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State-Federal Partnerships Encouraged
Who's Who
Commercialization of 3-Defender
NAWCADPAX Computer Donation
Point Mugu Incubator
Partnerships through CRADA's
TEAM Patents in '95
Yearly T2 Prioritization
TEAM T2 Patent Licensing
Implementation of Knowledge-Based, Intelligent, Next-Generation Test Generator

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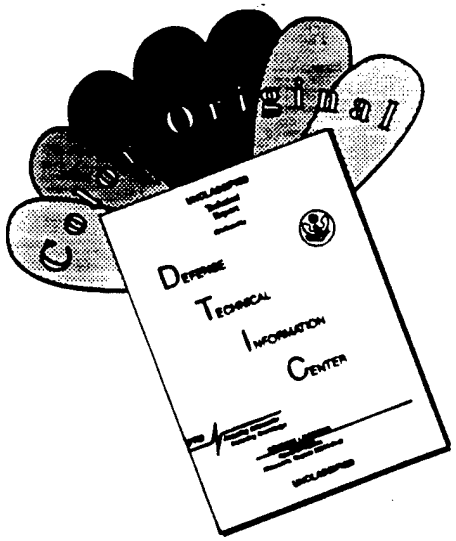

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NAVAL AVIATION SYSTEMS TEAM

TECHNOLOGY TRANSFER TODAY

Gaining the Competitive Edge

A Publication of Opportunities for Partnerships Between the Naval Aviation Systems TEAM and Industry Vol. 2, No. 1 Spring 1996

Dear Readers

Technology transfer adds a valuable dimension to government-sponsored research and development (R&D). It provides the tools for American industries to leverage the technologies developed at the Federal laboratories to bring new products to market. Both the Federal government and industry benefit from this process. Through commercialization of its technologies, the Federal government receives a much greater return on its huge R&D investment; industry gains a competitive edge by putting government-sponsored R&D activities and facilities to work for it.

Many industries today license the Federal government's patents. TEAM patents are no exception. As the patent base is expanding, so are opportunities for the corporate sector to develop an existing patent to enhance its commercial viability. A portion of the revenue earned is filtered to the inventor, as well as his or her laboratory; industry retains the remaining profit. For more information on the TEAM patents available for licensing or the patent licensing process, contact your local ORTA representative.

Russel G. Perkins

SQMB Formed to Strengthen NAVAIR Partnerships

A Naval Aviation Partnership Strategic Quality Management Board (SQMB) has recently been formed. Its mission is to form partnerships with other services, Navy components, industry, and academia to improve life-cycle effectiveness and affordability of Naval Aviation Systems Team's weapons systems, aircraft, airborne equipment, and support systems.

The SQMB is centered on three focused goals. The first of these goals is to develop partnerships to enable accomplishment of command themes, including readiness, reduced cost of doing business, recapitalization, and modernization. The second goal is to be recognized as the leader in (Naval) aviation technologies so that academia, industry, other services, and Federal agencies seek to partner with it. The third goal is to develop partnerships to enable accomplishment of the TEAM mission while supporting national objectives and strategies.

The SQMB is working with the Naval Air Warfare Center Training Systems Division (NAWCTSD), Orlando, Florida, to authorize use of "cooperative agreements." These are "in-kind" agreements with industry that allow sharing of research and development. The SQMB has also put together, in conjunction with NAWCTSD, a guide on how to partner with industry. The SQMB is comprised of the following members: Chairperson, Vice Commander, NAVAIR Brigadier General Joe Anderson (AIR-09); Air Antisubmarine Warfare and Assault Aircraft, PEO Mr. D. Czelusniak (PEO(A)); Cruise Missiles and Unmanned Air Vehicles, PEO RADM B. Strong (PEO(CU)); Tactical Aircraft, PEO RADM J. Cook (PEO(T)); Program Management, RADM G. Phillips (AIR-1.0); Contracts, CAPT R. Wood (AIR-2.0); Logistics, RADM W. Tinston (AIR-3.0); Research and Engineering, RADM W. Newman (AIR-4.0); Test and Evaluation, RADM D. McKinney (AIR-5.0); Industrial, RADM R. Smith (AIR-6.0); Corporate Operations, Mr. Ken Miller (AIR-7.0); Naval Inventory Control Point, RADM K. Lippert (NAVICP).

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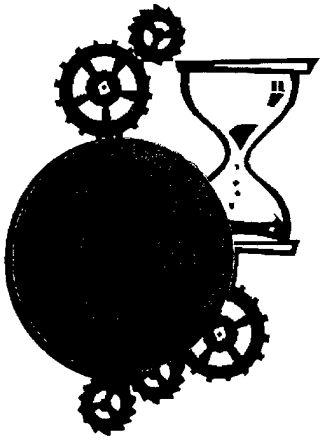


State Governments are Encouraged to Engage Federal Laboratories in Partnerships

The State-Federal Technology Partnership Task Force was recently formed to develop recommendations for the President regarding the Carnegie Commission report entitled, *Science, Technology and the States in America's Third Century* (1992). The goal of the task force is to make recommendations that lead Federal and state governments to take specific steps to improve the effectiveness and expand the benefits of the national science and technology system.

The task force developed a report that targeted research and drafting efforts into four primary working groups: Principles, Case Studies, Recommendations, and Implementation. Nine principles were found to be key in improving the national science and technology system. Three of these principles, shared ownership, broad participation/diversity of interests, and champions/advocates, were identified as overarching principles in the efforts. The remaining six were considered operational principles. These operational principles included partnership formalization, merit-based decisions, flexibility, cost-sharing, evaluation, and stability/long-term commitment.

In researching the national science and technology system, 11 case studies were conducted on past state-Federal partnerships. The task force found eight "successful" and three "unsuccessful" partnerships. The results of these case studies were determined by standardized assessments including goals and achievements, state and Federal partnership involved, mechanisms of partnership governance, and success principles used or neglected.

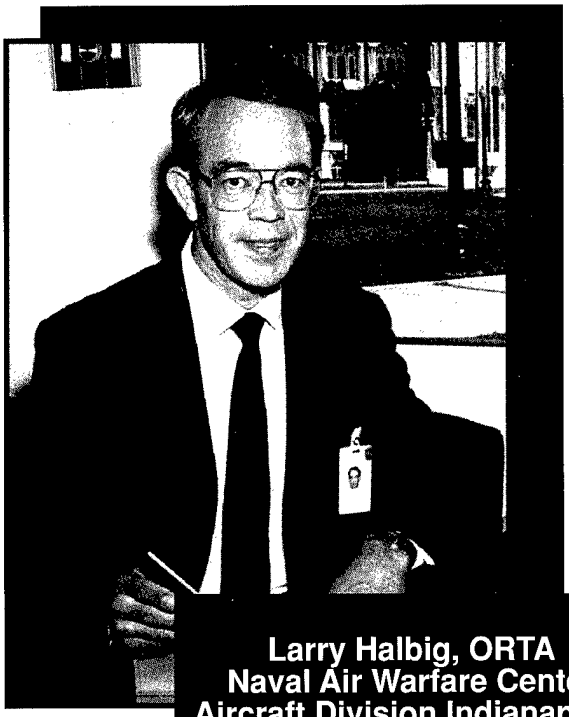
Through its research and case studies, the task force made four recommendations to the President. The first recommendation was to renew the national science and technology system, a critical step toward national growth. A joint-level state-Federal policy advisory mechanism should be developed to focus on the growth of science and technology. The task force also recommended building the role of the states in the national science and technology system. State governments, individually and collectively, should work to engage the Federal government in partnerships. The Indiana Business Modernization and Technology (BMT) Corporation, a national leader in state economic development, "is also a leader in establishing state-Federal partnerships," said Larry Halbig, Manager of the Technology Transfer Office at the Naval Air Warfare Center Aircraft Division Indianapolis (NAWCADIND). Working examples of these partnerships include: NASA - establishing an affiliation with Great Lakes Industrial Technology Center; Department of Defense (DOD) - establishing Indiana as the first state to be affiliated with the Wright Technology Network; and Department of Commerce (DOC) - developing National Institute of Standards and Technology (NIST) Manufacturing Program effort. "My office is currently developing an effort with the Indiana BMT to link their High-Impact Assessment Tools with the Navy's Best Manufacturing Practices (BMP) Program database," Halbig said. "Our state-Federal relationship has always been excellent. We were invited to contribute to the development of the highly successful Indiana BMT Regional Manufacturing Extension Center (RMEC) program. We have been looked upon as a valuable technical assistance resource for the RMEC field agents, contributed to the development of the state's science and technology strategy, and allowed engineers and scientists to participate in the BMT sponsored technical committees."

The second recommendation encouraged governors to establish state-unique science and technology strategies. Indiana has implemented such a strategic plan. The quantity of BMT's available programs is an indication of the state administration's support of this technology strategy. This recommendation also encouraged governors to create a gubernatorial-level mechanism to represent states at the highest national policy level on science and technology issues. The State-Federal Technology Partnership Task Force also recommended catalyzing private sector investments in technology, while the final recommendation was to build a national excellence-in-manufacturing initiative.

In order to implement these four recommendations, the task force called for tight Federal budgets for research and development (R&D), as well as tight industrial budgets for R&D. If industry interest in partnering with governments and universities increases, the recommendations will become a success. For more information on state-Federal partnerships, contact Larry Halbig, NAWCADIND, at (317) 306-3838.

WHO'S WHO IN NAVSTO TECH TRANSFER

Technology Transfer Today is proud to offer in each issue a biography of one of the champions of technology transfer throughout NAVSTO. Each quarter, a different technology transfer advocate will be highlighted, featuring his or her background as well as T² goals. This issue features Larry Halbig, Head of the Office of Research and Technology Applications (ORTA) at the Naval Air Warfare Center Aircraft Division Indianapolis.

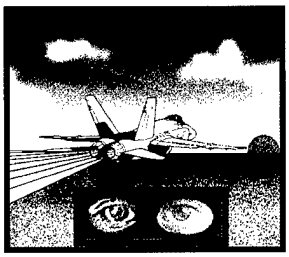


Larry Halbig, ORTA
Naval Air Warfare Center
Aircraft Division Indianapolis

Mr. Halbig is manager of the Naval Air Warfare Center Aircraft Division Indianapolis (NAWCADIND) Technology Transfer Office, which promotes and facilitates the transfer of Federal technology to state and local government, industry, academia, and other Federal agencies. Mr. Halbig represents NAWCADIND as manager of the Office of Research and Technology Applications (ORTA), Associate Director of the Navy's Best Manufacturing Practices (BMP) Program, Deputy Coordinator for the Federal Laboratory Consortium (FLC) Midwest Region, Patent Liaison, and Technology Transfer Advocate.

Mr. Halbig joined NAWCADIND in June 1965 and accumulated 31 years of total service, 22 years in the Manufacturing Technology Department and the past 9 years as the manager of the Technology Transfer Office. In this capacity, he has performed as an electronics test equipment design engineer, microelectronics process engineer, and the manufacturing computer hardware/operations manager. His specialties include conducting domestic technology transfer; identifying best practices; benchmarking U.S. Government/industry, producibility, defense conversion, partnerships, and technology assessment; and facilitating research and development transition to production.

Mr. Halbig is a member of the FLC and the Technology Transfer Society (T²S) and holds a Bachelor of Science degree in Electrical Engineering from the University of Evansville.



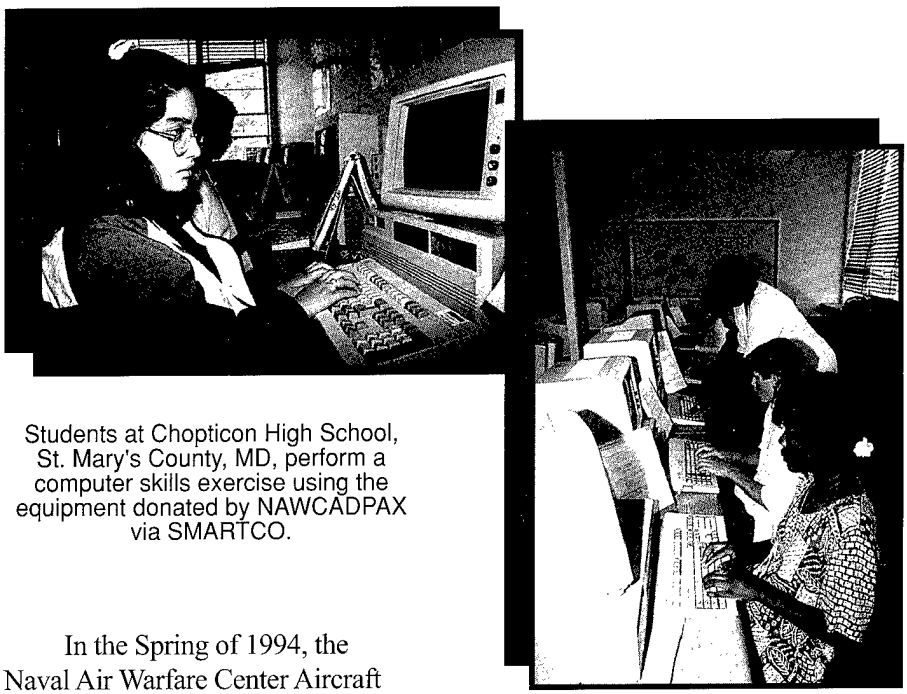
Commercialization of 3-Defender Firearms Training Systems

The Naval Air Warfare Center Training Systems Division (NAWCTSD) signed a cooperative agreement with ECI Systems and Engineering to commercialize the prototype 3-Defender interactive simulation training system.

The system itself is comprised of a large screen display featuring stereoscopic 3D projections, infrared control devices for synchronization of polarized glasses, and accurate and high-speed continuous weapon aim point tracking/scoring. Potential applications include shoot/no-shoot decision-making training for law enforcement, military operations other than war applications, and military security training.

The overall objective for this effort is to transition the current 3-Defender system into a production-quality, marketable product. Via the partnership, the following tasks will be performed: verification of system requirements; review of system design to use best available commercial items; modification or procurement of components to ensure a reliable design for production; identification and development of instructional features; and fine-tuning of the training session monitoring, recording, and feedback capabilities. For more information on the 3-Defender, contact Janet Weisenford, NAWCTSD, at (407) 380-9278.

NAWCADPAX Computer Donation Program Successful



Students at Chopticon High School, St. Mary's County, MD, perform a computer skills exercise using the equipment donated by NAWCADPAX via SMARTCO.

In the Spring of 1994, the Naval Air Warfare Center Aircraft Division Patuxent River (NAWCADPAX) entered into a Memorandum of Agreement (MOA) with the Southern Maryland Applied Research and Technology Consortium (SMARTCO) to implement the transfer of surplus computers to Southern Maryland elementary, junior, and high schools. Since then, SMARTCO has received approximately 1,000 computers (mainly 8086 and 286 processors) and printers from NAWCADPAX for repair and distribution. To date, about 600 computer systems and over 300 software packages have been placed in both public and private schools. Computer repair and distribution are provided by some 60 trained volunteers. The Government Surplus Computer Donation Program was made possible by Executive Order 12821 signed by President Bush, in 1992, and NAWCADPAX-SMARTCO implemented the first pilot program.

SMARTCO was organized in 1993 by the Southern Maryland Regional Technology Council (SMRTC) with a common Board of Directors for the primary purpose of technology development and transfer between Government and industry (domestic and foreign). SMARTCO has since brokered with several cooperative technology agreements, including development, test, and evaluation of the "Electric Wheel" invention and "PrepStar" technical education software. SMARTCO is currently investigating the feasibility of establishing an incubator in Southern Maryland.

The success of the NAWCADPAX-SMARTCO Computer Donation Program has been due to the donated resources from the following local businesses: Southern Maryland Electric Cooperative; SEMCOR, Inc.; Aldridge Ford; Wal-Mart Discount Stores; and the dedicated volunteers of Southern Maryland. For more information, contact Walt Kahle at (301) 342-6761.

Point Mugu Establishes Incubator

The Naval Air Warfare Center Weapons Division (NAWCWD) Point Mugu has extended its helping hand to young businesses in the Ventura County region by establishing a formal relationship with the Ventura County Business Incubator (VCBI). NAWCWD Point Mugu, the research, development, test, and evaluation operation resident on the air station, has been authorized by the Chief of Naval Research to enter into a Cooperative Research and Development Agreement (CRADA) with VCBI.

The CRADA is designed to foster the transfer of technology from Point Mugu to small businesses. All of the technologies at Point Mugu are candidates for transfer. Using the agreement as a mechanism, the Navy can provide its expert consulting services to any VCBI member company to help that company develop and market Navy technologies or, in fact, other company product lines. The Navy can also provide the use of its facilities to help VCBI companies in their product development or test efforts. All of the Navy consulting support can be provided at no cost to the entrepreneurial firms.

The businesses that will be accessing this important "defense conversion" resource will need to be members of VCBI, which is projected to open its doors in county-owned spaces at Camarillo Airport. Membership of these young firms can either entail actual residence in the incubator at the airport or "virtual" membership as a dues-paying member linked to the physical incubation operation by use of communication lines.

VCBI is a not-for-profit entity that has already been supported by Ventura County government. Initial use of the space required for its operations

(Continued on page 5)

Pace of Partnerships Through CRADA's Increases

As technology transfer via CRADA's becomes the norm rather than the exception, Technology Transfer Today is pleased to highlight approved CRADA's from various TEAM facilities throughout the country. This issue highlights CRADA's approved at NAWCAD Indianapolis and Warminster for the first quarter of 1996.

SONAR TECHNOLOGY

The Naval Air Warfare Center Aircraft Division Warminster (NAWCADWAR) recently signed an agreement with The Wild Dolphin Project to correlate and document the vocalizations and behaviors of dolphins based on extended observations made in a variety of natural situations, such as travel, feeding, etc. The nature of the work will include filming of the dolphins utilizing underwater video cameras while simultaneously recording their vocalizations utilizing hydrophones and recording equipment. Tracking at night will be aided by the use of a night vision scope. The work will be done by the staff of The Wild Dolphin Project. NAWCADWAR will lend high-frequency hydrophones and a night vision scope to the project at no cost. Magnetic tape recordings of the dolphin vocalizations will be made available to NAWCADWAR, at no cost, for its use in acoustic signal classification studies as required.

For more information, contact Angel Carreras, Jr., at (215) 441-1143.

RADAR SYSTEMS

The Naval Air Warfare Center Aircraft Division Warminster (NAWCADWAR) and the Antenna and Communications Research Laboratory (ARCLab) of Geneva College, Beaver Falls, Pennsylvania, recently signed an agreement to investigate modern radar systems and remote sensing components, subsystems, and techniques. NAWCADWAR is currently investigating and developing many state-of-the-art broadband sensors, microwave and lightwave components, and processing algorithms and techniques. It will supply (on loan for the duration of the CRADA) hardware and software, as well as technology direction in these areas. The ARCLab will supply research staff, students, and hardware and software laboratory facilities to investigate NAWCADWAR technology needs. Hardware and software components will be transferred from NAWCADWAR to the ARCLab for investigation. Data analysis, laboratory measurements, theoretical investigations, and analyses will be performed. NAWCADWAR will have full access to the results of such studies, while ARCLab will be able to train and give exposure to future engineers in many areas of Navy-sponsored research projects.

For more information, contact Angel Carreras, Jr., at (215) 441-1143.

TECHNOLOGY ACCESS SERVICES

The Naval Air Warfare Center Aircraft Division Indianapolis (NAWCADIND) and the National Electronics Manufacturing and Productivity Center (NEMPC) have signed an agreement to allow NAWCADIND participation in regional collaborative efforts, such as those of the Manufacturing Technology Center at Indianapolis (MTCI), which involve technology transfer projects.

The MTCI is a regional technical and educational alliance with participants from small, medium, and large companies, trade and labor organizations, and academia, as well as city/state/Federal governments. The mission of the MTCI is to stimulate the transition to an integrated manufacturing environment that can produce advanced defense/commercial systems, minimize delivery time and cost, and improve quality. This mission will be accomplished by transferring technology between government and industry, promoting dual use of products and technology, streamlining organizations by sharing needed resources, improving skill levels of the workforce, increasing the availability of skilled laborers, and using/sharing integrated electronic data.

It is expected that this CRADA will decrease product delivery times by improving technologies used, decreasing associated learning curve, and improving skills of the workforce, among others; decrease product cost by sharing resources that are of common need, but may be prohibitive for one company to justify and improving productivity with a more highly skilled workforce, among others; and improve product quality by allowing easier access to best manufacturing practices, sharing lessons learned, and raising the skill level of the workforce.

For more information, contact Larry Halbig at (317) 306-3838.

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Incubator

(Continued from page 4)

has been provided under a 5-year payback lease agreement from the County's Department of Airports. At the airport, offices and general business space are available for the incubator's management and the young companies that it will be supporting. These companies will have access to phones, data and video services, copy machines, faxes, and quality conference facilities.

As part of the "KNOWHOW" network, the incubator has, along with contributions of expertise from local business specialists, established another partnership with the California State University Institute wherein research, libraries, professorial expertise, and student project support will be made available to its entrepreneurs.

The U.S. Navy agreement with VCBI is valid for 3 years and can be continuously extended in 1-year increments. Navy CRADA administration and coordination are led by Dr. Mike Sullivan, who is Point Mugu's Technology Development Manager. VCBI's portion of the agreement is handled by VCBI's president, Wally Boeck.

For more information on the VCBI incubator, contact Dr. Mike Sullivan at (805) 989-9208.

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TEAM Has 39 Patents Approved in '95
Adds them to the Commercialization Portfolio

AIRCRAFT DIVISION

Polyurethane Self-Priming Topcoats
5,427,821

Lattice Core Sandwich Construction
5,424,113

Meniscus Regulator System
5,423,481

Helmet Head Tracking Mounting Device
5,416,922

System for Conveniently Providing Load Testing Termination of an AC Power Source Having at Least One Battery
5,418,922

Automatic Repeater Station for Signal Transmissions
5,408,681

Polyurethane Self-Priming Topcoats
5,403,880

Jack Mechanism Having Positive Stop Means for Its Crank Handle
5,402,984

Pressure Responsive Clasp
5,398,214

Underwater Acoustic Intensity Probe
5,392,258

Aircraft
355,157

Josephson Break Junction Thin Film Device
5,376,624

Trivalent Chromium Solutions for Sealing Anodized Aluminum
5,374,347

Apparent Size Passive Range Method
5,373,318

Thermoacoustic Sound Generator
5,369,625

Vibration Structural Component
5,368,914

Method of Measuring Liquid Level with a Thermal Interface Detection
5,367,175

Passive Range Measurement System
5,367,333

Simplified Reusable Sonobuoy Launcher
5,359,917

WEAPONS DIVISION

Photonic Electromagnetic Field Sensor for Use in a Missile
5,384,458

Wedge Feed System for Wideband Operation of Microstrip Antennas
5,389,782

Optically Powered Amplifier Used by an Electromagnetic Field Sensor to Amplify an Electrical Signal from an Antenna
5,389,782

Gas Projection Apparatus for Use in Preventing the Theft of an Automobile
5,415,246

Digital Audio Signal Processing Circuit
5,436,943

Gray Code Counter
5,448,606

Digital Circuit for the Introduction of Dither into an Analog Signal
5,448,237

Decoder Circuit for Generating a System Clock Signal Phase Locked to a Range Code Signal
5,450,136

Mounting Bracket for Global Positioning System Antenna
5,456,442

Circulation Enhancing Apparatus
5,458,562

Digital Circuit for Decoding Encoded Doppler Data
5,465,274

Aerosol Dispensing Apparatus for Dispensing a Medicated Vapor into the Lungs of a Patient
5,474,059

Multiple Stores Weapons Rail for Use with an Aircraft
5,476,238

Active Spray Rocket Propellant Ignition Controller
5,379,699

Scan Converter and Method
5,410,357

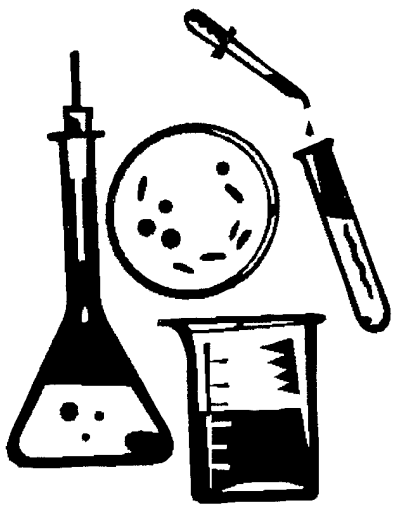
Method of Producing a Controller Fragmented Warhead Case
5,419,024

Bi-Refrigerant Waveguide Rotational Alignment Method Using White Light
5,422,713

Method and Apparatus for Active Control of Combustion Devices
5,428,951

System and Method for Database Tomography
5,440,481

Apparatus for Multiplexed Imaging Using Optically Generated Kronecker Products
5,454,048



Yearly Patent Prioritization Underway

The Office of Naval Research (ONR) has contacted its Navy laboratories to evaluate each of its FY96 expiring patents and rank them in order of commercialization potential. This prioritization will allow ONR to quickly determine which patent maintenance fees should be paid and which should expire.

In FY95, Navy laboratories had to solicit inputs from various factions in order to evaluate the commercial potential of the patents. Next, both the Office of Research and Technology Applications (ORTA) manager and the Navy installation's patent attorney provided their feedback on the commercialization options. Considering the patent inventor's input the most, inputs were weighed and a prioritization order was determined. The list was submitted to ONR, with a memo detailing related patents, as well as those currently involved in technology transfer agreements.

Navy sites received positive results in FY95 and hope for the same success in FY96. Success in patent prioritization will enable a greater pool from which to draw technology transfer efforts. This can only mean increased success for the public and private sectors as it will ensure that the transfer of technology continues on its escalating pace.

TEAM T^2 Patent Licensing Agreements

Research performed at the Naval Aviation Systems Team (TEAM) frequently produces patented, innovative discoveries of commercial value. These patents are available for licensing to the private sector. Each licensing agreement is individually negotiated between representatives from the laboratory and the prospective licensee. Licensees may be exclusive or nonexclusive. If owners of a small or disadvantaged business, you may be eligible for certain preferences and benefits.

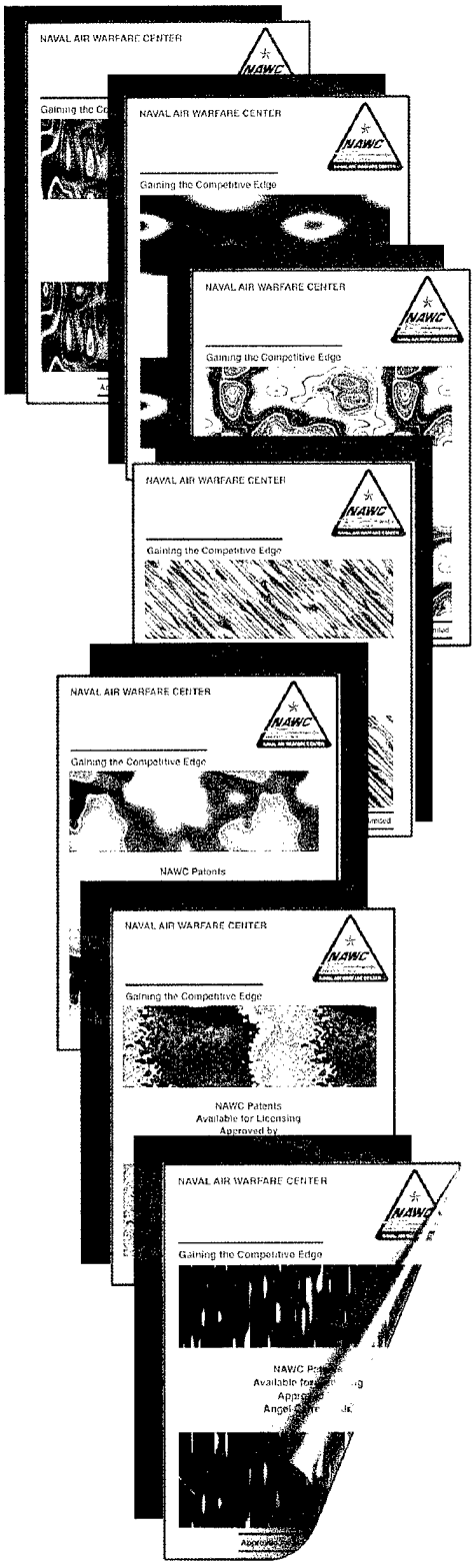
Royalties may be received from the licensing of Navy patents. The law requires that the inventor receive 15% of any royalties from a license; however, the Navy provision is 20% of royalties, up to $100,000 per year, per person. The remaining moneys are donated back to the inventor's laboratory.

Currently, the TEAM's portfolio includes numerous patents in areas such as aerospace engineering, corrosion, data acquisition and processing, electronic devices, electro-optical and optical, general, human factors, materials, mechanical, sensors, training devices, and simulation.

Approximately 30 to 40 new patents are added to this portfolio annually. A complete list of all TEAM patents is available in the Naval Aviation Science and Technology Office (NAVSTO) Patents Available for Licensing.

As a licensing partner, companies will need to have a plan for commercializing the invention. The plan should include technical goals for developing the product, the level of investment planned, and a timeframe for introducing the product to the marketplace. Because the TEAM is dedicated to improving the position of the United States in world markets, it requires that the products of NAVSTO licensees be manufactured substantially in the United States.

For more information or to obtain a copy of the NAVSTO Patents Available for Licensing, contact Angel Carreras, Jr., NAWCADWAR, at (215) 441-1978 (FAX).



Send materials for inclusion in future newsletters to:
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Implementation of Knowledge-Based, Intelligent, Next-Generation Test Generator Using Neural Networks

The Naval Air Warfare Center Aircraft Division Lakehurst (NAWCADLKE) recently conducted tests on implementation of a knowledge-based, intelligent, next-generation test generator using neural networks. This work investigated the use of neural network technology to stimulate faults and to generate output patterns used to diagnose electronic circuits via pattern classification. Among the circuits studied were digital, analog, hybrid (digital-analog), RF, and microwave.

The study focused on digital circuits while maintaining the posture of considering other types in the future with similar methodologies. The main focus was to model components using back-propagation algorithms and to classify patterns using the adaptive resonance theory (ART) neural network algorithm. In addition, a recursive methodology was established to generate input patterns required for the recognition scheme.

A report entitled, "Implementation of Knowledge Based Intelligent Next Generation Test Generator Using Neural Networks," was released to summarize the results of the tests. Authors Steven Singer and Mark Husni summarized the results of an experiment developed to demonstrate ART and back-propagation neural networks for electronic diagnostics (fault isolation and circuit verification). The basic approach was to develop equivalent neural network models of digital components (for this experiment, components refer to primitive logic operations (i.e., and, nand, nor, or)). The models included an ambiguity value of -1 for a special case fault that is generated in a circuit due to a broken pin or a lead. The component equivalents were wired together in software, and faults were injected and stored as new models. Thus, models of good and faulty circuits were developed.

ART was used to classify (input/output) patterns for good and defective circuit types. The models were used to generate the patterns. The ART provided recognition once trained with patterns classified according to the known condition of the circuit in question.

The input patterns were generated by two methods: a recursive algorithm that takes advantage of the circuit models and a program called HITS (Hierarchical Integrated Testing Software, a software for developing test program sets).

For more information, contact Pete O'Donnell, NAWCADLKE, at (908) 323-7566.

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