

MINUTES OF THE House COMMITTEE ON Communication, Computers and TechnologyThe meeting was called to order by Representative Mike Meacham at  
Chairperson3:30 ~~am~~/p.m. on March 2, 1983 in room 522-S of the Capitol.

All members were present except:

## Committee staff present:

Marlin L. Rein, Chief Legislative Fiscal Analyst, Committee Staff Director  
Sherry Brown, Fiscal Staff, Research Department  
Chris Stanfield, Fiscal Staff, Research Department  
Arden K. Ensley, Revisor of Statutes  
Betty Ellison, Secretary to the Committee

## Conferees appearing before the committee:

Representative Ron Fox, Sponsor of HB 2365 and HB 2366  
Jamie Schwartz, Secretary, Kansas Department of  
Economic Development  
Stanley Z. Koplik, Executive Officer, Board of Regents  
Jan Roskam, Director, Flight Research Laboratory and Professor  
of Aerospace Engineering, University of Kansas  
Dave Kraft, Dean of School of Engineering and Director,  
Center of Research, University of Kansas  
Dr. Don Rathbone, Dean of School of Engineering, Kansas State  
University and Legislative Committee Chairman,  
Kansas Engineering Society  
Mr. Bob Kelly, Kansas Independent College Association  
Elizabeth E. Taylor, Legislative Consultant, Institute of  
Electrical and Electronics Engineers, Inc.

Chairman Meacham began the meeting by introducing Representative Ron Fox, Sponsor of HB 2365 and HB 2366. Representative Fox explained that HB 2365 is a mechanism to provide one unit for grants for training-type programs. He said that in doing a study on economic redevelopment, he found that Massachusetts had a high success rate of attracting high technology industry. He stated that the provisions of this bill are similar to some in Massachusetts.

In regard to HB 2366, Representative Fox told the committee that the intent of the bill was to promote industry of a technological nature in the State of Kansas. This bill would create a corporation which would have the power to buy, hold and sell qualified securities. The proceeds of the investments would be used only to cover the seed capital needs of the enterprise except as otherwise authorized.

Staff reviewed HB 2442 for the committee. This bill would establish a Kansas high technology research partnership program to promote research projects within the state.

Jamie Schwartz, Secretary, Kansas Department of Economic Development, presented printed copies of his testimony to the committee. (Attachment 1). Mr. Schwartz testified that high technology firms are looking to new areas, including the plains region, for expansion opportunities. These firms tend to cluster around research activities, medical facilities, or educational institutions. He said that under the Research Partnership Program, appropriations will be made to the Board of Regents for the purpose of awarding grants to Regents' institutions for research and development projects in high technology areas. The grants must be matched on at least a 50-50 basis with private funds secured by the institutions.

CONTINUATION SHEET

MINUTES OF THE House COMMITTEE ON Communication, Computers and Technology  
room 522-S, Statehouse, at 3:30 ~~xxx~~/p.m. on March 2, 1983

Mr. Schwartz stated that the Regents' institutions would bring to the partnership program a strong academic base in the areas of pharmacology, biology, aeronautical technology and agri-products development, as well as research programs in other areas. It was his belief that the partnership between the Regents' institutions and private industry would be beneficial to both and in turn would improve the economic climate of the State of Kansas.

Mr. Schwartz also testified in favor of Representative Chronister's bill, HB 2259. He stated that this bill had the support of his department for the concept of the bill and the assurance that the funding would not come from general funds.

In addressing Representative Fox's bill, HB 2366, Mr. Schwartz favored a Department of Technology, rather than a technology development corporation, or at least making it independent.

Stanley Koplik, Executive Officer, Board of Regents, testified that the board strongly supported HB 2442. Mr. Koplik said that this bill could bring out centers of excellence at several large institutions, as well as providing benefits to some of our small regional universities in developing some lasting relationships with the private sector. He said that the results of the board's thinking are reflected in HB 2442 as being a workable model that best fits the economic environment in Kansas.

Mr. Koplik stated that a special characteristic of the program is the mandatory requirement for co-funding by the private sector. He said that this is the best way to stimulate lasting economic benefits to the state.

Mr. Koplik said that another important characteristic of the program is that the state participation in the funding of the matching grants would underwrite the establishment of effective programs which would address critical economic needs.

Dr. Jan Roskam, Director, Flight Research Laboratory and Professor of Aerospace Engineering at Kansas University, distributed four printed articles to the committee. (Attachments 2, 3, 4, 5). He used the first article to give examples of programs that would work well under HB 2442, with the cooperation of industry and education. Dr. Roskam gave a definition of high technology from the National Science Foundation. (Attachment 2). He also suggested several potential research areas for the Kansas matching fund high-technology program. (Attachment 2).

Dr. Dave Kraft, Dean of the School of Engineering and Director of the Center for Research at the University of Kansas, made some comments on why basically education, and specifically our Regents' institutions should be in the forefront of anything done regarding high technology. He stated that HB 2442 could be a very important element in the expansion of the existing industry and also in the attraction of other industries which are outside our state now in the area of high technology.

Bill Henry, Executive Vice President, Kansas Engineering Society, commented that Dr. Bill Wilhelm, Dean of the School of Engineering at Wichita State University, was unable to attend today's committee meeting.

Dr. Don Rathbone, Dean of the School of Engineering at Kansas State University and Legislative Committee Chairman, Kansas Engineering Society, testified in favor of HB 2311 and HB 2442. He made some recommendations that he thought could fit in with those bills.

CONTINUATION SHEET

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Dr. Rathbone stated that we should try to develop centers of excellence that relate to where the potential is for high technology development. This relates to other areas as well as electronics, such as the aircraft industries, robotics, etc.

Mr. Bob Kelly, Kansas Independent College Association, testified in favor of HB 2442. He said that in the area of applied research it would be helpful to allow all competition as many competitors as possible. He pointed out the advantages of allowing colleges other than the Regents' institutions to compete for the funds.

Elizabeth Taylor, Legislative Consultant, Institute of Electrical and Electronics Engineers, Inc., passed out printed copies of her testimony. (Attachment 6). She said that her organization favors HB 2442 because it would encourage Kansas graduates in high technology areas to remain in Kansas as well as attract new industry to the state. She also spoke in favor of HB 2311 because it encourages the coordination of education and research in advanced technology.

Testimony was closed on HB 2442.

Staff reviewed HB 2311 and the fiscal note for it. (Attachments 7,8)

Jamie Schwartz, Kansas Department of Economic Development, testified briefly in support of HB 2311.

Bill Henry, Kansas Engineering Society, testified regarding HB 2311. He stated that the Governor's Task Force could possibly be incorporated in statutory form and used as a starting basis in HB 2311. He had some reservations regarding this bill, one being that any money handed out should be done on a competitive basis. Mr. Henry cited some reservations about HB 2442, including one that it contains no requirement of federal money whatsoever.

Chairman Meacham told the committee that he and Representative Fox had agreed not to have hearings tomorrow on HB 2421. However, the committee would possibly take final action on all bills previously heard.

The meeting was adjourned by the chairman at 4:45 p.m.

The next meeting of the committee will be held at 3:30 p.m. on March 3, 1983.

Date: March 2, 1983

GUEST REGISTER

HOUSE

COMMITTEE ON COMMUNICATION, COMPUTERS AND TECHNOLOGY

NAME	ORGANIZATION	ADDRESS
Bob Kelly	Ks Independent College Assn	Topeka
TCZ Keph	Bd. of Regents	Topeka
FRENAS	Chamber of Commerce	Wichita
Danilo Schwartz	KDE D	Topeka
Wendred Hawn	AAUW	Topeka Branch
Ruth Groves	KEEN	Topeka
Chris Graves	Assoc. Students of Ks.	Topeka
Dana Hawkins	Assoc. Students of Ks.	Topeka
Mark Tallman	Assoc. Students of Ks	Topeka
David Daltan	Division of Budget	Topeka
Tom Vanderhooker	Guest	Wichita
F Seidermann	Wichita State University	Wichita
Bill Kaufman	Board of Regents	Topeka
Bill Henry	Kansas Engineering Society	Topeka
J. ROSKAM	UNIV. OF KANSAS	LAWRENCE
P. FORTIN	UNIV OF KANSAS	"
A. Kraft	UNIV. of KANSAS	"
Jeanette Knight	Barrois Office	Topeka
Susan Schroeder	Div. of Budget	Topeka
Mike Johnson	K. Sp.	Manhattan

BURR SIFERS CHANNEL 19



Testimony of  
Charles J. Schwartz, Secretary  
Kansas Department of Economic Development

on

House Bill No. 2442  
Committee on Communication, Computers and Technology

March 2, 1983

Attachment 1  
House Communication, Computers and Technology 3-2-83

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE:

The manufacturing sector of the U.S. economy is becoming increasingly dependent of technological advancement. The future of industrial development in Kansas lies with high technology industry.

High technology industries have achieved growth rates in recent years which exceed those of other industries by a substantial measure. They have accounted for 75% of the net growth in manufacturing jobs in the U.S. in the last decade, and 69% of new jobs in Kansas. They are expected to provide 75% of the nation's industrial growth for the remainder of the century. These industries have increased productivity twice as fast as conventional firms and have expanded employment nine times as quickly.

Many states have placed increasing importance on high technology and have initiated concerted efforts to foster high technology industrial development within their borders. Most states within our region are, however, just starting their efforts. Kansas must do the same to remain competitive.

High technology firms are looking increasingly to new areas, including the plains region, for expansion opportunities. In fact, a survey of high technology industries indicated that firms were planning to develop over 80 new plants in this region in the next four years.

High technology firms rely heavily on technical and scientific innovation as a means of making and maximizing a profit. Each of the high technology industries will spend in excess of 51% of net income each year on research and development in the early phases of the firm's growth cycle.

During the early stages of development, the successful new technology firms see revenue advances at rates in excess of 100% per year. This early growth rate is vital to the new firms' ability to attract necessary venture capital. High growth rates continue, fed by high profit earning ratios throughout the early phases. The growth rates slacken as the product base reaches maturity, with newer technologies replacing part or all of the original markets.

High technology industries tend to cluster around their source of raw material: brainpower. Technology-intensive firms tend to cluster around research activities, medical facilities or educational institutions. Basic research supplies the food-stuff on which new technologies thrive. High technology firms require large numbers of engineers to redesign the products and scientists to develop new applications from laboratory work on basic research.

House Bill No. 2442 introduced by the Committee on Communication, Computers and Technology would establish the Kansas High Technology Research Partnership Program. The Research Partnership Program is one in which appropriations will be made to the Board of Regents for the purpose of awarding grants to Regents' institutions for research and development projects in high technology areas. The grants must be matched on at least a 50-50 basis with private funds secured by the institutions. The act is intended to facilitate the application of the resources of public higher education to the state's economic goals and to promote closer cooperation between higher education and the state's business community. It is anticipated that such cooperation will provide enhanced employment opportunities, promote economic development and increase private sector investment in both the Kansas economy and in public higher education.

The Regents' institutions bring to the partnership program a strong academic base in the areas of pharmacology, biology, aeronautical technology, and agri-products development. In addition, the Regents' institutions operate substantial research programs in other areas, thereby providing a strong base for other high technology industrial research. The partnership between the Regents' institutions and private industry can be beneficial to both and in turn improve the economic climate of the State of Kansas. These institutions can provide the faculty, expertise and research facilities needed by industry for product and process development while through its financial support, industry can provide the university with strengthened instructional and research capabilities in high technology fields.

Other states including Colorado, Louisiana, Missouri, Michigan, and New York have research assistance programs. However, with the exception of the Missouri program, the mandatory requirement of co-funding by a private sector sponsor is a unique aspect of the Kansas program proposed in House Bill No. 2442. It is that requirement of private sector investment which is expected to enhance the possibilities for stimulating lasting economic benefits for the State of Kansas.

House Bill 2442 includes funding provisions which are intended to provide for effective coordination of state and private resources in an effort to strengthen the high technology research capabilities of the institutions. The act accomplishes this coordination by providing for the appropriation to the State Board of Regents of State General Fund monies which may be distributed to the state institutions under the jurisdiction of the Board of Regents. However, such funds would be available only upon demonstration by the institution that it can secure "from sources other than the state or federal government,

student fees, institutional endowment or other monies used to fund the operating budget of the university" an amount that would be at least equal to the amount of State General Fund monies transferred to the institution. The act also creates at each institution a high-technology research fund into which such donations would be deposited. The 1984 Governor's Budget Report includes a recommendation for the appropriation of \$1,500,000 to the State Board of Regents which would be utilized to provide the State General Fund matching monies required by the provisions of the act.

House Bill 2442 designates the State Board of Regents as the agency responsible for administration of the program. It also creates a high technology research partnership program advisory committee which includes 7 members -- the Lieutenant Governor, two members of the Legislature (one senator appointed by the President of the Senate and one representative appointed by the Speaker of the House), and three members of the Governor's Task Force on High Technology Development. If the Governor's Task Force on High Technology Development would be disbanded, the Governor is empowered by the act to appoint three persons representative of business and industry in the state to the advisory committee. The advisory committee will be utilized to provide a preliminary evaluation of each project proposal submitted to the board and may be asked by the board to establish specific areas of emphasis for project proposals for a particular grant cycle.

It is intended that the evaluation and selection of grant proposals will be guided solely by the quality of each proposal. No quota will exist concerning the distribution of grants among eligible institutions. No institution will be guaranteed receipt of a grant. Some institutions could conceivably receive more than one grant in the same fiscal year while others may receive none.

House Bill 2442 provides that both applied research projects and basic research projects may be funded from monies appropriated for the program. Both types of projects of will be evaluated on the basis of criteria such as:

1. the probability of enhanced employment opportunities in the state as a result of the initiation of the project;
2. the potential of the proposed project to stimulate economic development and to attract further private investment in the state;
3. the relative value of the proposed project's goals as measured against the state's needs and the quality of competing projects;
4. the ability of the sponsoring institution to provide administrative support and resources necessary to assure a reasonable probability of the project's success.

It is envisioned that project expenditures will include salaries of project personnel and the purchase of equipment and supplies. However, the law specifically prohibits the use of any monies appropriated pursuant to the provisions of this act from being applied to institutional overhead costs. The act also provides that any property, copyrights and patents which result from the development of products or processes as a result of any project grant awarded under this act be determined in accordance with the State Board of Regents' rules and regulations applicable to such matters.

## Conclusion

High technology industrial development can significantly enhance the Kansas economy in many ways. High technology industrial development can provide the needed growth in Kansas' industrial base, since this type of development has already demonstrated a trend of generating more growth in jobs and revenues than traditional industries. Business capital can be multiplied through the proposed new partnership of university research, industry, and state government. The state labor force can expect to find more job opportunities. The state can become a beneficiary of the youth it educates rather than seeing them migrate to out-of-state job opportunities.

K.U. - F.R.L

THE UNIVERSITY OF KANSAS  
FLIGHT RESEARCH LABORATORY



THE UNIVERSITY OF KANSAS CENTER FOR RESEARCH, INC.

DR. J. ROSKAM  
Director  
Flight Research Laboratory

CRINC—University of Kansas  
2291 Irving Hill Road—Campus West  
Lawrence, Kansas 66045  
Phone 913-864-4267

Ackers Professor  
of  
Aerospace Engineering



# WHAT IS HIGH TECHNOLOGY?

NATIONAL SCIENCE FOUNDATION  
DEFINES IT AS :

1. GUIDED MISSILES AND  
SPACECRAFT
2. COMMUNICATIONS EQUIPMENT  
AND ELECTRONIC COMPONENTS
3. AIRCRAFT AND PARTS
4. OFFICE COMPUTING AND  
ACCOUNTING MACHINES
5. ORDNANCE AND ACCESSORIES
6. DRUGS AND MEDICINES
7. INDUSTRIAL INORGANIC  
CHEMICALS
8. PROFESSIONAL AND SCIENTIFIC  
INSTRUMENTS
9. ENGINES, TURBINES AND  
PARTS

CAN THE K.U.-F.R.L.  
BE A CATALYST IN  
SECURING HI-TECH  
JOBS FOR KANSAS?

YES!

HERE IS HOW :

POTENTIAL RESEARCH AREAS  
FOR  
KANSAS MATCHING FUND  
HIGH-TECHNOLOGY PROGRAM

• FLOW PHENOMENA DIAGNOSTICS  
LABORATORY

- \* WINDTUNNEL
  - \* WATER TUNNEL
- } DIAGNOSTIC!

GOAL: REDUCE DRAG →  
ENHANCE SALES  
POTENTIAL OF WICHITA  
BUILT AIRCRAFT

• LIGHT, ADVANCED STRUCTURAL  
COMPOSITES AIMED AT:

- \* BUSINESS AND COMPUTER  
AIRCRAFT
- \* THE GAP IN THE MARKET

# THE GAP IN THE MARKET

HIGH COST  
EXISTING  
ULTRALIGHT  
AIRCRAFT  
~ \$5,000

LARGE  
GAP

LOW COST  
EXISTING  
FAR 23  
AIRPLANE  
~ \$30,000

↓  
SIGNIFICANT JOB  
POTENTIAL  
+  
OPPORTUNITY  
FOR KANSAS

# POSSIBLE PROTOTYPE PROGRAMS

## • FLOW PHENOMENA LAB

ESTABLISH DIAGNOSTIC WINDTUNNEL + PARALLEL WATER TUNNEL RESEARCH FACILITY AT K.U.

\* INDUSTRY USE FOR PROPRIETARY RESEARCH

\* F.R.L. USE FOR NASA SPONSORED RESEARCH

\* F.R.L. USE FOR INDUSTRY RESEARCH

\* DEPT. OF A.E. USE IN TEACHING (LABS)

CESSNA	50K		
BEECH	50K		
LEARJET	50K		
	<u>150K</u>		
		KANSAS	150K
			<u>150K</u>
		→ 300K ←	
		<u>NEW FACILITY!</u>	

# LIGHT ADVANCED COMPOSITE STRUCTURES

USE EXISTING AIRPORT  
FACILITY FOR :

- \* MATERIALS DEVELOPMENT
- \* MANUFACTURING  
PROCESSES DEVELOPMENT
- \* STRUCTURAL TESTING  
OF MAJOR AIRFRAME  
COMPONENTS
- \* FLIGHT TESTING OF  
ADVANCED NEW  
AIRPLANE IN GAP !

INDUSTRY : 75 K  
KANSAS : 75 K  
150 K

→ 3 YEARS  
IN A ROW  
WILL GET  
SIGNIFICANT  
RESULTS

# COMPANIES CONTACTED

CESSNA : WALLACE DIVISION  
MR. B. PETERMAN

BEECH : MR. C. REMBLESKE  
MR. W. WISE

LEARJET : MR. R. NEAL

ALL SEEMED GENUINELY  
INTERESTED IN THIS  
PROGRAM.

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K.U. - F.R.L.

TRACK RECORD

- ESTABLISHED IN 1967
- NASA FUNDING PRIMARILY  
SOME INDUSTRY FUNDING
- COOPERATIVE RESEARCH AND  
DEMONSTRATION PROGRAMS  
WITH : CESSNA  
BEECH  
LEARJET  
BOEING
- ANNUAL FUNDING  
~ \$250,000
- ~ 20 STUDENTS } EMPLOYED  
1 SECRETARY }



• CURRENT K.U. - F.R.L.  
PROJECTS :

- \* AIRPLANE INTERIOR NOISE  
REDUCTION RESEARCH
- \* RIDE QUALITY SYSTEM  
RESEARCH
- \* FLIGHT CONTROL SYSTEM  
RESEARCH
- \* DESIGN OF ADVANCED  
NATURAL LAMINAR FLOW  
WINGS
- \* ADVANCED ULTRALIGHT  
VEHICLE RESEARCH
- \* FLUTTER EXCITATION SYSTEM  
FOR X29 FIGHTER
- \* DRAG REDUCTION AND FLOW  
IMPROVEMENT FOR CATTLE  
TRUCKS
- \* COMPUTATIONAL AERODYNA-  
MICS
- \* ADVANCED COMPUTER AIRCRAFT

# K.U. - F.R.L. SPIN-OFFS

- ADVANCED MECHANICAL FLAP SYSTEMS NOW IN COMMON USE FOLLOWING K.U./NASA/BEECH/CESSNA/PIPER REDHAWK AND ATLIT DEMONSTRATION PROGRAMS (1968-1974)
- SEPARATE SURFACE FLIGHT CONTROL SYSTEMS NOW BEGINNING TO BE APPLIED FOLLOWING K.U./NASA/BEECH/BOEING SSSA PROGRAM (1972-1976)
- KOHLMAN AVIATION CORPORATION (LAWRENCE, KS) ~ 20 EMPLOYEES FORMED AFTER NASA FUNDED PARAMETER IDENTIFICATION PROGRAM PROVED TO BE A SUCCESS.

# Universities, Industry, and Competitiveness



John F. Welch, Jr.  
Chairman of the Board  
and Chief Executive Officer  
General Electric Company

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“Asking for productivity without quality would be an insult to the American people; but quality without productivity is a luxury we cannot afford.”

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**P**resident Low, Governor Carey, honored guests, friends of R.P.I. — this is a great day for R.P.I. and an opportune time to be talking about the impact of technology on New York State.

Our friend Walter Fallon, here with us on this platform, has had quite a year, what with the sensational success of his disk camera,

and new kinds of Kodak film, and a parade of other products coming out of Rochester.

And here's John Opel. At IBM hardly a month goes by that there isn't an announcement of another new technology and another leading-edge product to go with it.

As for General Electric, I'm sure many of you know that we've just demonstrated our faith in technology — and in this area — and in this State — by dedicating, a week ago, a major new addition to our R&D Center over in Schenectady.

Innovation and technical leadership are key words for many other businesses in New York State, of course, but in the case of just the

three companies I've mentioned, technology has helped inspire an increase in the total value of the three stocks involved — Kodak, IBM, and GE — of more than 25 billion dollars since January 1 of this year.

Is there any question, then, about the value of technology? Has New York State ever been more alive with new ideas?

So it is a great day to be here. It's a splendid occasion. And it's a pleasure to be in this distinguished assemblage. Thank you, George, for the occasion and for the invitation.

Like all good educators, George Low is an old hand at giving out assignments. Mine, for today, is “university-industry relationships,”

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resentation to Rensselaer Polytechnic Institute, Center for Industrial Innovation, Troy, New York, Tuesday, October 12, 1982.

## Universities, Industry, and Competitiveness

and I appreciate the opportunity to share some thoughts with you.

I'd like to talk about university-industry relations in terms of *competitiveness*. I don't mean competition between the two. I mean the academic and industrial areas working together to help America achieve national competitiveness, world-class competitiveness.

Undoubtedly there are some who will immediately think that topics like productivity, improved GNP, and a favorable trade balance are things for industry — and perhaps government — to worry about. Where do the universities come in?

My belief — and I believe it so strongly I'm trying to say it on every available occasion — is that *making America competitive* is a top-priority job for all of us: small business, large business, unions, educators, young people and old people, and our government.

**T**here's nothing new about cooperative teamwork between America's universities and the nation's business sector. They've been working with each other for a long time. What's needed now is recognition of how much more we can do if we perceive the mutuality of this new challenge of competitiveness.

The elements of national competitiveness are many, but two predominate: productivity and quality. And we must have both.

Asking for productivity without quality would be an insult to the American people; but quality without productivity is a luxury they cannot now afford.

Fortunately, new technologies — in areas such as microelectronics, modern materials, computer-aided design and manufacturing — are giving us opportunities for combining high productivity and superb quality to a degree never before possible.

Let's take a closer look at both of these key elements of national competitiveness — productivity and quality. First: "productivity."

Productivity is one of those tired words that is not understood by

many people and hated by some, when really it should have a great deal of meaning for the kind of lives that people can enjoy. There is a most direct link between productivity and quality of life as measured by the real increase in people's earnings.

In the Fifties and Sixties, when productivity was rising at nearly three percent per year, real compensation per-person-employed increased at almost exactly the same rate. But unfortunately the same direct relationship held for the Seventies. Despite all the inflationary take-home gains people thought they were getting — despite all the indexing that took place — real compensation per-person-employed, like productivity, increased less than one percent per year.

Few people realize what the state of our economy might be today if we had been able to maintain the annual productivity gains that we had in the Fifties and Sixties. Our own Company's economists believe that if we had been able to achieve a three percent productivity gain we would have been able to cut inflation in half.

We would have had an unemployment rate of around five or six percent, at most.

And the average annual income per American family today could be almost \$7,000 higher. That's in real, not inflated, dollars.

Productivity, then, will finally be understood when we close the loop between private economic performance and public social expectations. We've got to make the tie between personal productiveness, institutional competitiveness, and national and social well-being.

Establishing these linkages is a communications challenge of the first order, and we are highly dependent on our educational institutions whenever it comes to communicating ideas of fundamental importance.

But regardless of who communicates the message — or how — the important thing is to explain the "why" of productivity as it impacts national competitiveness. If we are

asking for their commitment, people must understand why we need a quality economy. They must believe that they will benefit.

Issues of "we" vs. "they" — of "management" vs. "labor" — of "government" vs. "people" — of "the system" vs. "us" — all of these lose their point when we face up to the larger task.

In short, these national economic issues must be a personal economic priority for each of us.

Fortunately, university-industry cooperation to increase productivity and thus help achieve world-class competitiveness for our nation is not just an abstract hope. There are some solid examples of success.

There is the way Caltech worked

facilitating can be done and done right. The Governor of New York State has done a job he can be proud of — always — in helping make possible the new Center for Industrial Innovation. Mr. Governor, we all congratulate you for what you have done here!

George Low has said that among the essential ingredients for success in university-industry relationships are "an attitude on the part of those university personnel involved that is best characterized as willingness to serve and a realization by industry that a university is a business that cannot provide a 'free' service or free advice any more than any other business can."

George's frankness on this sub-

the pursuit of excellence — that must pervade the thought and action of our entire nation. We must point the way out of "satisfaction-with-the-second-rate."

*We must challenge each other!*

Academia must challenge business. When we provide you with the teaching equipment you need, it must be the best available, not just obsolete hand-me-downs. Far too many of today's classrooms or labs are filled with out-of-date tools provided by some "generous" donor who was unloading leftovers.

When we send lecturers or adjunct professors, they must be the cream of our crop, not just the people who can be most readily spared.

When we seek consultation or solutions to problems, it must be for goals worthy of your best efforts — challenges on the leading edge of technology — not make-work that makes no real difference.

When we recruit for your best graduates, we must mean it when we promise opportunities for advancement and jobs worthy of their talent and worthy of the training you have invested in them.

Above all, the university that works with an industry deserves to know that the company's own products and services are aimed at quality, at superior value for customers.

**W**e in business, in turn, have the right and duty to challenge the universities to seek ever higher levels of quality, of excellence — excellence in a faculty dedicated to being creative and imaginative about developing creativity and imagination — excellence in programs unsatisfied with just basic education and striving always to find what it is that makes young people eager to lead and willing to dare — excellence in the graduates, the kind of excellence that produces a research scientist who can be a true innovator, an engineer who can make a productive difference, or a manager with an extra essence of leadership and entrepreneurial spirit.

As a nation, we have too many of the fairly-good, the self-satisfied, the

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*"Interactions between universities and industry should be the shining examples of the kind of quality — the pursuit of excellence — that must pervade the thought and action of our entire nation."*

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with the West Coast aircraft industry during the "Von Karman years," which resulted in a stream of outstanding engineers and scientists, the evolution of a top-flight educational institution, significant economic growth for the area, and a tremendously productive aircraft industry which, despite its current problems, remains the world leader and a significant factor in our nation's quest for a positive balance of trade.

The stories of M.I.T. and Route 128 in Massachusetts — and of Stanford and Silicon Valley — reflect the same kind of academic excellence coupled with worldwide technological leadership.

There are ample statistics to prove that the presence of a first-class university can have an extremely beneficial effect on the business climate of its area. And these values can be multiplied yet again when sensible governmental policies work to facilitate — not deter, not control, not enforce, just facilitate — interactions between academics and businessmen.

Today's festivities here at R.P.I. are a celebration of how this job of

ject prompts me to be equally frank about what I believe should be industry's attitude toward our relationships with universities.

Above all, a company's cooperation with — and support of — academic institutions is not a matter of charity. It's not "corporate giving." It is a matter of essential corporate citizenship — and of good business sense — and of legitimate investment for which an adequate return is expected.

Coupling this view with George's comment about the businesslike needs of the universities, we can put this whole matter of university-industry relationships on the down-to-earth, give-and-take basis it deserves. When we recognize that each partner is expected to give — and is expecting to get — fair value, we are in a far firmer position to talk about the excellence that both sides of the bargain have a right to demand.

That brings us directly to the second key element of our challenge to achieve national competitiveness: in addition to productivity, quality.

Interactions between universities and industry should be the shining examples of the kind of quality —

in-of-the-mill, the let's-not-make-waves crowd.

Mediocrity is a shame.

Satisfaction with mediocrity is a crime.

Rising above mediocrity to excellence, achieving the best that a per-

son — or an institution — can hope to be is life's ultimate thrill.

That's why there's such thrilling promise in this new Center for Industrial Innovation.

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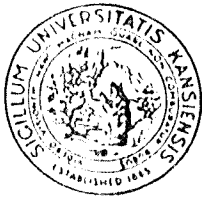
group of people to take something good and make it better.

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February 10, 1983

Memo to: Chancellor Gene A. Budig

From: Vincent Muirhead

Enclosed is an address by Jack Welch, General Electric's  
Chief Executive Officer at Rensselaer Polytechnic Institute.

I thought you might be interested in his discussion of  
industry academia relationships.

VUM/mm

encl.

cc: Dean Kraft



# Region Seeing Advanced Technologies

By Edward H. Kolcum

High-technology industries have become a prize coveted by economic developers throughout the U. S. The Southeast is no exception. Approaches and specific targets may vary as each state moves to erase perceptions that the South is a rural, impoverished region incapable of success beyond its traditional industries of textiles, tobacco, farming, paper and lumber.

Promotional techniques to attract industry to the Southeast can be individualistic, but the goals are the same: stability in times of recession and growth when the economy is on the upswing, jobs, prestige, an increasing tax base, the image of advancement and a contributor to the future.

AVIATION WEEK & SPACE TECHNOLOGY recently interviewed commerce, academic and industrial development officials in five southeastern states to develop a picture of this region that increasingly is attracting companies that are starting or expanding their plants. The states surveyed were Florida, Georgia, North Carolina, South Carolina and Alabama.

## No Agreement

While "high-technology industry" has been a popular phrase for some time, there is no agreement within the region on its definition. Asked how many employees there are in high technology in the southeastern states, a Bureau of Labor Statistics economist replied: "I'll be happy to tell you if you can define high technology."

As part of a study last year, the Joint Congressional Economic Committee listed five standard industrial classification (SIC) categories as high technology. They are machinery, electrical equipment, transportation equipment, instruments and related products and chemicals and allied products.

These are broad, two-number SIC listings, and most labor analysts believe they are relatively meaningless, that full use of the more descriptive three- and four-digit classifications is needed for accurate job identification.

## SIC Classification

For example, transportation equipment category No. 37. Within this category as aircraft and parts. Aircraft engines are classified as 3724. Guided missiles and space vehicles also are carried under transportation equipment as SIC 376. Propulsion units are 3764. The congressional committee said in the broad sense, 75% of jobs in manufacturing between 1955

and 1979 were in the five sectors with its SIC high-technology numbers.

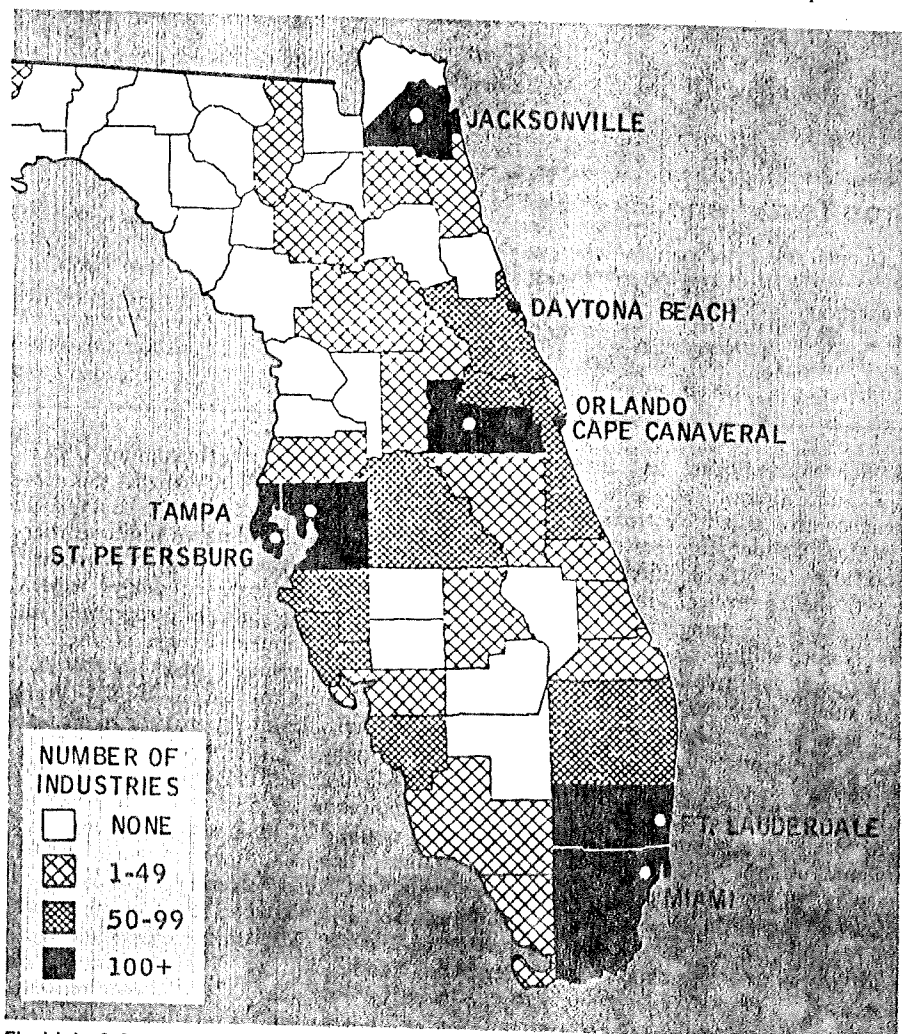
Lester A. Davis, of the Commerce Dept.'s Office of Trade and Investment Analysis, recently defined high-technology industries as those based on technology intensity, both total and direct. Davis studied 30 product fields that cover U. S. manufacturing and related how much is spent in each field on research and development in relation to the total value of shipments.

The manufacturing product classes were defined by the National Science Foundation, and Davis found that, in the 1977-79 period, research and development spending ranged from a high of 64 cents for each dollar of value shipped in guided missiles and spacecraft to one-half cent

per dollar shipped in ferrous metals and products.

By Davis' definition, aerospace leads by a wide margin in high technology. The top 10 technology intensive Science Foundation classifications, in order of rank, are as follows:

- Guided missiles and spacecraft.
- Communications equipment and electronic components.
- Aircraft and parts.
- Office computing and accounting machines.
- Ordnance and accessories.
- Drugs and medicines.
- Industrial inorganic chemicals.
- Professional and scientific instruments.
- Engines and turbines and parts.



Florida's 3,367 high technology companies are concentrated heavily in the "Golden Girdle" across the center of the state and in the

"Silicon Coast" of Palm Beach, Ft. Lauderdale and Dade County areas to the southeast (map, above). The state wants to develop the



# Key to Growth

Plastic materials and synthetic resins, rubber and fibers. These 10 industry categories, Davis says, spend 51% of all U.S. manufacturing research and development money, although they represent only 13.2% of the value of total shipments.

Until about 10 years ago, there were no well-established high-technology industrial areas in the country:

- Silicon Valley near San Jose, Calif. This area started as an electronics center in the 1930s, greatly expanded during World War 2 and has been the center of the U.S. electronics industry since.

- Route 128 in Boston, which was completed in 1951, had 40 industries in the area in 1955 and 600 in 16 industrial parks by 1965.

- Research Triangle Park in North Carolina. It was established in 1959 and differs from the San Jose and Boston enclaves in that it fosters research, not manufacturing.

Florida and Georgia are moving with vigor to join the ranks of leaders in high technology.

### Top Priorities

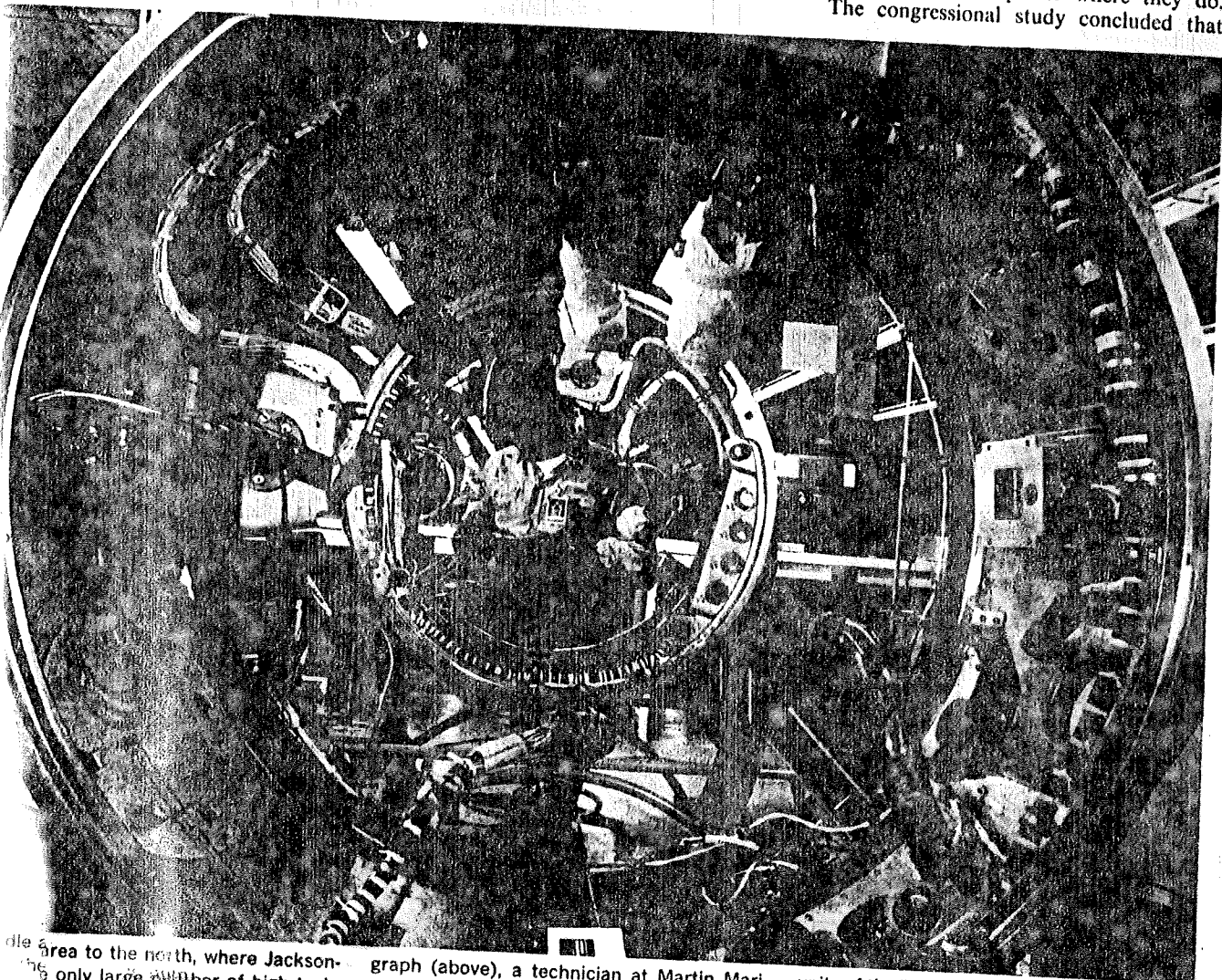
Each has specific target industries—Florida's top priorities are defense, satellite telecommunications and aviation, while Georgia is courting defense electronics, specifically manufacturers that produce electronic warfare hardware and software. Georgia also has targeted information technology including telecommunications.

North Carolina and Alabama both admit they have images to overcome. North Carolina wants to erase the picture that its only high-technology activity is R&D in the Research Triangle Park. Alabama believes it must convey to potential industry recruit companies that it is not a backward, undeveloped area. The state wants to promote its highly advanced training programs available for high-technology companies.

South Carolina looks on high technology essentially as computer-based, and this state is emphasizing the advantages it can offer to the electronics industry in taxes, labor, transportation, support services, quality of living and industrial siting flexibility.

All states surveyed have right-to-work laws with small percentages of their manufacturing employees unionized. Generally, the attraction is that without unions there is less labor unrest and lower labor cost.

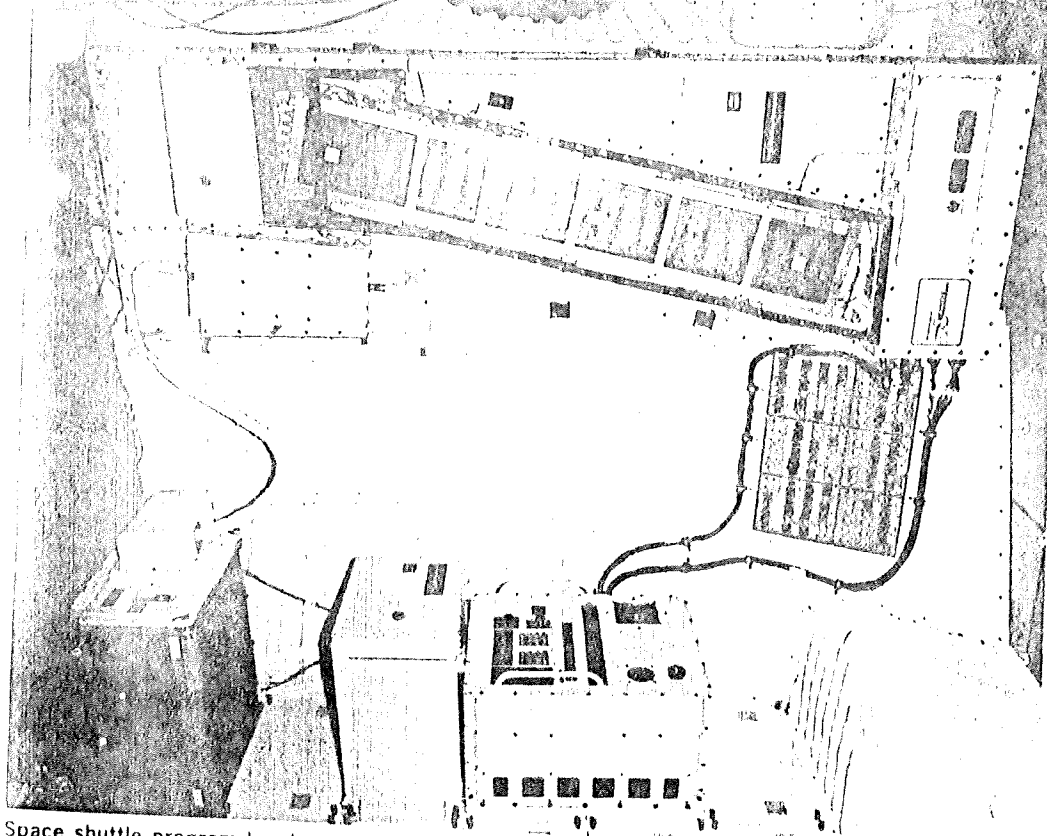
The purpose of the congressional study was to determine why high-technology companies locate plants where they do. The congressional study concluded that



...area to the north, where Jacksonville is the only large number of high technology businesses and industries. In photo-

graph (above), a technician at Martin Marietta's Orlando facility assembles the adaptor section between the guidance and control

units of the Pershing 2 missile. Martin Marietta and Harris Corp. are the largest manufacturing employers in the state.



Space shuttle program has been a significant magnet in attracting high technology industry to Florida. McDonnell Douglas has devised this continuous flow electrophoresis experiment that is being taken into orbit by the shuttle. This is the version that is scheduled to fly on the sixth shuttle mission.

there are 12 factors that influence a company's regional location choice, in the following rank:

- Labor skills and availability.
- Labor costs.
- Tax climate within the region.
- Proximity and quality of academic institutions.
- Cost of living.
- Transportation.
- Access to markets.
- Regional regulatory practices.
- Energy cost and availability.
- Cultural amenities.
- Climate.
- Access to raw materials.

In the congressional study, southern states are ranked low in cultural amenities and educational institutions. But these states top the rankings in five other categories: labor cost and availability; tax climate within the region; cost of living; regional regulatory practices and energy cost and availability.

The southeastern states questioned are oriented in foreign markets for exports, and in foreign investment and foreign trade in their states. Companies in the Southeast come from Europe and the Far East, primarily West Germany, Japan and Korea.

A statistical profile of each of the states in the survey follows. In each case, employment figures are for nonagricultural workers.

The year 1973 was used for comparison because the series of recessions that is still

under way began that year. The profiles show:

■ Alabama—Population in 1981 was 3.9 million, up 9% over 1973. Employment in September, 1982, was 1.3 million. Manufacturing employment on that date was 333,000. Unemployment rate in No-

vember, 1982, was 15.3%. The national unemployment rate at that time was 10.4%.

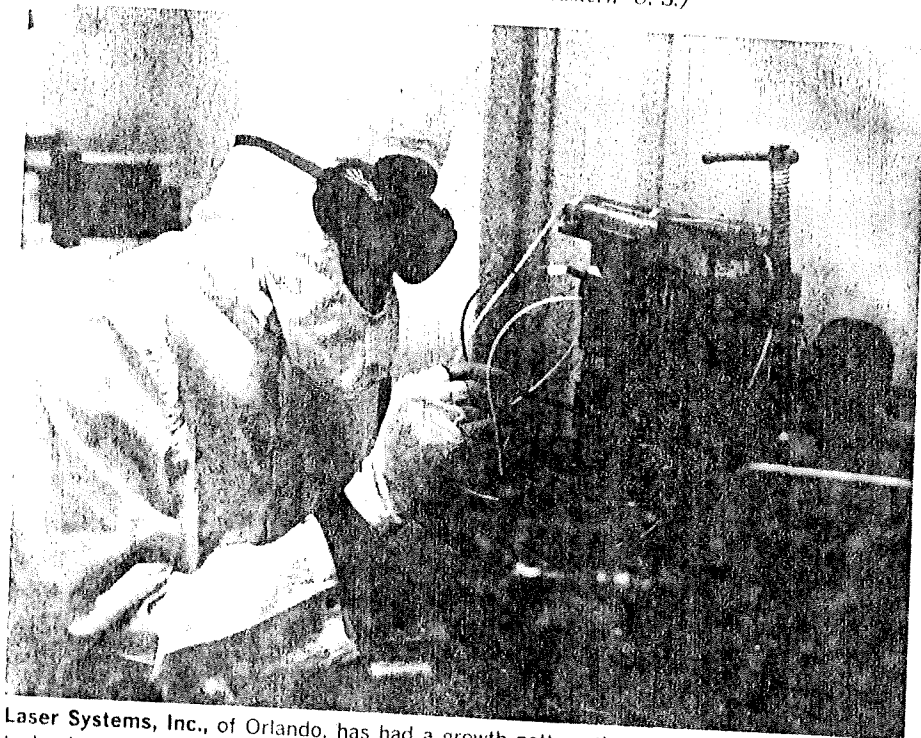
■ Florida—Population, 10.2 million, a 30% growth in 8 years, one of the fastest gains in the country. Employment was 3.7 million. Manufacturing employment was 448,000, an increase of nearly 50% since 1970. The unemployment rate reached 9.5%.

■ Georgia—Population was 5.6 million, up 17% over 1973. Employment was 2.2 million. Manufacturing employment reached 494,000. Unemployment rate was 8%.

■ North Carolina—Population was 6 million, up 13% in 8 years. Employment levels reached 2.3 million, including 774,000 in the manufacturing sectors. Unemployment rate reached 9.5%. North Carolina's high manufacturing employment reflects the labor-intensive industries that have been the state's economic backbone—textiles, furniture and clothing.

■ South Carolina—Population reached 3.2 million, up 19% since 1973. Employment rate was 1.2 million, including 358,000 in manufacturing. Unemployment rate is 10.8%. □

*(This and the following article are the first in a series on technological advances in the southeastern U. S.)*



Laser Systems, Inc., of Orlando, has had a growth pattern that mirrors the growth of high technology in Florida. Starting in 1968 with 12 employees, the company now has 430 workers and sales have grown to \$23 million. A technician works on a laser in a clean room in this photo.

# Florida's Business Climate Attracting New Industry

Tallahassee, Fla.—Florida is conducting a worldwide campaign to promote its business climate, low taxes, comparatively low land costs and trainable pool of workers in an effort to attract recession-proof, high-technology industries to the state.

Former Commerce Secretary Stuart Ederly is leading the drive to change Florida's image from a state that depends entirely on oranges, pensions and tourism for its economy into one that has a highly advanced industrial base that is rapidly developing into a U. S. technological keystone.

Lt. Gov. Wayne Mixson became commerce secretary Jan. 1, and Ederly will continue as a consultant on high-technology planning and implementation here until next month. At that time, he will return to private business in Miami. He committed himself to state service until Dec. 31, 1982, the end of Gov. Bob Graham's first term.

Florida has zeroed in on aerospace generally and electronics specifically as target industries that are able to survive economic downturns. Recession-proof industries, according to Florida economists, are those

associated with computer technology and the space shuttle, along with the wide variety of defense-related businesses. In the past five years, Florida has moved from seventh to fifth place among the states where most Defense Dept. funds are spent. The 1981 total was \$6.7 billion, ranking behind California, Texas, New York and Virginia.

Mixson said high technology will continue to be a Commerce Dept. priority under his leadership. There will be no reduction in commitment; Florida will seek new high-technology industries "with great determination," he said. As lieutenant governor, Mixson has been Graham's economic development spokesman. He will continue as lieutenant governor as well as functioning as commerce secretary.

Regarding high technology, Ederly said, "California is where it was. Texas is where it is. Florida is where it is going to be." All three states, along with Massachusetts, work hard to lure one another's high-technology enterprises to relocate in their own states.

There is also a strong emphasis in Flori-

da to promote the state as the most attractive location for plant expansion and for relocating corporate headquarters. "We want to be the place where decisions are made," Ederly said.

The secretary expressed Florida's economic rationale this way: "Heavy processing industries are being located in developing countries. It would be unwise for us to try to play catchup, so we focus on such things as microelectronics and the use of it."

## Economic Growth

The recession has slowed Florida's economic growth, but not stopped it. Economic indicators—employment, new mortgage loan commitments and new construction values—have led the Southeast and have been healthier than the U. S. average. For example, when the national unemployment rate was 9.8% in June, Florida had a rate of 7.7%. Florida's unemployment rate rose to 9.5% in November, when the U. S. average soared to 10.8%.

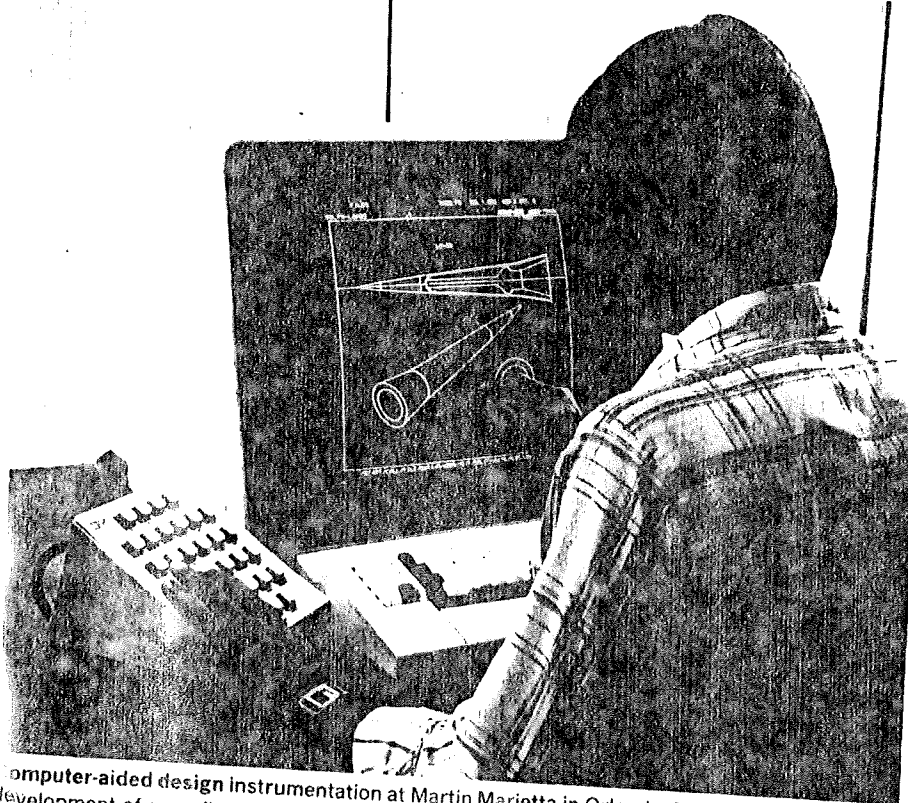
"We've had high-technology industry in the state for a long time based on aerospace and aviation," Ederly said. "The real growth came after the Cape [Cape Canaveral] was established in the 1950s." Although the space program and what is called the Space Coast were badly depressed in the late 1960s and early 1970s by a deemphasis in space flight, the space shuttle and greater defense expenditures have enabled Florida to surge into the top economic position in the southern region over the past three years.

"Today, one-fourth of Florida's manufacturing employment is in high-technology industries," Ederly said. "We are No. 1 in the Southeast in high-technology manufacturing employment and among the top 10 in the U. S."

## High-Tech States

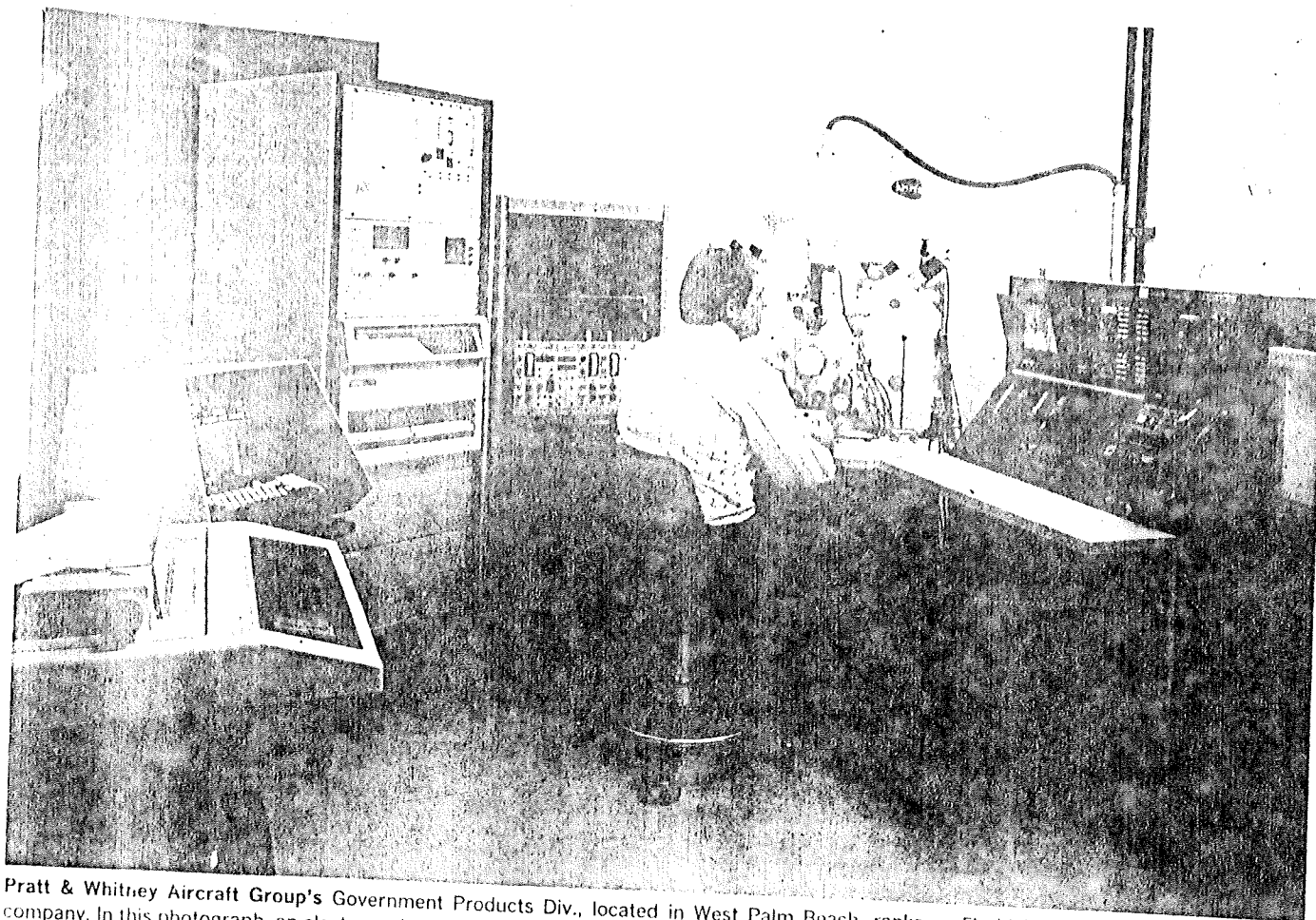
Studies indicate that Florida ranks behind California, Texas, New York, Massachusetts and Washington in high-technology manufacturing employment. There are now 3,367 high-technology businesses in the state, up 27% over the past five years. These firms range in size from Martin Marietta in Orlando with 10,000 employees to Tamm Electronics in Orange City, whose 37 workers produce communications equipment harness cables. Florida is particularly anxious to lure companies with 50 workers on their payrolls to industrialize the state's many rural communities.

As of Dec. 31, 1981, the latest date for which figures are available, there were 113,911 high-technology employees in Florida, nearly double the 1975 figure of 59,833. In 1982 through Nov. 1, 67 high-technology industries either started business or expanded in Florida with the help of the Commerce Dept. Div. of Economic



Computer-aided design instrumentation at Martin Marietta in Orlando, Fla., is being used in the development of a configuration for an antiballistic missile interceptor.





Pratt & Whitney Aircraft Group's Government Products Div., located in West Palm Beach, ranks as Florida's third largest manufacturing company. In this photograph, an electron microprobe is being used to determine the chemical analysis of microscopic areas on test specimens.

Development. Numerous other firms have located in Florida without state assistance, an official said.

Edgerly said the state is trying to select one target sector annually on which it will focus its recruiting. Current emphasis, including targets carried over from previous years, is on:

- Electronics, mainly defense, satellite telecommunications and aerospace.
- Medical devices and pharmaceuticals.
- High-technology food processing.
- Luring corporate headquarters.

He said the state encourages the spinoff of university-based research as well as plant expansion in Florida. For example, a California high-technology company plans to expand, and Florida learns of it, Florida commerce officials will market their state by informing California company officials that land is cheaper in Florida, the company will receive help in "one-stop permitting" (cutting red tape), basic training in exporting will be available, vocational and continuing college and graduate-level educational opportunities can be tailored to a potential employer's needs, business and private real estate taxes are lower and there is no state personal income tax.

Relaxed Florida life-styles and the Sun-

belt climate are exploited fully in the promotions.

One-stop permitting is a key element in the program, Edgerly said. "When a site team has selected a community, we get members together with the utility companies. We meet and determine all the interfaces. If there are any glitches, we try to resolve them in the planning phase. We can help expedite, get traffic lights where they are needed, and there is a separate road fund apart from that in the Transportation Dept. available to encourage industry." He said Florida local and state agencies attempt to work as a team to ease the complications of setting up and expanding.

Once a business is located in the state, various offices of state agencies, including divisions of the Commerce and Education departments, are available to help them develop and expand.

The 1982 economic development transportation fund totaled about \$7 million. Of this, about \$2.4 million was earmarked for an access road to a new Martin Marietta plant in Orlando.

Florida claims to have the best business climate in the U.S., a claim supported by the conclusions of several independent studies. One, by the accounting firm of

Alexander Grant & Co. of Chicago, raised Florida from 12th place in 1979 to first in 1981 based on average unemployment compensation, welfare expenditure per capita, state and local taxes per \$1,000 of income, government expenditure growth versus revenue growth and government debt per capita.

The study was made with the Conference of State Manufacturers Associations, which rates states by their success in controlling costs.

Florida also is emphasizing foreign exports. In 1982, there were 12 trade missions to Latin America. About 70% of the foreign commodity trade moving through Florida has Latin American points of origin or destination. The state has a permanent office in Stuttgart, West Germany, for economic development and another in London for tourism. "Two-thirds of the European companies that have established plants or offices in Florida are German," Edgerly said. The Commerce Dept. also provides introductory and advanced information in the form of seminars, export counseling and trade leads and sales opportunities.

Edgerly stressed that, because Florida depends heavily on tourism, workers come to the state for employment in service

industries. "But many are underemployed. We can find some motel managers who are mighty good aeronautical engineers."

He also said there is a large pool of young military retirees in the state. The Education Dept. has a computer program that lists them and identifies their skills and availability. There are 13,000 names on the retired military registration list.

Additionally, "our vocational education program in the Education Dept. is outstanding in responding to training implant or in a nearby school facility or by conducting classes in trailers. We tailor the skill to whatever level the company wants," Ederly said.

### Higher Education

"Companies are finding Florida education to have centers of excellence in physics, electronics and computer sciences," Ederly said. "IBM hired 1,000 engineers in Florida over the past few years and found one-third of them were educated in this state. Some companies are so enthusiastic they are endowing chairs and donating laboratory equipment."

"There are good opportunities for continuing education in several state schools—South Florida University in Tampa and Central Florida University in Orlando. Some companies allow their employees to work half time and go to school half time. Each university is evolving to serve the needs of the industries in its region. In continuing education, Florida pioneered a video system in the Cocoa area that delivered an engineering education system throughout the state."

Florida contains some distinct sectors. One is the "Golden Girdle" that crosses the central part of the state from the Tampa-St. Petersburg area on the Gulf Coast to the Atlantic Coast from Daytona Beach to the Palm Beaches. There, it merges with what is called the Silicon Coast that connects West Palm Beach with Ft. Lauderdale and Miami.

### Large Firms

The state's top six manufacturing firms, all of which are high-technology aerospace companies, are located in the Golden Girdle-Silicon Coast. They are Martin Marietta Aerospace in Orlando, 10,000 employees; Harris Corp. in Melbourne, 9,735 employees; United Technologies' Pratt & Whitney in West Palm Beach and United Space Boosters at Kennedy Space Center, a combined 8,340 employees; IBM Corp. in Boca Raton, 5,230 employees, and Honeywell, Inc., Clearwater and Tampa, 5,200 employees.

Other high-technology aerospace companies with more than 500 employees located in Florida are General Electric, St. Petersburg, Gainesville and Daytona Beach, 4,100 employees; Rockwell International, Kennedy Space Center and Collins Avionics in Melbourne, 3,700; Motor-

ola, Inc., Ft. Lauderdale, 3,500; Racal-Milgo, Miami, 3,400; Piper Aircraft, Vero Beach and Lakeland, about 2,200; Paradyne Corp., Largo, 1,970; Sperry Corp., Clearwater, 1,900; Stromberg-Carlson Corp., Sanford, 1,860; Coulter Electronics, Inc., Hialeah, 1,800; Systems Engineering Laboratories, Inc., Ft. Lauderdale, 1,500; Bendix Corp., Ft. Lauderdale, 1,475; Westinghouse Electric, Pensacola and Coral Springs, 1,350, and Automation Industries, Ft. Walton Beach and Eglin AFB, 1,250.

Also, E-Systems, St. Petersburg, 1,200; RCA International Services Corp., Patrick AFB, 1,100; Modular Computer Systems, Inc., Ft. Lauderdale, 1,060; Grumman Aerospace Corp., Stuart and St. Augustine, 1,030; Sangamo Weston, Inc., Sarasota, 880; Solitron Devices, Riviera Beach and Port Salerno, 850; Whitehall Corp., Lake City, 770; Burroughs Corp., Coral Springs, 660; ITT, Fernandina Beach, 600; Siemens Corp., Boca Raton, 600; North American Philips Corp., West Palm Beach, 550; McDonnell Douglas Astronautics, Titusville, 515, and Fairchild Industries, Crestview, 500.

"We are also encouraging technical entrepreneurship based on spinoffs of new divisions or companies from larger companies or formed from university research and development work."

Florida has formed five task forces of people from industry and universities to identify the needs of high-technology and defense-oriented companies.

"The greatest need," Ederly said, "is venture capital. In ventures, success breeds success. There is no large capital pool. We want venture teams with pools of \$10-50 million. The \$1-5-million pools are inadequate—they can handle only two or three deals a year."

There is plenty of money for business development ventures available in Florida, perhaps as much as \$5 billion. "Pension funds are becoming a major source, and some universities are using endowment funds for venture capital," he said.

Ederly believes one of every five manufacturing jobs in the U.S. will be in California, Texas or Florida by the year 2000 and that Florida, which now is seventh in population, will rank fourth. "We have a problem in the mix of our employees," he said. "We're heavy in the service industries because of the large number of workers in tourism and entertainment."

"Our Commerce Dept. assignment is to create jobs before the population influx, and our challenge is to manage growth and direct it geographically. The National Planners Assn. predicted that our population growth would be 28% in the 1970s. It went up 35%." □

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# Georgia Tech Facility Is Key to Growth

By Edward H. Kolcum

Atlanta—Georgia was late in joining the quest for high-technology industry, but in the two and one-half years it has been among the hunters, this state has developed a focus and strategy that have involved wide cross sections of its political, financial, business and academic leadership.

The impetus for the drive came with the 1980 organization of the Advanced Technology Development Center (ATDC) at Georgia Institute of Technology here. This facility will be a combination information-training-incubator base from which fledgling high-technology industries can be developed and have a temporary home.

Georgia's leaders believe the state has the attributes to become the nucleus for high-technology industry in the Southeast. Its large area, potential centers of technology excellence, low housing and living

costs, tranquil labor environment, and new emphasis on vocational and technical training are cited as reasons for industry to locate in the state.

But no attempt was made until recently to project either the state's technology base or its attractions to high-technology industries.

Some of Georgia's leaders now view high technology as the logical path to the good life and the only source of the so-called sunrise jobs based on computer technology. The traditional sunset industries of agriculture, textiles and apparel are continuously cutting back in employment, a factor that keeps too much of Georgia's population below the poverty level, its leaders believe.

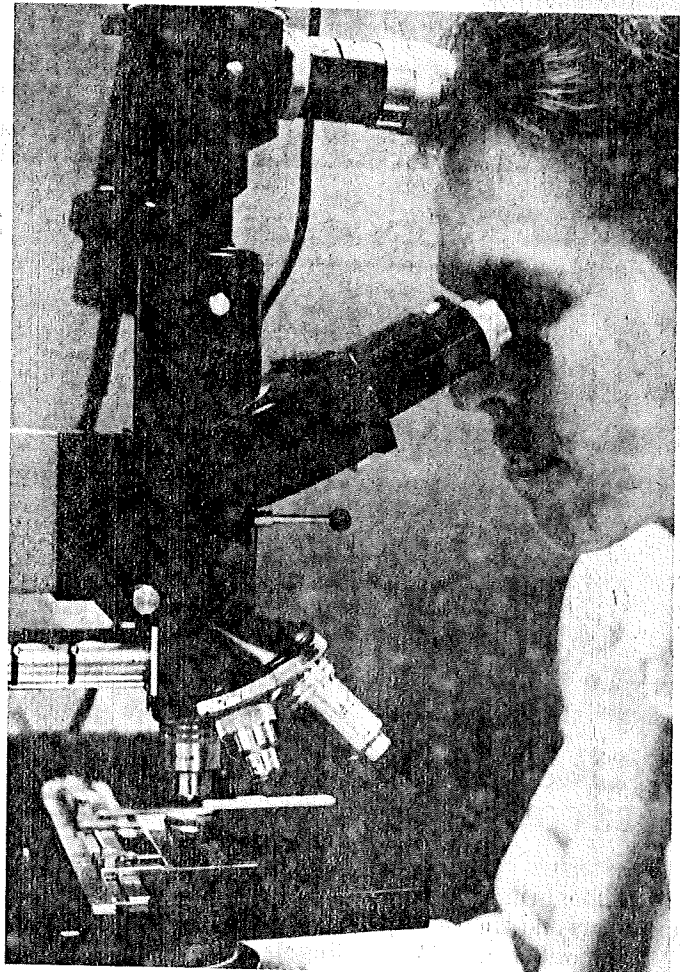
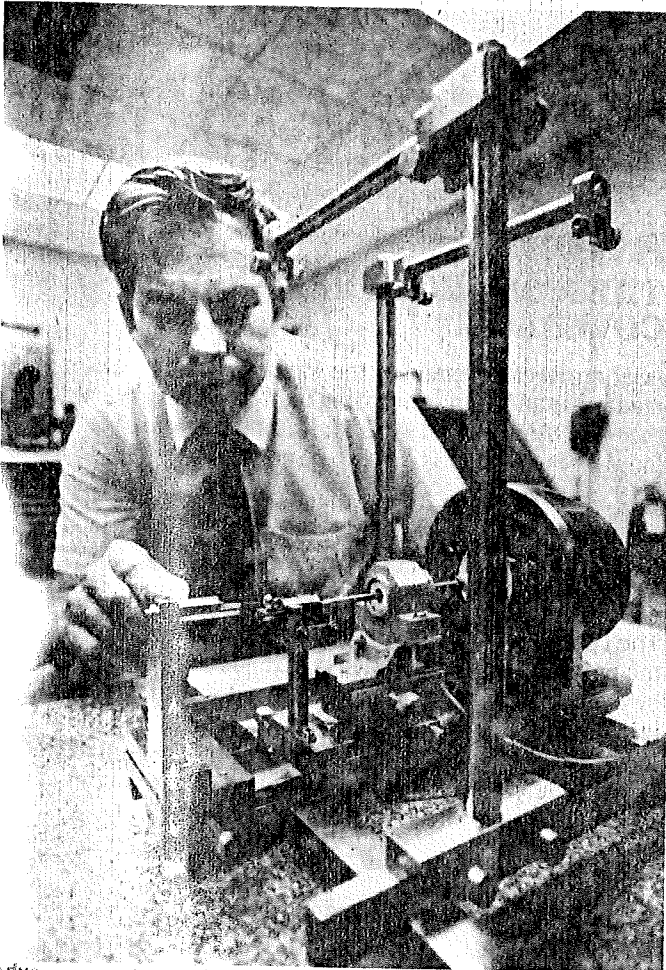
Georgia's goal is to generate at least 220,000 new high-technology jobs by the year 2000, increasing its share of high-technology jobs in the U. S. from the pres-

ent 0.8% to 2.6%. These are Georgia Tech estimates of the potential that exists if its plans are nurtured. The vast percentage of these jobs is aerospace-related: computers, 104,000; communications, 83,000; avionics, 22,000; fiber/laser optics, 8,000, and medical technology, 3,000.

But Wayne Hodges, associate director of the technology center, warned that only states "that can create economic climates encouraging and stimulating the formation and attraction of these technology-based industries will benefit from the new growth. The competition for the new companies will be fierce, and the traditional centers of technology may experience considerable attrition."

Hodges said the objectives of the Advanced Technology Development Center are:

- To create an environment for new high-technology industries, making use of



Advanced testing device (above left) has been developed by Georgia Institute of Technology to measure stress and strain characteristics. In the above right, an operator photographs semiconductor surface characteristics at Georgia Tech with this optical microscope.

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in Week & Space Techno  
logy, February 28, 1983



## University Center Fosters Industrial Growth

Atlanta—Georgia views its Advanced Technology Development Center at the Georgia Institute of Technology as a catalyst between high-technology industry and the resources that exist throughout the state. Although Georgia Tech is the hub for the center, the objective is to service companies that want to expand or relocate in any area of Georgia.

The center is in operation now in temporary facilities on the Georgia Tech campus while its headquarters are under construction a few blocks away, also on the campus. About a dozen small businesses are being counseled in these areas:

- Identification of product markets.
- Location of venture capital.
- Provision of low-cost work space.
- Assistance in marketing and finance.
- Evaluation of new products and ideas.

When the permanent facility is completed in September, 20-30 companies can be accommodated at any one time. The new center will contain an office of the future, high bay space for light manufacturing and other work rooms and meeting rooms, in a total area of 45,000 sq. ft. The objective is to start or expand high-technology industries as a means of broadening Georgia's economic base and providing jobs.

A developing business can come to the center for help on management, administrative, marketing, legal and financial matters. Location of the center provides access to consulting scientists, researchers and graduate students. The students would be a ready labor pool. Georgia Tech also is promoting convenience to the school's computer center, library and advanced test equipment.

These services are available to businesses locating or expanding in Georgia regardless of their location. Low-cost incubator space will be available at the center where a fledgling company can develop, manufacture and test its products for periods up to three years. Progress of the companies will be analyzed every six months during that period.

The center was created in 1980 and a permanent director, Jerry L. Birchfield, was named six months ago.

Georgia Tech. "We will use the incubator concept in which we offer low-cost space and access to the faculty and students."

■ To recruit established industries into the state.

The center will open in September at an initial cost of \$5.1 million. The state is providing two-thirds of the funding. Georgia Tech borrowed the other one-third when expected federal money was not provided.

Jerry Birchfield, director of the Georgia Tech facility, said the state has made a careful study of the Silicon Valley in California, Route 128 in Boston and Research Triangle Park in North Carolina in an effort to develop its own strategic planning for high-technology growth. He is proposing that several centers of excellence be established using the research resources of the state's public and private universities as cores. The risks would be reduced with parallel targets rather than complete emphasis on a single industry, he believes.

### Reassessment Planned

After a reasonable time for assessment, those centers of excellence showing promise would be expanded and those not progressing would be disbanded. Industry should be involved, and industry involvement in cooperative projects would be one criterion on which funding would be based.

The center has identified six technology areas in which it believes Georgia has strengths and which correlate with current and future high-technology growth. They are:

- Military electronics and electronics warfare.
- Software and telecommunications.
- Biogenetics.
- Microelectronics.
- Robotics and automated manufacturing.
- Alternate energy sources.

Although Georgia has a substantial number of military installations within its borders, these bases historically have been used more for training than for research and development. There has been little technological fallout from them to the state.

### Military Role

Birchfield said this is changing. Warner Robins AFB, near Macon, procures more than \$3 billion worth of military hardware annually, of which \$1 billion is in the electronic warfare area. Georgia Tech is heavily involved in electronic warfare research. In addition, Fort Gordon in Augusta is shifting to a stronger Army electronics role.

Several Georgia universities have established computer software and hardware research and development reputations, and Birchfield believes a focused center



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ould be organized that could be used by entrepreneurs for software development. said hardware should be available for further software development by new startup companies.

The Advanced Technology Development Center sees biogenetics as an ideal area for investment in future industrial growth because of the strengths in this field at the University of Georgia, Georgia Tech, Emory University and the Medical College of Georgia.

Approximately 24% of Georgia's 2.2 million workers are employed in manufacturing. Birchfield said increases in productivity using conventional means are difficult to achieve.

Thus, he said, robotics and computer-aided design/computer-aided manufacturing have enormous potential in the state. Birchfield said new industries probably will include these advanced manufacturing techniques and suggested that a new center of excellence emphasize techniques and research for such new industry.

"There is a need and demand for a semiconductor manufacturer in Georgia," Hodges said. "It would create a lot of things." Companies such as Scientific Atlanta are interested in locating such a capability in the state, he said.

Birchfield said the University of Georgia and Georgia Tech have developed talented teams in solar energy and biomass conversion as alternate energy systems, and he sees this as a sixth center that could help new energy industries start in these fields.

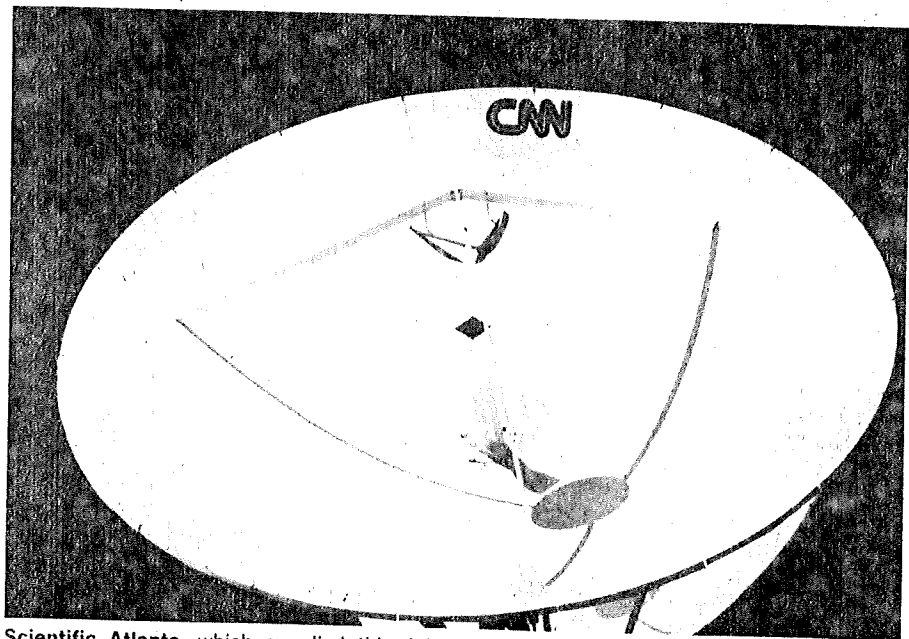
Georgia Tech receives about \$63 million in research grants annually—the faculty of 1,400 "is a terrific pool," according to Dr. Thomas P. Stelson, vice president for research. He said about 20% of this research money comes from industry, compared with an average industry university research involvement of 4%.

### Northrop Net Down

Los Angeles—Northrop Corp. has reported net income of \$5.4 million for 1982 after writing off expenditures of \$258.4 million on the company's new F-20 Tiger-shark tactical fighter aircraft. Net income for 1982 was down from \$47.9 million the previous year.

The company also reported record sales for 1982. Sales during the year ended Dec. 31, 1982, were \$2.47 billion compared with \$1.99 billion the previous year. Business backlog on Dec. 31 was \$2.78 billion, with increases recorded in the areas of aircraft, electronics and services.

Expenditures for the F-20 program were \$258.4 million during 1982, according to Northrop officials, who said all expenditures for the program are being written off as they are incurred.



Scientific Atlanta, which supplied this Atlanta-based Cable News Network antenna, was organized by several graduates and instructors from the Georgia Institute of Technology.

In addition to its position as a university with state responsibilities, Georgia Tech has been searching for ways to keep its talented graduates in the area. "We see 40-50% of our graduates going out of the state because the jobs here are not what they want," Hodges said. "A lot of them are going to high-technology jobs in California. But we do not want to replicate the Silicon Valley—we don't yet know what our silicon is."

### Georgian Jobs

Stelson said, in a recent survey, 3,500 Georgia Tech graduates who had jobs out of state said they would return to Georgia if they could find equal jobs there.

The school believes it is the South's largest industrial and engineering research agency with particular strengths in antennas, communications, computer systems, defense electronics, lasers, millimeter and infrared radar and remote sensing. Georgia Tech recently established a Microelectronics Research Center that is active in semiconductor materials and device research, microfabrication of low voltage field emitter array cathodes, ion implantation and surface analysis, materials and device characterization, device physics, semiconductor structures and bonding, very large scale integration (VLSI), switched capacitor filters, and reliability and defect analysis.

The Georgia Tech high-technology employment projections for the entire U. S. indicate that new jobs created will total 2.8 million over the next seven years and another 4 million by the year 2000 in computer, avionics and communications industries, Hodges said.

The initiatives being undertaken by states to compete for high-technology in-

dustries can be grouped in four basic categories, according to Hodges:

- Venture capital formation.
- Improved training of technical workers.
- Improved support for innovation.
- Development of new public-private forms of cooperation and interaction.

Regarding venture capital, Atlanta is

### McDonnell Earnings Rise

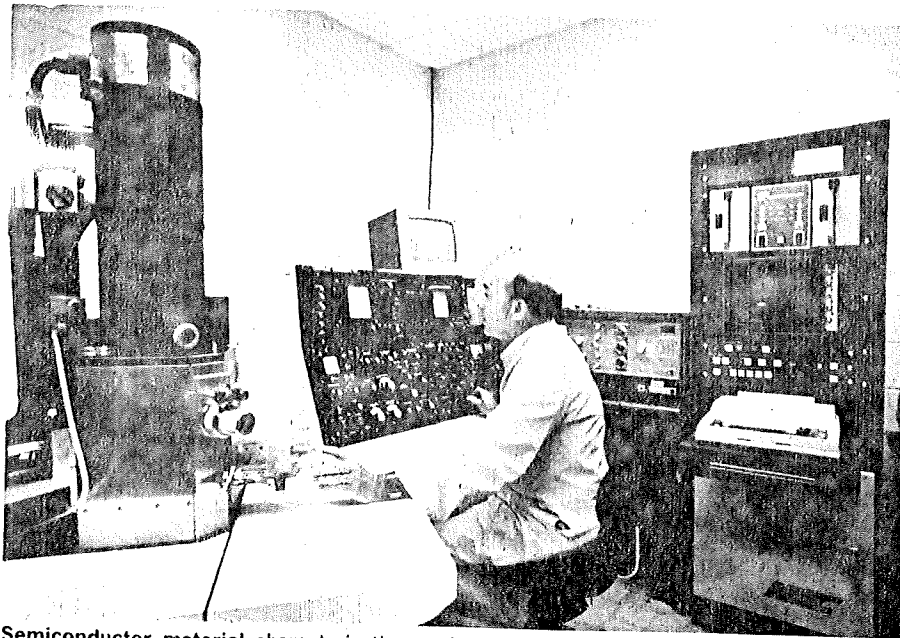
McDonnell Douglas Corp. earned \$214.7 million during 1982 compared with \$176.6 million the previous year, an improvement company officials said was the result primarily of improved operations and a decline in interest expense.

McDonnell Douglas earnings for the fourth quarter of 1982 were \$60.9 million, up from the \$35.3 million reported by the company during 1981.

Company officials said earnings last year were affected adversely by a pretax provision of \$30 million to cover possible losses connected with commercial aircraft financing. The operating loss in the commercial aircraft area for the company during 1982 was \$45.8 million, including the \$30-million loss provision.

The commercial aircraft market continued to be affected severely by economic conditions worldwide, company officials said, although production of the DC-9 Super 80 transport has been bolstered by sales and leases of the aircraft to domestic and foreign air carriers. Continuation of the DC-10/KC-10 assembly line has been maintained, though only at a marginally acceptable rate, by a multiyear contract received from the U. S. Air Force late last year for production of the KC-10.





Semiconductor material characterization and defects are determined by this instrument.

the financial center of the Southeast, and Birchfield said \$200 million is available in venture money through Atlanta, not necessarily in Atlanta. Hodges said the Advanced Technology Development Center has sponsored four venture capital conferences that attracted 60 new companies and 300 financial institutions.

Georgia's general assembly last year appropriated \$13.8 million to upgrade technical education programs, primarily in the area of electronics, electromechanical technology and mechanical technology. Associate degree programs will be offered in Augusta, DeKalb County and Columbus. Technician-level training in these same fields is being offered in Athens, Marietta and Savannah.

Georgia has developed what it calls a Quick Start program to provide specific training to employees of new or expanding industries before plant startup or expansion. This training is free and is custom designed either at the plant or in mobile facilities.

The state designs materials, supplies the school facility and pays the instructors. Under Quick Start, Georgia also will recruit, test and screen employees according to company specifications.

Other programs include video-based instruction and industrial education programs offered by Georgia Tech.

Georgia's existing new technology industrial base is made up of more than 300 companies, the largest category of which is the communications field. The center lists the major companies in this category as Continental Telephone, Lanier Business Products, Northern Telecon, Scientific Atlanta and Western Electric.

There are nearly 100 computer software companies, including Management Sciences of America and Peachtree Software.

Hayes Microcomputer is a leading producer of modulator/demodulators (modems), and Intelligent Systems Corp. fabricates color computer terminals. Rockwell International Missile Systems Div. recently relocated to Duluth, Ga., from Columbus, Ohio. Lockheed-Georgia in Marietta, with 12,700 employees, is the largest manufacturing employer in the state.

A strategy conference conducted by the center late last year established the background under which the center will begin its work to attract the new industries to the state. There were nine major conclusions from this conference:

- Georgia led in the resurgence of



Georgia Tech's industrial ion implanter is used to implant elements into the surface of tools, dies, semiconductors and other objects.

southern economy in the 1970s when its population grew 19% and the gross state product grew 49%. The fastest growing sectors were service industries—trades, transportation, communications and utilities. By 1981, over 70% of those employed were in service-type jobs and 25% were in manufacturing and construction.

- Georgia incomes lag considerably behind the national average with a large number of families below the poverty level.

- New job needs in Georgia by the year 2000 will total more than 1 million, which includes a 700,000 increase in population plus jobs lost through technical obsolescence, business failures and plant closings. Over the next 10 years, manufacturing will contribute only 3.8% of new jobs under current trends.

- Georgia has not shared in the growth of high-technology jobs to date, but if it captures the 220,000 new jobs in communications, computer services, avionics, advanced optics and medical technology, as estimated by Georgia Tech, the secondary economic impact of such job creation could result in an overall gain of a half million new jobs by the year 2000.

- Georgia's past efforts in attracting new industry have focused on site-specific industrial prospects. "Rather than concentrating on individual prospects who offer only a few hundred jobs, we need to direct our efforts toward industries that can bring in jobs by the thousands." This requires identification of industries with high growth potentials, and of specific companies within these industries that should be targeted with aggressive recruitment efforts.

- Localities will need \$1.8 billion in environmental needs over the next decade. Federal support in this area is diminishing, and if state assistance is required, it should be given top priority.

- Most new jobs created in Georgia result from the expansion of small companies already located in the state. A strategy should be developed for the state to take up the slack of lessened federal help by assisting these companies in management and finances.

- Georgia is not producing the number and quality of workers required by either new industries or existing industries. Some solutions are the upgrading of vocational and technical programs and the appointment of a gubernatorial Advanced Technology Training Advisory Council.

- Although Georgia places a high priority on economic development, there is no interdepartmental strategy that has common goals and objectives, a situation that should be rectified. □

*(This is the second part in a series on the expansion of high-technology industry in the southeastern U. S. Previous articles in the series appeared Feb. 21, pp. 56, 60.)*



THE INSTITUTE OF  
ELECTRICAL AND  
ELECTRONICS  
ENGINEERS, INC.

TESTIMONY ON H.B. 2442 & H.B. 2311

March 3, 1983

Dear House Communications, Computers & Technology Committee Members:

Thank you for the opportunity to present to you the support of the Kansas Sections of the Institute of Electrical & Electronics Engineers on H.B.s 2442 & 2311.

IEEE is a worldwide organization comprised of engineers from 32 specialty areas ranging from aerospace technology to computerization and quantum electronics.

We would like to give our general support to these bills as they would enhance the technological development as well as the economic development of Kansas.

H.B. 2442 would cover two very important issues to IEEE:

1) enhancement of employment opportunity in the areas of high technology. We would like to see Kansas graduates remain in our state. K.U. estimates that 90% of their undergraduates in the field of technology leave the state to find employment. W.S.U. estimates over 50%;

2) attraction of new industry to Kansas which would utilize engineering talents. Through encouragement of investment by private enterprise and through the promotion of research, we would hope to see improvement of our economy and expanded work environments for the technological engineers already employed in Kansas.

H.B. 2311 more specifically deals with electronics and related programs and encourages the coordination of education and research in advanced technology.

In keeping technological graduates in our state we must not only provide employment but also the availability for educational advancement. In the long run this will serve to better our economy and encourage development in the areas of high technology.

Thank you for the opportunity to present our concerns.

Sincerely,

Elizabeth E. Taylor  
Legislative Consultant - IEEE

## HOUSE BILL No. 2311

By Representative Meacham

2-9

0017 AN ACT establishing a Kansas advanced technology institute  
0018 within the department of economic development; and pre-  
0019 scribing its membership, purpose and objectives, powers,  
0020 duties and responsibilities.

0021 *Be it enacted by the Legislature of the State of Kansas:*

0022 Section 1. (a) There is hereby created within the department  
0023 of economic development a Kansas advanced technology insti-  
0024 tute, referred to in this act as the "institute." The institute shall  
0025 promote, develop and coordinate education and research pro-  
0026 grams in fields of advanced technology.

0027 (b) The institute shall seek to improve the quality and the  
0028 quantity of graduates from Kansas institutions of higher educa-  
0029 tion in fields of advanced technology, to further the research  
0030 capabilities of Kansas institutions of higher education, to provide  
0031 incentives to attract and retain superior faculty members at such  
0032 institutions and to enhance the economic health of the state of  
0033 Kansas through encouraging investment by both governmental  
0034 and private sources in educational programs which promote  
0035 advanced technology education and research development.

0036 (c) The institute shall place its initial priority in the area of  
0037 electronics and related programs. Programs in other fields of  
0038 advanced technology shall be developed as soon as feasible.

0039 (d) The institute shall exercise its powers and perform its  
0040 duties and functions specified in this act, within and as a part of  
0041 the department of economic development. All budgeting, pur-  
0042 chasing and related management functions of the institute shall  
0043 be administered under the direction and supervision of the  
0044 secretary of economic development. All vouchers for expendi-  
0045 tures and all payrolls of the institute shall be approved by the

Attachment 7

0046 chairperson of the advisory commission and the secretary of  
0047 economic development.

0048 Sec. 2. (a) The institute shall be administered by the ad-  
0049 vanced technology institute advisory commission, referred to in  
0050 this act as the "commission," which shall consist of nine com-  
0051 missioners. The state board of regents, the state board of educa-  
0052 tion, the advisory commission to the department of economic  
0053 development and the secretary of economic development shall  
0054 each appoint one commissioner, who shall serve at the discretion  
0055 of the appointing authority. Five commissioners shall be ap-  
0056 pointed by the governor and confirmed by the senate in the  
0057 manner prescribed by K.S.A. 1982 Supp. 75-4315b, from a list of  
0058 persons knowledgeable in advanced technology fields submitted  
0059 to the governor by groups which represent advanced technology  
0060 businesses. These five commissioners shall represent advanced  
0061 technology industries and associated businesses and at least one  
0062 of the five commissioners shall be a representative of a small  
0063 business enterprise.

0064 (b) The term of each commissioner appointed by the gover-  
0065 nor shall be for four years, except that, of such commissioners  
0066 first appointed, two commissioners shall be appointed for terms  
0067 of two years and three commissioners shall be appointed for  
0068 terms of four years. A member appointed or designated to fill a  
0069 vacancy arising other than by expiration of such member's term  
0070 shall be appointed for the unexpired term of the commissioner  
0071 such member is to succeed. A commissioner shall be eligible for  
0072 reappointment for one four-year term.

0073 (c) Commissioners shall serve without compensation but  
0074 shall be entitled to receive subsistence allowances, mileage and  
0075 expenses as prescribed by subsections (b), (c) and (d) of K.S.A.  
0076 75-3223.

0077 (d) The commission shall elect a chairperson and vice-chair-  
0078 person from its members; the member appointed by the secre-  
0079 tary of economic development shall serve as secretary of the  
0080 commission and the commission may create and fill such other  
0081 offices as it may determine. The commission shall adopt such  
0082 rules and regulations governing its procedure as it may consider

0083 necessary or advisable and shall keep a record of its proceedings,  
0084 which record shall be open to inspection by the public at all  
0085 reasonable times.

0086 Sec. 3. (a) The commission shall:

0087 (1) Assess the long-range goals and capabilities of Kansas  
0088 institutions of higher education concerning education and re-  
0089 search in fields of advanced technology;

0090 (2) analyze the impact the institute will have on the economy  
0091 of Kansas and how the institute can best nurture the economic  
0092 advancement of advanced technology industries in Kansas;

0093 (3) establish priorities for the distribution of equipment and  
0094 moneys available to the institute according to its assessment of  
0095 the long-range goals and capabilities of institutions of higher  
0096 education as determined pursuant to paragraph (1) of this sub-  
0097 section and according to its analysis of economic impact as  
0098 determined pursuant to paragraph (2) of this subsection;

0099 (4) establish a system to determine the needs of advanced  
0100 technology industries and a peer review process among institu-  
0101 tions of higher education;

0102 (5) make distribution of equipment and moneys among such  
0103 institutions based upon its established priorities.

0104 (b) Additionally, the commission shall:

0105 (1) Administer the flow of equipment and money available to  
0106 the institute by the use of individual institutional accounting  
0107 structures;

0108 (2) receive annual reports from the various institutions on the  
0109 use of allocated funds and equipment and consolidate such  
0110 reports into an annual report to be presented to the legislature.

0111 (c) (1) The commission is specifically empowered to receive  
0112 and expend all grants, gifts and bequests, specifically including  
0113 state and federal funds and other funds available for the purposes  
0114 for which the institute exists and to contract with the state of  
0115 Kansas, the United States and all other legal entities with respect  
0116 thereto. The commission may accept or provide, within the  
0117 limitations of its budget, matching funds wherever grants, gifts,  
0118 bequests and contractual assistance are available on such basis.

0119 (2) Contributions of advanced technology equipment, grants,

0120 gifts or bequests from an advanced technology company to the  
0121 institute may be designated to or accepted for use by a specific  
0122 institution of higher education or may be nondesignated.

0123 (3) Any nondesignated equipment, grants, gifts or bequests  
0124 received by the institute shall be utilized for advanced technol-  
0125 ogy industry-generated research to be conducted in equipped  
0126 laboratories at institutions of higher education and for maintain-  
0127 ing state-of-the-art laboratory equipment at such institutions.

0128 (d) The priorities established pursuant to paragraph (3) of  
0129 subsection (a) of this section shall take into account the following  
0130 objectives:

0131 (1) The avoidance of unnecessary duplication of programs,  
0132 particularly at the graduate level of instruction;

0133 (2) the establishment of centers of excellence for specialties  
0134 at various campuses of the institutions;

0135 (3) the consideration of industry needs for technical training,  
0136 associate degree, baccalaureate level and graduate level training  
0137 and for in-service and continuing education provided by post-  
0138 secondary education;

0139 (4) the determination of the types of equipment needed for  
0140 developing the electronics engineering phase of the institute,  
0141 where various types of equipment should be located and  
0142 whether the equipment will need to be purchased by the state or  
0143 whether industry will be willing to provide such equipment;

0144 (5) the coordination of proposals emerging from the plan with  
0145 the program approval process of the secretary of economic de-  
0146 velopment.

0147 (e) The commission may appoint advisory committees or  
0148 individuals to advise and assist the commission and suggest  
0149 solutions for the problems and needs of advanced technology  
0150 industries and institutions of higher education.

0151 Sec. 4. The accomplishment of the purposes of the institute  
0152 will be achieved only with a continuing commitment by the state  
0153 to fund the institute and to match, on an equal basis, the con-  
0154 tributions of equipment and money made by private industry  
0155 and other private sources to the institute in order to assure the  
0156 state-of-the-art level of programs and equipment previously at-

0157 tained through such private contributions.

0158 Sec. 5. This act shall take effect and be in force from and  
0159 after its publication in the statute book.

The Honorable Mike Meacham, Chairperson  
Committee on Communications, Computers and Technology  
House of Representatives  
Third Floor, Statehouse

Dear Representative Meacham:

SUBJECT: Fiscal Note for House Bill No. 2311 by  
Representative Meacham

In accordance with K.S.A. 75-3715a, the following fiscal note concerning House Bill No. 2311 is respectfully submitted to your committee.

House Bill No. 2311 establishes a Kansas Advanced Technology Institute within the Department of Economic Development to promote, develop and coordinate education and research programs in fields of advanced technology. The institute shall be administered by the Advanced Technology Institute Advisory Commission which shall consist of nine commissioners. The Commission is empowered to receive and extend all grants, gifts and bequests including state and federal funds and other funds available for the purpose for which the institute exists and to contract with the state of Kansas, the United States and all other legal entities.

The Kansas Department of Economic Development has estimated that House Bill No. 2311 would have an estimated \$8,600 fiscal effect for travel and subsistence. This includes \$3,600 which would be necessary to cover travel and subsistence expenditures for nine board members attending four meetings during the year at \$100 per person. The other \$5,000 would be for expenditures incurred by staff members for travel and subsistence. An undetermined amount of receipts could be generated from grants, gifts and bequests, however, this would require an equal match of state funds. This act shall take effect after its publication in the statute book.



Susan K. Schroeder  
Budget Analyst  
For the Director of the Budget

SKS:sr