TC 1.4 Control Theory and Applications
Research Subcommittee (RSC) Activities   Atlanta − June 29 2015

<u>RSC Meeting Minutes:</u>

1. Announcements

    a) Stats
- 61 active RPs totaling $10 million.
- 11 Completed projects, 11 New projects
- 13 TRPs released for bid (no projects on hold due to funding)
- RTARs: 3 Accepted, 4 Accepted with comments, 2 Rejected
- WSs: 4 Accepted, 1 Conditionally approved, 1 Returned, 2 Rejected
- 4 URPs under review and 8 TRP bid packages to evaluate

    b) Forum: ASHRAE Research Process Efficiency on Monday June 29, 2015 11-Noon Room 206/207

    c) ASHRAE Strategic Plan 2014
- Initative 5 - ASHRAE's Role in Residential Sector – TAC/RAC increasing residential emphasis.
- Iniative 1B – Impact of ASHRAE standards/technology on energy savings and performance.

    d) Web-based Training Modules for RTAR, WS, PES and PMS target release June 2015

    e) All 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. **<u>Payments at each milestone level will be made to the contractor only after approval of each milestone deliverables by the PMS.</u>**

    f) New research funding path: An ASHRAE Co-Funded Research Project Led by Other Non-Profits or Co-RP

    g) 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 Art is rolling as 1.4 Research Liaison of July 2. Please add Art Giesler as CC on all RTARs and WSs.

2. Active Project Status:

Name	Project	PMS	Status
RP 1455	Advanced Control Sequences for HVAC Systems - Phase I Air Dist and Terminal Systems		**Report published by ASHRAE. Closed**
URP 1633	Data and Interfaces for Advanced Building Maintenance and Operation		**Final report presented to PMS. PMS plans to bring motion to TC1.4 to accept final report.**
RP 1587	Closed Loop Control – Performance Measurement and Evaluation	Steve Taylor-chair Bill Pienta David Shipley Phil Haves David Underwood	**Basically on schedule. PI requests 6 month <u>(no cost extension)</u> to March 31, 2016 due to recent family illness.**
RP 1746	Field Validation of RP1455 Sequences	Chad Moore Kim Barker Kevin Ng Chariti Young	**PES to meet to review. Notify RL when this will occur.**

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	**PES met in Atlanta.**
WS 1711	Advanced Sequences of Operation for HVAC Systems – Phase II Central Plants and Hydronic Systems	Steve Taylor Marcelo Acosta Chris Benson	**Approved by RAC - Concerns per letter from Mike Vaughn to be addressed before RAC approval for awarding the project. Will be bid September 2015.**

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	Merge the following with WS-1661. Waterside economizer control optimization & Chilled water setpoint reset vs. pump differential setpoint reset for CHW plants. Revised WS by August 1.

4. Possible Research Project Status:

Status	Other TCs	Project	Champion	Remarks
Co-RP	1.5 TG2 7.5	Hvac Security	Hywel Davies(CIBSE) Mike Vaughn (ASHRAE)	Research subcommittee recommends that TC1.4 support the potential Co-RP between (CIBSE & ASHRAE) on Physical & Cyber HVAC Security. Motion: Carol Lomonaco 2nd: Marcelo Acosta Vote PASSED
Possible		Optimized Supply Air Temperature Reset Strategies	Steve Taylor Joe Zhou Jim Coogan	Taylor developed RTAR for RSC review. On hold until California CIEE project with Taylor Engineering scope is developed and completed.
Possible		Effectiveness of Night Setback and Optimum Start	Barry Bridges Li Song Heejin Cho Peter Armstrong	Analyze energy impact of different levels of setback vs. shut-off. RTAR needed. Barry and Heejin to lead.
Possible	1.5	HVAC System Thermal Control and Energy Performance using Work & Data Exchange Processes	Michael Pouchak	Pouchak says WS on hold for further development. Pouchak to be TC 1.4 rep on PMS.
Possible		Open Generic Language for Control Systems – Phase I Proof of Concept	Michael Wetter Phil Haves Joe Zhou	
Possible		Selecting Control Valves	Steve Taylor	On hold. RP must wait until 1587 is done – need loop "goodness" factor first. TC 6.1 would have to be cosponsor.
Possible		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. Wait for CIEE research.
Possible		Object Based HVAC Control & Advanced alarm strategies	Brent Eubanks Mark Hydeman Joe Zhou Kim Barker	Extend what RP-1455 did with hierarchal alarms to reduce nuisance alarms, ensure critical alarms are not ignored.
Possible		Waterside economizer control optimization	Jeff Stein Steve Taylor Mark Hydeman	Issues like when it is not worth keeping CT fans at full power, when to re-enable economizer based on estimates of approach temperatures. ==To be incorporate into WS-1661.==
Possible		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.

Status	Other TCs	Project	Champion	Remarks
Possible		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.
Possible		Optimizing TES control with weather forecasts or model predictive control	Marcelo Acosta Heejin Cho	Focus will be on ice storage since it is more susceptible to energy impact if storage is depleted,
Possible		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.
Possible		Chilled water setpoint reset vs. pump differential setpoint reset for CHW plants	Steve Taylor	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? To be incorporate into WS-1661.
Possible		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.
Possible		%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
New	7.9	Cost & benefits of commissioned building controls	David Underwood	Who quickly does a system degrade, Green Building alliance and others.

5. Research RTARs and WS Deadlines:

   - March 1 for spring meeting
   - May 15 for June meeting
   - August 15 for fall meeting
   - December 15 for January meeting

6. Adjourn: 3:50 pm

7. In Attendance: See main TC attendance table.