

MINUTES OF THE HOUSE COMMITTEE ON ECONOMIC DEVELOPMENT.

The meeting was called to order by Chairperson Barbara P. Allen at 3:30 p.m. on January 29, 1996 in Room 423-S of the Capitol.

All members were present except: Rep. Long - excused
Rep. Toplikar - excused
Rep. Kirk - excused
Rep. King - excused

Committee staff present: Lynne Holt, Legislative Research Department
Nancy Kirkwood, Committee Secretary

Conferees appearing before the committee: Dr. Howard Mossberg, Director Technology Transfer and Special Counselor to Chancellor, University of Kansas
Dr. Victor Frost, Associate Professor of Electrical Engineering and Computer Science, Director of Telecommunications and Information Sciences Laboratory, University of Kansas
Dr. Al Chapman, Associate Vice Chancellor for Research and Dean of Graduate School, University of Kansas Medical Center
Dr. Jon Wefald, President, Kansas State University
Dr. Rollie Sears, Professor of Agronomy, Kansas State University
Dr. Jim Hague, Professor of Electrical Engineering, Kansas State University
Carlene Hill, Director of the Center for Economic Development and Business Research, Wichita State University
Dr. Steven Hooper, Associate Professor Aerospace Engineering, Wichita State University

Others attending: See attached list

Dr. Howard Mossberg, Director Technology Transfer and Special Counselor to Chancellor, University of Kansas, gave a quick review of research partnerships between the university and the state.

Professor Victor Frost, Associate Professor of Electrical Engineering and Computer Science, Director of Telecommunications and Information Sciences Laboratory, briefed the committee regarding the University of Kansas research on the use of *Information Infrastructure in Kansas* (Attachment 1).

Dr. Al Chapman, Associate Vice Chancellor for Research and Dean of Graduate School, University of Kansas Medical Center, gave an overview of the *Technology Transfer Division* (Attachment 2).

Dr. Jon Wefald, President, KSU, gave a summary of the Kansas State Economic Impact Report.

Dr. Rollie Sears, Professor of Agronomy, reviewed the testing process of *Karl 92* (wheat) for human consumption.

Jim Hague, Professor of Electrical Engineering, reported on the *Troy Design Manufacturing* plant to be built in Manhattan, KS, to assemble electrically powered vehicles.

Carlene Hill, Director of the Center for Economic Development and Business Research, gave examples of what Wichita State University is contributing in Economic Development (Attachment 3).

Dr. Steven Hooper, Associate Professor Aerospace Engineering, summarized the impact of the research and development in safety technology at Wichita State University (Attachment 4).

The meeting adjourned at 4:50 p.m. The next meeting is scheduled for January 30, 1996.

HOUSE ECONOMIC DEVELOPMENT COMMITTEE GUEST LIST

DATE: Mon Jun 29

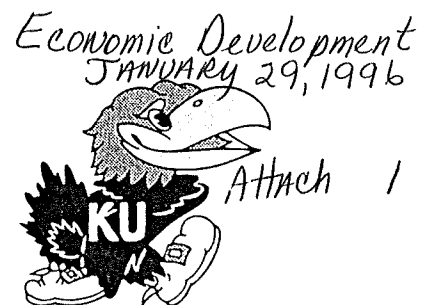
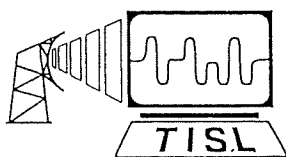
NAME	REPRESENTING
Jon Josseland	University of Kansas
Carlene Hill	Wichita State University
STEVE Hooper	WICHITA STATE UNIVERSITY
Charles Warren	Kansas Inc.
Tim Hague	K-STATE
Rollie SEARS	K-STATE
Roger Franke	KGC
Megan Owens	KU
Judy Mayo	Self
Bob Wunsch	KUMC
Al Chapman	KUMC
Wito Ant	KU
Howard Mossberg	KU
Ray [Signature]	FHSU
Tim Carpenter	Lawrence Journal World
Jenny [Signature]	Overland Park Chamber of Commerce
Mark Barce [Signature]	KDOcath

University of Kansas
Telecommunications and
Information Sciences Laboratory
&
Sprint

A Successful Industry/University
Partnership

Victor S. Frost
Professor
Electrical Engineering and Computer Science
and
Director
Telecommunications and
Information Sciences Laboratory

frost@eecs.ukans.edu
<http://www.tisl.ukans.edu/>



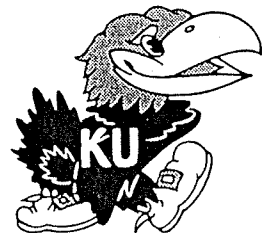
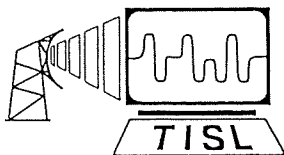
Why is Communications Technology Important to Kansas

— Use of the *Information Infrastructure* in Kansas

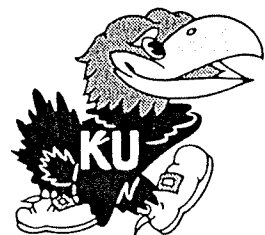
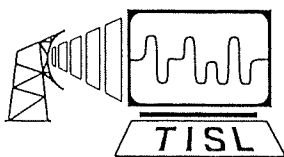
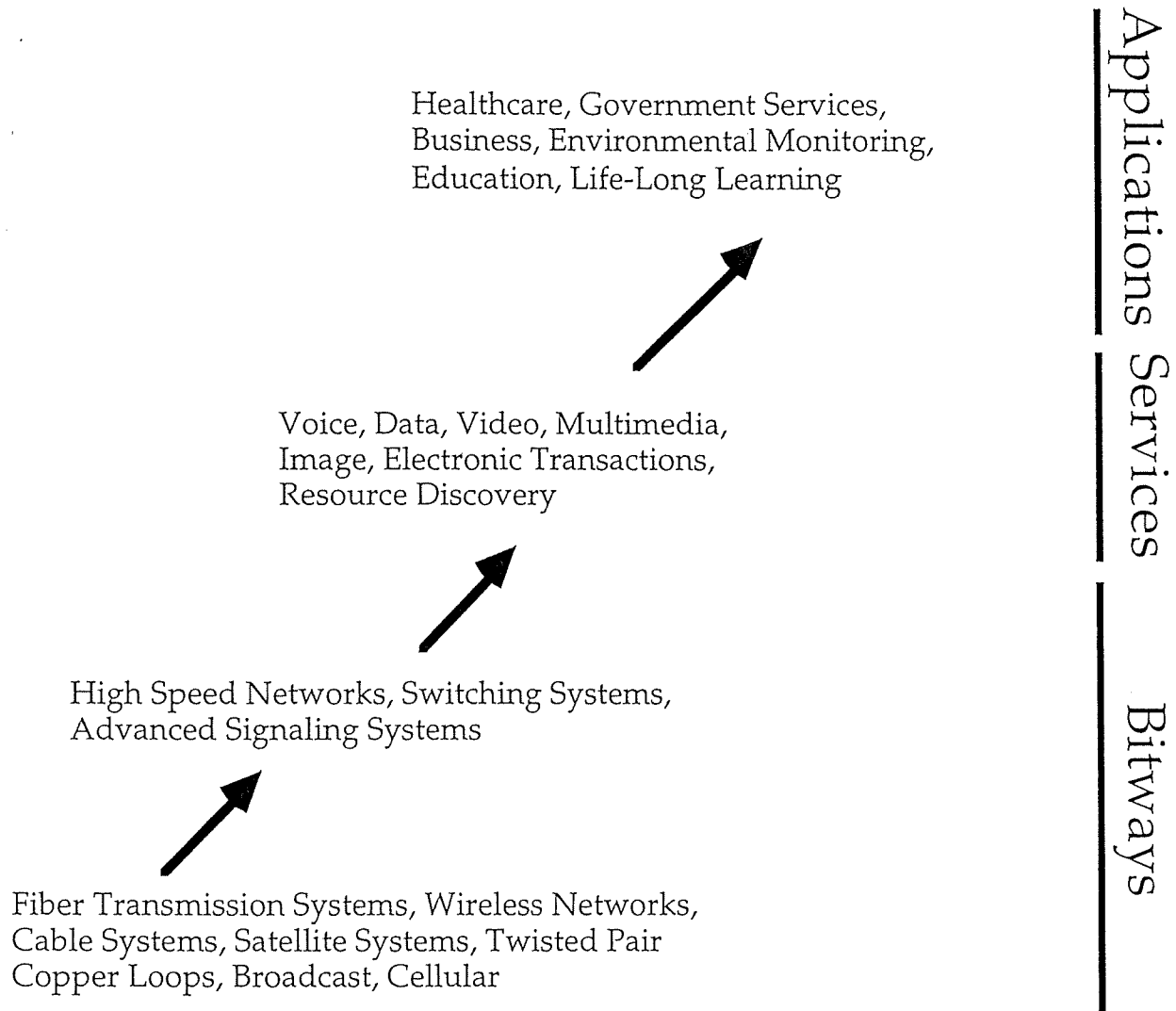
- Economic development requires access to a state-of-the-art *Information Infrastructure*
- Rural Community Development
- Delivery of Health Care

— Creation of the next generation *Information Infrastructure* in Kansas

- Communications industries employs about 20,000
- Sprint employs about 6,000
- Expanded opportunities for high-technology jobs in Kansas
- Early introduction of new information technologies leads to a increased competitive advantage for Kansas companies.

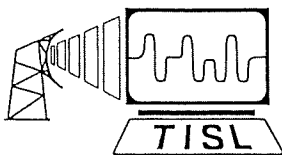


Architecture of the Global Information Infrastructure



Communications Research at KU: Background

- Communications Academic Emphasis and Research Programs
Established in 1983
- Graduated Students with Telecommunications Emphasis:
 - + Over 120 M.S. Degrees
(13 recent M.S. recipients have been hired by **Sprint**)
 - + ~ 10 Ph.D.
- Received External Funding > \$6.2 Million
- Over \$4.0 Million of External Funding is in Place for 1995-1998
- 9 EECS Faculty Actively Involved in TISL Research
3 Full-Time Staff Researchers
- Broad Base of Industry and Government Support
- Current Student Population
 - + 14 Ph.D., 33 M.S., 6 B.S.
(Including a **Sprint** Ph.D. Fellow and a Self Fellow)
- Unique Facilities
 - + Communication Engineering Tools
 - Networks
 - Links
 - DSP
 - VLSI
 - + DSP & Digital Radio Laboratory
 - + High-Speed Networking Laboratory including a 2.4 Gb/s SONET
connection to the **Sprint** long-distance fiber network

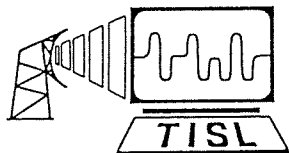




Gigabit Testbed Participants

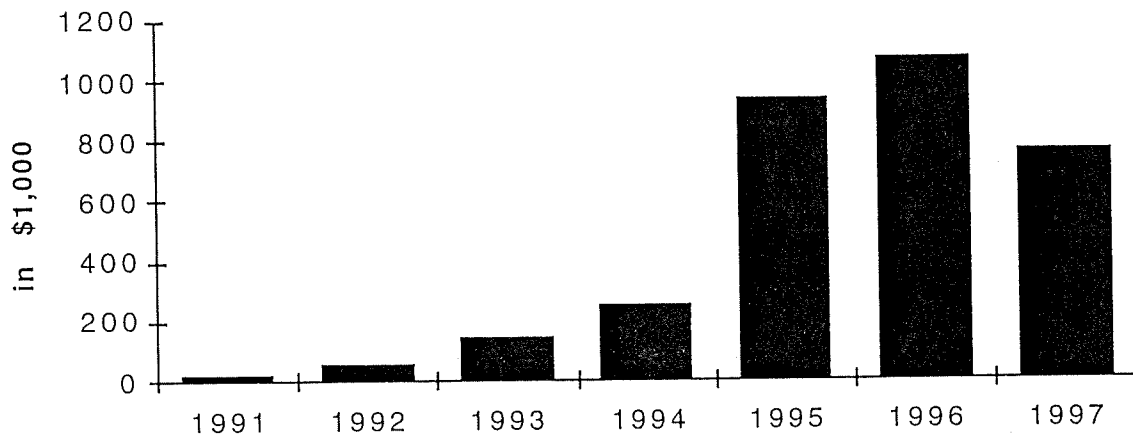
Testbed	Location	Industry	Federal Laboratories	Supercomputer Centers	Universities and Other
AURORA	Northeast	IBM Bellcore Bell Atlantic NYNEX MCI			MIT University of Pennsylvania
BLANCA	Nationwide	AT&T	Lawrence Berkeley Laboratory	National Center for Supercomputing Applications	University of Illinois University of Wisconsin University of California — Berkeley
CASA	Southwest	MCI Pacific Bell U.S. West	Jet Propulsion Laboratory, Los Alamos National Laboratory	San Diego Supercomputer Center	California Institute of Technology
NECTAR	Pittsburgh	Bellcore Bell Atlantic		Pittsburgh Supercomputer Center	Carnegie Mellon University
VISTAnet	North Carolina	BellSouth GTE		North Carolina Supercomputer Center (at MCNC)	University of North Carolina — Chapel Hill North Carolina State University MCNC
MAGIC	South Dakota Kansas Minnesota	Sprint MITRE Digital Equipment Corp. Southwestern Bell Northern Telecom Split Rock Telecom SRI International	U.S. Army Future Battle Laboratory U.S. Army High-Performance Computing Research Center U.S. Geological Survey Lawrence Berkeley Laboratory	Minnesota Supercomputer Center	University of Kansas

Source: Corporation for National Research Initiatives (CNRI), Advanced Research Projects Agency (ARPA)



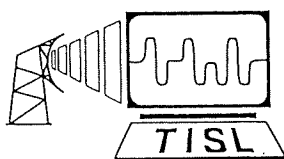
History of Sprint Support of University of Kansas Research

Industry/University Colaboration: Support of TISL Research

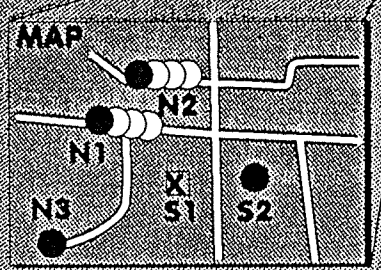
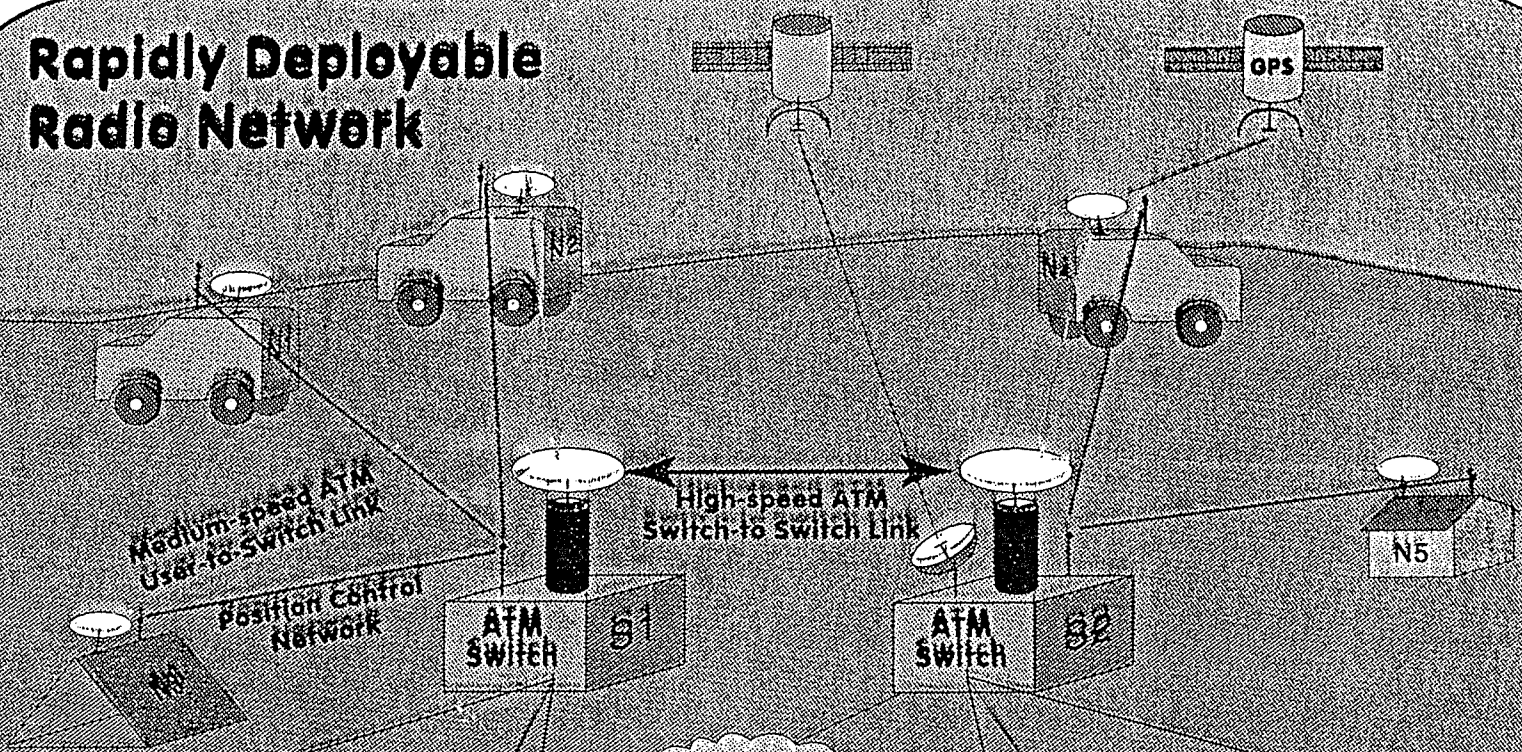


For more information about the KU/Sprint Interactions Contact:

William L. Edwards, Chief Scientist, Sprint LDD
Robert Weafer, Technology Transfer, Sprint LDD,
Technology Planning and Integration

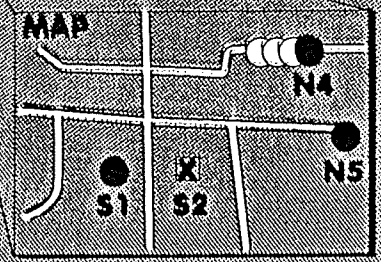


Rapidly Deployable Radio Network

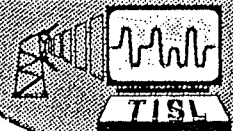


GPS-Derived Location Information for Antenna Beam Steering

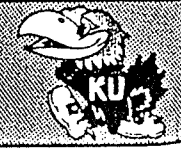
Public Switched ATM Network



GPS-Derived Location Information for Antenna Beam Steering

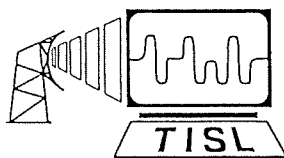


The University of Kansas
 Electrical Engineering & Computer Science Department
 Telecommunications and Information Sciences Laboratory



A New Initiative:
Lightwave Communications Systems
Research

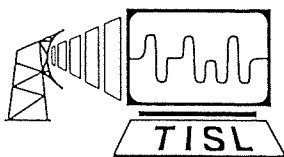
- Establish the only lightwave communications research facility in Kansas
- Chart a path from today's Electro/Optic environment to tomorrow's optical systems
 - Coherent Optics
 - Solitons
 - Evaluation of next generation semiconductor devices
- Produce students with the knowledge to engineer the next generation of the *Information Infrastructure*
- Continue to expand university/industry collaborations
- Support:
 - Sprint ==> \$977,000 (first year commitment)
 - NSF ==> \$640,000 (pending)
 - KTEC ==> \$410,000 (pending)



Summary

— The University of Kansas brings together academic and research expertise as well as the facilities required for the development of the Global *Information Infrastructure*.

— It is our goal to remain at the forefront of the creation of the enabling technologies for the Information Age.



TESTIMONY TO THE ECONOMIC & DEVELOPMENT COMMITTEE

BARBARA ALLEN, CHAIRPERSON
JAN 29, 1996

I- There are many ways that each Regent Institution assists in the economic development of the State, including general employment. But for today, I want to concentrate on research as a source. It is important to note that these are new dollars to the State and therefore have a significant impact on the state economy. As of this last fiscal year, the KUMC generated over \$42 million and when combined with the Lawrence campus exceeds \$90 million for KU alone. Of that amount, some \$28 million comes from federal resources. Of the latter, we expend over \$14 million in salaries and wages (most reside in the State) with the balance being spent in related areas including supplies and equipment (again, much spent in the State). From our total effort in research, we fund some 395 FTE with some 75 FTE being faculty positions.

II- In order to further increase this investment in the state economy by bringing new dollars into the economy, the KUMC has developed a not for profit (501 (3) c) foundation called the KUMC RESEARCH INSTITUTE whose mission is to interface with the private sector in 3 areas.... Grants management, Clinical Trials and Technology Transfer. It currently manages over \$10 million and growing----

III- Even more specifically, it is the Technology Transfer Division of the Research Institute that I want to emphasize today, since the Technology Transfer Division has as its purpose to enhance the economic development of the state through the transfer of new inventions and biomedical products to the public. In order to do this requires the use of the KTEC and the Kansas Innovation Center (KIC) located in Lawrence. We are currently serving as the focus of a funded effort by KTEC through the KIC for Wyandotte County..... The county will match a \$50K seed grant program with KTEC in order to develop and enhance the private sector-business community. Further, the R.I. has leased a small research bldg. (Incubator) from the KU Endowment Assoc. in which companies that are formed around our faculty can be placed. The Research Institute provides that bridge to the business community.

IV- Examples of new technology companies being formed as a result of our faculty's efforts include --- BioStratum--- Xenotech --- and EP Technologies--- These companies are built around our faculty including Dr. Billy Hudson analyzing basement membrane and the interaction

*Economic Development
January 29, 1996
Attachment 2*

with diseases such as diabetes and Bill Narayan---much press lately regarding the Simian AIDS virus (I refer you to the news clips) --- and the latter company (EPT) is based on a hot-tip catheter which burns out plaques in vessels that supply blood to the heart... The other two companies are providing new grants to our faculty to allow them to expand their research base.

V- In summary, biomedical research has three major effects on the economic development of the state through:

- a) funds derived directly from research which feed directly into the salaries paid to support personnel, faculty, nurses, etc..... most of whom reside in the state..., plus supplies and equipment some of which is purchased from businesses within the state...
- b) small companies that are derived from this biomedical technology that will be locating in the state-- bringing with it additional jobs
- c) the ripple effect on the economy

**Presented To The
House Economic Development Committee
January 29, 1996
Carlene Hill, Director
Center for Economic Development and Business Research
W. Frank Barton School of Business
Wichita State University**

It's a pleasure to talk to you today about some specific examples of the role Wichita State University plays in economic development. Wichita State University's contributions to the local, regional and state economies are concrete, and far reaching. Indeed one would be hard pressed to identify a component of the economy of South Central Kansas, in which Wichita State University has not played a role.

The University's economic development contributions are on carried forth on two broad fronts - the fundamental teaching and research activities and secondly, the public and community service activities. I'd like to first give you some examples in the second category - public and community service activities and conclude with the critical role that teaching and research plays. Dr. Hooper has some excellent and interesting examples of the role played by these scholarly endeavors.

I guess, I get to be a little self serving and start out with our Center. But I really provide this as only one example. There are numerous other examples: The Center for Entrepreneurship, the Center for Energy Studies and many others.

At the Center for Economic Development and Business Research, our mission is to collect, analyze and disseminate economic and business related information in ways useful for business development and economic development.

We are organized in such a way that we are able to respond to the information needs of business, government and individual citizens. By maintaining data bases on the census and personal income, as just two examples, in easily accessible ways, we are available to respond on a daily basis to the need for information. We respond to about 120 calls per month requesting such information.

Our forecasts are used by businesses and government throughout South Central Kansas for planning.

A very low profile, but critical, service that we provide is being available to regional and local businesses to help them explain and report the status of the local economy to their out-of-state corporate headquarters and investor/owners. When negative news grabs headlines, it is absolutely essential that developers and investors located out of state have a balanced picture of the health of our economy.

*Economic Development
January 29, 1996*

Attachment - 3

Additionally, we work in close partnership with the Wichita/Sedgwick County Partnership for Growth in helping collect and package information needed by business prospects. The attached booklet *Wichita MSA: The Facts At A Glance*, is just one example.

We also assist groups such as the South Central Kansas Economic Development District and other economic development groups in surrounding counties in their strategic planning. Last year, for example, between myself and my associate director, we made no less than 10 significantly involved presentations of census and economic information to groups across South Central Kansas, at no charge. By significantly involved, I mean that 2-5 days of data analysis was required. This is in addition to the call mentioned earlier, most of which are handled within that first phone contact.

Finally, we provide contract research and we've focused on

- ◆ labor market dynamics of our region, such as workforce training needs and
- ◆ cost/benefit analysis of various economic incentive packages.

For example, before leaving this morning, we finished an analysis of the cost and benefits of the city granting tax abatements for the renovation of one of our hotels in downtown Wichita.

Economic development affects and is affected by every aspect of our community. Issues of crime, housing, education, etc. are all part of the future strength of our Kansas economy. Wichita State University, by recognizing and capitalizing on its **Metropolitan Advantage** is marshaling all resources of the University to address problems within our community.

For example, the Hugo Wall School of Urban and Public Affairs uses concrete challenges within the community as both research and classroom laboratory. In 1994, when Wichita implemented a program of neighborhood policing, we joined resources on from our Center and the Hugo Wall School to provide the City with detailed and accurate census data for each crime reporting area. This analysis helped the police force and other city services identify priorities for new crime fighting and crime prevention efforts.

When Wichita discovered an underground water pollution problem, which became a severe limit to economic development in downtown, the WSU department of geology became a critical partner in the solution.

These examples, and we could give numerous others, are above and beyond the traditional teaching and research activities of a regents university. The fundamental duties of teaching and research are no less essential to the economic health and development of the region and state, especially when we look to the future. We could go through each discipline and trace the impact, but let's look first at education, then we'll let Dr. Hooper talk about engineering.

By now, we can use some short cut language and say simply, that the quality of our workforce is essential to our future competitiveness and economic well being. What would the quality of our workforce be in 20 years without high quality teacher education provided by our College of Education. Here again, we're learning to focus on our Metropolitan Advantage.

Students from the WSU College of Education are exposed to the world class industrial environment of Wichita's manufacturing companies and take what they learn into the classroom when they graduate. Back to public service for a minute: College of Education faculty work with local leaders to improve the quality of current education as well.

The College of Engineering plays a critical role in support of the aviation industry of Kansas. The aviation industry of Kansas is a world class show piece. We have, in our state, and in Wichita, some of the world's most sophisticated machinery and some of the world's most highly skilled workers, producing high valued products that are in demand around the world.

We've estimated that the four primary producers in Wichita, Boeing, Cessna, Learjet and Raytheon account for 7.6 percent of all earnings across the state. They account for 28.8 percent for all earnings in the Wichita MSA. These estimates were made in 1994. As general aviation takes advantage of market recovery and the health of the airlines returns, we can expect this share to only increase in the next five years. This does not include the vast network of suppliers across the state support by those four.

Dr. Hooper is going to give you some interesting examples of how critical the role of the College of Engineering at WSU is to the on-going competitiveness of this industry.

Let me conclude by simply saying - and keep this in mind as you hear Dr. Hooper's examples, in every way that we, at Wichita State University can help a business, we help it compete successfully. When a Kansas business is a successful competitor on world markets for high valued products, all Kansans win.

Wichita State University

A Report to the House Economic Development Committee

The Metropolitan Advantage



January 29, 1996

Wichita State University
1845 Fairmount
Wichita, KS 67260-0007

Economic Development Activities at Wichita State University

Wichita State University is integrally involved with economic development in Kansas. Located in the largest population and manufacturing center in the state, WSU is ideally situated to provide support for the growth of world-class industries.

The University President participates regularly in the Employment and Training Board of the Wichita/Sedgwick County Partnership for Growth (WI/SE). As part of its contribution to the *WI/SE Blueprint 2000 Action Plan*, WSU planning and institutional research offices contributed to the "Report of the Task Force on Training Wichita's Work Force, August 1993." These activities seek to develop concerted efforts to promote the economic development of globally competitive businesses and industries which utilize college-educated personnel. Through university involvement in such planning, WSU graduates have an increased potential for employment in Kansas.

Included in this document are a representative sample of projects in which Wichita State University applies state resources to foster and enhance the economic development of the Wichita-Sedgwick County area and the State of Kansas.

W. Frank Barton School of Business

The Barton School of Business operates several centers which provide direct support of business needs, such as for economic and demographic information, entrepreneurial and small business consulting, and assistance with international trade.

Center for Economic Development and Business Research

This Center collects, analyzes and disseminates information to support the activities of state and local government, education, and business and economic development organizations with its primary focus on Wichita and the south central Kansas region.

The Center is a designated *State Data Center*. As such, the Center maintains a collection of printed publications and computer files from the U.S. Bureau of the Census. Census data contains complete profiles of Kansas on the state, county, city, tract and block levels. The holdings of the State Data Center can be combined with the Center's Integrated Mapping And Geographic Encoding (IMAGE) system to provide a variety of maps and drawings. These graphics can be powerful tools for geo-demographic analysis and planning.

The Center is a primary source of monthly economic data for the region, publishing the annual *Wichita MSA: The Facts at a Glance* (in cooperation with WI/SE, the Wichita/Sedgwick

County Partnership for Growth), the quarterly *Business and Economic Report* and the monthly *Kansas Economic Indicators*, which provide comprehensive data on Wichita and the state.

Center for Entrepreneurship

The Center for Entrepreneurship was rated among the top 25 such centers nationally in a survey reported in the September, 1994, issue of *Success* Magazine. The mission of the Center is to enhance entrepreneurial attempts and successes through both credit and non-credit educational courses and workshops, and by advancing the discipline of entrepreneurship through meaningful applied and theoretical research. Major educational programs include *Entrepreneurship Camp*, a college-level workshop for high school students which has enrolled more than 700 students from more than 15 states; *Entrepreneurship: Your Future in Business*, a summer workshop for college students and members of the community; *Entrepreneurship for Innovative Educators*, a graduate-level workshop for primary and secondary teachers; a summer workshop featuring *Entrepreneurship for the Health Care Professional*; and a *Network for Young Entrepreneurs*.

The Center for Entrepreneurship, in cooperation with The Center for Entrepreneurial Leadership of the Kauffman Foundation, Kansas City, addresses minority concerns with its *Fast Trac II* program, designed to help minority-owned and women-owned businesses. In the fall 1994 semester, 37 business people were enrolled in the program.

The Center hosts the *Entrepreneur-in-Residence* and *Executive-in-Residence Lecture Series*. These showcase nationally-recognized entrepreneurs who have founded and operated major corporations. The lectures are open to the general public, and the series' programs include lunches for local business people.

Small Business Development Center

The Wichita Small Business Development Center provides management assistance, resource referrals/business information, and training to small business owners (including potential business owners) and inventors in Sedgwick and 15 other counties. The KSBDC state office (also located at WSU) has reported that 33% of the centers' clients reported an increase in gross income and their employment numbers increased by an average of 12% after receiving SBDC assistance.

World Trade Council

Together with the Wichita Chamber of Commerce, the Barton School sponsors the *World Trade Council*, which promotes international trade and the growth of Wichita and Kansas businesses through exports and foreign investments. The Council has been recognized by the U.S. Department of Commerce, winning the Presidential "E" Award (1985-86) and "EStar" Award (1991-92) for its excellence in export services.

College of Engineering

Other business needs involve direct research and design and manufacturing production support. This is provided primarily through several centers in the College of Engineering, with the involvement as needed of faculty and graduate students in the Fairmount College of Liberal Arts and Sciences departments of Chemistry, Computer Science, Mathematics and Statistics, Physics and Psychology/Human Factors.

The College of Engineering is a major resource for industries in the state, which draw upon the College's faculty, laboratories, and shop facilities in solving their engineering problems. Recent studies indicate that 27% of all the engineers working in the local aviation industry—Boeing, Cessna, Learjet, Raytheon—are graduates of the WSU College of Engineering. The College has four departments: Aerospace Engineering, Electrical Engineering, Industrial and Manufacturing Engineering, and Mechanical Engineering. With M.S. and Ph.D. programs offered in all departments, the College has a large pool of highly-qualified graduate students to participate in research projects. Facilities such as the *Walter H. Beech Wind Tunnel* perform many contract projects annually. In 1995, as part of the Aerodynamics Laboratory, industry contracts for wind and water tunnel tests totalling \$236,290 were fulfilled.

College of Engineering faculty serve as Faculty Fellows in the *National Institute for Aviation Research* and in the *Institute for Rehabilitation Research and Services*. Much of their research is directed toward engineering problems proposed by manufacturing and service industries in the Wichita area. The *Center for Energy Studies* performs research to support the needs of the Kansas Electric Utilities Research Program. Numerous other research projects are undertaken for state and national agencies which solicit competitive proposals on their priority projects.

Fairmount College of Liberal Arts and Sciences

Elliott School of Communication

Location of the Elliott School of Communication in the largest city in the state affords opportunities to be responsive to the metropolitan community that the University serves. Elliott School students, with a grant from Wichita's Bank IV, operate a *Student Advertising Agency*, "Ad Astra," offering advertising services to minority and small businesses.

Just established in the spring of 1995 is the Elliott School's *Interdisciplinary Communication Research Institute*. This cooperative program will bring together researchers from across campus and from the wider community, to focus upon individual and group aspects of social communication and technologically-mediated communication. Elliott School faculty and graduate students will assist in conducting surveys and focus group studies under contract with business and industry. Research facilities available include observation rooms for social communication in groups and instrumented facilities for measurement of individual reactions in various settings of technologically-mediated communication.

Ablah Library

Ablah Library, along with the Music and Chemistry branch libraries, offers a growing collection of more than 3 million items, including 972,116 bound volumes, 4,214 serials, 917,413 microform units, and 494,998 government documents. Other materials include corporate annual reports, scores, videotapes, audio recordings, and CD-ROMs. All library resources which circulate are available to residents of the metropolitan area. People with accredited computer access anywhere in the metropolitan area may dial into *LUIS* (the library's online catalog) and *MDAS* (the library's online bibliographic databases). A "*Special Borrowers*" program allows materials to be checked out on a restricted basis. Ablah Library participates in the *Area Health Library Association* which, with the professional libraries of area medical centers, provides a consortial arrangement for the exchange of journal articles.

Ablah Library's government document holdings were enhanced in 1991 when it became an official *United States Patent and Trademark Depository Library*, the only such depository in Kansas. In 1994, librarian instructional services provided training for 244 individuals doing 2,809 patent searches and 314 individuals doing 656 trademark searches. As a community service, approximately 94% of the collection's usage is by community persons, typically attorneys, inventors, manufacturers, etc.

Research and Governmental and Industrial Relations

The Vice President for Research and Governmental and Industrial Relations oversees three units which provide research staff services to corporations involved in economic development, support for aviation research and technology transfer/commercialization, and engineering research and development for rehabilitation services.

Office of Research Administration

Wichita State University supports economic development through making Office of Research Administration staff available to assist local businesses with proposal preparation and contract accounting. Examples include the recent award from the Kansas Department of Commerce and Housing (KDOCH) to Cessna Corporation for new employee training, and an earlier proposal to KDOCH for the WI/SE Employment and Training Board relating to workforce development.

The National Institute for Aviation Research

Wichita State University has a history of aeronautical research in cooperation with industry dating from the construction of its first wind tunnel in 1928. In 1985, the university established the National Institute for Aviation Research with major industry, regional, state and federal support. The mission of the Institute is to conduct research, transfer technology, and enhance education for the purpose of advancing the nation's aviation industries, and to assist local and regional non-aviation firms which may benefit from aviation-related technologies.

The National Institute for Aviation Research is one of five Kansas Board of Regents university-based *Centers of Excellence*, as designated by the Kansas Technology Enterprise Corporation (KTEC), a nonprofit corporation set up by the Kansas Legislature to advance technology to a level at which it can contribute to economic growth.

Achievements of the National Institute for Aviation Research in the past decade include participating in the NASA Task Force to define general aviation's long-range needs; assisting in the development of the composite tail cone and certification of seats for the Cessna Citation; assisting small manufacturers in creating or saving more than 1200 jobs through research and technical assistance; conducting more than 350 technology transfer workshops with over 7500 participants; and providing manufacturing assistance to 304 Kansas firms with combined employment exceeding more than 20,000.

The Institute is comprehensively involved in the *Advanced General Aviation Transport Experiment (AGATE)* for NASA. More than 70 U.S. companies, and another 30 organizations among government, nonprofits, and universities, have signed up to participate in this general aviation revitalization effort. Another cooperative research activity is the *Kansas Aviation Design and Manufacturing Research Committee*, conducted jointly with the University of Kansas, Kansas State University, and Pittsburgh State University. Cessna, Raytheon, and the Kansas Manufacturers Association are major industry partners. State funding is provided through KTEC.

Research at the Institute focuses on aeronautical topics such as airplane aerodynamics; crash-worthiness of aircraft seats and other structures; de-icing of airframe surfaces and engine inlets; producibility of aircraft components made of composite materials; reliability of avionics and computer software; strength and failure mechanisms of aircraft materials; human factors and ergonomics; and computer-aided design/computer aided manufacturing/computer-aided three dimensional interactive applications (CAD/CAM/CATIA). Often the aeronautical knowledge gained is applied in non-aviation areas such as development of wind turbines and production of lightweight, high-strength bicycle parts.

The Institute focuses its technology application activities through the Wichita Regional Office of the *Mid-America Manufacturing Technology Corporation (MAMTC)*. MAMTC receives major support from the National Institute for Standards and Technology (NIST) and the state of Kansas (KTEC). In 1995, MAMTC fulfilled 61 fee-based contracts and provided another 94 instances of informal assistance (no-fee contacts) with 108 different companies in Kansas. These activities resulted in \$116,950 in net industry revenues and \$544,983 in revenues from the National Institute for Standards and Technology.

The Institute also houses the *Wichita Technology Corporation*, a regional commercialization center sponsored by KTEC, the Wichita/Sedgwick County Partnership for Growth, and Wichita State University. WTC provides assistance to new and small Kansas firms in obtaining capital to accelerate technological developments. The applied research, prototyping and simulation capabilities of NIAR and its industrial partners provide an in-place, experienced facility and staff to assist with commercialization activities. KTEC economic measures for 1992-1994 reported more

than \$2 million in sales increases and 766 jobs created or retained by Kansas corporations by virtue of the Institute's commercialization of research and development.

Institute for Rehabilitation Research and Services

Wichita State University has hosted a federally-funded *Rehabilitation Engineering Research Center* since 1976, as a cooperative venture with the *Cerebral Palsy Research Foundation of Kansas*, located nearby. This new Institute, established in 1995, will mobilize the University's multidisciplinary faculty and graduate student research resources to address an expanded range of issues related to the needs of persons with chronic (congenital and acquired) disease and disability. The Institute will be a cooperative venture between the University, local schools and industries, and other rehabilitation facilities and organizations in the metropolitan area that will address the needs of persons with disabilities living in the community. Through this Institute the University will facilitate basic and applied research and offer professional education and service in ergonomics, rehabilitation engineering and bioengineering; communication sciences; physical therapy; extended rehabilitation; exercise science; and community services.

The Institute will help to ensure that persons with disabilities are able to participate in an independent life to the extent of their natural or augmented abilities. The measure of the success of the Institute will be in how effective it is in improving the quality of life of persons with chronic disease or disability. A multi-disciplinary team consisting of faculty from the Colleges of Engineering, Education, Health Professions, and Liberal Arts and Sciences will participate in addressing these issues.

Conclusion

Wichita State University is the only Regents university located within a federal metropolitan statistical area in the state of Kansas. WSU is clarifying its mission, together with similar metropolitan universities participating in the national Coalition of Urban and Metropolitan Universities, to provide educational service to an older (median age 27), increasingly multicultural (23%) predominantly commuting (78%) and off-campus employed (81%) student population. The non-traditional metropolitan student at Wichita State University thus contrasts significantly with the traditional residential student who continues to be the norm at other Regents universities.

Wichita State University recognizes its crucial role as a stakeholder in the economic and social development or decline of the Wichita metropolitan area and the state of Kansas, and continues to strive to provide efficient, effective services in active interaction with business and industrial development concerns, the public educational system, and city, county and area governments.

Biography


Dr. Steven J. Hooper

Steve Hooper is an Associated Professor of Aerospace Engineering at Wichita State University and a Faculty Fellow at the National Institute for Aviation Research. He has over 20 years experience working with dynamics problems. He has written 16 peer-reviewed journal articles and directed sixteen research projects at Wichita State with a combined funding level of \$1.9 million. These projects addressed a wide range of problems including delamination of composite materials, aircraft crashworthiness, and energy absorbing seat research and development. He recently served on an international FAR/JAR 16 g seat committee which revised the Advisory Circular AC 25.562 describing the procedures by which seats in transport aircraft are certified to the new dynamic test requirements. Dr. Hooper and his team of students developed the energy absorbing technologies which are being commercialized by Impact Dynamics Incorporated in Wichita, Kansas. Dr. Hooper earned his BS and Ph.D. in Aerospace Engineering at Iowa State University in 1973 and 1983 respectively. He received his MS in Engineering Mechanics from Wichita State University in 1978.

Economic Development
JANUARY 29, 1996
Attachment 4



***The Impact of R&D on Economic Development
in
Kansas
A Faculty Perspective***



**Dr. Steven J. Hooper
Assoc. Prof. Aerospace Engineering
NIAR Faculty Fellow
Jan. 29, 1996**



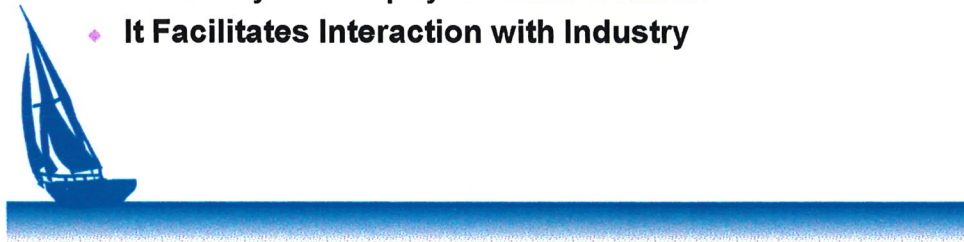
Topics

- ◆ **How the NIAR has helped me**
- ◆ **Crashworthy Seat Development**
 - **Aviation Safety Products**
 - **Impact Dynamics Incorporated**
- ◆ **Cessna Seat Certification - Structural Testing**



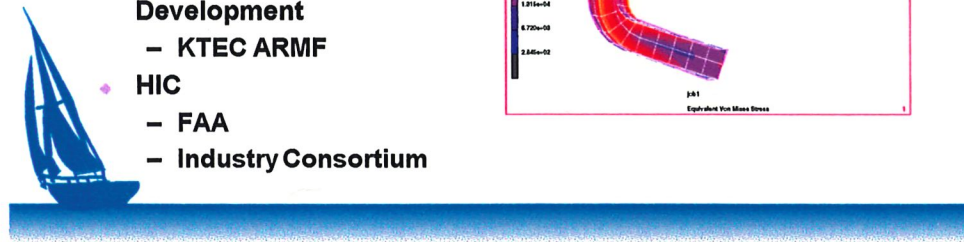
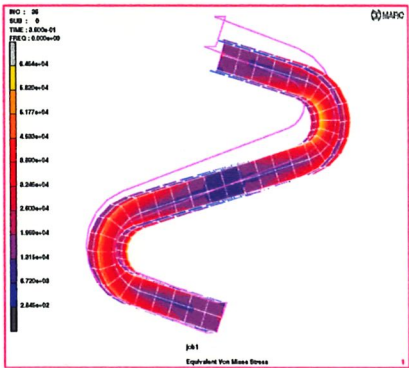
How the NIAR has Helped me

- ◆ The NIAR is Effective in Providing Research Opportunities to Faculty
 - World - Class Facilities
 - It has me attract Nearly \$2 Million in Federally Funded Projects
 - I have supported 18 Graduate Students
 - ▶ Only 4 are Employed Outside of Kansas
- ◆ It Facilitates Interaction with Industry



Aviation Safety Technologies

- ◆ Seat Cushions
 - FAA Research
 - SBIR with Terry Engr
- ◆ Energy Absorbing Seat Legs
 - FAA Research
- ◆ Formation of Impact Dynamics, Inc. - Seat Development
 - KTEC ARMF
- ◆ HIC
 - FAA
 - Industry Consortium





Impact Dynamics, Inc.

- ◆ **Without the Guidance of WTC, the Energy Absorbing Seat Technology would have been published**
 - **and the Commercialization Opportunity Would Have Been Lost**
- ◆ **Significant KTEC Support**
- ◆ **The “Business Expertise” provided by WTC is an essential resource**



Cessna Seat Tests

- ◆ **Static Tests Cessna Seats for Single-Engine Aircraft**
 - **3 Seats / 12 Tests (6 in one day)**
- ◆ **Excellent Experience for new Faculty and Students**
- ◆ **The Income Generated Will Result in a Significant Upgrade in the Structures Lab**

