Approved 3-4-92
Date

MINUTES OF THE House COMMITTEE ON Computers, Communications&Technology

The meeting was called to order by George Dean
Chairperson

12:00 Noon on January 23, 1992, 1992 in room 529-S of the Capitol

All members were present except: All present.

Committee staff present: Jim Wilson, Revisor of Statutes
Julian Efird, Research
Donna Stadel, Committee Secretary

Conferees appearing before the committee: Kevin Carr - KTEC
Doug Miller - Agri-graphics

Others attending: See attached list.

Kevin Carr, Vice-President - Operations, KTEC, appeared before committee to talk about technologies generated through KTEC. It was established in 1987 for purpose of advanced technology economic development to create and maintain employment by fostering inovations to stimulate the commercialization of new technologies and to promote creation, growth and expansion of Kansas enterprises.

Mr. Carr introduced a video highlighting applied research matching grant program and companies KTEC has assisted through their program (attachment 1). He also touched on a number of projects involving different areas of technology, some of which include:

Bi-rotor combine project. This project's concept is a more efficient harvestor using a threshing cylinder inside the combine with two rotating drums which counter rotate threshing grain at full 360 degrees. The through-put of grain by this process is faster and cleaner with the advantage of being a simplified lower cost machine to the farmer.

Discussion followed regarding how KTEC participates in rewards as result of approving grants to businesses. Mr. Carr explained until June of 1991, assistance was given strictly as a grant. If product was success, there was no payback. Today, success is tied to a royalty of usually 2% - 3%. We take back our investment, plus 5%. For example, on $100,000 investment, we would get back $105,000. If product goes out of state, the payback is twice the money. He added there has been discussion in KTEC's committees and board meetings, whether we might want to operate this as a venture capital fund. There is a seperate Astra Fund which comes at a later stage when companies are closer to product. They are invested in a portfolio of nine companies and own equity of 10% to 30%. However, the above mentioned case is an example of an assistance program, as opposed to a venture capital--the idea being to stimulate companies to stretch by reducing the risk.

Biocorp, Topeka. This is a new company operating both through AdAstra Fund and some small matching grants. They use collagen, a protein fiber found in bones of animals to produce a range of products used to promote healing of bones and tissue. To date, collagen has been used only in surgical settings only because it is terribly expensive to produce.

Kraft Robotics, Overland Park. This is high tech firm producing telerobotic manipulators used in dangerous environments, operated from a remote site. These have been used in under-sea construction at Three-Mile Island. Also are gearing up for the space station and promoting products for high voltage line maintenance.

Midwest Superconductivity. High tech firm involved in developoing new materials called super conductors having no resistance in terms of electrical current flow. First target market is in medical radiation proceeding toward a device planted inside MRI, CATSCAN and X-ray types of equipement. Will be able receive images currently accessible, without application of radiation to the person.

Mr. Carr went on to quickly touch on a number of other companies pointing to the fact these projects do take a fair amount of time. Success rate ranges between 30% to 40%, with many companies under threat from both foreign or domestic competition. KTEC is trying to save these Kansas companies by either getting them help, or helping them get on their feet to salvage jobs, hopefully upgrading jobs as technology comes in.

Chairman Dean, asked for information regarding research being done in our universities. Mr. Carr believed approximately 60% to 75% is being developed in our universities.

Mr. Doug Miller, Agri-graphics Software, Hiawatha, ended the meeting by giving a presentation on Technical Innovations and Practical Applications of Geographical Information Systems (GIS), Global Positioning Systems (GPS), Decision Support Systems (DSS), and Remote Sensing (RS), integrated into an Open System Design (attachment 2).

Chairman Dean summarized by saying there appears to be some different schools of thought about what should be venture capital or what should be grant and research program.

Meeting adjourned at 1:15 P.M., until Tuesday, January 28, 1992.

GUEST LIST

COMMITTEE: CCT DATE: Jan. 23, 1992

NAME (PLEASE PRINT)	ADDRESS	COMPANY/ORGANIZATION
Kevin Carr	Topeka	K-TEC
Mike Reecht	"	AT+T
BRAD MEARS	TOPEKA	COMMERCE
JIM GREEN	"	KDHE
Doug McNett	Great Bend	Rep. Mead Intern

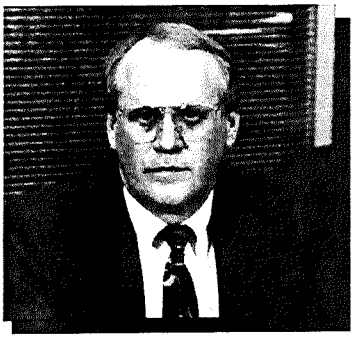
APPLIED RESEARCH MATCHING GRANTS

Osborne Industries, Inc., Osborne, KS.

"Companies that don't innovate, soon cease to exist," is the underlying philosophy and motivation for Osborne Industries, Osborne, according to Ron Thibault, vice president of engineering.

Osborne Industries came to KTEC in 1987 to enhance their agriculturally-used ventilation fans. Company growth and market expansion are visible results of this partnership between Osborne Industries, Kansas State University, Kansas Electric Utilities Research Program and KTEC.

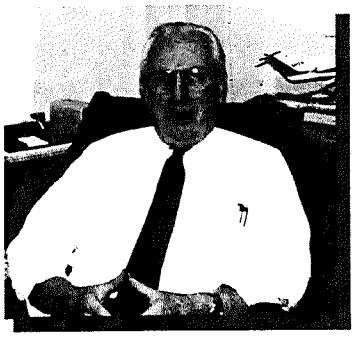
Oread Laboratories, Inc., Lawrence, KS.



Being able to "pursue new technologies that could be applied directly to our products" is one of many reasons that Oread Laboratories, Lawrence, and William Duncan, Oread's president, joined forces with KTEC. Their partnership utilized the research facilities of the Higuchi Biosciences Center of Excellence at the University of Kansas.

Dr. Duncan explains that "having access to world-class scientists" is an advantage when a company is competing globally, and with Oread's physical expansion of labs and employees, the "momentum is growing."

Precision Pattern, Inc., Wichita, KS.



"The need for more advanced technology than we had in this plant," in 1988 prompted Precision Pattern, Inc., Wichita, to enter a partnership with KTEC, according to Russell Bomhoff, president. Cost-effective applied research was achieved by utilizing facilities at the National Institute of Aviation Research in Wichita.

Precision Pattern produces interior furnishings for jets, on a national and international scale. Bomhoff explained, "we must continue to find and develop new technology or our competitors will pass us by."

House CCT
Attachment 1
1-23-92

AGRIGRAPHICS SOFTWARE, INC.
RR4 BOX 176
HIAWATHA, KANSAS 66434
PHONE 913/742-2884
FAX 913/742-7940

DOUG MILLER

23 January, 1992

The House Committee
on Computer Communication
and Technology
Kansas Capital Building
Topeka, Kansas

SUBJECT: Technical Innovations and Practical Applications of Geographical Information Systems (GIS), Global Positioning Systems (GPS), Decision Support Systems (DSS), and Remote Sensing (RS), integrated into an Open System Design.

- Definitions:
  - GIS - A Geographical Information System is a computerized database management system for capture, storage, retrieval, analysis, and display of spatial (locationally defined) data.[1]

  - GPS - The Global Positioning System was developed by the Department of Defense to simplify accurate navigation. It's based on a constellation of twenty-one satellites orbiting the earth at very high altitude. It uses these satellites and computers to triangulate positions anywhere on earth.[2]

  - DSS - Decision Support Systems assist managers in dealing with complex planning problems and in selecting

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[1] NCGIA, (NSF), 1988
[2] GPS, A Guide to the Next Utility, Jeff Hurn for Trimble Navigation

House CCT
Attachment 2
1-23-92

appropriate technology. DSS in natural resources are similar to those in other enterprises in that they are designed for a specific problem area, incorporate specified planning horizons, and guide decision makers through a process of logical planning and technology selection.[3]

° RS - Remote Sensing refers to data collected from a distance. Numerous sources of digital image data currently exist, each with advantages and limitations. There are now five general classes of raster image data. They are commercial remote sensing satellites, airborne digital scanners, aerial photographs, airborne video, (the last two must be converted to raster images after the flight), and most recently available, the Airborne Data Acquisition and Registration System (ADAR), a high resolution multispectral imaging system using GPS for geodetic control of each image at the time of acquisition.[4]

※ A brief history of GIS:

The Canadian Geographic Information System was implemented in 1964, one year after the first conference on Urban Planning Information Systems and Programs. The New York Land use and Natural Resources Information System was implemented in 1967, and the Minnesota Land Management Information System in 1969. In these early years, the costs and technical difficulties of implementing full-scale GIS systems were such that only large users of geographic information (such as federal and state agencies) could afford their development.

There has been a rapid increase in the number of GIS, because of both advances in computer technology and

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[3] Proceedings, International Conference on Decision Support Systems for Resource Management Texas A & M University, April, 1991

[4] Multispectral Imaging in the 1990's, Benkelman, Johnson, Verbyla

increases in the availability of spatially-referenced data in digital form. To date, a variety of systems has been developed, primarily for land use planning and natural resource management at the urban, regional, state, and national levels of government, but also for applications by public utilities and private corporations. Most of these systems rely on data from existing maps or on data that can be readily processed to provide the locational information required. Now, however, it is estimated that only about ten commercial firms are offering fully integrated GIS on the open market in the United States. Furthermore, few academic institutions offer courses in GIS. In 1962, Schwendeman's Directory of College Geography of the United States listed only one department as offering a course in GIS, while in 1984 only four departments offered courses (Monsebroten 1982, 1984). This lack of academic training has inhibited the development of the field.[5]

Currently, as fellow Kansan's, you will be proud to know that Kansas University is establishing a Bachelor of Science program for Geographic Information Systems Analysis, the first in the Nation. Additionally, Kansas State University is establishing an Associate Degree Program for Geographical Information Technicians. They will be one of four in the Nation. Highland Community College is studying the feasibility of offering an Associate Degree Program, also. Kansas is fortunate to have individuals that are leaders in the field of research and applications of GIS. I know that their efforts will be supported because Kansas has a very active GIS policy board. The existence of the board verifies that Kansas is planning its' future.

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[5] Requirments and Pricipals for the Implementation and Construction of Large-Scale Geographic Information Systems, Smith, Menon, Star, & Estes

Dataquest, a leading market analysis firm in the United States, projected the following in their October, 1991 forecast:

° The GIS/Mapping market is expected to grow 28% in 1991 with a compound growth rate of 25% through 1995.

° Total revenue for the GIS/Mapping market for 1991 in the United States should top $2.1 billion and should top $5.0 billion in 1995.

Specifically, ERDAS, a GIS company based in Atlanta, Georgia is experiencing a 50% growth rate. Trimble Navigation of Sunnyvale, California a GPS company is growing at an 80% rate. Presently, most true GIS systems are still not affordable in rural areas. The growth rate of the industry is such that rural areas are overlooked as a market.

Such growth ultimately brings about a question. What substantiates such growth? The reason is GIS saves money and while providing more detailed information. This allows the user to plan, using all available data, thus enhancing the quality of decisions made. GIS can measure and project environmental impact. It can assist in the management of natural resources. GIS can be used to cut costs by automating the handling and evaluation of spatial data. GIS can increase safety when used in transportation, road maintenance, and Emergency 911 applications. GIS is used as a marketing tool, to evaluate and target specific markets in a cost effective manner. These are only a few reasons why the industry is experiencing such growth.

Please join me now, and view an actual application of GIS/GPS technology. This application was spontaneous and involved the terrible fire in Oakland, California, in the fall of 1991.

When evaluating the users of GIS closely, we find that they are most generally large organizations, or government entities. They can most afford the initial cost of the hardware and software required to implement a GIS. They also can afford the cost of collecting the data to use in their GIS, which can quadruple the initial cost of the system. (Example Scott County 5 years, $400,000) Additionally, these organizations can afford to compete for the limited trained personnel to operate these complex systems. This situation tends to isolate them in terms of data transfer. Each has their own standards, and can afford duplicate data collection, therefore, the economies of sharing data have not been a critical issue. However, the recent recession has brought out the need to explore these economies and has increased the need for more accurate data. More accurate data will enhance decision making at all levels of government and industry thus lowering costs. The net effect will enhance our ability to compete in the world market.

An example of a possible trend to establish a relationship between users, to cut costs of data collection by sharing data, happened recently in Kansas. Fourteen companies, consisting of utilities, oil and gas, and rural electric cooperatives, set out jointly to purchase a base map. Therefore, the data derived could be shared, thus eliminating duplicate data collection. They are even considering a GPS network for Kansas to maintain their map when implemented. If this were to happen, Kansas would be the first State in the Nation to have such a network. I urge you to support or even participate in such a project. The economy derived by such a project would have a dramatic positive effect upon the cost of doing business for local, county and State governments, also private industry, especially agriculture.

Would a GIS benefit a rural community if it was affordable? Of course it would. Most decisions and planning are the same, despite a community's size. When measured by percentage, savings derived from a GIS would favor the rural community over a large one. A GPS community base station would improve the economy of the GIS, allowing the community to save additional tax dollars while increasing the performance of government.

I would like to refer to several articles in the January issue of the Soybean Digest and its' supplement and discuss the savings derived by this new technology for farmers and the positive implications concerning water quality. The article entitled Computers Power Your Chemical Choices states that a savings of $14 per acre was derived using a GIS with a GPS interface to apply chemicals and fertilizers based upon specific soil profiles. An article entitled Evaluate Your High Tech Options states that yields can be increased from five to fifteen bushels per acre with site-specific precision farming.

A farmer with five hundred acres would save $7,000 in chemical and fertilizer expenses if he experienced the same results, additionally, if corn yields increased five bushels per acre, additional revenue of $6,250 would result. Therefore, combining the figures would increase the gross margin of the operation by $13,250. A system such as the article describes could easily cost $9,000 with a GPS receiver, plus the cost of a computer at $1,500. The cost of a GPS base station, or who would own it is not discussed, however, it is needed and costs $10,950. Also, the time required for data entry and cost of the data used by the GIS is not discussed. Without considering data cost, the system would cost the farmer $21,450 including the base station. The initial capital outlay probably would prohibit most farmers of this size to purchase a system. However, they

might consider purchasing a service for $5 to $8 per acre. At $8 per acre a gross margin of $9,250 could possibly be achieved.

Consider now, the same farmer, purchasing a GIS for $1,100 with a universally acceptable base map installed, the same computer at $1,500 and a $5,000 GPS receiver that could be transferred from one machine to another. Additionally, consider that he would pay $1 per acre annually for the service of a community base station owned by a utility company. The farmer would have a positive cash flow of $5,150 the first year including the initial cash outlay. Additionally, the standardized base map would allow the communication of spatial data with his vendors, government agencies, the Cooperative Extension Service, and the agronomy lab of his supporting college, electronically.

Both scenarios would minimize environmental risk for the individual, thus improving water quality. However, the second scenario would promote more participation, thus lowering the cost of data collection for agencies that collect data from the farmer. Also, more participation extends environmental benefits to larger areas or water sheds.

We have taken the initiative to develop the system described in the second scenario. Our product will include versions for school districts, city and county governments, utility companies, hospitals, and agribusiness. Additionally, we are developing a system that will allow us to send evaluated satellite imagery for crop evaluation electronically to the farmer, hail companies, or local governments. This will add additional value to our program. As we are also a dealer for Trimble Navigation, we will be able to offer a complete GIS/GPS package. We are

considering offering computers as well. We would then be able to offer a plug-in and go system, a total solution.

The more technology based Kansas can become, the more we can insulate ourselves from economic downturns. Technology will allow us to become more efficient, thus more competitive in the global market. These efficiencies are not limited to our 500 acre farmer. They could extend to all businesses and governments of our State.

Thank you for allowing me to participate in your meeting. It has been both an honor and a pleasure.