E. Title III of the Defense Production Act

The Defense Production Act (DPA) (50 U.S.C. App. 2061 *et seq*). is the primary legislation for ensuring domestic availability of industrial resources and critical technology items that are essential for national defense. Title III Program provides a vehicle to create, maintain, modernize, or expand domestic production capability for technology items, components, and resources essential for national defense and for which there is insufficient production capacity to meet these needs. A key objective of the Title III Program is to accelerate the transition of technologies from the R&D arena to affordable production and insertion into defense systems. The Title III stimulates investments in key production resources to increase the supply, improve the quality, and reduce the cost of advanced technology. IT reduces U.S. dependency on foreign sources of supply for critical materials and technologies, and strengthens the economic and technological competitiveness of the U.S. defense industrial base.

In the calendar year 2003, the Title III Program had eight projects underway.

Radiation Hardened Microelectronics Capital Expansion (CAPEX) This project is making substantial capital investments to establish a capability for production of 0.15µm feature size microelectronic devices with strategic levels of radiation hardening. The project is using commercially available microelectronics equipment modified for radiation hardened production. Radiation hardened electronics enable spacecraft to operate in the extreme radiation environments resulting from nuclear threats and exposure to long-term natural radiation. Numerous defense programs require strategic radiation hardened microelectronics. Without Title III support, these programs will have difficulty achieving their goals and meeting insertion schedules. The Title III effort is part of an overall Radiation Hardened Microelectronics Accelerated Technology Development program initiated in 2001. The industrial capability will provide substantially higher electronic operating speeds and will lower the power/size of electronics in spacecraft. The smaller size and higher performance made possible by the Title III CAPEX equipment, combined with the advances in radiation hardened process technology will generate highly leveraged savings for spacecraft in terms of size, weight, reliability, and launch costs. Significant equipment purchases and qualification testing have been completed to date.

Radiation Hardened Microprocessors – This Title III project is scaling up production capacities for high performance radiation hardened microprocessors. The much higher clock rates will lead to significant cost and weight savings for space systems. Higher performance means greater on-orbit processing capabilities and lower ground support requirements. Radiation

hardened microprocessors will enable spacecraft to operate in the extreme radiation environments of nuclear threats and long term natural radiation.

Silicon Carbide (SiC) Substrates – The goals of this project are to establish efficient and affordable domestic sources of high-quality silicon carbide semiconductor substrates and to facilitate the transition and insertion of this advanced semiconductor material into defense applications. This Title III project has increased material availability, improved quality, reduced cost, and enabled the transition to full scale manufacturing by establishing the capability to produce 75mm diameter SiC substrates for device fabrication.

The fruits of the Title III SiC program have resulted in early insertion into DARPA programs such as the Wide Bandgap Semiconductor Technology Initiative, which is making use of improved substrates to demonstrate devices for military systems. Use of SiC semiconductor substrates will result in smaller, lower-weight, lower-cost, and higher-performance equipment. This effort is expected to generate savings in defense costs that are many times the projected Title III expenditure while also strengthening the position of the U.S. industrial base with respect to a critical state-of-the-art technology.

Laser Eye Protection (LEP) – The objective of this project is to establish a viable, highly responsive, and affordable production capacity for thin film dielectric coatings on polycarbonate substrates, which will be used to make laser eye protection spectacles and goggles. Thin film dielectric technologies are expensive and worldwide production capacity is limited. At the start of the project, the world's sole production facility was located in Great Britain and had an annual capacity of only 3,000 units per year. The project established a viable domestic source with sufficient production capacity to satisfy all projected Air Force and Navy demand for affordable thin film dielectric coatings. The remaining project tasks will demonstrate devices that meet the Army's unique requirements.

Microwave Power Tube Materials and Components – The objectives of this project are to improve the quality and reduce the production lead-time for microwave power tube materials and components. It will also reduce the production and life cycle costs of microwave power tubes. The project has begun to foster consistent, quality driven process and material improvements in the supply chain for microwave power tube production. This effort will complement ongoing Defense R&D and ManTech efforts to improve microwave power tube design and production processes.

Yttrium Barium Copper Oxide (YBCO) High-Temperature Superconducting Coated Conductors – The objective of this Title III program is to establish high volume, high quality, affordable, domestic production capacity for YBCO High Temperature Superconducting (HTS) conductors. An initial phase of the project has begun with two domestic U.S. companies using Title III

funding and additional funding through a Memorandum of Agreement with the U.S. Department of Energy. The DoE will also participate with several technical/industrial experts on the Title III Integrated Product Team. Industry cost share will match Government funding on a dollar-for-dollar basis.

Wireless Vibration Sensors – This project will enable the timely production and fielding of affordable smart sensors that will make Condition-Based Maintenance (CBM) possible. CBM is a critical enabling tool to lower asset lifecycle cost by providing online measurement and quantification of an asset's condition and maintenance needs (e.g. an aircraft engine). Incorporation of this technology in defense systems will enable more effective maintenance strategies. CBM holds the promise of substantial reductions in maintenance costs as well as increased readiness across a variety of defense systems.

Rigid-Rod Polymeric Materials – This project will initiate the transition of rigid rod, ultra-high strength polymer material from a small scale, R&D batch process to a limited production capability. The project is focusing on lowering manufacturing costs to make the material more affordable. Rigid-rod, ultra-high strength polymeric materials can be used as metal substitutes for a variety of applications. The material offers significant weight savings potential and is being explored for lightweight munitions, lightweight tactical system components, lightweight pistols and rifles, lightweight personal armor, and high strength structural foams.