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## What is the ROCK Program?

The ROCK Program is a joint research and development program between commercial component fabricators in the Rockford area and Northern Illinois University (NIU). Resulting collaboration will produce affordable low quantity parts on an "overnight" basis to the U.S.

Army. The ROCK Program will draw upon NIU faculty expertise to conduct research with commercial team members awarded by subcontracts.

The ROCK Program had its inception in October 2003, when a meeting was convened in Rockford to brainstorm ideas to revitalize Rockford area manufacturers.



*College of Engineering and Engineering Technology,  
Northern Illinois University*

The area's almost 2000 manufacturing companies have suffered significant job losses and plant closures due to increasing foreign competition and the trend for more and more large manufacturers (OEMs) in the U.S. channeling their production into off-shore facilities. This eliminates their need for U.S. suppliers. A typical Rockford company is a supplier - not an OEM. This is true for both large and small employers. Hamilton Sundstrand, a supplier to aerospace companies such as Boeing, is an example of a large employer (1000+ employees). Many smaller companies also are more specialized suppliers selling their goods and services to OEMs such as Caterpillar, automotive companies or other suppliers.

Most of the area's 2000 companies employ less than 100 and sell goods and services that are highly engineered or have a high complexity with low volumes of production. For example, the area is considered the fastener capital of the world and, until recently, was also considered the machine tool capital of the world. There is also said to be more tool and die companies in the area than any other place in the United States.

The outcome of the 2003 meeting was a request by Congressman Donald Manzullo to come up with a program working through the Department of Defense (DOD) to help accomplish this effort. A suggestion was made to the Congressman to fund two efforts: a development of small-sized machine tools for fabrication of parts with micron sized features/tolerances and the other a program to provide technology support to the forming Rockford supply chain organization (now called MARRV – Manufacturing Alliance of Rock River Valley). Both programs were proposed in such a manner as to make them relevant to the United States Army's advanced technology needs in the area of manufacturing.

Northern Illinois University (NIU), using its diverse technical and business base, under the ROCK Program will work closely with the MARRV supply chain to allow such companies to better respond to government needs.



# ROCK Projects

## CURRENT PROJECTS

### **COST STUDY (BENCHMARKING)**

Perform analysis of projected production cost of military components and compare to similar commercial component production costs. The intent is to look at similar components to see what cost saving potential lies in Army suppliers adopting more commercial practices.

### **MANUFACTURING PROCESS IMPROVEMENT**

Work with Rockford companies on new processing technology development such as smart forming, titanium machining, ceramics, adiabatic processing, micro-welding, metal cleaning, etc. This project will use locally available creativity to improve the Army's ability to readily procure small quantities of spare or new parts.

### **VIRTUAL SUPPLY CHAIN**

Utilize low-cost technologies such as Internet-based collaboration. The idea is to produce a virtual collaborative network of complimentary businesses that sell and deliver collective offers. This combination of small businesses has the advantages of speed, responsiveness, innovation, flexibility and costs.

## COMPLETED PROJECTS

### **WEAR SURVEY & RESEARCH**

Perform a benchmarking study of the DoD's and industry's needs to address unusual wear on systems caused by abrasive and/or corrosive environments. Special emphasis will be given to areas where use of coatings is likely to provide significant cost benefits. Another objective of this task is to supply decision makers with authoritative and actionable information and insight on an on-going basis relative to the status of applied Tribology and Tribology R&D, the tribological needs of the government and industry, and R&D and application priorities.

### **DIAMOND COATINGS FOR WEAR IMPROVEMENT**

Test three materials for abrasion resistance and investigate the resistance of the Diamond-like coating on each material.

### **NANOFLUID MACHINING FLUID**

Tribological testing with the anticipated results of improvement in load carrying capacity, anti-wear, friction reduction

## ANTICIPATED PROJECTS BASED ON 2007 CONGRESSIONAL BUDGET

### **LOW QUANTITY PRECISION FABRICATION**

The program will work with local companies to create more micro-precision fabricating machines; develop supporting technologies needed to make micro-fabrication tools commercially viable; utilize advanced broadband communication technologies to enhance the supply chain of the precision products; evaluate and demonstrate the machines and new manufacturing processes for military vehicle component fabrication and other areas of military interest; and transfer technology on an open basis to interested companies.

### **TITANIUM MACHINING**

Establish a National Center for Titanium Machining. This initiative will foster advanced research and development on very high strength, very low weight titanium components that are vital to America's future weapons systems, aerospace products, bio-medical equipment, and other applications. Working with local manufacturers, the National Center will research the effects of "high velocity impact powder metal compaction" on titanium tooling and products.

## NIU/ROCK Support to MARRV & Local Companies

Over the past two years, the NIU ROCK Program has been able to assist the Manufacturing Alliance of the Rock River Valley (MARRV) in several ways. The ROCK Program has created a tool called the MARRV Capabilities Database that will allow MARRV to search for manufacturing capabilities quickly. The first step of this project was to visit MARRV members and create a capability assessment of each company. A capability assessment was done on fifty-six MARRV member companies and the data was then entered into a database. The NIU ROCK team, with assistance from the College of Engineering and Engineering Technology (CEET) Technology Department at NIU, then created a web-based user interface so eventually the MARRV members can access the information and share specific data. Currently, NIU is still working with MARRV on testing the database tool.



The NIU ROCK Program has offered MARRV their engineering expertise on a few contract proposals. The ROCK Program is currently working with MARRV on a contract proposal which could bring significant, additional work to the region.

The NIU ROCK Program has also been able to help the individual companies of MARRV. New plant layouts and process flows have been created for three MARRV members and customized quoting software was created for two other companies.

# “America’s Competitiveness in a Global Environment” Panel Discussion & Networking Reception

On September 27, 2006, almost 200 Northern Illinois University (NIU) alumni and other members of the Rockford business community joined together at the NIU Rockford Campus for a panel discussion and networking reception. The event was co-hosted by NIU’s College of Business and the College of Engineering and Engineering Technology.

The panel discussion focused on ways NIU can help the Rockford manufacturing community and its workforce prepare for the new age of global competitiveness and at the same time expand business and manufacturing opportunities. After the panel discussion, participants were able to continue discussions during a networking reception.

The panel consisted of representatives from both the manufacturing and the academic communities, including: John Oller, executive director of the Manufacturing Alliance of the Rock River Valley; Denise Schoenbachler, dean of the NIU College of Business;

Promod Vohra, dean of the NIU College of Engineering and Engineering Technology and Richard Johnson, director of research and development for NIU’s College of Engineering and Engineering Technology. The discussion was moderated by John Lewis, associate vice president of NIU Outreach and Regional Development.

We welcome any additional input about topics discussed during the panel discussion. A questionnaire is still available on-line at [www.cob.niu.edu/rockfordclub/survey.asp](http://www.cob.niu.edu/rockfordclub/survey.asp). Answers to those questions will help NIU better address the issues which most concern those currently in the manufacturing workforce.

For copies of the notes from the evening’s discussion, please contact Sonya Hetzel at the NIU ROCK Program, (815) 316-6370 ([shetzel@niu.edu](mailto:shetzel@niu.edu)).



## Idea Center

### Manufacturing Partners:

The key to our survival in the next decade will be to successfully engage in innovation. In an effort to accomplish innovation, a partnership between academia and industry is essential. I strongly feel that the role of engineering colleges should be to help businesses innovate and be a catalyst in the commercialization and R&D efforts. I am pleased to offer this column in the ROCK Newsletter, *the Bridge*, which will enable you to ask relevant questions about innovation, modernization, workforce development, globalization, etc. Our college will attempt to provide you with the answers that will not only address your concerns and queries, but will also enable fellow manufacturers to learn from your questions. I hope that over time, we will build a forum for information exchange to further the growth of the Rockford manufacturing community. Thank you for your confidence in our capabilities and your decision to partner with us.

**Questions?** Please send them via E-mail to [ideacenter@niu.edu](mailto:ideacenter@niu.edu)  
To be added to the mailing list for the Bridge, the newsletter of the NIU ROCK Program, please E-mail your contact information to [rockprogram@niu.edu](mailto:rockprogram@niu.edu).



**Promod Vohra, Dean**  
Northern Illinois University  
College of Engineering and  
Engineering Technology

September 19, 2006 Swedish delegation visit to EIGER/lab



## EIGER/lab Hosts Delegation from Sweden

On Tuesday, September 19, 2006, a delegation from Lidköping, Sweden visited the EIGER/lab. Kent Skarp from the Center for Entrepreneurship and Innovation (CIEL), a center for innovation in Sweden, spoke about creating a joint program with the EIGER/lab. The delegation also spoke with the Manufacturing Alliance of the Rock River Valley (MARRV) about best practice exchange and other matters of interest to both organizations.

The delegation from Sweden represented members of a consortium called ATC of West Sweden. The ATC cluster is an association of cooperating companies and institutions within automation technology. The cluster is built up by small and medium sized enterprises with a strong tradition to design and develop machinery and automation equipment.

## Taiwanese Delegation Visits Northern Illinois University, EIGER/lab, and Rockford Area Manufacturing Companies

A delegation from the Metal Industries Research and Development Centre (MIRDC) of Taiwan visited NIU'S College of Engineering and Engineering Technology on September 11, 2006. The delegation was then brought to Rockford where they received a tour of the EIGER/lab and visited with many of the representatives of resident companies including: the NIU ROCK Program, Atometric, Inc., Alion Science & Technology and REALLCo. They also toured local manufacturing companies such as Ingersoll Machine Tools, Inc., W.A. Whitney and Superior Joining Technologies, Inc.



MIRDC is a model similar to what EIGER/lab hopes to emulate. It is a place where companies can have research and development done by colleges and then have the resulting technology and products commercialized into production by the company.

## Meet the ROCK Program Staff

Richard Johnson, Ph.D.  
Director, Research and  
Development Outreach  
College of Engineering and  
Engineering Technology



Dr. Johnson has 40 years experience in initiating and managing R&D projects in the areas of materials, manufacturing, and welding research. He earned a BS in Applied Mathematics from the University of Wisconsin at Madison, an MS in Engineering Mechanics from Case Western Reserve University, an MBA from Roosevelt University and a Ph.D. in Engineering Mechanics with a Mathematics Minor from the University of Wisconsin at Madison.

Prior to serving as Director of the ROCK Program, Dr. Johnson served as the Director of Alion Science & Technology's DuPage Manufacturing Research Center and was the co-developer of the Illinois Institute of Technology's Thermal Processing Research Center. Before working for Alion (and its former organization IIT Research), Dr. Johnson worked for six years at Northwestern University's Basic Industry Research Lab (BIRL), developing and managing programs in the manufacturing process control area. Dr. Johnson also previously worked for Borg Warner Corporate Research as head on Manufacturing and Materials Research, GATX Corporation's research center as creator and head of the Materials Engineering Department, and at NASA Lewis Research Center as a researcher in materials behavior.

Prior project sponsors have included many government agencies, from the Bureau of Mines to all departments within the Department of Defense, as well as private industry. He has also worked with numerous university faculties on joint research projects including efforts of this project with Northern Illinois University.

*Meet more of the ROCK Program staff in the next issue of the BRIDGE*



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