



DRAFT Agenda

Prepared by Li Song

TC 7.5 General Meeting

6/27/2023

3:30:00 PM– 6:00:00 PM Eastern Time (ET)

Tampa Marriott Waterside, Grand Salon GHIJ (2)

To join virtually click the link below

<https://events.rdmobile.com/Asset/Download/11755163>

Wi-Fi Access:

Network: CommitteeMeeting

Password: Tampa2023

Schedule for TC 7.5 Meetings, Summer 2023:

Time in EDT

Committee	Date	Start	End	Location	Chair
Enabling Technologies	6/25/2023	1:30 PM	2:15 PM	JW Marriott Tampa, Armenia (3)	Mike Galler
Bldg. Operations & Dynamics	6/25/2023	2:15 PM	3:00 PM		Donghun Kim
Fault Detection & Diagnostics	6/25/2023	3:00 PM	3:45 PM		Liping Wang
Smart Grid	6/25/2023	3:45 PM	4:30 PM		Greg Pavlak
Honors and Awards	6/25/2023	4:45 PM	5:15 PM		Carol Lomonaco
Handbook	6/25/2023	5:15 PM	6:00 PM		Greg Pavlak
Research	6/26/2023	5:15 PM	6:00 PM	JW Marriott Tampa, Gasparilla (2)	Joe Zhou
Program	6/26/2023	6:00 PM	6:30 PM		Mike Brambley
Main TC	6/27/2023	3:30 PM	6:00 PM	Tampa Marriot Waterside, Grand Salon GHIJ(2)	Li Song

Committee	Link	Password
Enabling Technologies	Click here to join the meeting	qve5MY
BOD		
FDD		
Smart Grid		
Honors and Awards		
Handbook		
Program	Click here to join the meeting	o4D2Pu
Research		
Main TC	https://events.rdmobile.com/Asset/Download/11755163	TC7.5

1. Welcome (Li Song).
2. Roll Call and Introductions. Determination of quorum.

- Current voting members (ending month):
Srinivas Katipamula (June 2023); Liping Wang (June 2023); Eric Yang (June 2023); Joe Zhou (June 2023), Mike Galler (June 2025), Donghun Kim (June 2025), Carol Lomonaco (June 2025), Greg Pavlak (June 2025), Li Song (June 2025), Zheng O'Neill (June 2026), Kristen Cetin (June 2026).

<input type="checkbox"/>	Srinivas Katipamula
<input type="checkbox"/>	Liping Wang
<input type="checkbox"/>	Eric Yang
<input type="checkbox"/>	Joe Zhou
<input type="checkbox"/>	Mike Galler
<input type="checkbox"/>	Donghun Kim

<input type="checkbox"/>	Carol Lomonaco
<input type="checkbox"/>	Greg Pavlak
<input type="checkbox"/>	Li Song
<input type="checkbox"/>	Zheng O'Neill
<input type="checkbox"/>	Kristen Cetin

3. Scope

TC 7.5 is concerned with the performance and interactions of smart building systems, the impact of smart systems on the total building performance, methods for achieving more intelligent control and operation of building processes, interactions of smart buildings with utilities, and documentation of the benefits of smart buildings and smart building systems as they relate to energy consumption, cost of operation, maintenance, occupant comfort, building commissioning, operations, and impact of the SBS on utilities and natural resources.

ASHRAE Code of Ethics Commitment – Chair

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>.)

4. Changes to Agenda? (e.g. liaisons visiting)
5. Discussion/Vote on Approval of 2023 Winter (Atlanta) Meeting Minutes
6. Announcements
7. Liaison Reports: Section Head, Res/Std/Hbk/CEC, TC 1.4 (Chariti Young), TC 1.5 (Mike Galler), TC 7.3/7.8 (need new liaison; Chad Ruch?), MTG OBB (Zheng O'Neill), **MTG EBO (Patrick Villaume) TC 1.9/1.10 (Currently Glenn Remington but need to identify a new liaison), SPC 223 (Parastoo Delgoshaei)**
8. Fault Detection and Diagnosis Subcommittee Report (Liping Wang)
9. Enabling Technologies Subcommittee (Mike Galler)
10. Smart Grid Subcommittee (Greg Pavlak)
11. Buildings Operations Dynamics Subcommittee (Donghun Kim)
12. Research (Joe Zhou)
13. Program (Eric Yang)

14. Handbook (Greg Pavlak)
15. YEA (Kristen Cetin)
16. Honors and Awards (Carol Lomonaco)
17. Web Page (Mike Galler)
18. Membership (Li Song)
19. Old Business
20. New Business
21. Adjournment



Agenda - TC 7.5 Enabling Technology Chair Mike Galler

6/25/2023 1:30 PM to 2:15 PM JW Marriott Tampa, Armenia Room (3)



Scan for meeting link

[\(Online meeting link\)](#)

Subcommittee Scope: • The Enabling Technologies Subcommittee of TC 7.5: Smart Building Systems aims at exploring and developing technologies which will enable the development, implementation and commercialization of smart building applications such as fault detection and diagnostics, model-predictive control and optimization, and smart grid applications such as automated demand response. Three focal points of this subcommittee are **i) smart transducers**, such as sensors and actuators which provide diagnostic information, **ii) communications**, such as wireless devices and protocols enabling greater data exchange, and **iii) embedded metadata**, such as embedded equipment and system information to enable smart building applications. On these topics, the scope of this subcommittee includes identifying and sponsoring research projects, evaluating existing technologies, providing recommendations to building operators and practicing engineers, developing supporting tools for researchers in these areas, and organizing programs to disseminate research findings and advancements among ASHRAE members.

Agenda:

5 min	Call to Order- Introductions; Agenda
5 min	Chair Discussion- discuss need for review of subcommittee scope. If needed have online meeting later to discuss the possible changes to scope.
30 min	Program- Current meeting status and new idea proposals due for Chicago: Program (Seminar, Forum, Workshop, Debate and Panel) Proposals Due Aug 2. Next Annual: Chicago, IL January 20-24 2024
15 min	Update/Discussion of Active Project/RTARs/Work Statement- as needed.

Program: New Ideas Discussion

- How can ChatGPT be used at each stage of the building lifecycle?
- Electrification of buildings, how will this affect smart buildings? New vs retrofit?
- Refurbishing old buildings with new tech (energy, cyber): limitations, benefits, opportunities?
- Smart Transducers (sensors and actuators) update?
- Communications
- Embedded Metadata
- Open discussion on other topics

Program: Previous Meetings:

Optimizing Thermal Energy Storage Integrated with HVAC (2023 Winter, Chair Kyle Gluesenkamp)
Standardized Building Datasets for Benchmarking Control Algorithms, Energy Efficiency, Modeling and Decarbonization (2023 Winter, Chair Farhad Omar)
How Common are Residential HVAC Installation Faults, and How Can We Detect Them? Results from the DOE Building America Program (2023 Winter, Chair David Yuill)
Managing the Complexities of Cybersecurity (2023 Winter, Chair Carol Lomonaco)
SPIRE, WELL, Building EQ: New Certifications for Smart, Healthy and Efficient Buildings (2023 Winter, Chair David Yuill)
What Happened to our Hospitals after the COVID-19 Fiasco? HVAC Design, Control and Operation (Toronto co-sponsor with 1.4, Chair Frank Shadpour)
Developing an ASHRAE Standard/Guideline to Assess the Performance of Occupancy Sensor Systems in Buildings (Toronto, Chair Kristen Cetin)
Smart Buildings as a Transactive Energy Hub: Decarbonizing by Enhancing Building-to-Grid Interactions (Toronto, Chair Ron Bernstein)
The Importance of O&M to Energy Efficiency, Comfort, IAQ and Energy System Decarbonization (Toronto co-sponsor with 7.3, Chair Mike Brambley)
Impacts on Occupants' Experience in Grid-Interactive Efficient Building Operations (Toronto, Chair Li Song)
Cybersecurity, Securing Building Control Systems: Are We Meeting Industry's Needs? (Toronto, co-sponsor with 1.4, Chair Ron Bernstein)
Fundamentals of Division 25: Integrated Controls and Cyber Security

(Toronto, co-sponsor with 2.10, Chair Beth Tomlinson)
Using Building Automation to Safely Return to Classrooms after COVID-19 (Toronto, co-sponsor with 1.4, Chair Frank Shadpour)
Can Connected Buildings Save the Grid? (Toronto, co-sponsor with 1.9, Chair Randall Higa)
Gas sensing technologies – Zach Siefker, Kristen Cetin. Seminar 10 Building-Integrated Indoor Air Quality Sensors, (Las Vegas Jan 30, 11:00 AM – 12:30 PM)
Technology for Cybersecurity- supporting need for more seminars on topic.
Building-Smart Grid Interface- Glenn Remington Seminar 12 Renewables and the Smart Grid, (Las Vegas Jan 30, 11:00 AM – 12:30 PM)
New Sensing Technology- Chair: Carol Lomonaco
Impact of IoT on building control & monitoring (2021 Annual, Chair: Carol Lomonaco)

Research: Update/Discussion of Active Project/RTARs/Work Statement

Next Meeting Time- Chicago, same time? Do we need a virtual meeting between conferences?

Adjourn Meeting



Meeting Note

TC 7.5 Building Operations Dynamics

2:15 - 3:00 PM (EDT), June 25, 2023
JW Marriott Tampa, Armenia (3)

Prepared by Donghun Kim

Subcommittee Scope: The Building Operations Dynamics Subcommittee of TC 7.5 is concerned with the dynamic characteristics and interactions of comfort conditions, the active components of HVAC systems, the passive components of HVAC systems, control systems and operation strategies and the building. The committee is concerned with the methods of building system operation which minimize energy used through the consideration of dynamics and interactions. It is also concerned with methods which consider dynamic and interactive characteristics in the design or comfort conditioning systems.

Hybrid Meeting Link: [Click here to join the meeting](#)

- Meeting ID: 250 987 446 624
- Passcode: o4D2Pu
- Or call in (audio only): [+1 312667-7145](tel:+13126677145)..686837483#United States, Chicago
- Phone Conference ID: 686 837 483#

Agenda:

5 min	Call to Order	
	Self-introduction, announce the subcommittee scope and other announcements.	
15 min	Program	
	Current meeting status and new ideas proposals	See below for more information
10 min	Update/Discussion of Active project/RTARs/Work Statement	See below for more information
15 min	New ideas and discussions	

Last Meeting Summary:

- **40+** participants (excluding on-line participants)
- **4 new programs** discussed for Atlanta and/or Tampa (GEB with focused on renewable integration, control for agriculture and smart thermostat)
- 1 almost-final RP (RP-1661)
- 2 WS are on-going (WS-1812, WS- 1809)
- 2 RTAR dropped or moved to program. 3 RTARs are under development

Program Discussion (15 min):

Program	Title	Lead	Previous talks
1	What to do with optimal control?	Peter Armstrong	<p>Orlando: Peter is not in the meeting. No discussions.</p> <p>Virtual Conf (Austin): Peter is not in the meeting. Park this idea</p> <p>Chicago: Zheng will reach out to Peter for this item</p> <p>Phoenix: David will reach out to Peter for this item</p> <p>Las Vegas: Zheng will reach out to Peter</p> <p>Atlanta: no discussion</p>
2	Building Operations for Grow Applications?	Glen(retired), Linping and Carol	<p>Orlando: No discussions. Park this idea. Reach out to TC 9.12 (?)</p> <p>Virtual Conf (Austin): Liping, Li, Glen and Carol will have a following talk</p> <p>Chicago: Follow-up meeting for Phoenix or later. Glen is seeking for speakers</p> <p>Phoenix: Liping, Li song, Kelly Cunningham (PG&E) will reach out to Glen</p> <p>Lingping: Accepted but dropped due to in person requirement, resubmit to Toronto</p> <p>Atlanta: potentially rename (e.g., controlled environment for agriculture) and resubmitted to Tampa or Chicago (Carol, Linping cf. Glen retired)</p>
3	Grid-interactive efficient buildings for renewable energy integration and decarbonization	Li, Zheng, Donghun, Michael, Kriten	<p>Chicago: potential contents: update GEB-related on-going projects</p> <p>Phoenix: submitted and accepted to present in this Phoenix meeting</p> <p>ASHRAE WGGBI(?) is working on the same topic (David).</p> <p>Abed/Christie have a few speakers</p> <p>Task force building decarbonization</p> <ul style="list-style-type: none"> - Mike <p>Last: GEB for thermal comfort</p> <p>Atlanta: discussed a follow-up seminar after Las-Vegas and Toronto. It would focus on a renewable energy integration in Tampa (Donghun will send an email to Mike, Li, Joe and Kristine). TC 6.7 (Solar and Other Renewable Energies) could co-sponsor this.</p>

	New programs idea (Monday, February 27, 2023)		https://ashraem.confex.com/ashraem/s23/cfp.cgi <ul style="list-style-type: none"> • HVAC&R Systems and Equipment • Building Automation and Control Systems
	Smart thermostats for EE and Grid flexibility (Residential focused but commercial is ok)	Li, Donghun	Toronto: new idea.
	CALFEXHUB	Donghun	Atlanta: Donghun will reach out to CALFLEXHUB folks

Research Proposals Discussions (10 min):

Research	Title	Lead	Previous talks (~ Feb/2020, Orlando)
RP-1661	RP- 1661: Development and Validation of Dynamic Models for the Evaluation of Chilled-Water System Control Strategies in the ASHRAE Handbook	TBD	<p>Orlando: Li (PMS): need to tune the model, scopes need to be changed. May need another extension. Wangda (contractor): provides updates. Submit 60 pages of documentation to move forward for modeling. Finish implementation, debug controllers. Try to finish the debugging within 1-2 months. Asked for another one year NCE to April 2021.</p> <p>Virtual Conf (Austin): Asked for another one year no cost extension. Made a good progress.</p> <p>On-going: complete initial study (data center, data center + office buildings) and work on developing suboptimal schedule from optimal results</p> <p>Chicago: No cost extension. Made a good progress, move to the next stage of obtaining heuristic controls from optimal control behaviors</p> <p>Phoenix: detailed approach has been changed. On-going discussion for another no cost extension.</p> <p>Las Vegas: Committee members requested performing another simulation and got another 12 month extension (due May/2022).</p> <p>Atlanta: PMS approved final report & submitted . waiting for TC.</p>

WS (Work Statement)	WS- 1809: Updating reference guide for dynamic models of HVAC equipment	Heejin Cho	<p>Send out to RAC before the RTAR rules changed PTAR (Publication TAR). Co-Sponsored by 1.4 Has been reviewed by all voting members. 1/15/2019 – Approved by all. RAC provided comments back to the author Orlando: no updates from Heejin Cho. Zheng will follow up with Heejin Li and Zheng iterated with Heejin and Virtual Conf (Austin): Zheng will follow up with Heejin. Chicago: WS was revised and waiting for response Phoenix: revision was completed. Vote on the main meeting this Wed. Las Vegas: Submitted last year (Aug), received feedback from RAC. Toronto: RAC asked to move to PTAR. contacted the Heejin, no response yet Atlanta: no response yet from Heejin</p> <ol style="list-style-type: none"> 1. Does the old version (1998) still contain valid and useful information? 2. Are updates necessary? 3. Can TC 7.5 support? <p>Joe will contact Heejin</p>
WS-1812	A Survey Study on the Development and Application of Data-driven Model Predictive Control for Buildings	Jin, Zheng, Helia, Joe	<p>Vote (Aug 15, 2021): 6-0-0-5 (CNV) Submitted in Aug 2021. Working on the WS with a goal to submit the WS by March 15th. Atlanta: A WS was submitted to RAC after Toronto meeting</p>

RTAR ¹	Title	Lead	Previous talks (~ Feb/2020, Orlando)
1	Occupancy-Aware Control and Operation of HVAC Systems in Commercial Buildings	Zheng	<p>Vote (06-25, 2019): 6-0-0-5 (CNV) MTGOBB (12 approve, 0 against, 5 absent, voted on June 22 2021) Submitted in June 2021 Inquiring the status</p>

¹ Research Topic Acceptance Request

			Waiting for RAC response Atlanta: No discussion
2	How IoT impacts operators	Joe Carol Liping Wang Scott Hackel	Carol working on an outline. How to quantify impact – Li Song Dovetailing with enabling technologies. Update the title Orlando: Carol: No updates Li: should include Residential application. We will need to have another idea/RTAR and Zheng will help Li Carol: Does the new idea include homes or multi-family homes? Need to consider privacy, multi-stories, etc. Virtual Conf (Austin): Carol, Joe and Li will have the following meeting. Chicago: Park this idea Phoenix: No discussion Las Vegas: No discussion Toronto: No discussion Atlanta: park the idea
3	Link the productivity with occupancy-based control; Occupant in the loop controls	Ivo Martinac	Ivo Martinac – professor developing idea. The idea but needs to develop the team. Park this idea at this time Orlando: No updates. Park this idea, Zheng will follow up with Ivo. Virtual Conf (Austin): No updates. Park this idea. Chicago: Zheng will follow up with Ivo. Las Vegas: No discussion Toronto: No discussion Atlanta: park this idea
4	How does remote work environment impact on residential building load profiles and HVAC operations	Li Song, Zheng, Kristine	Atlanta: Move to seminar (Tampa or Chicago)



DRAFT Agenda

TC 7.5 Fault Detection and Diagnostics

Sunday, 6/25/2023 @ 3:00 PM– 3:45 PM EDT

Microsoft Team: [Click here to join the meeting](#)

Meeting ID: 299 647 249 358

Passcode: qve5MY

Prepared by Liping Wang

Subcommittee Scope: explore and develop technologies to detect and diagnose common faults in both commercial and residential buildings. The scope of this subcommittee includes (a) identifying and sponsoring research projects to develop new FDD technologies, evaluate existing FDD technologies; provide recommendations to building operators and practical engineers, and develop supporting tools for researchers in FDD areas, and b) organizing programs to disseminate research findings and advancements in FDD areas among ASHRAE members.

Agenda:

0:00	Call to Order	
	Self-introduction, announce the subcommittee scope.	
5 mins	Sessions at current ASHARE conference	
	Monday, June 26 8:00 AM – 9:30 AM EDT Seminar 21: Automated Fault Detection and Diagnostics Methods for Building HVAC Systems Michael Galler, Liping Wang, Burak Gunay, Jin Wen @ JW Marriott Tampa Water Street, Tampa Bay 2 Tuesday, June 27 11:00 AM – 12:30 PM EDT Seminar 49: Learned from BAS Data: The Most Common Operational Problems in HVAC Systems, and the Energy Savings from Fixing Them Yimin Chen, Srinivas Katipamula, David Yuill @JW Marriott Tampa Water Street, Tampa Bay 2	
	2024 ASHRAE Winter conference seminar ideas <ol style="list-style-type: none">1. Fundamentals and Applications2. HVAC&R Systems and Equipment3. Refrigeration and Refrigerants4. Decarbonization and Climate Change5. Hydronic Systems6. Ventilation, Indoor Air Quality and Air Distribution Systems7. Comfort, Indoor Environmental Quality and Energy Efficiency8. HVAC&R Controls	

	9. Project Delivery Methods August 2, 2023: Program (Seminar, Forum, Workshop, Debate and Panel) Proposals Due	
10 mins	Potential Seminar Ideas for 2024 ASHRAE Winter	
	Automated Alarm Management: DDC alarms used for FDD? Segment the alarm information into useful pieces. The building operator has to go through all the alarms. Make a presentation to collect information to make an RTAR is a goal. TC1.4: program will be the co-host. Carol is looking for speakers.	Carol Lomonaco, Kim Barker, Jason, Chirag
	Assessment of FDD in Guideline 36 Idea for ASHRAE 2023 conference Guideline 36 Demonstration (conferences in 2024)	Joe Zhou, Steve Taylor
	New program ideas?	
	Open source FDD (software) platform	Anthony, Chirag Parikh Natasha Milesi-Ferretti, Yan Chen
	Data-driven based FDD (Annex 81)	Zheng O'Neill, Jin Wen
	Update/Discussion of Active project/RTARs/Work Statement	
30 mins	WS 1812 Development of AFDD for leakage of ground-source heat pumps (work statement revision) TC 6.1 (potential co-sponsor)	Zheng O'Neill and Kristen Cetin, Zachary Siefker
	Evaluation of the Usability of ASHRAE Standard 207 Co-sponsor TC 7.9, Maybe TC 1.4	Led by John House David Shipley
	RTAR in draft: Automated fault detection and diagnosis (AFDD) for smart and connected communities based on holistic considerations of microgrids and buildings (Phase 1: modeling)	Liping Wang
	Research Ideas	
	User's experiences with FDD? How do users respond to the alarms, correct or false?	Austin Rodgers, PNNL Laura Towsley (laura.towsley@rycom.com). Scott West Eric Yang
	FDD for low GWP heat pumps Evaluate existing FDD methods for heat pumps/variable speed	Donghun Kim, David Yuill
	VRF (actual performance vs expectation) Standard & FDD for refrigeration systems	
	New ideas and discussions	



Meeting Agenda

TC 7.5 Smart Grid Subcommittee (Hybrid)

Sunday, June 25, 2023 | 3:45 pm - 4:30 pm

Meeting Room: JW Marriott Tampa, Armenia (3)

Virtual Meeting Info:

Join on your computer, mobile app or room device

[Click here to join the meeting](#)

Meeting ID: 299 647 249 358

Passcode: qve5MY

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Or call in (audio only)

[+1 312-667-7145,,887377277#](#) United States, Chicago

Phone Conference ID: 887 377 277#

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Subcommittee Scope: This subcommittee will explore and develop ideas and research work statements to improve the building and utility interactions (and more specifically the electric grid). The research will focus on developing enabling technologies for seamless interaction of smart building components and utilities and other building services. An important aspect of this work is to identify the information that is necessary to support smart building technologies, and to identify the requirements of communication protocols to support the exchange of this information between different building services buildings and utilities, between multiple buildings, with outside service providers.

The importance of a stable and reliable electric power grid to life and the economy in the 21st century has been underscored by two major events over the last decade: a major black out on the east coast of North America and wildly varying electricity prices in California during an attempt at restructuring the electricity marketplace. In response to these events many organizations have started research activities to find ways to modernize the grid. However, there are significant gaps in the research activities, especially as they relate to buildings. Since buildings consume over 70% of the electric in the U.S., they have to part of the solution to modernize the grid. ASHRAE has traditionally developed technologies, standards, and guidelines for buildings. Therefore, this subcommittee can play a major role in continuing this effort.

Minutes:

0:00	Call to Order	
5 min	Introductions, announce the subcommittee scope	
5 min	Relevant sessions at current ASHRAE conference	
10 min	Task Force for Decarbonization's Working Group on Grid-Building Intersection – WS for Publication to develop a Grid-Building integration guide for ASHRAE to publish	
15 min	Annual ASHRAE conference seminar ideas	
10 min	RTAR Ideas and Updates	
Adjourn		

Detailed Agenda

Call to Order

- Read scope
- New members – name – affiliation, new member
- Sign In Sheet:

Relevant Sessions at current ASHARE conference

Update: Task Force for Decarbonization's Working Group on Grid-Building Intersection – Work Statement for Publication to develop a Grid-Building integration guide for ASHRAE to publish

ASHRAE conference ideas

Winter 2024 - <https://www.ashrae.org/conferences/2024-winter-conference-chicago> - Jan 20-24, 2024

Deadlines:

- *August 2, 2023: Seminar, Workshop, Forum, Debate, and Panel Proposals Due*
- Previous/Current Ideas
 - Connected buildings for decarbonization - **Mike Brambley, Jamie Lian (lead)**,
 - Looking for speakers (send email to Mike)
 - Demand Flexibility for ongoing projects DOE BENEFIT – **Zheng O'Neill** will follow up with **Jin Wen** – for 2023
 - For Jun (3 speakers confirmed)
 - Connected Communities Field Deployment and Lessons Learned (*from summer 2021*)– **Helia Zandi (Jamie Lian will follow up and help coordinate.) Summer**
 - Follow up seminar/panel to *Grid-interactive buildings, what's impact on efficiency?* (*from Summer 2021 by Mike Brambley*) – **Eric Yang**
 - Suggestion to plan for a follow up seminar or panel on this topic.
 - Eric will follow up with Mike
 - Potential series related to GEB
 - Cybersecurity & Smart Grid - **Carol Lomonaco** from Summer 2021
 - Please email Carol if interested in contributing - carol.lomonaco@jci.com
 - **Zheng O'Neill / Jin Wen** – can help, can discuss – have DOE project on this area
 - Present literature review results. Focused on GEB.
 - Present simulation framework/HIL testbed for cyber-attack evaluation.
 - **Eric Yang** – help connect with Ron Bernstein at TC 1.4 - has good amount of work on this and info in guide spec (primary author) – more at system level
 - (*from previous meeting*) **Glenn Remington** – has contacts who could speak
 - potential collaboration with TC 1.5
 - David Holmberg/Ron Bernstein/Doe GWAC as speakers
 - New chapter in G13 on cybersecurity (timely for Atlanta)
 - OpenADR 2.0
 - Other topics/ideas

- Smart products for residential and commercial buildings
 - talk with residential TC – net zero building committee
 - Panel discussion on grid interactive buildings
 - Joe Zhou organize for Winter 2024
 - Smart grid and building envelope interaction (from 4.4) - as an energy storage feature –
 - How building envelope can impact or interplay with smart grid contributions from buildings
 - Dynamic facades
 - Suggestion to follow up with NBI
 - TC 6.7 – Veronique Delisle
 - Utility Grid Battery Control Strategies and Impacts on O&M & LCA (From Atlanta 2019)
 - Large scale batteries
- Donghun K. – “California Flex Hub”: technologies for load flex.
 - Hydro Quebec/Concordia Flexibility Index (Nouanegue Herve Frank)

Update/Discussion of RTARs/Work Statement ideas

RTAR 1934 - A Survey Study on the Development and Application of Data-driven Model Predictive Control for Buildings – **Jin Wen, Zheng O’Neill, Helia Zandi**. → **Work statement available for comments after Toronto meeting. Approved by letter ballot in Aug 2022.**

RTAR Idea: ASHRAE Design and Integration of PV in the Built Environment Guide - **Costa Kapsis, Jim Liedel**- leidel@oakland.edu; costa.kapsis@uwaterloo.ca (from winter 2021)

- Draft is posted in Basecamp
- Looking for people to review and provide comments
- Comments:
 - o careful with “guide vs guideline”, suggestion to talk to research liason for Section 7
 - o Glenn – interested in reviewing
 - o Session 62 – related to this
 - o PTAR process created after
 - o seeking co-sponsorship
- (No report in Toronto)
- (No report in Atlanta)

Guidance on smart building equipment / IoT – **Carol Lomonaco, Scott Hackel**

- what are you getting, functionality, products?
- what program functions are necessary to work in different environments?
- Carol – can reach out to one of the consultants that works in this area, has a good feel of this (has looked at some of this already) some people say wont allow the use of IoT because of lack of security/authentication, but maybe this isn’t the case, seems to be a wide range; people don’t understand these features/components – what are the deficiencies?
- Scott - also interested and had ideas on this topic
- **Kristen & Carol can discuss**
- (No report in Toronto)

Development of models for better peak load predictions (some discussion at research subcommittee already) – James McNeil

- City-scale model validation for predicting demand response - some models exist
- Need an evaluation of the state of the art, perhaps useful for new city planning
- Need some more research on demand response capacity prediction

- Existing software – GridLabD – developed to designing rate cases
- (No report in Toronto)
- (No report in Atlanta)

Other ideas:

Instantaneous voltage and current load from buildings

- Specifically related to embedding DR in control sequences
- Inverter-based equipment / power quality / two-way power flow
- Direct DC wiring with AC in comb.
- May be more of an IEEE topic than ASHRAE

Energy demand prediction of multiple building scale

Linking building modeling to grid modeling

- Some existing efforts
- End user of this work would be policy recommendations for ISOs
- How to validate models?

Extending FDD to communities/smart grid (Brought up in FDD subcomm.)

Occupant impact of building-grid interactions (Mohamed Ouf)



Agenda – ASHRAE Tampa Annual 2023 Hybrid Meeting

TC 7.5 Honors & Awards Subcommittee
4:45 PM- 5:15 PM EDT, Sunday, June 25, 2023
Prepared by: Carol Lomonaco-Subcommittee Chair
Room: JW Marriott Tampa, Armenia (3)
Hybrid Meeting

Objective for this Meeting: Give TC 7.5 members an update on this subcommittee's work, and how many Fellow, DSA, and ESA nominations have been made thus far. The plan will be shared for the other potential Fellow, DSA, and ESA nominations to take place from Jan 1, 2023, until June 30, 2023. Also, discuss plans for future selections for other potential nominations.

Subcommittee Scope: ASHRAE's Honors and Awards program recognizes the dedicated ASHRAE Members who give freely of their time and expertise to fulfill the Society's mission of advancing the arts and sciences of HVAC&R to serve humanity and provide a sustainable world.

See ASHRAE's Honors and Awards link: <https://www.ashrae.org/about/news/2021/ashrae-recognizes-members-for-outstanding-industry-accomplishments>

Date and Time of the Subcommittee Meeting: TC 7.5 Honors and Awards

Date: June 25, 2023

Time: 4:45 PM- 5:15 PM EDT

Access Information:

ASHRAE Meeting Link for Attendees:

Time	Item
4:45 PM EDT	Call to order; Introductions; Agenda Overview, Sign into Google Doc
4:50 PM EDT	Review the actions the team has accomplished <ol style="list-style-type: none">Introduce team membersAgreed on six Fellow, six DSA and three ESA nominationsStatus on all nominationsStatus future nominations and submission date deadlines
5:05 PM EDT	Comments or questions & discussion
5:15 PM EDT	Wrap Up/Adjourn

TC 7.5 Handbook Subcommittee Meeting Agenda - Tampa

June 25, 2023 (Sunday) 5:15 PM to 6:00 PM ET

Hybrid Meeting

Meeting Room: JW Marriott Tampa, Armenia (3)

Web meeting info:

Join on your computer, mobile app or room device

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1. **Call to order / Introductions** (3 min)
2. **Report from TC 7.5 handbook Chair (Greg Pavlak)** (10 min)
 - 2.1. Progress since last ASHRAE meeting
 - 2.2. Schedule for the next version
 - 2.3. Handbook Online
3. **Expert/Potential Review List** (10 min)
4. **Discussion: Potential New Chapters** (10 min)
 - 4.1. Control-oriented modeling (Andreas A.)
 - 4.2. Multi-TC chapter on Optimization and Controls (Peter A.)
 - 4.3. Chapter (or subsection) on agent-based control (Joe Z.)
5. **Open Comments and Discussion** (10 min)

Comments and Discussion from Toronto and Atlanta:

 - For smart grid, have material related to building-to-grid optimization
 - Any other TC's cover power systems/batteries/etc.
6. **Next handbook subcommittee meeting** (2 min)
7. **Adjourn**

TC 7.5 Smart Building Systems
Program Subcommittee Meeting (misabeled in Conference agenda as Publications)
 2023 Annual Conference, Tampa, Florida
 Monday, June 26 | 6:00 pm – 6:30 pm | Gasparilla (2) JW Marriott Tampa

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Agenda

1. Self-introductions and sign in (5 minutes)
2. Tampa TC 7.5 sponsored and co-sponsored sessions (5 minutes)
3. Tampa conference sessions statistics (5 minutes)
4. Program tracks for Chicago Winter Conference (5 minutes)
5. TC 7.5 proposed program sessions for Chicago (5 minutes)
6. Program ideas for Orlando and beyond (5 minutes)

Annotated Agenda

Tampa TC 7.5 sponsored and co-sponsored sessions

Sponsored

Sponsoring Committee	Program Time	Session Chair	Session Title	Co-Sponsoring Committee
7.5 Smart Building Systems	Seminar 21 Monday, 6/26 8:00 AM - 9:30 AM	Liping Wang	Automated Fault Detection and Diagnostics Methods for Building HVAC Systems	1.5 Computer Applications GPC 36
7.5 Smart Building Systems	Seminar 31 Monday, 6/26 8:00 AM - 9:30 AM	Zheng O'Neill	Field Performance of Occupancy-based HVAC Control in Commercial Buildings: Demonstration Results from ARPA-E SENSOR (Saving Energy Nationwide in Structures with Occupancy Recognition) Category D Teams	MTG.OBB Occupant Behavior in Buildings
7.5 Smart Building Systems	Seminar 38 Tuesday, 6/27 8:00 AM – 9:30 AM	Michael Brambley	Connected Communities: Grid Interactivity, Energy resilience and Decarbonization	1.4 Control Theory and Application
7.5 Smart Building Systems	Seminar 49 Tuesday, 6/27 11:00 AM – 12:30 PM	David Yuill	Learned from BAS Data: The Most Common Operational Problems in HVAC Systems, and the Energy Savings from Fixing Them	7.3 Operation, Maintenance and Cost Management
7.5 Smart Building Systems	Seminar 70 Wednesday, 6/28 1:00 AM – 12:30 PM	Jin Wen	Flexible Building Equipment Performance Verification using Hardware-in-the-Loop Testbeds	1.4 Control Theory and Application

Co-sponsored

Sponsoring Committee	Program Time	Session Chair	Session Title	Co-Sponsoring Committee
1.4 Control Theory and Application	Seminar 11 Sunday, 6/25 8:00 AM - 9:30 AM	Taraneh Shoorideh	Are You Prepared to Specify the Future of Building Automation?	7.5 Smart Building Systems SGPC 13
4.7 Energy Calculations	Seminar 26 Monday, 6/26 9:45 AM – 10:45 AM	Ralph Muehleisen	Integrating Data-driven and Physics-based Modeling Approaches for Advanced Research in the Built Environment	7.5 Smart Building Systems

Tampa Conference Session Statistics

Session Type	Proposals Submitted	Proposals Scheduled
Debate		
Forum		
Panel		
Seminar		
Workshop		
Total		
Total with Paper Sessions		

Program tracks for Chicago Winter Conference

1. Fundamentals and Applications

Fundamentals are the foundation for understanding applications in engineering. Key components of ASHRAE fundamentals include thermodynamics, psychrometrics, fluid and mass flow. This track provides opportunities for papers and presentations of varying levels across a large topic base. Concepts, design elements and shared experiences for theoretical and applied concepts of HVAC&R design are included.

Track Chair: **Craig Bradshaw** | craig.bradshaw@okstate.edu

2. HVAC&R Systems and Equipment

HVAC&R systems and equipment are constantly evolving to address the changing requirements of the built environment. Papers and programs in this track focus on the development of new systems and equipment, improvements to existing systems and equipment and the proper application and operation of systems and equipment.

Track Chair: **Ng Yong Kong** | nyk@nyk.com.my

3. Refrigeration & Refrigerants

Refrigeration systems generate and use cold for a range of processes, from food preparation and conservation to vaccine preservation, to long-term protection of fragile ancient inks of historic documents and others. Differences in technologies and equipment, performances, refrigerants, etc., may hide synergies from which both industrial and commercial systems might benefit, also, but not only, from the points of view of reducing direct and indirect GHG emissions.

Track Chair: **Atila Biyikoglu** | abiyik@gazi.edu.tr

4. Decarbonization and Climate Change

HVAC&R systems and equipment are constantly evolving to address the changing requirements of the built environment. Papers and programs in this track focus on the development of new systems and equipment, improvements to existing systems and equipment and the proper application and operation of systems and equipment.

Track Chair: **Ng Yong Kong** | nyk@nyk.com.my

5. Hydronic Systems

Many different hydronic systems are used in the built environment. This track looks at heating hot water, domestic water, chilled water, condenser water, etc.

Track Chair: **Joe Chow** | joe.ashrae@gmail.com

6. Ventilation, Indoor Air Quality and Air Distribution Systems

Many different hydronic systems are used in the built environment. This track looks at heating hot water, domestic water, chilled water, condenser water, etc.

Track Chair: **Joe Chow** | joe.ashrae@gmail.com

7. Comfort, Indoor Environmental Quality and Energy Efficiency

ASHRAE Standards 55, 62 and 90 require many things – some of which seem to be in conflict with each other. This track looks at these standards as well as Guideline 10 and their effect on the final project as well as on each other.

Track Chair: **Kristen Cetin** | cetinkri@msu.edu

8. HVACA&R Controls

Determining the best system for a project only goes as far as the control system design that makes all of the elements function together and properly. This track looks at various control strategies and their application within the built environment.

Track Chair: **Alekhya Kaianathbhatta** | alekhya_k@rogers.com

9. Project Delivery Methods

There are numerous methods for delivering the final project (design-bid-build, design-build, construction manager at risk, indefinite-delivery/indefinite-quantity, etc.). This track looks at the different methods and how they produce the best results for the project delivery.

Track Chair: **Ehab Mamdouh Abu Taleb** | ehab.mamdouh@ipec-eg.net

TC 7.5 proposed program sessions for Chicago

Type	Session Chair / Speakers	Proposed Title	Status	Updates
	To Be Filled In With Information from Subcommittee Meetings			

Program ideas for Orlando and beyond

Type	Session Chair / Speakers	Proposed Title	Status	Updates
Seminar	Guanjing Lin, New Heaven University for FDD for Rooftop Unit	Users' experiences for FDDs in commercial buildings		Related to the RTAR.
Seminar	Glenn Remington	Cybersecurity & Control& Smart Grid		Could be; Zheng & Jin can contribute (MTG Mike Galler), Qun Zhou
Seminar	Kristen Cetin/Zheng O'Neill	Smart products for residential and commercial buildings		In the future
Seminar	Donghun Kim	Smart Grid – Building Envelope Interaction/Dynamic Facades		In the future (Donghun to follow up)
Seminar/Debate	Carol Lomonaco	IOT Security		
Seminar	Edward Tsui	Best practice of monitoring and instrumentation		Glenn Remington
Seminar	Eric Yang	Battery Control Strategies and its impact to life cycle cost	Christie Kjellman, Carol, Glenn Remington, Srinivas Katipamula	
Seminar	Peter Armstrong	What to do with optimal control?		
Seminar	Andreas Athienitis	Model accuracy impact study on model predictive control		BOD sc. David/Andreas
TBD	TBD	What data the lawyer would like to know –needs to define scope	In future	
Seminar	Peter Armstrong& Li Song	Building optimal / predictive control	For Future	
Seminar, co-sponsor TC 7.9	Li Song & Carol Lomonaco	How BAS can Enhance Existing Building Commissioning	For Future	
Seminar	Armstrong	Edge computing, Cloud Analytics, and On-Premises Systems – Architectures for Smart Building Systems	For future	
Seminar	Nick Gayeski / Speakers from Armstrong	Smart Transducers with Embedded Diagnostics	For future	

Seminar	Kristin Heinemeier / Kristin & Jon Douglas, someone from TC 7.9?	Fault Detection and Retro- commissioning: Where is the Line and Does it Matter?	For future	
Workshop	Kristin Heinemeier	Lab Methods for verifying that FDD tools for RTUs really work: Will Standard 2007 really work?	For future	
Seminar	Chris Kinney/Michael Munroe/Glenn Remington	FDD and Clouds?	For future	

ASHRAE TC 7.5: Smart Building Systems Research Subcommittee Meeting
Monday, 06/26/2023

5:15 PM– 6:00PM (EDT) JW Marriott Tampa, Gasparilla (2)

Virtual Meeting Link (Microsoft Teams):

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Agenda

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|---|-------------|
| 1. Roll Call and Introduction | 5:15– 5:20 |
| 2. Announcements/recap of the research subcommittee chair meeting (Joe Z.) | |
| 3. Current TC 7.5 research updates | 5:25 – 5:45 |
| 3.1 Two ongoing research projects updates | |
| a) RP 1661: Development and validation of dynamic models for the evaluation of chilled water system control strategies in the ASHRAE handbook. (Song L.) | |
| b) RP 1756: Evaluation of low-cost particulate sensors for building. (Liping W.) | |
| c) Work Statement for Publication – Guide for Designing and Operating Grid-interactive Buildings for Decarbonization. Expected the Guide will be completed at the summer meeting. | |
| 3.2 Five active work statements updates. | |
| a) WS-1809: Updating Reference Guide for Dynamic Models of HVAC Equipment. Need to move to PTAR. (Heejin Cho) | |
| b) WS-1934: A Survey Study on the Development and Application of Data-driven Model Predictive Control for Buildings: RAC conditionally approved it. Revised again. Sent to RAC in May for approval again. (Jose C.) | |
| c) WS-1812: Detection and Diagnosis of the Circulating Fluid Leakage for Hydronic Systems. Zachary Siefker is the new champion. Submitted a revision but lack of support from other TCs. Withdraw. | |
| d) WS-1875: Develop cost and performance indices to evaluate effectiveness of virtual sensors in HVAC applications. No draft yet. (Song L.) | |
| e) WS-1927: HVAC Equipment Health KPIs. (Ian B.) “still working on the work statement. We expect to have something around Q2 of this year for review.” | |
| 3.3 Eight active RTARs (three of them are co-sponsor)- see the table below. | |
| a) RTAR-1942: Evaluation of the Usability of ASHRAE Standard 207. Revision by John H. Research liaison provided comments and asked for another revision. Need a new lead. Dave Shipley can help. | |
| b) Discuss the new RTAR – Occupant-Centric DR for Residential Buildings. New RTAR co-sponsorship – voting needed. TC7.10 lead. (Mohamed Ouf.) | |
| c) Other RTARs | |
| 4. TC 7.5 research new ideas and topics | 5:45– 5:55 |
| 5. New Business | 5:55– 6:00 |
| 6. Adjourn | 6:00 |

ASHRAE TC 7.5: Smart Building Systems Research RTAR/Work Statement Status

June 2023

- Active TC 7.5 sponsored Project: 0
- Co-sponsored Projects: 3
- Active WS: 5 (including 1 co-sponsorship)
- Active RTAR with Draft: 6 (including 2 co-sponsorship)
- Parking lot RTARs/ideas: 24

Co-sponsored Projects: 3

#		Project	Contributors/PI	Status
1	TC 4.7 (Energy Calculations)	RP 1661 Development and validation of dynamic models for the evaluation of chilled water system control strategies in the ASHRAE handbook	PMS Liaison: Li Song	<p>Co-sponsoring with TC – 4.7 and 1.4</p> <p>WS is returned with comments. Wangda will provide updated WS for TC review during Orlando.</p> <p>STL: the TC voted Yes and submitted to RAC. RAC conditional approved.</p> <p>Las Vegas – Selected a bidder. Miami is the winner</p> <p>Long Beach – contract is being signed. Project starts on August 1st. Wangda is the PI (will be at Boulder)</p> <p>Chicago: The project has begun, and the PMS met with the contractor. Task 1 is complete. Conference call is complete.</p> <p>Houston: The PI gave a report on the progress.</p> <p>Atlanta Update by Wangda: PMS meeting was on Sunday. Identified 9 sequences rather than 3 sequences. Large scale simulation and debugging is ongoing. 12- month extension is requested.</p> <p>Orlando: the 2nd 12-month extension is proposed by the PI and main sponsoring TC.</p> <p>2021 virtual: LI: moving on well PMS in Oct 2020. Wrap the project in May 2021. Next PMS meeting is scheduled in Feb. 2021.</p> <p>2022 Las Vegas: NCE to May 2022.</p> <p>2022 Toronto: PMS meet in Feb and May 2022. First rough draft report was sent to the PMS in April. The PMS is waiting for the second version.</p> <p>2023 Atlanta: PI submitted the final report in July 2022.</p> <p>2023 Tampa: TBD</p>
2	TC 2.4 (Particulate Air Contaminants and Particulate Contaminant Removal Equipment)	RP-1756 Evaluation of low-cost particulate sensors for building	Brent Stephens (2.4) 7.5 PMS: Glenn Remington and Liping Wang	<p>ORL: – need co-authorship too – against lab-grade equipment to review their performances...</p> <p>STL: the TC voted YES and submitted to RAC. No feedback yet.</p> <p>Las Vegas – resubmit a WS. Need 1-2 PES volunteers</p> <p>Long Beach – PES met and is selecting winner.</p> <p>Chicago: Project was awarded to Jordan Clark at Ohio State University, and has commenced. There are some initial adjustments to scope requested.</p> <p>Houston: The PMS had their second meeting.</p> <p>Update: Li will follow up with Remington or Li Ping Wang for an update before the main TC meeting.</p> <p>Kansas City update: The Pis made decent progress on the project. They have submitted an STBE paper currently under revision.</p> <p>Orlando: need update from Glen/Liping. Wrap up the final report, which is due in March 2020. PMS chair is satisfied with the report.</p> <p>Glen: no update in the summer virtual meeting.</p> <p>2021 virtual: Liping: Liping received update in January 2021. Liping will provide an update offline.</p> <p>2022 Las Vegas: Liping: The project is completed. The team is finalizing the report.</p> <p>2022 Toronto: Final report is waiting for the PMS approval.</p> <p>2023 Atlanta: No update.</p> <p>2023 Tampa: TBD</p>

#		Project	Contributors/PI	Status
3	SG (Co-sponsor TSBD)	Work Statement for Publication Guide for Designing and Operating Grid- interactive Buildings for Decarbonization	Co-sponsorship (ASHRAE Building Decarbonization Task Force) Katherine Hammack, Scott Hackel	2022 Toronto change work statement to PTAR. Ask for co-sponsorship, will have an email ballot. 2023 Atlanta: TC electronic vote on 8/4/2022: 10 out of 11 voted YES. 1 no response. ASHRAE issued bids – NBI won and will write the Guide. Expected the Guide will be completed at the summer meeting. 2023 Tampa: TBD.

Active Work Statements: 5 (1 co-sponsorship)

#		Project	Contributors/PI	Status
1	BOD	<p>WS-1809</p> <p>Updating Reference Guide for Dynamic Models of HVAC Equipment</p>	Heejin Cho	<p>SEA –Is this tech transfer? Update of Jean LeBrun’s work from 1990’s All kinds of tech transfer hurdles to leap over. Would this be better as a tool kit? BOD discussion on toolkit option, changing scope and budget and timing of research. ATL – need to be revised completely. ORL – Heejin will give a revised version tonight.</p> <p>STL: The revised RTAR is ready for committee to review and vote. Committee voted approval. RAC approved. Need to develop WS.</p> <p>Las Vegas: WS in development.</p> <p>Long Beach: WS in development. Aim at Chicago meeting</p> <p>Chicago: a draft WS has been developed and sent to Zheng. It still needs some significant development. Attendees at the meeting were supportive of continuing this topic.</p> <p>Houston: Heejin expects to get a draft to us by mid-July.</p> <p>The Atlanta update by Zeng: WS was voted and submitted.</p> <p>Kansas City update: Carol mentioned the big-data based modeling approach. Jin will take the lead to communicate with Carol. Will be a new RTAR in BOD.</p> <p>Orlando: Zheng will follow up with the Author.</p> <p>2020 Summer: Zheng will follow up with Heejin. RAC has two questions 1) whether there is a need for the update and 2) add model validation to the WS. This part was removed due to budget concern. A rebuttal might be needed.</p> <p>2021 virtual: an updated version and rebuttal letter was sent to Bill (TC 7.5 research Liaison).</p> <p>2022 Las Vegas: submitted the revised WS in August 2021 and received the comments from RAC.</p> <p>2022 Toronto: The RAC recommended us resubmitting it through PTAR process.</p> <p>2023 Atlanta: No progress yet. Heejin Cho will look into it.</p> <p>2023 Tampa: TBD</p>

2	BOD	<p>WS-1934</p> <p>A Survey Study on the Development and Application of Data-driven Model Predictive Control for Buildings</p>	<p>Jose Candanedo, Zheng O'Neill, Jin Wen</p>	<p>2022 Las Vegas: Vote (Aug 15, 2021): 6-0-0-5 (CNV). Submitted in Aug 2021 and was approved. Working on the WS with a goal to resubmit the WS by March 15th, 2022.</p> <p>2022 Toronto: The draft is posted on the basecamp, will have an email ballot before Aug 15th.</p> <p>2023 Atlanta: Electronic Vote (Aug 15, 2022): 11-0-0-10 (CNV). Submitted v6 to RAC on 8/20.</p> <p>2023 Tampa: RAC conditionally approved it. Revised again. Sent to RAC in May for approval again.</p>
3	FDD	<p>WS-1812</p> <p>Detection and Diagnosis of the Circulating Fluid Leakage for Hydronic Systems</p>	<p>Zheng O'Neill, Kristen Cetin</p>	<p>STL: RTART discussed in sub-committee. Will be voted in mid-July. Committee voted approval. RAC approved. Need to develop WS.</p> <p>Las Vegas: WS in development.</p> <p>Long Beach: WS is ready to be voted. Aim at August deadline.</p> <p>Chicago: TC 6.8 was approached as co-sponsor. They were initially uncertain, but after a visit, they requested a change in title. TC 6.8 voted 9-1-1-1 CNV.</p> <p>Houston: WS was returned with comments. They aim to revise for August 15th deadline.</p> <p>Update by Zheng: First draft was submitted after Chicago meeting. Received comments in May 2018. TC 6.8 research committee has approved revised version. The WS is revised and is ready for vote.</p> <p>Kansas City update: revised WS is returned with comments.</p> <p>Orlando: Zheng will continue working on it.</p> <p>Summer 2020: Zheng has talked with TC4.8. Zheng and Kristen plan to resubmit by December 15, 2020. Need to seek co-sponsorship from TC6.8. FDD clarification is needed.</p> <p>2021 virtual: Zheng and Kristen are still working on it.</p> <p>2022 Las Vegas: Zheng and Kristen will discuss.</p> <p>2022 Toronto: Either drop the ball or find another champion. Zhou posted a message at Basecamp asking new champion (8/20).</p> <p>2023 Atlanta: Zachary Siefker is the new champion. The latest version needs to be voted at this meeting. Also seeking TC 6.1 and TC 6.8 co-sponsorship.</p> <p>2023 Tampa: Lack of support from TC 6.1 and 6.8. Withdraw.</p>

4	ET	<p>WS-1875</p> <p>Develop cost and performance indices to evaluate effectiveness of virtual sensors in HVAC applications</p>	Li Song	<p>Voted in Atlanta; Submitted for RAC to review. RAC accepted with comments.</p> <p>ORL – WS in preparation</p> <p>STL – WS in preparation</p> <p>Las Vegas – no update</p> <p>Long Beach – no update</p> <p>Chicago: there is still an interest in submitting a WS.</p> <p>Houston: Li will submit WS to RAC by August 15.</p> <p>Update in Kansas City: 1783</p> <p>Orlando: Li is Still working on it.</p> <p>Summer 2020: Li will get it done by December 2020.</p> <p>2021 virtual: Li is still working on it.</p> <p>2022 Las Vegas: Zheng to follow up with Li</p> <p>2022 Toronto: no progress. Try to have a draft by 12/15/2022.</p> <p>2023 Atlanta: No progress.</p> <p>2023 Tampa: TBD</p>
5	BOD (Co-sponsor TC 1.4)	<p>WS-1927</p> <p>HVAC Equipment Health KPIs</p>	Ian Bonadeo	<p>2022 Toronto: RAC approved the RTAR, now moved to WS.</p> <p>2023 Atlanta: Ian: “still working on the work statement. We expect to have something around Q2 of this year for review.”</p> <p>2023 Tampa: TBD.</p>

Active RTARs: 6 (including 2 co-sponsorship)

#		Project	Contributors/PI	Status
1	BOD	RTAR Occupancy-Aware Control and Operation of HVAC Systems in Commercial Buildings	Rich Hackner Li Song	<p>STL: An RTAR is prepared by Li and will be discussed in the committee meeting for comments. Rich will lead on WS if the RTAR is accepted. Need inputs to improve the RTAR. Two volunteers: James Sweeney and Gary Shamshoian.</p> <p>Las Vegas: In development</p> <p>Long Beach: In development</p> <p>Chicago: No update.</p> <p>Houston: Li plans to submit to RAC by August 15. The chair of MTG.OBB has agreed to cosponsor. We hope to vote at the main meeting to submit the RTAR.</p> <p>Atlanta update by Song: Li will upload the RTAR on basecamp and circulate among the TC.</p> <p>Kansas City update: Li will add the co-sponsorship to the RTAR and send it Jin for voting on Tuesday.</p> <p>Orlando: The RTAT was submitted to Bill Murphy</p> <p>Update after Orlando: Bill advised that we did to get vote from co-sponsor committee (MTGOBB) and he would provide feedback to this RTAR regardless but haven't heard back yet.</p> <p>Summer 2020: Research chair in STCOBB will be reached for voting.</p> <p>2021 virtual: waiting for MTG. OBB vote</p> <p>2022 Las Vegas. Vote (06-25, 2019): 6-0-0-5 (CNV)</p> <p>MTGOBB (12 approve, 0 against, 5 absent, voted on June 22, 2021). RTAR submitted in June 2021.</p> <p>2022 Toronto: waiting for the RAC comments. Zheng followed up will Bill and Jim 8/20/22.</p> <p>2023 Atlanta: No discussion.</p> <p>2023 Tampa: TBD</p>
2	BOD	RTAR How does remote work environment impact on residential building load profiles and HVAC operations?	Li Song	<p>2022 Las Vegas: New in LAS</p> <p>2022 Toronto: Kristen, Li is working with Residential Building Committee (RBC) on an ASHRAE news/journal (residential news brief), then will work on this RTAR. Keep this idea.</p> <p>2023 Atlanta; Li is working with Residential Building Committee to develop a brief issue for "impact of working from you" and prepared a seminar in the winter conference in Atlanta. Will decide how to prepare the RTAR after the feedback.</p> <p>2023 Tampa: TBD</p>

3	FDD	RTAR-1942 Evaluation of the Usability of ASHRAE Standard 207	John House SP 207P	<p>Kansas City update: David Shipley initiated the topic and will send the draft of the RTAT to Li for improvement in the TC.</p> <p>Orlando: Liping will coordinate with everyone since she is the subcommittee chair. Kim will lead this RTAR and Mike Brambley and Ahmed (ahmed.abdel-salam@rycom.com) will assist. Chirag Parikh is interested in seeing the document and see how he can help.</p> <p>2021 virtual: Liping: John House will take over to lead this effort. RTAR is not submitted yet.</p> <p>2022 Las Vegas TC 7.9 co-sponsorship Budget increased from 100K to 150K 24 m instead of 12 m. Editorial changes. Will be voted in this meeting Submitted to the RAC on March 15th. 2022 Toronto: Received RAC comments. John is revising the RTAR. 2023 Atlanta: A revised version is complete and sent to Region VII liaison in Jan. 2023. No discussion at this RAC meeting. 2023 Tampa: Research liaison provided feedback. Need another version. Need a new Champion.</p>
4	SG	RTAR Development of models for better peak load predictions for building clusters/neighborhood/city	Michael Bobker Kristen Cetin Li Song (localized weather impact)	<p>Long Beach – initiated the idea Houston: No update The Atlanta update by Kristen: still interested in working on. Helps are welcome. Helia Zandi with Oak Ridge will help Kristen work on it. TC4.1 is interested in co-sponsorship. Kansas City update: Kristen is still interested in working on it. Positive to develop a RTAR. Bing Dong and Zhe Wang volunteered to help. Orlando: still interested. Chicago. Summer 2020: Xiaohui recommended to connect with DOE new connected community solicitation. The funding from ASHRAE might not be sufficient for the study unless we focus on model development. We may wait to see if there is value to do something complimentary. Kristen and Michael will monitor and update the committee. 2021 virtual: Kristen” No updates”, call for new lead author. Joe; is submitting a similar idea for DOE BENEFIT program. 2022 Las Vegas: No discussions 2022 Toronto: Li Song is still interested and would like to include weather impact. 2023 Atlanta: No update. 2023 Tampa: TBD.</p>
5	Co-Spons or (TC 2.10)	RTAR Resilience in smart buildings	Carol Lomonaco	<p>New idea in 2022 Toronto meeting. 2023 Atlanta: No progress, but Carol is seeking co-sponsorship from TC 2.10 and the RES.MTG. 2023 Tampa: TBD.</p>

6	Co-Sponsor	RTAR Assessment of energy savings of “smart” web-based connected thermostats in new and existing single and multi-family dwellings for inclusion in SSPC90.2	Li Song	2021 virtual: Li Song is following up 2022 Las Vegas: No discussions 2022 Toronto: Li to follow up. 2023 Atlanta: An RTAR draft is almost finished but the lead RTAR writer has not been responding to Li. 2023 Tampa: TBD
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Parking Lot RTARs/Ideas: 20

1	BOD	How smart/connected thermostats impact energy performance?	Li, Jin, Kristen, Glenn, David Shipley, Bing Dong, Han Li (hanli@lbl.gov), Brent Huchuk (Univ. of Toronto), 3 more from 90.2	<p>Volunteers from 90.2: Mike Lubliner, Washington State University, lublinterm@energy.wsu.edu, 360-956-2082, Richard Watson, SSHC, Inc., rwatson@sshcinc.com, 860-399-5434, Matt Vargo, Carrier Corp, Matt.vargo@carrier.utc.com.</p> <p>Kansas City update: Li will explore the study done by EPA and start the draft of the RTAR</p> <p>Orlando: Mike Brambely provided inputs about the presentation on Sunday.</p>
2	BOD	<p>RTAR</p> <p>Previous title: "Night setback effectiveness" possible change to "Night preconditioning effectiveness"</p> <p>In Orlando: Recommended to change the title to Unoccupied-period Preconditioning effectiveness</p>	Peter Armstrong	<p>ORL: Seek co-authorship. Objective: show how to credibly model energy and comfort impacts of night preconditioning. (Effectiveness of simple through MPC controls?)</p> <p>Las Vegas – continue development</p> <p>Long Beach: no update</p> <p>Houston: No update</p> <p>Kansas City update: it is dropped by TC1.4. Peter will lead it.</p> <p>Orlando: Helen (University of Toronto). Li will coordinate with peter and will lead.</p> <p>2021 virtual: No discussion</p> <p>2022 Las Vegas: No discussions</p> <p>2022 Toronto: No discussions. May move to parking lot</p>
3	BOD	<p>RTAR</p> <p>Big data-based approach for HVAC equipment modeling</p>	Carol Lomonaco and Jin Wen	<p>Carol initiated the big data-based modeling approach in Kansas City. Jin will take the lead to communicate with Carol. Will be a new RTAR in BOD.</p> <p>Orlando: A new volunteer, Mr. Shengbo Zhang (U. of Toronto) was introduced to Jin and Carol.</p> <p>Summer 2020: Jin will talk with Carol</p> <p>2021 virtual: Carol: check with Jin (Zheng will follow up)</p> <p>2022 Las Vegas: No discussions</p> <p>2022 Toronto: follow up with Jin. May move to parking lot</p>
4	BOD	RTAR - Link the productivity with occupant-in-loop control	Ivo Martinac	<p>New at Long Beach</p> <p>Houston: Topic was discussed. Ivo was not present, but there is general interest among those present.</p> <p>Update by Zeng: update before Houston meeting “no time to get the work done”. Carol added that it was meant for a mini system for local air condition control, personal comfort.</p> <p>Kansas City update: Jin will update the TC after contacting POC.</p> <p>Orlando: Park</p>

5	BOD	RTAR - Smart management of moisture and energy consumption in residential houses, smart ventilation, optimal location for dryer, heat pump water heater, etc.	Andrew Windham; Kristen Cetin	New at Long Beach Houston: Not discussed Update by Kristen: still interested in working on it. Update in Kansas City: Kristen mentioned one discussion with Andrew a year ago. Kristen will clarify the intention with Andrew and update the team. Orlando: drop
6	BOD	Draft RTAR - Design guideline to consider unmeasured disturbance for an implementable MPC	Donghun Kim, David Blum	New at Long Beach Chicago: Still in progress Houston: Still in progress. Update by Zeng: The RTAR draft was prepared by Donghun Kim. David Blum sent the comments back to Donghun Kim January 2019 and no updates since then. Li will follow up. Kansas City update: Donghun Kim will finalize the draft RTAR. Targeted for August 15, 2019 deadline. Orlando: Drop
7	BOD	RTAR - How IoT impacts operators	Carol Lomonaco Liping Wang Scott West	New at Long Beach Houston: There was discussion about the topic, and there's still interest in it. A written RTAR is not planned before Atlanta. Update by Carol in Atlanta: Carol still interested in working on this RTAR. Joe and Li are interested to help. No RTAR is developed yet. Kansas City update: Carol will provide an update after the subcommittee meeting. Orlando: After Chicago added Scott Hackel (SHackel@slipstreaminc.org) as a coauthor (Joe Zhou is the contact). Summer 2020: Carol is still interested in working on it. 2021 virtual: Carol: still interested. (IoT devices, BACnet devices) impacts on the operators. Reach to others after May 2021 Scott: interface for FDD. Related to this RTAR?? 2022 Las Vegas: No discussions 2022 Toronto: Moved to parking lot

8	ET/FDD	Draft RTAR: Metadata and Taxonomy to Support FDD in Smart Buildings	Nick Gayeski Charity Young	<p>SEA NEW submitted for consideration by Subcomms CHI – Nick discussed wants feedback. Explained purpose</p> <p>ATL- Phil did not think the need and significance to ASHRAE are clear. Had discussion in ET subcommittee. Nick will revise</p> <p>ORL – Nick is continuously updating it.</p> <p>Las Vegas – Nick is continuously updating it.</p> <p>Long Beach – no update</p> <p>Chicago: No update.</p> <p>Houston: Dennis Krieger will pick this up to see if there's potential to move forward. He's unfamiliar with ASHRAE processes.</p> <p>Update from John Wallace: Will follow up with Dennis Krieger. Jin clarified it included two components: Taxonomy and point mapping. It might be good to organize a program before moving forward with RTAR - John.</p> <p>Orlando: Nick gave up on the RTAR but will move to a program. (David Yuill) Li will follow up with Nick to clarify it will be for a program or an RTAR. He is revisiting with BecNet to see if he can resubmit.</p> <p>Summer 2020: park it. Kristen will follow up with Nick.</p>
9	FDD	New in Orlando: User experience about FDD. Operator, building managers. System to be conservative or aggressive.	Austin Rodger	<p>Orlando: Austin proposed the idea. Not only for energy efficiency also O&M issues. Li will send the RTAT template to Austin to help him started. Li will connect Austin with Laura Towsley (laura.towsley@rycom.com).</p> <p>Summer 2020: Li will follow up with Austin and Laura. Scott west volunteered to help. Liping will coordinate with everyone on the list.</p> <p>2021 virtual: Liping/Scott West: had the meeting, did some literature review. Will move on for a RTAR.</p> <p>1633RP is relevant (likely the proposed work will be in this format) 1650 RP.</p> <p>Expect the RATA by annual meeting 2021.</p> <p>Liping will follow up with Austin and Laura</p> <p>2022 Las Vegas: No discussions</p> <p>2022 Toronto: Moved to parking lot</p>
10	FDD	RTAR: Self-fixing faults once it is diagnosed	Andrew Windham windhamaw@appstata.edu ; Jin Wen will help)	<p>New at Long Beach</p> <p>Houston: no update</p> <p>Kansas City update: an ongoing project is funded by DOE. Orlando. park</p>
11	FDD	RTAR: collect, clean, and label existing data for FDD research	Xi Wang Li, Liping Wang, Kristen. Shawn Shi (Carleton)	<p>Las Vegas: new idea</p> <p>Long Beach: no update</p> <p>Houston: No update</p> <p>Kansas City update: Park.</p> <p>Orlando: park</p>

12	FDD	WS 1781: – Methods to Evaluate AFDD Methods for Air Handling Unit Systems	Jin Wen	<p>CHI – Jin Wen has new version for submission.</p> <p>Atlanta – Voted; submitted to RAC. RAC accepted with comments for WS.</p> <p>ORL – WS in preparation</p> <p>STL – WS in preparation; 7.3 will co-sponsor. Might seek co-sponsorship with 9.1</p> <p>Las Vegas – WS in development. Will seek a vote in between meetings.</p> <p>Long Beach - WS is ready to be voted. Aim at submitting it by August deadline</p> <p>Chicago: WS was submitted after vote in LB. RAC returned with comments. Jin, Michael, and David met with Chris Wilkins, RAC liaison, and discussed revisions and resubmitting.</p> <p>Houston: No update. It times out within the next year, but we’re still interested in pursuing this.</p> <p>Update by Jin in Atlanta: WS was inspired by the difficulties of the evaluation of RTU FDD algorithms. The WS was submitted once and comments were collected. Jin will get it done before the February 2019.</p> <p>Kansas City update: drop from the list and park</p>
13	FDD	Idea - FDD for datacenters		
14	FDD	Literature Review and Survey of existing FDD methods and data	Nick Gayeski, Jin Wen	<p>ATL - FDD literature review and central location for download data/methods etc. (collection of methods) – existing</p> <p>Not only compiling but assessment of new technologies (indicating last large-scale study is 2005)</p> <p>Characterization (qualitatively) evaluate. IEA 34.</p>
15	FDD	Idea - Whole Building FDD through smart-meters (champion?)		
16	ET	Ideas -- Connectivity in the home?	Nick Gayeski	CHI – Much discussion no resolution
17	ET	RTAR -1782: “Learning occupancy presence in residential buildings through smart meter data”	Bing Dong and Zheng O’Neill	<p>Voted in Atlanta; Submitted for RAC to review. RAC rejected.</p> <p>“it is not clear if ASHRAE should lead or others (EPRI, etc.) and how much research is needed to detect or model the occupancy based on smart meter data...”</p> <p>ORL – discussed with Phil and solicited comments (comments on whether available technologies and other literatures have been integrated in the RTAR).</p> <p>Smart thermostat might learn occupancy.</p> <p>Behavior based action from Utility company – if you know occupancy patterns then send messages etc.</p>
18	SG	Development of models for better peak load predictions	Kristine; Mike, Srinivas will review	CHI—New idea.
19	SG	Idea – DR guideline related ideas		ATL – estimate thermal response etc.
20	SG	Idea --Instantaneous voltage and current load from bldgs. For SG	Ralph Muehleisen Argonne NL	CHI – New Idea
21	SG	Guideline on smart building equipment		<p>Chicago: New idea</p> <p>Houston: Not discussed</p>

22	SG	RTAR Linking building modeling to grid modeling	Donghun Kim	<p>Long Beach – initiated the idea</p> <p>Chicago: was discussed, there’s still interest.</p> <p>Chicago: Not discussed.</p> <p>Update by Kristen: Kristen will follow up with Donghun Kim. Jie Cai volunteer to participate. Ellen Franconi with PNNL will facilitate the project leaning toward to providing simulation capacity for enhancing code.</p> <p>Kansas City update: Kim is still interested in working on it. Li will follow up with Jie Cai to connect with Kim. Bing Dong volunteered to help.</p> <p>Orlando: Donghum, Jie Cai.</p> <p>Summer 2020: Donghum is still formulating the scope and topic. Qun Zhou, in addition to Bing Dong, has volunteered to participate.</p> <p>2021 virtual: Donghum to set up a meeting to define the scope</p> <p>Impacts on the grid (distribution level, voltage changes)</p> <p>Who will use this (DR aggregator or individual buildings)</p> <p>Joe: hard to be funded by ASHRAE 200K project although it is useful and has values.</p> <p>Abed Alkhatib <AAlkhatib@willdan.com>; Rushil Desai <rdesai@elementaengineering.com> - these people volunteered to help with this</p> <p>2022 Las Vegas: No discussions</p> <p>2022 Toronto: No discussions. May move to parking lot</p>
23	Co-Sponsor	Idea -	TC 7.3	<p>ATL – Mike Brambly mentioned an idea about building maintenance and FDD</p>
24	Co-Sponsor (TC 4.3)	RTAR Low-cost indoor pollutant sensor metrics for data-driven control of ventilation in smart buildings	Jordan Clark, Brent Stephens, Kristen Cetin	<p>Houston: In progress.</p> <p>TC4.3 is the main TC.</p> <p>Update by Kristen: RTAR is ready by Jordan. It is built off their existing project. Comments are welcome after TC review. Jin comments TC needs more time to review and vote. Zheng asked for difference between this project and prior project. Li will forward the questions to Jordan and request Jordan to present and answer the questions. Liping is the PMS of the prior project and should be consulted.</p> <p>Kansas City update: It is designed as the follow up project.</p> <p>Orlando: Kristen explained that Jordan Clark is being approved by the TC for submission.</p> <p>2021 virtual: Kristen to follow up with Jordan</p> <p>2022 Las Vegas: No discussions</p> <p>2022 Toronto: No discussions. May move to parking lot</p>