



## DRAFT Agenda

Prepared by Li Song

### TC 7.5 General Meeting

1/23/2024

3:30:00 PM– 6:00:00 PM Central Time (CT)

McCormick Place West, W179 A(1)

To join virtually click the link below

<https://events.rdmobile.com/Asset/Download/32fc5f77-2668-49e2-8261-7ce1a4f64c8e>

**Wi-Fi Access:**

**Network:** ASHRAE24

**Password:** Chicago2024

Schedule for TC 7.5 Meetings, Winter 2024:

**Time in CT**

Committee	Date	Start	End	Location	Chair
Enabling Technologies	1/21/2024	1:30 PM	2:15 PM	McCormick Place West, W183c (1)	Mike Galler
Bldg. Operations & Dynamics	1/21/2024	2:15 PM	3:00 PM		Donghun Kim
Fault Detection & Diagnostics	1/21/2024	3:00 PM	3:45 PM		Liping Wang
Smart Grid	1/21/2024	3:45 PM	4:30 PM		Greg Pavlak
Honors and Awards	1/21/2024	4:45 PM	5:15 PM		Carol Lomonaco
Handbook	1/21/2024	5:15 PM	6:00 PM		Greg Pavlak
Research	1/22/2024	5:15 PM	6:00 PM	Marriott Marquis Chicago, Analysis (2)	Joe Zhou
Program	1/22/2024	6:00 PM	6:45 PM		Mike Brambley
Main TC	1/23/2024	3:30 PM	6:00 PM	McCormick Place West, W179A (1)	Li Song

Committee	Link	Password
Enabling Technologies	MS Teams Meeting ID: 210 451 640 281 <a href="#">Click here to join the meeting</a>	NPCrAM
BOD		
FDD		
Smart Grid		
Honors and Awards		
Handbook		
Program	MS Teams Meeting ID: 236 470 136 553 <a href="#">Click here to join the meeting</a>	L6Nuwp
Research		
Main TC	<a href="https://events.rdmobile.com/Asset/Download/32fc5f77-2668-49e2-8261-7ce1a4f64c8e">https://events.rdmobile.com/Asset/Download/32fc5f77-2668-49e2-8261-7ce1a4f64c8e</a>	TC7.5

1. Welcome (Li Song).
2. Roll Call and Introductions. Determination of quorum.

- Current voting members (ending month):  
Mike Galler (June 2025), Donghun Kim (June 2025), Carol Lomonaco (June 2025), Greg Pavlak (June 2025), Li Song (June 2025), Zheng O'Neill (June 2026), Kristen Cetin (June 2026), Michael Brambley (June 2027), David Yuill (June 2027).

	Mike Galler
	Donghun Kim
	Carol Lomonaco
	Greg Pavlak
	Li Song

	Zheng O'Neill
	Kristen Cetin
	Mike Brambley
	David Yuill

3. Scope

*TC 7.5 is concerned with the performance and interactions of smart building systems, the impact of smart systems on the total building performance, methods for achieving more intelligent control and operation of building processes, interactions of smart buildings with utilities, and documentation of the benefits of smart buildings and smart building systems as they relate to energy consumption, cost of operation, maintenance, occupant comfort, building commissioning, operations, and impact of the SBS on utilities and natural resources.*

ASHRAE Code of Ethics Commitment – Chair

In this and all other ASHRAE meetings, we will act with honesty, fairness, courtesy, competence, integrity and respect for others, and we shall avoid all real or perceived conflicts of interests. (See full Code of Ethics: <https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics>.)

4. Changes to Agenda? (e.g. liaisons visiting)
5. Discussion/Vote on Approval of 2023 Winter (Atlanta) Meeting Minutes
6. Announcements:
7. Liaison Reports: Section Head (Satish), Res/Stds/Hbk/CEC (Kristen Cetin), TC 1.4 (Chariti Young), TC 1.5 (Mike Galler), TC 7.3 (Josh Gemmel) MTG OBB (current TC7.10) (Zheng O'Neill), MTG EBO (Patrick Villaume), TC 1.9/1.10 (A new liaison is needed), SPC 223 (Parastoo Delgoshaei)
8. Research (Joe Zhou)
9. Fault Detection and Diagnosis Subcommittee Report (Liping Wang)
10. Enabling Technologies Subcommittee (Mike Galler)
11. Smart Grid Subcommittee (Greg Pavlak)
12. Buildings Operations Dynamics Subcommittee (Donghun Kim)
13. Program (Mike Brambley)

14. Handbook (Greg Pavlak)
15. Standard (David Yuill)
16. YEA (Kristen Cetin)
17. Honors and Awards (Carol Lomonaco)
18. Web Page (Mike Galler)
19. Membership (Li Song) – Interested guests need to register on TC75 website first and then communicate with the TC chair if interested in being a corresponding member.
20. Old Business
21. New Business –
22. Adjournment



## Agenda - TC 7.5 Enabling Technology Chair Mike Galler

1/21/2024 1:30 PM to 2:15 PM McCormick Place West, W183c (1)



Scan for meeting link

[\(Online meeting link\)](#)

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

### Agenda:

5 min	<b>Call to Order-</b> Introductions; Agenda, Chair Discussion
30 min	<b>Program-</b> Current meeting status and new idea proposals due for Indianapolis: Program (Seminar, Forum, Workshop, Debate and Panel) Proposals Due February 26. Next Winter: Orlando, FL February 8-12 2025
10 min	<b>Update/Discussion of Active Project/RTARs/Work Statement-</b> as needed.

### Program: New Ideas Open Discussion

- ChatGPT/AI: how can it be used at each stage of the building lifecycle?
- Electrification of buildings: how will this affect smart buildings? New vs retrofit?
- Refurbishing old buildings with new tech (energy, cyber): limitations, benefits, opportunities?
- Smart Transducers (sensors and actuators) update?
- Communications
- Embedded Metadata
- Open discussion on other topics

### Next meeting conference tracks:

<ul style="list-style-type: none"> <li>• Fundamentals and Applications</li> <li>• HVAC&amp;R Systems and Equipment</li> <li>• Research Summit</li> <li>• Professional Development</li> </ul>	<ul style="list-style-type: none"> <li>• Electrification: Possibilities and Pitfalls</li> <li>• Artificial Intelligence and the Built Environment</li> <li>• Building Life Cycle Assessment</li> <li>• Legislation, Standards, Codes and Guidelines</li> </ul>
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### Program: Previous Meetings:

Optimizing Thermal Energy Storage Integrated with HVAC (2023 Winter, Chair Kyle Gluesenkamp)
Standardized Building Datasets for Benchmarking Control Algorithms, Energy Efficiency, Modeling and Decarbonization (2023 Winter, Chair Farhad Omar)
How Common are Residential HVAC Installation Faults, and How Can We Detect Them? Results from the DOE Building America Program (2023 Winter, Chair David Yuill)
Managing the Complexities of Cybersecurity (2023 Winter, Chair Carol Lomonaco)
SPIRE, WELL, Building EQ: New Certifications for Smart, Healthy and Efficient Buildings (2023 Winter, Chair David Yuill)
What Happened to our Hospitals after the COVID-19 Fiasco? HVAC Design, Control and Operation (Toronto co-sponsor with 1.4, Chair Frank Shadpour)
Developing an ASHRAE Standard/Guideline to Assess the Performance of Occupancy Sensor Systems in Buildings (Toronto, Chair Kristen Cetin)
Smart Buildings as a Transactive Energy Hub: Decarbonizing by Enhancing Building-to-Grid Interactions (Toronto, Chair Ron Bernstein)
The Importance of O&M to Energy Efficiency, Comfort, IAQ and Energy System Decarbonization (Toronto co-sponsor with 7.3, Chair Mike Brambley)
Impacts on Occupants' Experience in Grid-Interactive Efficient Building Operations (Toronto, Chair Li Song)

Cybersecurity, Securing Building Control Systems: Are We Meeting Industry's Needs? (Toronto, co-sponsor with 1.4, Chair Ron Bernstein)
Fundamentals of Division 25: Integrated Controls and Cyber Security (Toronto, co-sponsor with 2.10, Chair Beth Tomlinson)
Using Building Automation to Safely Return to Classrooms after COVID-19 (Toronto, co-sponsor with 1.4, Chair Frank Shadpour)
Can Connected Buildings Save the Grid? (Toronto, co-sponsor with 1.9, Chair Randall Higa)
Gas sensing technologies – Zach Siefker, Kristen Cetin. Seminar 10 Building-Integrated Indoor Air Quality Sensors, (Las Vegas Jan 30, 11:00 AM – 12:30 PM)
Technology for Cybersecurity- supporting need for more seminars on topic.
Building-Smart Grid Interface- Glenn Remington Seminar 12 Renewables and the Smart Grid, (Las Vegas Jan 30, 11:00 AM – 12:30 PM)
New Sensing Technology- Chair: Carol Lomonaco
Impact of IoT on building control & monitoring (2021 Annual, Chair: Carol Lomonaco)

#### **Research: Update/Discussion of Active Project/RTARs/Work Statement**

List of current RTARs:

Warmup/Setback

Occupant-Centric DR

WS-1875 Virtual Sensors

WS-1934 Data Drive MPC

WS-1812 Detection and Diagnosis of Circulating Fluid Leakage from Hydronic Systems

**Next Meeting Time-** Indianapolis, same time? Do we need a virtual meeting between conferences?

**Adjourn Meeting**



## Meeting Note

### TC 7.5 Building Operations Dynamics 2:15 - 3:00 PM (CST), Jan/21/2024 McCormick Place West: W183c (1)

Prepared by Donghun Kim

Subcommittee Scope: The Building Operations Dynamics Subcommittee of TC 7.5 is concerned with the dynamic characteristics and interactions of comfort conditions, the active components of HVAC systems, the passive components of HVAC systems, control systems and operation strategies and the building. The committee is concerned with the methods of building system operation which minimize energy used through the consideration of dynamics and interactions. It is also concerned with methods which consider dynamic and interactive characteristics in the design or comfort conditioning systems.

Hybrid Meeting Link: <a href="#">Click here to join the meeting</a> Meeting ID: 236 470 136 553 Passcode: L6Nuwp	Or call in (audio only) +1 312-667-7145, 467274889# United States, Chicago Phone Conference ID: 467 274 889#
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Sign in sheet: <http://bit.ly/42ZILT4>

## Agenda

5 min	Call to Order	
	Self-introduction, announce the subcommittee scope and other announcements.	
15 min	Program	
	Current meeting status and new ideas proposals	See below for more information
10 min	Update/Discussion of Active project/RTARs/Work Statement	See below for more information
15 min	New ideas and discussions	

## Last Meeting Summary

- 4 new programs discussed for Tampa or Chicago  
(Real barrier for optimal control, smart thermostat, technologies for load flexibility and decarbonization, optimal control beyond HVAC for buildings)

- 1 almost-final RP (RP-1661)
- 2 WS are on-going (WS-1809, WS- 1934)
- 3 RTARs dropped or moved to a program or on hold. 1 RTAR is under development

## Program Discussion (15 min)

Program	Title	Lead	Previous talks
1	Building Operations for Grow Applications?	Glen(retired), Linping and Carol	Orlando: No discussions. Park this idea. Reach out to TC 9.12 (?) Virtual Conf (Austin): Liping, Li, Glen and Carol will have a following talk Chicago: Follow-up meeting for Phoenix or later. Glen is seeking for speakers Phoenix: Liping, Li song, Kelly Cunningham (PG&E) will reach out to Glen Lingping: Accepted but dropped due to in person requirement, resubmit to Toronto Atlanta: potentially rename (e.g., controlled environment for agriculture) and resubmitted to Tampa or Chicago (Carol, Linping cf. Glen retired) Tampa: submitted but rejected Liping will reach out MTG-CEA this Tuesday to get their co-sponsorship Targeting Chicago
2	Smart thermostats for EE and Grid flexibility (Residential focused but commercial is ok)	Li, Donghun	Toronto: new idea Tampa: a low-cost MPC Chicago
3	Technologies for load flexibility and carbon decarbonization	Donghun	Atlanta: Donghun will reach out to CALFLEX HUB folks This topic was discussed and moved to Smart Grid subcommittee Chicago
4	Technologies and Real Barriers for Optimal Control	Mike/Donghun/ Joe	Tampa: Mike
5	Optimal Control Beyond HVAC	Joe/Donghun/ Mike	Tampa: General optimization for more than HVAC for DR and carbon emission? Resilience integration? Beyond HVAC (other DRs) <ul style="list-style-type: none"> <li>- DOE's vision</li> <li>- DOE sponsored demo projects</li> </ul> After Chicago

# Research Proposals Discussions (10 min)

Research	Title	Lead	Previous talks (~ Feb/2020, Orlando)
RP-1661	RP- 1661: Development and Validation of Dynamic Models for the Evaluation of Chilled-Water System Control Strategies in the ASHRAE Handbook	TBD	<p>Orlando:</p> <p>Li (PMS): need to tune the model, scopes need to be changed. May need another extension.</p> <p>Wangda (contractor): provides updates. Submit 60 pages of documentation to move forward for modeling. Finish implementation, debug controllers. Try to finish the debugging within 1-2 months. Asked for another one year NCE to April 2021.</p> <p>Virtual Conf (Austin): Asked for another one year no cost extension. Made a good progress.</p> <p>On-going: complete initial study (data center, data center + office buildings) and work on developing suboptimal schedule from optimal results</p> <p>Chicago: No cost extension. Made a good progress, move to the next stage of obtaining heuristic controls from optimal control behaviors</p> <p>Phoenix: detailed approach has been changed. On-going discussion for another no cost extension.</p> <p>Las Vegas: Committee members requested performing another simulation and got another 12 month extension (due May/2022).</p> <p>Atlanta: PMS approved final report &amp; submitted . waiting for TC.</p> <p>Tampa:</p> <ul style="list-style-type: none"> <li>- Should find a time to vote during the TC 7.5. main meeting (Li)</li> <li>- Report hasn't been received by TC 7.5</li> <li>- TC 1.4 has one and will send that to 7.5</li> </ul>



WS (Work Statement)	WS-1809: Updating reference guide for dynamic models of HVAC equipment	Heejin Cho	<p>Send out to RAC before the RTAR rules changed PTAR (Publication TAR). Co-Sponsored by 1.4 Has been reviewed by all voting members. 1/15/2019 – Approved by all. RAC provided comments back to the author Orlando: no updates from Heejin Cho. Zheng will follow up with Heejin Li and Zheng iterated with Heejin and Virtual Conf (Austin): Zheng will follow up with Heejin. Chicago: WS was revised and waiting for response Phoenix: revision was completed. Vote on the main meeting this Wed. Las Vegas: Submitted last year (Aug), received feedback from RAC. Toronto: RAC asked to move to PTAR. contacted the Heejin, no response yet Atlanta: no response yet from Heejin</p> <ol style="list-style-type: none"> <li>1. Does the old version (1998) still contain valid and useful information?</li> <li>2. Are updates necessary?</li> <li>3. Can TC 7.5 support?</li> </ol> <p>Joe will contact Heejin Tampa: Joe will follow up Heejin for Converting to PTAR</p>
WS-1934	A Survey Study on the Development and Application of Data-driven Model Predictive Control for Buildings	Jin, Zheng, Helia, Joe	<p>Vote (Aug 15, 2021): 6-0-0-5 (CNV) Submitted in Aug 2021. Working on the WS with a goal to submit the WS by March 15<sup>th</sup>. Atlanta: WS was submitted to RAC after Toronto meeting Tampa: RAC conditionally approved. Asked for revision. Revision was submitted, and will get updated.</p>

RTAR <sup>1</sup>	Title	Lead	Previous talks (~ Feb/2020, Orlando)
1	Occupancy-Aware Control and Operation of HVAC Systems in Commercial Buildings	Zheng	<p>Vote (06-25, 2019): 6-0-0-5 (CNV) MTGOBB (12 approve, 0 against, 5 absent, voted on June 22 2021) Submitted in June 2021</p>

<sup>1</sup> Research Topic Acceptance Request

			<p>Inquiring the status</p> <p>Waiting for RAC response</p> <p>Atlanta: No discussion</p> <p>Tampa: No discussion</p>
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## Ideas on Hold

Program	Title	Lead	Previous talks
1	What to do with optimal control?	Peter Armstrong/ Joe	<p>Orlando: Peter is not in the meeting. No discussions.</p> <p>Virtual Conf (Austin): Peter is not in the meeting. Park this idea</p> <p>Chicago: Zheng will reach out to Peter for this item</p> <p>Phoenix: David will reach out to Peter for this item</p> <p>Las Vegas: Zheng will reach out to Peter</p> <p>Atlanta: no discussion</p> <p>Tampa: move to Parking</p> <ul style="list-style-type: none"> <li>- Joe proposing a topic: optimal control focused on other applications not just HVAC</li> <li>- Li Song proposing a topic focus on field testing/real applications</li> </ul>

RTAR	Title	Lead	Previous talks (~ Feb/2020, Orlando)
1	How IoT impacts operators	Joe Carol Liping Wang Scott Hackel	<p>Carol working on an outline.</p> <p>How to quantify impact – Li Song</p> <p>Dovetailing with enabling technologies.</p> <p>Update the title</p> <p>Orlando:</p> <p>Carol: No updates</p> <p>Li: should include Residential application.</p> <p>We will need to have another idea/RTAR and Zheng will help Li</p> <p>Carol: Does the new idea include homes or multi-family homes? Need to consider privacy, multi-stories,etc.</p> <p>Virtual Conf (Austin): Carol, Joe and Li will have the following meeting.</p> <p>Chicago: Park this idea</p> <p>Phoenix: No discussion</p> <p>Las Vegas: No discussion</p>

			Toronto: No discussion Atlanta: park the idea
2	Link the productivity with occupancy-based control; Occupant in the loop controls	Ivo Martinac	Ivo Martinac – professor developing idea. The idea but needs to develop the team. Park this idea at this time Orlando: No updates. Park this idea, Zheng will follow up with Ivo. Virtual Conf (Austin): No updates. Park this idea. Chicago: Zheng will follow up with Ivo. Las Vegas: No discussion Toronto: No discussion Atlanta: park this idea



## DRAFT Agenda

### TC 7.5 Fault Detection and Diagnostics

Sunday, 1/21/2024 @ 3:00 PM– 3:45 PM CST  
McCormick Place West, W183c

Prepared by Liping Wang

**Subcommittee Scope:** explore and develop technologies to detect and diagnose common faults in both commercial and residential buildings. The scope of this subcommittee includes (a) identifying and sponsoring research projects to develop new FDD technologies, evaluate existing FDD technologies; provide recommendations to building operators and practical engineers, and develop supporting tools for researchers in FDD areas, and b) organizing programs to disseminate research findings and advancements in FDD areas among ASHRAE members.

Agenda:

0:00	<b>Call to Order</b>	
	Self-introduction, announce the subcommittee scope.	
5 mins	<b>Sessions at the current ASHRAE conference</b>	
	Monday, January 22 8:00 AM – 9:30 AM CST Seminar 21: Artificial Intelligence for Buildings Performance Simulation  Monday, January 22, 3:15 PM- 4:45 PM CST Paper Session 17: Fault Diagnosis of Chillers and Configuration Optimization for TES (Poster)  Tuesday, January 23, 8:00 AM – 9:30 AM CST Paper Session 19: Building System Monitoring and Optimization: From Fault Detection to Advanced Sensor Technologies	
	<b>2024 ASHRAE annual conference seminar ideas</b> <ol style="list-style-type: none"><li>1. Fundamentals and Applications</li><li>2. HVAC&amp;R Systems and Equipment</li><li>3. Research Summit</li><li>4. Professional Development</li><li>5. Electrification: Possibilities and Pitfalls</li><li>6. Artificial Intelligence and the Built Environment</li><li>7. Building Life Cycle Assessment</li><li>8. Legislation, Standards, Codes and Guidelines</li></ol> February 26, 2024: Program (Seminar, Forum, Workshop, Debate and Panel) Proposals Due	
10 mins	<b>Potential Seminar Ideas for 2024 ASHRAE Winter</b>	
	Automated Alarm Management: DDC alarms used for FDD?	Carol Lomonaco, Kim Barker, Jason, Chirag

	Segment the alarm information into useful pieces. The building operator has to go through all the alarms. Make a presentation to collect information to make an RTAR is a goal. TC1.4: program will be the co-host. Carol already has two speakers.	
	Assessment of FDD in Guideline 36  Idea for ASHRAE 2024 conference Guideline 36 Demonstration (conferences in 2024)	Joe Zhou, Steve Taylor
	<b>New program ideas?</b>	
	Open-source FDD (software) platform	Anthony, Chirag Parikh (Chair) Natasha Milesi-Ferretti, Yan Chen
	Data-driven based FDD (Annex 81)	Zheng O'Neill, Jin Wen
	Use smart thermostat data for FDD in residential buildings	Li Song, Lian Zhang, Burak Gunay, Donghun Kim
	<b>Update/Discussion of Active project/RTARs/Work Statement</b>	
	Evaluation of the Usability of ASHRAE Standard 207 Co-sponsor TC 7.9, Maybe TC 1.4 Revised based on comments from REC and Liaison. Look for volunteers to respond to the comments David Yuill, Srinivas Katipamula, Liping Wang	Led by John House David Shipley
	RTAR in the draft: Evaluating the impacts of faults from microgrids and buildings on grid and building system performance at community scales	Liping Wang
	<b>Research Ideas</b>	
	User's experiences with FDD? How do users respond to the alarms, correct or false?	Austin Rodgers, PNNL Laura Towsley (laura.towsley@rycom.com). Scott West Eric Yang
	FDD for low GWP heat pumps Evaluate existing FDD methods for heat pumps/variable speed	Donghun Kim, David Yuill
	VRF (actual performance vs expectation) Standard & FDD for refrigeration systems	
	<b>New ideas and discussions</b>	
	Reinvestigate FDD methods for low GWP refrigerant	Donghun Kim



## Meeting Agenda

### TC 7.5 Smart Grid Subcommittee (Hybrid)

Sunday, January 21, 2024 | 3:45 pm - 4:30 pm CT

**Meeting Room:** McCormick Place West, W183c(1)

#### Virtual Meeting Info:

**Join on your computer, mobile app or room device**

[Click here to join the meeting](#)

Meeting ID: 210 451 640 281

Passcode: NPCrAM

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[+1 312-667-7145](#), [81005188](#)# United States, Chicago

Phone Conference ID: 887 377 277#

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**Subcommittee Scope:** This subcommittee will explore and develop ideas and research work statements to improve the building and utility interactions (and more specifically the electric grid). The research will focus on developing enabling technologies for seamless interaction of smart building components and utilities and other building services. An important aspect of this work is to identify the information that is necessary to support smart building technologies, and to identify the requirements of communication protocols to support the exchange of this information between different building services buildings and utilities, between multiple buildings, with outside service providers.

The importance of a stable and reliable electric power grid to life and the economy in the 21st century has been underscored by two major events over the last decade: a major black out on the east coast of North America and wildly varying electricity prices in California during an attempt at restructuring the electricity marketplace. In response to these events many organizations have started research activities to find ways to modernize the grid. However, there are significant gaps in the research activities, especially as they relate to buildings. Since buildings consume over 70% of the electric in the U.S., they have to part of the solution to modernize the grid. ASHRAE has traditionally developed technologies, standards, and guidelines for buildings. Therefore, this subcommittee can play a major role in continuing this effort.

#### Agenda:

0:00	<b>Call to Order</b>	
5 min	Introductions, announce the subcommittee scope	
5 min	<b>Relevant sessions at current ASHRAE conference</b>	
5 min	<b>Update: Grid-Interactive Buildings for Decarbonization Guide</b>	
15 min	<b>Annual ASHRAE conference seminar ideas</b>	
10 min	<b>RTAR Ideas and Updates</b>	
Adjourn		

## Detailed Agenda

### Call to Order

- Read scope
- New members – name – affiliation, new member
- Sign In Sheet:

### Relevant Sessions at current ASHARE conference

### Update: Grid-Interactive Buildings for Decarbonization Guide and ALI course

### ASHRAE Seminar Ideas

Deadlines:

Tracks:

- Previous/Current Ideas
  - Donghun K. – “California Flex Hub”: technologies for load flex. (Planning for Chicago?)
  - 7.10 on humans and smart grid interactions. (Burak Gunay)
  - Hydro Quebec/Concordia Flexibility Index (Nouanegue Herve Frank) – (Future)
  - Connected buildings for decarbonization – **Srinivas K. (lead)**,
    - There are 10 connected community projects (just getting started)
  - Panel discussion on grid interactive buildings (Joe Zhou organize for Annual 2024)
  - Follow up seminar/panel to *Grid-interactive buildings, what’s impact on efficiency?* (from Summer 2021 by Mike Brambley) – **Eric Yang**
    - Suggestion to plan for a follow up seminar or panel on this topic.
    - Eric will follow up with Mike
    - Potential series related to GEB
  - Study impact of building and transportation electrification (EV chargers) – (Helia Z. lead)
  - Cybersecurity & Smart Grid - **Carol Lomonaco** from Summer 2021
    - Please email Carol if interested in contributing - [carol.lomonaco@jci.com](mailto:carol.lomonaco@jci.com)
    - **Zheng O’Neill / Jin Wen** – can help, can discuss – have DOE project on this area
      - Present literature review results. Focused on GEB.
      - Present simulation framework/HIL testbed for cyber-attack evaluation.
    - **Eric Yang** – help connect with Ron Bernstein at TC 1.4 - has good amount of work on this and info in guide spec (primary author) – more at system level
    - (from previous meeting) **Glenn Remington** – has contacts who could speak
    - potential collaboration with TC 1.5
    - David Holmberg/Ron Bernstein/Doe GWAC as speakers

- New chapter in G13 on cybersecurity (timely for Atlanta)
- OpenADR 2.0
- (Tampa update) Carol still interested.
- Other topics/ideas
  - Smart products for residential and commercial buildings (Li Song)
    - talk with residential TC – net zero building committee
  - Smart grid and building envelope interaction (from 4.4) - as an energy storage feature – (Jami L. will lead)
    - How building envelope can impact or interplay with smart grid contributions from buildings
    - Dynamic facades
    - Suggestion to follow up with NBI
    - TC 6.7 – Veronique Delisle
  - Utility Grid Battery Control Strategies and Impacts on O&M & LCA (From Atlanta 2019) – Future meeting
    - Webinar on NAESCO on battery storage in ESPC project. Could look for speakers.
    - Large scale batteries

## Update/Discussion of RTARs/Work Statement ideas

Program, Session, PTAR, RTAR? Current guidance is so high-level that it is not implementable.

- We don't have any sequences for the strategies that we are talking about (re: buildings/smart grid)
- Practitioners will be looking for that kind of guidance.
- Collaborate with 1.4?
- Still need to solve communication and integration problems first
- How do we actually do this?

## Guidance on smart building equipment / IoT – **Carol Lomonaco, Scott Hackel**

- what are you getting, functionality, products?
- what program functions are necessary to work in different environments?
- Carol – can reach out to one of the consultants that works in this area, has a good feel of this (has looked at some of this already) some people say won't allow the use of IoT because of lack of security/authentication, but maybe this isn't the case, seems to be a wide range; people don't understand these features/components – what are the deficiencies?
- Scott - also interested and had ideas on this topic
- **Kristen & Carol can discuss**
- (No report in Toronto)
- Focus on selection?
- (Indianapolis or Orlando PTAR, Herve also contribute. )

## Linking building modeling to grid modeling (Donghun K)

- Some existing efforts
- End user of this work would be policy recommendations for ISOs
- How to validate models?
- Tampa Discussion:
  - difficult to connect topic to ASHRAE users
  - Was a seminar in Atlanta on the topic.
  - Building response is important for the grid.



- Connected communities might be hook for getting ASHRAE to think about modeling buildings and grid.
- Forum or debate to understand tools?

### **RTAR/PTAR Parking Lot:**

Development of models for better peak load predictions (some discussion at research subcommittee already) – James McNeil

- City-scale model validation for predicting demand response - some models exist
- Need an evaluation of the state of the art, perhaps useful for new city planning
- Need some more research on demand response capacity prediction
- Existing software – GridLabD – developed to designing rate cases
- (No report in Toronto)
- (No report in Atlanta)
- Discussion in Tampa: Good idea, but maybe outside of ASHRAE research scope/abilities

Related: Energy demand prediction of multiple building scale

Instantaneous voltage and current load from buildings

- Specifically related to embedding DR in control sequences
- Inverter-based equipment / power quality / two-way power flow
- Direct DC wiring with AC in comb.
- May be more of an IEEE topic than ASHRAE

WS 1885 ASHRAE Design and Integration of PV in the Built Environment Guide - **Costa Kapsis, Jim Liedel**- [leidel@oakland.edu](mailto:leidel@oakland.edu); [costa.kapsis@uwaterloo.ca](mailto:costa.kapsis@uwaterloo.ca) (from winter 2021)

- Draft is posted in Basecamp
- Looking for people to review and provide comments
- Comments:
  - careful with “guide vs guideline” , suggestion to talk to research liason for Section 7
  - Glenn – interested in reviewing
  - PTAR process created after
  - seeking co-sponsorship (TC 6.7 initial sponsor)
- (No report in Toronto)
- (No report in Atlanta)
- Tampa discussion: No lead, put in parking lot



## Agenda – ASHRAE Chicago Winter 2024 Hybrid Meeting

TC 7.5 Honors & Awards Subcommittee  
4:45 PM- 5:15 PM EDT, Sunday, Jan 21, 2024  
Prepared by: Carol Lomonaco-Subcommittee Chair  
Room: McCormick Place West, W183c (1)  
Hybrid Meeting

**Objective for this Meeting:** Give TC 7.5 members an update on this subcommittee's work, and how many Fellow, DSA, and ESA nominations have been made thus far. The plan will be shared for the other potential Fellow, DSA, and ESA nominations to take place from Jan 1, 2024, until June 30, 2024.

**Subcommittee Scope:** ASHRAE's Honors and Awards program recognizes the dedicated ASHRAE Members who give freely of their time and expertise to fulfill the Society's mission of advancing the arts and sciences of HVAC&R to serve humanity and provide a sustainable world.

See ASHRAE's Honors and Awards on the ASHRAE.org website for the Personal Awards, or General Society Activities or Specific Society Activities.

**Date and Time of the Subcommittee Meeting:** TC 7.5 Honors and Awards

Date: Sunday, Jan 21, 2024

Scheduled Time: 4:45 PM- 5:15 PM EDT

### Access Information:

ASHRAE Meeting Link for Attendees:

Time	Item
4:48 PM EDT	Call to order; Introductions; Agenda Overview, Sign into Google Doc via QR code
4:50 PM EDT	Review the actions the team has accomplished Introduce team members: a) The subcommittee current members are as follows for July 1, 2023 through June 30, 2024: Carol Lomonaco (Subcommittee Chair), Natascha Milesi Ferretti, Mike Brambley, and Liping Wang b) Agreed on six Fellow, six DSA and three ESA nominations originally. c) Status on all nominations: we will congratulate new awardees for the Distinguished Service Award (DSA) at the ASHRAE Plenary Awards on Saturday, Jan 20, 2024. d) Status future nominations and submission date deadlines: will be reviewing the list and making future nominations. e) New list for TC 7.5 from the main ASHRAE Honors and Award Subcommittee f) Discussed ASHRAE "Get My Membership Back Program" for those who have had a disruption in their ASHRAE membership because of changing jobs. g) Carol will be scheduling meetings with the TC 7.5 Honors & Awards Subcommittee Meetings
5:05 PM EDT	Comments or questions & discussion: No comments or questions.
5:12 PM EDT	Wrap Up/Adjourn

Commented [CL1]:

# TC 7.5 Handbook Subcommittee Meeting Agenda - Chicago

January 21, 2024 (Sunday) 5:15 PM to 6:00 PM CT

Hybrid Meeting

**Meeting Room:** McCormick Place West, W183c(1)

**Web meeting info:**

**Join on your computer, mobile app or room device**

[Click here to join the meeting](#)

Meeting ID: 210 451 640 281

Passcode: NPCrAM

[Download Teams](#) | [Join on the web](#)

**Or call in (audio only)**

[+1 312-667-7145,, 81005188](#)# United States, Chicago

Phone Conference ID: 887 377 277#

[Find a local number](#) | [Reset PIN](#)

1. **Call to order / Introductions** (3 min)
2. **Report from TC 7.5 handbook Chair (Greg Pavlak)** (10 min)
  - 2.1. Progress since last ASHRAE meeting
  - 2.2. Schedule for the next version
  - 2.3. Handbook Online
3. **Discussion: Potential New Chapters** (30 min)
  - 3.1. Control-oriented modeling (Andreas A.)
  - 3.2. Chapter (or subsection) on agent-based control (Joe Z.)

Move/integrate with Multi-TC chapter on Optimization.  
Still needed to address multi-energy/component system
  - 3.3. Multi-TC chapter on Optimization and Controls (Peter A.)
    - TC 1.13 is more on the algorithms, but already working on chapter (outline approved)
    - Would it be focused on theory or HVAC controls?
    - Material beyond HVAC controls is needed?
    - Are the algorithms suitable for controls/operations/smart-buildings?
4. **Open Comments and Discussion** (if time permits)
5. **Next handbook subcommittee meeting** (2 min)

2024 ASHRAE Annual Meeting (Indianapolis)
6. **Adjourn**

**ASHRAE TC 7.5: Smart Building Systems Research Subcommittee Meeting**  
**Monday, 01/22/2024**

**5:15 PM– 6:00PM (CST) Marriott Marquis Chicago, Analysis (2)**

Virtual Meeting Link (Microsoft Teams):

[Click here to join the meeting](#)

Meeting ID: 236 470 136 553

Passcode: L6Nuwp

**Or call in (audio only)**

+1 312-667-7145, 467274889# United States, Chicago

Phone Conference ID: 467 274 889#

## Meeting Minutes

- |  |             |
|--|-------------|
| 1. Roll Call and Introduction<br>Sign in sheet: <a href="http://bit.ly/42ZILT4">http://bit.ly/42ZILT4</a>  | 5:15– 5:20  |
| 2. Announcements/recap of the research subcommittee chair meeting (Joe Z.)   | 5:20 – 5:25 |
| 3. Current TC 7.5 research updates   | 5:25 – 5:45 |
| <b>3.1 Four ongoing research projects updates</b>  |             |
| a) 1934-TRP: A Survey Study on the Development and Application of Data-driven Model Predictive Control for Buildings.<br>b) RP 1661: Development and validation of dynamic models for the evaluation of chilled water system control strategies in the ASHRAE handbook.<br>c) RP 1756: Evaluation of low-cost particulate sensors for building.<br>d) Work Statement for Publication – Guide for Designing and Operating Grid-interactive Buildings for Decarbonization.   |             |
| <b>3.2 Four active work statements updates.</b>  |             |
| a) WS-1809: Updating Reference Guide for Dynamic Models of HVAC Equipment.<br>b) WS-1875: Develop cost and performance indices to evaluate effectiveness of virtual sensors in HVAC applications. Draft version 1 available. Discussion.<br>c) WS-1927: HVAC Equipment Health KPIs.<br>d) WS: Warmup and Setback Research  |             |
| <b>3.3 Eight active RTARs updates.</b>   |             |
| a) RTAR: Occupancy-Aware Control and Operation of HVAC Systems in Commercial Buildings<br>b) How does remote work environment impact on residential building load profiles and HVAC operations?<br>c) RTAR-1942: Evaluation of the Usability of ASHRAE Standard 207.<br>d) RTAR: AFDD for Smart and Connected Communities<br>e) RTAR: Development of models for better peak load predictions for building clusters/neighborhood/city<br>f) RTAR: Occupant-Centric DR for Residential Buildings.<br>g) RTAR: Resilience in smart buildings.<br>h) RTAR: Assessment of energy savings of “smart” web-based connected thermostats in new and existing single and multi-family dwellings for inclusion in SSPC90.2 |             |
| 4. TC 7.5 research new ideas and topics  | 5:45– 5:55  |
| 5. New Business  | 5:55– 6:00  |
| 6. Adjourn   | 6:00        |

**TC 7.5 Smart Building Systems**  
**Program Subcommittee Meeting** (misabeled in Conference agenda as Publications)  
 2024 Annual Conference, Chicago, Illinois  
 Monday, January 22 | 5:15 pm – 6:45 pm | Analysis (2) Marriott Marquis Chicago

Microsoft Teams: <a href="#">Click here to join the meeting</a> Meeting ID: 236 470 136 553 Passcode: L6Nuwp	Or call in (audio only) +1 312-667-7145, 467274889# United States, Chicago Phone Conference ID: 467 274 889#
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### Agenda

1. Self-introductions and sign in (5 minutes)
2. Chicago TC 7.5 sponsored and co-sponsored sessions (10 minutes)
3. Chicago conference sessions statistics (5 minutes)
4. Program tracks for Indianapolis Annual Conference (10 minutes)
5. TC 7.5 proposed program sessions for Indianapolis (10 minutes)
6. Program ideas for Orlando and beyond (10 minutes)

### Annotated Agenda

#### Chicago TC 7.5 sponsored and co-sponsored sessions

##### Sponsored

Sponsoring Committee	Program Time	Session Chair	Session Title	Co-Sponsoring Committee
7.5 Smart Building Systems	Seminar 10 Sunday, 1/21 11:00 AM - 12:30 PM	Burak Gunay	Impact of occupant behaviour on demand response	No cosponsor
7.5 Smart Building Systems	Seminar 36: LIVESTREAM Tuesday, 1/23 8:00 AM – 9:30 AM	Srinivas Katipamula	How can connected communities support the U.S. DOE and ASHRAE goals for decarbonization and to mitigate climate change?	No cosponsor
7.5 Smart Building Systems	AHR Expo Session 5 Tuesday, 1/23 12:00 PM – 1:00 PM	Li Song	Field studies of smart thermostats for energy-efficient and grid flexibility operations in residential and light commercials	1.4 Control Theory and Application

##### Co-sponsored

Sponsoring Committee	Program Time	Session Chair	Session Title	Co-Sponsoring Committee
1.4 Control Theory and Application	Seminar 4, Sunday, 1/21	Frank Shadpour	The Significance of Selecting the Right Project Delivery Method for Building Automation Projects: One Size Does Not Fit All!	7.5 Smart Building Systems

7.6 Building Energy Performance	Seminar 25 Monday, 1/22 9:45 AM – 10:45 AM	Scott West	Grid-Interactive Buildings for a Decarbonized World	7.5 Smart Building Systems
9.12 Tall Buildings	Seminar 39 LIVESTREAM Monday, 6/26 9:45 AM – 10:45 AM	Mehdi Jalayerian	Indoor Air Quality, Automation and Artificial Intelligence in Tall Buildings	7.5 Smart Building Systems
1.13 Optimization	Seminar 46 Tuesday, 1/23, 11:00 AM – 12:30 PM	Christopher Laughman	Optimization to Enable Predictive Controls and Scheduling for Grid-Interactive Efficient Buildings	7.5 Smart Building Systems
6.7 Solar and Other Renewable Energies	Seminar 47 Tuesday, 1/23, 11:00 AM – 12:30 PM	Constantinos Balaras	The Future Is Electrifying: Zero-Carbon Case Studies Under Moderate Climate	6.7 Building Energy Performance; Other Sponsoring Committees: TC 9.7, TC 7.5, TC 3.2
9.12 Tall Buildings	Seminar 49 LIVESTREAM Tuesday, 1/23, 1:30 PM – 3:00 PM	David Norris	Emerging Technologies in Tall Buildings	7.5 Smart Building Systems
1.4 Control Theory and Application	Seminar 55, Wednesday, 1/24, 8:00 AM – 9:30 AM	Paul Ehrlich	True Building Controls Interoperability: New Digital Solutions Enabled by Proposed ASHRAE Standards 223P and 231P	7.5 Smart Building Systems
MTG.CYB	Seminar 59 Wednesday, 1/24, 9:45 AM – 10:45 AM	Carol Lomonaco	What's the Fuss About Zero Trust Cyber Security for BAS Control Systems	1.4 Control Theory and Application; TC 7.5 Other Sponsoring Committee
2.2 Plant and Animal Environment	Seminar 61. Wednesday, 1/24, 11:00 AM – 12:30 PM	Liping Wang	Challenges, Opportunities and Lessons Learned in Controlled Environment Agriculture	7.5 Smart Building Systems
1.3 Heat Transfer and Fluid Flow	Panel 4: LIVESTREAM Sunday, 1/21, 1:30 PM – 3:00 PM	Michael Ohadi	Thermal/Fluid Applications of AI in Advancing Energy Efficiency of HVAC/R Equipment and Building Energy Systems	Other Sponsoring Committees: TC 7.5, TC 8.5, TC 8.4, TC 1.1, TC 1.4

### Chicago Conference Session Statistics

Session Type	Proposals Submitted	Proposals Scheduled
Debate		
Forum		
Panel		
Seminar		
Workshop		
Total		
Total with Paper Sessions		

### Program tracks for Indianapolis Annual Conference

#### 1. Fundamentals and Applications

Fundamentals are the foundation for understanding applications in engineering. Key components of ASHRAE fundamentals include thermodynamics, psychrometrics, fluid flow and heat and mass transfer. This track provides opportunities for papers and presentations of varying levels across a large topic base. Concepts, design elements and shared experiences for theoretical and applied concepts of HVAC&R design are included. **Track Chair: Atilla Biyikoglu** | [abiyik@gazi.edu.tr](mailto:abiyik@gazi.edu.tr)

#### 2. HVAC&R Systems and Equipment

HVAC&R Systems and Equipment are constantly evolving to address the changing requirements of the built environment. Papers and programs in this track focus on the development of new systems and equipment, novel applications of existing systems and equipment, improvements to existing systems and equipment and the proper application and operation of systems and equipment. **Track Chair: Ng Yong Kong** | [nyk@nyk.com.my](mailto:nyk@nyk.com.my)

#### 3. Research Summit

Active research, and the exchange of those research findings, are critical to the development of our HVAC&R industry and built environment. The 11th Annual Research Summit invites researchers to share those results, including ASHRAE-sponsored research and research of interest to the ASHRAE community. Researchers are invited to present papers, extended abstracts, seminars, forums or participate in panel discussions. The Research Summit includes a partnership with ASHRAE's archival journal, *Science and Technology for the Built Environment*. **Track Chair: Kristin Cetin** | [cetinkri@msu.edu](mailto:cetinkri@msu.edu)

#### 4. Professional Development

As members of a professional organization, we participate not only for the great value of technical exchange, but also the interpersonal exchange. We recognize that the single greatest strength of our organization is its membership. This track is designed to allow those professionals an opportunity to develop in the areas of presentation skills, leadership, team building, understanding various business operations, interpersonal skills, etc. The Professional Development Track covers all aspects of business outside of engineering/technical applications and lends itself to interactive session types such as workshops and forums. **Track Chair: Ahmed Abdelsalam** | [ahmed.abdel-salam@usask.ca](mailto:ahmed.abdel-salam@usask.ca)



## 5. Electrification: Possibilities and Pitfalls

Global legislative efforts are pushing for full electrification of the building sector. This track features programs that explore the required technology to meet legislative targets and the seen and unforeseen challenges and consequences of rapidly electrifying the built environment in parallel with other sectors. Submissions are encouraged in the areas of relationships between electrification and decarbonization, electrification of space and water heating, building/grid interactions in a highly electrified environment, onsite energy generation and storage, district energy systems and all other areas related to the electrification of building systems.

**Track Chair:** **Kevin Brown** | [kevin@kbsquared.net](mailto:kevin@kbsquared.net)

## 6. Artificial Intelligence and the Built Environment

Artificial Intelligence and Machine Learning have the potential to transform how we design, optimize, and operate buildings and equipment. From the automated design of heat exchangers to adaptive controls to the development of new working fluids, the possibilities are vast. This track highlights papers, case studies, and programs that separate the hype from reality and explore the possibilities of AI and ML tools for advancing technology for the built environment.

**Track Chair:** **Vinod Venugopal** | [vinodpvgopal@gmail.com](mailto:vinodpvgopal@gmail.com)

## 7. Building Lifecycle Assessment

The explosion of computational capacity and data collection capability is rapidly expanding the scope, complexity, and practical applications of modeling and performance characterization both during design, construction, end-of-life, but even more so for fault detection, diagnostics, and operational optimization. These data can provide better insights on the whole life cycle impact of building construction and operation on efficiency and decarbonization goals. This track welcomes programs related to all aspects of building life cycle assessment, with a particular interest in successful applications that have extended modeling into operational phases of the building life cycle. **Track Chair:** **Money Khanna** | [khannamoney@gmail.com](mailto:khannamoney@gmail.com)

## 8. Legislation, Standards, Codes, and Guidelines

Legislation such as the US Inflation Reduction Act (IRA) of 2022 and global F-Gas regulations can dramatically impact the building sector by incentivizing different technologies and approaches to managing building energy systems. In addition, ASHRAE is well known for its standards and design guidelines and their continuous evolution to improve the built environment and its systems in terms of IEQ, resource efficiency and energy consumption. ASHRAE members must be able to keep up with the rapidly evolving legislative environment and prepare to inform future legislation, standards, and codes. The programs in this track highlight recent changes and opportunities to inform new legislation, standards and guidelines and their impact on the buildings sector. **Track Chair:** **Cindy Callaway** | [cindy.callaway@p2sinc.com](mailto:cindy.callaway@p2sinc.com)

### TC 7.5 proposed program sessions for Indianapolis

Type	Session Chair / Speakers	Proposed Title	Status	Updates
Seminar	Michael Brambley	Navigating utility building demand management programs—promises and pitfalls	Resubmit?	Not accepted for Winter 2024
Seminar	Xin Jin	Affordable Residential Electrification for Supporting Decarbonization Under Electrical Panel Constraints	Resubmit?	Not accepted for Winter 2024
Seminar	Donghun Kim	Accelerating Decarbonization with the California Load Flexibility Research and Deployment Hub	Resubmit?	Not accepted for Winter 2024

		To be Completed with Input From Subcommittee Meetings		
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### Program ideas for Orlando and beyond

Type	Session Chair / Speakers	Proposed Title	Status	Updates
Seminar	Guanjing Lin, New Heaven University for FDD for Rooftop Unit	Users' experiences for FDDs in commercial buildings		Related to the RTAR.
Seminar	Glenn Remington	Cybersecurity & Control & Smart Grid		Could be; Zheng & Jin can contribute (MTG Mike Galler), Qun Zhou
Seminar	Kristen Cetin/Zheng O'Neill	Smart products for residential and commercial buildings		In the future
Seminar	Donghun Kim	Smart Grid – Building Envelope Interaction/Dynamic Facades		In the future (Donghun to follow up)
Seminar/Debate	Carol Lomonaco	IOT Security		
Seminar	Edward Tsui	Best practice of monitoring and instrumentation		Glenn Remington
Seminar	Eric Yang	Battery Control Strategies and its impact to life cycle cost	Christie Kjellman, Carol, Glenn Remington, Srinivas Katipamula	
Seminar	Peter Armstrong	What to do with optimal control?		
Seminar	Andreas Athienitis	Model accuracy impact study on model predictive control		BOD sc. David/Andreas
TBD	TBD	What data the lawyer would like to know –needs to define scope	In future	
Seminar	Peter Armstrong & Li Song	Building optimal / predictive control	For Future	
Seminar, co- sponsor TC 7.9	Li Song & Carol Lomonaco	How BAS can Enhance Existing Building Commissioning	For Future	
Seminar	Armstrong	Edge computing, Cloud Analytics, and On-Premises Systems – Architectures for Smart Building Systems	For future	
Seminar	Nick Gayeski / Speakers from Armstrong	Smart Transducers with Embedded Diagnostics	For future	

Seminar	Kristin Heinemeier / Kristin & Jon Douglas, someone from TC 7.9?	Fault Detection and Retro- commissioning: Where is the Line and Does it Matter?	For future	
Workshop	Kristin Heinemeier	Lab Methods for verifying that FDD tools for RTUs really work: Will Standard 2007 really work?	For future	
Seminar	Chris Kinney/Michael Munroe/Glenn Remington	FDD and Clouds?	For future	