

**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 5.1 DATE 30 July 2010

TC/TG/TRG TITLE Fans

DATE OF MEETING 28 June 2010 LOCATION Albuquerque, NM

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
George Gamble	2008	John Cermak	2008	David Carroll
Mike Brendel	2007	Patrick Chinoda	2008	Laura Petrillo
Franco Cincotti	2007			Vivi Kootsogiaui
Chuck Coward	2008			Jay Eldridge
John Murphy	2009			Greg Wagner
Asesh Raychaudhuri	2007			Jenny Abney
Brian Reynold	2009			Michael Keating
Greg Sanchez	2007			Robert Z. Smith
J. Thomas Sobieski	2007			Dustin Meredith
Zhiping Wang	2008			Kevin Rucinski

DISTRIBUTION

All Members of TC/TG/TRG plus the following:

TAC Section Head: Gus Mastro	
TAC Chair:	
All Committee Liaisons As Shown On TC/TG/TRG Rosters:	
Manager Of Standards Manager Of Research & Technical Services	Claire Ramspeck Mike Vaughn

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DATE OF MEETING 28 June 2010 LOCATION Albuquerque, NM

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
				Brent Fullerton
				Kim Osborn
				Brian Reynolds
				Joe Brooks

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**ASHRAE TC 5.1 Meeting
28 June 2010
Agenda**

1. Call to Order

The chair called the meeting to order at 4:35 pm

2. Roll Call

The following voting members were present:

George Gamble, Chair
Mike Brendel
Franco Cincotti
Chuck Coward
John Murphy – Standards, Vice Chair
Ashesh Raychaudhuri – Program Chair
Brian Reynolds – Handbook Chair
Greg Sanchez
J. Thomas Sobieski
Zhiping Wang

The following voting members were absent:

John Cermak, Long Range Planning Chair
Patrick Chinoda

3. Adoption of Agenda

Motion TC 5.1 05-2010

Moved by: Ashesh Raychaudhuri
Seconded: David Carroll

“To approve the agenda.”

Passed 9-0-0

4. Approval of the minutes

Motion TC 5.1 06-2010

Moved by: Greg Sanchez
Seconded: Tom Sobieski

“To approve the minutes of the 26 January 2010 meeting of this TC as distributed.”

Passed 9-0-0

5. Items of business

5.1 TC 5.0 Section Head Report

Gus Maestro, Section Head for Section 5, reported,

- There will be a webmaster training session this fall,
- Thanked the chair for timely submission of member roster,
- Promoted subcommittee's use of web/conference calls for meetings.

5.2 TC 5.1 Liaison Reports

No liaisons were present.

5.3 Chairman's report

The chair discussed the highlights from the section head meeting:

- The TC should develop goals or objectives for the next year. Greg Sanchez, the incoming vice chair, volunteered to put together some objectives for discussion at the next meeting.
- That the TC was asked to provide input on the ASHRAE Strategic Plan and Strategic Research Plan which can be found on the ASHRAE Website. All TC members were to read and be ready to discuss at the next meeting.
- TC agendas should be included on the TC website. Brent Fullerton, TC 5.1 website manager, reported that agendas are being posted and asked all to send him any missing agendas.

6. Subcommittee reports

6.1 Standards subcommittee

6.1.1 ASHRAE Standard 149

The chair of NFPA 130 is asking ASHRAE 5.1 and ASHRE TC 5.6 to review the standard and add testing standards for sound attenuation and tunnel damper equipment. The committee should decide if they would like to commit to do the work.

Motion by: John Murphy

"Recommend to standards manager that next revision to ASHRAE 149 include tunnel damper equipment and sound attenuators, and TC 5.1 would provide technical expertise to that SPC.

Motion withdrawn after discussion.

The chair volunteered to summarize the TC 5.1 discussion and discuss with the chair of NFPA 130 and he will also talk with the chair of ASHRAE TC 5.6.

6.1.2 ASHRAE 68/AMCA 330

AMCA initiated the process to adopt (identically) ISO 5136 for AHSRAE 68/AMCA 330. Although it will probably not be needed (since the adoption will be identical), a committee is required to address any

comments that may be made. Tim Mathson's nomination as chair was approved by the AMCA International Board.

Motion TC5.1 07-2010

Moved by: Tom Sobieski

Seconded: Mike Brendel

"Recommend approval of Tim Mathson as chair of a joint ASHRAE/AMCA Committee to oversee the identical adoption of ISO 5136 in place of ASHRAE 68/AMCA 330."

Passed unanimously 9-0-0

6.2 Handbook subcommittee – Brian Reynolds

The handbook subcommittee is proceeding with work on the Fan chapter for the 2012 version of the H/B. About half of the chapter has been reviewed and revised. The subcommittee has met several times via web and conference calls. The subcommittee met yesterday in person. The handbook is now on-line (and will eventually replace CD+). The subcommittee is planning conference calls before next meeting of TC.

6.3 Research subcommittee – David Carroll

The report from the Research Subcommittee chair is attached.

The Subcommittee chair reported that:

- RTARs should reference the new Strategic Plan,
- Peter Damanski is the new Research Liaison, and
- the research budget has been expended.

6.3.1 Current projects

RP 1126 Optimization of Sampling Tube for Induct Sound Testing: Working on final report (June 2009). No other status. John Murphy will continue to try to contact the PI

RP 1216 Inlet Installation Effects on BI/Airfoil Centrifugal Fans, Air & Sound: PMS met earlier today (John Murphy acted as chair). PMS requesting additional changes to the report and resubmission.

RP 1272, Inlet Installation Effects on Forward Curved Centrifugal Fans, Air and Sound: Zhiping reported that the work was complete.

RP 1420, Inlet Installation Effects on Plenum Fans: Franco reported that project contracted to AMCA/CETIAT. No work has been done yet.

6.3.2 Unsolicited Research Project (1617-URP)

Dr. Jonson of Penn State University submitted an Unsolicited Research Project titled, "Fan Noise Scaling and Statistics" (URP-1126). It was reported that a PES was formed after the Research Subcommittee meeting that was held on the previous day. The PES recommended

that ASHRAE reject the project because the URP did not describe how the proposed research will benefit ASHRAE.

Motion TC5.1 08-2010

Moved by: David Carroll
Seconded: Zhiping Wang

“Move that TC 5.1 vote to reject the URP.”

Passed 9-0-0

The TC discussed reasons for the recommended rejection.

Mike Vaughan, of ASHRAE Staff, volunteered to reply with additional comments.

TC 5.1 did not feel the approach described in the URP is viable unless spectrum data is available and used. Spectrum data is needed to remove the structural resonances out of the data.

TC 5.1 asked David Carroll (PES chair) to write a letter to Mike Vaughan explaining why the PES recommended rejection.

It was suggested by one attendee that the proposal should be sent to AHRI for their review.

6.3.3 Future projects

A possible RTAR with TC 1.4 was suggested that would research VFD operation at very low frequency.

6.4. Program subcommittee – Asesh Raychaudhuri

Two forums were submitted for Albuquerque – They will be resubmitted (Large circulating fan performance, and fan vibration) for the Las Vegas Winter Meeting

RP -1272: Review comments on paper received by Principle Investigator, comments have to be addressed and paper will be submitted as a Technical Paper for Las Vegas.

Seminar – Fan in an Array: a possible submission for Las Vegas.

Will ask for 5.9 to co-sponsor.

Montreal Technical Paper RP-1216 would require submission by September 17, 2010.

Montreal Seminar on Fan Technologies – an idea (George and Greg will discuss).

6.5. Long Term Planning subcommittee – John Cermak

No report made.

7. FAQ -- John Murphy

Nothing to report

8. Website Report

All minutes available from website. Question was asked, should draft minutes be posted (i.e, before approval by TC). Yes, put "draft" watermark on pages.

9. Other Business

9.1 AMCA 205/ASHRAE 90.1 and the Efficiency of Specialty Fans

A letter to the TC 5.1 chair regarding TC 5.1's recommendation to the 90.1 Mechanical Subcommittee for minimum FEGs for supply, return, and exhaust fans was discussed. The letter requested that specialty fans, such as IFF fans, be excluded from this recommendation. The TC asked the Task Force to consider the letter. Some suggested ideas that should be explored were:

- See if the 90.1 scope includes Laboratory Exhaust
- Look at typical total efficiency's of IFF fans to see if they compare with non-specialty fans.

The Task Force will plan a meeting to make a recommendation on this request before the end of August.

9.2 Other new business

Brent Fullerton was contacted by TC 5.10 regarding belt drive efficiency.

10. Time and Place of Next Meeting

The next meeting will be held in conjunction with the ASHRAE Winter Meeting in Las Vegas, NV.

11. Adjournment

Motion TC 5.1 09-2010

Moved by: Tom Sobieski
Seconded: Asesh Raychaudhuri

"To adjourn"

Passed: 9-0-0

The TC adjourned the meeting at 6:35

Minutes recorded by:
Joe Brooks

Attachment: 6.3, Research Subcommittee report

MISCELLANEOUS RESEARCH TOPICS

TC 5.1 RESEARCH S/C CHAIR

- 6/25/07 (TC5.1 meeting): **David Carroll** replaces L.Z. Zeng as the TC5.1 sub-committee chairman.
- *MORTS (Manager of Research & Technical Services)*: **Michael Vaughn**, (678) 539-1211, mvaughn@ashrae.org & MORTS@ashrae.net
- *RL (Research Liaison, Section 5)*: **Piotr A. Domanski**, (301) 975-5877, pdomanski@nist.gov & RL5@ashrae.net
- *Research Coordinator*: **Donna Daniel**, 678-539-1136, ddaniel@ashrae.org & RESADMIN@ashrae.net
- *Administrative Assistant*: **Tara Thomas**, 678-539-1203, tthomas@ashrae.org

RESEARCH S/C CHAIR BREAKFAST (MONDAY 6:30 AM)

- 6/25/07 (TC5.1 meeting): David attended the workshop and noted the following: ASHRAE requested technical committees submit additional work statements and RTAR's, and the ASHRAE research reserve account balance is \$6 million.
- 1/21/08 (TC 5.1 meeting): David attended the workshop and reported that RTARs and Work Statements may now be submitted 4 times per year (3/3, 5/15, 8/15, 12/15).
- 6/23/08 (S/C Chair brkfst): our RAC Liaison, Fred Kohloss fredpeg@cox.net, is retiring from ASHRAE and is being replaced by Mohammad Hosni rl5@ashrae.net and hosni@ksu.edu.
- 10/28/08: Mo Hosni resigned as RAC Section 5 Liaison
- 12/8/08: Mike Vaughn reported that Dan Castellon, Univ. of Windsor, Windsor, ON Canada, PH: 519-253-3000 x 2164, E-mail: danc@uwindsor.ca is the new RL Section 5.
- 1/26/09 08 (S/C Chair brkfst): Research Advisory Panel (RAP) have begun developing the Strategic Research Plan for 2010-2015, they have solicited/received feedback from TCs/PCs/etc..., draft will be avail. Jun-09. Research will fall into two categories: Tactical (TC-level) and Strategic.
- 6/22/09 (S/C Chair brkfst): RL was not present due to emergency departure, Larry Markel (RAC Chair, RACChair@ashrae.net) substituted, requested that sub-committee chair be included in all research correspondence, items discussed include (ref. handout):
 - New 2010-2015 Research Strategic Plan in preparation
 - RAC meetings are open, TC can participate in RTAR/WS evaluation.
 - Submit RTAR and WS by 9/15/09 for consideration at Tech Weekend.
 - RL should help with and review RTAR and WS.
 - Awards and Grants for Winter Meeting (ref. handout).
 - Standard Research Agreement will require dual units.
 - RAC to offer measures to help w/literature search for new RTAR and WS prep.
 - RL is part of Proposal Evaluation Subcommittee (PES), should attend PES mtg, should complete score sheet, does not vote.
 - Project Monitoring Subcommittee (PMS) must monitor the project including review of quarterly progress reports. New Research Project Performance Evaluation Form to be completed and submitted to MORTS following PMS meetings at Winter & Annual Meeting in addition to regular PMS and TC meeting minutes.
 - Disposition of ASHRAE Research Form must be submitted upon project completion.
- 1/25/10 (S/C Chair breakfast):
 - ASHRAE Service to Research Award – John Murphy (TC 5.9)
 - RTARs due May 15th for Jun-2010 review & consideration.
 - 2010-2015 Research Strategic Plan is nearly complete, review draft #1 is available on website, deadline for comments is 2/22/10, scheduled completion Jun-2010.
- 1/31/10: e-mailed draft copy of Research S/C Notes to George G., John M. & Joe B.
- **6/28/10 (S/C Chair breakfast):**
 - **Final 2010-2015 Strategic Research Plan is available, includes RTARs submitted after July-2010.**
 - **Piotr A. Domanski is the new Section 5 Research Liaison.**
 - **ASHRAE Contribution to Research Award – TC Chair nomination due Sep.**
 - **Due to a number of large & short-duration projects the research budget is fully expended for this year and there is there is a backlog of approved “normal-sized” projects, a few will be submitted for bid in the Fall 2010, and most that are approved by Jan-2010 will be submitted for bid in the Spring 2011. Co-funded projects will get higher priority.**

ACTION ITEMS (GENERAL):

- Request PPT presentation info regarding types of papers (from 1/25/10).

- Provide TC meeting minutes to RL & MORTS (from 1/25/10, from 6/28/10).
- Send latest notes to PES/PMS Chairs, TC Chair (John Murphy)/Vice Chair (Joe Brooks)/Secretary (??), RL (Piotr Damanski) & MORTS (Mike Vaughn).
- Invite RL to regular Sunday pre-meeting at 3:00 PM, and/or Monday meeting at 4:15 PM
- Service to ASHRAE Contribution to Research Award – TC Chair nomination due Sep – contact George to possibly nominate John Cermak???

1126-URP**OPTIMIZATION OF SAMPLING TUBES FOR IN-DUCT FAN SOUND MEASUREMENTS**

PI: Peter Baade, Acting PMS Chair: John Murphy, VM: John Cermak, Robert Z. Smith, John A. Murphy, Paul R. Saxon, and Brian L. Reynolds (ALL FROM OLD ROSTER FOUND BY JOE BROOKS)

Contract Period: ??? to ???

Payment: Total \$???

- 1/29/07 (TC 5.1 Meeting): Peter Baade reported the following:
 - The sampling tube has been successfully tested up to 6000Hz
 - The sampling tube is available to anyone for testing
 - The research effort will likely be completed by the end of summer, 2007
- Peter requested a one year no-cost extension to complete the project. The committee is required to officially act on the request by notifying MORTS, requesting ASHRAE acceptance. John Murphy volunteered to prepare a request and to send it to the committee members for approval. Upon approval by the committee John will forward the request to MORTS.
- 6/24/07 (TC 5.1 pre-meeting): According to John M., Peter say's that he'll finish, John to follow-up w/Peter to determine status.
- 6/25/07 (TC5.1 meeting): Peter Baade has not yet completed the research report. John Murphy commented that it is not necessary to submit a no-cost extension for one year.
- 1/21/08 (S/C Chair brkfst): Need written justification from TC why they wish to terminate the project. Does the P.I. know of and agree with this decision? If not, ASHRAE may be responsible to pay the full contract amount at this stage with no report or paper to show for this expenditure.
- 1/21/08 (TC 5.1 meeting): no progress reported, John Murphy will contact Peter Baade to determine when the final report may be finished.
- 6/13/08 (Peter B. e-mail to Joe B.): Peter indicated that he is committed to finish this project as soon as the tests for measuring the self noise improvement are complete. A few days ago, he received preliminary test results from a colleague in Germany that has performed such measurements and found that the proposed design has a self noise that is 10 dB lower than that of the commercially available B&K turbulence screen, UA 0436, and has a smoother frequency response. Additional detailed tests are planned. Peter indicated that he expects to get this wrapped up before the Jan-2009 meeting.
- 6/22/08 (TC 5.1 pre-meeting): discussed Peter's 6/13 message.
- 6/23/08 (S/C Chair brkfst): same as 1/21/08 (S/C Chair brkfst).
- 6/23/08 (TC 5.1):
- 6/25/08 (Joe B. e-mail): I found some old correspondence that indicates the following persons on the PMS roster: Robert Z. Smith, John A. Murphy, Paul R. Saxon, and Brian L. Reynolds (the PMS chair was indicated). All of these folks are still active in ASHRAE except for Paul Saxon.
- 1/5/09 (Peter Baade e-mail): At the TC 5.1 meeting in Dallas 2 years ago I reported that I remain committed to complete this project but needed somebody to run test of my latest sampling tube design in a low noise wind tunnel. I have just received the attached paper from a colleague in Germany who has made such measurements. The plots in figures 5 and 6 of the attached paper show that my design does meet the objectives set for this project. Mr. von Heesen has requested my permission to construct several sampling tubes of my design and I have granted his request. Thus, I expect to have enough data to complete the final report on this project by the end of the year. Incidentally, Mr. von Heesen is one of the German members of the ISO working group responsible for updating ISO 5136.
- 1/25/09: we think that he'll get it done, John Murphy proposed to simply "let that sleeping dog lie" and give him time to finish it.
- 1/26/09 (TC 5.1 meeting): same as above.
- 2/4/09: e-mailed latest Research Project Notes to MORTS, RL & John M..
- 2/5/09: John M. responded that the notes look okay.
- 2/24/09: e-mailed John regarding possible contact w/Peter and offer to host conference call/WebEx meetings.
- 5/5/09 and 6/7/09: e-mailed John regarding possible update.
- 6/12/09 (Peter Baade e-mail): I am still waiting for the results of the wind tunnel tests that a colleague in Germany is going to run. 4 weeks ago he was about to construct a couple of copies of my sampling tube and I sent him some details he needed for that. When I get the results I will write the final report to wrap up this project.
- 6/19/09: e-mailed John regarding possible update.
- 6/22/09 (S/C Chair brkfst, Mike Vaughn): expectation is that PI will complete once some additional testing is completed by colleague, Mike indicated an outstanding \$19k is unpaid on the project, we would all like to see this successfully completed.

- 6/22/09 (TC5.1 mtg): Peter Baade has reported that he has gathered performance data and expects to produce a final report by the end of 2009.
- 1/24/10 (TC5.1 pre-mtg): John Murphy not available to provide update.
- 1/25/10 (S/C Chair brkfst): updated Dan Castellon that we are holding for PI's final report.
- 1/25/10 (TC5.1 mtg): Peter is not coming through with the report as promised; John has not contacted him yet.
- **6/27/10 (TC5.1 pre-mtg): (John M.) no update from Peter.**
- **6/28/10 (S/C Chair breakfast): no update.**
- **6/28/10 (TC 5.1 mtg): no update available from John, he will try to contact Peter.**

Action items (1126-URP):

- Submit meeting/project minutes to MORTS & RL???
- Decide who will be added to the active PMS roster and appoint a chair (acting chair: John Murphy?)
- Peter Baade has a colleague in Germany completing the testing (6/13/08, 1/5/09, 6/12/09).
- Peter to submit final report to PMS for review.
- PMS approval of final report, TC approval of final report.
- Peter to submit Transaction Paper.

1216-RP**INLET INSTALLATION EFFECTS ON BI/AIRFOIL CENTRIFUGAL FANS, AIR & SOUND**

PI: AMCA International, Mark Stevens and CETIAT, Alain Guedel, **PMS Chair:** Rad Ganesh, **VM:** John Murphy, Franco Cincotti, Kim Osborne (TC2.6) and Greg Meeuwsen (TC2.6), (Interested candidates in excess of five members: Patrick Chinoda, and Tim Mathson)

Contract Period: 9/1/2008 to 6/30/2009

Payment: Total \$95,600

~~(1st) \$23,900 at start,~~

~~(2nd and 3rd) \$23,900 after receipt and acceptance of Progress and Financial Reports (1/1/09 & 4/1/09),~~

~~(4th) \$14,340 submission of Final Report,~~

~~(5th) \$9,560 completion of all Services, acceptance of Final Report, and receipt of Technical Paper.~~

- 6/24/07 (TC 5.1 pre-meeting): needs to be re-bid, if submitted by Aug. can be re-bid in Oct.
- 6/25/07 (TC5.1 meeting): Rad Ganesh submitted a revised work statement. It isn't known if the statement has been approved.
- 1/14/08: Zhiping e-mailed WS & (4) proposals to PES members (John M.; John C.; Franco C. Rad G.)
- 1/21/08 (S/C Chair brkfst): Recommend a contractor. Released for bid in Fall-07. TC must complete Proposal Evaluation Summary Sheet and place in MORTS lockbox outside the HQ room in NY by midnight Tuesday 1/22/08 if funding approval is to be completed in NY. A request for rebid should be noted on the summary sheet if the TC rejects all bids.
- 1/21/08 (TC 5.1 meeting): The PES reported that only 2 of the 3 bids received were acceptable. The recommendation was to accept the low bidder. This recommendation was approved by a vote of 7 Yes. 0 No, 1 Abstain, 1 Absent.
- 1/30/08: e-mailed Summary Sheet for Evaluation of Proposals and Work Statement Cover Sheet to MORTS.
- 1/30/08: MORTS e-mailed "We should have all the information that we need now to handle this recommendation at the RAC level prior to Salt Lake City meeting. By recommending the lowest price/highest score proposal, approval at RAC should be easy."
- 5/14/08: Research Agreement signed by AMCA's Barbara Morrison, Executive Director.
- 6/22/08 (TC 5.1 pre-meeting): AMCA has received project from ASHRAE, fan is being procured.
- 6/23/08 (S/C Chair brkfst): need PMS roster sent to MORTS.
- 6/23/08 (1216 PMS meeting): AMCA to complete airflow testing, and Alain G. from CETIAT to complete sound data analysis, fan to be donated by Twin City.
- 6/23/08 (TC 5.1): project awarded to AMCA to complete the testing, and then the data reduction to be completed by Alain Guedel of CETIAT, the format will be very similar to 1272, meeting scheduled for Oct-08 when Alain G. visits the US, fan donation has been confirmed, add – Kim Osborne (2.6), Patrick Chinoda, and Tim Mathson
- 7/16/08: had a discussion w/Patrick, at this point we have five members and cannot add more.
- 8/27/08 (Donna Daniel): Please be advised that contract negotiations between ASHRAE and AMCA have been finalized. The first installment payment has been paid to the contractor. A copy of the research agreement is attached for your reference. Principal Investigator Note: Please find attached the project monitoring subcommittee roster for your convenience. Please provide quarterly progress and financial reports to the PMS members and copy me. Progress and financial reports are due quarterly: January 1, April 1, June 1, and October 1.
- 1/25/09: replace Zhiping Wang and John Cermak with Kim Osborne (2.6) and Greg Meeuwsen (2.6).
- 1/26/09 (11:00-12:00) 30" single width centrifugal airfoil fan donated to AMCA from Twin City, Rad identified the need to clarify presence/absence of duct collar, Mark reported that 2/3rds of testing complete.
- 1/26/09 (TC 5.1): WS very closely follows 1272 (FC fan), 2/3rds testing complete, results at next meeting, single-wide fan to be projected to double-wide, add a couple tests w/inlet bell,
- 2/4/09: e-mailed latest Research Project Notes to MORTS, RL & Rad G.
- 2/16/09: sent f/u e-mail to Rad.
- 2/24/09: left v-mail and sent f/u e-mail to Rad.
- 2/25/09: Josh Schubert e-mailed progress report and financial report due on 1/1/09 to MORTS.
- 3/18/09: sent f/u e-mail to Rad.
- 3/21/09 (Rad e-mail): All testing is complete and data analysis is proceeding. (Josh) had mentioned that Alain has pretty much completed the draft.
- 5/21/09 (Rad e-mail): Rad will not be attending the ASHRAE annual meeting in June. Requested that Mark send a draft of testing and Alain's analysis.
- 5/26/09 (Rad e-mail): The fan was tested properly with the inlet cone without a duct collar.
- 6/7/09 (e-mail to Rad): Progress reports and financial reports due on 4/1 and 6/1? No cost extension? Schedule?
- 6/11/09 (e-mail to Rad): Sent Research Manual including reference to section 8.
- 6/11/09: Mark Stevens e-mailed draft of report and appendices A & B.

- 6/12/09: Rad G. e-mailed draft report and work statement to PMS members for review and comment, PI will not be in Jun-09 meeting.
- 6/21/09 (TC5.1 pre-mtg): PMS to review draft report tomorrow, possible to get transaction paper submitted by Sep-25 for Albuquerque Jun-2010.
- 6/22/09 (S/C Chair brkfst):
- 6/22/09 (PMS mtg, John M., Franco C., Kim O.): initial review of draft final report that was submitted on 6/11/09, John to e-mail Rad with some issues that were discussed including:
 - How are the aerodynamic system effects actually calculated?
 - Question the use of splines to represent data.
 - Cleanup the legends
 - Was data reduction compromised by use of splines?
 - Possibly eliminate the system effect calc's left of the peak
 - Raw data for airflow and sound?
- 6/22/09 (TC5.1 mtg): same as PMS meeting.
- 12/14/09: Rad G. e-mailed draft report and work statement to PMS members for review and comment by 1st week in Jan-10.
- 1/4/10: Rad G. e-mailed a summary of comments received from PMS members. "We need to vote with a motion to approve/disapprove the report in Orlando."
- 1/24/10 (TC5.1 pre-mtg): Rad indicated that he received some PMS comments about work, testing looks good, some members thought that analysis needs improvement. Rad made the request to PI and has received a revised draft report, PMS to review tomorrow and vote to approve as-is, or continue. Overall, work was done well, room for improvement needed on analysis. Need system effects on air and sound in a dimensionless form, something to compliment AMCA 201.
- 1/25/10 (S/C Chair brkfst): updated RL.
- 1/25/10 (PMS mtg 9:00 AM): Rad walked the PMS through the revised final report rec'd two weeks ago details, data good, Rad compiled list of PMS requirements for PI to revise final report.
- 1/25/10 (TC5.1 mtg): PI's making good progress, good discussion at PMS meeting today, five items required for report revision, test data makes sense, but analysis falls short, Rad will follow-up w/PI.
- 5/31/10 (Rad G. e-mail to Mark & Alain): I would like to apologize for this delayed response. Please find attached the PMS comments from the ASHRAE winter meeting on your final draft of the RP 1216 report (RP1216_CentFans_finalReport_review_toPIs_5-31-10.doc) . I do not plan to attend the ASHRAE summer meeting in Albuquerque, and it is my understanding that you are not either. Your comments will be appreciated. Maybe we can plan your presentation for the ASHRAE winter meeting in Vegas. Please cc all in your response. If necessary, we can discuss these items when I am at AMCA 6/2, 6/3 for the fan committee meeting. These comments are important as they also affect the RP1420 project on plenum fans which will be kicking off soon.
- 6/23/10 (Rad G. e-mail): Dear PMS members of RP 1216, I have been struggling somewhat with the PIs on this project. Attached are the following:
 - 1. (Perf....pdf): Performance evaluation form
 - 2. (Report_review.....RG.doc): Recent correspondence with PIs based on the PMS meeting at ASHRAE in Jan 2010. Here, I am somewhat to blame as I did not get the comments in until end of May due to my travel and work schedule. **We are yet to come to an agreement on changes.**
 - 3. (Report 1216....pdf) Final report draft. No changes made since January 2010.
- At this point the PIs need to make the changes outlined, before the PMS can vote on its approval. Then they will have to make a presentation to the PMS. So far the PMS have not had a face to face meeting with the PIs on this project. In its current form, my vote is 'no'..not approved. Due to unforeseen circumstances, I will not be able to make it to Albuquerque. John M: I will appreciate if you can chair the PMS meeting on my behalf. Please email me the minutes.
- **6/27/10 (TC5.1 pre-mtg): PMS meeting tomorrow, no PI or PMS chair available**
- **6/28/10 (S/C Chair breakfast): no update.**
- **6/18/10 (PMS meeting): VM = John M, Franco C, Zhiping W, Greg Meeuwesen, others = Dave C, Joe B, Kim O, Brian R, Dustin Merideth,**
 - **Reviewed "Report_review_comments with Alain Guedel and Mark Stevens comments - Rev 2_RG.doc"**
 - **Apparently, the report copy attached to Rad's 6/23 e-mail is an older version. Rad e-mailed the latest version to the PMS on 1/15. The revision date should be added to report in order to avoid confusion.**
 - **Item #4: PMS suggests that statement in the noted sections be reworded to possibly include some summary values like the sound data, and the PMS feels that the efficiency changes are significant.**
 - **Item #5: the PMS expects the PI to include the BHP power data in the report, and does not feel as though this would be a scope increase.**

- After the PI adds the BHP data and adjusts the analysis portions they should submit a revised draft for PMS review. Essentially, the PI misstated the efficiency effects of the bearings, and the BHP data will confirm this to be true.
- John Murphy will compile the PMS meeting minutes and forward to Rad for review and presentation to the PI.
- Dave Carroll will forward the Research Project Performance Evaluation Form to Rad, the RL & MORTS.
- 6/28/10 (TC 5.1 mtg): problem was that changes were requested in Jan-2010 meeting that were not effectively communicated to the PIs, the changes were not readily accepted by the PI, the PMS met this morning, PMS will require some of the changes and get a resubmitted report. Data and research is good, presentation needs to be revised.

Action items (1216-RP):

- Current scheduled completion date: 6/30/09, PI to submit a request for another no-cost extension.
- Provide PMS meeting minutes and Research Project Performance Evaluation Form to RL & MORTS (from 1/25/10 and 6/28/10).
- PI to submitted revised final report per PMS requirements (1/25/10, 6/28/2010)
- PMS to vote to approve the revised final report rec'd ???.
- Following PMS approval, TC5.1 to vote to approve the final report.
- PI to possibly submit Technical Paper on or before 9/17/2010 for Jun-2011 Montreal meeting??
- PI to complete a seminar?? Rad to follow-up (6/22/09).

1272-RP**INLET INSTALLATION EFFECTS ON FORWARD CURVED CENTRIFUGAL FANS, AIR AND SOUND**

PI: AMCA, Mark Stevens, **PMS Chair:** Zhiping Wang, **VM:** John Murphy, Franco Cincotti, Rad Ganesh, Patrick Marks (2.6)

Contract Period: 4/3/2007 to 9/30/2007

Payment: Total \$49,500

~~(1st) \$18,562 at start, (2nd) \$18,562 after receipt and acceptance of Progress and Financial Reports, (3rd) \$7,425 submission of Final Report, (4th) \$4,951 completion of all Services, acceptance of Final Report, and receipt of Technical Paper.~~

- 11/11/05 (MORTS): RAC reviewed the subject Work Statement and voted to conditionally accept it for bidding provided the following conditions are addressed to the satisfaction of the TC's Research Liaison (see .PDF).
- 6/24/07 (TC 5.1 pre-meeting): project being worked on right now by AMCA, sound testing to be started, possible seminar in Jun-08, and Transaction in Jan-09.
- 6/25/07 (TC5.1 meeting): The preliminary results of the air flow tests have been completed and submitted to the PMS by AMCA. Testing inlet effects on sound, the remaining portion of the project, is scheduled for completion by the end of September, 2007. The complete results of the research may provide the basis of a new standard and presentation during a transaction session at the Chicago meeting in January, 2009.
- 9/27/07 (AMCA letter to MORTS): Request a no-cost time extension with a new completion date of January 15, 2008.
- 1/15/08 (AMCA message to MORTS): Request a no-cost time extension with a new completion date of June 30, 2008. By this completion date, we expect to have all required deliverables completed including a fully reviewed final report and presentation at the 2008 ASHRAE Annual Meeting in Salt Lake City, UT.
- 1/21/08 (S/C Chair brkfst):
- 1/21/08 (TC 5.1 meeting): The Contractor has requested a no cost time extension until June 30, 2008. Recommendation - approved by vote of 8 Yes, 0 No, 1 Absent.
- 6/23/08 (S/C Chair brkfst): Provide new contract end date or draft final report to MORTS. Original contract end date was Sep-07 and project has been extended twice to the latest date of Jun-08.
- 6/23/08 (1272 PMS meeting, Mark Stevens): completed all airflow testing, completing the post-processing and should be usable for AMCA 201. Sound has been a little tricky, request PMS input as to approach to make usable in AMCA 201. Mark presented a proposed format for sound data processing and reporting. Data analysis to be completed and report submitted to PMS by end of Sep-08 for review and discussion prior to Jan-09 meeting.
- 6/23/08 (TC 5.1): add Patrick Marks as a PMS member from TC 2.6, target completion date is by Jan-08, AMCA will process data per discussion at PMS meeting and submit by Sep-08 for review & discussion.
- 7/8/08: Zhiping provided meeting minutes from the 6/23/08 meeting to PMS & PI only.
- 10/15/08: Zhiping distributed AMCA's Final report, figures, sound and airflow data.
- 11/17/08: 1st PMS meeting to review report submitted by AMCA (Zhiping Wang, John Murphy, Franco Cincotti, Mike Brendel, Dave Carroll)
- 1/25/09: possibly have Transaction in Orlando (submit title & abstract submitted by 2/15/09), or have a Seminar in Orlando (submit title & abstract by 7/7/09)
- 1/26/09 (10:00-11:00 PMS meeting w/PI): AMCA to complete additional analysis work and submit another draft of final report.
- 1/26/09 (Zhiping's meeting minutes): All PMS members (Zhiping Wang, John Murphy, Franco Cincotti, Rad Ganesh, and Patrick Marks) and some guests from TC 5.1 and TC 2.6 attended this meeting. The PI, Mark Stevens from AMCA, was also present. In the meeting, PMS and PI reviewed and discussed the previous recommendations by PMS on the draft final report (submitted by AMCA in October 2008), and Mark Stevens presented additional data reduction results.
- 1/26/09 (TC 5.1 meeting): Jun-2009 submittal for transaction, paper submitted by Sep-2009 for review,
- 2/4/09: e-mailed latest Research Project Notes to MORTS, RL & Zhiping. MORTS provided copy of agreement for 1272-RP
- 2/24/09: followed up with Zhiping, still need meeting minutes & plan for action items.
- 2/25/09: Zhiping published meeting minutes from the 1/26/09 meeting, forwarded to MORTS and RL, action items are noted below.
- 5/22/09 (Mark Stevens e-mail): Please review the attached Final Report for ASHRAE 1272-RP. In accordance with the requests of the PMS at the last subcommittee meeting. With this submittal we consider that AMCA has met the requirements of the PMS in regard to the contents of the final report and we plan to proceed with the submittal of the final report to ASHRAE in a format consistent with Section B of Deliverables.
- 6/10/09 (Mark Stevens e-mail): At the moment I do not plan to be in Louisville, but I am hoping to provide the Technical Paper at a seminar in Orlando in January. I believe the request for a time slot needs to come from the PMS by July 10. My travel schedule is pretty light between now and August. I'm available for a conference call pretty much any time.

- 6/21/09 (TC5.1 pre-mtg): AMCA revised and resubmitted final report, Zhiping does not see any issues, to be reviewed/approved, AMCA to publish at least one formal technical paper (Transaction??), which may need to be submitted by Sep-25 for Albuquerque, also may complete a seminar, Zhiping to follow-up with PI.
- 6/22/09 (S/C Chair brkfst, Mike Vaughn): PMS mtg today to review 5/22/09 report, since final report has been submitted the quarterly progress reports are no longer required, need a no-cost extension (Jan-09?).
- 6/22/09 (PMS mtg): Zhiping to request PI to make a few minor changes, PI to submit revised final report, PI to submit for no-cost extension (Sep-2009?), PMS to review/approve, then a letter ballot to TC5.1.
- 6/23/09 (TC5.1 mtg): if not ready for Transaction by 9/25, it could be a Conference Paper, then the abstract would need to be submitted by ??? Motion: TC5.1 authorizes an e-mail ballot to approve the final report for 1272 if required (9-0-0).
- 7/21/09: Zhiping sent list of issues generated by the PMS to Mark Stevens, requested revised final report and resubmit to PMS, requested technical paper(s) & submission schedule (target Albuquerque?), and requested a no-cost extension since contract completion date was 6/30/2009.
- 9/4/09: Mark Stevens' e-mail response to Zhiping's 7/21 e-mail, he agreed to some requested changes and objected to others.
- 10/6/09: Zhiping submitted a revised PMS response to Mark Stevens.
- 10/8/09: Mark Stevens agreed to the proposals in the revised response.
- 12/15/09: Zhiping e-mailed the revised final report from Mark Stevens to the PMS members for review.
- 1/22/10 (Zhiping e-mail): AMCA recently re-submitted the revised final report per the PMS suggestion. The PMS will meet on Monday morning (10:00-11:00am) to review the final report, and hopefully, the PMS can reach a consensus to approve the final report. If that is the case, the PMS will ask for a TC vote in the main meeting to approve the final report. The only other remaining deliverable is the technical paper. The PI submitted an abstract for a conference paper at the Albuquerque meeting and got rejected. As of right now, the plan is to ask the PI to continue the preparation of the technical paper and plan for the 2011 winter meeting. I will also discuss this matter with the TC 5.1 program chair.
- 1/24/10 (TC5.1 pre-mtg): for 2011 winter meeting possible paper presentation (April 9 for Transaction, Aug 6 for Seminar). (Rad): tons of data by AMCA but analysis fell short, could be included in future
- 1/25/10 (S/C Chair brkfst): updated RL.
- 1/25/10 (PMS mtg 10:00 AM): Zhiping provided history of final report updated the PM regarding latest revised draft of final report rec'd 12/15. PMS voted to approve the final report.
- 1/25/10 (TC5.1 mtg): PMS met this morning for review/approval of final report, PMS approved the final report, Zhiping made a motion for TC 5.1 to approve the final report, vote was 9 for, 0 against, 0 abstain. PI submitted abstract for conference paper (we think) Jun-2010, but it was rejected, PI will most likely submit before April for Jan-2011 meeting.
- 1/29/10: Zhiping e-mailed PMS meeting minutes from 1/25 and Research Project Performance Evaluation Form.
- 1/31/10: e-mailed the latest PMS meeting minutes and "Research Project Performance Evaluation Form" to Mike V, Dan C, Donna D.
- 3/26/10 (Zhiping W e-mail): Aresh, I just talked to Mark about the status of the planned transaction paper for 2011 winter meeting. Mark said that he has not submitted the paper to ASHRAE yet, but he believes he can still meet the deadline which is exactly two weeks away from today. Just an update for you. Mark, After you complete and submit the paper, please drop me a line.
- 5/19/10 (ASHRAE e-mail): "A manuscript entitled "Inlet Installation Effects on Forward Curved Centrifugal Fans, Air Performance and Sound", TRNS-00050-2010, has been submitted to ASHRAE for consideration for publication."
- **6/27/10 (TC5.1 pre-mtg): Zhiping reported that the project is complete, the final report was approved by the TC at the Jan-2010 last meeting, technical paper was submitted (transaction paper) and is being reviewed, per Aresh: Program Committee review - one of four had comments and requested revisions that have to be submitted prior to 7/6 for a transaction paper (Aresh submitted this info to Mark on 6/15). According to Joe Brooks, Mark expects to make the requested changes. The issue may be the timing. Zhiping will generate and submit the "Disposition of ASHRAE Sponsored Research Results" form.**
- **6/28/10 (S/C Chair breakfast): no update.**
- **6/28/10 (TC 5.1 mtg): project is complete, final report approved at Jan-2010 meeting, transaction paper has been submitted, all deliverables have been delivered to ASHRAE, "Disposition of ASHRAE Sponsored Research Results" form to be completed.**

Action items (1272-RP):

- Provide PMS meeting minutes and Research Project Performance Evaluation Form to RL & MORTS (from 1/25/10 and 6/28/10).
- PI to revise and resubmit Technical Paper per the ASHRAE Manuscript Central review, must be returned by 7/6/2010 in order to be a transaction paper for the Jan-2011 meeting (6/27/10).
- PI to complete a seminar??? Zhiping to follow-up.

- PMS chair to submit a “Disposition of ASHRAE Sponsored Research Results” form.

1420-TRP**INLET AND DISCHARGE INSTALLATION EFFECTS ON AIRFOIL (AF) CENTRIFUGAL PLENUM/PLUG FANS FOR AIR AND SOUND PERFORMANCE****PI: T.B.D., PES/PMS - Chair: Franco Cincotti, VM: Rad Ganesh, Mike Brendel, Thomas Bader, Curt Eichelberger (TC2.6)****Contract Period: ??? to ???****Payment: Total \$???**

- 1/4/05(MORTS): RAC reviewed the subject RTAR and voted to return it (see .PDF).
- RAC approved the RTAR for topic #1420 in June 2006
- 6/24/07 (TC 5.1 pre-meeting): Rad was supposed to send out to TC for vote at this meeting, need to submit WS to MORTS by 8/15, John Cermak would like to be on PMS, need to have approved for bid by 10/1/07.
- 6/25/07 (TC5.1 meeting): The work statement was not completed. Dave will contact Rad Ganesh to determine the status work statement.
- 1/21/08 (S/C Chair brkfst): Submit work statement before May 15, 2008 or topic will be removed from display on plan. WS must be submitted and approved for bid by July 1, 2010 or topic will be dropped permanently by RAC.
- 1/21/08 (TC 5.1 meeting): The work statement was revised in the last two days. Tom Sobieski moved to submit this to the membership for an e-mail ballot. Seconded by Franco Concitti. Approved unanimously.
- 6/23/08 (S/C Chair brkfst): Submit work statement. Topic was removed from display on plan following May 15, 2008 deadline for submission of first draft of WS. WS must be submitted and approved for bid by July 1, 2010 or the topic will be dropped permanently by RAC.
- 6/23/08 (TC 5.1): letter ballot to be completed to get TC approval of WS (reference 149 ballot)
- 6/27/08: e-mailed Joe B. to confirm the e-mail addresses of (12) TC 5.1 voting members, e-mailed copy of WS 1420 to SPLS Liaison for review and sign-off.
- 7/1/08: e-mailed a letter ballot to the TC 5.1 members.
- 7/7/08: rec'd responses from (2) out of (12) members, e-mailed a letter ballot to the TC 5.1 members a 2nd time.
- 7/16/08: rec'd responses from (9) out of (12) members, e-mailed a letter ballot to the remaining (3) TC 5.1 members a 3rd time.
- 7/17/08: rec'd responses from (11) out of (12) members, Franco Cincotti is out of the country and unavailable.
- 7/22/08: e-mailed update to SPLS Liason.
- 7/25/08: rec'd final vote from Franco, e-mailed update w/ comments to TC 5.1 and Mo, asked Rad and Franco to address 3 TC5.1 votes with comments, we have until 8/15 to submit the approved work statement to MORTS in order for it to go out for bid in the fall.
- 8/26/08: requested update from MORTS.
- 8/27/08 (MORTS): RAC has not seen and reviewed any drafts of the work statement for 1420 yet. RAC is also holding their fall meeting two weeks later, which means the projects that are posted for bid this fall will be posted before RAC meets. Therefore, even if you had submitted your work statement for review on 8/15, it is likely the project would not post for bid until March 2009 at the earliest.
- 8/27/08: requested Rad and Franco to update WS for (3) TC5.1 votes with comments.
- 9/11/08: Franco provided updated WS "WS_1420_plenumfans-rev2.doc".
- 12/7/08: revised WS e-mailed to MORTS.
- 12/11/08: revised WS & coversheet e-mailed to MORTS.
- 1/25/09: Dan Castellan (new Research Liaison) reported that RAC reviewed and conditionally approved the WS with comments, he will forward details tomorrow morning, updated WS to be reviewed and voted for approval by the TC and returned to Dan for review/approval on or before 2/8/09 so that it can be put out for bid in the Spring.
- 1/26/09: Dan Castellan provided the comments from the RAC Committee:
 - 1) "It appears that all specific questions raised during review of the RTAR have been addressed properly. However, because acoustics is a big part of the project, the WS should require that bidders indicate their acoustical background and the availability and discussion of a specialized acoustic facility to be used."
 - 2) "It would be helpful to describe in detail the expected results from this project - maybe in terms of the specific plots that will be needed to characterize the fan performance data."
 - 3) "Are fitted equations an expected result?"
- 1/26/09 (TC 5.1 meeting): will forward hard copies and letter ballot vote to approve revised WS per RAC comments rec'd 1/25/09.
- 1/30/09 (e-mail from MORTS): 1420-TRP-C, "Inlet and Discharge Installation Effects on Airfoil (AF) Centrifugal Plenum Plug Fans for Air and Sound Performance;" Responsible Committee: TC 5.1 (Fans); Status: Conditionally approved for bid 09.01. Work with Research Liaison to resolve RAC's approval conditions by February 27th so project can bid this spring.

- 1/30/09: e-mailed revised WS to Dan Castellan for approval.
- 2/3/09: spoke with Dan regarding updated WS and he will decide by tomorrow whether or not he will forward on to MORTS.
- 2/4/09: Mike Vaughn forwarded RAC comments on conditional WS approval, I responded to all and submitted a revised WORK STATEMENT COVER SHEET (2/4/2009), and a revised WS (rev. 4, 2/4/2009).
- 2/4/09: e-mailed latest Research Project Notes to MORTS, RL & Zhiping.
- 2/5/09: Donna Daniel e-mailed the formal letter of conditional approval from WS (rev 2).
- 2/5/09: Dan Castellan e-mailed approval of revised WS (rev 4, 2/4/09).
- 2/5/09: Donna Daniel provided 1420-RFP and contact info sheet for review and approval.
- 2/6/09: Donna provided an updated RFP copy for approval, replied with approval, Donna stated that it will post for bid this spring.
- 2/11/09: Donna Daniel provided copy of 1420-RFP and indicated that it will be posted on their website 3/15/09.
- 2/24/09: e-mailed 1420-RFP rec'd on 2/11 to Franco.
- 3/15/09 (Donna Daniel e-mail): On March 15, 2009 a Request-for-Proposal entitled, 1420-TRP, "Inlet and Discharge Installation Effects on Airfoil (AF) Centrifugal PLENUM/PLUG Fans for Air and Sound Performance" Sponsored by TC 5.1, Fans, was posted for bids . <http://www.ashrae.org/technology/page/39>.
- 5/27/09: Donna Daniel e-mailed two proposals to Franco Cincotti, Rad Ganesh, Mike Brendel, Thomas Bader, Curt Eichelberger, & Dan Castellan.
- 6/21/09 (TC5.1 pre-mtg): PES meeting to occur after this meeting.
- 6/21/09 5:00-6:00 (PES 1420): (Franco C., Mike B., Curt E., Dave C.) two bids reviewed, both contained partial information, request for clarification will be submitted through RL/MORTS, Franco to generate meeting minutes and request for clarification.
- 6/22/09 (S/C Chair brkfst, Mike Vaughn): 2 bids need clarification, must be routed through Mike, he'll give bidders 30 days to respond, PES to then discuss, score, and choose a bidder. If the PES chooses a bidder, then TC5.1 must vote via letter ballot, and vote must be submitted to MORTS on or before 10/1/2009.
- 6/22/09 (TC5.1 mtg):
- 7/1/09: Franco submitted draft of minutes from 6/21 meeting topes members.
- 7/10/09: Franco submitted minutes from 6/21 meeting and a list of requests for clarification to PES members and MORTS.
- 7/13/09: MORTS confirmed receipt of request for clarification.
- 9/21/09: MORTS sent RFQ to AMCA, requested response by 10/26.
- 10/27/09: Donna Daniel requested PES feedback regarding recently issued clarifications.
- 12/9/09: PES conference call/web meeting.
- 12/15/09: Franco e-mailed each PES member's scores and the Summary Sheet.
- 12/16/09: e-mail to TC5.1 voting members for letter ballot.
- 1/13/09: letter ballot votes and Summary Sheet e-mailed to Franco.
- 1/24/10 (TC5.1 pre-mtg): Franco provided revised hard copy of Summary Sheet (original was missing Thomas Bader).
- 1/25/10 (PES mtg 5:00 PM): no meeting occurred.
- 1/25/10 (S/C Chair brkfst): updated Dan Castellan.
- 1/25/10 (TC5.1 mtg): PES selected bidder via conference call/web meeting in December, TC approved selected bidder by letter ballot in early January, SUMMARY SHEET FOR REPORTING EVALUATION OF PROPOSALS, PROPOSAL EVALUATION FORMS (from each PES member), and TC letter ballot vote will be dropped into MORTS mailbox tomorrow.
- 1/26/10: Delivered "SUMMARY SHEET FOR REPORTING EVALUATION OF PROPOSALS", "PROPOSAL EVALUATION FORMS" (from each PES member), and "TC letter ballot vote" forms to MORTS mailbox.
- 2/1/10 (Mike Vaughn e-mail): Hi David, Thanks for the information. I received the information that you list below was hand delivered to Tara in Orlando and 1420-TRP was approved for funding by RAC and Tech. Council based upon some of this information. Sincerely, Mike.
- **6/27/10 (TC5.1 pre-mtg): AMCA & CETIAT were notified in April of their successful bid, Franco reported that Mark is currently selecting the fans. It was discussed that the PI should participate in a face-to face or at the least a conference call prior to work starting. Fan selection, start of testing, quarterly progress reports, and a regularly-scheduled conference call between the PI and PMS will be coordinated.**
- **6/28/10 (S/C Chair breakfast): no update.**
- **6/28/10 (TC 5.1 mtg): AMCA/Cetiat notified in April, they are in the process of selecting two fans (arrangement #1).**

Action items (1420-TRP):

- Get copy of contract.
- Project kickoff meeting. (review WS with PI, discuss PMS expectations, establish schedule, identify deliverables, include intermediate quality checks, review fan selection, start of testing, quarterly progress reports, establish a regularly-scheduled conference call between the PI and PMS, etc...).

1617-URP**Fan Noise Scaling and Statistics****RESEARCH TO IMPROVE THE METHOD CURRENTLY INCLUDED IN AMCA 301 TO CONVERT TESTED FAN SOUND DATA INTO ACCURATE DATA FOR FANS OF DIFFERENT SIZE AND SPEED**

- 6/25/07 (TC5.1 meeting): Joe Brooks will contact Pennsylvania State University to determine their interest in submitting an Unsolicited Research Project (URP) request to ASHRAE.
- 6/21/09: (John Murphy) significant proposal was presented to AMCA to model inlet/outlet effects, however; the uncertainties were 2-3X bigger than were allowable, issues with resonances in actual data were significant for model correlation. Remove from list.
- 1/24/10 (TC5.1 pre-mtg): Joe Brooks indicated that Michael Jonsen (sp?) from Penn State had done some work for AMCA, and more was needed, however; AMCA did not want to appropriate any more money and proposed that remainder might be completed through ASHRAE as an Unsolicited Research Project (URP), Joe indicated that Penn State submitted a URP to ASHRAE, I'll f/u with MORTS tomorrow at Research S/C Chair breakfast. Joe e-mailed a copy of URP.
- 1/25/10 (S/C Chair brkfst): MORTS has the URP, it was received too late for consideration at this meeting, and it will be included in next cycle.
- 1/25/10 (TC5.1 mtg): Joe provided synopsis of URP to TC for discussion
- 5/18/10 (Mike Vaughn e-mail): The purpose of this e-mail is to request that you please ask the Proposal Evaluation Subcommittee (PES) for 1617-URP to evaluate the attached unsolicited research proposal on behalf of ASHRAE and recommend if it should be funded as an ASHRAE research project sponsored by your TC.
- Attached is a copy of ASHRAE Unsolicited Research Proposal #1617-URP, "Fan Noise Scaling and Statistics." Instructions and forms for conducting the review and reporting your recommendation to RAC are also provided.
- I have also copied the chair and research subcommittee chair of TC 2.6 on this message in case they wish to join TC 5.1 in this review and provide a representative to the PES. The chair should contact you directly, with me on copy, if they wish to have a representative on the PES. Your Research Liaison will most likely ok this larger than normal PES, if necessary, in order to gain broad participation from the related TCs in this particular case.
- If possible, I would like to have your funding recommendation on this proposal by midnight Tuesday, June 29, in order for RAC to have time to consider your recommendation at the Society's annual meeting in Albuquerque. Otherwise, a decision will have to wait until the next RAC meeting in October most likely.
- Please invite your Research Liaison, Danny Castellán, (who is copied on the e-mail), to all PES meetings regarding this project and place a copy of the individual review forms and the summary sheet in my mailbox and the mailbox of your Research Liaison's outside the ASHRAE headquarters room before midnight on that Tuesday.
- **6/27/10 (TC5.1 pre-mtg): funding recommendation on this proposal due to MORTS due midnight Tue 6/29. Because they only have 1/3octave data its value is limited, and the probability of success is very low. There was discussion about the value to ASHRAE. A PES was formed (Dave C, Mike B, Kim O, Franco C), we decided what to do, and will bring the recommendation to TC for Monday vote.**
 - **Brief Explanation: As the proposal is submitted it is to provide research that will be used to upgrade AMCA 301. It does not describe how it will benefit ASHRAE and its members.**
- **6/28/10 (S/C Chair breakfast): no update.**
- **6/28/10 (TC 2.6 mtg): Kim O. reported that PES discussed URP, there were questions about whether or not they included a large enough data set for the intended goals, and that the proposal is presented as way to upgrade AMCA 301, which is not an ASHRAE sponsored standard. The PES started the "ASHRAE Unsolicited Research Proposal Evaluation Form" and will recommend that TC 5.1 vote to Reject the URP.**
- **6/28/10 (TC 5.1 mtg): PES recommends that the TC vote to reject the URP. Some discussion ensued regarding proposal, data is viewed as too limited and needs to be narrow-band, not 1/3rd octave for it to be valuable to complete the goal.**
 - **Proposed Brief Explanation/Guidance: Project would be very valuable, but they apparently do not have enough data to complete the task. We should explain that we really feel that the intent of the project is worthwhile, we do not feel that using the data as he proposes to use will not lead to a successful conclusion. Odds would be better if they have narrow band data available, and much more. The objective is really deeper than simply updating AMCA 301. Everybody in the industry uses AMCA 301 to extrapolate sound data. This research would improve that process. Also need to describe how the proposal will benefit ASHRAE and its members. We do not feel that the approach is viable unless the database includes spectral density data. Also need to remove structural resonances from the data in order to normalize data.**
 - **If the statistical analysis approach is to be successful then the URP author must demonstrate that the structural resonances must be eliminated from the database.**
 -

- **URP rejected by unanimous TC vote.**
- **Dave Carroll will generate a response letter and forward to Mike Vaughn.**
- **Laura Pedrillo recommend that any corrected URP get forwarded to AHRI Steve Syzmurski (sszymurski@ahrinet.org).**

Action Items:

- **TC's funding recommendation on this proposal and brief explanation to MORTS due midnight Tue 6/29.**
- **Generate a response letter and forward to Mike Vaughn.**

SUGGESTED RESEARCH TOPICS (ACTIVE)

1) FAN INLET EFFECTS – ALL FIVE FAN TYPES – WHAT NEXT???

- 1/25/09: what to do with all five of these inlet effect research projects? Update/validate/revised the AMCA 201 (airflow), and AMCA 301 (sound)? Include a section in Handbook that identifies the DO's/DON'Ts to avoid significant system effects on airflow & sound by basic fan type?
- 1/26/09 (TC 5.1 meeting):
- 6/21/09 (TC5.1 pre-mtg): Compile the five research reports into addition to handbook? John M. talked about the possibility that high energy costs will drive system design to 0 system effect. George questioned "Then why did we do all this research?" (Mike B.) It is important to identify severity of system effects. We will want to pull the "lessons learned" from the five projects. Need ideas for RTAR generation – investigate/compile data, draw overriding conclusions, deliverables, etc...
- 6/22/09 (TC5.1 mtg): Brian Reynolds volunteered to generate an RTAR to compile/analyze all five.
- 7/13/09: Brian Reynolds e-mailed draft RTAR "Inlet Installation Effects on Fans used in Air Conditioning, Air and Sound – Summary of Previous Research Projects".
- 1/24/10 (TC5.1 pre-mtg): (Joe Brooks) ISO TC117 Fans has a pending work item proposed standard on system effects (Chair, Bill Corey, UK) they have a ton of data from UK lab, possibly combine the data from ASHRAE and UK lab in new RTAR, AMCA 201 is a way to predict system effect, however; it often results in erroneous predictions. (Rad); while its okay to look at UK lab data, it may greatly expand the scope and the time needed to complete this research, and there may be differences in the UK lab data vs. ASHRAE data. On airflow SE there is a roadmap, there currently is nothing on sound SE. All five projects cost ASHARE ~\$500-750 million, will be used to update the handbook chapter. Reference John M's comments from 6/21-22/09 regarding fan discharge effects.
- 1/25/10 (S/C Chair brkfst): next RTAR due date is May 15.
- 1/25/10 (TC5.1 mtg):
 - TC member comments due to Brian by ??? and he'll compile.
 - Review Research MOP
 - Review "How To Write An RTAR" PPT presentation
 - Review 2010-2015 Research Strategic Plan
 - TC 2.6 could co-sponsor (Curt)
- 1/27/10: Brian e-mailed updated RTAR with above changes.
- **6/27/10 (TC5.1 pre-mtg): will review with RL & MORTS tomorrow AM.**
- **6/28/10 (S/C Chair breakfast): no update.**
- **6/28/10 (TC 5.1 mtg):**

Action items:

- Review RTAR versus Research Manual, suggested RTAR prep documents, and 2010-2015 Strategic Research Plan.
- Draft RTAR to be submitted for Research Liaison preliminary review (6/27/10).
- RTAR to be submitted for TC review/revision/approval via e-mail/letter ballot.
- Contact Curt Eichelberger for TC 2.6 review and possible participation.
- Revise/modify RTAR per TC input and RL input.
- TC approval of RTAR and submit to Liaison for review/revision, and then to MORTS.
- TC approved RTARs can be submitted May 15, Aug 15, or Dec 15 to be considered by RAC at the Annual Meeting, Fall Tech Weekend, or Winter meeting.

2) NEW RESEARCH PROPOSAL FROM PATRICK RESEARCH ON PARALLEL FANS AND SERIES FANS

- 1/24/10 (TC5.1 pre-mtg, Patrick C.): Not too much out there besides Buffalo and AMCA 201, many people erroneously expect AMCA 201 predictions, however; actual results fall short, Patrick has some case studies, possible RTAR to offer better predictive methods for industry use and what implications of non-ideal arrangements. Series fans are not as bad as parallel, but there are still differences. Patrick to generate an RTAR with Dave's assistance. Joe Brooks provided a copy of Patrick's e-mail with photos.
- 1/25/10 (TC5.1 mtg): Patrick to generate an RTAR with Dave's assistance
- 2/2/2010: Patrick e-mailed a draft RTAR
- **6/18/2010: Patrick e-mailed a draft RTAR**
- **6/27/10 (TC5.1 pre-mtg): will review with RL & MORTS tomorrow AM.**
- **6/28/10 (S/C Chair breakfast):**
- **6/28/10 (TC 5.1 mtg):**

Action Items:

- Review RTAR versus Research Manual, suggested RTAR prep documents, and 2010-2015 Strategic Research Plan.
- Draft RTAR to be submitted for Research Liaison preliminary review (6/27/10).
- RTAR to be submitted for TC review/revision/approval via e-mail/letter ballot.
- Revise/modify RTAR per TC input and RL input.
- TC approval of RTAR and submit to Liaison for review/revision, and then to MORTS.
- TC approved RTARs can be submitted May 15, Aug 15, or Dec 15 to be considered by RAC at the Annual Meeting, Fall Tech Weekend, or Winter meeting.

3) DEVELOP METHOD FOR TESTING/RATING/COMPARING LARGE CIRCULATING FANS

- 1/24/10 (TC5.1 pre-mtg): Christian Taber (Big Ass Fans), works at circulating fan mfr, no industry standards for fan test/rating/comparisons/sizing, different companies publish different things, engineers are unable to complete a meaningful analysis. AMCA 230 – thrust is the measurement, which doesn't lend itself well for sizing. Trying to find a body that will help establish a test standard for the circulating fans. (Joe B.): 15 years ago AMCA came up with thrust calculation with loose ability to convert to CFM. Afterwards a number of smart people tried to improve, but gave up. (Christian) We have a 40k sq ft test lab w/60' high ceiling for testing and evaluation, and a method (air velocity profile) to test. Possibly have a Forum to solicit industry input.? Christian to get with Aresh regarding Forum, and possibly generate an abstract. Goal is to develop a standard method of test for industry to use.
- 1/25/10 (TC5.1 mtg): no update.
- **6/27/10 (TC5.1 pre-mtg): According to Aresh a forum was requested, but not approved. Another forum will be requested in order to determine what other test/rating/comparing methods could be used.**
- **6/28/10 (S/C Chair breakfast): no update.**
- **6/28/10 (TC 5.1 mtg): Forum will be requested.**

Action Items:

- Aresh to request a Forum for Jan-2011 (6/27/10)

4) DEVELOP METHOD FOR TESTING/RATING/COMPARING AIR CURTAINS

- 6/21/09: There is no standard test method for Air Curtain effectiveness. Several methods are being considered in AMCA discussions.
- 1/24/10 (TC5.1 pre-mtg): Joe B. brought up the topic again.
- 1/25/10 (TC5.1 mtg): no update.
- **6/27/10 (TC5.1 pre-mtg): Joe reported that while there is little interest for this at AMCA, there is European activity, 5-6 different ways, they are converging on best way. Fan efficiency is irrelevant, it is the equipment effectiveness. Will put this item in the parking lot. John M. stated that this RTAR may be worth pursuing along with another TC (4.4?), in light of the need for noise testing, which requires performance data. Joe will generate a draft RTAR after we discuss with 4.4 Research Subcommittee Chair.**
- **6/28/10 (S/C Chair breakfast):**
- **6/28/10 (TC 5.1 mtg):**

Action Items:

- Contact Research Sub-C Chair from 4.4 to discuss possible joint RTAR (6/27/10).
- Joe will work with TC4.4 participant to generate new RTAR (6/27/10).

5) FAN STALL RESEARCH?

- **1/25/10 (TC5.1 mtg.): Chuck indicated the need since peak efficiency and stall are very close, we should provide some guidance to help address issue, Joe indicated that EuroVent has a paper on fan stall available on web, Bob Smith indicated that there is a lot of available good work out there (Russian), Bob and Chuck will discuss and get back to us regarding a possible RTAR.**
- **6/27/10 (TC5.1 pre-mtg): no update, possibly get update tomorrow.**
- **6/28/10 (S/C Chair breakfast):**
- **6/28/10 (TC 5.1 mtg):**

Action Items:

- Chuck Coward and Bob Smith will discuss and get back to us regarding a possible RTAR (1/25/10).

PARKING LOT - SUGGESTED RESEARCH TOPICS

DEVELOP CRITERIA FOR IMPROVING THE DESIGN OF FLOW SETTLING MEANS UTILIZED IN MULTI-NOZZLE CHAMBER PERFORMANCE TESTING DEFINED IN AMCA STANDARD 210/ASHRAE STANDARD 51.

- 6/25/07 (TC5.1 meeting): Research to develop criteria for improving the design of flow settling means utilized in multi-nozzle chamber performance testing defined in AMCA Standard 210. John Murphy and John Cermak volunteered to prepare a RTAR for review at the next meeting.
- 1/21/08 (TC 5.1 meeting): Research to develop criteria for improving the design of flow settling means utilized in multi-nozzle chamber performance testing defined in AMCA Standard 210. John Murphy and John Cermak volunteered to coordinate the preparation of an RTAR for review at the next meeting.
- 6/22/08 (TC 5.1 pre-meeting): no RTAR generated yet.
- 6/23/08 (TC 5.1): progress overnight, generated basic format,
- 1/25/09: (John Cermak) AMCA fan committee may participate in developing RTAR/WS.
- 1/26/09 (TC 5.1 meeting): 2/11-13/09 AMCA Fan Committee Meeting will be used to develop RTAR for review by TC ahead of Jun-09 meeting.
- 6/21/09 (TC5.1 pre-mtg): (John M. & Joe B.) plan for AMCA generated RTAR did not happen, still a viable option, little info regarding how to setup settling means and zero info defining success, John Cermak was volunteered to follow-up.
- 6/22/09 (TC5.1 mtg):
- 1/25/10 (TC5.1 mtg): no update.
- **6/27/10 (TC5.1 pre-mtg): no update.**
- **6/28/10 (S/C Chair breakfast): no update.**
- **6/28/10 (TC 5.1 mtg):**

Action items:

- **Draft RTAR to be generated and submitted for Research Liaison preliminary review (1/25/09 John Cermak, Joe Brooks, AMCA).**
- RTAR to be submitted for TC review/revision.
- TC approval of RTAR and submit to Liaison for review/revision, and then to MORTS.

FAN OUTLET DISCHARGE EFFECTS WOULD BE THE NEXT LOGICAL STEP FOR FUTURE RESEARCH PROJECTS?

- 6/23/08 (TC 5.1 meeting): Rad Ganesh commented that fan outlet discharge effects would be the next logical step for future fan research projects.
- 1/26/09 (TC 5.1 meeting):
- 6/21/09 (TC5.1 pre-mtg): Joe B. reported that NREL System Effects Research data may be worth investigating. John M. commented that discharge effects are very sensitive to specific configurations details, testing would be very fan-specific, not much useful general data would result. John's opinion is that such research is not warranted since the downstream effects are calculate-able. Will need to find a champion in order to proceed. Could be a data analysis project NREL data?
- 6/22/09 (TC5.1 mtg): John M. stated that if there is a significant body of outlet system effects data from NREL (its NOT lab quality data, actual installations) its quite possible that a research project that makes sense would be to see/verify that you can see what is going on, personally do not feel its useful to complete a whole bunch of new tests. John has too many irons in the fire at this time to generate an RTAR, someone else could take this on. Curt feels that someone from TC2.6 might be convinced to generate RTAR for joint research.
- 1/25/10 (TC5.1 mtg): no update.
- **6/27/10 (TC5.1 pre-mtg): because outlets are not uniform, there would be little value in this effort. This will be removed from the list of potential research projects.**
- **6/28/10 (S/C Chair breakfast):**
- **6/28/10 (TC 5.1 mtg):**

Action items:

- **Need to find a champion in order to proceed, John to follow-up with Rad (6/21/09).**
- Draft RTAR to be generated and submitted for Research Liaison preliminary review.
- RTAR to be submitted for TC review/revision.
- TC approval of RTAR and submit to Liaison for review/revision, and then to MORTS.
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ROUND ROBIN TEST PROGRAM TO ESTABLISH THE ACCURACY OF ASHRAE 300 TESTS.

- 6/25/07 (TC5.1 meeting): Research has never been conducted to prove the accuracy of AMCA testing standards 210 and 300 and if the evaluation of testing uncertainties included in the standards is correct. Utilizing a statistical method to demonstrate the accuracy of the standards and the uncertainty evaluation may be an appropriate method to provide proof. The statistical research would be conducted by testing the same fan in as many AMCA accredited laboratories as possible. John Cermak and John Murphy will write a RTAR for evaluation at the New York meeting.
- 1/21/08 (TC 5.1 meeting): No volunteer came forward to prepare an RTAR.
- 6/22/08 (TC 5.1 pre-meeting): No volunteers came forward to prepare an RTAR.
- 6/23/08 (TC 5.1): John M. offered to look at available data from AMCA from certification tests of fans by AMCA and manufacturer, data has to be sanitized to eliminate the manufacturer, John did receive a batch some time ago, but needed additional data, Joe will f/u at AMCA, John suggested that we put in parking lot for now.
- 6/21/09 (TC5.1 pre-mtg): (John M.) repeatability of acoustic data between two labs analysis completed and delivered to AMCA fan committee, the observed variation was close to or bigger than the allowable tolerance. Largest variations occur in lower octave bands. (Mark Fly) AHRI is doing the same right now with similar results (generally in-tolerance). (John) AMCA 300 allowable tolerance may be too tight. For TC5.1 it's a dead issue at this time and will be dropped.

PAST TC 5.1 RESEARCH TOPICS

1223-RP

INLET INSTALLATION EFFECTS ON SMALL PROPELLER FANS, AIR AND SOUND

PI: TTU, Corinne Darvennes, **PMS Chair:** David Carroll, **VM:** John Murphy, John Cermak, Rad Ganesh, Franco Cincotti, Kim Osborn (2.6)

Contract Period: ??? to ???

Payment: Total \$???

- 6/24/07 (TC 5.1 pre-meeting): Seminar 36 on Monday 6/25
- 6/25/07 (TC5.1 meeting): Results of the testing for the first fan type were presented at a seminar conducted by Dr. Steve Idem. The remaining work scope of the project is two-thirds complete. The final research report is scheduled to be submitted to the committee in Dec-2007 for review at the meeting in New York Jan-08. A transaction session to present the research results is planned for the Chicago meeting in January 2009.
- 1/17/08: Steve I. e-mailed Matthew's dissertation: "Inlet Installation Effects on Propeller Fans, Air and Sound."
- 1/21/08 (S/C Chair brkfst):
- 1/21/08 (TC 5.1 meeting): Testing is complete and the final report is in work. Will provide final report by 3/1/08. (3) papers will be written to publicize the results (apparatus, airflow, sound). Deadline for submission of papers for Transactions at Jan-09 meeting is 4/4/08, could have apparatus & airflow ready.
- 3/7/08: Steve I. e-mailed TRNS-00042-2008: "Test Apparatus and Procedure to Measure Inlet Installation Effects of Propeller Fans," and RSCH-00043-2008: "Aerodynamic Performance and System Effects of Propeller Fans RP-1223," and noted that he anticipated completion of the acoustic paper in the next several weeks.
- Apr-08: Rad asked by ASHRAE to review TRNS-00042-2008 "Test Apparatus..."
- 6/9/08: Prof. Jelena Srebric requested that I be a reviewer for RSCH-00064-2008 "Acoustic System Effects of Propeller Fans Due to Inlet Installations RP 1223." I declined and referred her to John Murphy & John Cermak.
- 6/14/08: Steve I. e-mail soliciting feedback for the above two papers, they're still working on the acoustic paper, will complete soon.
- 6/22/08 (TC 5.1 pre-meeting): meeting later today.
- 6/22/08 (PMS meeting): According to Steve I. the Transaction paper TRNS-00042-2008: "Test Apparatus..." has been accepted for Jan-09 Transactions pending submission and acceptance of final proofs. Steve also HVAC & R paper RSCH-00043-2008: "Aerodynamic Performance..." has been tentatively approved for the same for revision of figures. He will be updating them and returning to ASHRAE in time for Chicago. The third paper RSCH-00064-2008 "Acoustic System..." is currently being sent out for review by ASHRAE. The PMS members will review the draft of the final report (3/7/08), and discuss during a conference call in late July/early August.
- 6/23/08 (S/C Chair brkfst): TC to formally approve the draft final report rec'd on 3/7/08 by vote and notify MORTS, or set new end date with P.I. and notify MORTS of date.
- 6/23/08 (TC 5.1): Asesh R. (Program S/C Chair) prefers to wait for Louisville Jun-09 and will follow-up with ASHRAE to determine status of all three papers that have been submitted by TTU.
- 7/10/08: sent e-mail to John M, John C, Kim O, and Rad G to review final report and schedule a meeting in late-Jul/early-Aug.
- 7/30/08: e-mailed a meeting request for Wednesday 8/6 at 2:00 PM.
- 8/6/08: PMS-only conference call w/WebEx for final review of Final Report.
- 8/26/08: PMS & PI conference call w/WebEx for final review of Final Report.
- 9/16/08: PI provided final report with the recommended updates per the discussion on 8/26.
- 1/25/09: PMS meet (David Carroll, John Murphy, Franco Cincotti, Kim Osborn) and voted unanimously to recommend that the final report submitted on 9/16/08 be approved by TC vote tomorrow. 1223-RP will be a seminar and/or a transaction?
- 1/26/09: notified Donna Daniel that PMS plans to recommend that the final report be approved by TC vote today.
- 1/26/09 (TC 5.1): voted unanimously (9-0-0) to approve the final report submitted by PI on 9/16/08, program – 1 transaction approved, 1 research paper approved, 1 rejected by the PMS? Asesh/Steve to identify status of third, most likely will be a seminar in Jun-09 since only two transaction papers have been approved and three are needed for a transaction.
- 1/27/09: e-mail to Donna Daniels that TC5.1 approved the final report.
- 2/4/09: e-mailed latest Research Project Notes to MORTS, RL.
- 6/22/09 (S/C Chair brkfst, Mike Vaughn): Transaction 15 is on 6/23, need to submit Disposition of ASHRAE Sponsored Research Results
- 6/23/09 (TC5.1 mtg): same as 6/22.
- 6/23/09 (11:00-12:30, G, S3, Beckham): Transactions 15 - Inlet Installation Effects on Air and Sound for Propeller Fans.

- 1/21/10: E-mailed “Disposition of ASHRAE Sponsored Research Results” form to Michael Vaughn, Donna Daniel, & Dan Castellan.
- 1/24/10 (TC5.1 pre-mtg):
- 1/25/10 (S/C Chair brkfst):
- 1/25/10 (PMS mtg):
- 1/25/10 (TC5.1 mtg):
- 1/26/10: Delivered “Disposition of ASHRAE Sponsored Research Results” form to MORTS mailbox.
- 2/1/10 (Mike Vaughn e-mail): Hi David, Thanks for the information. I received the information that you list below was hand delivered to Tara in Orlando and 1420-TRP was approved for funding by RAC and Tech. Council based upon some of this information. Sincerely, Mike.

Action items (1223-RP):

- Send corrections to George for Jun-09 meeting minutes.
- PMS Chair to submit meeting minutes for 1/25/09 PMS meeting minutes and approval of final report.
- PMS Chair to submit APPROVED Meeting Minutes for 1/26/09 TC5.1 meeting minutes and approval of final report.
- Confirm that MORTS received e-mail (1/21/10) and/or hard copy (1/26/10) of “Disposition of ASHRAE Sponsored Research Results” form.
- Confirmation from ASHRAE that project is closed successfully.

1076-URP

PROPELLER FAN VIBRATION ANALYSIS

- 6/24/07 (TC 5.1 pre-meeting): project complete as of Nov-06, need to complete and submit a Disposition of ASHRAE Research Results.
- 6/25/07 (TC5.1 meeting): David Carroll submitted the appropriate disposition of research forms to the ASHRAE RAC Research

1010-RP

AN EXPERIMENTAL STUDY OF INLET SYSTEM EFFECTS ON THE PERFORMANCE AND NOISE OF AXIAL FANS

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RP-139

EFFECT OF SYSTEMS CONNECTIONS OF FAN PERFORMANCE

Principle Investigators: Clark, M.S., AMCA, Sponsor: TC 5.1, Fans, Conducted: August 1973 - October 1977

RP-264

IN-DUCT MEASUREMENT OF FAN SOUND POWER USING ASHRAE STANDARD 68-78

Principle Investigators: Crocker, M., Purdue University, Sponsor: TC 2.6, Sound and Vibration Control, Conducted: October 1979 - March 1981