HEAT FLUX CALIBRATION TASK GROUP

2011 March Materials Meeting
Savannah, GA

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March, 2011

Federal Aviation Administration

AGENDA

- History
- “Interim” Aviation Heat Flux Calibration Standard
- Proposed New Calibration Method (Draft)
- Radiant Panel Calibration Study
  - NSIT Calibrated Schmidt-Boelter HFG Data
- Next Steps

BRIEF HISTORY

06/08 – Discovery of Heat Flux Gage Calibration Discrepancy

Visit to Manufacturers / NIST

06/09 – International Heat Flux Gage Calibration Study

Industry Submitted Gages To FAA Technical Center For Calibration Comparison

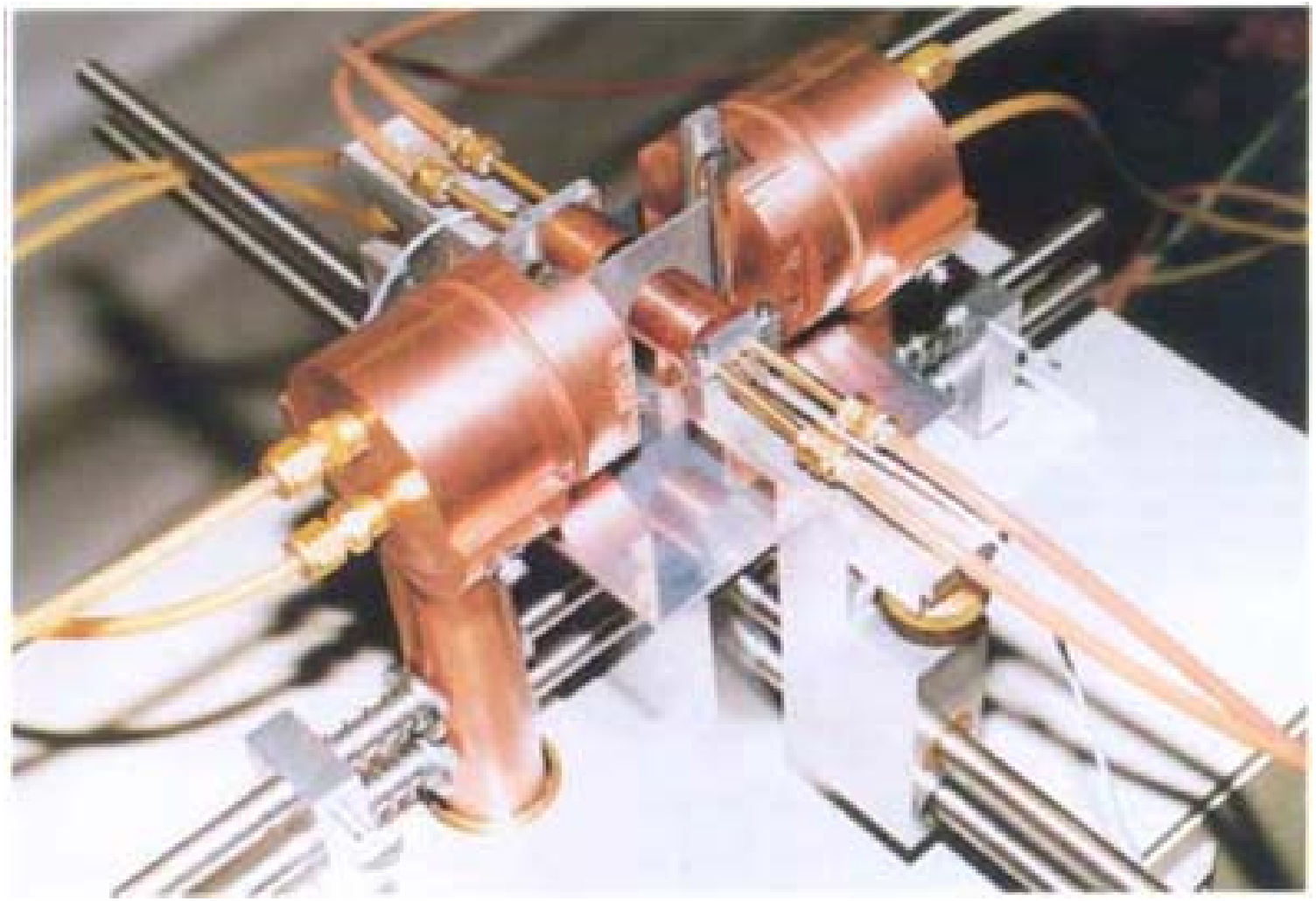
07/09 – Heat Flux Sensitivity Study Using Gages Installed In Test Apparatus (HRR, NBS Smoke Density & Radiant Panel tester)

10/09 – Sensitivity Study

Effect On Data By Varying Heat Flux Levels

10/10 – Development Of Interim Aviation Heat Flux Gage Calibration Standard

Interim Aviation Heat Flux Calibration



Interim Aviation Heat Flux Calibration

Calorimeter Specifications

- Construction / Type - Gardon
- Principle of Operation – Gardon Foil
- Painted Surface Area – Partial vs. Full Face

Definitions

NIST Calibration

- Single Point vs. Full Range (Based on 10 point Cal.)
- FAA Flammability Heat Flux Requirements - Ranges

Calibration Interim

Interim Aviation Heat Flux Calibration

Calibration Method

- Like gage with like gage – Manufacturer / Paint
- Place Standardized HFG and Working HFG an equal distance from heat source (traditionally, opposite sides of a graphite plate)
- Ramp up heat and record data on cool down
- Calculate HFG Sensitivity

Calibration Procedure

Requirements – Repeatability / Reproducibility

Supplemental Section – General notes / Reporting

Draft - Aviation Heat Flux Calibration Standard

Calorimeter Specifications

- Construction / Type – Possibly including Schmidt-Boelter type gages
- Principle of Operation – Possibly include Thermopile
- Painted Surface Area – Changed so that only gages with entire front face painted will be used

Definitions – Minor Changes / Additions

NIST Calibration

- FAA Flammability Heat Flux Requirements – Possibly change from nearest Range to exact heat flux point

Calibration Interim - Unchanged

Draft - Aviation Heat Flux Calibration Standard

Calibration Method

- Like gage with like gage - Removed
- Place Standardized HFG and Working HFG an equal distance from heat source (traditionally, opposite sides of a graphite plate) – Must be in exact same position
- Ramp up heat and record data on cool down – Steady State
- Calculate HFG Sensitivity – Possibly Add % STDEV

Calibration Procedure – Steady State, interchange positions

Requirements – Possibly Changed to Allowable % STDEV

Supplemental Section - Minor Changes / Additions

Radiant Panel Validation Study

Gardon vs. Schmidt-Boelter

- 2 Vatell (Full Paint), 1 Medtherm (Partial) & 1 Hukseflux (Partial) HFG Were Sent To NIST For Calibration
- Radiant Panel Tester Set To 1.4 BTU/ft^2*sec Using one of the Vatell Gages
- Interchanged Vatell Gage with other 3 gages

Man.	BTU/ft2*sec	% Delta
Vatell	1.43	2%
Medtherm	1.25	-11%
Hukseflux	1.37	-2%

NEXT

- Continue to look at Schmidt-Boelter type gages
  - Install Gages Into OSU & NBS

- Continue forward on “Interim” Aviation Heat Flux Calibration Method (Transition Target Date 06/01/11)

- Continue Work On “Draft” Aviation Heat Flux Calibration Method via Task Group Participation

Questions / Comments?

"The road to success is always under construction"

Unknown Author