Boeing Proposal for OSU Round Robin

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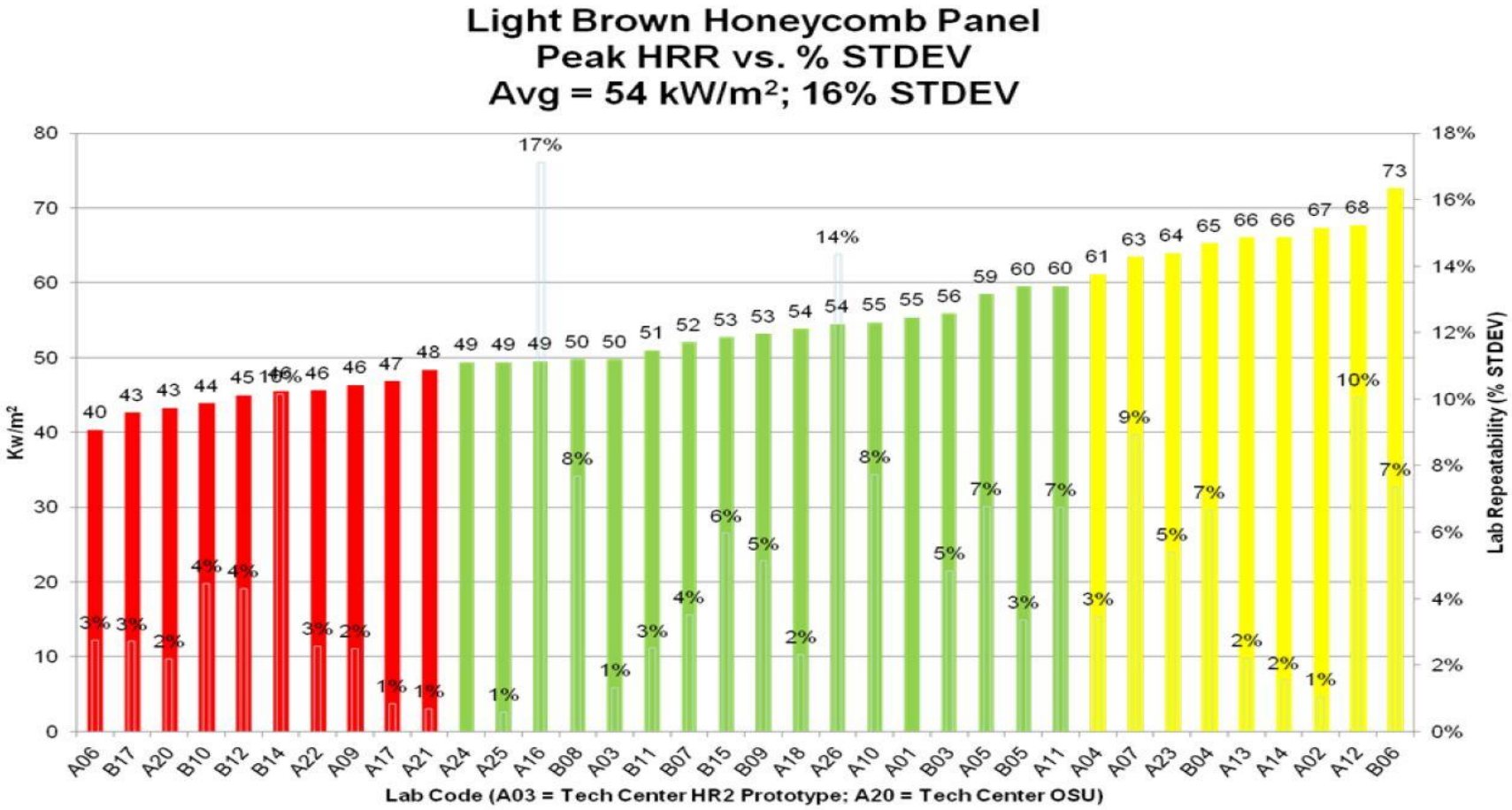
2012 FAA Round Robin Statistical Analysis

- **Variable data in test results and standard deviation**
  - 36 heat release units
  - PRR = 40 – 73 kW/m^2 , 1-10 % variability

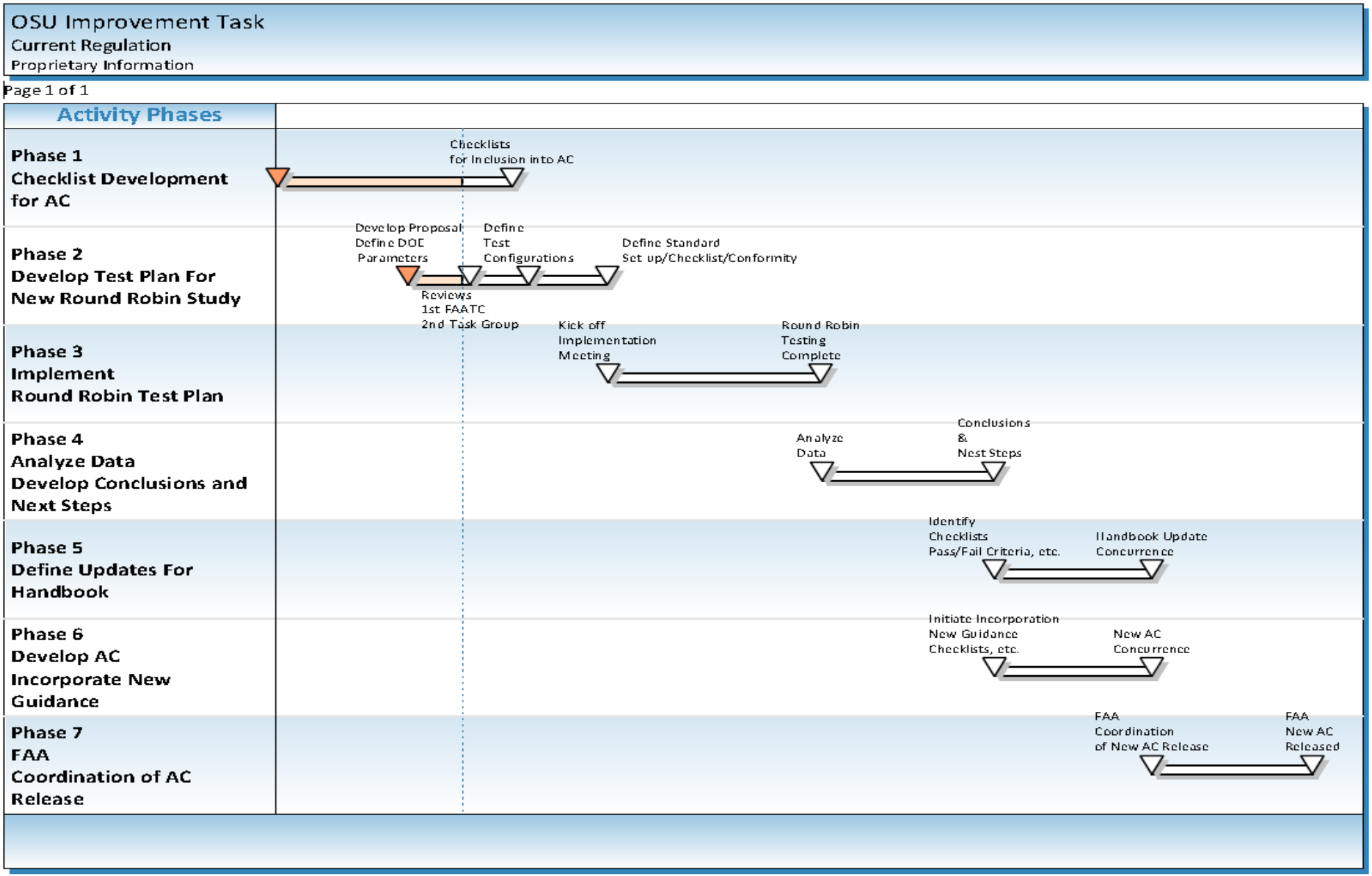


http://www.fire.tc.faa.gov/pdf/materials/June12Meeting/Burns-0612-OSU_HR2_Prototype_Data.pdf

2012 FAA Round Robin Statistical Analysis

- **Conclusion**
  - Identified several equipment/setup parameters that significantly affect variability
    - Machine type
    - Blower vs. compressor (air source)
    - Gas pressure
  - Not all variation is explained by observed parameters (less than 50%)
  - Too many uncontrolled parameters and not enough data to explain the variability
- **Recommendation**
  - Conduct focused round robin with controlled parameters

Proposed Plan for OSU Improvement Task



Other sources of variability

- **Identified over 60 variables in heat release testing (2010)**
  - Cleanliness of chamber
  - Distance of lower pilot from coupon
  - Cleanliness of thermocouples
  - Cleanliness of chimney
  - Length of upper pilots
  - Chamber preconditioning
  - Sample holders
  - Heat flux determination
  - Heat flux gauge calibration
- **Most variables identified can be controlled**
- **Developed daily and monthly checklist to check/maintain machine**

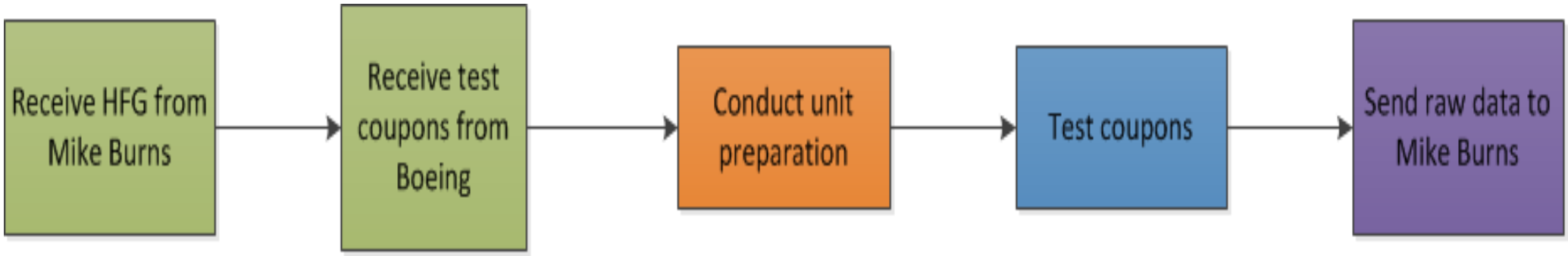
Boeing Round Robin

- **Objective**
  - Pinpoint other major sources of variability in heat release testing

- **Focused and Controlled**
  - Start with small focus group
  - Labs must conduct unit preparation to show units are under control
  - Labs must follow unit preparation procedure
  - Labs provide unit preparation record sheet
  - Heat flux gauge calibrations done by Mike Burns at FAA Tech Center

Round Robin Flow (Participating Labs)

- **Mike Burns**
  - Calibrate HFG
  - Gives labs unique ID
  - Forwards raw data with unique lab ID to Boeing



Unit Preparation

- **Control as much as we can to correctly identify major variables**
  1. Cleaning and maintenance checklist
  2. Pressure check
  3. Heat flux calibration
  4. Determine calibration constant

- **4-5 hours of prep work**

Testing / Analysis

- **3 sets**
  - Sandwich Panel (core and decorative)
  - Laminate
  - Aluminum with single layer of tape
- **10 samples per set**
  - 30 individual tests (about 3 hours)
- **Analysis**
  - Raw data analyzed by Boeing Math Group

OSU Fire Test Working Group

- **Concurrence of Plan**
- **Lab Participation**
- **Timeline / Propose Schedule**
- **Concerns / Suggestions**