

**ASHRAE TC1.5 Computer Applications**  
**Meeting Minutes**  
**Long Beach Summer Meeting**  
**Jun 25, 2007**

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

## ASHRAE TC1.5 ACTIVITIES SHEET

TC NO. TC 1.5

CHAIR: Rob Hitchcock

DATE: June 25, 2007

TC TITLE: Computer Applications

VICE CHAIR/SECRETARY: Krishnan Gowri

TC Web Site: <http://tc15.ashraetcs.org/index.html>

### TC MEETING SCHEDULE

Location, past 12 mo.	Date	Location, next 12 mo.	Date
Quebec City	Jun 2006	New York	Jan 2008
Long Beach	Jun 2007	Salt Lake City	Jun 2008

### TC SUBCOMMITTEES

Subcommittee	Chair
Emerging Computer Applications	Nick Rajkovich
Handbook	Mike Galler
Program	Pornsak Songkakul
Research	Mike Pouchak
Standards	Alison Kwok

### TC 1.5 MEETING ATTENDANCE

	Number Present	Total Number on Committee
Voting Members	7	9
International Members	1	1
Corresponding Members	10	27
Visitors and Guests	5	-

Name	Affiliation	TC	Res	Prog	Emer Apps	Hand book
Vikrant Aute	CEEE, University of Maryland	X	X		X	
Bruce Billedeaux		X				
David Branson	Compliance Services Group, Inc.	X		X		
Tim Dwyer	London South Bank University	X	X	X	X	
Mike Galler	NIST	X	X	X	X	X
Krishnan Gowri	PNNL	X	X	X	X	X
Walter Grondzik	Florida A&M University	X	X	X	X	
Rob Hitchcock	Lawrence Berkeley National Laboratory	X	X	X	X	X
Mark Hydeman	Taylor Engineering	X		X		
John Kennedy	Green Building Services	X				
Alison Kwok	University of Oregon	X				
Ron Nelson	Iowa State University	X	X	X		

Name	Affiliation	TC	Res	Prog	Emer Apps	Hand book
Bob Old	Siemens Building Technologies	X	X	X	X	
Vernon Peppers	Peppers Engineering	X				
Michael Pouchak	Honeywell, Inc.	X	X	X	X	
Steve Rosen	Autodesk, Inc.	X				
Stephen Roth	Carmel Software	X				
Nick Rajkovich	Cornell					
Pornsak Songkakul	Siemens Building Technologies	X	X	X	X	X
Bill Koran	PECI, Portland				X	
Xiaohui Zhou	IOWA Energy Center		X	X		
Martha Hewitt	MNCEE	X			X	
LinJie Huang	Delphi		X	X	X	

**RESEARCH PROJECTS**

<b>Project Title</b>	<b>Contractor</b>	<b>Monitoring Committee Chair</b>	<b>Report Made at Meeting?</b>
RP-1354 Generic Common Interoperable Data for the HVAC & R industry	GARD Analytics Principal Investigator: Jason Glazer	Rob Hitchcock	Yes

**LONG RANGE RESEARCH PLAN**

<b>Priority</b>	<b>Project</b>	<b>Champion</b>	<b>Status: Long Beach, CA (June 2007)</b>
1	Development of reference building information model (BIM) for thermal model compliance testing.	John Kennedy, Dave Branson, Nick Rajkovich	RTAR approved. Work statement to be prepared.

**HANDBOOK RESPONSIBILITIES**

<b>Year &amp; Volume</b>	<b>Chapter Title</b>	<b>No.</b>	<b>Deadline</b>	<b>Approval</b>	<b>Handbook Committee Liaison</b>
2007 HVAC Applications	Computer Applications	39	07/31/06	Approved	David Meredith dxm15@psu.edu

**TECHNICAL PAPERS FROM SPONSORED RESEARCH (PAST 3 YRS, PRESENT, PLANNED)**

<b>Title</b>	<b>When Presented</b>
N.A.	

**TC SPONSORED SYMPOSIA (PAST 3 YRS, PRESENT, PLANNED)**

<b>Title</b>	<b>When Presented</b>
Symposium: Interoperable Computer Applications – Branson	Chicago (1/03)

**TC SPONSORED SEMINARS (PAST 3 YRS, PRESENT, PLANNED)**

<b>Title</b>	<b>When Presented</b>
Web-Based Simulation – Give me a minute and it's done	Quebec '06
ASHRAE HQ: Extreme Makeover	Chicago '06
Designing Building Automation Systems with IT Security in Mind	Chicago '06
Miss the plane, make the meeting and cut the cost – Dwyer	Denver (6/05)
HVAC Unplugged - the Wireless Approach - Branson	Orlando (2/05)
A Vision of eASHRAE: or How to Give a Seminar in your Pajamas - Hydeman	Nashville (6/04)
XML Guidelines for the HVAC Industry - Gowri	Nashville (6/04)
Computer Tools for Sustainable Design – Dwyer	Anaheim (1/04)
Emerging Web Applications for HVAC and Energy Industries - Hitchcock	Anaheim (1/04)

**TC SPONSORED FORUMS (PAST 3 YRS, PRESENT, PLANNED)**

<b>Title</b>	<b>When Presented</b>
How can proposed Guideline 20 Help the ASHRAE Membership? - Barnaby	Nashville (6/04)
How Secure is Your Wireless Office Place - Culp	Kansas City (6/03)

## TC 1.5 Computer Applications

### TC Web Site: <http://tc15.ashraetcs.org/index.html>

### Main Committee Meeting Long Beach CA, June 25, 2007

#### Committee Meeting Schedule

- TC 1.5 Computer Applications Monday 6:30-9:00p LBCC/302\*
- TC 1.5 Internet/Emerging Applications Sunday 5:00-6:30p LBCC/103A
- TC 1.5 Program/Research Sunday 6:30-8:30p LBCC/103A
- TC 1.5 RP 1354-PMS Monday 8:00-10:00a R/R Ballroom III (2<sup>nd</sup> level)
- TC 1.5 Handbook Monday 6:00-6:30p LBCC/308A\*

#### Main Committee Meeting Minutes

• *Call to order*

Meeting called to order at 6:30 p.m.

• *Introductions/Sign up sheet/Welcome*

Web-based sign-up sheet was made accessible through wireless connection to local server. In order to record the attendance of those without the laptop computer, the sign-up sheet was circulated.

• *Agenda Review*

Martha Hewitt requested to be moved up on the Agenda  
Section Head Chuck Wilson wanted to move up on the Agenda

• *Roll Call: **Quorum: 7** voting members present.*

MEMBER	PRESENT?
Vikrant Aute	X
Bruce Billeadeaux	X
Wayne Dunn	
Tim Dwyer (International)	X
Rob Hitchcock	X
Alison Kwok	
Vernon Peppers	X
Mike Pouchak	X
Nick Rajkovich	
Steven Rosen	X

• *Dallas Meeting Minutes Approval*

Motion to approve Quebec City Meeting Minutes: Moved by **Pouchak**, Seconded by **Billedaux**.

Discussion: **None**

Motion **Passed 5-0-0 CNV**

## Chair's Report

· **Dinner Plans:** Billedaux hosts on the boat

### · Section Head Report – Chuck Wilson

- Rob was recognized and thanked for his services as Chair of TC 1.5 (Loud applause)
- Reminded the TC to submit the minutes and activity sheet
- Add MBO to the web site
- Programs need to be reviewed 10 days prior to the meeting
- Presentation not uploaded before 24 hrs will not be allowed to present
- TC chair should be identified in the web site with the e-mail alias



### · Advanced Indoor Air-quality Design Guide - Martha Hewitt

- Discussed the content of the guide that needs to be delivered as an electronic tool for extracting the requirements specific to projects.
- The printed document is expected to be 600 pages long.
- Needs volunteers to help develop this tool.

· **Action Item** – Webmaster to post the Indoor Air-Quality Design Guide documents to the TC 1.05 and send out a note to the listserv for all the members to review and contact Martha Hewitt as needed.

### Announcements:

- All members are recommended to participate in the subcommittees. Chair will assign roles for those who do not express interest in any specific subcommittees.
- MBO discussed – members are invited to provide input to this process.
  - **Committee Membership**
    - Rolling off July 2007 – Bruce Billedaux, Wayne Dunn, Rob Hitchcock, Alison Kwok
    - Rolling on July 2007 – Branson, Galler, Gowri, Grondzik, Nelson, Roth
    - Officers July 1, 2007: Chair: Gowri, Vice-Chair/Secretary: Pouchak

· We need a volunteer for Research Chair

ALI – Tim Dwyer: The society is seeking short courses (3 hrs duration), and Tim has volunteered to help with any members interested in submitting proposals for short courses. No specific deadlines for submission, so members are invited to submit proposals.

## Action Items

Note yellow highlight indicates that action item is more than 1 meeting old

- Action item: **All:** Email Hitchcock one new Objective for TC1.5 Management By Objective (MBO) exercise. Choose objective accomplishment by next meeting, one year, or long term.

This TC has been focused on many different topics. More definite MBO's with an objective and time line are needed by next meeting.

## Subcommittee Reports

### Research – Mike Pouchak

- RAC reviews RTARs and work statements May 15, Aug 15 and Oct 15.
- Shelf life for RTARs is 4 meetings; if no action is taken it will be inactivated.
- RAC has invited more proposals as there is more research money is available.
- ASHRAE research now has surplus funding and has 6.5 Million available for future research and members are invited to submit new proposals.
- USGBC, ARI, CIBSE, CEC all have offered co-funding for ASHRAE projects.
- All research topics in the area of sustainability are encouraged.
- Mike Brambley has asked for new research ideas to use the ASHRAE Headquarters building renovation and monitoring.
- RP-1354 PMS met at this meeting and work is in progress.
- RP-1468 RTAR has been approved and work statements

Motion to accept the proposal of prioritized list of research plan as proposed in the attached minutes of the Research subcommittee: Moved by **Pouchak**, Seconded by **Galler**.

Discussion: **Peppers discussed the support for TC 5.2 RTAR. TC 1.5 will continue to support this effort, but it is not part of the prioritized list of TC 1.5.**

Motion **Passed 6-0-0 CNV**

- . TC 5.2 RTAR on duct-loss will be cosponsored as this is being revised and resubmitted by TC5.2
- . Hitchcock reported on the RP-1354 progress. Tasks 1-3 are completed and there is significant progress.
- . No cost extension of RP-1354 is required because of the delay in completing initial tasks.

Motion to approve the request for a no-cost extension for RP-1354 to be completed by Summer 2008 meeting.

Moved by **Pouchak**, Seconded by **Peppers**.

Discussion: Motion amended to reflect revised completion date of January 31, 2008.

Motion **Passed 6-0-0 CNV**

- . RP-1468 RTAR authors are requested to draft the work statement Grondzik, Hitchcock, Roth and Branson to assist Kennedy with preparation of the work statement. Jim Braun, Section 1 RAC Liaison has offered to review before submitting the work statement. Branson and Kennedy to provide an initial draft by July 3<sup>rd</sup> week and have others review and send to Jim Braun by July 31. TC 4.7 and TC 4.1 have expressed interest and authors are requested to include Chip Barnaby for reviewing the draft workstatement.

Action: John Kennedy to prepare the workstatement before the next RAC Meeting in September 2007.

## Emerging Applications – Nick Rajkovich (Pornsak filling-in for Rajkovich)

- Role of BIM and simulation requirements for LEED projects present new opportunities for TC 1.5
- Program proposals and discussions were forwarded to the program subcommittee.

## Handbook - Mike Galler

- The Applications handbook 2007 includes the latest version of the Handbook chapter.
- CDPlus update for the chapter is due in March 2008. There are no enhanced content for the Handbook. Walter encouraged to include enhanced content in CDPlus, as there are not much enhanced content presently.
- CDPlus contents were discussed.

## Standard Subcommittee

- Requests funding for getting the Standards work started.

## Program - Pornsak Songkakul, Chair

No program was scheduled at Long Beach.

New York meeting program submission deadline Aug. 3., 2007.

Ranked programs listed below under Program Subcommittee Meeting Results.

Motion to accept the program as prioritized and proposed by the program subcommittee for New York meeting: Moved by **Peppers**, Seconded by **Aute**.

Discussion: **None**

Motion **Passed 6-0-0 CNV**

## Web Page - Ron Nelson

- ASHRAE has updated the web site.
- Web page is up to date.

## T&P – Dave Branson

. Rob was thanked for his services as Chair of TC 1.5. In recognition of all the good work he has done in the past two years, he is appointed as Vice-Chair of T&P Subcommittee.

## Meeting Times for New York

Chair discussed the need to shorten the length of the subcommittee meetings. It was agreed to reduce the duration of the Research and Program subcommittees to 45 minutes.

New meeting requests to subcommittee meetings to list Program and Research separately.

No other changes to meeting times are requested.

## Liaisons

None.

### ***Old Business***

MMTM Award – Chair reviewed the Management By Objective suggestions.

- Handbook Update Review Team (HURT) (Galler)
- Update TC 1.5 “New member” document (Schwedler) - Need a new volunteer
- TC 1.5 shall propose at least 1 programme item per year that has particular relevance to the application of IT to HVAC&R in countries outside North America (Dwyer)
- Publish and distribute paperless-meeting best practices to other TC or article (Pouchak)

### ***New Business***

None.

### ***Adjournment***

Meeting adjourned at 9:00 p.m.

## Research Subcommittee Meeting Minutes TC 1.5, Computer Applications

Sunday, June 24, 2007

Long Beach, CA

TC 1.5 Program/Research Sunday 6:30-8:30p  
Long Beach Convention Center , Rm 103A (1)

1. **Call to Order/Introductions** – members introduced.

2. **Review of ASHRAE Strategic plan for research.**

Identify your research proposal in terms of ASHRAE themes:

- Research themes include 1) Energy and Resources, 2) Indoor Environmental Quality 3) Tools and Applications , and 4) Equipment, Components, and Materials.
- Be aware of weighted criteria: 1) supports strategic plan 45% 2) co-funding support 10% 3) anticipated application 10% 4) TC vote 10% 5) RAC vote 20% 6) Tech Council Preview Feedback 5%.
- RAC reviews RTARS at all meetings (3 / yr) – need 45 days advance – May 15, Dec 15, Aug 15.
- Limited time for RTARS in Implementation Plan ( 4 meeting shelf life)

**Jim Braun** , research liaison for section 1 Introduced himself and gave an overview of current research from TC 1.5

**Update from Section 1 TC Chairs meetings:** “A new Research Advisory Panel has been appointed to develop the 2010-2015 Research Strategic Plan for the Society: Jeff Spittler, Oklahoma State (Chair), Martha Hewett, Center for Energy & Env, Zahid Ayub, Isotherm, James Brodrick, DOE, Marilyn Brown, GA tech, Don Colliver, Univ of Ky, Hywell Davies, CIBSE, Alison Kwok, U of Oregon, Wayne Reedy, Retired Carrier, Steve Taylor, Taylor Eng.”

ASHRAE Research Funds: “The 2006-2007 Society year will end with a \$200k surplus in the budget for research project payments due to a lack of projects underway. TCs, TGs and TRGs should be encouraged to submit more RTARs and to expedite the development of research work statements this coming year. The \$200k surplus will be rolled into the Research Reserve Fund and invested so the funds are not lost for research and continue to grow. The Research Reserve Fund, however, contains approximately \$6.5 million now, which could be spent on needed research if we had more quality projects on which to spend it.”

3. RTAR #1468, "Development of Reference Building Information Model (BIM) for Thermal Model Compliance Testing" status update. John F. Kennedy; Dave Branson; Nick Rajkovich  
- current version of the RTAR review – news from Jim Braun (RL1) indicates this is approved and will move to need WS effective 6-23-07.

4. Mike Brambley proposal for RTAR to incorporate Living Laboratory ASHRAE Headquarters.

According to Mike: “Making the renovated building an example sustainable building, the ASHRAE Building Committee to which the Technical Advisory Committee reports, is proposing to make the building a resource for use in ASHRAE research. This is being approached by instrumenting the building beyond ordinary sensing provided for control to enable monitoring of the performance of the whole building as well as its systems and equipment. Furthermore, two rooms will be outfitted with extra controllers to provide for easy installation of additional sensors for specific real world research in those spaces”

“I am writing to ask you to consider use of the Headquarters Living Lab in this proposed research project, as well as others you have in RTAR development or may in the future.”

It was decided to add the Headquarter Living Lab to a Research Project RTAR proposal ID 13.

4A. Emerging Application proposal from Pornsak. This was identified as ID 12.

4B.

5. 2007 TC 1.5 Research Project Prioritized:

Votes were taken and priorities were decided as follows.

<b>ID/Priority/</b>	<b>Project</b>	<b>Champion</b>	<b>Status: Chicago Jan 2006</b>
Funded 1354-RP	Generic Common Interoperable Data for the HVAC & R industry	Chip Barnaby, Krishnan Gowri (PMS chair), Ken Gillespie	PMS mtg to be held 6/25/7 RTAR approved 7/27/4. WS submitted 5/12/5 WS approved PES selection 1/23/06 PMS mtg 6/26/06
1468	Development of reference building information model (BIM) for thermal model compliance testing.	John Kennedy, Dave Branson, Nick Rajkovich	Needs WS 6/23/07 RTAR approved 6/23/07 with comments. Voted Priority 1 on 6/25/06. Potential co-sponsor with TC 4.7 energy calc and TC 4.1 load calc
1 (former id13)	Living Laboratory for ASHRAE Headquarters	Joe Zhou, Mike Pouchak	New Topic. Needs RTAR
2 (former id12)	Development of Guidelines to use BIM for HVAC design	Rob Hitchcock	New Topic. Needs RTAR
3 (former id7)	Methods to validate and ensure quality of data from the Controls systems; Vote 1: 1 vote; vote 2 : 5 votes		New Topic. Needs RTAR
4 (former id2)	Retooling the HVAC&R Design process to Better use Computer aided design and simulation software. Vote 1 : 1 vote, Vote 2: 4 votes,	Dave Branson, Ron Nelson	RTAR 1355 rejected by RAC 11/4/4. Returned to Author 11/11/4. Action: Jeff to review with Steve Rosen for Quebec mtg. Jeff no longer available. Action: Dave & Ron to review for Dallas.
5 (former id3)	Human computer interactions - Combined effect of thermal and visual environment on human computer interaction.- vote 1: 1; Vote 2: 3 votes	Nick Rajkovich, Allison Kwok	Working on RTAR – possible co-sponsor with tc 2.1
6 (former id5)	Develop a expert system front end to 90.1 Std. Benefit to ASHRAE – vote 1: 1 vote; Vote 2:1 vote	Ron Nelson, Krishnan Gowri, (formerly 90.1 rep. David Weitz )	David Weitz is no longer available to work on this RTAR. Per vote of subcommittee, this Research is to be placed in lower

			priority. Need work statement.
Not prioritized A- (former id4)	Study of personal preference control behavior. 0 votes	Bruce Billedeaux	New Topic. Needs RTAR
Not prioritized b (former id8)	Methods to collaborate the controls decision of the set point; vote 1 : 0 votes		New Topic. Needs RTAR
Not prioritized c (former id9)	Handbook filter – for advanced filtering - if you view the handbook from an architecture perspective, from a chiller manufacture perspective-make xml data in handbook- tabled – 0 votes	Jeff Haberl	
Not Prioritized d (former id10)	Demonstration of Development of advanced visualization method for viewing results from computer simulation- tabled. Vote 1: 0 votes	Jeff Haberl	
Not Prioritized e (former id11)	Methods for the development of drive by simulations- Generate 3D model from drive by video- tabled. Vote 1: 0 votes	Jeff Haberl	Jeff to work on RTAR by next meeting.
<del>(Withdrawn ) (former ID 6) withdrawn</del>	<del>Requirements for diagnostics and optimization for deployment in a large scale removed from voting for support. ID “D”</del>	<del>Kris Subbarao</del>	<del>New Topic Needs RTAR – Jeff to work on RTAR by next meeting.</del>

6. PMS #1354 update – PMS review.

**1354-RP**, “Common Data Definitions for HVAC&R Industry Applications;” Responsible TC/TG: TC 1.5 (Computer Applications); Co-Sponsor (s): GPC-20; Contractor: GARD Analytics; Duration: 18 months; Cost to ASHRAE: \$127,500; Supports Strategic Goals: A.7, C.4 (Energy & Resources Goal #7, and Tools & Applications Goal #4).

Rob will give update RP-1354 and Rob takes over as chair of Project Monitoring Committee (PMS) from the Long Beach meeting.

**1354-RP**

**COMMON DATA DEFINITIONS FOR HVAC&R INDUSTRY APPLICATIONS**

April 2006 – September 2007  
 GARD Analytics, Inc  
 Principal Investigator, Jason Glazer

## TC 1.5, Computer Applications

As is clear from the discussion above, there is much activity across the industry devoted to development of data exchange methods. It is natural to question why ASHRAE should become involved rather than simply waiting for the results of the work of others. ASHRAE has a unique and broad role in the HVAC&R industry. If ASHRAE is not involved in the definition of data exchange methods, the interests of its members may be overlooked with the result that important processes remain isolated from the emerging automated business world. The initiatives described above are championed by groups whose interests are not necessarily aligned with those of the ASHRAE membership. On the other hand, the related initiatives should not be ignored – there is no reason to re-invent methods that are suitable for ASHRAE. In addition, these methods are being applied and will be encountered in practice. The approach of this project is to examine existing data models in light of ASHRAE's needs as represented by the GPC-20P use cases. This will yield a map of the overlaps, inter-relationships, and omissions in the range of models pertinent to the ASHRAE domain. The availability of such a map will accelerate development of guidelines, standards, and software that addresses the entire life-cycle of HVAC&R projects.

## 7. Open Issues

None.

## Program Subcommittee Meeting Minutes TC 1.5, Computer Applications

### Long Beach Program Proposals:

Rank	Venue	Type	Title	Chair
1	Long Beach	Seminar	Bringing Fresh Air to HVAC Classroom	Grondzik, Walter
2	Long Beach	Forum	What can ASHRAE do to electronically convey information to students and faculty	Charlie Culp
3	Long Beach	Seminar	On-line code compliance	Norm Borassa
4	Long Beach	Forum	Emerging from the trenches: What should the mature E-HVAC/R industry look like	Dave Branson
	Long Beach	Transaction	Emerging Applications for the HVAC Industry	Branson

### Future Program Proposals:

Venue	Type	Title	Chair	
Future	Forum	RFID tags for HVAC/R industry	Bruce Billedeaux	
Future	Forum	AHSRAE 20/20 - Is the HVAC Engineer Endangered from the Research done in 2000-2005 ?	Schwedler	Ye
New York	Seminar	Using the Internet Classroom for Lifelong Learning"	Tim Dwyer	3
Future	Seminar	X-Tech: Extreme technologies for HVAC and R industry	Dave Branson	3
Future	Seminar	Impact of Nanotechnology on HVAC industry	Peng Xu	3
Future	Forum	Software quality assurance	Krishnan	
Future	Seminar	Tooling up today's youth to be an engineer	Dave Branson	
Future	Seminar	Big Brother is Watching	Billedeaux	ye
Future	Seminar	Can the Spam Guaranteed	Billedeaux	
Future	Short Course	Electronic Information Exchange - (how to)	Hydeman	
New York	Transaction	Emerging Applications for the HVAC Industry Part 2	Branson	Ye
New York	Seminar	BIM There Done That	Hitchcock	
New York	Seminar	Unboxing the solutions: Temperature Controls Solutions from Outside the Box	Branson	

### TC 1.5: Program Subcommittee - Past Programs (Updated 01/28/2007)

Past Programs				
(06/06)	Quebec	Seminar 7	Web-Based Simulations for Design: Yata Yata Yata	Nick Rajkovich
(06/06)	Quebec	Seminar 13	Greening the ASHRAE HQ Building	Tim Dwyer
(01/06)	Chicago	Seminar	Designing Building Automation Systems with IT security in mind	Mike Pouchak
(01/06)	Chicago	Seminar	ASHRAE HQ: Extreme makeover	Tim Dwyer

<b>(6/04)</b>	Nashville	Seminar	A Vision of eASHRAE: or How to Give a Seminar in your Pajamas	Hydeman
<b>(6/04)</b>	Nashville	Seminar	XML Guidelines for the HVAC Industry	Gowri
<b>(6/04)</b>	Nashville	Forum	How can proposed Guideline 20 Help the ASHRAE Membership?	Barnaby
<b>(1/04)</b>	Anaheim	Seminar	Computer Tools for Sustainable Design	Dwyer
<b>(1/04)</b>	Anaheim	Seminar	Emerging Web Applications for HVAC and Energy Industries	Hitchcock
<b>(6/03)</b>	Kansas City	Seminar	Establishing Cost Effective Energy Baseline for Measurement and Verification	Pornsak
<b>(6/03)</b>	Kansas City	Forum	How Secure is Your Wireless Office Place	Culp
<b>(1/03)</b>	Chicago	Poster Paper	1017 RP	Haberl
<b>(1/03)</b>	Chicago	Symposium	Interoperable Computer Applications	Branson
<b>(1/03)</b>	Chicago	Seminar	Computer Security	Pouchak
<b>(1/03)</b>	Chicago	Seminar	Experiences in Distance Learning: Leveraging Curriculum through Media	Pouchak
<b>(6/02)</b>	Honolulu	Seminar	Internet Technology for HVAC/R Business: Use It or Lose It	Dwyer
<b>(6/02)</b>	Honolulu	Seminar	Terms that Your Engineer Knows, but You Don't	Schwedler
<b>(6/02)</b>	Honolulu	Seminar	Self-Configuring Controls: Needs, Technology and Potential Benefits	Brambley
<b>(1/02)</b>	Atlantic City	Seminar	Uses and Benefits of Electronic Collaboration, Newsrooms and Groupware	Pouchak
<b>(1/02)</b>	Atlantic City	Symposium	Tools and Techniques for Calibration of Component Models	Reddy
<b>(6/01)</b>	Cincinnati	Seminar	Internet for Global Working	Dwyer
<b>(6/01)</b>	Cincinnati	Seminar	Future NET Gains for the AE Office	Kammers
<b>(6/01)</b>	Cincinnati	Seminar	Pattern-Recognition-Based Fault Detection and Diagnostics for Building Operation	Brambley
<b>(6/01)</b>	Cincinnati	Seminar	Future NET Gains for the AE Office	Kammers
<b>(1/01)</b>	Atlanta	Seminar	Interoperable Computer Applications for the Computer Industry	Hydeman
<b>(1/01)</b>	Atlanta	Forum	What Does the ASHRAE Membership Need from the Computer Applications Handbook	Pouchak