus will be on Disruptive Technologies to bring more visibility and dedicating time to this topic to inform potential research opportunities and programs
 - (2) Chris Benson to lead efforts and provide update at Las Vegas meeting
 - (3) Proposal will be being posted to Basecamp for additional input.
 - (4) Potential for Las Vegas for time to be dedicated to this topic, keep an eye out for the schedule.
- ii) Executive Committee to Propose 3 New Voting Members to start in July 2021
 - (1) If you're interested in being a Voting Member in the future, make sure you are on the official roster as a CM and be active in the subcommittees.
- iii) Open discussion/feedback on hybrid meetings in the future.
 - (1) Las Vegas is currently planned to be an in person meeting, but virtual allows us to reach a broader audience. There was general agreement that a hybrid option allowing remote participation for those not able to travel is the highly desirable, and will also be challenging.
- iv) Research Subcommittee - WS 1809
 - (1) Update from Kim
 - (a) WS 1809 was presented by Zen Oneil, sponsored by TC 7.5: Updating Reference Guide for Dynamic Models. TC 7.5 have requested 1.4 review the revised Work Statement as TC 1.4 co-sponsored the original WS. Research Subcommittee voted unanimously to propose the TC review the revised version and vote to approve the WS 1809.
 - (2) Motion to vote was made during subcommittee meeting to approve cosponsorship for WS 1809. Updates were sent previously to the Voting Members for review.
 - (a) Work statement is to gather updated dynamic models, not develop. Will also identify needs.
 - (b) The research committee recommended Jin Wen represent TC 1.4 as a liaison on the PES or PMS for this project when those subcommittees form.
 - (c) Motion is approved 5-0.
- v) Open forum
 - (1) Re-allocating or extending Sunday afternoon time to make time for disruptive technologies focused discussion.

- (a) Elise Backstrom brings up that the YEA Happy Hour typically occurs Sunday evening, so pushing the TC schedule later could impact the YEA attendance during the Programs Subcommittee.
 - (b) Could we extend earlier? As a part of the proposal, Chris Benson to identify possible conflicts through extending Sunday's TC meetings.
- vi) There was a motion by Chariti Young that TC 1.4 acknowledge the outstanding contributions of James Del Monaco over the last couple of years and thank him for his leadership.
 - (1) Chris Benson seconded.
 - (2) Approved - 3-0

7) Announcements

a) **TAC – Technical Activities Committee**

- i) Update on TAC initiative to reduce the number of technical groups
 - (1) TC ReOrg committee issued a final report.
 - (2) So far, TAC has approved 4 TC mergers – 3.2&3.3, 8.10&8.12, 9.4 & 9.8, 7.3&7.8. TC's 10.1 and 10.3 have approved a merger as well.
 - (3) More being considered.
 - (4) Annual reaffirmation process being performed.
- ii) Decarbonization Task Force Created.
- iii) ASHRAE Strategic Plan Extended Through 2025.
 - (1) Existing strategy was scheduled from 2019-2024.

b) **CEC – Conferences and Expositions Committee**

- i) Technical Program Statistics for Virtual Conference:
Conference Papers and Extended Abstracts
The following information was not provided by ASHRAE for this conference.
 - X conference paper abstracts submitted, X approved
 - X conference papers presented
 - X Conference Paper Sessions
 Technical Papers
 - X Technical papers received
 - X Technical papers presented
 - X Technical Paper Sessions
 Seminars
 - X submitted
 - X presented
 Panels
 - X submitted
 - X scheduled
 Workshops
 - X submitted
 - X scheduled
 Forums
 - X submitted
 - X scheduled
 Debates
 - X submitted
 - X scheduled
- ii) Upcoming conferences
 - 2022 Winter – Las Vegas, Nevada, Jan. 29 – Feb. 2
 - 2022 Annual – Toronto, ON, June 25-29

c) **RAC – Research Activities Committee**

- i) No major updates.

8) **OLD BUSINESS**

a) **PROJECT COMMITTEE AND ONGOING RESEARCH REPORTS**

- i) **SSPC 135 (BACnet) – Michael Osborne / Carol Lomonaco**
 - (1) Ron Bernstein reported that a lot of work toward semantic tagging and modeling has occurred in the past year for not only HVAC, but multiple domains in building automation.
 - (2) Paul Ehrlich reported that a related DoE project is supporting this committee. 223P has expanded to a broader effort than just semantic tagging, will allow users to develop a complete model, Steve Bushby is the chair of this effort. Suggestion to add 223P as a separate line item for report out for this Agenda moving forward.
- ii) **SGPC 13 (Specifying Building Automation Systems) – Ron Bernstein**
 - (1) Guideline 13 meets Friday. Reorganization of Guideline 13 is the current major effort for better flow and organization. Includes new sections on cyber security and re-writes of sections that were out of date regarding IT.
- iii) **SGPC 36 (High-Performance Sequences of Operation for HVAC Systems) –Steve Taylor**
 - (1) Jim Coogan reported that an addendum that recently went through public review regarding optimum start was discussed in depth and committee voted to proceed with addendum.
 - (2) Chariti Young reported that since the 2018 version, the committee has published a lot of addenda which will all be incorporated into the 2021 published version. Multiple addenda still actively in the works. There is a technical seminar regarding control standard 231. Addendum X & Y incorporate cooling and hot water plants, which are significant additions. Committee received approval to publish as a Word document.

b) **SUB-COMMITTEE REPORTS**

- i) **Executive** – James Del Monaco
- ii) **Education/YEA** – Michelle Shadpour
 - (1) Subcommittee discussed upcoming plans and TC Seminar for Las Vegas.
- iii) **Control Components and Applications** – Chad Moore
 - (1) Subcommittee had a lot of discussion on cyber security.
- iv) **Program** – Frank Shadpour
 - (1) 10 Seminars approved, 9 being presented for current virtual conference.
 - (2) For Winter Meeting, TC Seminar will occur during first half hour of main TC 1.4 meeting, open to everyone.
 - (3) 15 Proposals for Las Vegas.
- v) **Research** – Kim Barker
 - (1) Four active research projects ongoing for our TC. RP 1661 was granted an extension to the end of April and is expected to wrap up soon. RP 1865 was awarded but contract has not been signed, will likely begin after Jan 2022 meeting. RTAR regarding building operation and equipment key performance indicators has been approved but Work Statement has not been written yet.
- vi) **Handbook** – Charlotte Dean
 - (1) Handbook Central: authoring.ashrae.org

- (2) Working on chapter 48 for 2023 version of the Applications handbook which is due next year. Meeting monthly through Zoom, reach out to Charlotte if interested (charlotte.dean@p2sinc.com). The subcommittee is aiming to complete the chapter updates by the 2022 winter conference.

vii) **Standards** – Steve Taylor

viii) **Webmaster** – Elise Backstrom/Joseph Kilcoyne

c) COMMITTEE LIAISON REPORTS

- i) TC 1.5 (Computer Applications) – Mike Pouchak
- ii) TC 2.10 HVAC Security – Kim Barker
- iii) TC 5.6 (Control of Fire & Smoke)
- iv) TC 6.1 (Hydronic Systems)
- v) TC 6.7 (Solar Energy Utilization) – Gaylen Atkinson
- vi) TC 7.3 (Operations & Maintenance Management)
- vii) TC 7.5 (Smart Building Systems) – Jin Wen
- viii) TC 7.6 (Systems Energy Utilization)
- ix) TC 9.10 (Laboratory Systems) – Jim Coogan
- x) TC 9.11 (Clean Rooms) – Phil Naughton
- xi) SSPC 62.1 (Ventilation and Acceptable IAQ) – Steve Taylor
- xii) SSPC 90.1 (Energy Efficient Design of New Buildings) – Steve Taylor
- xiii) SSPC 202 (Commissioning Process for Buildings and Systems) – TBD
- xiv) SPC231P, CDL – A Control Description Language for Building Environmental Control Sequences – Paul Erlich

- (1) Focused on three primary efforts. First is defining function blocks. Also working on the actual format of what a file looks like in the language in two versions, one is CDL (control description language, uses Modelica) and the other is CEF (control exchange format, uses JSON).

- xv) TC 1.6 (Terminology) – Phil Naughton
- xvi) SPC 189.1 Design of High-Performance Building – Bogi Setty
- xvii) MTG Occupant Behavior in Buildings – Kim Barker
- xviii) MTG Cybersecurity – Kim Barker/Ron Bernstein

- (1) No new updates.

d) SOCIETY COMMITTEES

9) Upcoming Deadlines

- Las Vegas Winter Conference – January 29 – February 2, 2022
- Seminar, Forums, Workshops, Panels and Debates proposals for Las Vegas are due by August 2, 2021
- RTARs & Work Statements
- Conference Website: <https://www.ashrae.org/conferences/2022-winter-conference-las-vegas>
- Program Focus at Las Vegas Winter Conference
 - i. Track 1: HVAC&R Systems and Equipment
 - ii. Track 2: Fundamentals and Applications
 - iii. Track 3: Refrigerants and Refrigeration
 - iv. Track 4: Buildings at 360°: Buildings use a large share of a country's final energy, in particular for heating, cooling and various services. Papers and presentations explaining methods, equipment, systems and solutions to satisfy occupants' needs, to guarantee

buildings' performances and resilience, and to save resources (energy, water, etc.) will fit this track.

v. Track 5: Energy System Integration

vi. Track 6: Environmental Health and IEQ in the International Arena

vii. Track 7: HVAC for Industrial and Commercial Purposes – Challenges and Opportunities

viii. Track 8: Refrigerants, Safety, Performances

- 10) Chariti Young moved that TC 1.4 acknowledge the outstanding contributions of James Del Monaco over the last couple of years and thank him for his leadership. Chris Benson seconded. Approved 4-0-0.

11) Next Meeting – Las Vegas, NV | January 29 – February 2, 2022

12) Adjourn