

TC 1.4 Control Theory and Applications

Research Subcommittee (RSC) Activities

Orlando – January 25 2016

RSC Meeting Minutes:

1. Announcements

a) Tech Council

- RAC to look into more “Applied” Research
- Evaluate the concept of allocating Research funds for post project processing that will produce tools, presentations, etc. that add value to the membership and society (not just ASHRAE, but aligns with our mission)
 - (1) Could be a second bid package for the post “data” research project to perform “applied research to make the tool.
 - (2) Could be a line item budget for hiring outside services to “finish” the holistic research project not just Work Plan scope.

b) Stats

- RTARs: 5 Accepted with comments, 4 Rejected
- WSs: 1 Accepted, 1 Conditionally approved, 1 Returned, 1 Rejected
- 4 URPs under review and 8 TRP bid packages to evaluate

c) Honors & Awards – need to submit nominees

- Service to ASHRAE Research – Sept 30
- Homer Addams Award – Graduate Student with published paper – Dec 15.
- New Investigators Award
- Grant-in Aid

d) Web-based Training Modules for RTAR, WS, PES and PMS.

e) WS and TRP’s must have milestone chart and associated costs for each milestone as a percent of total project cost. Bidders may propose a different milestone chart with associated costs than suggested in the RFP. A questionnaire will be sent to PMS Chair at each milestone level to obtain project status. **Payments at each milestone level will be made to the contractor only after approval of each milestone deliverables by the PMS.**

f) Reminder:

- RTARs and WSs should be reviewed by liaison prior to submission to RAC. TC 1.4 Research Liaison is Shinsuke Kato RL1@ashrae.net and Art Giesler RACvchair@ashrae.net

2. Active Project Status:

Name	Project	PMS	Status
RP 1587	Closed Loop Control – Performance Measurement and Evaluation	Steve Taylor-chair Bill Pienta David Shipley Phil Haves David Underwood	Work has been complete, final report draft has been sent to PMS for review/comment. PMS will have call-in meeting in Feb 2016 to provide comments to PI. PI requests no-cost extension until July 1, 2016. Research committee voted and requests TC1.4 for no-cost extension. Paper has been submitted to ASHRAE Research Built Environment. Potential seminar presentation for St. Louis or Las Vegas.
RP 1746	Field Validation of RP1455 Sequences	Chad Moore Kim Barker Kevin Ng Chariti Young	Contract signed in Dec 2015. PI attend this meeting and gave brief presentation on project. PI will review Public review version of GPC-36 to assess impact on project deliverables (e.g., CV system).

Name	Project	PMS	Status
RP-1747 TC 4.3 w/1.4 Co-Sponsor	Implementation of RP-1547 CO2-based Demand Controlled Ventilation for Multiple Zone HVAC Systems in Direct Digital Control Systems	Stanke, chair Len Damiano Raj Daswani Heejin Cho Verle Williams	Contract signed in Dec 2015. PMS meeting held in Orlando.
WS 1711	Advanced Sequences of Operation for HVAC Systems – Phase II Central Plants and Hydronic Systems	Steve Taylor Marcelo Acosta Chris Benson TC6.1 Person	Approved by RAC - To be bid Spring 2016. Request that TC6.1 have representation on PES/PMS.

3. Pending Research Project Status:

Status	Project	Champion	Remarks
WS-1661 TC 4.7 w/1.4 Co-Sponsor	Development of Modelica Models for Evaluation of Supervisory Control Strategies	Michael Wetter Wangda Zuo Steve Taylor	RAC returned WS with comments to TC4.7 in Nov 2015. WS has been revised. Research committee voted (PASSED) asks TC to co-sponsor WS.

4. Possible Research Project Status:

Status	Other TCs	Project	Champion	Remarks
WS Feb 2016		Optimized Supply Air Temperature Reset Strategies	Steve Taylor Joe Zhou Jim Coogan Mike Pouchak	WS developed, needs review/comment by TC1.4 members. R.Chair to send WS out to members for review,
RTAR Feb2016		Optimizing TES control with weather forecasts or model predictive control	Marcelo Acosta Heejin Cho	RTAR has been authored, needs review/comment by TC1.4.
Develop RTAR		Effectiveness of Night Setback and Optimum Start	Barry Bridges Peter Armstrong	B.Bridges (Champion). My need call-in meeting to discuss content of RTAR.
WS	Co-sponsor TC 6.1	Selecting Control Valves	Steve Taylor	Work statement under development.
Develop RTAR		Reset of space setpoints seasonally or using online daily forecast	Kim Barker Gwelen Paliaga	Determine if comfort and efficiency are improved by using seasonal space temperature setpoint reset or using next-day forecast obtained via internet. Also using forecast for pre-cooling strategies. Could start with simulation followed by real-building studies. {NEED RTAR}
IDEA		Object Based HVAC Control & Advanced alarm strategies	Brent Eubanks Mark Hydeman Joe Zhou Kim Barker	Extend what GPC-36 has done with hierarchal alarms to reduce nuisance alarms, ensure critical alarms are not ignored.
IDEA		Controlling HVAC using effective temperature (ET)	Joe Zhou	Does using ET instead of drybulb temperature reduce energy efficiency? Simulation followed by field test. Joe looking for grad student to develop this.
IDEA		Coordinating control of hybrid radiant and air systems for maximum efficiency	Phil Haves	Applies primarily to hybrid systems but also could apply to DOAS with respect to supply air temperature control.
IDEA		Open Generic Language for Control Systems – Phase I Proof of Concept	Michael Wetter Phil Haves Joe Zhou	
IDEA		Develop conventional sequences from MPC optimized sequences	Phil Haves	Near-optimum sequences developed from model predictive controls that are too cumbersome to work in realtime control systems.

Status	Other TCs	Project	Champion	Remarks
<i>To be incorporate into WS-1711.</i>		<i>Chilled water setpoint reset vs. pump differential setpoint reset for CHW plants</i>	<i>Steve Taylor</i>	<i>Chilled water setpoint reset increases pump energy but decreases chiller energy, especially for VFD chillers. DP reset saves pump energy but with standard control valves, the two setpoints cannot be reset independently. Which to reset first?</i>
IDEA		DOAS supply air temperature reset for VRF and WSHP systems	Steve Taylor Joe Zhou Jim Coogan	Reset logic is not straight forward due to heat recovery that occurs between interior and exterior zones.
IDEA		%kW vs, %CFM and %GPM curves for real systems	Steve Taylor Joe Zhou Jim Coogan	Real variable flow systems do not have ideal parabolic system curves because of closing dampers/valves. DP setpoint reset helps but
IDEA	7.9	Cost & benefits of commissioned building controls	David Underwood	When does building performance start to degrade. What are top ten items to look at on scheduled basis?
IDEA	7.5?	Mixed-Mode Building Control Sequences	Kim Barker	What is the current state of mixed-mode control sequences? What are people doing? What is recommended? Literature search,

5. Research RTARs and WS Deadlines:

- March 15 for spring meeting
- May 15 for June meeting
- August 15 for fall meeting
- December 15 for January meeting

6. Adjourn: 4:15 pm

7. In Attendance: See attached sheet.