

**AMERICAN SOCIETY OF HEATING, REFRIGERATING AND
AIR-CONDITIONING ENGINEERS, INC.**

1791 Tullie Circle, NE Atlanta, GA 30329 (404-636-8400)

TC/TG/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/TRG NO. TC 7.5 DATE: First draft ---March 24, 2015

TC/TG/TRG TITLE: Smart Building Systems

DATE OF MEETING: January 27, 2015 LOCATION: Chicago, IL

Members Present	Appt	Members Absent	Appt	E-Officio Members and Additional Attendance
Natascha Milesi Ferretti, Chair, (V)	2015	Meli Stylianou, (V)	2014	Kirsten Cetin
Zheng O'Neill (V)	2014	Hiroei Mikami, Member Non-Quorum (V)	2017	Eric Gregory
Michael Brambley, Handbook Subc., (NV)	2008	Yuebin Yu (V)	2017	Xin (Sherry) Hu
Li Song, Building Operations Dynamics Subc (V)	2017	Mike Galler, Webmaster (NV)		Hassan Javed
Rich Hackner, Secretary, (NV)		Robert Sonderegger, (V)	2015	Mukesh Khattar
Steve Blanc (V) Vice Chair, Research Subc Chair	2015	Carlos Haiad, (V)	2015	Steve Snyder
Xiaohui Zhou, Program Subc. Chair (NV)	2013			Stanton Stafford
Edward Tsui (V, NQ)	2017			Luke Werner
Glenn Remington (V)	2017			Kyle Hasonkox (CM)
David Yuill (V)	2017			
Joshua Rhodes (V)	2017			
Adrienne Thomle, Section 7 Head				
Members Present		Members Absent		
Peter Armstrong	2012	Jerine Ahmed, (CM)	2007	
David Bornside, (CM)	2004	Hashem Akbari	2013	
Sukru Erisgen, (CM)	2011	Osman Ahmed, (CM)	2006	
Nick Gayeski, (CM)	2011	Narendra Amarnani, (CM)	2004	

Members Present	Appt	Members Absent	Appt	E-Officio Members and Additional Attendance
Kristin Heinemeier, (CM)	2011	Don Bailey, (CM)	2008	
David Heinzerling (PCM)	2014	Fred Bauman, (CM)	2009	
Carol Lomonaco (CM)	2013	Christopher Benson, (CM)	2011	
Mayumi Miura	2013	David Blum	2012	
Agami Reddy (CM)	2006	Michael Bobker, (CM)	2008	
Reinhard Seidl	2012	Marijn Braadbaart, (PCM)	2010	
Dave Shipley (CM)	2012	Michael Brandemuehl, (CM)	2007	
James Sweeney(PCM)	2013	Dave Branson, (CM)	2001	
Jin Wen, (CM)	2011	James Braun, (CM)	2007	
Chariti Young, (CM)	2002	Barry Bridges	2002	
		Martha Brook, (CM)	2006	
		James Butler, (CM)	2002	
		Joon Ho Choi	2011	
		Brian Coffey, (CM)	2009	
		Robert Coleman, (CM)	2008	
		Maria Corsi, (CM)	2003	
		Charles Culp, (CM)	2000	
		Arthur Dexter, (CM)	2005	
		Sharon Dinges, (CM)	2006	
		Piotr Domanski, (CM)	2005	
		Kirk Drees, (CM)	2008	
		Jay Eldridge, (CM)	2011	
		Mohsen Farzad, (CM)	2005	
		Clifford Federspiel, (CM)	2006	
		James Gartner, (CM)	2007	
		Krishnan Gowri	2013	
		Eunice Hameyie, (CM)	2010	
		Phil Haves (CM)	2005	
		David Holmberg, (CM)	2011	
		Ahmad Husaundee, (CM)	2006	
		Mark Johnson, (CM)	2004	
		Samuel Anthony Jasinski	2013	
		Ashok Kadakia, (CM)	2006	
		David Kahn, (CM)	1996	
		Srinivas Katipamula, (CM)	2005	
		George Kelly, (CM)	2001	
		Michael Kintner-Meyer,	2007	
		Curtis Klaassen, (CM)	2008	
		Jan Kreider, (CM)	2008	
		James Kummer, (CM)	2008	
		Jean Lebrun, (CM)	2008	
		Scott LeClair, (CM)	2008	
		Kuei-Peng Lee, (CM)	2008	
		Hui Li, (CM)	2010	
		Mingsheng Liu, (CM)	2003	
		Darrell Massie, (CM)	2003	
		Itzhak Maor	2012	
		Hung Manh Pham, (CM)	2001	
		Peter May Ostendorp, (PCM)	2010	
		John Mitchell, (CM)	2000	
		Shahid Naeem, (PCM)	2010	

Members Present	Appt	Members Absent	Appt	E-Officio Members and Additional Attendance
		Ram Narayanamurthy, (CM)	2010	
		Ian Nelson (PCM)	2014	
		Ron Nelson, (CM)	1998	
		Richard Ng, (CM)	2008	
		Leslie Norford, (CM)	2006	
		Robert Old (CM)	2011	
		Xiufeng Pang, (CM)	2011	
		William Pienta, (CM)	2006	
		Kinga Porst, (CM)	2002	
		Michael Pouchak, (CM)	2003	
		Andrew Price, (CM)	2003	
		Barry Reardon, (CM)	1999	
		Jeffrey Schein, (CM)	2007	
		Russell Secor, (CM)	2008	
		John Seem, (CM)	2003	
		Dipak Shah, (PCM)	2010	
		Peter Simmonds, (CM)	2008	
		Vernon Smith, (CM)	2011	
		Pornsak Songkakul, (CM)	2002	
		Gene Strehelow, (CM)	2006	
		Stephen Treado (CM)	2012	
		Matthew Tyler, (CM)	2011	
		Dan Veronica, (CM)	2011	
		Arun Vohra, (CM)	2006	
		Paul Wacker, (CM)	2008	
		Josh Wall, (CM)	2011	
		Stuart Waterbury, (CM)	2011	
		Thomas Webster, (CM)	2009	
		Allen Weidman, (CM)	2011	
		Jonathan West, (CM)	2008	
		Andrew Windham	2013	
		James Winston, (CM)	1996	
		Jonathan Wright, (CM)	2008	
		Peng Xu, (CM)	2011	
		Daihong Yu		
		Shui Yuan, (PCM)	2009	
		Tea Zakula	2012	
		Li Zhang, (CM)	2010	

(V) = voting member

(CM) = corresponding member

(PCM) = provisional corresponding member

These draft minutes have not been approved and are not the official, approved record until approved by this committee.

DISTRIBUTION:

ALL MEMBERS AND CORRESPONDING MEMBERS OF TC

TAC CHAIR: Eric Adams

TAC SECTION HEAD: Adrienne Thomle

ALL COMMITTEE LIAISONS AS SHOWN ON TC ROSTERS:

Research: Phil Haves

Standards: Rick Larson

CTTC: Chad Moore

Publications Committee Staff Liaison: Mark Owen

ALI/PDC.: Darin Nutter

Staff Liaison (Stds): Stephanie Reiniche

2015 HB Applications: George Sestak

Staff Liaison (Research/Tech Services): Michael Vaughn

DATE: January 27, 2015

TC NO. 7.5 TC TITLE: Smart Building Systems

CHAIR: Natascha Milesi Ferretti VICE CHAIR: Steve Blanc

TC Meeting Schedule

Location, past 12 mo.	Date	Location, planned next 12 mo.	Date
Seattle, WA	07/1/14	Atlanta, GA	6/27/15
Chicago, IL	1/27/15	Orlando, FL	1/26/16

TC Voting Member Status

1x	Natascha Milesi Ferretti (until 06/30/2015)	Yes
2x	Steve Blanc (until 06/30/2015)	Yes
3x	Carlos Haiad (until 06/30/2015)	Yes
4x	Robert Sonderegger (until 06/30/2015)	No
5x	Glenn Remington (until 6/30/2017)	Yes
6x	Josh Rhodes (until 6/30/2017)	Yes
7x	Yuebin Yu (until 6/30/2017)	No
8x	Li Song (until 6/30/2017)	Yes
9x	David Yuill (until 6/30/2017)	Yes
INTL	Hiroei Mikami (until 6/30/2017)	No
INTL	Edward Ka Cheung Tsui (until 6/30/2017)	Yes

ASHRAE 2015 Winter Meeting – Chicago, IL – January 23 -28, 2015

Chair/Standards	Natascha Milesi-Ferretti
Vice Chair/Research Subcom. Chair	Steve Blanc
Secretary	Richard Hackner
Handbook Subcom. Chair	Mike Brambley
Program Chair	Xiaohui Zhou (Joe)
Buildings Operations Dynamics Subcom. Chair	Li Song
Smart Grid Subcom. Chair	Ram Narayanamurthy (David Holmberg-sub)
Enabling Technologies Subcom. Chair	Nick Gayeski
Fault Detection Diagnostics Subcom. Chair	Haorong Li
WebMaster	Mike Galler

**ASHRAE TC 7.5, Smart Building Systems
2015 Winter Meeting
Chicago, Illinois**

DRAFT AGENDA

Location: Price
Date: Tuesday, January 27, 2015

Time: 3:30 - 6:00 p.m.

1. Roll Call and Introductions. Review VMs, CMs, and PCMs after July 1, 2015.
8 of 10 voting members were present: Natascha Milesi Ferretti, Steve Blanc, Glenn Remington, David Yuill, Li Song, Carlos Haiaid, Edward Ka Cheung Tsui , and Joshua Rhodes

3 Members were Absent: Robert Sonderegger, and Hiroei Mikami (NQ), Yuebin Yu

Quorum achieved.

2. 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.

3. Approval of Seattle Minutes

Corrections: None

Motion to approve with minor corrections

Seattle 2014 Meeting minutes

- Edward Ka Cheung Tsui moved and Steve Blanc seconded. 7-0-0 (8) Chair voting.

4. Announcements

- TC 7.9 was awarded the best TC for Section 7. Natascha will request feedback to see what TC 7.5 can do to improve. Roster effective Through July 2, 2014, TC will be receiving a request to confirm desire to maintain corresponding membership.
- Hightower award (John Carter TC 4.3), Service to ASHRAE Research Award (Iain Walker TC 4.3) nominations are due 9/1/15.
- New MTG on Operations & Maintenance Activities that Impact Energy Efficiency- seeking members
- Please add employment discipline to ASHRAE bio.
- Electronic & Physical Meeting
 - i. available and we can have priority if that would help our TC.
 - ii. Options for subcommittee meetings via conference calls & web meetings
- Thank you for TC volunteers to review technical program.
- CEC track ideas sought for St Louis (Summer 2016) and beyond.
- Ideas for new ASHRAE Learning Institute requested
- Presentations available for outreach:
 - i. TAC
 - ii. ASHRAE Code Interactions
 - iii. TC's
- Draft minutes to be posted on the website (w/in 60 days of meeting)
- Welcome to new members & visitors & YEA.
- Thank you letter to employers is available.
- Upcoming program dates & tracks
- TC master calendar available through google
- Upcoming workshops & conferences
- ASHRAE seeing input for "How to" modules
 - i. Our suggestion on "how to write an RTAR" was developed!
- Ashraexchange.org
-
- See attachment for other chair announcements

5. Liaison Reports:TC 1.4, TC 1.5, TC 1.6, TC 7.3, SPC 207P, URP-1633

Research Liaison Phil Haves --- Requested feedback on new RTAR format. Send e-mail comments to Phil.

TC 1.4 Chariti Young ---Guideline 13 Saturday 8-Noon. Anyone interested contact Chariti for more information. Guideline 36 out for public review soon.

TC 1.5 Mike Galler --- Starting two new subcommittees: Cyber Security and Big Data. Check the Summer meeting schedule for meeting times and locations.

Requesting co-sponsorship of “HVAC System Thermal control and energy performance using Work and Data exchange processes”

Summary:Modern HVAC control systems using Direct digital controls (DDC) on heating, ventilation and air conditioning (HVAC) equipment are rapidly being expanded in capability and coordination with other components in the building systems including sharing of data points, coordination of thermal comfort, energy usage, building operation health, design and commissioning information, and alternatives for control This research will create needed investigations to address the coordination and give guidance for user work cases interactions in proposed and actual performance of physical controllers in building simulation environments to evaluate building control and building efficiency. ASHRAE needs to support this work to allow effective coordination with current best practices for sequences and integration with Building information model and comparison of energy usage. This work may influence the BACnet standard with important application data points standards and data dictionary requirements

Action item: Letter Ballot for co-sponsorship.

TC 1.6 David Bornside --- N/A

TC 7.3 Michael Brambley --- Draft RTAR for testing RTUs. Looking to determine O&M value. Make sure they check previous ASHRAE projects done in this area.

SPC 207P Michael Brambley --- First version of the standard is shaping up. Advisory Public review to be scheduled for either before/after June meeting. There is an issue of needing to test the standard before it's published. Advisory can proceed without having done the testing. Quickly write an RTAR and WS to put in front of RAC in time to have RFP out this Spring. Would need e-mail ballot to be done.

URP-1633 --- N/A

6. Fault Detection and Diagnosis Subcommittee (Haorong Li with Zheng O'Neil reporting)
Full details of the subcommittee meeting are available in the attached minutes.

7. Enabling Technologies Subcommittee (Nick Gayeski)
Full details of the subcommittee meeting are available in the attached minutes.

8. Smart Grid Subcommittee (Natascha Milesi Ferretti reporting for David Holmberg for Ram Narayanamurthy)

- Need to establish Liaison positions to report on relevant activities:
 - i. SPC 201,
 - ii. NIST SGIP
 - iii. BACnet- Carol Lomonaco reported there is are many documents out for public review.
 - iv. What are other TC's doing in the area of Smart Grid?
 - v. New ASHRAE initiatives
- Research discussion

- i. Smart Grid Smart Buildings, interactive controls for light commercial, including a survey of what is going on. RTAR to be developed by Li Song.
- Program Proposals for Chicago- Joe Zhou to discuss.
- Smart Grid, Smart Buildings ASHRAE Learning Institute course today (Tom Lawrence). About 20 people attended and it went extremely well. This will be offered again online with ASHRAE in September. This was TC 7.5 reviewed.

Josh Rhodes will be the new subcommittee chair at the next meeting

9. Buildings Operations Dynamics Subcommittee (Li Song)
Full details of the subcommittee meeting are available in the attached minutes.

10. Research (Steve Blanc)
- Executive Session: TRP-1615 “Fault Detection and Diagnostic (FDD) Methods for Supermarkets- Phase I”

Motion to accept the PES recommended contractor

- Steve Blanc moved and Glenn Remington seconded. 6-0-0 (6) Chair voting. One member (bidder) not voting.

- WS #1661 Development and Validation of Dynamic Models for the Evaluation of Chilled Water System Control Strategies in the ASHRAE Handbook
Action:Tabled until next meeting
- Draft RTAR Methods to Evaluate AFDD Strategies for Air Handling Unit Systems

Motion to accept the RTAR and send to MORTS

- Steve Blanc moved and Carlos Haiad seconded. 6-0-0 (7) Chair not voting.

- Draft RTAR Learning occupancy presence in residential buldings through electrical meter data

Motion to accept the RTAR and send to MORTS

- Steve Blanc moved and Carlos Haiad seconded. 6-0-0 (7) Chair not voting.

- Draft RTAR Metadata and Taxonomy to support Fault Detection and Diagnostics in smart buildings

Motion to accept the RTAR with the addition of an objective to provide the input to Guideline 13 and send to MORTS

- Steve Blanc moved and Carlos Haiad seconded. 6-0-0 (7) Chair not voting.

- Draft RTAR Realize value of virtual sensing technology in the operation of packaged ac units

Motion to accept the RTAR subject to minor editorial changes and with the condition of being reformatted into the new format and then submission to MORTS

- Steve Blanc moved and Josh Rhodes seconded. 6-0-0 (6) Chair voting.

Announcement: Jin Wen will be the new Research Chair at the next meeting.

Full details of the subcommittee meeting are available in the attached minutes.

11. Program (Xiaohui Zhou (Joe))
See program notes from Joe

Need name of new Program Chair after Atlanta meeting

12. Handbook (Mike Brambley)
New chapter coming out in 2015 applications. Plus revised supervisory chapter.

Next steps. Proofs will be available end of March.

Vern Smith will be the incoming handbook chair.

13. Web Page (Mike Galler)
Please send any comments or suggestions on updating the website to Mike.

Need to update several parts of the website.

14. Old Business
 - Speaker Registration Fees – No update on issue.
 - Roadmapping Webinar --- TC 7.9 used this process to ID research gaps. Jin suggested we start with a steering committee. Multiple volunteers---Carol, Dave S, Glenn, Agami, Zheng, Jin, Sherrie, Joe, Bing, Josh, Natascha
 - Organize a workshop to seek additional input from the general membership.

15. New Business

16. Adjournment

Meeting adjourned at 5:58 pm

ASHRAE TC 7.5 Smart Building Systems 2015 Winter Meeting, Chicago IL

Minutes from TC 7.5 6.Fault Detection and Diagnosis Subcommittee

Written by Haorong Li, January 27, 2015

The meeting started on time at 3:00 pm on January 24, 2015. Approximately 60 people attended the meeting. The room was full with a few people standing. We talked about requesting a bigger room for future meetings.

Research: We discussed the status of the five research topics in the order they are presented in the agenda.

- 1) The first one is, "FDD Methods for Supermarkets" which was out for bid.
- 2) The second one is, "Reducing Simultaneous Heating and Cooling in Commercial Buildings". The Champion, Danny Taasevigen, was not present, so there was no update.
- 3) The third one is "DIY Energy Assessment Using Smart Phones with Low Cost IR Cameras for Residential Buildings (RTAT and WS)." Yuebin reported that the work statement was done but he did not know what next step to take. The committee also expressed concerns that this was not content-oriented research and ASHRAE might not approve it. In addition, the committee talked about the general procedures for work statements and pointed Yuebin to Steve for follow-ups.
- 4) The fourth one was, "Realize Value of Virtual Sensing Technology in the Operation of Packaged Air-conditioning Units." Yuebin presented the scope and objectives of the idea but the work statement had not been done yet.
- 5) The fifth one was, "Methods to Evaluate AFDD Strategies for Air-Handling Unit systems". Jin Wen reported that this work statement had been reviewed and was ready for submission.

New Research: Jin Wen proposed a new research idea about field fault frequency survey. The basic idea was to review a service database provided by HVAC&R service contractors. David Yuill expressed that there was a need for this research but it might be not realistic to obtain this data.

Haorong brought up an issue: There have been no active projects sponsored by TC 7.5 for the past few years. This means TC 7.5 has been not as productive as it used to be; our younger generation of members should be more aggressive and proactive and senior members should offer to mentor the younger members to get them more familiar with the process. In addition, an a DOE workshop for modeling validation on Wednesday was announced and although it was by-invitation-only our TC members were encouraged to attend.

Kristin was not present to update the status of Standard or Guideline for FDD.

Program: Xiaohui Zhou briefly updated the status of seminars and workshops with details to be presented in the main meeting.

Handbook: Mike Brambly briefly reported the status of Handbook Chapters which would be covered in the Handbook subcommittee meeting in details.

Meeting adjourned at 3:50 PM.

DRAFT

ASHRAE TC 7.5 Smart Building Systems
2015 Winter Meeting, Chicago, IL
Enabling Technologies Subcommittee Meeting Minutes
Prepared by Nick Gayeski

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

Related Committee activities: BACnet committee AP data modeling working group, Facility Smart Grid Information Model, Computer Applications, Emerging Technologies, SGPC20 HVAC process data exchange requirements and SPC 205 Standard Representation of packaged unit models.

1. Introductions

2. Announcements: TC1.4 1:00-1:30 Tuesday seminar on wireless, dashboards, and integration.

3. Research

- RTARs to prepare and submit.
 - i. A Review of Metadata and Taxonomies to support Fault Detection and Diagnostics
 - 1. UTRC and Commercial Building Energy Initiative have related work that should be referenced.
 - 2. Please review and provide comments for approval of submission to RAC
 - ii. Procedural criteria to evaluate the effectiveness of virtual sensors.
 - 1. Li Song intends to complete a draft RTAR for the Summer 2015 meeting.
- RTAR concepts in need of development
 - i. Wireless: Review of cloud-based BAS using wirelessly connected controllers – cybersecurity, reliability
 - ii. Wireless: Why is connectivity and reliability such a failure point in Smart Homes?
 - 1. E.g. in California, there are initiatives for Smart Homes that include PV, EE, DR, battery storage, optimization...but they often fail because the systems don't respond/perform/communicate as expected. Why are they failing?
 - 2. What are all the system and devices that talk to each other, how do they talk/what are the standard modes of communication, why do they fail? How do you test them?
 - 3. Maybe a plug test is needed for Smart Grid applications (like with BACnet)
 - 4. Possible RTAR – map out where the communications are, estimate which are consistent, which ones are going down the most, etc... with the intent to create guidance or a method of test for Smart Home wireless applications

5. Conclusion: Need a champion who will research what IEEE and other authorities are doing around the concept of a Smart Home, and define the role of ASHRAE in ensuring HVAC, lighting, and IEQ are adequately included. This may be through an RFP.
 - iii. Smart transducers: No new ideas
 - iv. Embedded metadata/diagnostics: A Review of Metadata and Taxonomies to support Model-Predictive Control. To be drafted after similar FDD RTAR.
 - Parked ideas:
 - i. Co-sponsor for “Evaluation of Low-cost Particle and CO2 Sensors for Indoor Air Quality Monitoring in Smart Building Systems.”
4. Handbook
- Future Assignment: Need a volunteer Reviser for ASHRAE Handbook Applications 2019 specific to wireless applications. New content for expanded Enabling Technologies scope (smart transducers and Smart Building metadata)
5. Program
- Successful Seminar 9: Modeling and Simulation of Occupant Behavior in Chicago. Thanks to Bing Dong et al. Reminder to use large font and know your audience size/room size in your presentations. Bing to propose follow-up program.
 - Parked ideas waiting for the right conference track.
 - i. Nick Gayeski: “Smart Transducers with Embedded Diagnostics” for June meeting. Speakers from Armstrong and Schneider Electric are interested.
 - ii. Bill Healey: “Sensing Technologies to Enable Smart Homes” for New York. Speakers from NIST, PNNL, and EPRI have been lined up. Bill Healey. Orlando, Modern Residential Systems. Abstracts due March 23rd.
 - iii. Carlos: Potential program was discussed on the role of cloud-based communication on smart meter technology.
 - iv. Josh Rhodes - Smart appliances – GridWise, Talk to each other, Whirlpool Corporation.

ASHRAE TC 7.5 Smart Building Systems

2015 Winter Meeting, Chicago IL

Minutes of Building Operations Dynamics Subcommittee Meeting

Location: Dearborn 1

Date: Monday, January 26, 2015

Time: 4:00-4:45 p.m.

1. Roll Call and Introductions
2. Program Proposals

Program	Title	Lead	Newest update
1	Building operation dynamics-high mass buildings	Andreas	Positive responses were received from Andreas for both program and research. (Bruno Lee will follow up Andreas), next winter 2016.
2	Model-based commissioning	Xiufeng Pang	Li Song has followed up with Xiufeng and sees the potential for co-sponsorship with TC7.9 in summer 2015. Will be prepared for summer Atlanta, Li will chair it. (Zheng, Xiufeng and Li will be the speakers)
3	How BAS can enhance RCs	Carol Lomonaco	Carol will prepare it for the winter meeting in Orlando.
4	What to do with optimal control?	Josh Wall	Josh Wall has confirmed that he is still interested in doing it. Josh is not presenting in this meeting.
6	LEED building energy performance model evaluations	Joshua D. Rhodes	Joshua will still working on it as a possibility for the Orlando meeting.
7	On-line optimal scheduling for demand response and real time price.	Zheng	Completed in the Chicago meeting.

3. Research

Research	Title	Lead	Newest updates
RTAR	Learning occupancy presence in residential buildings through electrical meter data	Bing Dong	Sub-committee recommended for voting in tomorrow's TC meeting.
RTAR	Updating reference guide for dynamic models of HVAC equipment	Heejin Cho	Sub-committee suggested to revising the works scope to literature review and material collections for a new formatted publications.
WS	Distributed control	Josh Wall	Dropped
New	Model accuracy impact study on model predicted control	Andreas	Positive responses were received from Andreas for both program and research. Updates are needed. (Bruno Lee will follow up with Andreas)
New	Low-cost particular matter measurements for indoor infiltration controls	Discussed in Enabling Technologies	Moved to Enabling technologies subcommittee.

4. Handbook: TBD.
5. Other topics
6. Adjournment

**ASHRAE TC 7.5 Smart Building Systems
2015 Winter Meeting, Chicago, IL
Smart Building Systems Research Subcommittee Meeting**

**Monday, June 30, 2014, 5:15 – 6:20 p.m.
Washington State Convention Center
Meeting Room: Rm 614, Floor 6**

AGENDA

1. Review of and additions to agenda: 5:15 – 5:45 p.m.
TC7.5 Discussion by Agami and Haves about the need for a roadmap of research for 7.5 was tabled to bring up in the general committee meeting on Tuesday.
2. Announcements: **None**
3. Status of current Research Projects and Overview of Research Plan: 5:45 – 6:10 p.m.
As noted below, two WS/RTARs dropped, 1671 Distributed Control and 1697 Reduce Simultaneous H&C (being redone with TC 1.4) 1615 requires changes from RAC and will need 10.7 revote
Next RAC meeting 8/15
4. TC 7.5 research new ideas, new topics.
5. Brief review of RTARs/ Work Statements under development
NO New Business 6:10 – 6:20 p.m.
6. Adjourn **Actual Adjournment 6:20 PM** 6:20 p.m.

ASHRAE TC 7.5: Smart Building Systems DRAFT Research Plan
Active RTARs:0
Draft RTARs:7
Active WS:1

Subc	Project	RTAR Contributors	Status
FDD	WS-1615- FDD Methods for Supermarkets	Zheng O'Neill (Chair) Manrola (10.7) Daihong Yuebin Yu	<p>-RTAR voted on at Louisville 6/2009 (9-0-1-CNV) 1615-RTAR approved 6/2010 in Albuquerque with RAC comments Draft WS ready for TC vote in Chicago 1/2012 TC approved (6-0-1-CNV) for submission to RAC 4/12 RAC returned with comments:</p> <ul style="list-style-type: none"> • Describe envisioned methodology • Better define tasks • Cite more existing researchers as qualified bidders <p>New draft WS, version 7 ready. RAC Comments addressed and Sec. 7 Research Liaison comments addressed. Due for TC vote in Dallas- MUST BE SUBMITTED AND APPROVED FOR BID BY JULY 1, 2014 OR TOPIC WILL BE DROPPED PERMANENTLY. Z O'Neil has addressed comments of RAC in update. Should be ready to resubmit after January meeting Voted this out to resubmit to RAC Submitted to RAC at SEA, more comments? P Haves – RAC other concerns raised actions of Ref systems and interactions with other systems. Comments: How to bid Ph2 if not knowing results of Ph1? Examples of faults in supermarkets Is RAC contradicting itself about phases. Remove lighting Reduce Scope. Review PES list.</p>
BOD	WS1671- Real-Time Optimal Control in a Distributed Environment.	Josh Wall	<p>Original RTAR 2005-26 Review and approve in Orlando and vote in Orlando 2010 meeting. -Submit RTAR and WS simultaneously to RAC. Revised RTAR and revised Workstatement prepared for Chicago TC approved (6-0-1-CNV) for submission to RAC</p> <p>4/12 RAC returned with comments:</p> <ul style="list-style-type: none"> • Describe major outcomes • Obtain co-funding • Better define task 3 • Cite more qualified bidders <p>Comments addressed and due for TC vote in Dallas- MUST BE SUBMITTED AND APPROVED FOR BID BY JULY 1, 2014 OR TOPIC WILL BE DROPPED PERMANENTLY. NYC – Wall revised and resubmitted to deal with RAC comments. Voted this out to resubmit to RAC SEA --Wall communicated that NIST research had covered most of the WS. He wants to drop the WS. This is dropped.</p>

Subc	Project	RTAR Contributors	Status
FDD	Draft RTAR Whole Building FDD (Development of effective and low cost FDD techniques for large office buildings)	Xiufeng Pang David P. Yuill	New draft RTAR prepared for Chicago Update needed. NYC -- more discussion about breadth of definition. SEA - Dropped
FDD	WS 1697 RTAR Reduce Simultaneous Heating and Cooling in Commercial Buildings	Zheng O'Neill Danny Tassevigen Steve Taylor Joe	-Voted in Louisville June 23, 2009 (9-0-0 CNV) -Re-submit to RAC at Orlando 2010 meeting. New draft RTAR V3 prepared for Dallas NYC --RTAR completed and approved now a WS. Zheng will edit to address comments, submit to RAC and do WS. Drop this and combine with Supply Temp Reset Optimization (Taylor, 1.4)
FDD/ET	Draft RTAR-Energy Audit using Smart Phones with Low Cost IR Cameras	Yuebin Yu, Zheng Song	New RTAR presented in Dallas NYC – Much discussion of goals of the RTAR and WS, product development not a good option. SEA – neither author here, held over to Chicago.
FDD/ET	Draft RTAR-Realized Value of Virtual Sensing Technology in the Operation of Packaged Air-Conditioning	Yuebin Yu, Haorong Li Li Song	New RTAR presented in Dallas NYC --More discussion SEA – neither author here, held over to Chicago.
FDD	Draft RTAR – Methods to Evaluate AFDD Methods for Air Handling Unit Systems	Jin Wen	Draft of a start of RTAR distributed at NYC. More complete RTAR at SEA. Need to get from Jin Wen. Different from 207 RTPs
SG	Draft RTAR Energy Management System for Residential Houses	Jin Wen (rev: Srinivas K)	More work needed to be done on the draft RTAR. New champion needed. Bill Palieuta identified as potential contributor. Update needed.
BOD	Draft RTAR – 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.
ET/FDD	Draft RTAR Metadata and Taxonomy to Support FDD in Smart Buildings	Nick Gayeski	SEA NEW submitted for consideration by Subcomms
BOD	Draft RTAR Bio-Sensing Visual Environment Control in the Workplace	Joon-Ho Choi	New in January NYC SEA No action, cosponsor ship from 1.4 suggests
BOD	Idea - Model accuracy impact study on model predicted control	Andreas Athenitis	Positive responses are received from Andreas for both program and research. More details to be discussed in Seattle. SEA – No discussion
BOD	Idea - Model predictive controls	Nick Gayeski, Andreas Athenitis)	Nick developed outline and will write RTAR using input from MPC-related program for Dallas meeting. Update?
BOD	Idea - Low Cost Particle sensors for dynamic ventilation of Smart Buildings	Brent Stevens Josh Rhodes 2.4	TC 2.4 in the lead.
FDD	Idea – Validation of SPC207P Method of test...	Kristin Heinemeier	SPC 207P to develop RTAR/outline for San Antonio. Lead identified, Update needed. Alternate path

Subc	Project	RTAR Contributors	Status
FDD	Idea - What is the most effective way to present results to operators? Monthly meetings, weekly emails- in a way that they take action. (related to dashboard- 'data and interfaces- RP)		
FDD	Idea - FDD for datacenters		
FDD	Idea - Whole Building FDD through smart-meters (champion?)		

Regarding WS-1615:

“There is research project, 1467-RP, which is complete except for the final report, which was a study of the relative loads and interaction between the case refrigeration and HVAC loads and energy in supermarkets. TC10.7 sponsored, and I am the PMS chair. Mike Brandemuehl from Colorado was the contractor. It might be helpful for you to understand the relative loads and how they are coupled since this is one of the topics mentioned in your work statement.”

Daryl Erbs

ASHRAE TC 7.5 Smart Building Systems 2015 Winter Meeting, Chicago, Illinois Smart Grid Subcommittee Meeting Draft Minutes

Date: Sunday, June 29, 2014
Time: 4:30 – 5:15 p.m.
Location: Price (Palmer House Hilton 5th Floor)

1. Roll Call and Introductions [David Holmberg acting subcommittee chair for Ram Narayanamurthy]
2. Liaisons reports – SPC 201, NIST SGIP, BACnet, OpenADR, others
 - a. David reviewed status of work in SGIP, SPC 201, BACnet and international standardization work for DR (OpenADR, Energy Interoperation, SEP) in IEC PC118.
 - b. Some discussion that ASHRAE 90.1 and 189.1 want input on Smart Grid.
3. Role of ASHRAE in Smart Grid - New ASHRAE Initiatives
 - a. Education and communication
 - i. ALI Smart Grid education course at the Expo (“Smart Grid and Building DR”)
 - ii. More seminars - building O&M, case studies on lessons-learned, data analysis to find where problems are.
 1. “ADR in your state” program
 - b. Coordination with other SDOs (like IEEE) to coordinate on political issues
 - c. Mike asked if ASHRAE has a SG Roadmap, start with TC7.5 SG roadmap.
 - i. IEEE has a grid roadmap, but doesn’t understand buildings; see them as lumps.
 - d. ASHRAE can help designers to interact with the grid.
 - i. SG data; ASHRAE regression models not the best for interval data. Time lag. Weather data is tricky. Host of models out there.
 - ii. ASHRAE parameters have physical meaning that are the start for inverse modeling.
4. Research Ideas – Discussion
 - a. ASHRAE 90.1 should incorporate SG similar to what CA Title 24 is doing. Maybe guideline 14 for M&V side, not design side.
 - b. Joint with 4.7 development of models for better peak load conditions. When staging chillers, where are we going to end up? Need RP1050 (“Inverse Model Toolkit: Numerical Algorithms for Best-Fit Variable-Base Degree-Day and Change-Point Models”) to include DER (but that is only inverse modeling, not for prediction for dynamic). What are all the things that need to be put together, data, models, etc.? Electrical models, staging, scheduling loads, etc. New vs existing buildings.
 - c. Inside the utility—has to also assume/estimate load from the grid.
 - d. Making SG work for existing buildings. How to do that.
5. Program Proposals for Chicago
 - a. What’s new in SG?—things in the future. SG vocab? DR. Some DR definitions. Mike to mentor Glen on how to make this seminar go forward. Zhou will help. Include the regulatory side.

**ASHRAE TC 7.5 Smart Building Systems
2015 Winter Meeting, Chicago, Illinois
TC 7.5 Program (Draft 1) Report**

Xiaohui (Joe) Zhou

01/27/2015

I. TC 7.5 Program Submitted and Accepted for Seattle Meeting

Red indicates accepted/scheduled programs that TC 7.5 sponsored or co-sponsored at Chicago conference.

Sub Committee	Type	Session Chair / Speakers	Proposed Title	Status
NBT	Seminar	Bing Dong/ Bing, Tianzhen Hong, KheePoh Lam	Modeling and Simulation of Occupant Behavior in Buildings	Accepted
NBT	Seminar	Chair: Srinivas Katipamula	Improving Energy Efficiency of Commercial Buildings thru Data Analytics	Submitted to Chicago
BOG	Seminar, Co-sponsor (Sponsor: TG1-Optimization)	Peter Armstrong/speakers ready	Online Optimal Scheduling for Demand Response Under RTP (Real Time Price)	Submitted to Chicago???
FDD	Seminar	Zheng O'Neill/TBD	Energy Monitoring and FDD for Industrial Facilities	Submitted to Chicago

Notes: ASHRAE has changed the term “Retro-commissioning” to: “Existing Building Commissioning”.

II. Program Subcommittee Chair Training

1. David Claridge – Atlanta Technical Chair did the training;
2. Tech/Conf. paper sessions; Seminar, Forum, Workshop, mini-Conference; Workshop – 60 minutes: 30 minute for presentation and 30 minute for Q&A. This is the only format that allows more than one presenters in one presentation. Scheduled AFTER the paper sessions.
3. More interaction with track chair is encouraged to discuss other formats, etc.
4. **Submission due Feb 9, 2015. Seminar, Forum and Workshop presentations due one month prior to the meeting for commercialism review.**
5. Make sure to have a complete abstract submitted. Work with track chair to discuss the topics, etc. (by phone, email) is strongly encouraged before and after the submission.
6. Authors: provide learning objectives for NY PDH process.
7. Starting with the Orlando meeting, ASHRAE will require the use of provided presentation templates (multiple options) for all presentations.
8. Speaker review: 3.5score needs to be achieved; 3 strike rule.
9. **What to do if you are rejected? Contact the Track Chair.**

III. Program Notes for Atlanta Meeting (June 27 – July 01, 2015)

ATLANTA — ASHRAE is seeking papers for its 2015 Annual Conference in Atlanta, Georgia, June 27-July 1, 2015.

“The 2015 Annual Conference in Atlanta will have a strong focus on the **design, construction and operation of high performance buildings** as **four of the nine tracks** in the conference focus on **advanced design guidance, modeling, operation and optimization, and indoor air quality** which are key aspects of high performance buildings along with one track that explicitly considers measured results and other aspects of high performance buildings.” David Claridge

The third annual Research Summit brings together researchers to present and discuss the latest research. Papers describing ASHRAE-related research are encouraged as well as papers from societies and associations worldwide.

The Moving Advanced Energy Design Guidance to the Mainstream Track focuses on the Advanced Energy Design Guides and seeks papers on methods for using the guides, including actual building case studies and other documented uses to move the market towards energy efficiency.

The High Performance Buildings Track extends ASHRAE’s extensive activities in the design and measured performance of these buildings by seeking papers on these successes as well as identifying shortfalls where high performance has fallen considerably short of the design.

Real engineering as applied to operation, maintenance and operational optimization or “commissioning” can bring increased comfort and offers huge financial returns. **The Building Operation, Maintenance, and Optimization/Commissioning Track** seeks papers related to all aspects of this topic.

Computational capacity and data collection capability has expanded the scope, complexity and practical applications of modeling. The Modeling throughout the Building Life Cycle Track seeks papers related to all aspects of building modeling and, in particular, successful applications that have extended modeling into operational phases of the building life cycle.

Indoor air quality is closely linked to comfort and to occupant satisfaction, productivity and health. The Indoor Air Quality Track seeks papers that explore these links, particularly in ways that make the case for high levels of IAQ compelling to building owners.

The Refrigeration Track has an emphasis on related refrigeration technologies that will reduce the use of traditional refrigerants including evaporative cooling and desiccants.

As with past ASHRAE conferences, the Atlanta Conference also seeks papers addressing advances and practices across HVAC&R systems, equipment, fundamentals and applications.

Check <https://www.ashrae.org/chicago> for updates.

Track 1 – Systems & Equipment

Track Chair: Jon J. Cohen / Rocky Alazazi; Email: jcohen@hohwatertechnology.com / mralazazi@yahoo.com

Track 2 – Fundamentals & Equipment

Track Chair: Ann Peratt / Cynthia Moreno; Email: agregg.ksu@gmail.com / cindym@tmmechanical.com

Track 3 – Research Summit

Track Chair: Thomas H. Kuehn / Samir Traboulsi; Email: kuehn001@umn.edu / traboulsi.samir@gmail.com

Track 4 – Refrigeration

Track Chair: Gary C. Debes / Monte G. Troutman; Email: gcdebes@verizon.net / montemechsys@bellsouth.net

Track 5 – Building Operation, Maintenance, & Optimization/Commissioning

Track Chair: Alan Neely / Mike McDermott; Email: alan_neely@pghcorning.com / mmcdermott@grummanbutkus.com

Track 6 – Indoor Air Quality

Track Chair: Chuck Curlin / Dennis Alejandro; Email: ccurlin@shultzeg.com / denzjac@yahoo.com

Track 7 – Modeling Throughout the Building Life Cycle

Track Chair: Jeffrey Spitler / Michael Collarin; Email: spitler@okstate.edu / Michael.Collarin@parsons.com

Track 8 – High Performance Building

Track Chair: Rachel Romero / Andrea Zarour / Mary Ann Piette; Email: rachel.romero@nrel.gov / azarour@greaterbaymechanical.com / mapiette@lbl.gov

Track 9 – Moving Advanced Energy Design

Track Chair: James Liston / Paul A. Torcellini / Frank Schambach; Email: jfliston@verizon.net / paul.torcellini@nrel.gov / frankschambach@mindspring.com

Conference Program Chair: David Claridge

Email: dclaridge@tamu.edu

Schedules and Deadlines:

- January 5, 2015 Website Opens for Seminar, Forum and Workshop Proposals
- January 5, 2015 Final Conference Papers Submitted for Review (Includes Bio, Learning Objectives and Methods of Assessment)
- January 30, 2015 Conference Paper accept/reject notifications
- February 9, 2015 Seminar, Forum and Workshop Proposals Due**
- February 13, 2015 Revised Conference Papers/Final Technical Papers Due
- February 27, 2015 Conference and Technical Paper Final Accept/Reject Notifications
- March 23, 2015 Seminar, Forum, Workshop Accept/Reject Notifications
- May 04, 2015 Upload of PPTs Begin
- June 05, 2015 All PPTs Due Online**
- June 17, 2015 Final Day for Commercialism Revision Upload prior to on-site
- June 27, 2015 Speaker's Lounge Opens

Information and Program Application Submission web address:

<https://www.ashrae.org/atlanta>

III. Program Notes for Orlando Meeting (January 23 - 27, 2016, Orlando, FL)

“The 2016 ASHRAE Winter Conference will have a fresh feel with new tracks focused on **design-build practices and residential systems**. We’ll continue our emphasis on energy efficiency and sustainability

while addressing current engineering and construction practices outside of the U.S. and Canada. We're also taking one of the most attended conference program styles and making an entire track out of debates. I think we'll be offering our attendees some great programs that align well with current trends in HVAC&R engineering," Jennifer Leach, conference chair, said.

The increasing choice of **Design Build** project delivery brings the contractor and designer together on the same team. The track explores the challenges and benefits, highlights successful projects and addresses several topics, including contracts and alternative design and construction processes.

The **Modern Residential Systems Track** presents energy efficient solutions and the latest advances ranging from glazing to water heating to lighting for the residential market.

The inventive aspect of engineering is covered in the **Cutting-Edge Technologies Track**, exploring the efforts to achieve net zero energy buildings. Papers and programs address recent advances in HVAC&R system design, equipment and construction techniques including the responsible use of resources and energy recovery.

With ingenuity comes the debate as to the best practices where there may be divergent methods for accomplishing the same task. **The Great Debate Track** seeks to bring a lively discussion in a point, counterpoint format on the "best" approach for a certain project.

In addition, the 2016 ASHRAE Winter Conference also seeks papers addressing advances and practices across HVAC&R systems, equipment, fundamentals and applications, especially for the **International Design Track**.

Track 1: Systems and Equipment

Track Chair: [Gary C. Debes](#)

Email: gcdebes@verizon.net

Track 2: Fundamentals and Applications

Track Chair: [Cynthia Moreno](#)

Email: cindym@tmmechanical.com

Track 3: Design Build

Track Chair: [James Liston](#)

Email: jfliston@verizon.net

Track 4: International Design

Track Chair: [Leon Shapiro](#)

Email: leoneshapiro@gmail.com

Track 5: Standards, Guidelines and Codes

Track Chair: [Michael Collarin](#)

Email: Michael.Collarin@parsons.com

Track 6: Cutting-Edge Technologies

Track Chair: [Ann Peratt](#)

Email: agregg.ksu@gmail.com

Track 7: The Great Debate

Track Chair: [Chuck Curlin](#)

Email: ccurlin@shultzeg.com

Track 8: Modern Residential Systems

Track Chair: [Rocky Alazazi](#)

Email: mralazazi@yahoo.com

This is the overall publication schedule for the 2016 ASHRAE Winter Conference, Orlando. For specific details and questions regarding these dates, please contact the appropriate Track Chair.

March 23, 2015	Conference Paper abstracts due
April 6, 2015	Conference Paper Abstract Accept/Reject Notifications
April 20, 2015	Technical Papers Due
June 4, 2015	Website Opens for Seminar, Forum and Workshop Proposals
July 6, 2015	Final Conference Papers Submitted for Review (Includes Bio, Learning Objectives and Methods of Assessment)
August 3, 2015	Conference Paper accept/reject notifications
August 10, 2015	Seminar, Forum and Workshop Proposals Due
August 21, 2015	Revised Conference Papers/Final Technical Papers Due
August 28, 2015	Conference and Technical Paper Final Accept/Reject Notifications
September 11, 2015	Seminar, Forum, Workshop Accept/Reject Notifications

Conference Program Chair: **Jennifer Leach**

Email: pennst8jen@yahoo.com

Information and Program Application Submission web address:

<https://www.ashrae.org/orlando>

V. Program Ideas for Atlanta:

Sub Committee	Type	Session Chair / Speakers	Proposed Title	Status
NBT	Seminar	Srinivas Katipamula	Improving Energy Efficiency of Commercial Buildings thru Data Analytics	Submitted to Chicago but not selected. Resubmit for Atlanta
NBT	Seminar	Bing Dong	Occupancy Behavior Modeling in Buildings	For Atlanta
BOD	Seminar	Li Song/Xiufeng Pang	Model-based Commissioning	For Atlanta. Li will follow up with Xiufeng

FDD	Seminar	Zheng O'Neill/TBD	Energy Monitoring and FDD for Industrial Facilities	Zheng will contact speakers; Shooting for Atlanta
FDD	Seminar	David Yuill/Jin & Kristin	Evaluating FDD Performance	For Atlanta; co-sponsor TC 1.4? 1.5? 7.3?
FDD	Seminar	Nick Gayeski	Incorporating FDD into Operations and Maintenance Processes	For Atlanta
SG	Seminar	Glen Remington will contact Carlos Haiad, David Holmberg	How FERC, Utilities, Regulating Bodies Operate and How Demand Respond	For Atlanta; Zhou send Glen a past example of seminar application
SG	Seminar	Rich Hackner	Smart grid ready building owners, managers and operators: What do you need to know?	For Atlanta

Notes: ASHRAE has changed the term “Retro-commissioning” to: “Existing Building Commissioning”.

VI. Program Ideas for future

Sub Committee	Type	Session Chair / Speakers	Proposed Title	Status
General	Seminar	Carol Lomonaco	Writing a Successful RTAR	For future
NBT	Seminar	Bill Healy	Energy Monitoring and Management Systems to Enable Energy Efficient Operations of Residential Buildings	For Orlando; Residential Home Track
NBT	Seminar	Kristen Cetin	Smart Appliance	For future
FDD	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
FDD	Workshop	Kristin Heinemeier	Lab Methods for verifying that FDD tools for RTUs really work: Will Standard 207 really work?	For future – Orlando?
BOD	Seminar, co-sponsor TC 7.9	Song Li & Carol Lomonaco	How BAS can Enhance Existing Building Commissioning	For future
BOD	Seminar	Andreas	Building Operation Dynamics - High Mass Buildings	Bruno Lee will contact Andreas.

				Possible for Orlando.
BOD	Seminar	Josh Wall	What to Do with Optimal Control?	For future
BOD	Seminar	Josh Rhodes/ Josh, Joe Zhou	LEED Building Energy Performance Model Evaluations	For future
SG	Seminar	David Holmberg/ Carol Lomonaco?	Green Button / Open ADR	For future
Research	Workshop	Jin Wen	Roadmap for Smart Building Research	For future

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**ASHRAE TC 7.5 Smart Building Systems
2015 Winter Meeting, Chicago, Illinois
Minutes of the Handbook Subcommittee**

N/A

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