

**UNIVERSITY OF CENTRAL FLORIDA**  
*Enhanced and Expanded Solar Thermal Test Capabilities*

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**Description:** The project focus was to increase the collector testing reliability, efficiency and capability to meet the market demands for 3<sup>rd</sup> party independent testing. The project focused on eight (8) projects

- Implement interim testing/certification protocol to streamline quality products to market.
- Design, install and qualify wind systems for collector test platforms
- Convert test platforms to allow all 3 type of collector testing on one platform.
- Automate portions of qualification tests for improved reliability and efficiency
- Increase capability by adding more test stands
- Convert to new control system for improved test reliability and data storage
- Develop automated testing protocol to increase efficiency.
- Design and implement information control system to improve efficiency in record capture, data capture and report generation.

**Budget:** \$654,295

**Universities:** UCF/FSEC

**External Collaborators:** Solar thermal manufacturers

### **Progress Summary**

Following is the summary for each project.

1. Implement interim testing/certification protocol to streamline quality products to market.  
The interim testing and certification was released in May of 2009. It allows thermal collectors to be certified with an interim rating as long as the unit passed the quality testing as described in the test standard (ISO 9806-2). Twenty thermal collectors have been processed since the release. Seventeen of those units have passed through for certification.
2. Design, install and qualify wind systems for test platforms  
The wind system was developed and qualified on a single test stand and then propagated to the other 2 test stands. The wind system has increased test capability by creating acceptable test conditions for collector testing when wind speed were low. The low wind speed condition was present about 50% of the time.
3. Convert test platforms to allow all 3 type of collector testing on one platform.  
Designed and implemented the required hardware set that allows a test stand to test either unglazed, glazed flat plate or evacuated tube style thermal collectors. The increased flexibility will increase overall throughput at the test center.
4. Automate portions of qualification tests for improved reliability and efficiency.  
Differential pressure test and flow calibration tests were automated with LabVIEW software and National Instrument hardware. The tests are currently undergoing qualification.
5. Increase capability by adding more test stands  
A 3rd test stand was built with National Instrument data acquisition and LabVIEW software control. It is currently undergoing qualification testing.

6. Convert to new control system for improved test reliability and data storage.  
The National Instrument data acquisition and LabVIEW software control will be propagate to other 2 test stands once the initial unit is qualified for production.
7. Develop automated testing protocol to increase efficiency.  
Automated testing algorithms have been written and are currently in qualification testing. The semi-autonomous program provides efficiency improvement by having the computer monitor the progress of testing and move to the next stage in the test process without the need for human intervention. Previously the testing required significant human intervention.
8. Design and implement information control system to improve efficiency in record capture, data capture and report generation.  
The flow diagram of the test and certification process has been developed. The database structure has been developed. The new collector testing software is writing the database.