ABSTRACTS OF 2007 FLC MAR AWARDS

EXCELLENCE IN TECHNOLOGY TRANSFER AWARDS

First Place
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Second Place
Targeted Treatments for Chronic and Painful Diseases

Third Place
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Commercialization of Armstrong Powder Process

Coal Chemistry Module (CCM)

Identification of Small Molecule Inhibitors of Anthrax Lethal Factor

SpaceWire Link-and-Switch Implementation

Innovative Robotic Crane Improves Large Aircraft Maintenance Operations

Threat Containment Unit

OUTSTANDING TECHNOLOGY TRANSFER PROFESSIONAL

Mr. Paul Fritz	**First Place**
Dr. Claudia Golenda	**Honorable Mention**

EXCELLENCE IN TECHNOLOGY TRANSFER

Naval Research Laboratory

Transparent Spinel Ceramic Armor

Dr. Jasbinder (Jas) S. Sanghera Dr. Ishwar (Ish) D. Aggarwal
Dr. Guillermo Villalobos Dr. Shyam Bayya

Drs. Jas Sanghera, Ish Aggarwal, Guillermo Villalobos and Shyam Bayya, Code 5606 at the Naval Research Laboratory (NRL), have developed and commercialized transparent spinel ceramic, which provides a cost and performance advantage over materials such as glass, ZnS, and sapphire that have traditionally been used in military and commercial applications . Not only is spinel transparent in the visible, but it also transmits certain wavelengths in the infrared which sapphire and glass cannot – an important property for sensor and laser systems. Spinel also has excellent mechanical properties. It has comparable strength to sapphire but is considerably stronger than glass and ZnS. The manufacturing costs for spinel are relatively low due to the improved yield, attributed to the high reproducibility, and because the entire process only takes a few days compared with many months required to grow high quality single crystal sapphire. Also, the process is readily scalable to considerably larger sizes than sapphire as well as complex shapes such as domes, which are not possible with sapphire.

This technology, licensed to MER Corporation, has received multiple order contracts and is being sampled for both government and commercial applications. Further, transparent spinel is on a path to realize global commercial distribution via a joint venture between MER Corp. and Mitsubishi of Japan.

The successful and rapid transfer of this novel ceramic technology from the Navy to MER Corp. has created, for the first time, a US supplier of high optical quality spinel ceramic. The government will benefit from the availability of inexpensive, high optical quality and strong/rugged spinel which will enable lightweight transparent armor for military personnel and platform protection, thin and rugged windows for high energy lasers, and domes for aircraft sensor systems. The public sector will benefit from cost-effective improvements to existing protective equipment for fire and rescue workers – as well as enhanced performance and ruggedness of consumer electronics. Because of its reduced cost for manufacturing as well as improved optical and mechanical performance, this material is expected to replace glass and ZnS in many applications, as well as allow for some applications simply impossible to address with previous technologies, and has the potential to become a multi-billion dollar business.

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EXCELLENCE IN TECHNOLOGY TRANSFER

National Institute of Diabetes and Digestive and Kidney Disease of the National Institutes of Health

Targeted Treatments for Chronic and Painful Diseases

Dr. Kenneth A. Jacobson

Researchers at the National Institute of Diabetes and Digestive and Kidney Diseases have developed a group of compounds useful in treating a wide variety of diseases, many of which are chronic and painful for those afflicted. These compounds, known as adenosine A3 receptor agonists, are small molecules that bind to adenosine A3 receptor and induce their biological activity. The adenosine A3 receptors are embedded in cell surfaces and are important for communicating the need for a cell to initiate activity in response to adenosine detected outside the cell. Adenosine is important in the body's response to chronic or acute tissue stress or cell damage. Because the four subtypes of adenosine receptors are located in different tissues, they tend to be tissue- and disease- specific, making them both very valuable in drug development and challenging for identifying molecules that will bind to them with the desired affinity and specificity. The first selective adenosine A3 receptor agonist and also the most selective such agonists have been designed by NIDDK researchers to stimulate this receptor subtype exclusively and, therefore, have very focused biological activity. For example, certain of these small molecules activate adenosine A3 receptors to provide cerebroprotective, cardioprotective, and anti-inflammatory effects and to shrink tumor cells.

The development of receptor-specific adenosine A3 receptor agonists of high affinity at NIDDK has enabled current clinical trials and pre-clinical studies by NIDDK's licensee and CRADA partner, Can-Fite Biopharma, Ltd. for treatment of rheumatoid arthritis, dry eye syndrome, and psoriasis, with very encouraging results. Rheumatoid arthritis is a chronic disease of unknown cause affecting 2.1 million Americans. It can lead to long-term joint damage, resulting in chronic pain, loss of function and disability. Dry eye syndrome is an extremely common condition, the cause of which remains unclear, and is thought to affect approximately 60 million Americans. Psoriasis is a lifelong skin disease affecting approximately 7.5 million Americans, about 10 percent to 30 percent of whom also develop psoriasis arthritis, which causes pain, stiffness and swelling in and around the joints. Other autoimmune inflammatory diseases are under study and in pre-clinical trials in an effort to bring comfort to other patients and alleviate other chronic and painful diseases through use of the technology. Its use is also being evaluated in pre-clinical studies for cancers.

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EXCELLENCE IN TECHNOLOGY TRANSFER

National Energy Technology Laboratory

High-Temperature Sorbent to Control Mercury in Gasification Processes

Dr. Evan J. Granite Mr. Henry W. Pennline

In this project, researchers at NETL developed a novel technology to remove mercury in gasification-based electric power generation systems, and transferred the technology to Johnson Matthey Corporation (JM) for commercialization. The technology was developed within the in-house research effort at DOE's National Energy Technology Laboratory (NETL). The technology transfer activities included the licensing of a patent on a technique to remove the pollutant mercury in gasification-based power generators, and a CRADA between NETL and JM. JM not only wished to pursue this mercury removal technology but also realized the future importance of coal gasification as a means to produce power, hydrogen, and chemicals. NETL's idea for mercury removal was licensed to JM under the CRADA. The potential market for the technology is significant. Additionally, when the technology is implemented, the American public will benefit because low-cost electric rates would continue and ambient air would be free of the air toxic, mercury.

Over 50% of the electric power generated in the United States comes from the use of coal. A major concern for power generation systems that use coal as an energy source is the air emissions from the plant. Although certain gaseous emissions are currently regulated, the emergence of new regulations by the EPA for the trace pollutant mercury will have a direct impact on coal-using facilities, both conventional steam generating systems as well as advanced power systems, such as integrated gasification combined cycle (IGCC) systems. The EPA ruling pertaining to mercury as proposed in March 2005 established that regulation of mercury emissions from utility steam generating units is necessary and appropriate.

Gasification is an important strategy for increasing the utilization of abundant domestic coal reserves and is a key to the improved power generation thermal efficiency of IGCC. The Department of Energy envisions increased use of gasification in the United States during the next several decades, particularly for its adaptability to remove carbon dioxide, a greenhouse gas. As such, the gasification-based technology strives to approach a near-zero emissions goal with respect to pollutants. Mercury is a pollutant that must be addressed by gas cleaning and conditioning. With EPA's Clean Air Mercury Rule, and several states promulgating their own regulations, the need exists for a low cost mercury removal technique that can be applied to gasification-based processes, e.g. IGCC, and conventional coal-burning plants. Thermal efficiency considerations and completeness of removal are two concerns that are alleviated when elevated temperature removals of mercury are conducted in a gasification system.

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EXCELLENCE IN TECHNOLOGY TRANSFER

National Energy Technology Laboratory

Commercialization of Cast Steel Armor for Department of Defense

Mr. Paul Turner Mr. Jeffrey Hansen Dr. Paul Jablonski
Mr. Jim Ogilvy Mr. Matthew Burkins Mr. William Gooch
Mr. Michael Keele Mr. David Kleponis Mr. Kirk Stoffel

The Department of Defense (DoD) needs 10 million pounds of P-900 cast steel armor to be delivered starting the last quarter of calendar year 2007. According to the Office of the Secretary of Defense (OSD), this program is the highest priority program at DoD. In late July of 2007, OSD sent the Army $200 million of FY07 funding to procure the first set of castings. This cast armor will be used as add-ons to retrofit US military vehicles to protect soldiers from the effects of improvised explosive devices (IEDs). A number of foundries will be required to produce the approximately 200,000 castings within the specified time frame. Each foundry has to be qualified both ballistically and for its production/business plan to ensure that it can deliver.

About 20 years ago, NETL (then U. S. Bureau of Mines) scientists Jeff Hansen and Paul Turner, at the request of U.S. Tank and Automotive Command (TACOM) and Army Research Laboratory (ARL) personnel, had developed a process to make P-900, which is a cast slotted steel armor produced using the lost foam process. A patent was issued in 1993 covering a portion of this process. TACOM metallurgist (now retired) Jim Ogilvy and ARL engineers Bill Gooch and Matt Burkins developed the armor's ballistic specifications. Earlier this year, NETL scientist Paul Jablonski and technicians produced castings for ARL using a new heat treatment to optimize ballistic performance against IEDs. ARL engineers Burkins, David Kleponis, Michael Keele, and Kirk Stoffel performed ballistic testing and evaluation of these test plates which proved so successful that TACOM decided to put out the market call. At present, NETL is the only source of production-sized patterns.

TACOM and NETL contacted eight different foundries throughout the U.S. to produce this armor. Since the need is so pressing, some foundries will use the lost foam method to produce the castings while others may use a different, but more expensive technology. To help with the process of qualifying foundries to produce this large quantity of castings, Paul Turner provided technical expertise along with polystyrene P-900 patterns for them to use in making test targets. NETL also volunteered its pattern tooling to TACOM in order to make additional patterns to help jumpstart the production process while the foundries await full-size patterns.

Once foundries are qualified, the plan is to go into full-scale production to produce in excess of 200,000 castings, with foundries producing between 100 and 600 castings per day each. Paul Turner, NETL Division Director, is now visiting the foundries, ARL and the Undersecretary of Defense for Industrial Policy (director of the overall P-900 effort). The purpose is to help the foundries meet the program needs and to help DoD write the MilSpec for the new P-900 armor.

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EXCELLENCE IN TECHNOLOGY TRANSFER

National Energy Technology Laboratory

Commercialization of Armstrong Powder Process

Mr. Paul Turner Mr. Edward Argetsinger Dr. Paul Jablonski
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Mr. William H. Peter

Titanium is recognized as a superior material for many structural applications due to its high strength, low density, excellent corrosion resistance, and good ballistic characteristics. The cost of titanium has doubled annually for the last three years and order lead times have doubled over a two year time period. Prices of $35 to $50 per pound and 12 to 18 month lead times for Ti and Ti alloy plate are common. The high cost and extremely long production lead times have forced engineers to use alternative materials resulting in significantly reduced performance. At present, titanium is produced using the slow, batch Kroll Process. In 1998, a small startup company, International Titanium Powder, LLC (ITP) of Lockport, IL contacted NETL and asked for assistance in evaluating powder produced from their then patent-pending Armstrong Process. The Armstrong Process continuously produced titanium powder and there are plans to continuously produce titanium alloy. At that time, the product contained unacceptable levels of contaminants.

Over the next 9 years, through a series of CRADAs, Division Director Paul Turner, NETL scientists Stephen Gerdemann, Paul Jablonski and technician Edward Argetsinger worked with ITP engineers to improve the ancillary equipment associated with the Armstrong Process to continually improve the titanium powder and to make alloyed powder. Later, Oak Ridge National Laboratory (ORL) Division Director Craig Blue and scientist William Peter were brought on board to lead the efforts to formulate a single step, solid state compaction process to produce revolutionary low cost products using Armstrong products.

ITP began marketing its products commercially in October of 2006. In May, 2007, ITP broke ground on a new, 4,000,000 pound/year production facility that should be online in 2008. Economic studies show that ITP alloyed powder can be combined with low-cost processing to produce plate that will retail at approximately 50 percent less than the retail price of plate using the Kroll process. This increased capacity at a reduced cost has the potential to open up many new markets for titanium. The Department of Defense is considering funding increased capacity of the Armstrong process as a method to guarantee a consistent titanium cost and supply for defense contractors supplying DoD with armored vehicles, etc.

ITP and its development team, including NETL and ORL, were the recipients of an R&D 100 award to be officially awarded in October 2007.

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EXCELLENCE IN TECHNOLOGY TRANSFER

National Energy Technology Laboratory

Coal Chemistry Module (CCM)

Dr. Chris Guenther Dr. Madhava Syamlal

Researchers at the Department of Energy's (DOE) National Energy Technology Laboratory (NETL) developed the Coal Chemistry Module (CCM) software as a means to incorporate coal chemical reactions into physics-based models of multiphase reactors to solve scale-up problems for advanced power plants using coal gasification, such as Integrated Gasification Combined Cycle (IGCC) plants. Advanced power plant technologies combine the technology of multiphase reactors with high-temperature chemical reactions for processing fossil fuels; for example, coal, a complex solid chemical mixture, is reacted with gas-phase steam and air in a gasifier at high temperatures and pressures. The chemical reactions in these systems are inextricably linked with the multi-phase flows, i.e. mathematical models cannot address these phenomena separately but must solve the reaction chemistry and multi-phase flow equations in a coupled or integrated manner. NETL is leading the way, with industry partners, to a new generation of simulation software capable of integrated solutions to this technology challenge. NETL's effort has resulted in the development of CCM, which has been incorporated in the NETL open-source multi-phase flow code MFIX (Multiphase Flow with Interphase eXchanges) (winner of a 2007 R&D 100 Award), and has been used in collaborative projects with end users. CCM is also being incorporated into a future version of the well-known commercial FLUENT computational fluid dynamics software. These developments have positively impacted not only the primary target, the fossil fuel industry, but also coal conversion R&D at universities and national labs.

A collaborative project between NETL and gasifier developers has resulted in CCM being used with MFIX for advanced gasifier design. NETL researchers have been using CCM to simulate the coal chemistry as part of an overall MFIX simulation of the transport gasifier at the Power Systems Development Facility, Wilsonville, Alabama, operated by Southern Company and Kellogg Brown & Root (KBR). The advanced transport gasifier is a promising process for use in high efficiency, low emission IGCC systems that can capture carbon for sequestration. The simulations convincingly showed the gasifier developers that the model does not merely reproduce what is already known, but provides insight into unobserved phenomena, which they could later experimentally verify. Also, CCM was used with MFIX to predict the expected gasifier behavior almost a year before certain design modifications were completed. KBR design engineers are using similar simulations to help in the design of a commercial-scale Clean Coal Power Iniative (CCPI) transport gasifier at Orlando, Florida. Technology transfer of CCM is also being done under a CRADA in collaboration with Fluent, a leading vendor of simulation software, leading to incorporation of CCM in the well-known (commercial) computational fluid dynamics code FLUENT.

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EXCELLENCE IN TECHNOLOGY TRANSFER

U.S. Army Medical Research Institute of Infectious Diseases

Identification of Small Molecule Inhibitors of Anthrax Lethal Factor

Dr. Sina Bavari

Anthrax has been the subject of intense interest because of its use as a biological weapon. The inhalation of anthrax spores is usually fatal if it is not properly diagnosed and treated with the antibiotics during the very early stages of infection.

Unfortunately, the antibiotics that we have today are not always effective, and therefore it has become necessary to formulate a new and more successful treatment for anthrax. To help in this cause and global concern, Microbiotix Inc. has teamed up with the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) and the National Institute of Health (NIH).

Under the direction of Dr. Sina Bavari, the technology's lead inventor and head of a combined virology and bacteriology lab within USAMRIID, a team of researchers began screening various compounds stored at the repository of the National Cancer Institute (NCI) to test them against anthrax. Compounds showing some potency against anthrax were then optimized, resulting in the new compound licensed by Microbiotix.

Microbiotix was awarded an exclusive license to develop and commercialize a small molecule that has inhibition activity, to prevent and treat anthrax poisoning. In 2001, five Americans died from anthrax inhaled from contaminated mail. This patent license agreement allows Microbiotix to take the early stage technology developed by Army and NIH scientists and contractors and to further fund and develop it. These additional developments can lead to various potential discoveries in helping to overcome not only anthrax poisoning, but also bacterial resistance overall. Due to the fact that the bacteria can build up resistance to antibiotics, it's a global concern to develop new treatments for bacteria infections as well.

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EXCELLENCE IN TECHNOLOGY TRANSFER

NASA Goddard Space Flight Center

SpaceWire Link-and-Switch Implementation

Mr. Glenn Rakow Mr. Omar Haddad Mr. Locksley Haynes

NASA Goddard Space Flight Center's SpaceWire link-and-switch is a local-area-network router implementation of the SpaceWire protocol that is specifically targeted to embedded low-power avionics applications requiring high reliability. The router enables high- and low-rate communication between avionics components. This significant advancement helps reduce the complexity of communication for satellite architecture applications and other space-flight systems while improving speed and reliability. Between 2006 and 2007, Goddard researchers and technology transfer personnel worked with four major U.S. aerospace companies to form Space Act Agreements (SAAs) that would enable them to integrate Goddard's router design into their existing and in-development products. One of the most significant of these efforts is an agreement with BAE Systems, providing the springboard for a new application-specific integrated circuit (ASIC) design for Goddard's router technology. By integrating the SpaceWire router functionality into BAE's computer board design, BAE's completed ASIC will benefit future NASA missions as well as other aerospace organizations by lowering the cost, required power, and number of parts needed to integrate the technology's functionality into space-based computer systems. In addition, NASA and other organizations will be able to purchase the SpaceWire ASIC at a much lower cost than would be required to develop it in house. The collaborative effort also has the potential to positively impact future NASA missions as well as the U.S. private aerospace industry by helping to further widespread use and acceptance of the international SpaceWire standard. Widespread acceptance of the SpaceWire protocol may enable more aerospace missions at lower cost, as aerospace organizations worldwide will be able to reuse components and avionics systems from one mission to the next rather than customizing avionics applications for each new mission. In turn, more exploration – and therefore more discovery – may be possible.

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EXCELLENCE IN TECHNOLOGY TRANSFER

National Institute of Standards and Technology (NIST)

Innovative Robotic Crane Improves Large Aircraft Maintenance Operations

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Mr. James S. Albus
Mr. David W. See Mr. Forrest Kelman Mr. Mark E. Cundiff

One of the harshest jobs in the Air Force's maintenance depots has been dramatically ameliorated by a revolutionary new robotic crane called RoboCrane which allows paint stripping ("de-paint") personnel to work around large aircraft from the relative safety and comfort of an enclosed cab suspended from the hangar ceiling. This technology transfer effort leveraged years of engineering research into robotic cranes performed by the National Institute of Standards and Technology (NIST), part of the U.S. Department of Commerce. The project was sponsored by the Air Force Research Laboratory (AFRL) and used cooperative research and development agreements with U.S. Technology Corporation to build and demonstrate an operational prototype — renamed the Aerial Multi-Axis Platform (AMP) — within a maintenance hangar at the Warner Robins Air Logistics Center (ALC).

Working closely with depot personnel, the project team identified requirements, tested critical components within hazardous dust-filled environments, and generated creative design solutions to apply research results. The RoboCrane/AMP prototype demonstrated dramatic process improvements which could transform the de-paint process around large aircraft. Since then, U.S. Technology Corporation has licensed the applicable patents from NIST and installed two production systems to support aircraft coating removal at Warner Robins. They are working on two more RoboCrane/AMP installations at Tinker ALC as well.

The RoboCrane/AMP is expected to significantly improve the working environment for maintenance personnel, and support additional tasks such as aircraft preparation, inspection, touch-up, and final cleaning. It creates a 40-50 percent reduction in the de-paint flow time of the aircraft, and over 70 percent reduction in operator stress/injury. When applied to the current Air Force workload of more than 200 aircraft per year, with an average cost for de-painting of $200,000 per aircraft, the RoboCrane/AMP has the potential to save the Air Force $8 million annually.

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EXCELLENCE IN TECHNOLOGY TRANSFER

Naval Surface Warfare Center Carderock Division

Threat Containment Unit

Mr. William H. Hoffman Mr. David T. Wilson Mr. Reeg Allen
Mr. Randy Markey

In March 2005, Mr. Reeg Allen, a consultant with FirstLink, the nation's first National Center of Excellence for First Responder Technologies, was reviewing patents in search of technology to support first responders when he came across an explosive containment device patented by the Navy in 2001. The Threat Containment Unit (TCU), as the device was called, had been developed by Naval Surface Warfare Center Carderock Division (NSWCCD) engineers Mr. David Wilson and Mr. William Hoffman in the late 1990s at the request of the FAA to contain and transport airport baggage suspected of carrying bombs or other explosives. It is an easily maneuverable, 72x34x48 in. steel vessel lined with polyurethane foam that fits through a 36-in.-wide door. While lightweight, it's built to handle a relatively large bomb. Although the project had been temporarily sidetracked by the events of 9/11 and the subsequent establishment of the Transportation Security Administration and its integration into the Department of Homeland Security, the technology had lost none of its vitality. In fact, the need for the TCU is greater today than ever before. Transferring this technology would not only make the country's airports safer, it would also save millions of dollars. With the TCU, when suspect baggage is identified by TSA personnel, it can quickly be loaded into the TCU and moved to a remote location where the local bomb squad can deal with it. The alternative is to shut down the airport, at an estimated cost of $15,000 per minute, and wait for the bomb squad. Mr. Allen contacted NSWCCD and Nabco, Inc., a leading manufacturer in explosion containment vessels. Both parties were interested in pursuing the transfer, and with the help of FirstLink, NSWCCD and Nabco were able to come to an agreement that met each party's needs. Nabco was granted a partially exclusive license in June 2006. Thanks to an innovative team effort, the TCU is now available to the more than 400 U.S. commercial hub airports as well as other civilian and military users, a multi-million dollar market. No other containment device on the market today combines the TCU's small footprint and high-explosive capacity, giving Nabco a

decisive competitive edge. Nabco's customer base includes more than 90 percent of the bomb squads in the country. This foundation and its global distribution channels ensure that the TCU will play a vital role in improving security in airport facilities all around the world.

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OUTSTANDING TECHNOLOGY TRANSFER PROFESSIONAL

Mr. Paul Fritz

Office of Research & Technology Applications
Naval Air Warfare Center Aircraft Division

1. Mr. Fritz is a Federal Technology Transfer Professional

Mr. Paul M. Fritz is the Office of Research and Technology Application (ORTA) and Team Leader at the Department of the Navy, Naval Air Warfare Center Aircraft Division (NAWCAD), Patuxent River, Maryland and has been responsible for the daily business operations of the Business Office since 2003. Mr. Fritz is a recognized leader in technology transfer and has been designated as the NAWCAD laboratory technology transfer representative to the Federal Laboratory Consortium (FLC), ORTA, and the Office of Naval Research (ONR). Leveraging his Navy career experiences as a Senior Chief Petty Officer, Mr. Fritz applied a unique skill set that he uses to enhance the effectiveness of the Technology Transfer (T2) program. Those who work with him state that he is always helpful, responsive, friendly, trusting, and committed to doing his best every day. Mr. Fritz believes that his successes in technology transfer are a result of outstanding team efforts within NAWCAD. Those who know him say that he leads by example.

2. Mr. Fritz Has Contributed to the Advancement of Technology Transfer within the Federal System

Prior to his assignment as Team Leader, team members had very little involvement in the transfer of Intellectual Properties (IP) to industry or other military installations. When Mr. Fritz became the Team Leader at NAWCAD, there was a substantial backlog of IP that needed review and evaluation. By reviving the Invention Evaluation Review Board (IEB), he was able to create a working board of senior leaders to help the Navy make sensible decisions about the allocation of limited funding for intellectual property protection by concentrating on those opportunities that might benefit the Navy and/or have commercial potential. He initiated a training program for inventors to help them understand how to preserve IP, fill out an invention disclosure, and market IP, and he continues to teach this course. Mr. Fritz was able early on to recognize good IP, find licensees for it, and bring money to the laboratory and his inventors. He not only "turned around the program," but in 2005 made it the second highest money earner in the Navy with royalties of $137,500. Since 2004, Mr. Fritz initiated 74 private party agreements worth over $24 million. In addition, he wrote 27 CRADAs and 17 PLAs. In FY2007 alone, Mr. Fritz has negotiated 8 CSA agreements worth $1,938,924; there are 11 CRADAs currently in progress. Forty-six active patents have been filed with US Patent and Trademark Office (USPTO) with three issuing within the past year. Nineteen new invention disclosures at NAWCAD are awaiting an IEB review.
Through his efforts, inventors at NAWCAD are motivated to protect their newly created IP and work with Paul to see it transitioned and transferred for the benefit of the military and civilian sectors. Mr. Tim Wittig, technology management advisor, states, "Paul's ability to motivate other people and keep them going has really made a difference at Pax River. Paul has a firm sense of how to lead people and his staff and his inventors go the extra mile for him." Mr. Fritz is personally involved in the protection of intellectual property, the operation of the Invention Evaluation Board, and the negotiation of CRADAs, CSAs and PLAs. More importantly, he works continually with the

chain of approval to move these agreements through the system is as little time as possible with the least impact as possible on the Navy scientists and engineers for whom he works.
Mr. Fritz has been a frequent speaker and trainer at National and Regional FLC meetings and Technology Transfer Integrated Planning Team (TTIPT) workshops and conducts training on technology transfer procedures and opportunities. An IP/T2 course taught by Mr. Fritz, entitled "Intellectual Property and Technology Transfer" is now mandatory for all new enrollees in the Engineer and Scientist Development Program (ESDP) within Naval Air Systems Command. The course covers T2 agreements, ethics, public information release, and other aspects of technology transfer. Mr. Fritz is a recognized expert in technology transfer training and in the development of cooperative agreements between the military and private sector.

3. Mr. Fritz Has Made a Significant Contribution to the Transfer of Federally Developed Technology

Mr. Fritz works proactively with companies to investigate opportunities for inventions developed at NAWCAD. He works collaboratively with TechLink, SpringBoard, FirstLink, TEDCO, and SAIC to promote NAWCAD's patent portfolio, develop business plans, and foster business relationships critical to the laboratory's technology commercialization efforts. Through his efforts, the Navy has successfully transitioned a patented air and harbor surface multi-sensor technology to more than a dozen military sites and is working with several states to bring utilization to the private sector. In the technology transfer of the anti-corrosion passivation coating TCP, Mr. Fritz worked closely with all those interested in manufacturing and selling the product and guided them and the Navy through the licensing process. All of the licenses have been renegotiated to add additional inventions and all Licensees are actively selling the product in the US and abroad. He has marketed and licensed a mold inhibiting product and is working with the EPA to get approval for a non-corrosive mold killing agent. He is particularly adept at using "World's Best Technologies Conference" and other technology expositions to showcase and license Navy technology and, while showcasing specific technologies, also makes available the "Technology Transfer, NAWCAD, Patent Portfolio" booklet describing over 50 commercially useful patents. Using this multi-pronged approach he has successfully licensed high efficiency nozzles for combating aircraft fires, environmentally friendly cleaners for removing mildew and preventing corrosion in aircraft, multi-sensors air and surface systems for improved harbor surveillance, and electronic systems to measure the health of helicopter blades while in flight. Mr. Fritz strives for the license where the inventions are being used in both the military and private sector, private sector investments drives the cost commercialization and the military and civilian users enjoy the benefit of competition among suppliers.

4. Mr. Fritz Has Demonstrated Outstanding Effort in Transferring a Specific Technology to the Private Sector for Widespread Consumer Use.

The development of the anti-corrosion passivation coating, TCP, is a NAWCAD invention that has extraordinary benefits for the military and the private sector. Naval aircraft experience the harshest possible environment for metal corrosion, since most are deployed on aircraft carriers where elevation changes from 60,000 feet to sea level consistently occur giving rise to continuous condensation on aircraft parts. The most widely used corrosion inhibitor, hexavalent-chromium (HC), is inexpensive, but has been proven to be toxic to heath and the environment. Researchers at NAWCAD developed TCP as a pretreatment coating to replace HC for military use; however the technology has vast market potential in the private sector as well. Like HC, TCP improves corrosion resistance and helps paint adhere. Mr. Fritz (working in collaboration with TechLink) developed an information package; marketed TCP widely to industry; identified and solicited over 100 potential

industrial partners in the U.S. and abroad; simplified a complex sample distribution procedure so that potential licensees could test the materials; established an system for evaluation of license offers; synchronized United States and international patent protection for 11 individual inventions; and coordinated licensing with the Navy approval chain. Mr. Fritz's successful transfer of this patented technology through Limited-Purpose CRADAs led to four domestic nonexclusive licenses and one exclusive global license issued in 2004 and 2005. The four licensees are in various stages of marketing TCP to consumers in the U.S., Canada, Mexico, and Europe. The licensees are Luster-On Products, Inc. (Aluminescent™, Tridescent™); Metalast International, Inc. (TCP-HF Seal™); Henkel Surface Technologies Corp.; and SurTec International GmbH. Automotive and aircraft manufacturers, computer and construction parts manufacturers, and other industries that use light metals are adopting TCP because of its excellent appearance, wear, low toxicity, and corrosion resistance. The USEPA, OSHA, and European regulatory bodies are targeting the elimination or reduction of HC coatings. Further, TCP is currently the only approved HC substitute that meets all military specifications for corrosion resistance. By recognizing the potential and orchestrating the patenting and technology transfer, Mr. Fritz's efforts have made an effective and environmentally friendly product available to Department of Defense and private sector markets throughout the world.

OUTSTANDING TECHNOLOGY TRANSFER PROFESSIONAL HONORABLE MENTION

Dr. Claudia Golenda

Office of Research and Technology Applications
US Army Medical Research & Materiel Command

The mission of the U.S. Army Medical Research and Materiel Command is to support the warfighter through research and the subsequent development of materiel. However, what is critical to the warfighter does not always have wide applicability to civilians, which creates a problem when trying to license and commercialize technology to be used on a broad scale. The development and commercialization of a new treatment for severe malaria is relevant for American soldiers, yet it is a rare disease for American civilians to encounter, and therefore will not be highly lucrative for companies looking to commercialize a new treatment for severe malaria.

Dr. Claudia Golenda, the Chief at the Office of Research and Technology Applications (ORTA) at the Walter Reed Army Institute of Research (WRAIR), has successfully written and coordinated a CRADA, with a pending exclusive patent license agreement, that involves private company Sigma Tau Pharmaceuticals, Inc. working towards producing an FDA licensed drug for the treatment of severe malaria utilizing the medicine Intravenous (IV) Artensunate.

In 2003 a malaria outbreak greatly affected US forces when 80 out of 220 marines deployed to Liberia contacted *falciparum* malaria. The Center for Disease Control reported in 2005 that two of the seven malaria deaths in the United States were due to the lack of availability of IV-quinidine (currently the only FDA-approved treatment for severe malaria, which also has serious life threatening side effects). Four to eight deaths occur annually in the US as a result of misdiagnosed or delayed treatment.

The goal of the three way CRADA between WRAIR, the U.S. Army Medical Materiel Development Activity (USAMMDA), and Sigma-Tau Pharmaceuticals, Inc. is to develop a USFDA-approved, affordable intravenous artemisinin derivative that will reduce mortality from severe malaria, with minimal risk for neurotoxicity. Having a treatment that is in an intravenous form (as opposed to the pill that is currently available) will have significant impact on children (who need to take the drug intravenously) and the vast majority of patients with severe malaria who are in a coma and can not take the pill form. Sigma Tau will support research at WRAIR with over 1.5 million dollars under the CRADA. Sigma-Tau has also submitted an application for an exclusive patent license agreement with the goal of commercializing the resulting severe malaria treatment in both the United States as well as other countries of the world. Once completed, it will be the first patent license for a malaria product.

Golenda, who has been the ORTA at WRAIR for over six years, had to overcome several obstacles in order to successfully orchestrate the cooperative research agreement. In the early stages of putting the CRADA in place, Golenda realized that the intellectual property to be associated with the agreement was the result of a contract between WRAIR and a private company. Dr. Golenda contacted the company and facilitated the assignment of rights to the US government. At this time Golenda discovered that the private company, while a US corporation, was an Italian company. At this point it was necessary to notify the Trade representative and obtain concurrence in order to enter into a CRADA with a foreign partner.

Another unusual aspect to this CRADA was the inclusion of USAMMDA. Golenda recognized that USAMMDA was the official representative of the US Army Surgeon General for the FDA Investigational New Drug Application. WRAIR had conducted several clinical trials, but only USAMMDA could officially turn over the clinical trial data to Sigma Tau. Having three parties involved in the CRADA required extensive coordination on Golenda's part.

Under the agreement, Sigma-Tau will be responsible for the commercial development and manufacturing of IV Artesunate once approved by the FDA. In March 2006, an Orphan-Drug designation was granted for IV Artesunate for the immediate treatment of malaria. Sigma-Tau plans to submit an application for FDA review in 2008.

Golenda's integral role in the Sigma-Tau agreement is just one of many successful partnerships she has facilitated. She developed and implemented procedures for evaluating CRADAs that allowed for a more efficient and effective flow. In addition she maintains superb budgeting practices, recovering as much costs as possible under all agreements. Traditionally, the Statement of Work on a CRADA was written very broadly – Dr. Golenda writes very narrow SOWs in order to ensure that inventions can be used with other CRADA partners, licensed out or utilized in other ways. The Sigma-Tau CRADA is an outstanding representative of implementation of all three of these factors that benefit both the warfighter and the civilian populations.