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UNIVERSITY EXTENSION

COLLEGE OF ENGINEERING

The Center for Industrial Research and Service
2272 Howe Hall, Room 2620 • Iowa State University
Ames, IA 50011 • (515) 294-3420
Fax (515) 294-4925 • www.ciras.iastate.edu

Annual Report 2000

A Banner Year at CIRAS

A Banner Year at CIRAS

Expanded Capabilities • Increased Client Opportunities • New Technologies • Growing Knowledge Base
New Campus Offices • Enlarged Scope of Services

Reflections

On December 29th, 2000, I will work my last day at CIRAS and Iowa State University. What an interesting time it has been. Although I have had many challenging assignments along the way, I have had two "favorite" jobs in my life; my first and my last. My first job was as a coop engineering student with ISU and the John Deere Company (subsequently employed full time with Deere, in Ottumwa); and the last job has been as Interim Director of CIRAS at ISU. In my first job I had youthful enthusiasm to guide me and I enjoyed undergraduate Mechanical Engineering at ISU, the coop program, and my employment with Deere. This program gave me a great start.

My last favorite job as Interim Director for CIRAS for four and one half years has been the most challenging, and I would like to share a few thoughts on this subject before I leave. Like some before me, I had the idea that I could help by sharing my industrial experience with the university that helped me get started That turned out to be true, only in some ways that I did not expect. The world has changed since 1960, and it turned out the university could still teach me a little about being an engineer. (high tech, computers, etc.)!

I also learned that things can and do change rapidly in the industrial outreach area in which CIRAS operates. When I began in 1987, CIRAS was a smaller unit (approximately 14 people) operating essentially as a stand alone unit within ISU Extension. Since that time, industrial outreach services to manufacturers by Universities, Community Colleges, and others has become a significant national effort. Today CIRAS along with Engineering Distance Education, and IPOC comprises 33 people and has doubled the number of the field agents it had in 1960. It is a viable component of the College of Engineering, and is a partner in the IMEP. As such, CIRAS now coordinates its efforts with many related units at ISU and other regents, governmental, or Community College groups. Happily, CIRAS has made this transition well, and has emerged as a top flight service provider to Iowa manufacturers. I am proud and happy to have been a part of this process.

I congratulate, and thank the people of CIRAS for this effort!

Iowa State University established a strategic plan centered on three goals, learning, discovery, and engagement. CIRAS, through a variety of activities, is working to help ISU achieve its goals.

Learning–Distance Education: The ISU goal calls for "enhanced learning." CIRAS has a new department, the College of Engineering's Engineering Distance Education (EDE) unit. The goal of EDE is to bring education to Iowans through off-campus degree and non-degree programs, courses and conferences. EDE has an active distance-education degree program for students wanting to earn a bachelor's degree in engineering without ever attending ISU.

CIRAS' client project work is education focused. Over the past year CIRAS has reached over 1,700 people representing 500 manufacturers. These classes were conducted onsite, as public seminars over the ICN, or in-house.

The Iowa Procurement Outreach Center (IPOC) also sponsored or participated in 15 education events reaching over 900 people in the first half of 2000.

Engagement–Technology Transfer and Responsiveness to Constituencies: The ISU goal calls for " engagement with key constituents (clients for CIRAS) through sharing. . .of knowledge and expertise." CIRAS does this through learning opportunities and through work with Iowa's manufacturers. The main thrust to CIRAS client activity is technology transfer. This is very evident in the product design and test, process improvement, quality/inspection, and simulation activities done by CIRAS engineers. The work has resulted in new products on the marketplace, more efficient facilities, and new manufacturing enterprises.

As you read the case studies in this report, you will find examples of learning and engagement in our work.

CIRAS' Mission

The Mission of CIRAS is to enhance the performance of Iowa industry, and associated entities, through educational and technology-based services.

CIRAS not only made a physical move to new, modern facilities nestled within Iowa State University's College of Engineering, it also made significant strides in its capacity and ability to meet the ever-changing needs of Iowa manufacturers and industries.

Although many "successes" contributed to a remarkable year for the organization, the following highlights demonstrated the growing capabilities and strengths of CIRAS.

- CIRAS became operational with its first rapid prototyping (RP) machine and acquired another RP machine, increasing capabilities of engineering staff to assist manufacturers in further developing ideas and products and learning how newer technologies can help them. The first machine, purchased by CIRAS just before January 1999, uses powder materials to create rough concept prototypes. By June, a second machine–a fused deposition machine–using nylon or plastic as base material was in use. That machine was partially gifted to CIRAS by Rockwell-Collins. CIRAS also has worked out an agreement with Advanced Manufacturing Engineering Systems in Nevada, allowing engineers and students to use a DTM RP machine that creates parts that are high enough quality they can be used in project prototypes.

- CIRAS and Iowa State University Extension opened the ISU Industry Outreach Center in the Cedar Falls Industrial and Prairie Technology Business Park. The new center partners with many industry resources in programming for the center, providing on-site information on new technologies, technical assistance, and training. One of the first events was an on-going educational series called the Job Shop Management series, sponsored by CIRAS. A variety of manufacturing and business topics are being offered over a year's time, leading to a certificate for participants.

- The Iowa Procurement Outreach Center (IPOC) became a partner in CIRAS' manufacturing assistance efforts, moving from the Iowa Department of Economic Development offices in Des Moines into the CIRAS suite in Howe Hall on campus. IPOC is a federally funded program providing marketing and technical assistance to Iowa businesses, especially those firms with the potential to provide goods and services to the federal government. IPOC continues its leadership in working with the Targeted Small Business (TSB) Program for women- and minority-owned businesses in Iowa.

- CIRAS became a partner with the College of Engineering in offering engineering distance education, credit and non-credit, in Iowa and, with new technologies, throughout the country and world.

- E-commerce and lean manufacturing gained strength as new initiatives with CIRAS and its partners, including the Iowa Manufacturing Extension Partnership (IMEP). During the last half of the year, staff and resources were committed to sponsoring the first E-Business Conference in Ames for companies in the region. The conference brought together U.S. and foreign experts in e-commerce and information technologies. It is slated to become an annual and growing event.

- Work in value-added agriculture, with programming and direct assistance to related industry, increased due to client demand as well as partnering efforts with other university and government groups. CIRAS added one staff member to strengthen this content area and others, experienced in quality issues for traditional manufacturing, also have become involved in projects for value-added companies. As production agriculture and ag businesses begin to question how they can improve efficiency, competitiveness, and profits, they are looking to technologies and practices long tested and proven in the manufacturing sector. CIRAS has been a mainstay in providing such assistance to traditional manufacturers and now is being asked increasingly to bring it to businesses aligned with agriculture. CIRAS has taken a lead role in establishment of the Iowa Agricultural Quality Initiative, a group looking to improve competitiveness of Iowa agriculture. Primary focus has been on use of quality systems, particularly ISO 9000-based systems.

- CIRAS, with the ISU College of Engineering and other university centers and departments, showcased technological achievements and outreach services in June at the Technology Outreach 2000 conference, which drew leaders in business and academia for a glimpse of possibilities through new technologies.

- CIRAS engineers began work with a start-up company on a large product design project that merges some of the newest of technologies to come out of university research centers with practical application for the marketplace. The project is similar in nature and scope to the one with Advanced Analytical Technologies, Inc. (AATI), completed about a year and a half ago, which was the largest single fee-for-service project to date for CIRAS. In the same manner, the new project will provide hands-on, real industry experience for engineering students at CIRAS.

"With strong support from the College of Engineering and ISU Extension, CIRAS has continued to develop well compared to other university outreach groups," noted Richard Grieve, interim director. "CIRAS continues to be on the leading edge of tech transfer and management assistance services."

Grieve attributes this, in large part, to investments in training of CIRAS professionals, the equipment they use to do their jobs, and the latest in technical support equipment. With these investments, CIRAS continues to meet the needs of Iowa manufacturers, whether in doing routine problem solving, long-range planning, or transferring newer technologies.

In all of its services, but most notably in product development projects, one of the strengths of CIRAS lies in bringing ISU students into the picture, both to help reach project goals and as real-job learning experiences for the students. This year, CIRAS employed 15 students–11 engineering; 3 information technologies; and 1 general.

"Another factor in our success has been the ability to work with partners, new and old," said Grieve. An example of an emerging partner is the Advanced Manufacturing Research & Collaboration Cluster, sponsored by the Iowa Business Council.

Case Studies

Midwest Industries, Ida Grove

Challenge: *Midwest Industries produces high-quality recreational products, including boat trailers and hoists, boat docks, trailers for personal watercraft, and snowmobiles and general purpose utility trailers. After participating in the CIRAS-sponsored Goldratt Satellite Program on TOC and a follow-up program, the company decided to use CIRAS to assist in implementing TOC in production. Management felt the company was not managing bottlenecks effectively, especially in the peak season.*

Action: A 20-member implementation team was formed within the company. The group was trained on the basics of "Drum/Buffer/Rope and Buffer Management," part of the TOC approach. Team members, in turn, took part in a mini training session for all employees, and they met six times planning the implementation. Last January, the "switch was thrown" to officially begin the new processes.

Outcomes: Midwest was able to achieve a 10-percent increase in throughput on 33 percent less work in progress inventory.

Agent: Tim Sullivan

Stoyles Graphic Services, Mason City

Challenge: *The company is a family-owned commercial printer with a staff of 50, serving clients in Iowa and southern Minnesota. It uses a network of distributors to sell printed material nationwide and has multiple products, including magazines, books, brochures, newsletters, and custom forms. Stoyles was selected for a total assessment audit demonstration project by groups at ISU. CIRAS worked as project manager of the audit team to perform a company benchmark and to provide hands-on assistance in constraint management and continuous improvement projects.*

Action: An assessment compared Stoyles with a nationwide database of printers of comparable size. Teams were established to look at productivity, energy consumption, waste reduction, marketing, estimating, training, billing, pre-flighting, job ticket data and routing, proofing, spoilage, communication, and scheduling. A constraint management approach was used to improve flow of work through the plant.

Outcomes: Company profits increased by 3.4 percent, and sales per employee increased 10.1 percent; spoilage decreased 39 percent, waste removal costs decreased 5.7 percent, and energy costs decreased 4.8 percent.

Agent: Ron Cox

Schaeff Manufacturing, Inc., Sioux City

Challenge: *Schaeff manufactures electric forklift trucks, which are sold under its own brand name and under private label. Analysis of field complaints showed most could be attributed, in part, to variations in assembly methods. The company asked the CIRAS specialist to help in developing an ISO-like audit process to 1) identify causes of the problem, and 2) provide a policing mechanism to control activities once problems were eliminated.*

Action: CIRAS worked with Schaeff managers to create and test a universal audit procedure that would work in several manufacturing and assembly areas. Once in use, the audits showed that in many cases, simple changes would allow employees the proper information and tools to do jobs correctly each time, even on specific infrequent jobs.

Outcomes: By eliminating variations in assembly, field adjustments can be minimized and warranty claims can be significantly reduced. Improvements from the new system will be measured over the next few years.

Agent: Merle Pochop

Dubuque Clamp, Dubuque

Challenge: *The company manufactures wood clamps for several client companies around the world, putting company names on the products. With four employees, it makes clamps completely in-house from metal and wood. It was asked by a European customer to become ISO 9000 certified.*

Action: With the owner, the CIRAS agent discussed the process and requirements of ISO 9000 certification and assisted a review of the firm's strategic business plan. They analyzed the single customer making the request and drafted a response, offering the option of Dubuque Clamp becoming certified.

Outcomes: The company found out its customer was merely inquiring about ISO certification and did not require it. The owner considered, but declined the option of becoming ISO certified at the present time. Markets and other opportunities were explored with the company and the strategic business plan was modified to reflect the decision on ISO certification.

Agent: Rudy Pruszko

In Tolerance Contract Manufacturing, Cedar Rapids

Challenge: *The company does precision machining of small parts for various customers, employs 30 people, and is ISO 9002 certified. It requested CIRAS assistance to complete a production part approval process (PPAP) for a key customer. PPAPs are technical documents with specific information based on a requirement level about variables and attributes of the manufacturing processes used to produce a production part at the quoted production rate.*

Action: The CIRAS specialist worked with quality and production managers to develop the necessary documents for the customer's PPAP requirement: process flow diagram, control plan, process failure mode effects analysis (FMEA), process capability (Cpk), statistical process control charts (SPC), and gage/calibration information. Low-cost software was used to create the documents.

Outcomes: CIRAS' knowledge of and experience with QS-9000 and associated core tools was necessary to assist company personnel in developing documentation. The company met the customer's requirement on the current production order. It was anticipated that new machining orders would be forthcoming, so the company decided to purchase the software to meet future needs.

Agent: Don Brown

Nevada Metalworks, Inc., Nevada

Challenge: *The company contacted CIRAS for assistance with product design, testing, and drawings of a playground equipment product it had developed.*

Action: Under the ICAP program and using the Ames Lab at ISU, a finite element analysis (FEA) of the product was conducted. Recommendations were made for structural and safety improvements, and those recommendations were incorporated. Product load tests were conducted at the engineering research laboratories. When a possible structural problem was detected, the product was modified and retested.

Outcomes: CIRAS and the ISU groups working on the project provided the company with product drawings and a report, which included project review, finite element analysis, and load test results. The company is now marketing the new product to playground equipment users and suppliers.

Agent: John Van Engelenhoven

Ritchie Industries, Inc., Conrad

Challenge: *The company needed a more effective inspection process to detect leaks in its products, water troughs for animals. The troughs are manufactured from a single sheet of metal and were routinely inspected for leaks at welded joints by filling them with water and using an air hose outside, which would create bubbles if leaks were present. The process was time-consuming and inefficient.*

Action: CIRAS connected the company with the ISU Center for Nondestructive Evaluation lab, which offered a technique using a water-soluble dye penetrant. Fluorescent dye was applied to metal components, which then were exposed to ultraviolet or black light. Through capillary action, cracks, crevices, and holes in welded joints attracted the dye, which surfaced on the opposite sides of troughs revealing minute openings.

Outcomes: Ritchie engineers adopted the technique and worked with CIRAS to develop a unique, streamlined application method using an airbrush. Troughs were suspended on a conveyor belt and systematically spraypainted on the inside. If dye revealed itself, a leak was present and the unit was promptly separated. The inspection process has been applied to more than 90 percent of products at savings of about $60,000 annually.

Agent: John Van Engelenhoven

McLeodUSA, Cedar Rapids

Challenge: *McLeodUSA, with more than 8,000 employees, provides integrated communications services to business and residential customers in 22 Midwestern and Western states. Products include local and long-distance communications services, Internet access, and voice mail, teleconferencing, and calling card services. The company wished to do a company-wide evaluation of operating software systems. A network services (NS) manager contacted CIRAS for assistance.*

Action: It was decided to use the SoftSelect process to evaluate needs of the Network Services Materials Management Department. Extensive questioning of employees in the materials, finance, engineering, and IT&S departments led to even more extensive questioning in 24 work areas. After routing and answering of questions had taken place, the information was submitted to SoftSelect for processing.

Outcomes: The processing of information was concluded in less than two weeks and produced a list of 10 software package options, with comparison of features and functions, that would best meet the company's current and future needs. Hundreds of hours and thousands of dollars in meeting time, analysis, and decision making was saved.

Agents: Don Brown, Steve Vanderlinden

All Home Central, Council Bluffs

Challenge: *All Home Central installs TV satellite systems. It also has started a company named Sat-align, which manufactures a satellite-dish-aligning tool that aids in installation.*

Action: Working with CIRAS, a two-position satellite- alignment tool was developed and marketed by the company. Because of added complexity of newer satellite dishes, a three-position tool was needed. Sat-align had the idea for a cost-effective alignment tool, but needed both drawings and a prototype. The CIRAS agent developed layouts and drawings for parts of the tool.

Outcomes: Prototype parts were made and manufacturers were contacted for making production parts. A prototype of the tool was constructed and Sat-align presented it at a product show in Las Vegas, where it was well received. The company made the decision to proceed with further development and marketing of the tool.

Agent: Clay Crandall

Bonser's Pasta Products, Agency

Challenge: *The pasta manufacturing company has three employees and operates out of a 30-by-100-foot store on Main Street. It needed to reduce noodle drying time and make improvements in product as well as process speed.*

Action: This involved three projects, beginning in 1997 and ending this year. First a dehumidifying system and a measuring device to keep moisture content consistent were installed. ISU's nondestructive evaluation lab supplied information on the measuring device, and the CIRAS agent researched options on humidifiers, suggesting also material handling reductions and adjustments in packaging and roll speeds of product handling machines. Secondly, a problem with inconsistent quality/brittleness of dried noodles was addressed. Through the ICAP program, the ISU food science department analyzed samples, offered suggestions on ingredients, and referred the company to an out-of-state noodle expert. And finally, the reduction-of- drying-time problem had to be addressed quickly to meet product demand and the needs of a key out-of-state client. A goal was set to decrease drying time by 30-40 percent in order to increase throughput by 25 percent or more. With assistance from CIRAS specialist Ron Cox and others at ISU, air movement in the drying room, porosity of the drying rack's paper liner, materials flow, and rate of moisture evaporation from product were examined.

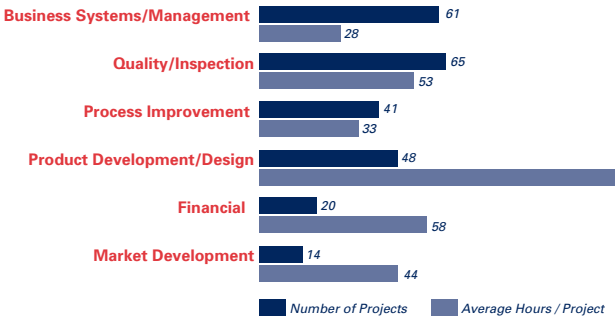
Outcomes: Moisture content of product can be more accurately measured; a semi-automatic packaging machine and dehumidifying equipment were installed in stages to meet demand. Changes in the plant and materials flow brought improvements. Air circulation was redirected. Drying time has been reduced from 40 hours to less than 24 hours, and production rate nearly doubled to a consistent rate of 300 cases per week without personnel additions. The company expected business to "nearly double" and is planning other improvements.

Agent: Dan Meyer

Report on Activities

During the 1999-2000 fiscal year, project work was the main CIRAS focus. CIRAS staff worked on 453 projects. The projects have increased in complexity over the previous year, which is reflected in the average hours per project.

Projects Completed – Category

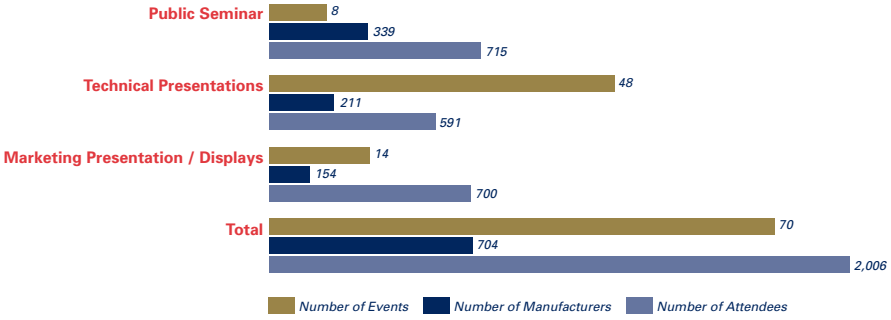


CIRAS completed 316 projects for the 12-month period 7/01/99-6/31/00. The top six project categories with the average hours per project are shown above. Engineering student time is not included.

Ongoing Projects (June 30, 2000)

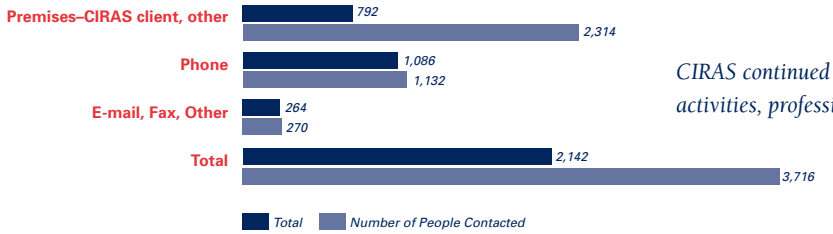
At fiscal year end, 137 projects were ongoing. Five categories accounted for 81% of all projects.

Educational Events



The topics for the seminars and presentations are related to the CIRAS products. Topics were Theory of Constraints, Kaizen, ISO and QS 9000, finance, strategic planning, human resources, and many others. Education plays a major role in CIRAS' activities and is always an underlying theme in our project work with clients.

CIRAS Manufacturing Contacts, Annualized



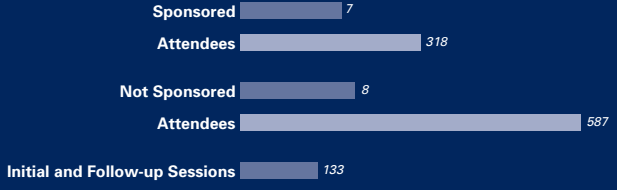
CIRAS continued to contact manufacturers through its project work, educational activities, professional societies, and client calls.

Iowa Procurement Outreach Center

The Iowa Procurement Outreach Center was relocated to CIRAS from the Iowa Department of Economic Development on January 1, 2000. IPOC has an active outreach mission in Iowa with a focus on assisting Iowa's minority- and women-owned businesses to find procurement contracts with Iowa and federal agencies. Iowa firms in the first half of 2000 received new contracts worth over $3.5 million. IPOC also assists private firms, such as Iowa manufacturers who have government contracts that require use of small suppliers, in finding suppliers.

IPOC dealt with firms through one-on-one counseling sessions and procurement conferences. For the period January 1, 2000 to June 30, 2000:

Procurement Outreach Conferences



View from the Field

Don Brown, Cedar Rapids

During the year Don continued to provide assistance to Iowa industry in quality systems. Most of the work related to the implementation of the ISO 9001 or 9002 quality management processes. He also provided assistance to many companies in implementing portions of QS 9000, including control plans/APQP and PPAP. Training was provided in FMEA (failure mode effects analysis) and continuous process improvement. He helped the Woods Quality Center establish the Iowa Recognition for Performance Excellence (IRPE), the Iowa state quality award based on the Malcolm Baldrige National Quality Award. He is an examiner for the process.

Don was honored by the Iowa Board of Regents with the Award for Staff Excellence in recognition of his outstanding contributions to higher education. In addition to being a member of the CIRAS staff for 13 years, Don has 22 years of manufacturing experience. He has a B.S. from Ohio University and an M.B.A. from St. Ambrose University.

Reg Clause, Fort Dodge

Clause joined CIRAS this year bringing in expertise in quality systems, supply chain management, and business planning, as well as manufacturing. He hit the ground running to meet a growing demand among ag and value-added ag companies for assistance in quality and planning issues. An example was the ISO 9000 implementation project with Farnhamville Coop, which included development of supply-chain management protocols to tie farmers directly to the quality system. Another project for a cooperative group of dairy farmers involved developing group dynamics, a strategic plan, a business plan, and related efforts to capture volume and component premiums, then create a specialty product with strategic marketing. Clause also is involved with several feasibility studies for startups and has been involved in the creation of the Iowa Quality Initiative. He traveled to the Netherlands to explore international supply-chain management practices.

Clause, who received a B.S. in animal science from ISU, has 28 years experience in entrepreneurial business and has been a private consultant to companies of regional and multi-national size. He operated a contract machine shop and currently operates farming and commercial cattle-feeding operations. He is a frequent speaker on marketing, entrepreneurship, and government policy issues and has been an advisor to banks, including the Chicago Fed Bank.

Clay Crandall, Council Bluffs

Crandall, who joined CIRAS staff this year, has put the majority of his efforts into becoming acquainted with the manufacturers he serves and the needs they express. Three company product design projects have flowed from those get-acquainted meetings. One of those was with All Home Central, which installs TV satellite systems and has a subsidiary company named Sat-align that makes a satellite dish aligning tool. The company asked CIRAS' assistance in developing a three-position alignment tool, a change from the traditional two-position tool. Layouts, drawings, and prototype parts were made and presented by Sat-align at a national product show. The new tool was well received.

Crandall has more than 16 years experience in mechanical design, product development, and support. He earned B.S. and M.S. degrees in mechanical engineering from South Dakota School of Mines.

Paul Gormley, Cedar Rapids

Gormley, who has been with CIRAS for one and a half years, focused on the development of the e-business arena for CIRAS clients. "I see a real educational need among small manufacturers throughout the country, not just in Iowa–even if they are already aware of some benefits in using the Internet for various business functions," he said. The effort is paying off, he feels, as he sees momentum created for adopting e-business practices and tools. "It's a matter of applying a little piece here and there, then saying, 'So what else do we do?' " Manufacturers are seeing e-business tools as ways to build relationships with clients, improve communications, and improve the bottom line. Gormley also has broadened the CIRAS scope by finding solutions for clients' electrical-based problems.

In addition to information technology (IT), Gormley specializes in product development and design. He was honored with the "Rookie of the Year" award for 1999-2000 from the Iowa Manufacturing Extension Partnership (IMEP) for his work in the Y2K and e-business arenas. He has a B.S. in electrical engineering and an M.B.A. from Iowa State University and has worked for many years as an electrical engineer with industry and consulting groups.

Merle Pochop, Sioux City

Pochop found that ISO 9000 dominated client issues throughout the year. He worked with nine separate entities on issues of ISO 9000 and was asked to step into the agricultural arena with four firms that wished to use ISO as a way to increase opportunities in value-added ag. In order to gain further knowledge about agricultural quality issues and practices, he participated in two study trips to Europe. He is prepared to meet what many see as a fast-rising emphasis on quality systems and supply-chain management in U.S. agricultural production in coming years. Pochop also sponsored ISO user groups to assist area manufacturers in advancement in quality issues.

Pochop received the ISU Extension New Professional Award in fall 1999 in recognition of his enhancement of the perception of ISU as a high-quality, responsive problem solver in the eyes of businesses and industries in northwest Iowa. He has been with CIRAS for eight years. He earned a B.S. in mechanical engineering from South Dakota State University and an M.B.A. from the University of South Dakota. He has more than 26 years experience in industrial positions.

Rudy Pruszko, Dubuque (Peosta)

In his work with clients, Pruszko has found an emerging need across all industries for resource persons, such as CIRAS specialists, to provide the knowledge and experience to help them grow and meet the challenges of the new millennium. "New industries are coming forward to take advantage of what we offer. Value-added ag is one of these new industries, especially in the areas of feasibility studies and technology reviews and development." Other rising areas of need are noted in e-business and the integration of resources offered by different federal, state, local, and community organizations, programs, and agencies. Traditional business, marketing, and strategic planning issues have had a strong presence during the year, as well.

Pruszko specializes in manufacturing and technology integration, fluid process engineering, new technology development and patents,

and strategic business development. He has a B.S. in chemical engineering from Penn State University and an M.B.A. in finance from the University of Dubuque. He joined CIRAS in 1999 with more than 25 years experience in upper management and engineering positions in the chemical and equipment manufacturing industries.

Denzil W. Stacy, Spencer

Stacy focused much effort in assisting Iowans in value-added ag enterprises and farm-based businesses. He worked in cooperation with Palo Alto and Kossuth County Extension offices and the Iowa Lakes Community College to put on a seminar, "Income Alternatives for Rural Business," which was attended by 104 persons. Other key industrial projects came from a water-well manufacturing company that needed finite-element engineering analysis and testing for new equipment for large water systems, a medical equipment company requesting rapid prototype assistance, and a rapidly growing machinery manufacturing firm that needed ISO 9000 training to expand international markets. Stacy also contributed significant articles to manuals written to assist pork and beef producers in starting food processing businesses. Those manuals were to be published by CIRAS in fall of 2000.

Stacy received B.S., M.S. and Ph.D. degrees in ceramic engineering from ISU. He has been associated with CIRAS for 24 years, after spending several years in private industry.

Tim Sullivan, Ankeny/Des Moines

Helping client companies devise and implement practical applications of TOC (the Theory of Constraints) has dominated the year's work for Sullivan. A growing number of smaller firms have become interested in the benefits they have seen others achieve with TOC. According to Sullivan, "they see TOC as a means to significant increases in throughput and reductions in work in process inventory without making significant capital investment." Midwest Industries was one firm that sought Sullivan's assistance to do a global analysis of the organization and implement TOC in its production system. Midwest was able to achieve a 10-percent increase in throughput on 33 percent less work in process inventory.

Sullivan, a CIRAS specialist for nearly 10 years, has advanced training in TOC from the Goldratt Institute, reaching the level of Jonah's Jonah. He received a B.S. in industrial education from Northwest Missouri State University and an M.S. in industrial relations from ISU. He has more than 10 years manufacturing experience.

John Van Engelenhoven, Marshalltown

Van Engelenhoven introduced a newsletter unique to his own territory this year to meet the interests and needs of local clients and keep them informed of opportunities and industry changes. He has been with CIRAS as a staff engineer for two years, working primarily in product design and development; product testing, finite element analysis; plant layout and simulation; and material handling equipment layout selection and design. He teamed one of his clients, Ritchie Industries, Inc., Conrad, with experts in the nondestructive evaluation lab at ISU to create a more effective and efficient inspection process to detect leaks in animal watering troughs, which the firm manufactures. A fluorescent dye penetrant test was used to reveal minute openings in the trough. A process for inspection was implemented impacting more than 90 percent of the troughs manufactured by the company at savings of $60,000 annually.

Van Engelenhoven received a B.S. in civil engineering and an M.S .in structural engineering from Iowa State University and has 21 years experience in private industry.

Michael R. Willett, Waterloo

Willett's leadership efforts in establishment of the Iowa State University Industry Outreach Center in Cedar Falls came to successful conclusion in December 1999. CIRAS and ISU Extension have partnered with other programs and departments of the university as well as outside resources to bring new knowledge and technology into one place to benefit industry in the area. The center has brought new energy to industrial outreach in the region. Among initial activities for manufacturers at the center has been the Job Shop Management Series of courses, which was developed by Willett. This year-long lineup includes a variety of financial, process, and planning courses and leads to a certificate of completion for participants.

Willett specializes in general and production management and computer simulation for plant layout. He has a B.A. in industrial technology and an M.A. in industrial supervision and management from the University of Northern Iowa. His experience with CIRAS spans five years, and he has more than 22 years industry experience.

Field specialists Ron Cox, Mason City, Dan Meyer, Ottumwa, and Steve Vanderlinden, Davenport, are not featured in this section. Case studies of projects conducted by them are featured in the report. Dan Meyer retired in January 2000.

CIRAS Plans For The Future

Under direction of Margaret Wilson, chair of the advisory council, and working with other members of the advisory council and staff, CIRAS underwent a lengthy strategic planning process in spring 2000. The process was carried out with leadership from Jim Black, CIRAS specialist, whose area of expertise is strategic planning and lean manufacturing. The process is expected to bring more focus to CIRAS programming, both in education and project work, and better position the center to fulfill its mission of outreach to industry.

Known changes and endeavors into the new 2000-2001 year include the following:

- A first annual E-business Regional Conference will take place at Iowa State with CIRAS taking the lead role in its sponsorship. National and international, as well as state and Midwest speakers, will draw a sizable audience. CIRAS plans to build on this first step with a series of conferences in future years.
- CIRAS will continue to strengthen its offerings–educational and project assistance–in the value-added agriculture arena. Increased numbers of projects carried over from the 1999-2000 year, particularly in quality management and business feasibility areas.
- The College of Engineering's Engineering Distance Education program, now under CIRAS direction, will begin to strengthen its position in the marketplace for credit and non-credit education. A new director was in place at the beginning of 200-2001.
- Richard Grieve, who has served as CIRAS' interim director for more than four years, will retire. A nationwide search already is underway to fill the position.
- CIRAS will continue development of the design clinic, an Iowa State merging point for all engineering, research, and applied science centers to explore relationships on projects and in newer technologies.