ASHRAE TC1.4 Control Theory and Application
Draft Meeting Minutes
San Antonio Summer Meeting
June 26, 2012

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

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.
1791 Tullie Circle, N.E./Atlanta, GA 30329
404-636-8400

TC/TG/TRG MINUTES COVER SHEET

(Minutes of all TC/TG/TRG Meetings are to be distributed to all persons listed below within 60 days following the meeting.)

TC/TG/TRG NO.: 1.4

TC/TG/TRG TITLE: Control Theory and Applications

DATE OF MEETING: Jun. 26, 2012 LOCATION: San Antonio

DISTRIBUTION:

ALL MEMBERS OF TC

ALL COMMITTEE LIAISONS

TC 1.4 Activity Feedback Form

TC/TG/TRG Activity Feedback Form

TC#	1.4	Committee Name:	Control Theory & Application
		Chair:	Steven Linn

Meeting was Held (City)	San Antonio	Tuesday		6/26/2012	

Membership	Quorum Established (Yes/No)	YES
	Number Present	Total on Committee
Voting Members (excluding Non-Quorum Members)	6	10
Non-Quorum Members		
Corresponding Members	12	59
Provisional Members	3	10
Visitors and Guests	5	

Handbook Responsibilities		Standards Responsibilities	
Volume and Chapter (i.e. A17 Printing Plants)		Standards Number (i.e. SPC 178, Std 90.1, Gld 2)	
A47 - Design and Application of Controls		SSPC-135	
F7 - Fundamentals of Controls		SGPC-13	
		SPC-195P	
Total Number of Chapters	2	Total Number of Standards	2

Program Activities (This Meeting)									
Total # of Poster Sessions		Total # of Forums		Total # of Technical Sessions		Total # of Transactions		Total # of Seminars	
Sponsored	Co-Sponsored	Sponsored	Co-Sponsored	Sponsor	Co-Sponsored	Sponsored	Co-Sponsored	Sponsored	Co-Sponsored
0	0	0	0	0	0	0	0	4	0

Current Research Activities (active)		FAQ Responsibilities	
# of active RTARS	1	Total # of FAQ's	
# of active Workstatements	0	Have FAQ's been updated on a 5 yr cycle?	Yes
# of active TRPs	0		
# of active RPs	4	**TC Website**	
Total # of Active Projects	0	TC has a website (yes/no)	Yes
		Wesite Up-to-date? (Yes/No)	Yes
TC Management		Website is on the ASHRAE Server (Yes or No	Yes
	(Yes/No)	Link to website from www.ashrae.org/technology/page/104 is functional? (yes/No)	Yes
Minutes Completed on Time?	YES		
Agenda distributed on time?	YES		
Members asked to Reconfirm participation (winter)?	YES		
Roster Workbooks Completed (Winter)	YES		
Did Chair and Vchair attend Training?	NO		
Did Handbook Chair attend Training?	NO	Chair & Vice Chair will attend training in Dallas	

Any Concerns or requests for the Technical Activities Committee? (Please type in Space Below)

We will consider formally adding an Education Sub-Committee. Matter was deferred to the Dallas meeting, specifically in relationship to development of work required for a potential Professional Certification Program, and PDC programs.

WFM 1/2011

Any requests of the Technical Activities Committee? No

TC 1.4 Action Items

Completed:

Responsible Member	Description	Due Date	Completion Date

New and Pending:

Responsible Member	Description	Due Date	Completion Date
Barker	Post Meeting Minutes to Website	8-26-2012	

Minutes

TC 1.4 Control Theory and Application
http://tc14.ashraetcs.org/
Tuesday, June 26, 2012 1:00 – 3:30 pm
Grand Hyatt Hotel
San Antonio Convention Center
San Antonio, TX

TC 1.4 Control Theory & Application (40) (Screen)	Tuesday	1:00-3:30p	Conv Center Room 006B
TC 1.4 Control Components and Applications	Sunday	3:00-4:45p	(H) Presidio B (3)
TC 1.4 Program	Sunday	4:45-5:30p	(H) Presidio B (3)
TC 1.4 Reference Applications	Sunday	5:30-6:30p	(H) Presidio B (3)
TC 1.4 Research	Monday	2:15-4:15p	(H) Bonham E (3)
TC 1.4 Handbook	Monday	4:15-6:15p	(H) Bonham E (3)
TC 1.4 Executive	Tuesday	7:00-8:00a	(H) Travis C (3)

1) Call to Order

Call to order at 1:11pm

2) Introduce Members, Guests, and Liaisons

Folks introduce themselves. We have a quorum.

3) Approve agenda

Motion to approve: Charti Young, 2nd Gaylen Atkinson[6-0-0]

4) Present scope of TC 1.4

5) Approve minutes from previous meeting

Motion Gaylen, 2nd Charti Passed[6-0-0]

6) Announcements

a) Section Meeting announcements

b) Art Giesler – RP summary

RP-1455 needs to submit up to date reports.

c) Vic Pinar – TAC

Change policy for ASHRAE attendance. ASHRAE will now charge $100 for speakers to attend technical sessions.

Comments: There was general discussion on the new policy of charging speakers to attend ASHRAE technical sessions. It is difficult to get speakers outside of ASHRAE. What does BOMA, IFMA, AEEE, ASHE do? This just makes it more difficult to get people from owner's side. There were 20 speakers had not uploaded presentations, there were multiple no-show speakers in San Antonio. 25 speakers in Chicago scored below 3.

7) OLD BUSINESS

A) PROJECT COMMITTEE AND ONGOING RESEARCH REPORTS

i) SSPC 135 (BACnet) – David Robin

BACnet-2010 has been published (1000 pages long), New addenda are out for public review,due mid-August: Lighting output, Elevators output, New web-services, functional components(AHUs, etc). Added access controls, authorization policies, annunciations fire panel discussion profile for device type. Incoming chair of BACnet: Carl Neilsen

ii) SGPC 13 (Specifying DDC Systems) – Chariti Young
Meets Saturday 8:00AM-Noon, Hyatt Bowie B (2)

(1) Addendum 13g, 13h, 13i

(2) Old Business

(3) New Business

See Published Agenda for more details or contact Chariti Young. Performance Montiroting addendum is out for public review, voted 2 additional addenda out for review: Benefits of BAS and CSI references. Major focus now overhaul of how to specify networks.

iii) RP-1353 (Stability and Accuracy of VAV Box Controls at Low Flows) − Jim Coogan

Steve Taylor – Done. Final report approved by TC 1.4 via e-mail vote on May 22, 2012. Needs paper. This was continuation of work on VAV box velocity sensors. Velocity sensor amplification factor dies off at low flows. No issues with low flow with velocity sensors, difference with controller themselves and how they work.

iv) RP-1455 (Advanced Control Sequences for HVAC Systems) - Michael Pouchak

Did meet today. New standards with control sequences for state of the art. Delivered to Task 2. Tasks: 3, 4 and 5. There is a no cost extension thru Jan 2013. PMS wants to see further deliverables progress before additional work.

v) RP-1597 (Stochastic Control Optimization of Mixed-Mode Buildings) – Kim Barker

(1) Vote for No Cost Extension

Researcher has created model on how peoples behavior vary and how can we control based on that information. Completed models, found 2 test buildings: NREL_NSF building (Boulder, Co), NASA_ AMEs building will be next summer. Request no cost extension on the project. So they can run complete tests on 2nd building (NASA_AMES). No Cost extension until Jan 2014. TC 1.4 approved no cost extension [6-0-0].

vi) RP-1633 (Data and Interfaces for Advanced Building Maintenance and Operation) – Reinhard Seidl

Conducted literature review and interview people on what they would like to see in visualization Tasks 1 &2 complete, Started on task 3. Continues on June 2013.

vii) ASHRAE Certified Building Controls Profession certification submittal – David Kahn

David Merdith came to meeting. We are #1 on list for next certification. Need to get group of people together to create product of knowledge. Once more defined, they will vote to spend money. Its approved. Frank Shadpour, Chad Moore and Larry Fisher, Steve Taylor and VerleWilliams will help. Will sendout email with scoping letter. Target is controls professionals that are rockstars, consulting engineers. Voted [4-0-0] need to be done by Oct 1st, want to vote on this at next meeting. Assign person form PDC for us. Need volunteers on writing test, not on course development. People from committee get paid to write test.

b) SUB-COMMITTEE REPORTS

i) Executive – Steven Linn

(1) Call for interest in Handbook Sub-committee Chair

Completed handbook Chapter 47 Applications. Need someone to take over Handbook. Let Kim know if you are interested.

(2) Adjustment of Voting Member Roster

TC Chairs, some discussion on electronic meetings. Will need quorum at the meeting, for example: (6 at meeting,4 remote).

(3) Consideration of creating an Education Sub-Committee

Need to establish Education subcommittee may be a future. Could wait until Denver

ii) Handbook – Dave Kahn

(1) Final edit comment review and approval of Fundamentals Chapter 7

Final edits and approval of Fundamentals Chapter 7 were completed on July 5th . Review chapter 47. Handbook talking with TC6.1 revising their chapter on valve sizing in 3 years. Open to long term movement to valves moving to TC1.4. Handbook recommends chapter be voted on for publication. Call for vote: [6-0-0] PASSED. Thankyou to all those who helped to get the handbook chapter completed on time.

iii) Control Components and Applications – Steven Linn (for Barry Bridges)

(1) Progress of Integrated Building Control Design Professional Certificate

(2) Review of PDS 22 and 36.

Certification- Specifying DDC Systems (2004 – Coogan, Kahn), Retrofit DDC (2004) – presented in Calgary and Chicago. They do fundamentals (valves, dampers). Does not have anything on networks, protocols, etc. Need someone to market these courses. Retrofit – Taylor and Hydemann. Gaylen teaches at local community college. Because of connections update dialup. Need to update fast track, add new technologies that are hot now. Need to update with internet technologies. Action Item: Look at it as part of certification program. Update as part of certification (Larry Fisher).

(3) Strategic Recommendations to the MTG – Energy Efficient Air Handling Systems

MTG (Multi Task Group) – Energy Efficient Air Handling Units. Craig – write short description for (TC1.4, TC5.1).Chuck Coward to send information to Kim Barker about building interface for Smart Fans. Do you design with controls in mind? Len Damiano (62.1 and 1.4), Chuck Coward will be alternate for TC1.4. Start looking at what drives and motors. Len Damiano thought overlap and conflict between TCs, any area; for example: 90.1 and 62.1. How is this going to happen (changes to standards, handbook)?

iv) Reference Applications – Kim Barker (meeting not held)

v) Research – Steve Taylor

No pending ATARS or Work Statements.

vi) Program – Frank Shadpour

Four programs in San Antonio. Good feedback. Discussion about attendance to Seminars. IPD program in Dallas interested in program. Ethics discussion, people want to learn more, lots of interest. Want to know tools.

Programs proposed for Dallas: 2 forums, 1 seminar, 1 conference papers. Forums: GPC-13 workplan future of, Certification for Controls. Seminar: Gaylen and conference paper RP-1353? Seminar Co-sponsored with TC6.1: control of thermal energy storage systems needs Chair (Carol Lomonaco) and Speakers. August 13th deadline. Discussion of Speakers fee.

Motion: Approved program Larry and Gaylen

There was much discussion on the decision to charge speakers an attendance fee for the technical program. Straw-poll [16-1-0] of people who were dissatisfied with this new policy. Much discussion

on how this would impact the ability to acquire speakers outside of those attending ASHRAE meetings already. Suggestion was made that an allowance at TCs discretion for 2 one-day passes for speakers (given to Program Chair). Provides ability of program chair to develop good programs by bringing in speakers non-affiliated with ASHRAE.

vii) Standards – Steve Taylor

90.1 - DDC reset added new section to 6.4

62.1 – zone is schedule for occupancy, but not occupied. Don't need ventilation. Ventilate to building component off-gases.

SPC-195 is out for review.

viii) Webmaster – Kim Barker

c) Committee Liaison Reports

i) TC 1.5 (Computer Applications) – Mike Pouchak

ii) TC 2.1 (Physiology & Human Environment)

iii) TC 2.8 (Building Environmental Impacts and Sustainability) Kim Barker

iv) TC 5.2 (Duct Design) – Larry Felker

v) TC 5.6 (Control of Fire & Smoke) –Larry Felker

vi) TC 6.1 (Hydronic Systems) – Dave Kahn

vii) TC 6.7 (Solar Energy Utilization) – Gaylen Atkinson

viii) TC 7.1 (Integrated Building Design) – Larry Felker

ix) TC 7.3 (Operations & Maintenance Management) – Jim Gartner

x) TC 7.5 (Smart Building Systems) –John House

xi) TC 7.6 (Systems Energy Utilization) – Kim Barker

xii) TC 7.9 (Building Commissioning) – David Bornside

xiii) TC 9.6 (Healthcare Facilities) – Kim Barker

xiv) TC 9.10 (Laboratory Systems) – Jim Coogan

xv) T 9.11 (Clean Rooms) – Jim Coogan

xvi) SSPC 62.1 (Ventilation and Acceptable IAQ) − Len Damiano

xvii) SSPC 90.1 (Energy Efficient Design of New Buildings) − Darryl DeAngelis

xviii) SSPC 166 (Terminology) – David Bornside

xix) SGPC 0.2 & 1.2 (The Commissioning Process) – David Bornside

xx) SPC134 (Graphic symbols for HVAC systems) – David Bornside

xxi) US TAG to ISO/TC 205 (Building Environmental Design) – Damian Ljungquist

xxii) SPC 189 Design of High Performance Building – Bogi Setty

d) Society Committees

i) Professional Development Committee – Larry Fisher

8) New business

a) T.B.A.

b) Roster updates:

i) Kimberly Barker becomes our new Chair

ii) Chad Moore becomes our new Vice-Chair and Secretary

iii) Voting Members Rolling off after San Antonio: Gaylen Atkinson
Voting Members Rolling on: Kim Barker

9) Due Dates:

a) June 1 – Web Site Opened for Seminar, Forum, TPS and CPS Proposals

b) July 9 – Final Conference Papers Submitted for Review

c) Aug. 13 – Seminar, Forum, TPS and CPS Program Proposals Due for Dallas

d) Sept. 24 - Conference Papers due for Denver

10) Next meeting

a) Winter Meeting – Dallas TX Jan. 26 – 30, 2013

11) Adjourn

Attachment 1 - Attendance

Name	Position	Company	Components and Applications	Program	Reference Applications	Research	Handbook	Executive Breakfast	**Main Committee**
Voting Members									
Steven Linn	Chair	Johnson Controls Inc	X	X		X	X	X	X
Gaylen Atkinson	Member	Atkinson Electronics Inc	X	X					X
Chuck Coward	Member	Waddell Engineering	X	X					X
Larry Fisher	Member	ECT Building Automation	X	X					X
Philip Haves	Member	LBNL				X			X
Chariti Young	Member	Automated Logic Corp		X			X		X
Non-Voting Officers									
Kim Barker	Vice-Chair	Siemens Bldg Technologies Inc	X	X			X	X	X
Dave Kahn	Vice-Chair, Handbook	RMH Group	X	X		X	X	X	X
Frank Shadpour	Chair, Programs	SC Engineers, Inc.	X	X				X	X
Jim Coogan	Chair, Reference Applications	Siemens Building Technology		X		X			X
Steve Taylor	Chair, Research	Taylor Engineering				X			X
Corresponding Members									
Carol Lomonaco	CM	Johnson Controls Inc							X
Chad Moore	CM	Terry Trane	X	X		X	X		X
David Branson	CM	Compliance Services Group, Inc.	X						
David Underwood	CM	CERL				X			
Garry Cole	CM	Belimo Americas	X	X		X	X		X
Len Damiano	Member	Ebtron Inc				X			X
Michael Pouchak	CM	Honeywell International				X			X
Nicholas Gayeski	Prov. CM	KGS Buildings				X			X
Peter Armstrong	CM	Battelle/Pacific Northwest Nat'l Lab				X			X
Sean Graham	Prov. CM	DLB Associates	X						
Verle Williams	CM	Utility Services Unlimited Inc							X
Dr. Wangda Zuo	Prov. CM	Lawrence Berkeley Lab							X
Xiaohui (Joe) Zhou	CM	Iowa Energy Center ERS DMACC				X			X
Guests									

Ryan Tanner		C.U. Boulder	X	X							
Art Giesler	RLI	Permalent				X			X		
Vic Penar	Section 1 Chair	Permalent							X		
Zheng O'Neill		UTRC				X					
Li Zhang		Carrier Corp				X					
Lynn Sheen		Independent							X		
David Robin	SSPC 135 Liason								X		
Antonyos Fanous		Infrastructure Ontario							X		
David Shadpour		Student USC	X	X	X				X		
Joseph Kilcoyne		SC Engineers, Inc.	X	X	X				X		

Attachment 2: Agenda

TC 1.4 Control Theory and Application
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TC 1.4 Executive	Tuesday	7:00-8:00a	(H) Travis C (3)

12) Call to Order

13) Introduce Members, Guests, and Liaisons

14) Approve agenda

15) Present scope of TC 1.4

16) Approve minutes from previous meeting

17) Announcements

a) Section Meeting announcements

b) Art Giesler – RP summary

c) Vic Pinar – TAC

18) OLD BUSINESS

A) PROJECT COMMITTEE AND ONGOING RESEARCH REPORTS

i) SSPC 135 (BACnet) – David Robin

ii) SGPC 13 (Specifying DDC Systems) – Chariti Young
Meets Saturday 8:00AM-Noon, Hyatt Bowie B (2)

(1) Addendum 13g, 13h, 13i

(2) Old Business

(3) New Business

See Published Agenda for more details or contact Chariti Young

iii) RP-1353 (Stability and Accuracy of VAV Box Controls at Low Flows) − Jim Coogan

(1) Final report approved by TC 1.4 via e-mail vote on May 22, 2012

iv) RP-1455 (Advanced Control Sequences for HVAC Systems) - Michael Pouchak

v) RP-1597 (Stochastic Control Optimization of Mixed-Mode Buildings) – Kim Barker

(1) Vote for No Cost Extension

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i) Executive – Steven Linn

(1) Call for interest in Handbook Sub-committee Chair

(2) Adjustment of Voting Member Roster

(3) Consideration of creating an Education Sub-Committee

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(1) Final edit comment review and approval of Fundamentals Chapter 7

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19) New business

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20) Due Dates:

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c) Aug. 13 – Seminar, Forum, TPS and CPS Program Proposals Due for Dallas

d) Sept. 24 - Conference Papers due for Denver

21) Next meeting

a) Winter Meeting – Dallas TX Jan. 26 – 30, 2013

22) Adjourn

Attachment 3

SSPC 135 Report

Attachment 4

SGPC 13 Meeting Minutes

MINUTESSGPC13 Guideline for Specifying Building Automation Systems

Saturday June 23, 2012 8:00 - Noon
(Hyatt) Bowie B (2nd Level)

1. **CALL TO ORDER**
   - 1.1. Introduction of Members and Guests
   - 1.2. Quorum Determination (5 Voting Members)
   - 1.3. Select secretary for minutes – Chariti Young
   - 1.4. Announcements
     - 1.4.1. Seminar 1 – Breaking boundaries in building controls integration (Kimberly chairing)
     - 1.4.2. Seminar 9 - Practical Applications for DDC dashboards and green kiosks (Ron speaking)
     - 1.4.3. Seminar 36 – Control Specification Fundamentals: How to get what you really want (Chariti speaking)
     - 1.4.4. Sunday pm dinner hosted by Siemens and Ron with an invited group of 10 to explore topic of Enterprise Application Integration.

2. **AGENDA REVIEW**

3. **MINUTES OF THE LAST MEETING**
   Grant moved, Kimberly seconded to approve the minutes from 1/21. Approved (6-0-0).

4. **ROSTER CHANGES**

5. **PUBLICATION PUBLIC REVIEW DRAFTS –** Note: For any Publication Public Review motions all project committee members must be given the opportunity to vote. If all members are not present a continuation letter ballot will be sent to ballot the absent members. All project committee voting members voting **no with comment** will be offered a right to appeal upon Board approval of publication. All project committee voting members voting **no without comment** will not be offered the right to appeal.
   - 5.1. Addendum 13g – Performance Monitoring
     - 5.1.1. In 60-day public review period from May 4, 2012 – July 3, 2012
     - 5.1.2. No public review comments as of 6/23/2012
   - 5.2. Addendum 13h – CSI changes
     Grant Wichenko moved, Dave Kahn seconded to approve the addendum for public review. Approved (7-0-0).
   - 5.3. Addendum 13i - Benefits of a Building Automation System (BAS) rewrite
     Kimberly Barker moved, Grant Wichenko seconded to approve the addendum for public review. Approved (7-0-0).

6. **REPORT FROM STANDARDS LIAISON**
   - 6.1. Need updated work plan
   - 6.2. Watch roster and balance
   - 6.3. SPLS breakfast Sunday 7-9 am
   - 6.4. Report to Mark Weber re: public review of Addendum g

7. **RESPONSES TO COMMENTERS**

7.1. Addendum 13g – Performance Monitoring

7.1.1. Table column labeled "Object Type" – Jeremy Roberts

Jeremy Roberts moved, Grant Wichenko seconded to accept the revisions as reflected in the working addendum. (Change column header, add (pulse) after BI, add legend.) Approved (7-0-0).

7.1.2. Two Table 1's; why are performance monitoring specs lower than not? – Len Damiano

Grant Wichenko moved, Kimberly Barker seconded to accept the revisions as reflected in the working addendum. (Corrected error where "full scale" should have been "reading".) Approved (7-0-0).

8. **CONTINUOUS MAINTENANCE PROPOSALS**

9. **OLD BUSINESS**

9.1. Republication of Guideline

Guideline 13 was last published in 2007 and is up for republication. The committee wants to include the Performance Monitoring Annex and the Benefits of a BAS rewrite in the republication.

9.2. Integration of Master Spec with Guideline

Not discussed

9.3. Work Plan

Chariti's action item.

9.4. Action items review

10. **NEW BUSINESS**

11. **NEXT MEETING: 8-Noon Saturday January 26, 2013 Dallas, TX**

12. **Adjourn**

Kimberly Barker moved, Mike Gibson seconded to adjourn at 11:49. Approved (7-0-0).

SGPC 13 Meeting Attendance List

Present	Name	Affiliation
Voting Members		
X	Chariti Young	Chair, Automated Logic Corporation
X	Dave Kahn	Vice Chair, RMH Group
X	Kim Barker	Siemens
X	Mike Gibson	Echelon
	James R Kelley	Msktd & Associates
X	Kris Kinney	Kinney Engineering Services
X	Jeremy J. Roberts	Lonmark
	David Underwood	US Army Corps of Engineers
X	Grant Wichenko	Appin Associates
Consultant		
	Steve Taylor	Taylor Engineering
Liasons		
X	Douglass S Abramson	SPLS Liaison
	Mark Weber	Staff Liaison
Guests		
	Damian Ljungquist	JDL Business Services
	Gideon Shavit	Self
	Kenneth Chappell**	ARCOM
X	Steven Linn	Johnson Controls
	Joshua New	Oak Ridge National Laboratory
	Ron Bernstein	Ron Bernstein Consulting Services (LonMark)

*would like to become a voting member

**would like to become a corresponding member

Attachment 1. Addendum 13h – CSI Changes

Rationale:

The CSI MasterFormat™ has been updated since the original publication of Guideline 13, and is about to be revised again. Some changes in this addendum are intended to keep the specification guidance applicable to any format. Others make the example specification language and numbering provided generic, so that they are not specific to any one (especially the oldest) format that's available.

Scope:

Make guidance to specifier in the body of the Guideline and example specification language non-specific to a particular CSI format. This also impacts the example specifications that are currently provided with Guideline 13.

[In **Section 3.3 Organization of the Guideline**, remove the clause that indicates that the Guideline is based on the 1995 CSI format.]

The example specification follows the format determined by the Construction Specification Institute (CSI). Under the 1995 CSI MasterFormat™ , a controls specification will typically be placed in Division 15 for mechanical systems, usually in Section 15900 or 15950, although the exact placement varies. The section is divided into three parts (General, Product, and Execution), each consisting of articles, paragraphs, and subparagraphs. Under the 2004 CSI MasterFormat™, control specifications are typically in Division 23 Heating Ventilating and Air Conditioning Section 23 09 00, or in Division 25 Integrated Automation. ~~This Guideline is currently based on the 1995 CSI format, but the~~ *The* electronic version of the sample specification is available in both 1995 and 2004 formats.

[Revise the last paragraph of **Section 5.3.5 Specification** so that the paragraph applies to either CSI format.]

It is important to note that the specification created for DDC systems will need to be well coordinated with the other sections. For example, Division 0 specifies how the contracts will be administered, along with general terms and conditions. This language also will apply to the systems and contractors addressed ~~in Section 15950~~ *the relevant section*. Work provided in other sections also requires coordination. For a more complete discussion, refer to Clause 7.

[In Section **7.1 Products Furnished but Not Installed under This Section**, revise the **Project Considerations** section and Guide Spec language so that they apply to either CSI format.]

Project Considerations: The paragraph should be stricken for projects in which the controls subcontractor may be the prime contractor (e.g., a controls upgrade project). Also, the specifier ~~needs to~~ *must* complete the ~~listed~~ *CSI* section numbers (shown below as "~~15xxx~~*xxxxx*") and edit the titles to match the actual sections used within the remainder of the specification.

1.0 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION
- A. Section ~~15xxx~~*xxxxx*—Hydronic Piping
  1. Control Valves
  2. Flow Switches
  3. Temperature Sensor Wells and Sockets
  4. Flow Meters
- B. Section ~~15xxx~~*xxxxx* —Refrigerant Piping
  1. Pressure and Temperature Sensor Wells and Sockets
- C. Section ~~15xxx~~*xxxxx* —Ductwork Accessories
  1. Automatic Dampers
  2. Airflow Stations

[In Section **7.2 Products Installed but Not Furnished under This Section**, revise the Project Considerations section and Guide Spec language so that they apply to either CSI format.]

Project Considerations: This specification paragraph should be edited to list only those other specification sections that include products for installation under this section. The paragraph should be stricken for projects in which the controls subcontractor is the prime contractor (e.g., a controls upgrade project). Finally, the specifier ~~needs to~~ *must* complete the ~~listed~~ *CSI* section numbers (shown below as "~~15xxx~~*xxxxx*") and edit the titles to match the actual sections used within the remainder of the specification.

1.1 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION
- A. Section ~~15xxx~~*xxxxx* —Refrigeration Equipment
  - 1. Refrigerant Leak Detection System
- B. Section ~~15xxx~~*xxxxx* —Rooftop Air-Handling Equipment
  - 1. Thermostats
  - 2. Duct Static Pressure Sensors

[In Section **7.3 Products Not Furnished or Installed under but Integrated with the Work of This Section**, revise the Project Considerations section and Guide Spec language so that they apply to either CSI format.]

Project Considerations: The following specification paragraph should be edited to include only the other specification sections that apply to the integration involved. Also, the specifier ~~needs to~~*must* complete the ~~listed~~ *CSI* section numbers (shown below as "~~15xxx~~*xxxxx*") and edit the titles to match the actual sections used within the remainder of the specification. Finally, a detailed discussion of the integration required should be included in Part 3, "Sequences of Operation."

1.2 PRODUCTS NOT FURNISHED OR INSTALLED UNDER BUT INTEGRATED WITH THE WORK OF THIS SECTION
- A. Section ~~15xxx~~*xxxxx* —Heat Generation Equipment
  - 1. Boiler Controls
- B. Section ~~15xxx~~*xxxxx* —Refrigeration Equipment
  - 1. Chiller Controls
- C. Section ~~15xxx~~*xxxxx* —Rooftop Air-Handling Equipment
  - 1. Discharge Air Temperature Control
  - 2. Economizer Control
  - 3. Volume Control
- D. Section ~~15xxx~~*xxxxx* —Unit Ventilators and Fan Coil Units
  - 1. Set Point Reset
  - 2. Day and Night Indexing
- E. Section ~~15xxx~~*xxxxx* —VAV Terminal Units
  - 1. Cross-Flow Velocity Sensor
- F. Section ~~15xxx~~*xxxxx* —Variable Frequency Drives

[In Section **7.4 Related Sections**, revise the Project Considerations section and Guide Spec language so that they apply to either CSI format, and are consistent with the rest of the Guideline.]

Project Considerations: The specifier must ~~This section needs to be edited~~*edit this section* to list the actual *CSI* sections and their titles *used within the remainder of* ~~in~~ the project specification.

1.3 RELATED SECTIONS

A. The General Conditions of the Contract, Supplementary Conditions, and General Requirements are part of this specification and shall be used in conjunction with this section as part of the contract documents.

B. The following sections constitute related work:

1. Section ~~01xxx~~*xxxxx*—Submittal Requirements
2. Section ~~01xxx~~*xxxxx*—Commissioning
3. Section ~~13xxx~~*xxxxx*—Security Access and Surveillance
4. Section ~~13xxx~~*xxxxx*—Detection and Alarm
5. Section ~~15xxx~~*xxxxx*—Basic Mechanical Materials and Methods
6. Section ~~15xxx~~*xxxxx*—Heat Generation Equipment
7. Section ~~15xxx~~*xxxxx*—Refrigeration Equipment
8. Section ~~15xxx~~*xxxxx*—Heating, Ventilating, and Air Conditioning Equipment
9. Section ~~15xxx~~*xxxxx*—Air Distribution
10. Section ~~15xxx~~*xxxxx*—Testing, Adjusting, and Balancing
11. Section ~~16xxx~~*xxxxx*—Basic Electrical Materials and Methods
12. Section ~~16xxx~~*xxxxx*—Wiring Methods
13. Section ~~16xxx~~*xxxxx*—Electrical Power
14. Section ~~16xxx~~*xxxxx*—Low-Voltage Distribution

Attachment 2. Addendum 13i – Benefits of a Building Automation System (BAS) rewrite

Rationale (not part of the addendum, provided for information purposes only):

This addendum revises and updates Section 4.1 to include benefits commonplace today that were merely emerging when the Guideline was written. This addendum also brings the language into alignment with the revised (September 2011) title, purpose, and scope of the Guideline, as well as the content of the Guideline, which addresses Building Automation Systems more comprehensively than just HVAC and DDC.

Scope:

This addendum completely replaces section 4.1 Benefits of DDC.

4.1 Benefits of a Building Automation System (BAS)

A BAS provides the technology platform by which the owner's project requirements for energy efficiency, sustainability, and occupancy conditions can be monitored, controlled and tracked over the life of the building. A BAS provides the following benefits:

a. *A BAS is comprised of microprocessor controls that provide a flexible platform onto which one or all of the following can be applied: control algorithms, scheduling events, event notification, trend data collection and network communications. Combinations of these applications are not possible with pneumatic or electric control systems.*

b. *A BAS can incorporate the algorithms for energy conservation and system optimization specified in ASHRAE Standards 90.1 and 189.1. Controls strategies such as night setback, optimum start/stop and demand limiting, and set point reset for variable air volume systems require a BAS as these strategies cannot realistically be accomplished using pneumatic nor electric controls.*

c. *With the advent of networked lighting systems, the BAS can also read the state of the occupancy or vacancy sensors on the lighting system and can have the terminal equipment controllers reduce the airflow when the space is unoccupied for a specified period (e.g., 30 minute timeout per California Title 24 rules).*

d. *A BAS provides the ability to match control performance to control application requirements. Sensors, control devices and DDC controllers must be selected to meet control performance goals in order to meet end-to-end accuracy requirements for control application performance monitoring requirements. The issue of accuracy to meet control performance goals is discussed in detail in the Performance Monitoring Annex.*

e. *A BAS provides advanced scheduling features. A BAS allows building equipment and systems to be scheduled to operate under different time-of-day schedules for seven different day-types (i.e., Sunday thru Saturday) as well as scheduling non-business day (i.e., Christmas, Labor Day, etc.) for years in advance. The BAS can also permit occupied and unoccupied set points to meet energy savings targets.*

f. *A BAS provides event notification for alarms, system and operator events. BAS activities such as event notification can provide a time/date stamp to allow the building operator to track and monitor events. System activities can be sorted by time/date, point name or panel to allow the building operator to observe the order that events occur. BAS software also comes with built in audit trail functions that will log the operator's identity as well as the time/date of changes the operator made, such as changes to a set point or manually stopping a fan.*

g. *A BAS provides the ability to collect trend data from any controller that resides on the building automation system network. Trend data may be collected by change-of-value (COV) or by synchronized time interval. The ability to collect trend data from the building automation system is a valuable tool for commissioning and performance monitoring of building systems.*

h. *One of the barriers to BAS use was that older systems required their own separate network infrastructure. BASs can now co-exist on the enterprise Local Area Network (LAN) along with desktop computers, servers and other devices. A separate network infrastructure and the maintenance of that infrastructure can be done by the Information Technology (IT) department, not necessarily by the Facilities department. IT can secure BAS assets and the information they contain and grant access rights in the same manner as other computing devices on the enterprise LAN.*

i. *A networked BAS can utilize both hardwired and wireless network protocols. The specifier must evaluate the suitability of wired verses wireless solutions. Some owners prohibit the use of wireless for security reasons. Wireless does have the advantage of not requiring more cabling infrastructure. A wireless solution is particularly advantageous in existing buildings or buildings with high ceilings like hotel ballrooms or arenas.*

j. *Integration of other building systems (such as Weather Station, Lighting, Security, Fire, Submeters, emergency generators, etc.) into the BAS provides the opportunity for global optimization of building systems for energy conservation, occupant comfort and safety. Integration of other building systems is accomplished by the use of different industry standard communication protocols. This Guideline Specification does not cover the specification of these other non-HVAC systems. This Guideline does provide guidance on the integration of these systems into a BAS.*

k. *A BAS reduces labor and energy costs through remote monitoring and troubleshooting. The response time for correcting building system problems can be minimized though the use remote monitoring and commissioning services. In many cases, on-site operations can be eliminated or reduced through the use of remote monitoring as a central monitoring service or an off-site technician with a cellular phone or tablet device that provides remote access to the BAS.*

l. *A BAS is often necessary to meet sustainability guidelines such as LEED™, Green Globes™, and Go Green™. The BAS allows the user to commission the systems to meet these sustainability guidelines. BAS will also monitor the various systems to ensure compliance to these standards so the energy savings are maintained over the long term.*

m. *A BAS offers a viable platform for implementing performance monitoring, which can provide facility managers and operators with the means to easily assess the current and historical performance of the building/facility as a whole and of its significant energy consuming systems and components. Performance monitoring can be implemented as part of a new construction project or as part of a BAS system installation or upgrade project in an existing building. With the advent of initiatives such as ASHRAE 189.1, LEED™, Net-Zero, and the SmartGrid, a BAS must now respond in a dynamic fashion to changes in price signals from the local utility (called demand response), weather events, or power outages.*

n. *Virtually all BAS manufacturers offer product that conforms to worldwide interoperability standards at no extra cost over a proprietary communications protocol. Unless an owner is making an extension to a proprietary protocol installation or has a specific requirement that necessitates the use of a proprietary protocol system, it makes no sense to design and specify a proprietary protocol BAS. While the current project may be only an HVAC project, there may be future lighting, security, or fire alarm system installations that the owner will install and will expect that the original HVAC system can interoperate with these other systems.*

o. *When is a BAS not required or when is the BAS not the primary means of control?*

a) In the past it was common not to install a BAS for small buildings with one or more rooftop units. This is often not the case today as rooftop units, heat pumps or other packaged equipment come with their own built-in automation controls that permit this equipment to be connected to the Internet to permit remote monitoring and control. With the cost of energy and servicing costs rising and the cost of onboard networkable controls becoming commonplace, it makes good sense to utilize these onboard controls.

b) There will be cases such as high hazard buildings where electronic controls that could generate a spark are not allowed. In this case pneumatic controls or intrinsically safe electric controls may be the only solution.

c) UL, cUL or other codes may necessitate the use of hardwired interlocks between the fire alarm and the corridor pressurization fans in the facility. The specifier should consider providing BAS controls to monitor these non-electronic control interlocks. Some BAS suppliers offer UL or cUL 864 (UUKL7) listed DDC devices that are listed for smoke control. Such devices maintain the UL chain of continuity between the fire alarm panel and BAS smoke control algorithms. The use of such listed BAS devices may reduce or eliminate hardwired interlocks and will allow for more sophisticated monitoring during operation. The suitability of such devices needs to be evaluated during the project design stage.

d) Hardwired interlocks may also be required by the equipment supplier. It is common practice to wire a flow switch through the chiller starter circuit rather than making a software interlock between these two devices with the BAS.

e) Unit heaters in shops or mechanical rooms often use simple line voltage controls, which may not require a BAS. Even in this case, the specifier should not rule out the option for controlling this equipment via the BAS so as to permit remote monitoring and control.

In summary, BASs provide tangible savings in both energy conservation and maintenance. More importantly, the technology gives the owner better control over the building and can save labor and energy costs through remote diagnosis and troubleshooting. Pneumatic or electronic controls cannot provide the sophisticated alarm and trending features that are available as standard items on most commercially available BASs.

In making a decision on controls, property owners and managers need to understand that use of BAS technology is not a solution to all building problems. A BAS should not be installed before a proper assessment of needs is made. A BAS cannot correct problems with mechanical systems that are under capacity, poorly designed or do not meet current codes. This is of concern primarily in retrofit projects. In this case, the specifier must make the owner aware of these issues or the BAS, once installed, may be unfairly blamed for these pre-existing problems.

OLD VERSION (2007)

4.1 Benefits of DDC

~~The use of a DDC system provides many benefits for property owners, operators, and managers and as a result has become the predominant system specified for new buildings and retrofits. Here are some of the major reasons why DDC systems are being specified:~~

~~a. DDC systems can reduce energy costs by enabling mechanical systems to operate at peak efficiency. Equipment can be scheduled to run only when required and therefore generate only the required capacity at any time. Additional savings are possible if the DDC system is used for more sophisticated purposes than time clocks or conventional controls. If the DDC system simply duplicates the function of these devices, there may not be a significant reduction in energy consumption.~~

~~b. DDC systems have extensive functionality that permit the technology to be used in diverse applications, such as commercial HVAC, surgical suites, and laboratory clean rooms. For example, they can be used to measure the~~

amount of outdoor air introduced to meet the ventilation requirements of *ANSI/ASHRAE Standard 62.1*. This level of control is not practical with pneumatic or electronic controls.

c. A DDC system that controls HVAC systems in commercial, institutional, and multi family residential buildings will provide tighter control over the building systems. This means that temperatures can be controlled more accurately, and system abnormalities can be identified and corrected before they become serious (e.g., equipment failure or dealing with occupant complaints).

d. In addition to commercial HVAC control, DDC can be used to control or monitor elevators and other building systems including fire alarm, security, and lighting. This enhances the ability of maintenance staff/building operators to monitor these systems.

e. DDC allows the user to perform intricate scheduling and collect alarms and trend data for troubleshooting problems. The alarm and trend features permit the operator to learn the heartbeat of the system. Observing how a mechanical system performs under different load conditions allows the programming to be fine tuned and permits the operator to anticipate problems. This allows the occupants' comfort concerns to be dealt with promptly before the problems become serious.

f. Many DDC systems can provide programming and graphics that allow the system to serve as the building documentation for the operator. This is valuable since paper copies of the system documentation are often misplaced.

g. A DDC system requires significantly less maintenance than pneumatic controls. Pneumatic controls need regular maintenance and must be calibrated regularly. The use of DDC results in lower preventive maintenance costs due to calibration and also lower repair costs for replacement of pneumatic or electromechanical devices that degrade over time. All systems require some maintenance. Sensors such as relative humidity and pressure sensors require regular calibration regardless of what type of system they serve.

h. DDC systems reduce labor costs through remote monitoring and troubleshooting. Paying a technician to drive to the building to deal with every problem can be minimized with DDC. In many cases, on site operations can be eliminated or reduced to a single shift. Problems with the building are called out to a central monitoring service or to a technician with a pager and often may be rectified from remote locations by modem.

i. DDC systems are programmable devices. As the needs of a building change, the system can be reprogrammed to meet the new requirements.

In summary, DDC provides tangible savings in both energy conservation and maintenance. More importantly, the technology gives the owner better control over the building and can save labor and energy costs through remote diagnosis and troubleshooting. It is likely that pneumatic or electronic controls could not provide the sophisticated alarm and trending features that are available as standard items on most commercially available DDC systems. As new features are integrated into the DDC system added (e.g., calculating the minimum floor temperature), new pneumatic devices are required. With DDC, however, simple programming changes may be all that are needed.

These benefits come with a price. The owner must weigh the benefits and costs of DDC before proceeding with the project any further. In the past, this was a significant premium. Today, the installation cost of DDC systems is often similar to that of pneumatic systems. The actual cost of any project depends on system complexity, building conditions, and the local market.

In making a decision on controls, property owners and managers need to understand that DDC is not a solution to all building problems nor should DDC systems be installed before a proper assessment of needs is made. For example, a small warehouse served by unit heaters may not need DDC unless remote control and alarm features are required.

DDC cannot correct problems with mechanical systems that are under capacity, poorly designed, or do not meet current codes. This is of concern primarily in retrofit projects. In this case, the engineer specifying the DDC system needs to make the owner aware of these issues or the DDC system, once installed, may be unfairly blamed for these pre-existing problems.

Attachment 3. Addendum 13g Comments

1. Table column labeled "Object Type"

Jeremy Roberts - The table contains a column of "Object Type" but that term is never defined in the standard. It includes such things as "AI" and "BI" that also go undefined. I suspect they relate to the protocol carrying that information (BACnet) but there is no reference as such. I would suggest removing that column rather than adding description for it, since it does not add much for the reader.

At first I thought "object type" was clear. However, the more I thought about it the more I wondered if the information would be objectified in all situations. It may be that it is simply a 4-20mA or 0-10V, etc. But even if made into packets of information (maybe packets could be the term to use), the AI and BI confused me: Analog Input and Binary Input, I presume. But I wasn't sure why a BI would be used for, say, "S4, Building Main Natural Gas Meter, BI, Positive displacement - pressure compensated; continuous output, ±1% of reading, > 10-1 turndown, 0.05 L/s (0.1scfm)".

Am I mistaken about what AI and BI mean? Since it didn't say, I just assumed it was related to something in BACnet but maybe I'm wrong. If we want to define them in this document (instead of killing the column) I'm OK with that but I don't really get them.

Mike Gibson - I agree with Jeremy's comments regarding the column labeled "Object Type." It doesn't really have context in the meaning of the specification of accuracy's etc... It is a reference to a particular type of implementation of the resolutions and accuracy. I believe object type definitions are best left to specification on implementation. For example a BACnet companion section or reference would benefit from would contain this information. I think we can remove that column and keep all the meaning and intent of the update.

Grant Wichencko - AIs and BIs are "objects" or are more correctly referred to as Object Types in BACnet. In the case of a gas meter, one is normally reading a pulse or a contact closure. This would be a BI. Now some meters give you a direct reading but that would be in software so this would be an AV (Analog Value Object Type) and the meter needs to be protocol aware.

We can solve the issue by using terms analog, binary or software. Specifiers need to understand that there are differences. For example I know of no utility gas meter with a software interface built in as gas meters are normally located outside and do not have power. Thus this is a binary. Water meters can be binary or software but there is a cost to go from a meter that provides a binary contact closure to say a Badger meter with a BACnet interface that is a networkable device.

If the term object or Object Type is too BACnet-ish, and using the term point is old fashioned then using these three terms may be a way to convey hardware vs software to a specifier and still maintain protocol neutrality.

Jeremy Roberts - A column name might make more sense to people less-familiar with BACnet if it were "value type," "sensor type," or something like those.

Irrespective of a column name change: If we use the initials of AI, BI, AV, etc. to denote these things, I'd be OK with it (if we define them also) but in that case, I'd love to have a single line above the table that says: AI = Analog Input, BI = ... (because I still don't know how an AI differs from an AV; sorry). I'd support something like that. It's probably clear to system integrators but I'm not sure about to all buyers of the sensors, specifiers, or spec enforcers. BUT, Grant, your proposal of using the names "analog" and such is ideal (if others agree), since it requires little interpretation of the meaning and no additional defining.

Attachment 4. Addendum 13g Comments

1. Two Table 1's; why are performance monitoring specs lower than not?

Len Damiano - Why are there 2 "Table #1" in the draft? Neither is underlined or crossed-out to show changes. They are different.

Chariti Young - There are 2 Table #1 because the first is what you would use in your spec if you are NOT doing Performance Monitoring. The second is what you would use in your spec if you ARE doing performance monitoring. The guidance text between the tables should indicate this. If not, that is an oops.

Len Damiano - There may have been an explanation in the full GDL, but it did not get carried into the draft addendum, which only showed the changes.

No rush to answer, but I don't understand why the performance monitoring specs are so much lower in quality than without. If you were doing both, wouldn't you want the higher quality inputs? The first shows AFMS@ 5% of **READING**, while the second is 5% of **FULL SCALE**. (I don't know of any vendor that uses FS accuracy for the total accuracy of the system.) You know these are very different values, which doesn't make sense for end-to-end accuracy comparisons or spec compliance. I don't understand why the differentiation in accuracy statement for same device. Can it be as simple as a typo?

[redacted]

Attachment 5. Action Item Register

Responsible Member (Assistant)	Description	Due Date	Completed
Chariti Young	Request that the cognizant organizations for the guide specifications referred to in the Guideline Currently BACnet International/SSPC135 (Roy.Kolasa@honeywell.com) and LonMark/CEA R7WG13 (Jeremy Roberts) provide their guide specifications in the CSI/CSC MasterFormat. Focus on substance and consistency between the guide specifications, which will require some collaborative effort.	6/2012	
Chariti Young	Send Benefits of DDC and CSI addenda to Jim Kelley and Dave Underwood for vote	6/2012	6/2012
Chariti Young	Work plan update	7/2012	
Chariti Young	Send revisions to addendum to Mark Weber	6/2012	6/2012
Chariti Young	Request forum for Dallas to validate approach to network infrastructure and integration rework proposal. Forum Title: Specifying BAS Networks and Integration: Help determine the future direction of ASHRAE's BAS Specification Guideline	6/2012	
Chariti Young (Grant Wichenko, Jeremy Roberts)	Review DDC > BAS changes and galley proofs	6/2012	
Jeremy Roberts	Provide protocol-neutral guidance throughout the body of the Guideline document and remove the protocol-specific specification language to the respective organizations that promote them. The Guideline would also include an appendix to refer consulting engineers to those organizations.		
Jeremy Roberts (Chris Larry, Grant Wichenko)	Draft chapter on Integration with other systems, include cost of integration (may have some starting words from Chris Larry)	10/2012	
Kim Barker (Grant Wichenko)	Guidance related to system backup/recovery plan	6/2012	
Kim Barker	UPS language for both panels and OWS. Include types of UPS (structure similar to Schneider's paper from Grant).		
Ron Bernstein (Mike Gibson, Grant Wichenko)	Network infrastructure and structure of devices needs an overhaul and update. Infrastructure, devices, management/configuration, tools, UI, enterprise connectivity, system security and reliability. Figure out what to do with gateways (Kris Kinney), addendum related to hardware/software requirements if sharing a facility data network (Mike Gibson)	10/2012	
	Addendum/proposal re: airflow measurement Guidance similar to water metering for supply/return and OA, also include info for performance monitoring		
	Smart sensors and actuators are missing		
Completed since last meeting			
Dave Kahn	Update sensor/meter categories in two versions of Table 1, including missing inputs from old Table 1 and send to Chariti so we can use them in the Addendum	7/2011	1/2012
Chariti Young	Get approved minutes on file with SPLS	1/2012	1/2012
Chariti Young	Circulate Performance Monitoring addendum with working copy of Guideline that includes the addendum as tracked changes for approval (to include Tables from Dave Kahn)	1/2012	2/2012
~~Kim Barker~~ Grant Wichenko	Revise "Benefits of DDC" section, include integration and cost thereof. Include sharing facility data network. Send to committee for review.		6/2012

Attachment 5

TC 1.4 − Executive Subcommittee Minutes

Meeting Date: June 26, 2012
Location: San Antonio TX

Attendees:

Steven Linn	TC 1.4 Chair
Kimberly Barker	TC 1.4 Vice Chair
David Kahn	Vice (Acting) Chair - Handbook Sub-Committee
Frank Shadpour	Chair – Programs Sub-Committee

Topics Discussed:

Voting Members and Quorum Challenges
Possible Creation of Education Sub-Committee
Chair requirements for Handbook, and possible Education Sub-Committee
Succession Guidance for Kim's new role as Chair, and Chad Moore as Vice-Chair

Respectfully Submitted – Steven Linn Chair

Attachment 6

TC1.4 – Handbook Subcommittee Minutes

San Antonio
Room – Hyatt Bonham E
Monday June 25, 2012 4:30-6:30pm

Attendees: Chariti Young
Steve Linn
Gary Cole
Dave Kahn
Chad Moore

1. The Fundamentals deadline is 7/5/2012.
2. The Applications Liaison is Chris Ahne. He has requested that TC 1.4 begin reviewing the applications chapter and complete an outline for suggested revisions. Additionally he requested that we complete the handbook review forms. The deadline for the Applications chapter is July 21, 2014.
3. Dave Kahn is filling in for Al Garza.
4. Robert Walker, the Handbook Liaison from TC 6.1 stopped by to suggest we work together on valves. They are extensively revising the valve chapter which will be published in three years. The 1.4 Handbook subcommittee welcomed the spirit of cooperation. Dave Kahn will stop in the 6.1 Handbook subcommittee meeting in Dallas.
5. The section captains had no revisions for their sections.
6. Only one comment was received from the June broadcast of the chapter to TC 1.4 membership. The change from the June version is shown in red:

Indoor Air Quality Sensors

Indoor air quality control can be divided into two categories: ventilation control and contamination protection. In spaces with dense populations and intermittent or highly variable occupancy, ventilation can be more efficiently applied by detecting changes in population or ventilation requirements (**demand-controlled ventilation**). This involves using time schedules, population counters, measuring the indoor/outdoor differential levels of carbon dioxide (CO_2) or other contaminants in a space. Differential CO2 changes in relation to changes in the space population. The amount of outdoor air introduced into the occupied space is then controlled. Demand control helps maintain proper ventilation rates at all levels of occupancy. Control set-point levels for carbon dioxide are determined by the specific relationships between differential CO_2, rate of CO_2 production by occupants, the variable airflow rate required by the changing population, and a fixed amount of ventilation required to dilute building-generated contaminants unrelated to CO_2 production. ASHRAE *Standard* 62.1 and its user's manual (ASHRAE 2010) provide further information on ventilation for acceptable indoor air quality and DCV for single-zone systems.

7. Chariti made a motion to recommend to TC 1.4 to vote to approve the 2013 Chapter 7 Fundamentals of Control for publication.
8. The TC needs to vote on approving the chapter for publication at this meeting. From the Handbook Revisers Guide:
   Year 3: The nearly-complete draft is reviewed by all members of the subcommittee, and then all members of the TC. After any changes are made, the subcommittee chair requests a recorded approval vote by the full TC. When approved, the lead author/reviser completes the chapter approval checklist and submits the revision and supporting material to the TC's assigned Handbook Committee liaison before the required deadline.
9. Thanks to everyone that contributed to the revisions, especially our section Captains

   a. Page 7.1 to 7.4 up to Classification by Energy Source - **Barry Bridges**.
   b. Page 7.4 starting at Energy Sources to Page 7.8 Sensors - **Gary Cole**.
   c. Page 7.8 starting at sensors to page 7.11 Auxiliary Controls **Steve Linn**.

d. Page 7.11 starting at Auxiliary Controls to page 7.14 Communication Controls - **Chad Moore**.
e. Page 7.14 starting at Communication Networks to page 7.18 Commissioning - **Charity Young**.
f. Page 7.18 Starting at Commissioning to the end - **Dave Kahn**.

Attachment 7

ASHRAE TC 1.4 Control Theory and Application, Sunday 22 January 2012 Meeting Agenda:

Introduction (10 Minutes) Sub-committee Control Components and Applications with "Green Buildings" applications.

Meeting: 1500-1645, 24 June 2012; Sub Committee Chair Barry Bridges – Steve Linn Moderating

SCOPE Includes: Components (Sensors, Actuators, Controllers, OWS), Networks, Control Applications Loops, Building management reporting

The **Components and Control Application "brainstorming session"** lets TC 1.4 members and guests talk openly about issues and hot topics without being subjected to budgets or due dates.

Attendance: A separate attendance list shared by the Program and Reference Application subcommittees is provided and will circulate for sign up.

Introductions Around the Room: Name; TC1.4 Committee Responsibility: Business Affiliation There were 21 individuals in attendance during the meeting.

DISCUSSION TOPICS

Certified Building Control Professional (Dave Kahn 5 Minutes)

- Any Updates, Discussion, or Contributions Required?
-

Multidisciplinary Task Group, MTG (Steve Linn 15 minutes)

BACKGROUND

- MTGs intended to coordinate activities, between Committees, meet just before and after the Society's Annual meetings
- A new MTG topic seeks to develop packages of tools, technology, and guidelines related to the design, operation, and retrofit of energy-efficient air-handling systems in new and existing non-residential buildings.
- Len Damiano agreed to represent 1.4 since he is already participating for 62.1. Distribute Len's report.
- The MTG would like to have 3 strategic recommendations from TC 1.4 that we feel would result in air handling systems with greater energy efficiency. Given the scope of the MTG, the ideas are more likely to be those that overlap the TC and an SSPC or another TC. TC14 Reference Controls a start point
- Other MTG's for us to contribute towards?

Green Building Controls Integration (15 minutes)

- Desirable to develop the process of taking the parameters from building modeling to figure out the best means of control that gets exported into actual building operation. This would be especially useful for novel and uniquely constructed sustainability and renewable systems. An example would be in a solar heat collector over an unoccupied weekend the collector overheats the DHW so it dumps heat by turning on rejection fans using rather than collecting energy. Another example would be a GSHP in a cold climate integrated with a solar heat collector that would charge the ground during the summer for winter loads.
- The need for integration will impact a building in ways we have not experienced yet. Presentation of real time performance indicates if a building is working well and if not provides a message to encourage a response. It needs to be easily understood by an operator with some graphic presentation and indicate a comparison with good building operation.
- High performance buildings need to have control system provide performance energy/productivity metric scores
- Limit operator overrides to require that a manual change be approved by the person who pays the bill.
- CO2 potential for the fuel as a measure of performance.

- GREEN BUTTON or a California program Green Glowing Globe dynamic feedback for modification of occupants or operations staff. Folks want to win if they can find out the score. Developing dashboards an easy energy score.

Open Forum:

- **Discussion Topics from Chicago Meeting**
  - How can a hospital better use BAS to leverage energy savings as part of Health Care in Energy Design guide. As it turns out lots of hospital energy is used in areas that are not critical and so can be managed more than can be expected
  - Sustainable systems have entirely different needs for optimization such as managing thermal mass of an in floor solar based heater at the end of the day to provide warm floors for morning heating or seasonal need to recharge the earth for a GSHP that predominately provides heating. This may relate to Seminar 40 TC 7.5 Active control of high performance building
  - Datacenter design includes increasing redundancy, but what is the reason for N+1 failover. Are there other criteria for measuring system performance (Unified Facility Criteria UFC potential inputs to evaluate) that would bring on the back up as more efficient or to identify the existing unit as below expected capacity and needs to be repaired even though not yet in fault mode. It is important that, whatever the reason, a clear message is sent to the operator that a transfer was made and the reason described. Occupants should have no idea the system is in back up mode, but operations folks should have the repair team on the way.
  - Update status of Sensors quality and reliability including:
    Temperature and CO2 sensors Air Flow Monitoring stations
    To measure full flow of outside air to avoid turbulence will sensor be below accurate measurement when AHU is at minimum demand. The flow may be too slow.
    What calibration is required for flow sensor acceptance?
    Is a one-time traverse per SPC 111 sufficient?
  - EN 15232 Recognition of the BAS as the brains
  - Control systems/strategies for special /sustainable /green systems like GSHP; COAF; DOAS VRF (variable refrigerant flow)
  - Should there be a standard language for representation of control (not the vagueness of natural language typical in a sequence of operations) Specs for example have an understanding of the meaning and use of terms like shall/ may/ should. Would it be better to have standard symbols and diagrams as the means of representation? Would an example be the development of control strategies in a simulation model for the building application with something like Modellica and link with Matlab then load the developed through simulation product into the control product. As an added bonus one can then then compare the modeled expectation to the measured what is actually happening and report performance through a dashboard.
  - Would it be useful to describe perhaps in a table the typical control sequence of operations details required to get an "A" energy rating and what would be good practice, but only expected to get a "B" rating. The discussion could then address how much is saved with control strategies that go beyond just meeting the minimum.
  - What would be the dynamics of first designing the control system and from that determine what HVAC equipment is needed to provide that control capability. This could also include network web services connections if predictive control systems required real time weather forecasts or ongoing reporting to users of building performance.
  - What basics like how to better use VAV drives, brains the size of a planet and we put in an analog signal… how to use pump curves to replace dP sensors and without a need to interface to a sensor the VFD is all the control needed
  - With the increase in the number of devices with full microprocessor capability, for example a network of VFD's and the ability to use directly measureable surrogates (like amps and speed to determine flow) is it possible to have control without controllers and further as these are packaged by a vendor is it possible to have controls without a controls company. An example would include a mode selection based on a BTU sensor and not a controller.

- Seminar 5 in Chicago had as a thesis that excessive "control" is a bad thing. How to involve maintenance staff to understand what is happening through dashboards or allowing input with setpoint offsets that return to normal each night may be the actually call for even more but smarter controls. For an owner at what point is it better to increase insulation rather than tweak with any more control fine tuning
- The digital nature of our control systems provide opportunities for excessive dumps of data in frequency and device types, what was once a limited set of values may now include many additional parameters. What research is needed to figure out how to better get back information from all this data. How else can the data be used for reporting or evaluation of performance.
- Is there a need in advanced or high quality critical reliability spaces like data centers to replace the typical HVAC equipment packaged commercial controller with a higher quality PLC to provide best practice performance.

TC1.4 − Components and Control Applications Subcommittee Minutes
Sunday 22 Jun 2012
Meeting Notes

Certified Building Control Professional
Dave Meredith (certification) and Nathan Hart (PDC) in attendance.

Update from Dave Meredith. Certification meeting yesterday, voted on controls and it passed. Need certification, PDC and technical committee work together to provide a body of knowledge. Faster than ASHRAE, slower than business. Get something put together by the Fall 2012. Put together by telcos, live-meetings, no travel planned for this development. Need names of people who will be on the committee. Need guidance to develop body of knowledge; don't know where to go for knowledge. Need to expand abstract, everyone needs to be one the same page. What knowledge does a profession need for core competency? Approval is conditional. First paragraph was ok, but 2nd paragraph should be removed because of sustainability. Target audience should be Design Engineer.

1. Specifications
2. Control Diagrams
3. Point list
4. Sequence of Operation.

Do we need to add things like network architecture?

Want to start spending money after fall teleconference. Pull together this fall, once content is defined. Who will be technical representatives? Focus towards: 4-year degree, 5-years experience of which 2-years in controls.

Dave Kahn volunteered. Tuesday we will create a committee for establishing this scope by Sept 2012. Think about concurrent development of online training for Professional Development. Nathan Hart – PDC has online learning modules. TC1.4 committee is responsible for 2 of them:

PDS-13 Design and Specification of DDC Systems
PDS-22 DDC Retrofits: From project planning thru performance verification

When did anyone take these courses? Nathan will get numbers. Get copies of all the control courses (electronic, self-learning). Create training tool to prepare for Certification Test.

Nathan needs to know, who should get info? Do we need to revamp for certification? Larry Fisher will review PDS-13 and PDS-22 to see if they are up to date.

Do we exclude refrigeration controls? Include VRF, not refrigeration controls.

Volunteers: Larry Fisher, Dave Kahn, Charti Young, Frank Shadpour, Steve Taylor

MTG – Energy Efficiency of Air Handlers

In Chicago, there was not much interest in TC1.4. Len Damiamo will be on committee. They are looking for 3 recommendations on how to improve energy efficiency in AHUs.
Chuck Coward Is on TC5.1 has interest in being on committee. Does this impact control algorithms. New pumps, Smart Pump. That has firmware uses pump curves to calculate speed.(Dave Kahn). Seeing more ECMs on fans, tMore effiecnet motors, there comes Smart Fans.

Reid Harts ASHRAE papers are good reference on optimizing energy efficiency on AHUs. What's in AHU, heat-wheels. Do you need to tweak sequence of operation? What type of AHU (size, rooftop or built-up unit)?

Traditionally running at 60 Hz, some fans give better performance at 75Hz. There is no research on this subject. No ASHRAE sponsored research, manufacturers have documentation on this topic. Education topic for consulting engineers.

From: Len Damiano [mailto:Damiano@ebtron.com]
Sent: Sunday, June 24, 2012 8:44 AM
To: Steven.Linn@jci.com
Subject: RE: TC 1.4 Control Components Applications Meeting Agenda for San Antonio

Everyone:

I appreciate Steve including the MTG request in the subcommittee agenda. This should help provide a better discussion and consensus opinion from the TC at the full meeting. Hopefully you get this in time for your meeting.

Although I will be unable to attend this subcommittee meeting, I have included my comments on sensors to support your discussion.

- **Update status of Sensors quality and reliability including:**
  Temperature and CO2 sensors Air Flow Monitoring stations
  To measure full flow of outside air to avoid turbulence will sensor be below accurate measurement when AHU is at minimum demand. The flow may be too slow. 100% OA for setup is required for most measurement technologies, not to avoid turbulence, but to provide sufficient pressure or velocity range for the sensor technology to work. Velocity pressure and vortex shedding devices (assuming sufficient quality in the associated electronics which contribute significantly to potential error), are limited to about the same lower velocity. Fundamentals Handbook for Pv says 600-700 fpm, as do many researchers. TAB has stated that 1000 fpm is required for a reliable Pitot traverse. Vortex design intentionally forces sensor to contribute zero below 450-500 fpm because the velocity is too low to generate a reliable frequency rate. At the other extreme, some lab testing has shown Pitot static tubes or specialized Pitot stations to be accurate below 200 fpm. This is not a practical minimum for hand-held devices and field conditions and commercial (non-scientific) pressure sensors.

  When compared to an airside economizer operating with a louver face velocity maximum of 500 fpm to avoid water carry over, any turndown greater than 3:1 would put the minimum range below even that possible for measurement in a lab. Realistically, most technologies cannot measure OA because of the space limitations creating conditions that prevent the device from sensing a sufficiently developed velocity profile to determine an average in the cross section that has a low uncertainty. Low cost electronics can now provide users with a displayed "number" that some rely upon, but the value of it is pretty meaningless because the uncertainty or error potential is so high.

  Another issue is the physical ability of mechanical dampers and actuators to control flows as low as 50 fpm with minimum blade movements that exceed the flow needed. Built-in hysteresis also causes actuators to have greater control error potential than desired. Although needed to help prevent early failures, this combined with linkage hysteresis effectively limits the repeatability of predetermined flow rates pegged to blade position. Even though some products can measure accurately from zero flow, I recommend that minimum control velocity for OA design use 150-200 fpm as the low-end limit, simply to allow dampers sufficient authority to exert reasonable control over flow rates within the ability of the damper, linkage and actuator system.

  Once you have selected a measurement technology appropriate for the velocity you need to measure, designed to include the appropriate duct length and damper/louver sizes within the velocity range needed, then you can look at the control sequence necessary to provide the results you want.

  Fan energy savings on the order of -20-30% can be achieved by decoupling OA/RA dampers, over those mechanically linked in opposition with a single actuator, in many packaged AHUs. We use a sequence that provides RA fan speed control to maintain needed flow differentials and OA rates until set point cannot be satisfied, only then is RA damper engaged. Dampers are maintained fully open throughout most of the operating range of flows and the great majority of the occupied times. Avoiding the pressure losses across the dampers by using an airfoil damper and keeping them open at higher flow range, provides most of the savings.

The alternative for Pv and vortex technologies is to reduce the size (increasing the minimum velocity) and increase the distance available for measurement between the building envelope and the OA damper, as measurement can only be accomplished upstream of a modulating damper and the length is required for a profile to develop with minimal turbulence.

What calibration is required for flow sensor acceptance? Our goal should be to require the highest level of certainty in the comparative reference and not mistake lab-based accuracy results for that obtainable in field conditions. In practical terms that means enforce the regular maintenance and calibration of hand-held "references" by the highest authority available, when used to set up air systems.

Is a one-time traverse per SPC 111 sufficient? Yes and No. If a traverse is possible in the space available and if the instrument system is of sufficient quality/accuracy and if the method is performed correctly, then YES for any smaller system that runs at one speed and is used in low-rise buildings. Problem is that most of these qualifying conditions do not exist in reality on many projects and the TAB technician is allowed to use highly inaccurate methods of indirect estimating to establish the "actual" flow rate. These methods are generally no better than a random selection within a wide targeted range. It is these methods that bring the real problems.

Environmental changes impact the rage of intake flows (regardless of air system design) and NO consideration is given to the effect from wind, stack and other sources of pressure during operation. We engineer systems to ensure acceptable performance during operation, not just to meet prescriptive minimum requirements.

Another deficiency is upon checking the flow rates, it is automatically assumed by TAB that the system needs to be adjusted to match the current measurements, without consideration of the accuracy of the current and prior reference used for comparison. The other problem occurs in smaller systems where fan designs are capable only of lower static pressures and external pressure sources overcome the fan's ability to perform as needed. Only 0.25" to 0.50" WG impact from wind or filter loading can turn an intake into an exhaust. Without dynamic control the air system cannot adapt to ongoing environmental or internal system changes, and therefore cannot satisfy minimum standards during operation.

If anyone is interested, I can provide a number of references exploring these issues further.

Len

Green Building Controls Integration

Heat collector on DHW, Gaylen presented in Seminar 30, Monday 11-12:30pm on thte work he has done on integrating Solar into the building. Web services for weather forcasting use of XML data, updates to the last minute.

Amazon has service to predict what other books you will buy? Paid to have algorithm developed. Why can't we do this? It eludes our industry. Scientific American article.
We can get algorithm to provide information, but facility manager does not trust what it is happening.

Is PID going away? Imbedded sensors on the walls, clothes, sensors in cell phones. Cell phones enable the zone. Example: everyone has comfort index on phone, feedback to controls systems. What defines adaptive comfort conditions? If your schedule was on Outlook, the schedule event would know how many people where invited. One temperature sensor in one room may not be a good thing, but where do you put temperature sensors. Use of radiant sensors for measuring temperatures. How do we do multiple sensors, multiple data? 2Gig product for a large home. More sensors the better coverage of mesh network. Uses V-wave that provides loads of wireless sensors. Everything comes up on i-phone including the video. Bandwidth does not seem to be a issue. This stuff is more sophisticated than commercial buildings.

Need to start looking outside our industry to see what technology should be brought into our industry. Why hang-on to our traditional technology? Customers will be starting to ask for technology that they can have in their home.

To be continued in Reference Applications.

Attachment 8

TC 1.4 − Reference Sequences Subcommittee Minutes

TC 1.4 Control Theory and Applications

Sunday 22 Jun 2012

Meeting was not held.

Attachment 9

TC 1.4 Control Theory and Applications
Research Subcommittee (RSC) Activities
San Antonio – June 25, 2012

RSC Meeting Summary:

1. Announcements

a) There is still a major shortage of RTARs and WSs at the moment. Only 5 RTARs and 4 WSs reviewed at this meeting. RAC encouraging TCs to produce more.
b) Innovation Research Grant is an ASHRAE funded program sponsoring more outside-of-box research. It is a separate program from the normal research track. Last year 20+, 5 projects were asked for more detail; none were funded.
c) URPs have been received that are continuations of existing research projects. These will now have to demonstrate that there is a time and cost savings to ASHRAE, e.g. lab is prepped and workforce is available now and costs will be higher if done later.
d) Denver (June 2013) program to be 25% research related. Research seminars do not have to fit into any of the normal tracks. Trying to create a Research Mini-Conference to promote research and collaboration among researchers.
e) Reminder
- RTARs should be reviewed by liaison prior to submission to RAC. TC 1.4 Research Liaison is Art Giesler with PermAlert, Hurst. RL1@ashrae.net
- There are new RTAR forms that can be downloaded from ASHRAE website. New RTARs must use this form.
- There is a new WS cover sheet. New WSs must use this form.

2. Active Project Status:

Name	Project	PMS	Status
RP 1353	Stability and Accuracy of VAV Box Controls at Low Flows	Stein-chair Coogan, Pouchak, Daswani	The PMS voted 5-0-0 to accept the final report. TC voted by email to accept final report. Project complete.
RP 1455	Advanced Control Sequences for HVAC Systems - Phase I Air Dist and Terminal Systems	Pouchak-chair, Underwood, Bridges, Ljungquist	PI (Hydeman) did not attend San Antonio meeting so PMS did not meet. Due date is Feb 2013.
URP 1597	Stochastic Control Optimization of Mixed-Mode Buildings	Barker-chair; Taylor, Wetter, Young	The URP 1597 PMS met this morning. They will be testing their control algorithms in the NREL RSF building this summer, but the NASA Ames building hasn't completed construction yet, so the second building will not be available to perform testing in until next summer. The contract is currently due to end in March 2013. PMS recommends a no-cost extension to January 2014 to allow testing in the second building to be completed and then allow time to generate and approve their final report. No cost extension approved by RSC unanimously – will be sent to full TC for approval Tuesday.
URP 1633	Data and Interfaces for Advanced Building Maintenance and Operation	Reinhard Seidl Jim Kelsey, Martha Brook, Kristin Heinemeier, Chariti Young, Steve Taylor	PMS met Monday. Currently halfway through Task 3 of 5 and on schedule. 1. Define stakeholders and EMCS. 50 buildings included 2. Creating a questionnaire of interface needs 3. Interviews based on questionnaire. 4. Create mock interfaces. Due January 5. Second round of interviews and ranking of interfaces.

3. Pending Research Project Status:

Status	Project	Champion	Remarks

Status	Project	Champion	Remarks
WS 1587 TC 7.9 w/ 1.4 Co-Sponsor	Closed Loop Control – Performance Measurement and Alternate Algorithms	Bill Pienta TC 7.9 Bldg Cx	Pending. WS returned with comments. RAC -John House noted JCI had a patent on loop tuning index and did not think ASHRAE should be doing research on work already commercially developed. Taylor to review JCI patent and resubmit. PES members: Steve Taylor, David Underwood, Bill Pienta, and David Shipley. This will be dropped if new WS not developed by August 15.
RTAR 1639	Comparison of Methods to Control and Maintain Building Pressurization	Len Damiano Barry Bridges Steve Taylor	Conditionally Approved at Montreal Meeting. Len D has turned WS development to Steve T. First must address RAC comments and resubmit to our liaison. No further RAC review is required. Upon liaison approval, WS may be prepared.
RTAR TC 4.7 w/1.4 Co-Sponsor	Development of Modelica Models for Evaluation of Supervisory Control Strategies in ASHRAE Handbook	Michael Wetter Phil Haves	Not yet resubmitted.
Dropped	CO2 Sensor Automatic Background Calibration	Steve Taylor	RTAR still needed. RP needed to see how well Automatic Background Calibration works in real applications. Dropped since work plan would be tough with various ABC variations among manufacturers – too hard to tell if algorithm or sensor or application was cause of any issues.
Possible	Optimized Supply Air Temperature Reset Strategies	Jim Coogan	Pending. Jim, Steve Taylor, and Joe Zhou to develop RTAR. To be based on analytical model, not real building. Joe has a RP looking at optimization using numerical analysis of data generated by varying supply air temperatures and DP setpoints. Results due in June. Results could inform nature of our RP.
Dropped	VFD's: How Slow Can You Go?	Chuck Coward	Chuck prepared draft RTAR. TC 1.11 Motors and Controls RSC chair says his TC is more appropriate. Taylor to send concerns to TC 1.11, including how low can you go with respect to motor bearings and temperature, impact on motor type (e.g. TEFC, ODP), and efficiency of both VFD and motor at low loads. TC 1.4 to cosponsor so we can get a seat on PMS. Dropped because energy impact is too small – use is about the same at 25% speed as 5% speed.
Possible	Demand Controlled Ventilation for Parking Garages	Molly McGuire Jeff Stein	Pending. DCV now allowed for exhaust in Standard 62. California Title 24 has just added CO requirement for garages >10000 cfm. Molly on maternity leave. Jeff Stein – author of the CA code − may agree to help.
Possible	Effectiveness of Night Setback and Optimum Start	Peter Armstrong Barry Bridges Dave Underwood	Analyze energy impact of different levels of setback vs. shut-off. RTAR needed.
Possible	Impact of Airflow Sensor Fouling	Chad Moore Chris Benson	Research to see how particles in air streams affect the long term accuracy of various DP and thermal type sensors. RTAR needed.
Possible cosponsor with TC1.5	HVAC Control using Work and Data Exchange Processes	Michael Pouchak Joe Zhou	Improved control via data exchange from work related systems to EMCS. People vote – system aggregates votes, sends to EMCS.
Possible	Optimized Sequences for Chilled and Hot Water Plants	Steve Taylor	Sequel to RP1455.
Possible	Field Validation of RP1455 Sequences	Mark Hydeman Steve Taylor	Field testing to show that RP1455 sequences "work". Possibly develop Cx functional performance tests to validate proper implementation.
Possible	Open Generic Language for Control Systems – Phase I Proof of Concept	Michael Wetter Phil Haves Joe Zhou	Open language that can be used not only for DDC applications but also for modeling
Possible	Selecting Control Valves	Steve Taylor	Email sent to TC 6.1 members to see if they would co-sponsor this WS. They killed it previously saying it was not necessary.
Dropped	Smart Pumps – Do they save energy?		Sensorless pumps are becoming available. Do they save energy or just costs? Dropped: logic proprietary to Armstrong.
Possible	Seasonal reset of space setpoints	Kim Barker Gwelen Paliaga	Determine if comfort and efficiency are improved by using seasonal setpoint reset

4. Research Promotion Deadlines:

a) August 15, 2012 for RTARs and WS to MORTS for consideration at Tech Weekend

b) Other regular deadlines: May 15 (for June meeting), December 15 (for January meeting)

5. In Attendance: See main TC attendance table.

Attachment 10

TC 1.4 – PROGRAM SUBCOMMITTEE
ASHRAE SUMMER MEETING MINUTES
JUNE 23–27, 2012

The subject meeting was held on Sunday, June 22, 2012 starting at 5:00 PM following the Components and Control Applications Subcommittee meeting. The attendees remained. The sign-in sheet is attached.

Programs Presented in San Antonio:

1. Seminar 9: Practical Applications for DDC Dashboards and Green Kiosks,
   Sunday 11 - 12:30 PM - Room 001A , Chair: Frank Shadpour

2. Seminar 20: BAS Integration in the Occupied Space,
   Monday 8:00 - 9:30 - Room 001A, Chair: Jim Coogan

3. Seminar 30: Case Studies in Controls,
   Monday 11 - 12:00 - Room 001A, Chair: David Kahn

4. Seminar 36: Control Specification Fundamentals: How to Get What You Really Want,
   Monday 3:00 - 4:30 - Room 001A, Chair: Larry Fisher

Anticipated Programs for San Antonio That Did Not Take Place:

1. *Technical Paper Session: Chaired by Michael Brambley Cosponsored by TC 7.5*
   a. Stability and Accuracy of VAV for Low Flow Conditions – How Low can you Go? By Jeff Stein
   b. *Current Control topic by Mark Hydeman or Steve Taylor*
   c. *Report on RP1353. Field and Lab report.*

Programs Proposed for Dallas Winter Meeting Jan 26-30, 2013

1. *Forum: Chaired by Chariti Young,*
   Specifying BAS Networks and Integration:
   Help determine the future direction of ASHRAE's BAS Specification Guideline 13

2. *Forum: Chaired by David Kahn,*
   What does the Certified Building Control Design Professional Control Professional Need to Know?

3. *Seminar: Chaired by Gaylen Atkinson,*
   Integration for successful Operation:
   How the new players have changed the game?

4. *Conference Paper: Chaired by Steve Linn,*
   RP1353: Stability and Accuracy of VAV for Low Flow Conditions

Program "Pipeline" for Future Meetings:

1. *Technical (Conference) Paper:* "Control Sequences within an Energy Simulation Program" (Are controls being applied properly in simulation programs)
   Chaired by: Phil Haves, Probable Dallas
2. *Seminar / Symposium:* "Control Strategies for Museums and Libraries"
   Chaired by: Dave Kahn, Probable New York
3. *Seminar*: "Valves and Actuators: Are they Smart Mechanical Devices or Control Components?"
   Chaired by: Steve Linn
4. *Technical Papers. Report on RP1597 "Stochastic Optimal Control of Mixed Mode Buildings" Author: Ryan Tanner of the U of Colorado, Probable New York*
5. *Seminar:* "Building Automation System for Data Centers"
   Chaired by: David Kahn
6. *Seminar / Symposium:* "Optimization and Controls of VAV Systems to Meet ASHRAE 62.1"
   Chaired by: Steve Taylor
7. *Seminar*: "Wireless DDC Technology – Real Applications"
   Chaired by: Frank Shadpour
8. *Seminar:* "Be Alarmed at what your BAS is not Telling You: Is no news really good news?"
   Chaired by: Kimberly Barker
9. *Technical Paper*: "Proactive Energy Performance Optimization"
   Chaired by: Jim Tello

   Chaired by Barry Bridges, Track 8: Professional Skills

10. Seminar. "Control Specification Fundamentals, How to Get What You Really Want"
    Chaired by Larry Fisher, Track 4: HVAC&R Fundamentals and Applications

11. (Web-Services. XML, SOAP): How Do I Get Non-Traditional BAS Information and Use It for My Building Automation. (How do I use traditional information non-traditionally…N+one Control Systems….)

12. Control of Geothermal HVAC Systems,

13. *Controls without Controllers and Control Companies: Integrating Factory-Mounted Controls*

Dallas Conference Tracks:

Track 1 HVAC&R Systems & Equipment — Track Chair: Yunho Hwang / Kaith Newcomer
yhhwang@umd.edu / Keith.Newcomer@piedmontng.com

Track 2 HVAC&R Fundamentals and Applications — Track Chair: Mike McDermott
mxm@grummanbutkus.com

Track 3 Standards, Guidelines, and Codes — Track Chair: Jon Cohen
jcohen@hohwatertechnology.com

Track 4 Energy Conservation — Track Chair: Charlie Henck
chenck@wrallp.com

Track 5 Refrigeration — Track Chair: Rob Risley

rrisley@fpl.com

Track 6 Large Building Design Track Chair: Dennis Wessel

dwessel@karpinskieng.com

Track 7 Facility Management; Operations, Technology & Energy ImprovementsChair: Bill Dean

Bill.Dean@nrc-cnrc.gc.ca

Track 8 Special Interest Track Chair: Sarah Maston

sarah@advancedbuildingperformance.com

2013 – Dallas Winter Meeting:

- Web site opens for Seminar and Forum proposals on June 1, 2012.
- Web site closes for Seminar and Forum proposals on August 13, 2012.
- The deadline for submitting papers has passed.

1. *Conference Paper vs. Technical Paper:* Conference paper is limited to eight (8) pages, the timeline is shorter and the review process less rigorous than the technical papers currently presented in the Technical Paper Sessions.

2. *Seminar and Forum Submissions:* For Seminar submissions, they should include six (6) Learning Objectives and ten (10) Questions and Answers for the session.

3. *Seminar Program Submission:* 60 minutes (1-2 speakers) or 90 minutes (3-4 speakers).

4. During the Montreal Conference, the Board of Directors approved the following, effective for the 2013 meeting in Dallas:
   - Members of the ASHRAE Board will transition from free registration to paying a fee discounted by 75 percent
   - Speakers will transition from free registration to paying a fee discounted by 75 percent.
   - Students and student branch advisors will transition from free registration to paying a very nominal fee of $25.
   - The Conferences and Expositions Committee (CEC) will transition from free registration to paying a fee discounted by 75 percent.

Upcoming Meetings:

Dallas	*Jan 26-30, 2913*
Denver	Jun 22-26, 2013
New York	Jan 18-22, 2014
Seattle	Jun 28-Jul 2, 2014
Chicago	Jan 24-28, 2015
Atlanta	Jun 27-Jul 1

Submitted by: Frank Shadpour, TC1.4 Program Subcommittee Chair.