Automation and Data Systems

Increasingly sophisticated network- and computer-based technologies are allowing Southwest Research Institute to advance the state of the art in hardware and software applications for our government and industry clients. We are creating innovative solutions to overcome problems in such diverse arenas as autonomous vehicles, intelligent transportation, network security, aerospace, medical, communications, manufacturing, petroleum and business systems.

The automation and data systems software development sections recently achieved Level 5, the highest level of the Software Engineering Institute's Capability Maturity Model® Integration (softwaredesign.swri.org). CMMI® is a set of best practices that addresses productivity, performance and costs while helping organizations improve the quality of software services and systems. This distinction is held by fewer than 300 entities worldwide and very few applied research and development institutions.

In the competitive global marketplace, information is one of the most valuable assets (cybersecurity.swri.org). SwRI plays an important role in developing cyber security technology to protect that information, as well as creating data warehousing technologies to provide accurate and reliable centralized data storage that can efficiently provide an enterprise view of operational data (ised.swri.org).

Ground-breaking real-time, network-based data acquisition technology we developed for a large aerospace company provides enhanced flight test capabilities for certification of new commercial passenger and freight airplanes (aeronet.swri.org).

As part of SwRI's $5 million Southwest Safe Transport Initiative (SSTI) internal research and development program, our staff developed an autonomous vehicle platform used to demonstrate active safety and cooperative communications technologies. We demonstrated the vehicle and a variety of vehicle infrastructure integration technologies in the streets of New York City during a major industry tradeshow (ivs.swri.org). SwRI coordinated the Eleventh Avenue Theater, showcasing equipment that extracted probe data directly from the vehicle data interface and then processed and transmitted the data through a VII network to a demonstration of a Traffic Management Center of the Future, as well as the autonomous vehicle demonstrations.

We have continued to advance intelligent transportation systems technology for Florida and Texas supporting the implementation of variable toll pricing, data fusion technology to provide advanced traveler information services and next-generation statewide transportation software that provides advanced travel times and enhances the integration of multiple centers (its.swri.org).

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SwRI played a large role in the 2008 World Congress on ITS in New York City, including a demonstration of our autonomous vehicle on the streets of Manhattan. Our staff also demonstrated equipment that extracts probe data directly from a vehicle data interface, processing and transmitting the data through the VII network, and developed communications signal preemption algorithms and coordinated integration efforts for other applications demonstrated on tour buses.

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We are installing the Automated Coating REmoval System at Hill Air Force Base, which will use GPX, a corn-starch-based medium, to remove paint from 30 different off-airframe components. The system quickly and efficiently removes coating from a variety of materials without damaging the underlying structure. ACRES was built to accommodate the integration of a laser-based coating removal process as well.

medical information systems • cyber & application security • automated inspection • machine design process re-engineering • embedded systems & security • image & signal processing • machine vision radar & remote sensing • information technology • autonomous vehicle technologies • orthopedics reconfigurable communications • biomedical research • network modeling & simulation • robotics SEI CMMI® Level 5 software design • intelligent transportation systems • cooperative vehicle technologies control systems • green efficient manufacturing • network-centric systems • control center software aerospace networks • MEMS & microfluidics • immunofluorescence detection • lean manufacturing instrument & test systems • medical device development

Courtesy KCI Licensing Inc.

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Staff members developed an instillation pump module add-on to this vacuum-assisted wound healing device to control the rate and amount of fluids delivered to the wound site. To meet a clinical trial schedule, the client required quick turnaround on this full-scale medical device development project, including mechanical, electronic and software development capabilities. SwRI designed, developed, manufactured and delivered 160 modified InfoV.A.C.® Therapy Systems and 35 replacement instillation modules in six months.

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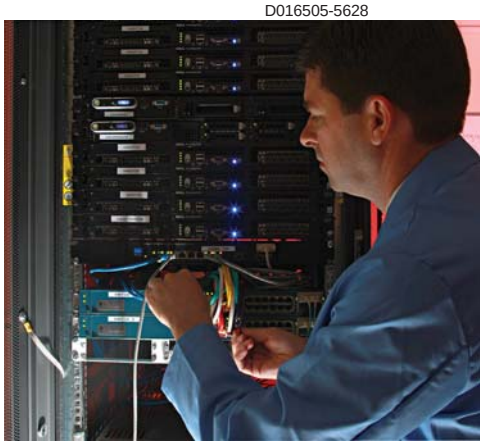

SwRI's ability to generate controlled network traffic at up to 20 gigabits per second provides an ideal test bed to develop and test novel solutions to today's difficult cyber security problems.

Our biomedical engineers developed a high-throughput, low-noise Raman spectrometer that uses a fiber optic catheter to navigate and image cardiac arteries, allowing for real-time clinical applications (bioengineering.swri.org).

We delivered the alpha candidate patient appointment scheduling application for evaluation and completed phase one of integrating pharmacy enterprise capabilities into an existing system for the Veterans Health Administration; these programs are among the first major reengineered applications to be deployed within the VHA's new Service Oriented Architecture (ised.swri.org). Other medical information systems programs included investigating a novel medical algorithm to help clinicians interpret diagnostic data and using personal digital devices to support accurate patient identification and medication administration.

In the 13 years SwRI has operated a Texas Manufacturing Assistance Center, 2008 was one of our most successful. This year, we served 66 regional clients and expanded activities to include training conducted in cooperation with community colleges. Through the TMAC program, we help local manufacturers become more globally competitive by teaching advanced manufacturing techniques and facilitating improvement activities and automation. TMAC is providing pollution prevention and energy efficiency assessments in cooperation with regional utility companies through the Environmental Protection Agency's Green Suppliers Network program (tmac.swri.org). ❖

Visit autodata.swri.org for more information or contact Vice President Susan Crumrine at (210) 522-2089 or susan.crumrine@swri.org.

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Courtesy Tzec Maun Foundation

SwRI is assisting the Tzec Maun Foundation, an organization that provides free access to telescopes primarily to students, as it refurbishes this 50-year-old observatory in Cloudcroft, New Mexico. Our staff is installing a modern control system for the various observatory subsystems, as well as developing integration software to enable observatory control via the Internet.

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