KU, Industry Prepare KC to Become International Port

R ecently, ITTC researchers completed field tests on technology that could help turn Kansas City into an international inland port. The metro's central location within the continent and nation and abundant transportation network make Kansas City an ideal distribution center for global goods, according to KC SmartPort. The economic development group has teamed up with KU researchers and regional industry to develop secure, efficient transportation corridors.

This winter ITTC researchers attached active electronic seals to rail container cars. A locomotive was outfitted with a system to receive signals from the seals and a communications link to the Internet. ITTC-developed hardware and software, known as the Transportation Security SensorNet (TSSN), integrated the different components.

"Our partnership with ITTC and EDS has been great. Victor [Frost] and the team bring a tremendous amount of knowledge and experience to our project…"

— *Chris Gutierrez, president of Kansas City SmartPort*

"Before TSSN, 'black holes,' or information vacuums, occurred en route. ITTC, in collaboration with KU's Transportation Research Institute (TRI), is providing stakeholders with greater visibility, security, and accountability along the supply chain," says **Victor Frost**, principal investigator on the project and Dan F. Servey distinguished professor of EECS.

Recently ITTC researchers used a rail car to test technology used for monitoring goods en route. Alerts are sent to authorized individuals if cargo is breached. KU and industry are teaming up to create safe, efficient transportation corridors necessary for the creation of an inland port in Kansas City.

Photo Courtesy of KC SmartPort

Combining real-time tracking and associated sensor information, the TSSN works independently of the operator. This is critical given supply chains often involve multiple modes of transportation. ITTC is concentrating on intermodal points, such as transitions from rail cars to trucks, where tampering or theft is most likely to occur. The TSSN has been integrated with another SmartPort component, the Trade Data Exchange (TDE).

Developed by EDS, an HP company, the TDE is a secure information clearinghouse for cargo. It is designed to provide real-time supply chain visibility and cargo security. TDE stakeholders will be able to access detailed, aggregated supply chain information online.

"Our partnership with ITTC and EDS has been great," says **Chris Gutierrez**, president of Kansas City SmartPort. "Victor [Frost] and the team bring a tremendous amount of knowledge and experience to our project and have allowed us to move quickly on the test project." ∎

KU Only School to Have 2 IEEE ComSoc Officials

KU distinguished professors **Joseph Evans** and **Victor Frost** serve as the only current IEEE ComSoc Members-at-Large from the same institution. The Institute of Electrical and Electronics Engineers Communications Society (IEEE ComSoc) Members-at-Large are elected to represent the interests of its more than 40,000 members. ComSoc is the second largest IEEE society.

Evans is ITTC director while Frost is an ITTC affiliated faculty investigator. The former began his three-year term in 2009 year while Frost started in 2008. ▪

Roberts Honored for Career

In recognition of his long-term contribution to engineering education, ITTC investigator **James Roberts** received a 2008 IEEE Education Society Achievement Award at the Frontiers in Education (FIE) Conference this October in Saratoga Springs.

Roberts was a member of the IEEE Education Society Administrative Committee from 1995 to 1998. His FIE service includes conference program cochair in 1998 and conference general chair in 2000. ▪

Hui's Book is Published

Ron Hui, an ITTC investigator, and former ITTC Industry Advisory Board member **Maurice Sullivan** of Nortel Networks have written the most up-to-date, practical resource on optical measurement techniques for use in developing photonics systems. Published by Academic Press, "Fiber Optic Measurement Techniques" serves as a reference guide for academic and industrial researchers and field engineers. ▪

Oguna Is Named University Scholar

Angela Oguna, an ITTC undergraduate research assistant**,** was selected as a 2008–2009 University of Kansas Scholar by the Honors Program. The highly competitive scholarship program honors talented sophomores and fosters their development via seminars, events, special advising, and faculty mentors. **Gary Minden**, director of ITTC's Communications and Networking Systems Laboratory, serves as Oguna's mentor.

"Angela is a dedicated and intelligent student. We are fortunate to have her at ITTC," says Minden. ▪

Rohrer First Student to Win Best Paper Award at Elite Conference

Ph.D. student **Justin Rohrer** received the Best Conference Paper Award at the International Telemetering Conference (ITC) in October. Originally, Roher's paper was submitted in the graduate student category. The session chair felt "End-to-End Disruption-Tolerant Transport Protocol Issues and Design for Airborne Telemetry Networks" was the best paper and nominated it for the top honor. It is the first time a student paper received the award.

ITTC investigators **Erik Perrins** and **James P.G. Sterbenz** were coauthors on the paper. ▪

Future Internet Develops in Midwest

The phenomenal growth of the Internet has exposed fundamental inadequacies in network security, reliability, and manageability. ITTC investigator **James P.G**. **Sterbenz** is leading a multiuniversity research effort to develop more secure, robust networks.

KU, Kansas State University, University Missouri-Kansas City, and the University of Nebraska-Lincoln have received a three-year $462,000 award from the National Science Foundation (NSF). ITTC will lead the "Great Plains Environment for Network Innovation" (GpENI) project. Regional deployment of network infrastructure will support interdisciplinary research and development.

GpENI is part of the larger NSF Global Environment for Network Innovations (GENI) initiative. The suite of experimental network research infrastructure will enable a wide range of science and engineering experiments, including Internet design research. Currently, technological shortcomings make it impossible to validate new designs under realistic conditions.

Greg Monaco, executive director of the Great Plains Network (GPN), a consortium of 23 universities in the Midwest, says GPN is a proud partner in the cutting-edge project. He sees GpENI as having significant impact at the local to international levels in regard to science, engineering, and the economy. Furthermore, GpENI infrastructure will be supported by the Kansas and Missouri Research and Education Networks (KanREN and MOREnet). Industrial collaborators include Ciena and Qwest.

"This is an important project that will enable new network research in the Great Plains Region and foster wider collaborations, leveraging investments in optical network infrastructure by the states of Kansas, Missouri, and Nebraska," says Sterbenz, lead principal investigator (PI) and associate professor of EECS.

GpENI is one of only two regional networks funded through Spiral 1 of the GENI program. "Spiral development" enables simultaneous development and prototyping. ∎

Information Assurance Laboratory Established

Security is currently the fastest growing segment within the IT industry. ITTC's new Information Assurance Laboratory (IAL) provides a University-wide focal point for research, education, and implementation of data protection systems. IAL research includes theoretical modeling, high-assurance system synthesis and verification, security modeling and analysis, network security, and database security.

IAL Director **Perry Alexander** also guides the MSIT (Master's of Science in Information Technology) program in information security. ∎
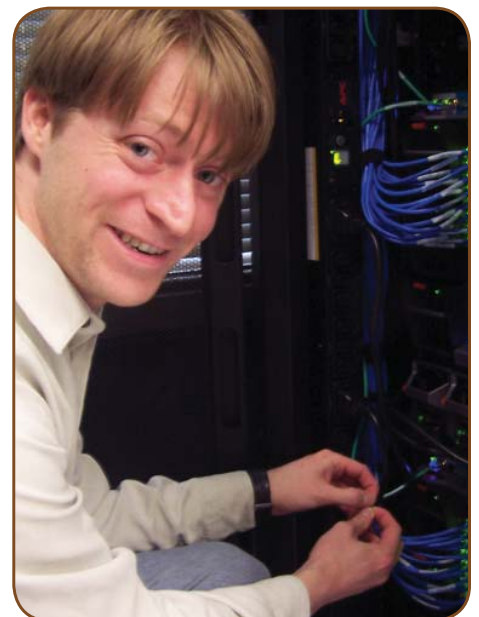
Information Systems Analyst **Charles Henry** works on the ITTC cluster addition. KU researchers will make use of the new addition with InfiniBand, a high-speed interconnect between nodes in the cluster. The NSF/KTEC-funded project will enable more KU life-sciences researchers to use the powerful, integrated research platform. The cluster drastically reduces the amount of time it takes to perform data-intensive research, such as genome analysis.

NASA Funds Collaborative Communication Research

Future Lunar and Martian surface communication systems will need to transmit large amounts of scientific and operational data while adhering to severe size, weight, and power (SWaP) constraints.

A multi-institution, NASA-sponsored research project will develop communication systems for future missions. EECS Assistant Professor **Erik Perrins** serves as the principal investigator for ITTC. The University of Alabama and lead institution Wichita State University are collaborators.

> "This is an exciting opportunity to combine communications research with future manned spaceflight missions."
>
> — *Erik Perrins, ITTC investigator*

Perrins and his students will develop miniaturized hardware for four specific scenarios: astronauts to surface assets in immediate vicinity, astronauts to the main hub (assuming line of sight), back-up link for astronauts to the main hub (assuming no line of sight), and main hub to Earth. Most of the antenna research will be conducted at Alabama with WSU leading system integration and testing.

The "Lunar and Martian Surface Communication Systems with Efficient Miniature Antennas" project received a three-year NASA Experimental Program to Stimulate Experimental Research (EPSCoR) Cooperative Agreement Notice (CAN) award. The NASA EPSCoR CAN program addresses high-priority NASA research and technology development needs.

"This is an exciting opportunity to combine communications research with future manned spaceflight missions," says Perrins. "This project will enable these missions, and the technological output will also have promising applications closer to home." ▪

www.ittc.ku.edu

KU INFORMATION & TELECOMMUNICATION TECHNOLOGY CENTER
The University of Kansas

2335 Irving Hill Rd
Lawrence, KS 66045-7612