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

**Tuesday, June 16, 2020, 3:45pm to 4:45pm**

[https://zoom.us/j/94837407267?pwd=RGlaOUVrYnVlSU1OUXFMYllvcXdQZz09](https://urldefense.proofpoint.com/v2/url?u=https-3A__zoom.us_j_94837407267-3Fpwd-3DRGlaOUVrYnVlSU1OUXFMYllvcXdQZz09&d=DwMFaQ&c=qKdtBuuu6dQK9MsRUVJ2DPXW6oayO8fu4TfEHS8sGNk&r=v6SKVf9FbLiHLc6le3Xzlg&m=ZKPLT-jbXiJJ9HWcrTJcPYzUE3VGoteym56BncP-SL4&s=bwMkHZ5KIt5C9R_dh-Jwgz6pD6hruBCCeraHF23CKQw&e=)

Agenda

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| 1. Roll Call and Introduction | 3:45 – 3:50 |
| 1. Announcements/recap of the research subcommittee chair meeting   The research chair meeting will not happen until mid-July | (will be updated through email later) |
| 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.   2. RP 1756: need an update from PEM member Liping or Peter.   3.2 Four active work statements.   1. WS 1783: changed to WS1875. Li is working on it. 2. WS 1809: Heejin is still working on it. 3. WS 1812: Zheng is working on it.   3.3 Four active RTAR (one of them is co-sponsor)  - RTAR-SP207P evaluation (added)  3.4 New research candidates  a. New RTAT proposed by TC6.7 regarding the development of the ASHRAE Design and Integration of PV in the Built Environment Guide. Contact in TC67 are Costa Kapsis [costa.kapsis@uwaterloo.ca](mailto:costa.kapsis@uwaterloo.ca) and Jim Leidel ([james.leidel@dteenergy.com](mailto:james.leidel@dteenergy.com))  3.5 RTARs/WS underdevelopment | (3:50 – 4:15) |
| 1. TC 7.5 research new ideas and topics | 4:15 – 4:30 |
| 1. New Business   Internal committee seminar about how FDD can help achieve the energy performance required by 90.1. | 4:30 – 4:45 |
| 1. Adjourn | 4:45 |
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**ASHRAE TC 7.5: Smart Building Systems Research Plan**

**Active Project: 0; Co-sponsor Project: 2; Active WS: 3; Active RTAR:3; 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. |
| 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. |
| **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. |
| 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. |
| 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. |
| **RTAR** |  |  |  |
| BOD | Draft RTAR: 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 | 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. |
| 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. |
| 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 |
| SG | RTAR - Development of models for better peak load predictions for building clusters/neighborhood/city | 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. |
| SG | RTAR - - Linking building modeling to grid modeling | 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. |
| BOD | RTAR - How IoT impacts operators | Carol Lomonaco  Liping Wang  Scott ?? | 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). |
| 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 |
| 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. |
| 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) wass introduced to Jin and Carol. |
| 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. |
| FDD | Method of evaluation of the FDD standard of air-side economizer on RTU | David Shipley | Kansas City update: David Shipley initiated the topic and will send the draft of the RTAT to Li for improvement in the TC.  Orlando: Kim will lead this RTAR and Mike Brambley and Ahmed (ahmed.abdel-salam@rycom.com) will assist. |
| FDD | New in Orlando: User experience about FDD. Operator, building managers. System to be conservative or aggressive. | Austin Rodger | 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). |
| 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. |
| **Parking Lot** | | | |
| 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. |