

## Grasp, Inc Case Study

*NOTE: In order to prepare for the Learning Plan Methodology exercise for which this case will be used, the trainer may wish to recommend that trainees review the Sloan Management Review article from which it is derived. Also an excel file with the Learning Plan Methodology template should be provided with this manual.*

Rice, Mark P.; O'Connor, Gina Colarelli; and Pierantozzi, Ronald. "Implementing a Learning Plan to Counter Project Uncertainty." Sloan Management Review. (Winter 2008 Issue).

G R A S P , I N C .

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David Baker Wood III Class of 1996 prepared this case under the direction of Professor Mark P. Rice as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. Professor Mark P. Rice revised the case and created an abridged version in 2009.

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## Introduction

*"Things are going great," thought John Cervený, Director of Marketing for GRASP, Inc. "We have just finalized our last funding round, Randy Field should be starting next week as our new salesperson, and the new location in the Rensselaer Tech Park is perfect. All we need to do now is close a few of the sales we have on the table and we will be on our way."*

Cervený had begun his association with GRASP during his final semester of a Masters of Business Administration at Rensselaer Polytechnic Institute through work on a term project for technical marketing class. Cervený, as a member of a team of three students, developed a sales and marketing plan for the fledgling Company. During the crafting of the plan, Cervený became aware of the potential the robot GRASP was developing; its low cost, high accuracy design was sure to be a winner with industry.

The first two years had been quite exhilarating. Sales were slow to come, but more companies than Cervený could contact continued to show interest in GRASP's product, a robotic arm with a patented three-pronged hand (end effector). The end effector, which contained a variable gripper to handle small parts on an assembly line, enabled manufacturers to achieve high precision placement of components on an assembly line at a reasonable cost. Though the GRASP robot was not suitable for every assembly task because of the limitations of the end effector, where appropriate, few other devices could surpass the GRASP robot's performance.

## Product

The GRASP robot is a low cost, high precision assembly robot which is highly repeatable as well as easy to use and maintain. CLAMP (closed loop assembly micropositioner) is an end effector (end-of-arm tool) mounted on the GRASP robot. The robot's manipulator (arm, links and joints) executes large-motion commands, and the CLAMP end effector (which is in effect a small robot) executes the fine positioning motions needed to bring the robot into position to pick up (dock with) the work-piece and perform the appropriate manufacturing tasks.

With CLAMP, the manipulator becomes simply a transfer device to move the end effector from docking site to docking site. Manipulator accuracy, traditionally a large problem and thus expense for other robots, is no longer a strict requirement, and the manipulator's components can be configured and sized to large, gross motions. Fine-positioning accuracy is handled by the end effector. Because the motions of the end effector come from small moment arms, it is easier to keep to tighter tolerances and meet the required accuracy.

CLAMP is constructed from off-the-shelf components, and is controlled by an IBM PC/AT computer using a three-axis motion control card. The CLAMP end effector is connected to a mounting plate by a compliant coupling, which allows for limited 3-D translations and rotation. The mounting plate is in turn attached to the robot.

When the CLAMP end effector docks with the worktable, it forces two conical tips on its locating legs into conical and wedge locating receptacles on the worktable's surface, until they are seated. A third locating leg, which is a conical tip with a flattened nose, is forced to rest against a flat surface on the worktable. The three legs fix CLAMP in 3-D space.

## **Players**

### **Steve Derby, President and CEO**

Derby, an associate professor at Rensselaer Polytechnic Institute in the Mechanical Engineering Department specializing in Robotics, founded GRASP at the age of 33. Derby had received his B.S., M.S. and Ph.D. in Mechanical Engineering from Rensselaer Polytechnic Institute. Derby's calculating, professorial nature provided thoughtful direction for the growing company.

Derby's first foray into entrepreneurship in 1982 had been a software robot teaching tool which was developed as part of his doctoral studies. This software enabled students to experiment with robots without the cost associated with maintaining a physical robot. Derby called this product GRASP also, and even though his main focus was obtaining a Ph.D., he was able to sell a small number of copies of his software program.

### **John Cerveney, Director of marketing**

Cerveney, an engaging, charismatic individual, joined GRASP at the age of 26 after finishing his Master of Business Administration at Rensselaer Polytechnic Institute (RPI) with a concentration in Technical Marketing. He had also received a Bachelors of Science in Industrial Engineering from RPI four years previously. Before and during his MBA studies, Cerveney worked as the Executive Director of the Independent Student Coalition, a New York State lobby organization focused on promoting the interests of the 200,000 students attending non-profit, non-state administered institutions of higher learning in New York State.

Cerveney had quickly agreed to join GRASP when the offer was presented to him by Derby. Developing the plan to market the GRASP robot had been an intellectually challenging exercise, but he knew that the real work was in the implementation of the plan. He felt the opportunity would allow him to further develop the marketing and management skills he had obtained through his previous position.

### **John McCarthy, Engineer**

McCarthy, a talented, hard working mechanical engineer, was the first employee of GRASP. His knowledge of both robotics, learned as a graduate student under Derby; and machining, developed while working in his father's machine shop, provided the foundation for the development of the GRASP robot. McCarthy was also a graduate of Rensselaer Polytechnic Institute, obtaining a Bachelors of Science in 1987 and a Masters of Science in 1988 both in Mechanical Engineering.

Derby had little concern for McCarthy's lack of work experience. McCarthy had grown up working in his father's machine shop, enabling him to have an in depth knowledge of machining and the electronics associated with machine design.

Further, Derby was aware that McCarthy had financed part of his college through buying, fixing up, and selling Ford Escorts. Derby felt that McCarthy's structured learning during his M.S., unstructured knowledge of machining, and his demonstrated entrepreneurial flair made him the perfect employee for Derby's start-up venture.

### **Albert Santos, Software Engineer**

Santos, a talented, quiet software designer, was the final member of the original team. Santos, 26 years old, brought to the team not only a talent for software design, but two years experience in the robotics industry as a programmer for a large automation systems integrator. Derby first met Santos during his graduate studies at Rensselaer Polytechnic Institute in Computer Science, which he completed one year after graduating with a B.S. from Rensselaer. Derby reconnected with Santos during the summer of 1989 in a chance meeting, which led to the talented programmer joining the GRASP team.

Santos' flair for developing solid, user friendly programs helped the company develop the reputation of having simple, easy to use software. Once after overhearing Cerveny and McCarthy speaking about the benefits a demo disk would provide in the Company's sales effort, which they estimated would take months to develop, Santos quietly went to work developing the software. Working late into the night, Santos delivered the product to Cerveny the following morning. "His skill is only matched by his work ethic. I hadn't even asked him to estimate the time it would take to develop a demo, and there it was on my desk in the morning," remembered Cerveny.

### **Randy Field, Director of Sales**

Field, an outgoing, energetic salesperson, was introduced to the company by a "cold call" from an executive recruiter early in 1991. With over ten years experience as a sales manager of a large industrial automation wholesaler, Field provided the sales management skills GRASP required to establish a significant sales pipeline. Though his previous experience centered on selling components for robotic systems, Field stated he was confident that he could adapt his skills to the new product line.

## **Development Phase: 1987-1988**

### **The Art**

The idea for the three prong end effector came to Derby while mowing his lawn during the summer of 1987. "It just came to me, wham," he often remarked. Designs like the one he envisioned had been effectively used in other machine applications, but no one, until Derby, realized the advantages of coupling the technology with robotics.

Derby submitted the idea to the Patent and Intellectual Properties Department at Rensselaer. Rensselaer, like most other universities, maintains the first right to patent any technology generated by members of the faculty, since the institution

supplies funding for research through overhead and salaries of researchers. With the GRASP end effector, Derby argued that Rensselaer was not entitled to rights to the art, since it had not been generated while he was working and it was not related to his current funded research. Rensselaer accepted Derby's argument and decided to forego its rights to the technology.

### **Financing**

With Rensselaer's decision not to pursue the patent process, Derby individually filed his patent and began developing a plan to produce the first prototype of his envisioned robot. Derby's first efforts to secure financing for a prototype of the robot were successful. Given the patentability of his design and widely reported corporate interest in robotics, Derby was able to easily attract friends and family to invest in a prototype. Over the next few months, almost \$225,000 was raised to form the company.

Derby was especially happy to be able to fund the company using investment from friends and family. This enabled Derby to share the economic return GRASP would bring among people that he cared about, and he wouldn't have to worry about attracting outside investors to finance the project. Several of the larger investors, including a friend who had experience running a large, growing construction business, were interested in serving as members of the Board of Directors. As a result, Derby did not have to waste time looking for people to fill board seats.

### **Developing the Team**

With financing in hand, Derby approached McCarthy to implement his end effector on a simple robotic arm. Creating the first prototype took McCarthy most of the summer and fall of 1988. While McCarthy constructed the robot, Derby worked to get a better understanding of the commercial potential of the robot. His knowledge of the industry told him that his robot was timely, given the tremendous growth expected in the assembly marketplace, but he wanted to try and quantify demand. He accomplished this through the use of a simple questionnaire, mailed to over 200 former students and professional contacts which described the robot and its functionality, asked whether the respondent's company would be interested in such a device and, if yes, asked approximately how many units the respondent's organization would be likely to purchase. Response was quite positive. Over 60 people returned the questionnaire, of which 37 felt their organization would buy over 50 robots of the type described.

Given the high level of potential orders shown by the respondents of the survey, Derby felt certain that the economic opportunity for his device was quite strong. Based upon this information, Derby leased space in Rensselaer's business incubator, and took a one semester sabbatical to directly oversee the initial growth of the company.

Realizing that he did not have the training to develop an effective marketing plan for GRASP, Derby solicited help from Rensselaer's School of Management, leading ultimately to Cervený's involvement in the company. Cervený, along with two other students, developed the marketing plan for GRASP as part of team project for one of

their classes. Their research found that there was currently no supplier in the robot industry with the ability to provide highly flexible robots at low cost to the highly diverse and fragmented end-user markets.

Derby was impressed by Cerveny's intellect, maturity and enthusiasm for the GRASP robot. Further he realized that he would not be able to continue teaching and actively marketing the robot, so he decided to hire Cerveny as the Company's Director of Marketing and Sales. When presented with the opportunity to join GRASP during the spring of 1989, Cerveny quickly accepted.

The final member of the team joined the company a few months after Cerveny. Santos was working as a programmer for a large systems integrator, a firm that specialized in designing, constructing, and servicing work cells for production robots. Having worked with Santos during his master's thesis on robotic programming, Derby knew that Santos was a top notch programmer who could design and develop the software program that would be needed to control the GRASP robot in a production setting. After meeting with the whole team, Santos was impressed with both the product and the people, leading him to join GRASP during the final months of Derby's sabbatical.

## **Initial Marking: 1989 - 1990**

### **Transition**

With his team in place, Derby returned to his full-time job as a professor at Rensselaer, working for GRASP 20% of the time. The team would continue to work on developing and marketing the robot. Derby wasn't sure when he would return full-time to the business, but he was convinced from his experience with the company during his nine month sabbatical that he could manage the company while maintaining his associate professorship.

Derby's transition to a full-time academic and part-time CEO was facilitated by Cerveny. Cerveny was a natural born leader with a business skill set developed at Rensselaer, enabling him to take over the day to day functions of the business. Derby was pleased that Cerveny was willing to step in and help the company with day to day administration, without Derby having to direct him to do so.

Cerveny was aware that Derby planned to return to teaching and welcomed the opportunity to try out the new skills he had acquired in his MBA Program. Administration was cutting into some of his time as the Director of Marketing, but with Cerveny filling in for Derby, GRASP would not have to increase the personnel costs.

### **Marketing**

Though Cerveny spent some time dealing with management tasks, his main focus was sales and marketing. His market research showed that there was great potential, but limited awareness of the GRASP robot and its unique end effector among potential customers. Developing product and brand identity would be his primary task.

Besides press releases and demonstrations to corporate officers and government officials who visited Rensselaer, Cerveny felt that participation in major trade shows would create awareness and stimulate demand for the robot. However, he was also aware that they did not have the resources to maintain a major presence at any of the trade shows.

Cerveny remembers: “We decided that we need to find a unique way to demonstrate the abilities of the CLAMP to provide precise positioning for a given assembly task. It was easy to come up with a task that the robot could accomplish better than other robots, but one that would create flash at a trade show initially eluded us. Finally, we thought about tasks that any two year old could do, but a robot couldn’t. That led us to developing a work cell that stacked two Legos™ - one on top of the other. Any child could do this, but standard robots were incapable of it.

“It was a great hit. We handed out over 1700 bright yellow blocks imprinted with our name and phone number at the first show and generated over 100 leads. Over the next three months I followed up on the leads, and we developed several prospects, including a large automotive manufacturer. They had an assembly task for which our GRASP robot and CLAMP end effector were perfectly suited. It involved placing a steel plate within a cylinder at very tight tolerances. The task was very time consuming for humans, and other robots were unable to accomplish it at all. We are still working on the sale today, though; the automotive manufacturer who is interested in purchasing our system has a very long development cycle.”

“Given the response from the automotive manufacturer, we decided to attend an automotive robotics trade show in the spring of 1990. Here we used the same Lego demo and interest was again high. I again worked to qualify the leads and arrange product demonstrations, but it became increasingly obvious that, without help, I couldn’t follow up on all the leads we were generating from the trade shows. During the summer of 1990, I got a call from a headhunter who said he had an experienced robotics sales manager who was looking for employment. After several discussions with Steve Derby, we decided to make Randy Field an offer. I think Randy will bring the industry knowledge and the experience we need to close some of these leads.”

### **Technical Advances**

McCarthy continued to refine the end effector and the control systems of the robot. One issue that had been raised during the trade shows was that the motors used in the end effector, stepper motors, were not favored by end users. End users preferred servo motors, a newer but functionally similar technology. So McCarthy redesigned the robot to allow for the use of servo motors, increasing the production costs by \$10,000, but the redesign did not create any engineering difficulties. By the summer of 1990, McCarthy and Derby were happy with the GRASP robot and CLAMP end effector enough that they felt that the prototype was complete. Design and manufacturing of a production model began soon after.

### **Moving to the Next Level**

With the increased staffing, the current office space at Rensselaer’s Incubator Center on campus began to look quite small and unprofessional. Derby and the

GRASP Board of Directors decided that the company should make the move out of the Incubator and into the Rensselaer Technology Park. With the new offices, higher staffing levels and increasing marketing budgets, management decided that it was time to raise an additional \$600,000 to get the company to break-even. The search for more capital began with the largest initial investor committing to an additional \$200,000 in financing.

## **Looking Forward**

Cervený moved forward in his chair and paused briefly. “Everything is in place. We have financing; we have someone to follow up on all these leads; we have a new, more professional office in the Tech Park. We have all the components that we need to build our success.

“With the replacement of the stepper motor, technically, the product is shaping up just great. Really, the stepper motor was not even a true technical issue. The stepper and servo motors function in exactly the same way. Steve and John just weren’t familiar enough with the market then to understand that end users prefer servo motors.

“From a marketing standpoint, I couldn’t be more pleased that the Board has decided to allow the additional expense of a salesperson. Field should be a great addition to the team. Not only is he the other person I need to fully cover this diverse market, but his industry contacts can help us speed up the sales cycle. It’s funny. I never really thought of the sales cycle as being an issue for our product. From the initial contacts with all the companies that have seen the robot, I assumed that we would have sales by now, but these manufacturers just are not moving as fast as we hoped. I hate to throw out a number, but I think the sales cycle could be as long as twelve months - not that we will really know until we sell one, but all in due time.

“Generally, the business is doing fine. With the planned infusion of capital, we should be able to make it to well past break-even. I do get concerned about our new level of expenses related to the move to the Rensselaer Technology Park and the addition of a high-powered salesperson, but we all know that it is time to act.”

John settled back in his chair. “Clearly it is time to perform. We have all the pieces falling into place. I know that I am not officially running the show,” he winked, “but still I wonder what I need to do to get us performing at the high level that will drive our success.”