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NASA/FMIEP Program's Impact on NASA, Minority Students and the Business Community

Dr. Irma Becerra–Fernandez, Dr. Ann Taylor, Gregg Buckingham, and Frank Kinney

Abstract

The NASA/Florida Minority Entrepreneurial Partnership Program (FMIEP) is a partnership established in 1997 between NASA-KSC, four Florida minority institutions, and the Technological Research and Development Authority (TRDA); with the primary goal of transferring NASA technologies to the small business sector. The FMIEP program was designed to identify, understand, and find solutions to business problems with the assistance of minority students participating in the program. This paper presents some of the program's first results, together with the second year objectives. This paper also presents the benefits this program brings to the participating students and minority institutions. The program draws on the strengths of each of the academic institutions and invites faculty and students to collaborate with the KSC Commercialization Office to promote entrepreneurship through NASA assistance.

Introduction

The NASA/Florida Minority Institution Entrepreneurial Partnership Program (FMIEP), established in June of 1997, is a partnership between NASA-KSC, the Technological Research and Development Authority (TRDA), and four Minority Institutions in the State of Florida. This partnership is funded by a \$1.6 million grant from the NASA Equal Opportunity Office. The program draws on the outstanding resources of the participating institutions. The FMIEP consortium is led by Bethune-Cookman College (B-CC) in Daytona Beach, including Edward Waters College (EWC) in Jacksonville, and Florida International University (FIU) and Florida Memorial College (FMC) both in Miami. The State of Florida's TRDA plays a support role to B-CC in program administration and coordination. The FMIEP Program simultaneously trains the students on the challenges of entrepreneurship, while transferring advanced NASA technologies to the private sector, particularly to small and minority-owned businesses. The business thrust (of the program) seeks to assist businesses in identifying, understanding, and finding cost-effective solutions to a variety of industrial/business problems, which can potentially have a significant economic impact. The academic thrust consists of training graduate and undergraduate students, who may become technology transfer professionals and/or entrepreneurs of the future. This paper presents some of the achievements of the FMIEP consortium since its inception, and its impacts on the students and to the community that these institutions serve.

FMIEP Project Objectives

Several projects have helped NASA KSC/FMIEP promote their advanced technologies to the business community. These technologies have in turn produced valuable jobs and have led to an uprising of entrepreneurship, which has ensured the expansion of companies. Entrepreneurship has aided in this expansion by attracting talented individuals trained to maximize an industry's assets, thereby helping them to better compete in the business world. "Entrepreneurship plays a key role in ensuring the successful growth of companies, especially

when creating value-added jobs that focus on high technology goods and services. By drawing technical and business talent from a comprehensive pool of individuals, opportunities are being created that will help the United States remain competitive in the high tech arena, and ensure that all its resources (particularly those being developed by NASA-KSC) are being maximized” (Becerra-Fernandez, 1998). As a result, the projects executed by the NASA funded programs have attracted business corporations and most importantly raised the awareness of the significance of developing such entrepreneurial programs in minority institutions and universities. In order to strengthen Florida businesses and increase the transfer of NASA technologies to the private sector, the TRDA and the four minority institutions in the consortium joined with NASA to form the NASA/FMIEP Program. The program employs students and faculty members to assist entrepreneurial companies to solve problems and conduct research, enabling the students to experience opportunities that normally would not be afforded to them. The consortium has formulated an innovative concept that includes using the existing Commercialization and Technology Transfer programs to strengthen KSC’s partnership with Florida businesses and the minority institutions. “In recent years minority groups have been poorly represented among the legions of high-tech entrepreneurship because very few colleges include this course in their curriculum (Office of Advocacy, 1994). The incorporation of entrepreneurship into the academic practices of faculty and students at Historical Black Colleges and Universities and Minority Institutions (HBCU/MI) effectively counteracts the lack of minority participants in the establishment of small, high-tech companies” (Becerra-Fernandez, 1998). The academic thrust of the FMIEP seeks to attract attention to these programs, in order to promote the importance of entrepreneurship at minority institutions and its resulting economic spillover to the community.

First Year Results of the FMIEP Consortium

Through the NASA/FMIEP initiative, over 100 students (including African Americans, Hispanics and Pacific Islanders) and 13 faculty members have contributed their efforts to accomplish significant goals during the first year of the program. The achievements of the participating institutions include collaboration with the Technology Outreach Program (TOP), which enables businesses to obtain free technological assistance. Together, B-CC, EWC, and FMC visited over 700 Florida companies to familiarize them with the (TOP). In addition, EWC participated in several technology expositions, and held numerous meetings and seminars throughout the state encouraging Florida businesses to participate in the Small Business Innovative Research program. Furthermore, EWC has been involved with providing businesses interested in SBIR with technical assistance in the application process. An interesting result of this initiative is that sixteen of the 78 Florida companies that submitted SBIR proposals in 1998 were EWC clients, and four out of the five winners in the 1998 SBIR solicitation period were assisted by EWC. In addition to assisting individual tenants of the Florida/NASA Business Incubation Center (FNBIC), FMC also developed a marketing plan for the FNBIC as a whole. This plan was used to secure a \$432,000.00 enhancement grant to expand Business Incubation Centers throughout the Space Coast. Furthermore, teams of undergraduate and graduate students at Florida International University have evaluated several technologies developed by NASA-KSC for commercialization through industries manufacturing related technologies (Becerra-Fernandez, 1999). In this particular effort, over 800 companies were identified as potential commercialization partners. What’s more, over 100 new commercial uses were also identified for the KSC technologies intended to be commercialized by the private sector. Bethune-Cookman College was instrumental in assisting KSC in promoting their technologies to Florida companies by developing various marketing materials.

The FMIEP Program has made a tremendous impact on the students. The following are testimonies offered by diverse students participating in this program. "The experience I have gained is immeasurable...I have acquired skills that will prepare me for the real world...opportunities like these are greatly needed at our institution so other students can be afforded similar situations to prepare us for the future." (Andre Dean, student-Florida Memorial College) "The NASA/FMIEP program has taught me things that I would not normally learn in the classroom, like marketing and technology research, patent research, software research and development, writing technical papers, evaluating new technologies, and company market investigation. As a future Hispanic engineer, all that I have learned in this program will have tremendous value for my career and has motivated me to pursue entrepreneurship in the future." (Claudia Alarcon, student-Florida International University)

Second Year Results of the FMIEP Consortium

Most of the deliverables for year one are continuing during year two. For example, B-CC, EWC, and FMC, continue working on the TOP efforts by making company visits, creating visit-training presentations for new program students, and creating presentations that are used during the visits. EWC continues its efforts in the SBIR program. The first year proved so successful in this area, that B-CC has joined them in order to expand the exposure of the SBIR program to more companies throughout the state. Florida Memorial continues to assist the Florida/NASA Business Incubation Center tenants in such areas as accounting, marketing, and management. Florida International University continues to assess various KSC technologies to identify potential partners and new uses. Nevertheless, there are three additional activities planned for year 2 that will also have significant benefits to NASA, to the community, and to the students involved.

One of the FMIEP projects currently underway is the creation of four videos documenting successful technology transfer and NASA spin-off products. NASA spin-off products refer to products that are based on NASA-developed technologies, which were originally developed to fulfill NASA's mission of space exploration, yet simultaneously having a useful commercial application here on Earth. Examples of successful NASA spin-offs include cellular phones, cordless tools, and "Tang" the popular orange drink of the 70's. The videos include interviews with NASA-KSC representatives, faculty from all four minority institutions, and the presidents of companies working with successful spin-off products. NASA-KSC along with Bethune-Cookman College developed several video chronicles entitled "Successful Technology Transfer and Spin-Off Products" documenting the activities of the graduate and undergraduate minority students working at the four participating institutions. The students participating in the FMIEP consortium pursue diverse courses of study, ranging from the hard sciences to the social sciences, and from engineering to business. This documentary not only acquainted spectators with the students participating in FMIEP, but also recorded their activities and interviewed students, thereby giving them the opportunity to speak about the experiences and skills learned as a result of the program. "The FMIEP Program has provided students first hand knowledge of the practices and challenges of small businesses. This program better prepares the participants of these institutions to disseminate information about, and embark on high-tech, small business ventures"(Becerra-Fernandez, 1998). Furthermore, the video chronicles also document NASA spin-offs and Success Stories, interviews with producers of NASA spin-off products, steps to take for successful commercialization of federal technologies, and steps to successfully secure federal research funding. These videos guide small businesses looking for available help from the federal government, in addition to informing them of NASA's available programs that may

assist them in their ventures. Additionally, these videos will constitute an important tool that could be used in the implementation of entrepreneurial courses at minority institutions.

In an effort to keep a steady pace with state-of-the-art web technology and Internet commerce strategies, the need to provide technology upgrades to KSC commercial partners will be provided through a secured web site. This site, currently under development at Bethune-Cookman College in an experimental World Wide Web server, will ultimately be co-located with the technology server maintained at NASA-KSC. B-CC has begun the development of a general Internet based system for the KSC Commercialization Office, which will identify, authenticate, and validate potential customers of NASA's technologies. The system under development will provide access and allow qualified web visitors to download documents and executable software in their field of interest. This system will also provide a means (for NASA) to record who has accessed the system, when the site was accessed, and what was downloaded. A security mechanism is being implemented into the system. As such, in order for a user to access and download software developed and owned by KSC, they must be considered a "qualified" user. Becoming a "qualified user" requires the reading of a licensing agreement before receiving authorization to download software. Reverse DNS authentication is required in order to insure that the user's location is within the U.S. Prior to receiving authorization to download, the user will supply their e-mail address and a time-limited password will be e-mailed back to the user to ensure identity authentication. B-CC is also creating the HTML server mechanism so that KSC office personnel can add new software, edit the agreements, and other routine tasks (for example modification of the host names) without B-CC's intervention.

The Florida International University (FIU) team is currently in the process of developing the Searchable Answer Generated Environment (SAGE) application, which intends to create a repository of experts in the State of Florida SUS. Currently, each of the State Universities in Florida maintains a database of funded research, but these databases are disjoint and disparate. This application creates one single web-enabled repository, which can be searched in a number of ways including research topic, investigator name, funding agency, or university (Becerra-Fernandez, 1999). The SAGE Knowledge Management (KM) System combines and unifies existing data from multiple sources into one user accessible interface. The aggregated data needs to be accessible from one point of entry. For example, the data being accessed may consist of multiple data types that have been converted to a standard file format. SAGE consists of the typical university sponsored research data incremented by object-oriented data such as research topic, investigator name, funding agency or university. One of SAGE's advantages is that there is only one point of entry or a web enabled interface, allowing multiple occurrences of the interface and giving the end user deployment flexibility. The main interfaces on the query engine (in SAGE) use text fields to search the processed data for key words, fields of expertise, names, or other applicable search fields. The application processes the end user's query and returns the pertinent information. The information is collected from a conglomeration of multimedia databases, and then presented as queried (see Figure 1) (Becerra-Fernandez, 1999). The benefits of SAGE are: (1) SAGE is a repository of Intellectual Capital within the state of FL SUS; (2) SAGE helps locate FL SUS researchers for collaboration with industry and federal agencies, thus increasing the potential for research funding to the SUS; (3) SAGE enhances communication and allow more visibility for FL SUS experts, making universities more marketable; and (4) combines and unifies existing data from multiple sources into one user web-accessible interface (Becerra-Fernandez, 1999).

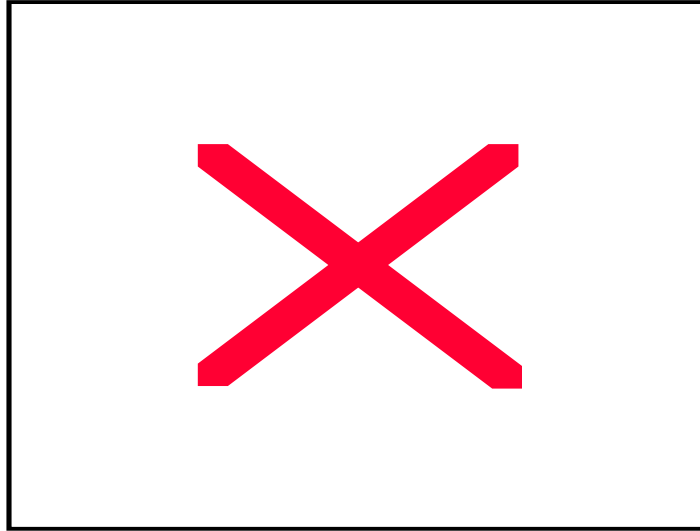


Figure 1. SAGE Architecture

The purpose of the SAGE KM System is to unify myriad data collections into one database collection that could easily be mined for relevant data. SAGE will give university researchers more visibility and increase their chances for future funding opportunities, while simultaneously allowing interested parties to identify available expertise within the SUS. This application helps to identify a researcher's expertise within a discipline, and to facilitate communication or a point of contact (Becerra-Fernandez, 1999).

Conclusion

There are many benefits to the participating students and minority institutions in the NASA/FMIEP consortium. The program draws on the strengths of each of the academic institutions and invites faculty and students to collaborate with KSC Technology Commercialization office to promote entrepreneurship through NASA assistance. Through this program students have the opportunity to collaborate with NASA-KSC, with the added benefit of creating stronger relationships between NASA and the Florida-based Minority, broadening the potential for future joint programs and contributing talent and resources to existing outreach programs. Students and faculty with academic specialties in the areas of business, marketing and engineering greatly enrich the capabilities of the Commercialization Office at KSC. This program maximizes the benefits of proven programs by recruiting faculty and students to participate with entrepreneurial ventures of NASA technologies. This program also expands the knowledge and helps to foster the technologies that have been developed for the space exploration missions and that could have great benefits on Earth. The program helps NASA seek out commercialization partners for its new technologies and promotes community awareness of the various NASA-KSC activities and opportunities.

There are a number of benefits and applications received by the Florida industry from NASA-KSC technologies. These benefits include creating or saving jobs by establishing a NASA Florida network that provides free technical assistance to Florida companies. This program helps create new economic activities that can accelerate the transfer of NASA technology to Florida Industry. These Florida businesses are assisted through Small Business

Innovation grants, marketing plans, business plans and accounting systems. Furthermore, these businesses are establishing a potential commercialization partnership with NASA technologies thereby creating a community awareness of NASA-KSC activities.

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