

HRR² Development Task Group

2011 June Materials Meeting Bremen, Germany

Materials Working Group

Michael Burns, FAA Tech Center

June, 2011



Federal Aviation
Administration



Agenda

- Sub Task Team Updates (1 – 5)
- HRR² Prototype
- HRR² Development Plan Timeline
- Interesting Observations
- Next



HRR² DEVELOPMENT PLAN

Sub Task Group #	Team Leader	Improvement Area
#1	Martin Spencer Marlin Engineering Tim Earl GBH International / FTT	Thermopile Globar/Heater Box
#2	Segundo Vargas Custom Scientific Inc.	Upper Section, Lower Section/Insulation
#3	Bill Mountain The Boeing Co.	Airflow, Specimens (Advance materials or materials that affect upper / lower pilot)
#4	Fred Schall Govmark Inc. Nimisha Kaul Weber Aircraft	Heat Flux Methane Gas Calibration/Performance Material Baseline
#5	Michael Miler Schneller, LLC.	Standardized Checklist / Operating Procedures, Update /Rewrite Handbook - Chapter 5



Sub Task Group #1

Martin Spencer / Tim Earl

Martin Spencer (Marlin Engineering)

Thermopile

- Research Plan



Sub Task Group #1

Martin Spencer / Tim Earl

Tim Earl (GBH International / FTT)

Global / Heater Box

- Exploring electric panel option
- 9" x 12" panel like that used in insulation test
- Panel shipped to Mike Burns for trial
- Awaiting trial results

Sub Task Group #2

Segundo Vargas (Custom Scientific Instruments Inc.)

Upper Section / Lower Section / Insulation

The two conditions: overlapping flanges and no flanges in the fabrication of the Inner Cone, Outer Cone and Chimney in the Upper Section of the Heat Release Rate Apparatus have been tested. The flanges were 3/8" wide. All other conditions kept constant as much as possible, including insulation and design of other chamber components. The results show :

No flanges – 60.02 Peak HRR (kW/m²)

Four Flanges – 57.05 peak HRR (kW/m²)

The difference between the two construction configurations is about 5%.

Observation - Results indicate that the design without the flanges provides the more conservative test results.

Future tests are planned for the main burn chamber (Lower Section) to be conducted this summer. Including sample holders, clean-out doors and viewing windows.

Sub Task Group #3

Bill Mountain (The Boeing Co.)

Airflow

- Separate Chamber / Cooling Airflow (High Pressure System)
Replace orifice plate/mercury manometer with sonic choke/pressure gage
- Feasibility of validating flows using anemometer (Low Pressure System)

Air/Methane

- Standardize flame profile / flow rates

Specimens

- Develop Recommendations Addressing:
 - Swelling (covering lower pilot)
 - Shrinking / Popping / delaminating / exploding specimens
 - Dripping / Melting away from holder
 - Fire Retardant (Effects on pilot flames)
 - > 1.75” materials

Sub Task Group #4

Fred Schall (Govmark Inc.)

Nimisha Kaul (Weber Aircraft)

Heat Flux

- Assisted FAA Tech Center in preliminary Testing.
- Standardize method of setting heat flux
 - Steady State vs. Intermittent
- Standardize sample preheat location

Methane Gas Calibration / Performance Criteria

Material Baseline

- Evaluating the possibility of a single standard reference material for all test method evaluation. Current limitations:
 - Every test facility has its own set of standards
 - Material availability
- Once the HRR test method optimization is complete, a material baseline would be established in order to ensure continued validity of past data.

Sub Task Group #5

Michael Miler (Schneller, LLC.)

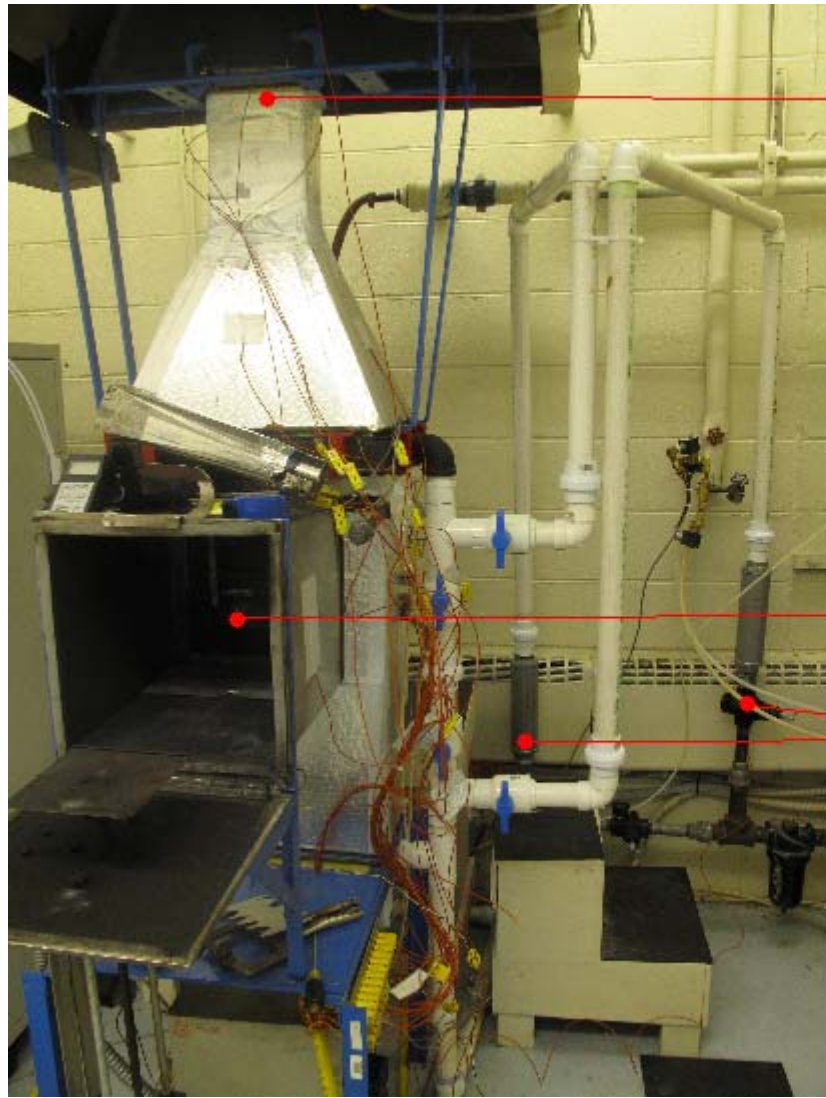
Standardized Checklist / Operating Procedures

- Conformity Inspection Criteria
- Hot / Cold Inspection
- Validation Of Software
- Interval Recommendations
- Sample Preparation
- Testing

Update / Rewrite Handbook - Chapter 5



HRR² Prototype Development



TYPE "E" THERMOPILE

R&D RADIANT HEAT PANEL

SPLIT AIRFLOW / SONIC SHOKES

HRR² Development Plan Timeline

The goal of this plan is to eliminate or reduce a major portion of variables that may have an impact on data produced in the Heat Release Rate test apparatus.

11/01/2010 - 11/01/2011 (4 months remain)

Focused on how to update the heat release tester (HRR2) with the latest technologies as well as standardizing and improving the test method itself.

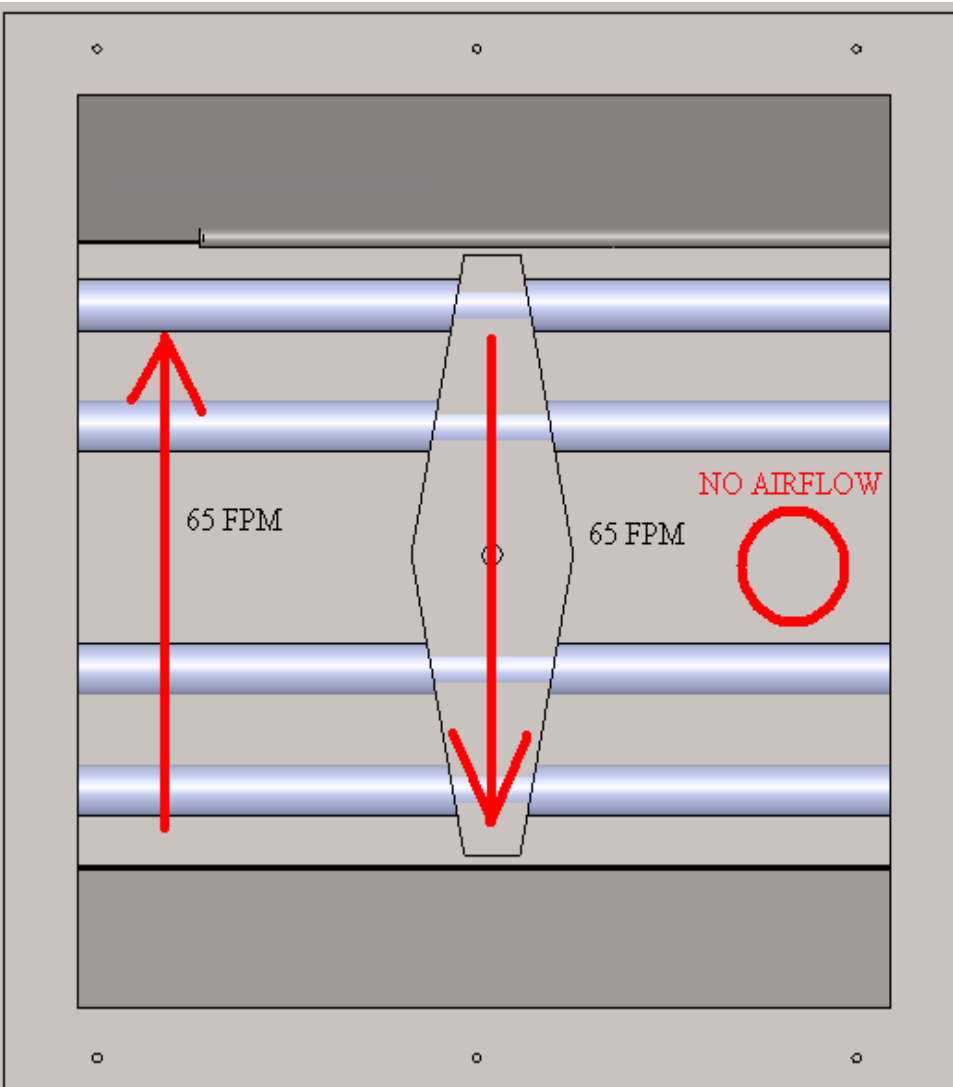
11/01/2011 - 05/01/2012

Focused on establishing pass/fail criteria based on the improvements that were made that could have impacted results of current approved aviation materials.

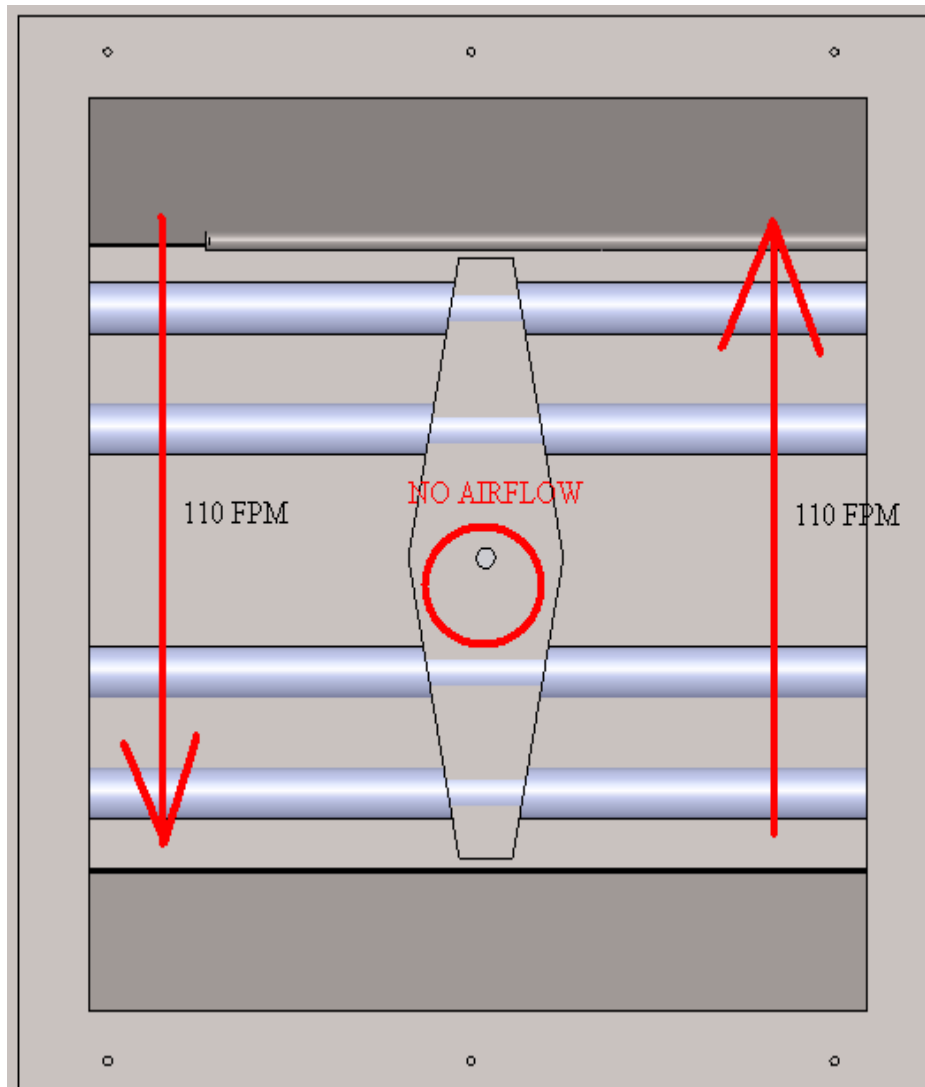
05/01/2012 - 11/01/2012

Update chapter 5 of the FAA Fire Test Handbook.

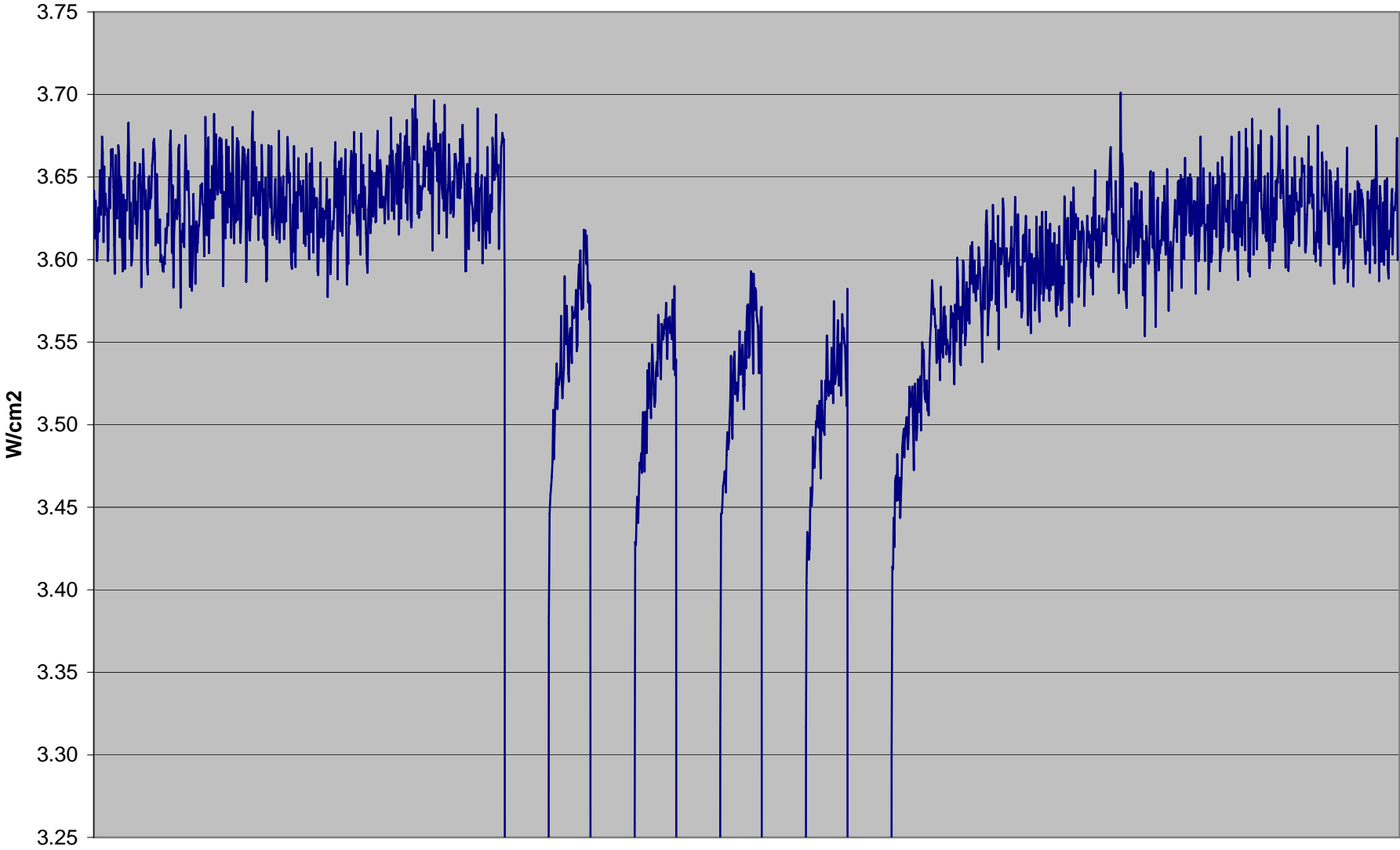
OSU2 AIRFLOW PATTERN

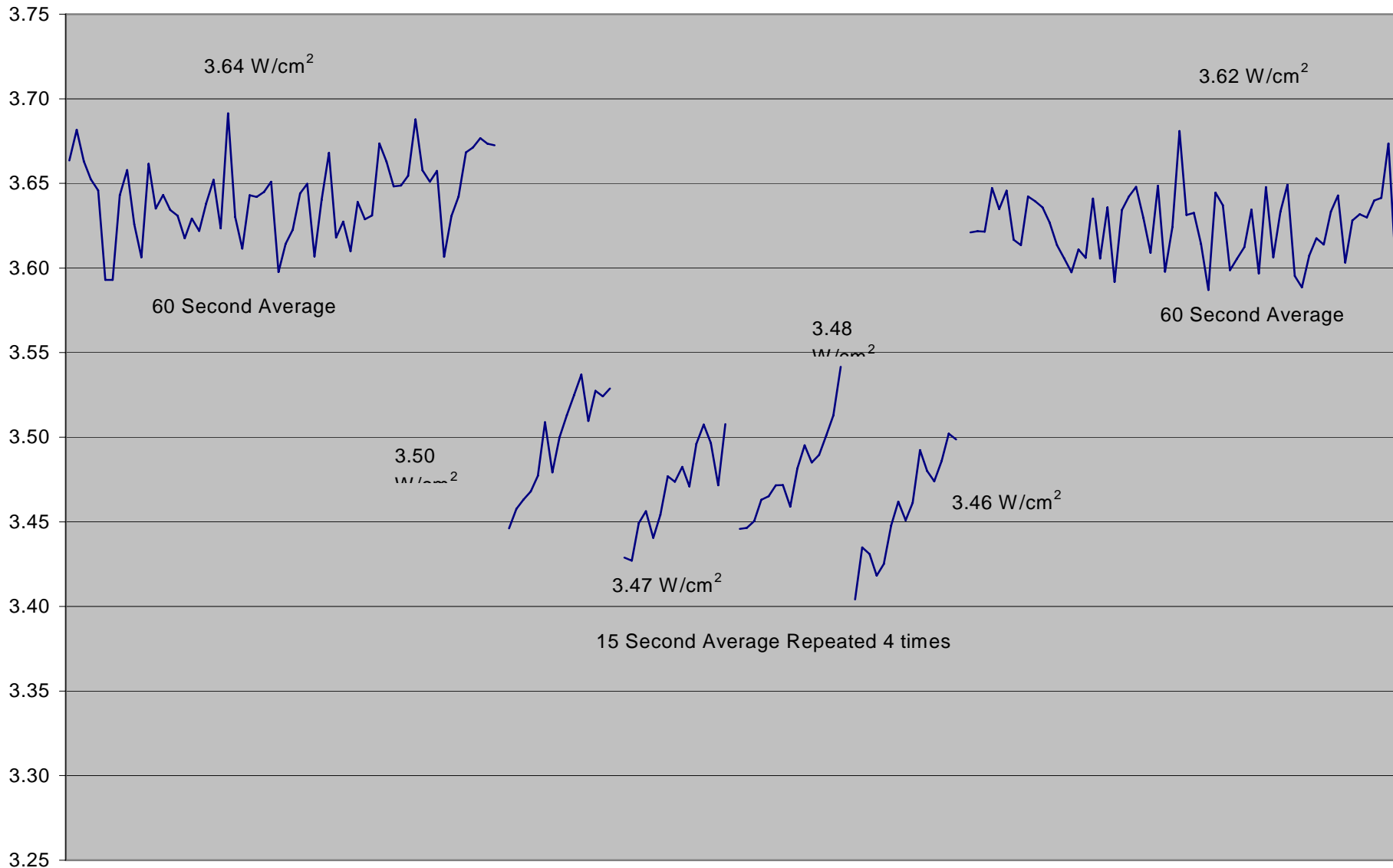


OSU1 AIRFLOW PATTERN



Raw Data Insitu vs. Transient Heat Flux Measurement in OSU





Questions / Comments?

“The cost of living is going up and the chance of living is going down.”

Unknown Author

