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**1791 Tullie Circle, N.E./Atlanta, GA 30329**

**404-636-8400**

**DRAFT v3**

**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. **TC7.5** DATE 02/1/2022

TC/TG/MTG/TRG TITLE **Smart Building Systems**

DATE OF MEETING 02/1/2022 LOCATION Las Vegas, NV. Cesar Palace Emperors II. Also available via Zoom meeting to remote participants.

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| --- | --- | --- |
| **Subcommittee Chairs and Voting Members** | **Term in Position** | **Ex-Officio Members and Additional Attendance** |
| David Yuill, Chair (V) | 07/2020 – 06/2022 | See attached attendance list |
| Li Song, Vice Chair (V) | 07/2021 – 06/2025 |  |
| Xiaohui Zhou, Secretary (V) | 07/2020 – 06/2023 |  |
| Zheng O’Neill, Research Chair (non-V) | 07/2021 – |  |
| Kristen Cetin, Smart Grid Chair (non-V) | 07/2021 – |  |
| Eric Yang, Program Chair (V) | 07/2019 – 06/2023 |  |
| Donghun Kim, Enabling Tech Chair (V) | 07/2021 – 06/2025 |  |
| Liping Wang, FDD Chair (V) | 07/2019 – 06/2023 |  |
| Gregory Pavlak, Handbook Chair (V) | 07/2021 – 06/2025 |  |
| Michael Galler, BOD Chair (V) | 07/2021 – 06/2025 |  |
| Michael Galler, Webmaster (V) | 07/2021 – 06/2025 |  |
| Carol Lomonaco, Honors and Awards Chair (V) | 07/2021 – 06/2025 |  |
| Glenn Remington (V) | 07/2019 – 06/2023 |  |
| Srinivas Katipamula V) | 07/2019 – 06/2023 |  |

(V) = voting member

(non-V) = non-voting member

Note: The complete attendance list from TC 7.5 main meeting is attached at the end of the minutes.

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| --- | --- |
| **DISTRIBUTION: *All Members of TC/TG/MTG/TRG plus the following:*** | |
| Satheesh Kulankara (Section 7 Head) | [SH7@ashrae.net](mailto:SH7@ashrae.net) |
| Larry Smith (TAC Chair) | [TACchair@ashrae.net](mailto:TACchair@ashrae.net) |
| Harris Sheinman (Handbook Liaison) | [lyy9@cdc.gov](mailto:lyy9@cdc.gov) |
| Steve Hammerling (Staff Liaison) | [shammerling@ashrae.org](mailto:shammerling@ashrae.org) |

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

Schedule for TC 7.5 Meetings, Winter 2022:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Time in PST** | |  |  |
| **Committee** | **Date** | **Start** | **End** | **Location** | **Chair** |
| Handbook | 1/25/2022 | 1:00 PM | 2:00 PM | Virtual | Greg Pavlak |
| Honors and Awards | 1/27/2022 | 6:00 PM | 6:30 PM | Virtual | Carol Lomonaco |
| Enabling Technologies | 1/30/2022 | 1:30 PM | 2:15 PM | Octavius 17-18 | Mike Galler |
| YEA | 1/30/2022 | 2:15 PM | 2:30 PM | Octavius 17-18 | Kristen Cetin |
| FDD | 1/30/2022 | 2:30 PM | 3:15 PM | Octavius 17-18 | Liping Wang |
| BOD | 1/30/2022 | 3:30 PM | 4:15 PM | Octavius 17-18 | Donghun Kim |
| Smart Grid | 1/30/2022 | 4:30 PM | 5:15 PM | Octavius 17-18 | Kristen Cetin |
| Program | 1/30/2022 | 5:30 PM | 6:00 PM | Octavius 17-18 | Eric Yang |
| Research | 1/31/2022 | 5:15 PM | 6:00 PM | Octavius 17-18 | Zheng O'Neill |
| Main TC | 2/1/2022 | 3:30 PM | 6:00 PM | Emperors II (E) | David Yuill |

Links to virtual meetings:

|  |  |  |
| --- | --- | --- |
| **Committee** | **Link** | **Password** |
| Handbook | <https://psu.zoom.us/j/94789100957?pwd=cmNyOHFBVitGcXUvKzdaSFJYd1lwdz09> | 895026 |
| Honors and Awards | <https://ashrae.webex.com/ashrae/j.php?MTID=m5e0a9fa6726964572beb1bbf1980bc77> | TC7.5 |
| Enabling Technologies | <https://msu.zoom.us/j/99125272959> |  |
| YEA | <https://msu.zoom.us/j/99125272959> |  |
| FDD | <https://uwyo.zoom.us/j/92706431261> |  |
| BOD | <https://lbnl.zoom.us/j/93694120017> |  |
| Smart Grid | <https://msu.zoom.us/j/98867590927> | 199610 |
| Program | <https://us04web.zoom.us/j/9820517880?pwd=TFpLdk1HdW50NnA2bmtqSDVSTERmUT09> | 1234 |
| Research | [https://tamu.zoom.us/j/93314149119?pwd=UlpJWGhubUJGalRrVGtqeTZoWU1RQT09#success](https://tamu.zoom.us/j/93314149119?pwd=UlpJWGhubUJGalRrVGtqeTZoWU1RQT09#success ) |  |
| Main TC | <https://ashrae.webex.com/ashrae/j.php?MTID=m57382be8761a8b9c90ba93b4b781b9a2> | TC7.5 |

**Meeting Minutes**

The general meeting starts at 3:36 pm.

1. Welcome (David Yuill).
   * Ask attendees without badges to go register and receive the badge.
   * Discussion of Basecamp procedures – whoever want to access TC 7.5 basecamp content, please reach out to TC 7.5 Vice Chair – Li Song.
2. Roll Call and Introductions. Determination of quorum.

Introduce company affiliation as well as name.

* + Current voting members (ending month):

David Yuill (June 2022); Srinivas Katipamula (June 2023); Glenn Remington (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).

|  |  |  |  |
| --- | --- | --- | --- |
| X | David Yuill | X | Mike Galler |
| X | Srinivas Katipamula | X | Donghun Kim |
|  | Glenn Remington | X | Carol Lomonaco |
| X | Liping Wang | X | Greg Pavlak |
| X | Eric Yang | X | Li Song |
| X | Joe Zhou |  |  |
|  |  |  |  |

10 out of the 11 voting members were present – we have a quorum.

Sign in sheet online and circulate paper sign in sheet in the room.

1. 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>.)

1. Discussion/Vote on Approval of 2021 Annual (virtual) Meeting Minutes

* Xiaohui Zhou move approving the minutes, Carol Lomonaco second.
* Nobody oppose approving the minutes. 9-0-0 (chair not voting). **Minutes approved**.

1. Announcements
   * Chairs’ breakfast meeting and other ongoing activities.
     + Changes in the MOP – technical committee should have a balance in distribution of member affiliations. Our TC is balanced.
   * Discussion on a new rating systems for Smart Buildings – like LEED or WELL. SPIRE (<https://spiresmartbuildings.ul.com/>) crearted by Underwriter Laboratary (UL). Six categories of things to get points (connectivity, cybersecurity, energy, occupant comfort, etc.) Suggested they gave ASHRAE a presentation.
     + Sudi Singer – speaker on this and need to find another potential speaker. Seminar proposal? Delos (Well)?
     + Liping – integrate all categies?
     + Zheng – difference with EU’s smart readiness indicator for buildings?
     + Xiaohui Zhou – GEB -ready concept.
     + Eric – ASHRAE BEQ – find a speker.
     + Carol volunter to be the seminar chair.
     + Nobody from TC 7.5 has heard of SPIRE. <https://spiresmartbuildings.ul.com/> - linke to the UL Spire website.
   * Dicussion about continue TC 7.5 as an independt TC. Mike move. Carol second. **Unanimous approval** 9-0-0 (chair not voting).
   * Informaiton about ASHRAE *Task Force on Building Decarbonization* (TFBD) – *Working Group on Grid-Building Interactions* (WGGBI)
     + Dave is a member of this task force. The task force met every two weeks.
     + Jim Buteler: what’s the planned output?
       1. Dave: it is part of the discussion – publications, identify the problem. So we know what’s the next step.
       2. Carol: should we create another subcommittee? Dave: don’t see the need.
   * Kristen Cetin: Information about the live session with DOE, ARPA-E and NSF program directors - invited four presenters from DOE, NSF, etc. for a seminar about funding, proposals, targeting younger members. It went well.
2. Liaison Reports: Section Head, Res/Stds/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)
   * Section head report from James Bennett: for Satheesh (Section Head.) Direct email TACchair@ashrae.net Don’t have access to basecamp. Three areas to remind people:
     + Function group activity forum. Send every to Shateesh and James
     + Conflict of interest is important – real or perceived. Succesful planning is the roster.
     + Breakfast handout – TC leadership basecamp
   * TC 1.4 Chariti Young:
     + YEA group hosted a session - jeopardy games - what happens within TC 1.4?
     + Many seminar co-sponsorships overlapped with TC 7.5. 5 programs approved for Las Vegas; 3 happened. 2 remaining (along with 12 others) will be submitted for Toronto meeting, several around Cybersecurity and controls.
     + Overlap with TC 7.5 on research too. All current active research may be cosposonred or share PMs.
       - No cost exteniotion to May 2022 for the RP1661 “Development and Validation of Dynamic Models for the Control of Chiller Plants with Water Side Economizer”.
       - RP1865 “Optimizing Supply Air Temperature Control for Dedicated Outside Air Systems” work begins in April 2022.
       - RTAR1925 “Building Operation & Equipment Key Performance Indicators” looking for feedback and requesting committee review prior to TC vote before March 15.
       - WS-1809 “Updating Reference Guide for Dynamic Models of HVAC” TC 1.4 is co-sponsor with TC 7.5.
     + New ideas:
       - 1. New optimal start research.
         2. Semantic tagging.
     + Gudieline 13 “Specifying Building Automation Systems”: in the process of final review of all changes /addemdas since 2015. Recruite reviewers of the guideline. If interested in participating, please [apply](https://www.ashrae.org/technical-resources/standards-and-guidelines/apply-to-a-project-committee) to participate in Guideline 13 through the ASHRAE process and notify the SGPC13 chair and vice chair ([tgottshall@westernallied.com](mailto:tgottshall@westernallied.com); [pnaughton76@outlook.com](mailto:pnaughton76@outlook.com)).
     + Gudieline 36: 2021 version published last Summer - extending sequences to include water-side (chilled water plant and heating plant). Addemdum fixssing issues. Wild fire smoke seqeunce did not pass – need to address more generally on outdoor pollution. Sensor connectivity issues.
     + Two new research projects:
       - True energy conservation value of optimal start strategy. The project is currently focused on simulation, not field data gathering
       - DOE building hosted tool for control using Latex to tag sequences.
     + Carol: goal for guideline 36 tool? To documente the seqeucne more conveniently.
   * TC 1.5 Mike Galler:
     + program – through social media.
     + Applications handbook chapter 41– computer applications.
   * MTG OBB Zheng:
     + ASHRAE global occupant behavior database is now online free to general public.
     + ASHRAE Global Occupant Behavior Database: <https://ashraeobdatabase.com/#/>
     + Chapter 65 oocupant-centric control. Some links to our chapter 43 and 63.
     + MTG OBB may become a full TC.
   * MTG EBO? Patrick? not present
   * TC 1.9/1.10 Glenn: not present.
   * Carol :
     + Steve Bushby presented for the BACnet committee on SPC 223P started with Tagging Semantic Standard.
     + Similar to Brick or Haystack.
3. Fault Detection and Diagnosis Subcommittee Report (Liping Wang)
   * Met on Sunday (30 people total).
   * Seminar ideas: Automated Alarm Management (Atlanta); Moving Beyond Data Overload – Guanjin Lin – moving forward; Residential FDD (Toronto, Dave, Zheng, Li, etc.) FDD for High-performance Systems. Residential case study.
   * Assessment of FDD in Guidleine 36 (2023 Summer) potential lead by Joe
   * RTAR – Evaluation of the Usability of ASHRAE Standard 207 – cosponsor by TC 1.4? 18 months to 2 years and budget increase.
   * FDD for connected buildings and communities. Broden the concept to include other DERs.
4. Enabling Technologies Subcommittee (Mike Galler):
   * Met on Sunday about 15 people.
   * Program: designer perspective on GPC 13; Connected buildings for decarbonizations – looking for spekers on Toronto or Atlanta.
   * Discussion included potential seminar on POV of designers and installers regarding cybersecurity.
   * Lomonaco led discussion on seminar for residential security.
   * Bernstein led discussion on seminar on smart grid building to grid and grid to building, things beyond the meter.
   * Brambley led discussion on connectred buildings for decarbonization of the energy system, looking for speakers for Toronto or Atlanta meetings.
   * Discussion determined TC would probably benefit from a virtual meeting between conferences.
5. Smart Grid Subcommittee (Kristen Cetin)
   * Met on Sunday.
   * ASHRAE task force on decarbonization – effort on a PTAR on grid building interaction, build on to a smart grid application guide. Looking for TC 7.5 co-sponsor the effort.
   * TC 7.5 **voted unanimously to co-sponsor the PTAR** through email letter ballot. The vote tally was:
     + 9-0-0-2-11 (Chair Not Voting)
     + The letter ballot closed on 2/25/22.
   * Seminar ideas:
     + Connected community and decarbonization. (Mike Brambley)
     + Smart builsing on Transactin Energy Hub (Ron Berstein).
     + Demand flexibility (DOE projects, Zheng and Jin).
   * Data-driven model and MPC RTAR discussions.
6. Buildings Operations Dynamics Subcommittee (Donghun Kim)
   * 15 + 5 people attended.
   * Programs: three ongoing – one dropped. Two accepted in Las Vegas but dropped, speakers are not allowed to travel. Building Operations for Grow Applications (Glenn). Try to resubmit. GEB for renewable energy integration and decarbonization – resubmit in Toronto or later. Overlapp with Mike Brambley’s similar seminar topic. What to do with optimal controls (three years ago) – will reach out Peter Armstrong.
   * Research:
     + RP- 1661: Development and Validation of Dynamic Models for the Evaluation of Chilled-Water System Control Strategies – 12 monht no-cost extention by May of 2022.
     + WS- 1809: Updating reference guide for dynamic models of HVAC equipment – in revision.
   * New RTAR ideas:
     + A Survey Study on the Development and Application of Data-driven Model Predictive Control for Buildings – moving forward to submit WS by March 15;
     + Meta-analysis of building-centric methods, costs, and benefits of electrification and grid services – under revision;
     + Occupancy-Aware Control and Operation of HVAC Systems in Commercial Buildings – in collaboration MTG OBB approved by MTG OBB, inquiring status.
7. Research (Zheng O’Neill)

* Research updates from society/RAC
  + Since last meeting, TC 7.5 submitted three RTARS. Current 6 active RTARs (drafts), three active WSs. Co-sponsor two research projects.
* Currently sponsored projects
  + ASHRE only cover current contracts (1.7 million). Suspend three other types of research fundings.
  + New research strategic plan – 6 researhc initiatives
* Current RTARs and WS
  + 1661 – no-cost extention to May 2022.
  + 1756 – finalizing final report.
  + Three active WS
    - 1855 – Develop cost and performance indices to evaluate effectiveness of virtual sensors in HVAC applications - will revise WS by 8/15.
    - 1809 - Updating Reference Guide for Dynamic Models of HVAC Equipment – received comments form RAC, recommend change it to PTAR.
    - 1812 – Detection and Diagnosis of the Circulating Fluid Leakage for Hydronic Systems. Zheng and Kristen will discuss.
  + Vote on RTAR about Standard 207 validation (John House) – changing budget and schedule.
    - Srinivas move; Carol second. TC 7.9 sending out for letter ballot.
    - Other Yes. Joe abstain because of not read it yet.
    - 8-1-0-1-11 8 yes-1 abstaintion -0 oppose – 1 did not present – chair not voting. **Motion passed.**
    - RTAR table (see minutes)
* Report on letter ballots since Annual meeting:
  + RTAR 1927.
  + RTAR on conducting a survey of using data-driven models for model predictive control of supervisory level control.
  + RTAR on Decarbonization.
  + RTAR on If you had “perfect information” on occupants comfort preferences and their location within a conditioned space, then how would you optimize control and how much value would you be able to realized.

1. Program (Eric Yang)
   * Submitted 7 seminars with 3 accepted in Las Vegas meeting
   * Building optimal control – Peter would like to drop the seminar idea.
   * Batter control strategy and impact to life cycle cost.
   * Smart products for commerncal and residential buildings.
   * 2/17 deadline to submit seminar applications for Toronto meeting.
   * Mike/Ron Berstein –7.5 cosponsor a seminar on smart building as a transactive energy hub?
2. Handbook (Greg Pavlak)
   * Applications Chapter 43 – Supervisory Control Strategies and Optimization
     + Chapter due Spring (March) – TC comments by April
   * Applications Chapter 63 – Smart Building Systems
     + Chapter due Summer (July)
   * Everyone can provie feedback.
   * Send Greg an email if interested in contributing.
3. YEA (Kristen Cetin)
   * A quick meeting – going through TC 7.5 how organized and encourage participation.
4. Standards (David Yuill)
   * + Standard 201 – Facility Smart Grid Information Model (RA2020)
     + Standard 207 (2021) – Laboratory Method of Test of Fault Detection and Diagnosis for Air Economizers
     + TC 6.3 heating and cooling equipment - method of test for AFDD residential & heat pumps – some comments that this should be TC 8.11 HVAC equipment and new AFDD subcommittee
     + TC 7.3 O&M now SSPC 221 continue revision. Mike V. directed Mike Brambley to connect to 8.11.
5. Honors and Awards (Carol Lomonaco)
   * Members: Carol, Joe, Natasha, Zheng
   * Submitted two DSA, two ESA, two Fellow applications.
   * Working on three potential fellow and one more DSA.
   * Zheng and James are new approved fellows at this conference.
   * Emmerson award – James Braun.
   * Member can nominate themselves.
6. Web Page (Mike Galler)
   * Up to date.
7. Membership (David Yuill)
   * Committee leadership rolling practice
   * Provisional member want to become a corresponding member, please send current TC 7.5 Chair (David) an email
   * Want a leadership role, need some past history of charing a subcommittee
8. Old Business
9. New Business
   * James Butler presentation on BACnet Cybersecurity
   * BACnet Secure Connect and related addenda
10. Adjournment.

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| TC 7.5 Fault Detection and Diagnostics Sunday, 1/30/2022 @ 2:30 PM– 3:15 PM PST  Zoom: <https://uwyo.zoom.us/j/92706431261>  **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:

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| 0:00 | **Call to Order** |  |
|  | Self-introduction, announce the subcommittee scope. |  |
| 5 mins | **Sessions at current ASHARE conference** |  |
|  | [updated program link](https://www.ashrae.org/file%20library/conferences/winter%20conference/updated-program-12.9.pdf) |  |
| 5 mins | **2022 Annual ASHRAE conference seminar ideas**  June 25-29, 2022 – Toronto, ON   1. Fundamental and Applications 2. HVAC&R Systems and Equipment 3. Research Summit 4. Connected Buildings, Connected Communities 5. Cold Climate Building System Design, Operation and Resilience 6. IAQ, Energy Use, Comfort and Health of Sustainable Buildings. 7. Professional Development and Education 8. Buildings in the Aftermath of COVID-19   February 17, 2022: Program (Seminar, Forum, Workshop, Debate and Panel) Proposals Due |  |
| 10 mins | **Potential Seminar Ideas for 2021 Winter ASHRAE** |  |
| 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 identified three speakers. Plan to submit the seminar proposal if we will have a virtual conference in 2021 winter ASHRAE.  Defer to ASHRAE Winter Conference 2023 in Atlanta | Carol Lomonaco, Kim Barker |
| Moving Beyond Data Overload to Effective Use of Fault Detection and Diagnostics Analytics | Guanjing Lin (Chair), Patric Villaume, Young, Chariti |
| Residential FDD (multiple family residential buildings) review of FDD on residentials.  Submit for 2023 Winter or Summer conference  Li has an accepted conference paper presentation for Toronto conference. | David Yuill, Jin Wen, Zheng O’Neill, Li Song |
| ~~California requirement of FDD~~  ~~May consider FDD requirement in standards such as Title 24, Guideline 36, SPC 207.~~  ~~Completed: 2021 Winter Conference~~ | ~~Steve Taylor, Kim Barker, Kristin Heinemeier~~ |
| **New ideas?** |  |
| FDD methods for building HVAC systems |  |
| Case study for FDD implementation and testing in buildings  Toronto Conference  David: prevalence faults for buildings with LBNL  1-2 speakers  Liping: FDD testing results for high-performance HVAC systems.  Atlanta Conference  Li Song: Residential FDD case study | David Yuill, Li Song, Liping Wang |
|  | Assessment of FDD in Guideline 36  Idea for ASHRAE 2023 conference | Joe Zhou, Steve Taylor |
| 15 min | **Update/Discussion of Active project/RTARs/Work Statement** |  |
| WS 1812 Development of AFDD for leakage of ground-source heat pumps (work statement revision) | Zheng O’Neill and Kristen Cetin |
| Evaluation of the Usability of ASHRAE Standard 207  Co-sponsor TC 7.9, Maybe TC 1.4  John led a discussion on the RTAR idea. Can tests be properly done? What are the expected results? Who will be the users?  Discussion on the budget $150K? Project period: 18-24 months. | Lead by John House  David Shipley, Kim Barker,  Mike Brambley, Ahmed Abdel-Salam  Chirag Parikh, Liping Wang, David Yuill |
| **Research Ideas** |  |
| New idea: 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 |
| Literature Review and Survey of existing FDD methods and data  ATL - FDD literature review and central location for download data/methods etc. (collection of methods) – existing  Not only compiling but the assessment of new technologies (indicating last large-scale study is 2005)  Characterization (qualitatively) evaluate. IEA 34. | Nick Gayeski, Jin Wen |
| Automated Alarm Management: DDC alarms used for FDD? (automated analytics to correct alarms or utilize alarms) – return the threshold to reduce false alarms in an automated process. | Carol Lomonaco,  Reinhard Seidl, Li Song, Te Qi, John Wallace |
| What research should TC 7.5 provide to use the FDD results to support the energy-saving requirement for Standards and Guidelines such as Standard 90.1 and 189.1? What is the minimum requirement for 90.1? An internal TC7.5 meeting.  Host a meeting for brainstorming by inviting members from other standards. Or discuss this in TC 7.5 main meeting or seminar or forum. | Guanjing Lin and Kim Barker, Scott West, Glenn Remington, Li Song |
|  | FDD for connected buildings and communities  A project group for broadening the concept of FDD | Lixia Wu, Zac Siefker, Liping Wang, … |
| 10 min | **New ideas and discussions** |  |
| Review of fault feature selection (what data to use)? |  |
| Adjourn | | |

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| logo_ashrae.png | **Meeting Minutes** |
| TC 7.5 Smart Grid Subcommittee (Virtual/In Person) January 30, 2022 | 4:30 pm - 5:15 pm  **Prepared by Kristen S. Cetin** |

**Subcommittee Scope:** This subcommittee will explore and develop ideas to improve building and utility/electric grid interactions. 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, and 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 a significant gaps in the research activities, especially as they relate to buildings. Since buildings consume over 70% of the electricity 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.

**Zoom:** <https://msu.zoom.us/j/98867590927>

Meeting ID: 988 6759 0927

**Attendance:**  [*https://docs.google.com/spreadsheets/d/1PrI20VZuD1Q56cxNidVCfqID0uuX48qx/edit?usp=sharing&ouid=105951178563267302098&rtpof=true&sd=true*](https://docs.google.com/spreadsheets/d/1PrI20VZuD1Q56cxNidVCfqID0uuX48qx/edit?usp=sharing&ouid=105951178563267302098&rtpof=true&sd=true)

Minutes:

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| --- | --- | --- |
| 0:00 | **Call to Order** |  |
| 5 min | Introductions, announce the subcommittee scope |  |
| 5 min | **Relevant sessions at current ASHRAE conference** |  |
|  | Schedule Link: https://www.ashrae.org/file%20library/conferences/winter%20conference/2022winterconferenceprogrambook.pdf | see link |
| 10 min | **Task Force for Decarbonization’s Working Group on Grid-Building Intersection - PTAR to develop a Grid-Building integration guide for ASHRAE to publish** | Scott Hackel |
| 15 min | **Winter 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: <https://docs.google.com/spreadsheets/d/1PrI20VZuD1Q56cxNidVCfqID0uuX48qx/edit?usp=sharing&ouid=105951178563267302098&rtpof=true&sd=true>

**Relevant Sessions at current ASHARE conference**

* Sessions Link: <https://www.ashrae.org/file%20library/conferences/winter%20conference/2022winterconferenceprogrambook.pdf>
* Seminar 12 - Renewables and the Smart Grid – Sunday, 11-12:30 - Christie Kjellman
* Seminar 20 - HVAC Design, Control and Operation of Hospitals After COVID-19 Fiasco, Monday, 9:45-10:45 am - Frank Shadpour
* Seminar 16 – Decarbonization seminar – 8:00 am tomorrow

**Task Force for Decarbonization’s Working Group on Grid-Building Intersection - PTAR to develop a Grid-Building integration guide for ASHRAE to publish – Scott Hackel**

* Identify gaps that ASHRAE can address in how building/grid interaction can assist with decarbonization
* Group is putting together a PTAR to put together a guide on grid-building interaction for decarbonization
* Builds on “smart grid applications” guide – but provides more specific design and operational parameters to allow buildings to maximize carbon reduction
* May be sponsored by ASHRAE + other funding sources
* May be done in phases, or may be turned into a guideline (but this is not the initial goal)
* Requesting that TC 7.5 would co-sponsor this, (also requesting co-sponsorship from TC 1.9)
* David will send this out to the TC for sponsorship (and feedback as well)
  + March 15 deadline for RAC co-sponsorship

**ASHRAE conference ideas**

**Summer 2022 --** [**https://www.ashrae.org/conferences/2022-annual-conference-toronto**](https://www.ashrae.org/conferences/2022-annual-conference-toronto) **- June 25-29, 2022**

Deadlines:

* + *February 17, 2022: Seminar, Workshop, Forum, Debate, and Panel Proposals Due*
* Tracks *(most relevant)*
  + **(3) Research Summit**
  + **(4)** **Connected Buildings, Connected Communities**
  + **(5) IAQ, Energy Use, Comfort and Health of Sustainable Buildings**
* Previous/Current Ideas
  + Connected buildings for decarbonization - **Mike Brambley**
    - Looking for speakers
    - Li Song – residential – send a title and abstract
    - Some ideas were discussed in BOD meeting that are similar
  + Smart Buildings as a Transactive Energy Hub– **Ron Bernstein** – plan for re-submission in Summer 2022
    - Smart Buildings as a Transactive Energy Hub. August 2020. PNNL-30103 V1- <https://www.gridwiseac.org/pdfs/pnnl_30103_smart_buildings_teh.pdf>
    - **Christie** has some ideas on potential speakers from Universal Devices
    - **Scott** – Slipstream doing work on automation and demand response; suggest to consider a session on automation, ADR, EDIS to automate processes
    - Question on if focus is on building/building or Building/Grid?
    - Katherin Hammack [hammackk@gmail.com](mailto:hammackk@gmail.com) – interested in co-sponorship
  + Demand Flexibility for ongoing projects DOE BENEFIT – **Zheng O’Neill** will follow up with **Jin Wen** – for 2023
  + Connected Communities Field Deployment and Lessons Learned (*from summer 2021*)*–* **Helia Zandi**
  + 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
  + Cybersecurity & Smart Grid ***-* Carol** **Lomonaco** from Summer 2021
    - Please email Carol if interested in contributing - [carol.lomonaco@jci.com](mailto:carol.lomonaco@jci.com)
    - **Zheng O’Neill / Jin** **Wen** – can help, can discuss – have DOE project on this area
    - **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
  + Other topics/ideas
    - Smart products for residential and commercial buildings
      * talk with residential TC – net zero building committee
    - Panel discussion on grid interactive buildings
    - 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
    - Utility Grid Battery Control Strategies and Impacts on O&M & LCA (From Atlanta 2019)
      * Large scale batteries

**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**

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

* Draft is posted in Basecamp
* Looking for people to review and provide comments
* Comments:
  + careful with “guide vs guideline” , suggestion to talk to research liason for Section 7
  + Glenn – interested in reviewing
  + Session 62 – related to this
  + PTAR process created after
  + seeking co-sponsorship

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**

*Other ideas:*

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

* 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

Instantaneous voltage and current load from buildings

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?

**ASHRAE TC 7.5: Smart Building Systems Research Subcommittee Meeting**

**Monday, 01/31/2022**

**5:15 PM– 6:00PM Pacific Standard Time (PST)**

<https://tamu.zoom.us/j/93314149119?pwd=UlpJWGhubUJGalRrVGtqeTZoWU1RQT09>

Minutes.

|  |  |
| --- | --- |
| 1. Roll Call and Introduction   Zheng called for the order and people signed in | 5:15– 5:20 |
| 1. Announcements/recap of the research subcommittee chair meeting  * Our current budget is 1.8 million and it covers current contract commitments only. * To maintain budget, our 1st priority is to maintain our ability to fund ongoing projects where a current contract is in place. * The NIA, GIA, and IRG programs have been suspended for this Society year due to severe budget constraint caused by Pandemic – No applications or nominations will be accepted this year. Please check back for SY 22-23. * URP stopped for the time being * RTAR/WS/TRP   Fall 2021 Meeting:  Research Strategic Plan approved  6 Research Topic Acceptance Requests (RTARs)  5 Work Statements  3 Released for Bid  Winter 2022 Meeting:  1 RTARs (carry over from fall 2021 meeting)  0 Work Statements  17 TRPs that are ready to bid in Spring 2022 – impact SY 22-23 budget   * ASHRAE’s Research Strategic Plan: 6 Research Initiatives:  1. Resilience 2. IEQ – Environmental Quality in Occupied Spaces and Impacts on Work and Learning Health and Well Being, and Transmission of Airborne Infectious Viruses 3. Sustainability, Decarbonization, Energy and Resources 4. HVAC&R Tools and Applications 5. Education and Outreach 6. Equipment, Components, and Materials  * Check the ASHRAE website for latest instructions on RTAR and WS. | 5:20-5:25 |
| 1. Status of current Research Projects   3.1 Two ongoing research projects that are co-sponsored by TC75.   * 1. RP 1661: the 2nd 12-month no-cost extension was approved. PEM had a project update meeting in May. The PI had made good progress to troubleshoot the first simulation case.   Note: Another NCE to May 2022   * 1. RP 1756: need an update from PEM member Liping or Glenn.   PMS member (Liping Wang): The project is completed. The team is revising the final report.  3.2 Three active work statements – see attached table   1. WS1875. Develop cost and performance indices to evaluate effectiveness of virtual sensors in HVAC applications 2. WS 1809: Updating Reference Guide for Dynamic Models of HVAC Equipment   Resubmit in Aug 2021,   1. WS 1812: Detection and Diagnosis of the Circulating Fluid Leakage for Hydronic Systems   3.3 Seven active RTARs (two of them is co-sponsor)- see attached table   1. BOD: Ian Bonadeo talked about RTAR of “HVAC Equipment Health KPIs” 2. FDD: RTAR: Method of evaluation of the FDD standard of air-side economizer on RTU by John House. This RTAR is ready for vote.   3.4 New research candidates from last meeting   1. BOD: How does remote work environment impact on residential building load profiles and HVAC operations   3.5 RTARs/WS underdevelopment - see attached table | 5:25 – 6:05 |
| 1. TC 7.5 research new ideas and topics   No discussions | 6:05– |
| 1. New Business   No discussions | 6:05– |
| 1. Adjourn   The meeting was ended at 6:06pm | 6:06 |

**ASHRAE TC 7.5: Smart Building Systems Research Plan**

**Active Project: 0; Co-sponsor Project: 2; Active WS: 3; Active RTAR with Draft:5; Co-sponsor WS/RTAR: 2**

| Subc | Project | Contributors/PI | Status |
| --- | --- | --- | --- |
| Co-Sponsor | (TC 4.7) 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 | Co-sponsoring with TC – 4.7 and 1.4  WS is returned with comments. Wangda will provide updated WS for TC review during Orlando.  STL: the TC voted Yes and submitted to RAC. RAC conditional approved.  Las Vegas – Selected a bidder. Miami is the winner  Long Beach – contract is being signed. Project starts on August 1st. Wangda is the PI (will be at Boulder)  Chicago: The project has begun, and the PMS met with the contractor. Task 1 is complete. Conference call is complete.  Houston: The PI gave a report on the progress.  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.  Orlando: the 2nd 12-month extension is proposed by the PI and main sponsoring TC.  2021 virtual: LI: moving on well PMS in Oct, 2020. Wrap the project in May 2021. Next PMS meeting is scheduled in Feb. 2021.  2022 Las Vegas: NCE to May 2022. |
| Co-Sponsor | TC 2.4: RP-1756 evaluation of low-cost particulate sensors for building | Brent Stephens (2.4)  7.5 PMS: Glenn Remington and Liping Wang | ORL: – need co-authorship too – against lab-grade equipment to review their performances…  STL: the TC voted YES and submitted to RAC. No feedback yet.  Las Vegas – resubmit a WS. Need 1-2 PES volunteers  Long Beach – PES met and is selecting winner.  Chicago: Project was awarded to Jordan Clark at Ohio State University, and has commenced. There are some initial adjustments to scope requested.  Houston: The PMS had their second meeting.  Update: Li will follow up with Remington or Li Ping Wang for an update before the main TC meeting.  Kansas City update: The PIs made decent progress on the project. They have submitted an STBE paper currently under revision.  Orlando: need update from Glen/Liping. Wrap up the final report, which is due in March 2020. PMS chair is satisfied with the report.  Glen: no update in the summer virtual meeting.  2021 virtual: Liping: Liping received update in January 2021. Liping will provide an update offline.  2022 Las Vegas: Liping: The project is completed. The team is finalizing the report. |
| **WS** |  |  |  |
| BOD | WS-1809 – Updating Reference Guide for Dynamic Models of HVAC Equipment | Heejin Cho | 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.  STL: The revised RTAR is ready for committee to review and vote. Committee voted approval. RAC approved. Need to develop WS.  Las Vegas: WS in development.  Long Beach: WS in development. Aim at Chicago meeting  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.  Houston: Heejin expects to get a draft to us by mid-July.  The Atlanta update by Zeng: WS was voted and submitted.  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.  Orlando: Zheng will follow up with the Author.  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.  2021 virtual: an updated version and rebuttal letter was sent to Bill (TC 7.5 research Liaison).  2022 Las Vegas: submitted the revised WS in August 2021, and received the comments from RAC.  The RAC recommended us resubmitting it through PTAR process. << Zheng/Jin will follow up with RAC for actions>> |
| FDD | WS-1812 – Detection and Diagnosis of the Circulating Fluid Leakage for Hydronic Systems | Zheng O’Neill  Kristen Cetin | STL: RTART discussed in sub-committee. Will be voted in mid-July. Committee voted approval. RAC approved. Need to develop WS.  Las Vegas: WS in development.  Long Beach: WS is ready to be voted. Aim at August deadline.  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.  Houston: WS was returned with comments. They aim to revise for August 15th deadline.  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.  Kansas City update: revised WS is returned with comments.  Orlando: Zheng will continue working on it.  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.  2021 virtual: Zheng and Kristen are still working on it.  2022 Las Vegas: Zheng and Kristen will discuss. |
| ET | WS-1875: Develop cost and performance indices to evaluate effectiveness of virtual sensors in HVAC applications | Li Song | Voted in Atlanta; Submitted for RAC to review. RAC accepted with comments.  ORL – WS in preparation  STL - WS in preparation  Las Vegas – no update  Long Beach – no update  Chicago: there is still an interest in submitting a WS.  Houston: Li will submit WS to RAC by August 15.  Update in Kansas City: 1783  Orlando: Li is Still working on it.  Summer 2020: Li will get it done by December 2020.  2021 virtual: Li is still working on it.  2022 Las Vegas: Zheng to follow up with Li |
| **RTAR** |  |  |  |
| BOD | **RTAR 1934** A Survey Study on the Development and Application of Data-driven Model Predictive Control for Buildings (Active) | Zheng O’Neill  Jin Wen  Jose Candanedo | 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 submit the WS by March 15th, 2022 |
| **BOD** | Draft RTAR: Meta-analysis of building-centric methods, costs, and benefits of electrification and grid services (Active) | Hayden Reeve | 2022 Las Vegas:  Vote (November, 18 2021) 0-7-0-3 (CNV).  David Yuill will be helping Task Force for Building Decarbonizationto revise the scope of the RTAR. |
| BOD | Draft RTAR:  Occupancy-Aware Control and Operation of HVAC Systems in Commercial Buildings  (Active) | Rich Hackner  Li Song | 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.  Las Vegas: In development  Long Beach: In development  Chicago: No update.  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.  Atlanta update by Song: Li will upload the RTAR on basecamp and circulate among the TC.  Kansas City update: Li will add the cosponsorship to the RTAR and send it Jin for voting on Tuesday.  Orlando: The RTAT was submitted to Bill Murphy  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.  Summer 2020: Research chair in STCOBB will be reached for voting.    2021 virtual: “ Li” – waiting for MTG. OBB vote  2022 Las Vegas  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 |
| BOD | Draft RTAR:  HVAC Equipment Health KPIs  (Active) | Ian Bonadeo | 2022 Las Vegas  Joe/David Existing commercial software has FDD software to provide health indicator.  Jin: provide awareness for the need of FDD.  Ian: campus wide buildings with multiple vendors. For both old buildings and buildings with G36. Generalized algorithms. |
| FDD | Draft RTAR:  Method of evaluation of the FDD standard of air-side economizer on RTU  (Active) | John House  SP 207P | Kansas City update: David Shipley initiated the topic and will send the draft of the RTAT to Li for improvement in the TC.  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.  2021 virtual: Liping: John House will take over to lead this effort. RTAR is not submitted yet.  2022 Las Vegas  TC 7.9 co-sponsorship  Budget increased from 100K to 150K.  Editorial changes. Will be voted in this meeting |
| BOD | How does remote work environment impact on residential building load profiles and HVAC operations (Active) | Li Song | 2022 Las Vegas:  New in LAS |
| SG | RTAR - Development of models for better peak load predictions for building clusters/neighborhood/city  (Active) | Michael Bobker  Kristen Cetin | 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 |
| SG | RTAR - - Linking building modeling to grid modeling  (Active) | Donghun Kim | Long Beach – initiated the idea  Chicago: was discussed, there’s still interest.  Chicago: Not discussed.  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.  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.  Orlando: Donghum, Jie Cai.  Summer 2020: Donghum is still formulating the scope and topic. Qun Zhou, in addition to Bing Dong, has volunteered to participate.  2021 virtual: Donghum to set up a meeting to define the scope  Impacts on the grid (distribution level, voltage changes)  Who will use this (DR aggregator or individual buildings)  Joe: hard to be funded by ASHRAE 200K project although it is useful and has values.  Abed Alkhatib <AAlkhatib@willdan.com>; Rushil Desai <rdesai@elementaengineering.com> - these people volunteered to help with this  2022 Las Vegas: No discussions |
| BOD | RTAR - How IoT impacts operators  (Active) | 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](mailto: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 |
| BOD | TC 1.4 RTAR Current title: "Night setback effectiveness" possible change to "Night preconditioning effectiveness"  Orlando: Recommended to change the title to unoccupied-period Preconditioning effectiveness | Peter Armstrong | ORL: Seek co-authorship. Objective: show how to credibly model energy and comfort impacts of night preconditioning.  (effectiveness of simple through MPC controls?)  Las Vegas – continue development  Long Beach: no update  Houston: No update  Kansas City update: it is dropped by TC1.4. Peter will lead it.  Orlando: Helen (University of Toronto). Li will coordinate with peter and will lead.  2021 virtual: No discussion  2022 Las Vegas: No discussions |
| BOD | RTAR: Big data-based approach for HVAC equipment modeling | Carol and Jin | 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.  Orlando: A new volunteer, Mr. Shengbo Zhang (U. of Toronto) was introduced to Jin and Carol.  Summer 2020: Jin will talk with Carol  2021 virtual: Carol: check with Jin (Zheng will follow up)  2022 Las Vegas: No discussions |
| FDD | New in Orlando: User experience about FDD. Operator, building managers. System to be conservative or aggressive.  (Active) | Austin Rodger | 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](mailto:laura.towsley@rycom.com)).  Summer 2020: Li will follow up with Austin and Laura. Scott west volunteered to help. Liping will coordinate with everyone on the list.  2021 virtual: Liping/Scott West: had the meeting, did some literature review. Will move on for a RTAR. 1633RP is relevant (likely the proposed work will be in this format) 1650 RP.  Expect the RATA by annual meeting 2021.  Liping will follow up with Austin and Laura  2022 Las Vegas: No discussions |
| Co-Sponsor | Draft: Low-cost indoor pollutant sensor metrics for data-driven control of ventilation in smart buildings | Jordan Clark, Brent Stephens, Kristen Cetin | Houston: In progress.  TC4.3 is the main TC.  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.  Kansas City update: It is designed as the follow up project.  Orlando: Kristen explained that Jordan Clark is being approved by the TC for submission.  2021 virtual: Kristen to follow up with Jordan  2022 Las Vegas: No discussions |
| Co-Sponsor | Assessment of energy savings of “smart” web-based connected thermostats in new and existing single and multi-family dwellings for inclusion in SSPC90.2  Active) | Li Song | 2021 virtual: Li Song is following up  2022 Las Vegas: No discussions |
| **Parking Lot** | | | |
| BOD | How smart/connected thermostat 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 | Volunteers from 90.2: Mike Lubliner, Washington State University, [lublinerm@energy.wsu.edu](mailto:lublinerm@energy.wsu.edu), 360-956-2082, Richard Watson, SSHC, Inc.,[rwatson@sshcinc.com](mailto:rwatson@sshcinc.com),860-399-5434, Matt Vargo, Carrier Corp, [Matt.vargo@carrier.utc.com](mailto:Matt.vargo@carrier.utc.com).  Kansas City update: Li will explore the study done by EPA and start the draft of the RTAR  Orlando: Mike Brambely provided inputs about the presentation on Sunday. |
| BOD | RTAR - Link the productivity with occupant-in-loop control | Ivo Martinac | New at Long Beach  Houston: Topic was discussed. Ivo was not present, but there is general interest among those present.  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.  Kansas City update: Jin will update the TC after contacting POC.  Orlando: Park |
| BOD | RTAR - Smart management of moisture and energy consumption in residential houses, smart ventilation, optimal location for dyer, 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 |
| ET/FDD | Draft RTAR: Metadata and Taxonomy to Support FDD in Smart Buildings | Nick Gayeski  Charity Young | SEA NEW submitted for consideration by Subcomms  CHI – Nick discussed wants feedback. Explained purpose  ATL- Phil did not think the need and significance to ASHRAE are clear. Had discussion in ET subcommittee. Nick will revise  ORL – Nick is continuously updating it.  Las Vegas – Nick is continuously updating it.  Long Beach – no update  Chicago: No update.  Houston: Dennis Krieger will pick this up to see if there’s potential to move forward. He’s unfamiliar with ASHRAE processes.  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.  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.  Summer 2020: park it. Kristen will follow up with Nick. |
| 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 |
|  |  |  |  |
| FDD | RTAR: Self-fixing faults once it is diagnosed | Andrew Windham windhamaw@appstate.edu; Jin Wen will help) | New at Long Beach  Houston: no update  Kansas City update: an ongoing project is funded by DOE. Orlando. park |
| FDD | RTAR: collect, clean, and label existing data for FDD research | Xiwang Li, Liping Wang, Kristen. Shawn Shi (Carleton) | Las Vegas: new idea  Long Beach: no update  Houston: No update  Kansas City update: Park.  Orlando: park |
| FDD | WS 1781: – Methods to Evaluate AFDD Methods for Air Handling Unit Systems | Jin Wen | CHI – Jin Wen has new version for submission.  Atlanta – Voted; submitted to RAC. RAC accepted with comments for WS.  ORL – WS in preparation  STL – WS in preparation; 7.3 will co-sponsor. Might seek co-sponsorship with 9.1  Las Vegas – WS in development. Will seek a vote in between meetings.  Long Beach - WS is ready to be voted. Aim at submitting it by August deadline  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.  Houston: No update. It times out within the next year, but we’re still interested in pursuing this.  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.  Kansas City update: drop from the list and park |
| FDD | Idea - FDD for datacenters |  |  |
| FDD | Literature Review and Survey of existing FDD methods and data | Nick Gayeski, Jin Wen | ATL - FDD literature review and central location for download data/methods etc. (collection of methods) – existing  Not only compiling but assessment of new technologies (indicating last large-scale study is 2005)  Characterization (qualitatively) evaluate. IEA 34. |
| FDD | Idea - Whole Building FDD through smart-meters (champion?) |  |  |
| ET | Ideas -- Connectivity in the home? | Nick Gayeski | CHI – Much discussion no resolution |
| SG | Development of models for better peak load predictions | Kristine; Mike, Srinivas will review | CHI—New idea. |
| SG | Idea – DR guideline related ideas |  | ATL – estimate thermal response etc. |
| SG | Idea --Instantaneous voltage and current load from bldgs. For SG | Ralph Muehleisen  Argonne NL | CHI – New Idea |
| Co-Sponsor | Idea - | TC 7.3 | ATL – Mike Brambly mentioned an idea about building maintenance and FDD |
| ET | RTAR -1782: “Learning occupancy presence in residential buildings through smart meter data” | Bing Dong and Zheng O’Neill | Voted in Atlanta; Submitted for RAC to review. RAC rejected.  “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…”  ORL – discussed with Phil and solicited comments (comments on whether available technologies and other literatures have been integrated in the RTAR). Smart thermostat might learn occupancy.  Behavior based action from Utility company – if you know occupancy patterns then send messages etc. |
| SG | Guideline on smart building equipment |  | Chicago: New idea  Houston: Not discussed. |

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| --- | --- |
| logo_ashrae.png | **Minutes** |
| TC 7.5 Building Operations Dynamics 3:30 - 4:15 PM (PST), Jan 30, 2022  **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.

**Zoom Info:**

Link: <https://lbnl.zoom.us/j/93694120017>

Details: Meeting ID: 936 9412 0017

Passcode: None

**Meeting Attendance:**

<https://docs.google.com/spreadsheets/d/1PrI20VZuD1Q56cxNidVCfqID0uuX48qx/edit?usp=sharing&ouid=105951178563267302098&rtpof=true&sd=true>

**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** |  |
| Adjourn | | |

**Summary:**

* 3 on-going programs (building renewable energy integration, building operation for grow applications accepted), 1 program idea was dropped
* 1 on-going RP
* 1 on-going WS
* 3 RTARs submitted, 5 RTARs are under development/ 1 new RTAR idea

**Program Discussion (15 min):**

|  |  |  |  |
| --- | --- | --- | --- |
| Program | Title | Lead | Previous talks |
| 1 | What to do with optimal control? | Peter Armstrong | Orlando: Peter is not in the meeting. No discussions.  Virtual Conf (Austin): Peter is not in the meeting. Park this idea  Chicago: Zheng will reach out to Peter for this item  Phoenix: David will reach out to Peter for this item  **Las Vegas: Zheng will reach out to Peter** |
| ~~2~~ | ~~Model accuracy impact study on model predictive control~~ | ~~Andreas Athienitis~~ | ~~KC: Complete, conference paper, Plan to organize seminar.~~  ~~Orlando: Dave Blum from LBNL is willing to participate in this seminar (Chicago). Zheng O’Neill will connect them with Andreas.~~  ~~Zheng will connect them with Andreas.~~  ~~Virtual Conf (Austin): David & Jose will contribute to this seminar (Chicago)~~  ~~Chicago: Resubmit to Phoenix~~  ~~Phoenix: Donghun will reach out to Zheng~~  **~~Las Vegas: Accepted and presented before~~** |
| ~~3~~ | ~~Training plan for facilities~~ | ~~Zhou Joe~~ | ~~Bach to follow up~~  ~~Orlando: No discussions. Park this idea.~~  ~~Park this idea~~  ~~Virtual Conf (Austin): No discussions. Park this idea~~  ~~Chicago: No discussion~~  ~~Phoenix: No discussion. Park this idea.~~  **~~Las Vegas: Dropped the program idea~~** |
| 4 | Building Operations for Grow Applications? | Glen | Orlando: No discussions. Park this idea.  Reach out to TC 9.12 (?)  Virtual Conf (Austin): Liping, Li, Glen and Carol will have a following talk  Chicago: Follow-up meeting for Phoenix or later. Glen is seeking for speakers  Phoenix: Liping, Li song, Kelly Cunningham (PG&E) will reach out to Glen  **Lingping: Accepted but dropped due to in person requirement, resubmit to Toronto** |
| 5 | Grid-interactive efficient buildings for renewable energy integration and decarbonization | Li, Zheng, Donghun, Michael, Zoltan, Kriten | Chicago: potential contents: update GEB-related on-going projects  Phoenix: submitted and accepted to present in this Phoenix meeting  ASHRAE WGGBI(?) is working on the same topic (David).  **Donghun will reach out to Michael Brambley (PNNL) to avoid overlap**  **Maybe propose two seminars under this umbrella**  **Abed/Christie have a few speakers**  **Task force building decarbonization** |
|  | New programs idea |  | <https://www.ashrae.org/conferences/2022-annual-conference-toronto>  Track 2: HVAC&R Systems and Equipment  Track 3: Connected Buildings, Connected Communities  Track 5: Cold Climate Building System Design, Operation and Resilience  Track 6: IAQ, Energy Use, Comfort and Health of Sustainable Buildings  Track 8: Buildings in the Aftermath of COVID-1 |
|  |  |  |  |

**Research Proposals Discussions (25 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 | 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.  Virtual Conf (Austin): Asked for another one year no cost extension. Made a good progress.  On-going: complete initial study (data center, data center + office buildings) and work on developing suboptimal schedule from optimal results  Chicago: No cost extension. Made a good progress, move to the next stage of obtaining heuristic controls from optimal control behaviors  Phoenix: detailed approach has been changed. On-going discussion for another no cost extension.  **Las Vegas: Committee members requested performing another simulation and got another 12 month extension (due May/2022).** |
| WS | WS- 1809: Updating reference guide for dynamic models of HVAC equipment | Heejin Cho | 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.** |

|  |  |  |  |
| --- | --- | --- | --- |
| RTAR[[1]](#footnote-1) | Title | Lead | Previous talks (~ Feb/2020, Orlando) |
| ~~RTAR1~~ | ~~If you had “perfect information” on occupant’s comfort preferences and their location within a conditioned space then how would you optimize control and how much value would you be able to realize~~ | ~~Rich Hackner?~~  ~~Li Song?~~ | ~~RTAR completed but did not submit.~~  ~~Internal TC review, and started to award, but search for co-sponsorship.~~  ~~Should check with occupant behavior group.~~  ~~Coordinate with TC 1.4?~~  ~~Circulate the document again via e-mail and repost by Li Song.~~  ~~Wen to communicate with Rich Hackner~~  ~~Voting Members to review on this RTAR and posted on BaseCamp.~~  ~~Organize electronic voting.~~  ~~Voted in KC~~  ~~Orlando:~~  ~~Not submitted yet.~~  ~~Will submitted by Li~~  ~~Virtual Conf (Austin): Bill asked to get vote from MTG.OBB. No feedback yet. Li will iterate with Bing Dong.~~  ~~Drafted 3 years ago but haven’t submitted yet due to delays in MTG.OBB.~~  ~~Chicago: No feedback from MTG.OBB for a while. Li will reach out to MTG.OBB to move it forward~~  ~~Phoenix: Li Song will reach out to Bing Dong & MTG.OBB for co-sponsorship.~~  ~~Maybe submit RTAR without co-sponsorship from MTG.OBB.~~ |
| RTAR2 | 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 Residentia 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 |
| RTAR3 | Link the productivity with occupancy-based control; Occupant in the loop controls | Ivo Martinac | Ivo Martinac – professor developing idea.  The idea but need 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. |
| RTAR4 | Open source tool for integrating building and grid simulations | Donghun Kim,  Jie Cai,  Qun Zhou,  Bing Dong,  Zoltan Nagy | Orlando:  First, we will need to define the scope. Qun Zhou from University of Central Florida talked about her perspectives from grid side  Chicago: Donghun, QZ, Jie Cai and Bing Dong will have the following talk to narrow down the scope of research.  Phoenix: No discussion |
| RTAR5 | Which way to go between MPC and RL for load flexibility and/or energy efficiency for which types of buildings?: Comparison between MPC & RL | Zoltan, Donghun, Zheng, David | Chicago: Specific metrics ?  benefits & interests to ASHRAE ?  narrow down the scope ?  Phoenix: Donghun will schedule a separate meeting for determining the scope of work and benefits & interests to ASHRAE |
|  | new ideas? |  |  |
| New idea | How does remote work environment impact on residential building load profiles and HVAC operations | Li Song, Zheng, Kristine |  |
| RTAR6 | **A Survey Study on the Development and Application of Data-driven Model Predictive Control for Buildings** |  | **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.** |
| RTAR7 | **Meta-analysis of building-centric methods, costs, and benefits of electrification and grid services** |  | **Vote (Nov? 2021) 0-7-0-3 (CNV).**  **David Yuill will be helping to revise the scope of the RTAR.** |
| RTAR8 | **Occupancy-Aware Control and Operation of HVAC Systems in Commercial Buildings** |  | **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** |

## **TC 7.5 Handbook Subcommittee Meeting Minutes**

Jan 25, 2022 (Tuesday) 1:00 PM to 2:00 PM PST

Virtual Meeting

Prepared by Greg Pavlak

1. **Web meeting info:**

ASHRAE Platform: Zoom

Join from PC, Mac, Linux, iOS or Android: <https://psu.zoom.us/j/94789100957?pwd=cmNyOHFBVitGcXUvKzdaSFJYd1lwdz09>

Password: 895026

Or iPhone one-tap (US Toll): +13126266799,94789100957# or +16468769923,94789100957#

1. **Call to order / Introductions** (1:05 PM, 3 min)
2. **Report from TC 7.5 handbook Chair (Greg Pavlak)** (10 min)
   1. Progress since last ASHRAE meeting
      * Revising two chapters for 2023 Applications. One working group for each has been meeting bi-monthly to organize and draft revisions.
      * Significant changes proposed for both chapters.
   2. Schedule for 2023 Applications
      * Ideal Process: 1) Send to CMs and VMs, 2) Discussion, 3) VMs vote.
      * Ch 43 – revisions and approvals due to Society staff no later than **3/1/2022**.
      * Ch 63 – revisions and approvals due to Society staff no later than **7/31/2022**.
      * Greg will reach out to Handbook liaison with questions regarding potential deadline extension and re-arrangement.
3. **Discussion on Chapter 43 Supervisory Control Strategies and Optimization** (0 min)
   1. Status – Greg will follow up with Chapter 43 working group for update.
4. **Discussion on Chapter 63 Smart Building Systems (Greg Pavlak)** (35 min)
   1. Status
      * Draft “Track changes” version posted to Base Camp for TC review. Please send all comments, suggested edits, etc. to [greg.pavlak@psu.edu](mailto:greg.pavlak@psu.edu).
   2. Discussion
      * Consider converting Table 1: AFDD Acronyms to definitions section to provide more useful information about these methods
      * Regarding Table 5/6:
        + Consider revising table (or adding other section) to better reflect what is available/being done in different utility regions. Current table is mostly written from the perspective of what is possible. Goal: help designers know what they should be working towards.
        + Add links to utility tariff databases or NREL study?
      * Need stronger participation from ASHRAE in encouraging implementation of new utility incentives for DR, GEB, thermal storage, etc.
        + Not a complete solution, but Decarbonization Task Force members have been working on drafting some material for Chapter 63. Greg will reach out to get an update on that material.
5. **Next handbook subcommittee meeting** (2 min)
   * + Next handbook subcommittee meeting will take place at ASHRAE Annual 2023.
     + Chapter 43 and 63 working groups will continue to hold intermediate meetings as needed to complete the revisions and publication process. Reach out to Greg if interested in joining one of the groups.
6. Adjourn (1:55 PM)

|  |  |  |
| --- | --- | --- |
|  | **Agenda – ASHRAE Las Vegas Winter 2022 Virtual Meeting** | |
| TC 7.5 Honors & Awards Subcommittee 6:00 PM- 6:30 PM PST, Thursday, January 27, 2022  Virtual ASHRAE Zoom Meeting  Prepared by: Carol Lomonaco-Subcommittee Chair | |
|  |  | |
| **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, 2022 until June 30, 2022. Also, discussed plans for July 1, 2022 and the selection 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: January 27, 2022

Time: 6:00 PM- 6:30 PM PST

**Access Information:**

ASHRAE Zoom Meeting Link for Attendees: **Link to Join:** [https://ashrae.webex.com/ashrae/j.php?MTID=m5e0a9fa6726964572beb1bbf1980bc77](https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fashrae.webex.com%2Fashrae%2Fj.php%3FMTID%3Dm5e0a9fa6726964572beb1bbf1980bc77&data=04%7C01%7CCarol.Lomonaco%40jci.com%7Cd501440b8d5c453b14e508d9d1f3a8f7%7Ca1f1e2147ded45b681a19e8ae3459641%7C0%7C0%7C637771667783595238%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000&sdata=nhvTeWBm9BSw7BRKKlVIUA499pSgXpqBs1pBKc0Yj5I%3D&reserved=0)

Meeting number:

2335 776 7896

Password:

TC7.5

**The ASHRAE Code of Ethics** is to be adhered to by those doing ASHRAE business whether or not they are an ASHRAE member.

“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>.)”

|  |  |
| --- | --- |
| Time | Item |
| 6:00 PM PST | Call to order; Introductions; Agenda Overview, Sign In to Google Doc, Ethics |
| 6:05 PM PST | Review the actions the team has accomplished   1. Introduce team members 2. Agreed on six Fellow, six DSA and three ESA nominations 3. Status on all nominations 4. Status future nominations and submission date deadlines |
| 6:20PM PST | Call comments or questions & discuss |
| 6:30 PM PST | Wrap Up/Adjourn |

The current subcommittee members are:

Carol Lomonaco (TC 7.5 Honors and Awards Subcommittee Chair)

Joe Zhou

Zheng O’Neill

Natascha Milesi Ferretti

We discussed the current subcommittee’s efforts to submit to ASHRAE Two ESA, Two DSA and Two Fellow nominations.

Also, the Fellow nominations (Z. O’Neill and J. Butler) will be receiving their Fellow Honors at the ASHRAE Plenary Meeting at Las Vegas on Saturday, Jan 29, 2022.

In addition, we will be asking for two new members to join us as Joe Zhou and Zheng O’Neill roll off the subcommittee meeting on June 30, 2022.

Natascha will present on one of the Honors and Awards at the TC 7.5 Main TC Meeting on Tuesday, February 1, 2022.

Lastly, the other item of discussion is that we would still have a goal to nominate ESA, DSA, and Fellow potential candidates.

**Note: 2022 ASHRAE Annual Conference to be held in Toronto Saturday, June 25 – Wednesday, June 29, 2022.**

**TC 7.5 Smart Building Systems**

**Program Subcommittee Meeting**

01/30/2021 5:30 PM to 6 PM

Remote attendee zoom link: 9820517880

Passcode: 1234

<https://us04web.zoom.us/j/9820517880?pwd=TFpLdk1HdW50NnA2bmtqSDVSTERmUT09>

# Sign in

Hybrid (virtual and in person)

# Programs to be presented at Winter 2022 Conference

Seven seminars were submitted at this conference and 3 of 7 seminars were accepted as part of the conference and listed below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sponsoring Committee | Program Time | Session Chair | Session Title | Co-Sponsoring Committee |
| 7.5 Smart Building Systems | Seminar 10 | Zachary Siefker | Building-Integrated Indoor Air Quality Sensors | 6.10 Fuels and Combustion |
| 7.5 Smart Building Systems | Seminar 12 | Christie Kjellman | Renewables and the Smart Grid | 6.7 Solar Energy Utilization, 7.6 Building Energy Performance and 2.8 Building  Environmental Impacts and Sustainability |
| 1.4 Control Theory and Application | Seminar 20 | Frank Shadpour | HVAC Design, Control and Operation of Hospitals After COVID-19 Fiasco | 9.6 Healthcare Facilities, TC-1.5, TC-7.3, TC-7.5, TC-2.8 |

# Program tracks and timelines for Toronto, CANADA | Jun 25–29, 2022

|  |  |
| --- | --- |
| **Track** | **Description** |
| 1 | **Fundamentals and Applications:**  Fundamentals are the foundation for understanding applications in engineering. Key components of ASHRAE fundamentals include thermodynamics, psychometrics, 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:**Erik D Sanchez [esanchez@prmech.com](mailto:esanchez@prmech.com) |
| 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:**Marites Calad [mcalad@norman-wright.com](mailto:mcalad@norman-wright.com) |
| 3 | **Research Summit:**Active research, and the exchange of those research findings, are critical to the development of our HVAC&R industry and built environment. The 9th annual research summit invites researchers to share those results, including ASHRAE-sponsored research and research of interest to the ASHRAE community. Researchers are invited to present papers, extended abstracts, seminars, forums or participate in panel discussions. The Research Summit includes a partnership with ASHRAE's archival journal, *Science and Technology for the Built Environment*.  **Track Chair:** Brian Fronk  [brian.fronk@oregonstate.edu](mailto:brian.fronk@oregonstate.edu) |
| 4 | **Connected Buildings, Connected Communities:**As buildings become smarter, and as sensor systems, internet connectivity and data collection become more ubiquitous, there are substantial opportunities to improve the performance and efficiency of buildings. Similarly, as renewable energy resources, including wind and solar energy and energy storage, becoming increasingly common, buildings can be used as electric grid assets, to strategically support energy efficiency and demand flexibility. To accomplish this requires many stakeholders, coordinated efforts and a diversity of buildings and buildings systems components and controls.  **Track Chair:**Ahmed Abdel Salam  [ahmed.abdel-salam@usask.ca](mailto:ahmed.abdel-salam@usask.ca) |
| 5 | **Cold Climate Building System Design, Operation and Resilience:**The design, construction and operation of buildings in cold climate regions which experience extreme winter conditions require specific considerations for the building envelope and HVAC&R systems and resulting thermal and hygrothermal performance. Resilience in the face of extreme temperature shifts, and in some cases remoteness and permafrost, should be considered to ensure building maintain interior design conditions. This track covers efforts and topics specifically focused on buildings, building systems and equipment in cold, arctic and subarctic climates.  **Track Chair:**Davide Ziviani  [dziviani@purdue.edu](mailto:dziviani@purdue.edu) |
| 6 | **IAQ, Energy Use, Comfort and Health of Sustainable Buildings:**Indoor environmental quality, energy use and efficiency and occupant comfort and health are all priorities buildings must balance. Sustainability priorities in buildings continue to increase, requiring careful consideration of how to achieve sustainability goals without sacrificing other building functions and owner/operator priorities. This track covers each of these topics, and how they interact and impact one another.  **Track Chair:**Rafi Karim  [rkarim@aeieng.com](mailto:rkarim@aeieng.com) |
| 7 | **Professional Development and Education:**As members of a professional organization, we not only participate for the great value of technical exchange, but also the interpersonal exchange. We recognize that the single greatest strength of our organization is its membership. This track is designed to allow those professionals and educators an opportunity to develop and share knowledge in the areas of presentation skills, leadership, team-building, understanding various business operations, lean collaboration strategies, interpersonal skills, etc., and an opportunity for educators to share knowledge in the teaching and education of current and future generations of professionals. Submissions to this track may lend themselves to interactive session types such as workshops, panels and forums.  **Track Chair:**Maggie Moninski  [maggie.moninski@gmail.com](mailto:maggie.moninski@gmail.com) |
| 8 | **Buildings in the Aftermath of COVID-19:**The pandemic has had significant impacts on how buildings are used, and the priorities associated with building operations to ensure a healthy environment for occupants. More people are working remotely; commercial building interior design and functionality and occupant use of these buildings, ventilation and system needs and building owner, operator and occupant priorities have been impacted. This track covers these topics as our buildings transition to design and operation in the aftermath of the pandemic.  **Track Chair:**Andy Cochrane [acochrane@industrialairinc.com](mailto:acochrane@industrialairinc.com) |

**Deadlines (not announced; TBD):**   
**Monday Feb 17, 2022:**  Program Submissions Due / Extended Abstracts Due

**(TBD):** Program Submissions Accept/Reject Notifications







# Program Pipeline for future meetings

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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 |  | Patrick can chair this seminar (Toronto) |
| 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 |
| Seminar | Zhou Joe | Training plan for facilities |  | Glenn/Joe |
| TBD | TBD | What data the lawyer would like to know –needs to define scope | In future |  |
| Seminar | Zheng& Li Song | Building optimal / predictive control | For Future | Potential for Toronto seminars |
| 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-Premise 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 |  |

**NEXT IN-PERSON MEETING: June, 2022 – Toronto, CANADA**

1. Research Topic Acceptance Request [↑](#footnote-ref-1)