INTELLIGENT SYSTEMS CENTER (ISC)

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The mission of the Intelligent Systems Center (ISC) is to provide an interdisciplinary research environment in which faculty from various departments can cooperate and conduct research on sponsored projects involving real physical systems with special emphasis on an intelligent (smart) system approach. ISC has integrated its primary research mission with Missouri S&T's commitment to develop internationally recognized graduate research programs focused on key emerging and critical technologies.

The approaches that we are taking to accomplish ISC's objectives are:

1. Developing multidisciplinary research programs to address the emphasis areas of federal sponsoring agencies with the expertise of Missouri S&T faculty who are ISC members
2. Obtaining both short- and long-term federal research grants and industrial contracts
3. Developing advanced research facilities

The education of graduate students is one of ISC's major activities. To this end ISC provides graduate research assistantships to selective graduate students through the Center Members. The interdisciplinary nature of ISC provides an excellent environment for ISC supported students to interact with fellow students from other departments. The students also gain valuable experience in working as a team and acquire oral and written communication and project organization skills. The interaction of graduate students with engineers from industries and program managers from federal agencies is very valuable.

Multidisciplinary research teams consisting of faculty members and graduate students from the departments of computer science, electrical and computer engineering, engineering management and systems engineering, and mechanical and aerospace engineering have been established to conduct research. ISC has also developed state-of-the-art laboratories to conduct research on virtual prototyping, additive manufacturing, smart structures, neural networks, energy systems, automatic inspection, MEMS, robotics, and structural health monitoring. Active research is in significant progress in the following thrust areas:

1. Intelligent Manufacturing Processes, Equipment and Systems
   1.1 Virtual Reality and Prototyping
   1.2 Additive/Rapid/Direct Digital Manufacturing
   1.3 Laser Micromachining
   1.4 Friction Stir Processing
   1.5 Composite Manufacturing
   1.6 Liquid Metal Processing
2. Intelligent Cyber Physical Systems
   2.1 Energy Generation Systems
   2.2 Power Distribution Systems
   2.3 Fuel Cells and Batteries
   2.4 Transportation Systems
3. Advanced Simulation, Sensing, Control, and Communication
   3.1 Sensors and Sensor Networks
   3.2 Intelligent and Adaptive Control
   3.3 Communication Systems and Networks
4. Computational Intelligence and Embedded Systems
   4.1 Data Processing, Fusion and Management
   4.2 Design and System Support
   4.3 Trustworthy and Embedded Hybrid Systems
5. Cyber Security and Trustworthiness
   5.1 Cloud Systems and Software
   5.2 Critical Infrastructure
   5.3 Wireless Networks and Big Data Management
   5.4 Smart Health-Care and Social Systems