Idaho Incubation Fund Program

Progress Report Form

Proposal No.	**IF15-004**
Name:	**John Gardner**
Name of Institution:	**Boise State University**
Project Title:	**SAVE: Self-organizing Air Vent System**
Reporting Period:	**HERC FY 2014**

Information to be reported in your progress report is as follows (attach additional information as needed):

1. Summary of project accomplishments for the period just completed and plans for the coming reporting period:

   We developed a more robust testing prototype to collect data related to system health and energy use (Figure 1). The prototype was built from a 12,000 BTU room air conditioning unit. Custom supply and return ductwork were attached to simulate a small-scale residential HVAC unit. Two vent registers were installed on the supply side. Static pressure, temperature, in-duct air flow, total unit power, and fan current measurements were taken using separate tools to compare with the SAVE customized development boards.

Figure 1: A/C Testing Prototype

   The new prototype will allow more accurate models of SAVE performance to be completed. Then, when the system is deployed in field tests, the collected data can be brought back to the lab for review and comparison with previous results. This iterative process of testing and field data collection will provide a better understanding of SAVE device performance in zoning residential systems.

   Extensive testing was completed adjusting two vent registers and a bypass valve

connecting the supply and return ducts. These results highlighted the strength of the SAVE project: a network of microcontrollers collecting and sharing data. This capability allows for optimization adjustments that safeguard system health in the most energy efficient way.

Typical residential HVAC units have design specifications that determine air flow in the system as a function of static pressure differential across the evaporator coils. SAVE boards placed on both the supply and return sides can detect changes in this differential pressure when vent registers change position. With the addition of a controlled bypass valve, the networked boards can make adjustments within the system to prevent low air flow (Figure 2). This will prevent icing of evaporator coils, undue stress on the blower fan (Figure 3), and generally promote better HVAC system health.

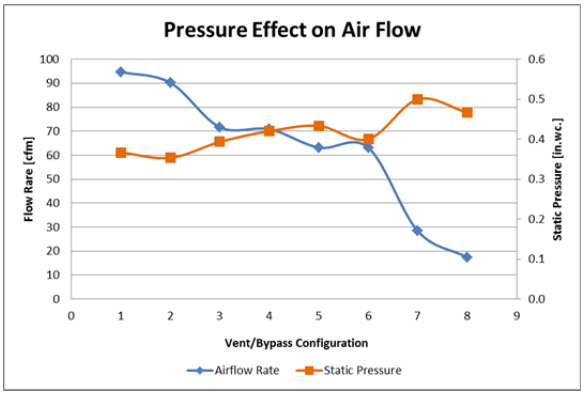

Figure 2

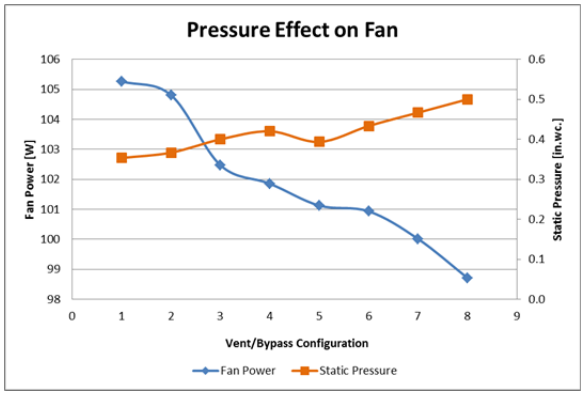

Figure 3

- *Partially open bypass and registers*

2. Summary of budget expenditures for the period just completed (include project burn rate):

$45,559.67 expended and $4,430.33 will be expended.

3. Numbers of faculty and student participation resulting from the funding, including internships:
   - Principal Investigator: Dr. John Gardner
   - Research Engineer: Beau Husfloen
   - Graduate Research Assistant: Kyle Schwab

4. List patents, copyrights, plant variety protection certificates received or pending:

   None

5. List technology licenses signed and start-up businesses created:

6. Status of private/industry partnerships (include enough information to judge level of engagement):

   On June 8, 2015, Martin Artis from Famco, Inc. visited the lab to view progress. We engaged in a lengthy discussion about possible future directions for this project. It was agreed that the information gained from the new experimental apparatus will answer their prior concerns about the impact of the SAVE system on system health and efficiency. We had a productive meeting discussion possible future directions and we agreed to share the final report with them at which point we will discuss future viability for this product.

7. Any other pertinent information that will indicate to the council that the project is meeting satisfactory progress.

   None