DEPARTMENT OF THE ARMY
US ARMY RESEARCH, DEVELOPMENT AND ENGINEERING COMMAND
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AMSRD-SS-D

20 July 2006

MEMORANDUM FOR Mr. Michael Caccuitto, DoD SBIR/STTR Program Administrator, Department of Defense Office of Small Business Programs, 201 12th Street South, Arlington, VA 22202

SUBJECT: Executive Order 13329 – *Encouraging Innovation in Manufacturing* Annual Reporting Requirements

1. The following enclosures are provided in response to your memorandum dated 22 June 2006, requesting data on the Army's implementation of Executive Order 13329.

a. Examples of Army manufacturing-related SBIR projects (Enclosure 1).

b. Procedures and mechanisms the Army has used to date to give priority to manufacturing-related projects (Enclosure 2).

c. Actions the Army has taken toward promoting and supporting manufacturing-related research projects (Enclosure 3).

d. An updated Army action plan to implement the executive order (Enclosure 4).

2. My point-of-contact is Ms. Susan Nichols, Army SBIR Program Manager, 703-806-0859, susan.nichols@us.army.mil.

DEBRA O. SALETTA
Acting Deputy Commander for
Systems of Systems Integration

Enclosures

CF:
Mr. Craig Rutler, Action Officer, Office of the Deputy Assistant Secretary of the Army for Research and Technology, 2511 Jefferson Davis Highway, Arlington, VA 22202-3926

Army SBIR Manufacturing-related Case Studies

1. The Materials & Electrochemical Research (MER) Corporation project "Continuous Reactor for the Large Scale Production of Nanotubes" is an excellent example of a manufacturing related SBIR. It has enabled affordable production-scale quantities to meet research demands that will eventually be part of Defense and non-Defense products. A systematic evaluation of potential processes for large-scale Carbon Nanotubes (CNT) production was undertaken. The evaluation of arc, hot plasma, catalytic chemical vapor deposition (CCVD), and several production approaches determined that the CCVD approach holds the highest potential for continuous production of several types of CNT. A CCVD reactor was operated continuously and produced about one kg of high-yield CNT. Continuing work will include the refinement of the nanotubes formation model developed to yield quantitative relationships between reaction conditions and products. Procedures for product purification will be automated and applied to the full range of products. The results of this SBIR effort will enable the US industrial base to manufacture a myriad of products for military and civilian applications including filtration, new high efficiency backlights fro LCDs, high power vacuum tubes for microwaves and X-ray production, and flexible transparent conductive films.

Proposal #: A002-1723
Contract #: DAAD17-C-03-0014
Award Amount: $1,729,907 ($729,907 SBIR and $1M outside investor - Mitsubishi International Corporation)
Organization: US Army Research, Development and Engineering Command, Army Research Laboratory (RDECOM-ARL)
Organization POC: Robert Dowding, 410-306-0632

2. Opto-Knowledge Systems, Inc. (OKSI) developed the "Continuously Variable Aperture Cold Stop" for the slim line cooler/dewar design. This is part of the overall demonstration of the 3rd Gen IR system. Army ManTech is programmed to fund a $12 million Manufacturing Technology Objective (MTO) for affordable integrated dewar (insulated containers having a vacuum space designed to protect and maintain the IR focal plane arrays at cryogenic temperatures) and cooler assemblies. The OKSI-demonstrated variable aperture will be an integral part of this MTO. OKSI has been committed to developing this fully functional dewar system that will be demonstrated using manual micrometer via a feed-through. Under a proposed option the variable cold stop will be motorized. 3rd Gen IR systems are critical to the Army's Future Combat Systems (FCS), aviation turrets, and long range surveillance systems. The technology developed by OKSI under the SBIR program will be made available through licensing to the industrial base vendors serving the DoD for ground and air platform based targeting and surveillance systems.

Proposal #: A012-0227
Contract #: DAAB07-03-C-P004
Award Amount: $1,240,000 ($985,000 SBIR and $255,000 outside investor – CERDEC)

Organization: US Army Research, Development and Engineering Command, Communications Electronics Research Development and Engineering Center (RDECOM-CERDEC)
Organization POC: Jay Vizgaitis, 703-704-1521

3. Physical Acoustic's "Nondestructive Inspection Technique for Detecting Defects in Metal Matrix Composites (MMC)." As the Army continues the push to make lighter, stronger structures, the use of MMC composites is increasing and Nondestructive Evaluation (NDE) for damage is becoming a necessity. MMCs are emerging for a variety of applications where lower weight and increased strength or durability are critical factors for improved operational performance. Within the DoD, MMC composite materials are used, or are planned to be used, in such areas as, F-16 Ventral Fin & Fuel Access Doors, Aircraft Equipment Racking, lightweight tank track shoes, missile structures, advanced engine components, etc. The NDE system can be adapted for use in many or most of these applications. Initially the primary military market for the NDE instrument developed would be for the Army for inspection of Bradley Fighting Vehicle (35GVW) tank track shoes. The system will be used for acceptance testing of newly fabricated material and could also be used for in-service field testing of existing track shoes. The results of this SBIR effort will be marketed to the US industrial base for the military applications listed above and selective applications within the commercial automotive sector.

Proposal #: A022-1113
Contract #: W31P4Q-05-C-R028
Award Amount: $728,770 (SBIR)
Organization: US Army Research, Development and Engineering Command, Tank Automotive Research Development and Engineering Center (RDECOM-TARDEC)
Organization POC: Dr. Basavaraju B Raju, 586-574-6065

Procedures and Mechanisms Used to Give Priority to Manufacturing-related Research Projects

1. In response to Executive Order 13329, Army SBIR/STTR PMO has established a closer collaborative relationship with the U.S. Army Manufacturing Technology (ManTech) Program. Our initial efforts to gather manufacturing-related data began with the 06.2 Topics where we asked the topic authors to designate whether the written topic supported Manufacturing Technology. The Army ManTech Program Office and the individual Manufacturing Technology Objective (MTO) Managers reviewed, evaluated, and provided an endorsement of the 06.2 topics, with the intention of facilitating the possible integration and alignment of SBIR efforts directly into MTO projects. The Army ManTech Program Office and the MTOs reviewed all of the 06.2 topics for manufacturing-relatedness against the following categories:

a. Core Manufacturing Innovation Topic
   - Addresses manufacturing process, technique or innovation as the primary objective of the topic
   - Topic addresses the development and application of advanced technologies for manufacturing processes, tools, and equipment
   - Targets manufacturers of manufacturing equipment or applicable to the manufacture of many systems or production lines (i.e., pervasive)
   - Addresses the affordability, producibility or manufacturability of a demonstrated technology

b. Research Topic with Significant Manufacturing-related Innovation (Shared Objective)
   - Research for a process or product that has significant manufacturing implications, although not the sole purpose of the topic
   - Topic addresses the development or application of advanced technologies for manufacturing processes, tools, and equipment
   - Topic includes manufacturing issues associated with technology under development

c. Research Topic that has Product or System Focus, Addressing Manufacturing Aspects of that Product
   - Primary objective of topic is to develop a system or weapon-specific capability
   - Manufacturing, producibility, cost and yield are referenced but not the primary objective of the task
   - Manufacturing-related activities may be part of Phase II

d. Topic with No Direct Manufacturing Innovation, but Potential to Apply Techniques Developed to Manufacturing
   - Research topic may include a process or product that has manufacturing implications or could apply to a manufacturing process as a secondary

application, even if not stated in the topic description, may include manufacturing-related activities as part of Phase II

e. Topic with Some Indirect Manufacturing Applications
   - Topic does not address any manufacturing process or product, but may indirectly improve the manufacturing base through training, protection of domestic manufacturing capability or other methods of strengthening the manufacturing base

2. Comments and endorsements provided by the Army ManTech Program Office and the MTOs were forwarded to the Army SBIR Source Selection Board and were used in their analysis and recommendations of the 06.2 Topics submitted to the Office of the Secretary of Defense, Office of the Director, Defense Research and Engineering, USD (ATL) for final approval.

3. In May 2006, the Army SBIR program incorporated the Army ManTech Program Office and the MTO Managers into both the Phase I and Phase II source selection process. The intent is to use the ManTech review and comments of the proposals as a discriminator by the source selection board and to facilitate the possible integration and alignment of SBIR efforts directly into MTO projects. The Army employs the use of manufacturing related as a tie-breaker in the evaluation process to the maximum extent possible without adversely impacting other critical mission areas.

Actions Taken to Promote and Support Manufacturing-related Research Projects

1. The Army focuses many efforts on promoting manufacturing-related projects. These efforts include the Army SBIR and STTR website, the Army SBIR and STTR Quality Awards, and the annual Commercialization Brochure. One of the most successful methods of promoting manufacturing-related projects is through the Army SBIR and STTR website. This website brings together the small business community, Army researchers, Army Programs of Record and prime contractors, and the ManTech community for possible collaboration on new and ongoing SBIR projects.

2. The PMO, Army SBIR tracks and reports SBIR and STTR success stories through the annual Commercialization Brochure. The Army Commercialization Brochure is an excellent opportunity for Army organizations and Small Businesses to share information about their SBIR and STTR projects and the success of their projects. The brochure is distributed at Army, Defense, and National conferences providing exposure to these exceptional SBIR and STTR projects.

3. In 2006, for the first time, the PMO, Army SBIR participated in the Defense Manufacturing Conference (DMC) and will continue to attend in the future as a way to promote the SBIR program within the manufacturing community.

4. The PMO, Army SBIR will continue to incorporate the Army ManTech program in topic writing and the Phase I and Phase II source selection processes. This closer collaboration should stimulate opportunities to transition successful manufacturing-related SBIR projects in the future.

Army Plan to Implement Executive Order 13329:
Encouraging Innovation in Manufacturing

Implementation of EO 13329: The Army SBIR/STTR Program Management Office (PMO) will use the following approach to implement E.O. 13329. Six specific areas are described: 1) Development of baseline proportion of projects related to manufacturing; 2) Integration of Executive Order initiative into Army goals; 3) Procedures and mechanisms to be used; 4) Tracking progress of manufacturing-related SBIR/STTR awards; 5) Promoting Executive Order activities; and 6) Tracking and publishing success stories:

1) **Baseline proportion of projects related to manufacturing.**
   - The baseline manufacturing related data provided by the SBA on 5/6/2004, as well as the FY01-03 average data is used internally as a gauge by which increases or decreases in the proportion of manufacturing related projects can be observed.
   - The Army currently has a mechanism in place for identifying manufacturing related technologies through its technology areas and will continue to use this mechanism.
   - The Army's data for number and dollar value of manufacturing related SBIR/STTR awards will be submitted to DoD for the annual report.

2) **Integration of Executive Order initiative into Army goals.**
   - The Army currently has ten technology areas under which SBIR/STTR projects can be categorized. One specifically is Advanced Materials and Manufacturing. Manufacturing related technologies potentially can be linked to all of these ten technology areas.
   - The Army will encourage participating laboratories and centers to develop manufacturing related topics and/or to emphasize the linkage to manufacturing innovation if a relationship is not readily apparent. For example, environmental or societal level technologies may not be as readily apparent as machine level technologies.

3) **Procedures and mechanisms to be used.**
   - The Army has provided a copy of Executive Order 13329 to all participating laboratories and centers and has posted a copy to the Army Knowledge Online (AKO) SBIR Knowledge Center.
   - The Army has notified all participating laboratories and centers in writing of its plan to execute the Executive Order.
   - The Army will comply with DoD procedures and mechanisms related to the Executive Order.
   - The Army has established a closer collaborative relationship with the US Army Manufacturing Technology (ManTech) Program. The Army ManTech Program Office and the individual Manufacturing Technology Objective (MTO) Managers review, evaluate, and endorse manufacturing-related topics, with the intention of facilitating the possible integration and alignment of SBIR efforts directly into MTO projects. The Army ManTech Program Office and the MTOs review topics for manufacturing-relatedness against the following categories:

- Core Manufacturing Innovation Topic
  - Addresses manufacturing process, technique or innovation as the primary objective of the topic
  - Topic addresses the development and application of advanced technologies for manufacturing processes, tools, and equipment
  - Targets manufacturers of manufacturing equipment or applicable to the manufacture of many systems or production lines (i.e., pervasive)
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- Research Topic with Significant Manufacturing-related Innovation (Shared Objective)
  - Research for a process or product that has significant manufacturing implications, although not the sole purpose of the topic
  - Topic addresses the development or application of advanced technologies for manufacturing processes, tools, and equipment
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- Research Topic that has Product or System Focus, Addressing Manufacturing Aspects of that Product
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- Topic with No Direct Manufacturing Innovation, but Potential to Apply Techniques Developed to Manufacturing
  - Research topic may include a process or product that has manufacturing implications or could apply to a manufacturing process as a secondary application, even if not stated in the topic description, may include manufacturing-related activities as part of Phase II

- Topic with Some Indirect Manufacturing Applications
  - Topic does not address any manufacturing process or product, but may indirectly improve the manufacturing base through training, protection of domestic manufacturing capability or other methods of strengthening the manufacturing base

- The Army will employ the use of *manufacturing related* as a tie-breaker in the evaluation process to the maximum extent possible without adversely impacting other critical mission areas.

4) **Tracking Progress.**
   - The Army will track and report its progress regarding implementation of the Executive Order to DoD annually.

5) **Promoting Executive Order activities.**
   - The Army will post the Executive Order and plan to its website.
   - The Army has added a link on its website to the to the "Manufacturing in America" document issued by the Department of Commerce (DOC): http://www.commerce.gov/DOC_MFG_Report_Complete.pdf
   - The Army will educate small businesses on the Executive Order and plan at local, regional and national conferences.
   - The Army will attend the annual Defense Manufacturing Conference.

6) **Tracking and publishing success stories.**
   - The Army currently tracks and publishes all success stories. Future publications will emphasize success stories related to manufacturing technology.