The Siemens Energy Large Manufacturing Solutions Laboratory conducts research focused on the challenges of precision manufacturing of large-scale components and systems, including machining, assembly and joining, and dimensional metrology. This work has applications in large-scale energy components, aerospace, defense and other industries. The lab was made possible with $2 million in support from Siemens Energy.

Located in UNC Charlotte’s Energy Production and Infrastructure Center (EPIC), the Siemens Lab builds on the expertise of the Lee College of Engineering’s Center for Precision Metrology. The new lab advances the state of the art in the theory and practice of precision manufacturing at large scale by:

- Developing and conducting a program of basic and applied research
- Educating the next generation of leaders in the field
- Supporting industry partners through applied technology development and transfer
- Pursuing opportunities for external support of laboratory activities and facilities
RESEARCH AGENDA

Siemens Laboratory faculty, students and staff work with industry partners to identify strategic research themes and conduct basic and applied research aimed at improving the productivity and accuracy of large-scale manufacturing operations. Our research exploration areas include:

- Correcting gravitationally induced distortions in large component metrology
- Correcting thermally induced distortions in large component metrology
- Understanding and correcting rotary table error motions under load
- Performance comparison of portable dimensional metrology systems

EQUIPMENT

The centerpiece of the lab is a Leitz PMM-F 30-20-16 coordinate measuring machine that can accept large, heavy components with very complex geometry, and quickly measure every dimension, angle and radius with an accuracy of a few micrometers. The Leitz PMM-F was made available through a generous contribution from Hexagon Metrology, who has become an active partner in the Siemens Laboratory. The new machine is housed in a custom-designed environmental chamber that controls temperature to 20 +/- 0.5 degrees Celsius. In addition to the Leitz CMM, the lab also has three laser-trackers and access to an articulated-arm CMM.

RESEARCH PROJECTS

Some of our recent research projects include:

- Alternatives to broaching of turbine disk grooves
- Spiral milling of tapered holes
- In-process metrology for generator rotors and volumetric accuracy
- Machining process for combustor basket resonator rings
- Measurement of throttle valves and components based on laser trackers
- Improved methods for generator rotor tramming and charting
- Muffler id measurement and visualization
- Advanced metrology for rotor blade tipping
- Study of dimensional quality assurance in generator rotor machining
- Combustor basket machining
- Generator shaft cooling hole drilling
- Improved methods for mounting and alignment of rotors on slotted

FOR MORE INFORMATION CONTACT:

Dr. John Ziegert
jziegert@uncc.edu
704-687-8203