Below is a list of projects for the 4th Congressional District and North Carolina that was included at my request in the Fiscal Year 2010 Department of Defense Appropriations Act . This bill became Public Law 111-118.

Completion of Soldier Portable PowerCharge 250 Project - $2.4 million

INI Power Systems

175 Southport Drive Suite 100

Morrisville, NC 27560

The PowerCharge 250 is a clean, environmentally friendly, fuel cell enabled soldier portable power source that allows for efficient, quiet, rapid battery recharge in the field for our soldiers and special operations personnel. INI Power Systems will use federal funding to support further development and testing of the PowerCharge 250, accelerating its delivery to soldiers in the field. In addition to the environmental benefits of the product, the PowerCharge 250 would significantly reduce weight (by up to 25 lbs.) and bulk of power sources carried in nearly every soldier's pack. Reducing weight and bulk allows the soldier greater mobility with less fatigue and greater flexibility to carry additional provisions and equipment. The rechargeability of the battery would allow soldiers to carry out longer missions with less logistical support.

Federal support to complete development of the Power Charge 250 will enhance the readiness and safety of the military warfighter. The device will significantly reduce battery weight in soldier packs, leaving more room for critical life-saving and protective equipment, and will provide sustainable power for longer missions. In addition, the project will deliver a cost savings to taxpayers because life-cycle costs of rechargeable fuel cells are significantly lower than comparable costs of batteries.

Continuing Development of High-Frequency, High-Power Electronic and Optoelectronic Devices on Aluminum Nitride (AlN) - $3.2 million

Hexatech

991 Aviation Parkway

Morrisville, NC 27560

Aluminum Nitride (AlN) is a promising semiconductor material under development for use in high-performance electronic and optoelectronic devices, which are highly sought by the military for next-generation wireless and optical communications applications, radar technology, early warning systems, and biochemical defense. It offers significant potential improvements over existing materials in power, efficiency, and reliability, translating into far greater performance using less energy. Hexatech will use federal funding to accelerate development of Aluminum Nitride materials and high-performance Aluminum Nitride devices in order to improve the efficiency and reliability of military systems, including communications systems, sensors, electronic warfare applications, and radars.

Our nation's readiness needs require that the military stay on the leading edge of electronic technology. The proposed research will open new avenues for military and homeland security applications in wireless and optical communications, radar technology, early warning systems, and biochemical defense. It also will develop devices that can meet the military's increasing bandwidth and power needs for tactical communications.

Low-Defect Density Gallium Nitride Materials for High-Performance Electronic Devices – $2.8 million

Kyma Technologies

8829 Midway West Road

Raleigh, NC 27617

Gallium Nitride is a promising semiconductor material under development for use in high-performance electronic devices, such as radars, communications systems, power switching, and hybrid vehicle electronics. It offers significant potential improvements over existing materials in power, efficiency, and reliability, translating into far greater performance using less energy. Kyma Technologies will use federal funds to accelerate development of Gallium Nitride materials and high-performance Gallium Nitride devices in order to improve the efficiency and reliability of military systems, including the Navy All-Electric Ship, the Army Joint Light Tactical Vehicle, and the Air Force More Electric Aircraft.

The military has identified energy cost and availability as one of the key threats to U.S. global military reach and superiority, and has prioritized research into innovative ways to increase energy efficiency. Moreover, ever-evolving technologies used by modern systems throughout the military require more powerful, more reliable electronic devices. The proposed project would (1) save taxpayers money by increasing energy efficiency of numerous military systems, thereby reducing energy usage and costs; (2) enhance U.S. national security by helping to maintain military technological superiority; and (3) promote the development of electronic technologies that could have numerous important non-defense applications, such as increased electrical efficiency of traditional, hybrid, and electric vehicles and improved electric grid stability.

Nanofluidic Lubricants for Increased Fuel Efficiency in Heavy Duty Vehicles - $1.2 million

International Technology Center

P.O. Box 13740

Research Triangle Park, NC 27709

Nanofluids are fluids that contain a small concentration of nanoparticles, or microscopic particles. Recent research has shown that adding certain nanoparticles to fluids has the potential to alter the physical properties of the fluids in ways that enhance performance. Adding nanoparticles to fluids such as motor oil, transmission fluid, fuel, and coolant can achieve significant benefits in terms of improved vehicle fuel efficiency, increased performance, lower maintenance, and extended lifespan. For example, the addition of nanoparticles to motor oil can significantly reduce engine friction and wear, and studies have suggested that doing so could increase fuel efficiency by up to 20 percent. International Technology Center will use federal funds to support continuing research into the development of nanofluids for increasing fuel efficiency, engine performance, and other favorable properties for military vehicles.

The military has identified energy cost and availability as one of the key threats to U.S. global military reach and superiority, and has prioritized research into innovative ways to increase energy efficiency. The project will (1) save taxpayers money by increasing energy efficiency of any vehicle powered by an engine (including wheeled vehicles, airplanes, and ships), thereby reducing energy usage and costs; (2) help reduce U.S. military dependence on foreign oil; and (3) promote the development of nanofluids that could have significant positive benefits for taxpayers, such as nanofluidic motor oil to increase passenger vehicle fuel efficiency.

North Carolina National Guard Family Assistance Centers - $1.28 million

North Carolina National Guard

Claude T. Bowers Military Center

4105 Reedy Creek Road

Raleigh, NC 27607

The North Carolina National Guard (NCNG) has experienced an unprecedented operational pace that includes mobilizing over 95% of its force. Current indications are that this pace will continue for the foreseeable future. These mobilizations have a significant effect on Guard families and children, who experience this impact not only during the deployment, but prior to and especially after the service member returns. Family Assistance Centers (FACs) provide essential support and services to families of members of the NCNG and of all the other Armed Services. These services include counseling, health care information, financial advice, employer support, legal support and guidance, crisis referral, community outreach, veteran affairs and more. NCNG families are spread throughout the state and in most cases cannot easily access services on military installations. NCNG will use federal funds to establish FACs across the state so that they Guard can provide consistent and continuous vital support and services to the families of members of the NCNG and the Armed Services.

The Defense Department has identified support for families during deployment as a key influence on the readiness of deployed military personnel. Moreover, support for military families plays a major role in service members' decisions on reenlistment, directly impacting retention rates. This program would significantly reduce the impact of deployment on families and would directly contribute to sustaining and retaining a strong North Carolina National Guard.

Secure Open Systems Initiative (SOSI) - $2.4 million

North Carolina State University

Raleigh, NC 27695

The Secure Open Systems Institute is a multi-disciplined research, development and collaboration between North Carolina State University and government and corporate partners. Its mission is to proactively work to prevent cyber-based attacks on open source software and open systems, which are increasingly used by the Department of Defense in applications including weapons systems, communications, power grids, training modules, and so on. NCSU will use federal funding for SOSI to perform two functions. First, it will serve as a recognized center for vetting open source and open systems technology for security assurance, improving DoD's confidence in the security of its systems. Second, it will offer a virtual computing research test bed to facilitate open systems research that will improve the security of current systems and help develop new and innovative approaches to open system security.

As recent cyberattacks in Estonia, Georgia, and the United States demonstrate, cyberwarfare is a serious and growing threat to our national security. With nearly every component of the military reliant upon computer and information technology, cyberattacks could significantly degrade our military readiness without adequate protections in place. As the Department of Defense and other government departments turn increasingly to open source and open systems technology, SOSI will help ensure our protection against cyberattacks.