ASHRAE TC 7.5: Smart Building Systems Research Subcommittee Meeting

Tuesday, 1/19/2021

4:00 PM– 4:45 PM Eastern Standard Time (EST)

https://ashrae-org.zoom.us/j/92908393542?pwd=dGhxVUFKL1Irem1nM2trRUFmSVdrUT09

Agenda

1. Roll Call and Introduction — 4:00– 4:05

2. Announcements/recap of the research subcommittee chair meeting
   The research chair meeting will not happen until later on — (will be updated through email later)

3. Status of current Research Projects — (4:05 – 4:25)
   3.1 Two ongoing research projects that are co-sponsored by TC75.
   a. 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.
   b. RP 1756: need an update from PEM member Liping or Peter.
   3.2 Four active work statements.
   a. WS 1783: changed to WS1875. Li is working on it.
   b. WS 1809: an updated version was sent to Bill (section 7 research liaison)
   c. WS 1812: Zheng /Kristen
   3.3 Four active RTAR (one of them is co-sponsor)
   - RTAR-SP207P evaluation (added)
   3.4 New research candidates
   a. How TC7.5 to participate in the movement of including FDD in standards for example 189.1 Addendum L? A internal brainstorming meeting is suggested, probably in Chicago.
   b. 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 and Jim Leidel (james.leidel@dteenergy.com). RTAR is 85% complete by Jim Leidel. Joe has volunteered to help. Seminar 56 – introduction to the guide and 66 – communication protocol discussion. Kristen has received an 85% done draft from TC6.7.

   3.5 RTARs/WS underdevelopment

4. TC 7.5 research new ideas and topics — 4:25– 4:40

5. New Business 4:40– 4:45
   Internal committee seminar about how FDD can help achieve the energy performance required by 90.1.

6. Adjourn 4:45

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. Glen: no update in the summer virtual meeting. Liping: Liping received update in January 2020. Liping will provide an update offline.
WS			

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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.

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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 cosponsorship from TC4.1. FDD clarification is needed.
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.
RTAR			

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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 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.
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. 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.

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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. Summer 2020: Donghum is still formulating the scope and topic. Qun Zhou, in addition to Bing Dong, has volunteered to participate.
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) as a coauthor (Joe Zhou is the contact). Summer 2020: Carol is still interested in working on it.
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) was introduced to Jin and Carol. Summer 2020: Jin will talk with Carol

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FDD	Method of evaluation of the FDD standard of air-side economizer on RTU	David Shipley 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.
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). Summer 2020: Li will follow up with Austin and Laura. Scott west volunteered to help. Liping will coordinate with everyone on the list.
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			
BOD	How smart/connected thermo 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, 360-956-2082, Richard Watson, SSHC, Inc.,rwatson@sshcinc.com,860-399-5434, Matt Vargo, Carrier Corp, 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

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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

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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.

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SG	Guideline on smart building equipment		Chicago: New idea Houston: Not discussed.