

APPENDICES

A. Selected Army PLAs

PLA Number	PLA Title
A1	Nonexclusive License with Kessler Soils Engineering
A2	Exclusive License with Baird and Associates
A3	Nonexclusive License with Rheinmetall Industries AG
A4	Nonexclusive License with Pharmacia & Upjohn Company
A5	Exclusive License with Paratek Microwave, Inc.
A6	Exclusive License with New England Ropes

A1

PLA Title: Nonexclusive License with Kessler Soils Engineering

Patent Title: U.S. 5313825 Dual Mass Dynamic Cone Penetrometer

DoD Organization: U.S. Army Engineer Research and Development Center (ERDC)

Inventor POC: Steve Webster

Licensee: Kessler Soils Engineering

Licensee POC: Mr. Ken Kessler

Date of License: March 7, 1996

Type of License: Nonexclusive

Summary

The Dual Mass Dynamic Cone Penetrometer is a soil test device that measures the strength profile of pavement (strength with depth profile).

Kessler Soils Engineering learned about the technology on a visit to U.S. Army Engineer Research and Development Center (ERDC) for another reason. The licensee saw the technology and immediately thought of some civilian applications for which it would be useful. Once Kessler Soils contacted the inventor, he forwarded the information on the potential licensee to his ORTA. Having the ability to work directly with the inventor was very attractive to the licensee. Currently, Kessler Soils has a CRADA with ERDC to continue research in this area. If a new technology is discovered while working under the CRADA, although ERDC will keep the patent rights, Kessler Soils will be able to obtain an exclusive license on the patented technology.

Typically when one wants to measure the strength of soil, a sample equivalent to a six inch section of the area is taken and sent to a lab for analysis. The time it takes to receive results is between seven and ten days at a cost of between \$300 and \$1000 per sample. With the Dual Mass Dynamic Cone Penetrometer technology, a rod is used to take a sample ten meters deep and results are received within ten minutes.

Value/Benefits to DoD

The Dual Mass Dynamic Cone Penetrometer technology has been sold to the Air Force and Navy engineers to evaluate pavement supporting military operations. It was used in Bosnia, Somalia, and Kosovo. In addition, the technology has also been sold to 24 states for use in pavement evaluation.

The license involves royalties of a yearly fee plus commission for non-government sales. Kessler Soils Engineering pays either \$1000 or 5% of sales in royalties per year, whichever is greater.

Benefits to Licensee

Kessler Soils Engineering is a small business with two full-time and 11 part-time employees. Kessler makes approximately \$125K by selling the technology. Once the American Society for Testing and Materials (ASTM) approves the technology's use, business and competition is expected to increase.

A2

PLA Title: Exclusive License with Baird and Associates

Patent Title: Foreign Patent: Concrete Armor Unit to Protect Coastal and Hydraulic Structures and Shorelines

DoD Organization: U.S. Army Engineer Research and Development Center (ERDC)

Inventor POC: Mr. Jeff Melby and Mr. George Turk

Licensee: Baird and Associates

Licensee POC: Mr. David Werren

Date of License: August 16, 2000

Type of License: Exclusive for a particular territory

Summary

Engineers at ERDC developed CORE-LOC, an innovative coastal protection armor unit. The patented technology is actually the shape of the concrete blocks that are used for breakwaters. CORE-LOC has several advantages over its competitors. A CORE-LOC armor layer has outstanding interlocking features and is extraordinarily efficient, dissipating the maximum amount of wave energy with the least amount of concrete, therefore requiring significantly less material than existing armor units. It also has a reserve stability that other structures do not have.

Baird and Associates have an exclusive license for patents and patent applications for CORE-LOC with ERDC for a particular territory that includes Oman, Saudi Arabia, Egypt, Kuwait, Jamaica, Australia, and New Zealand. Baird is an engineering consulting firm that sublicenses the technology to contractors in these various countries who actually build the concrete structures. Although Baird acts as a middleman, they are responsible for the quality of the CORE-LOC structures. The sublicensee pays a royalty to Baird per cubic meter and Baird in turn pays 50 percent of the "net royalty" to ERDC. The "net royalty" is the remaining sum after expenses related to design work are subtracted. This particular royalty payment arrangement is something that was negotiated for this particular license.

Baird learned about the CORE-LOC technology through a Commerce Business Daily (CBD) advertisement. By the time they learned about the technology, it had already been available for licensing for a year. They acted quickly to license the technology for the remaining territories. The relationship began under a CRADA from which they negotiated the license.

Although the Army Corps of Engineers is unique to DoD in that it services both civilian and military needs, CORE-LOC is a good example of a dual-use technology resulting from research that serves both the civilian and military sectors. Knowledge gained in wave prediction phenomena was applied in the development of CORE-LOC which is used in civilian breakwater applications.

Value/Benefits to DoD

According to the licensee, the royalties Baird paid for the year 2000 are approximately \$100K. The royalties allow funds to flow back to the agency known for its worldwide expertise to further research that may not otherwise be conducted. Each time ERDC works with an engineering firm to provide a specific design for a particular application of CORE-LOC, knowledge is gained that can be applied to future designs. ERDC developed the technology and continues to develop it.

The early support for CORE-LOC has developed into an active foreign market. With projected royalties of \$2.00 to \$5.00 per metric ton, a single half-mile long breakwater built with 12 ton armor units could result in royalties of over \$1/2-million. Each CORE-LOC unit weighs about 2 tons requiring these units to be built on site. Therefore, patent applications have been filed in over 40 countries and trademark applications filed in many others. The CORE-LOC concrete armor unit is now licensed to four companies, each having an assigned geographic territory. These territories include Europe and South America, North America, Japan, and South Africa. In the near future, annual royalties could easily exceed \$1 million.

Benefits to Licensee

The license for CORE-LOC expanded Baird's traditional business areas. As a design firm, Baird could specify and recommend the use of CORE-LOC. However, now with the licensing arrangement in place, Baird can provide a full range of services associated with CORE-LOC.

A3

PLA Title: Nonexclusive License with Rheinmetall Industries AG

Patent Title: U.S. 5328130 Stabilizer for a Cannon Projectile

DoD Organization: U.S. Army Armament Research, Development and Engineering Center (ARDEC)

Inventor POC: Stewart Gilman and Anthony Farina

Licensee: Rheinmetall Industries AG

Licensee POC: Not available

Date of License: April 26, 1996

Type of License: Nonexclusive

Summary

In 1983, U.S. Army Armament Research, Development and Engineering Center purchased a technology data package from Rheinmetall Industries. The data package involved a 120mm gun system, including ammunition that was used to upgrade the M1 tank to the M1A1 (now M1A2). As part of the agreement in purchasing the data package, any updates or advance to the technology had to be disclosed to Rheinmetall. In July 1994, the patent for the stabilizer for a cannon projectile was awarded to Army which was based on the earlier tech data package purchased from Rheinmetall. The patented stabilizer technology, Cartridge TP-T, M831A1, is used on the 120mm M831 A1 High Explosive Anti-Tank Training Projectile with Tracer.

Approving the patenting of the cannon projectile stabilizer technology took almost two years. Once the patent was awarded, two U.S. companies, Primex and Alliant, licensed the technology and began manufacturing the TP-T M831A1 based on the new technology. Since the patented technology stemmed from an improvement to the original Rheinmetall data package, DoD had to disclose the improvement to Rheinmetall. Rheinmetall, in turn, was entitled to a portion of the royalties resulting from the sale of the stabilizer. However, since an agreement had not been reached on the breakdown of royalty entitlements to the parties involved, the two U.S. companies placed their royalty payments in an escrow account until an agreement had been reached.

In 1997, a nonexclusive agreement was signed between DoD and Rheinmetall; however, Rheinmetall decided not to manufacture the Cartridge, TP-T M831A1 due to the expense involved in making the necessary changes to their existing manufacturing process. The two U.S. companies, Primex and Alliant, continued to produce the munitions for both domestic and foreign sale.

Marketing of this particular patent was unusual in that the patented technology, the Cartridge TP-T M831A1, was licensed back to Rheinmetall. The technology had to be disclosed Rheinmetall based on the earlier 1983 agreement.

In 2000, an agreement was reached where the two U.S. companies could not sell to certain European countries, but rather Rheinmetall would have an exclusive agreement to sell to those specific countries. Since Rheinmetall does not manufacture the improved stabilizer technology, the two U.S. companies sell to Rheinmetall who, in turn, sells the munitions to the specific European countries.

The licensing fees and royalty stream for the patent technology is complex. The DoD was initially paying Rheinmetall royalties consisting of five percent of sales of the original technology based on the technology data package. It was then decided that five percent of sales of the new patented technology would be paid out in royalties with half going to Rheinmetall and half going to DoD. Initially, Primex and Alliant paid DoD royalties, consisting of two and a half percent, on the sale of the new patented technology. When a nonexclusive license was negotiated with Rheinmetall in 1997, both DoD and Rheinmetall were paid royalties by Primex and Alliant amounting to two and a half percent respectively. Since Rheinmetall has an exclusive license for foreign military sales in select European countries, Rheinmetall pays the U.S. royalties of two and a half percent plus a flat fee per year.

ARDEC has received over \$500,000 in royalties to date. After inventors are paid, the remaining royalty income goes to support R&D or technology transfer activities. The royalty breakdown includes two and a half percent of the royalties going to Rheinmetall while two and a half percent goes back to the DoD laboratory and is placed in a fund designated for technology transfer activities.

Value/Benefits to DoD

DoD receives royalty income from the sale of the cartridge TP-T M831A1 round. The military benefits from improved munitions based on the patent for a stabilizer for a cannon projectile.

Benefits to Licensee

Rheinmetall receives royalties for the sale of the TP-T M831A1 round. Rheinmetall has an income stream through both the exclusive and nonexclusive licenses while not having to manufacture the munitions.

A4

PLA Title: Nonexclusive License with Pharmacia & Upjohn Company

Patent Titles: U.S. 5059349 Method of Measuring the Efficiency of Gas Mask Filters Using Monodispersed Aerosols; U.S. 5059352 Method for the Generation of Monodispersed Aerosols for Filter Testing; and U.S. 5076965 Method of Generating Monodispersed Aerosols for Non-Destructive Gas Mask Filter Testing

DoD Organization: U.S. Army Soldier Biological Chemical Command

Inventor POC: Mr. Mark Guelta

Licensee: Pharmacia & Upjohn Company

Licensee POC: Mr. David Mulder

Date of License: July 8, 1997

Type of License: Nonexclusive

Summary

The Pharmacia & Upjohn Company were looking for a replacement filter test solution to the suspected carcinogen Di(2-ethylhexyl) phthalate, DOP, for use in certifying their laboratory High Efficiency Particulate Air (HEPA) filters. The liquid is atomized and used to challenge cleanroom collective protective systems. These filters are used internally in Upjohn's sterile facilities where they do not want any particulates coming in from the outside or particulates going out from the inside. These filters are certified on an annual basis.

In searching for a replacement solution, Upjohn decided that Emery 3004 (a brand name for poly-alpha olefin solution) was the preferred solution for use in their filter certification process. Upjohn was informed that the Army had a patent for the use of Emery 3004 as a replacement for DOP in particulate filter testing. After contacting the inventors, Upjohn complied with the requirements and obtained a nonexclusive license from the Army. Since this license does not involve commercializing a product, Upjohn paid a one-time up-front licensing fee. Upjohn and their contractors are authorized to use this solution in testing the filters in their onsite sterile facilities.

There was no need for a follow-on working arrangement with the inventors in this case, for their license involved using a substitute liquid for a filter testing process that the licensee was already familiar with.

Value/Benefits to DoD

In addition to the one-time up-front licensing fee, DoD benefits from using the Emery 3004 to certify cleanrooms in Federal Government laboratories.

Benefits to Licensee

Using the Emery 3004 in the filter testing process provides Upjohn with a means to meet environmental standards for their sterile facilities.

A5

PLA Title: Exclusive License with Paratek Microwave, Inc.

Patent Titles: U.S. 5334958 Microwave Ferroelectric Phase Shifters and Methods for Fabricating the Same; U.S. 5427988 Ceramic Ferroelectric Composite Material - BSTO-MgO; U.S. 5635434 Ceramic Ferroelectric Composite Material - BSTO-Magnesium Based Compound; U.S. 5680141 Temperature Calibration System for a Ferroelectric Phase Shifting Array Antenna; U.S. 5830591 Multilayered Ferroelectric Composite Waveguides; U.S. 6071555 Ferroelectric Thin Film Composites Made by Metalorganic Decomposition; U.S. 6063719 Ceramic Ferrite/Ferroelectric Composite Material; and U.S. 6074971 Ceramic Ferroelectric Composite Materials with Enhanced Electronic Properties BSTO-Mg Based Compound-Rare Earth Oxide

DoD Organization: U.S. Army Research Laboratory (ARL)

Inventor POC: Dr. Louise Sengupta (formerly with the U.S. Army Research Laboratory)

Licensee: Paratek Microwave, Inc.

Licensee POC: Dr. Louise Sengupta

Date of License: October 1999

Type of License: Exclusive

Summary

While at the U.S. Army Research Laboratory (ARL), Louise Sengupta led a team of scientists in developing a new ferroelectric ceramic material. Using the new material, the team designed low-cost, tunable scanning antennas for satellite communications, voltage tunable filters and devices, and ultra-fast scanning phase shifters. After working eight years as a scientist for the ARL developing missile-tracking antennas, Louise Sengupta left the Government laboratory and started her own company, Paratek Microwave, Inc. Louise and three other team members left ARL to create a new company, raise venture capital, and exclusively license the technology they developed for the Army. The license agreement covers a total of eight patents.

Paratek Microwave, Inc. is a privately held company established to develop, manufacture and commercialize electronically tunable RF (ETRF™) components and electronically scanning antennas for the wireless telecommunications industry. Paratek's mission is to incorporate ETRF™ components and electronically scanning antennas into all broadband wireless communication systems.

Paratek's ETRF™ product lines consist of tunable filters, diplexers, phase shifters, and delay lines. All of Paratek's products are enabled by a family of Parascan™ materials, with attractive properties such as low-loss, high Q, high tunability, linearity over a wide range of input power levels, and high third-order intermodulation (IP3). ETRF™ offers lower total cost of ownership through the implementation of embedded software controls.

The new tunable ceramic material will be used in microwave cell towers to increase the range of each tower and in better tunable filters which will remove noise from multiple channels in a cell phone and other communication systems. This material will also reduce, by at least an order of magnitude, the cost of low earth orbit satellite antennas for home use.

Value/Benefits to DoD

To date DoD has received a one-time up-front license application fee. However, they will receive royalties once products are sold.

The patented materials and devices will result in lower cost and lower weight phase shifters and phased array systems than exist today. Military uses include target acquisition radars for defensive and offensive missiles, artillery rounds, counter-battery systems, and secure communications. Paratek is currently field testing a number of products. One family of electronically scanning antennas that will be introduced in the near future will be 2-D scanning antennas for satellite communication ground terminals.

Paratek's commitment to private funding has advanced technology of vital importance to the military that will lead to the rapid commercialization of needed technology.

Benefits to Licensee

Paratek will be introducing its first family of electronically scanning antennas based on the licensed DoD technology. This first family of antennas includes a 1-D scanning antenna for the cellular, personal communication systems (PCS), multipart microwave distribution systems (MMDS) and local microwave distribution systems (LMDS) industries.

In licensing the patented technology from ARL, Paratek was able to benefit from the development of the technology. Being a small business, Paratek could not have invested the money necessary to mature the technology to its level at the time of licensing. Paratek was able to obtain something that took time to craft. Company funds now go into building products to generate revenue for the company. Paratek has recently received its third round of venture capital and has grown from a four person company to one with over 90 employees.

A6

PLA Title: Exclusive License with New England Ropes

Patent Titles: U.S. 5868219 Rappel Rope Storage System and U.S. 5857540 Harness for Human Wear

DoD Organization: U.S. Army Soldier Systems Center (Natick)

Inventor POC: James Sadeck

Licensee: New England Ropes

Licensee POC: William Fronzagalia

Date of License: July 1998

Type of License: Exclusive

Summary

The Rappel Rope Storage and Deployment System is used in rappelling soldiers and consists of two patented technologies. The Army issued a requirement for a smaller diameter, stronger rope and new rope pack. A new rope and storage system was developed and patented by the Army to meet this new requirement. The Rappel Rope Storage and Deployment system is combined with the Harness for Human Wear to create a Micro Rappel System.

Natick worked with the New England Ropes company to manufacture the small diameter rope needed for the rappel system. New England Ropes planned to manufacture the rope for the rappel system to the Army and the general public. The soldiers in the field were interested in this device, so a user had been secured.

New England Ropes developed the items to the Army's specifications with both New England Ropes and the Army investing resources into the effort. Although the Rappel Rope Storage Deployment system was completed to the Army's specifications, the soldiers in the field decided against adopting it. Consequently, neither the Rappel Rope Storage Deployment System nor the Harness for Human Wear were procured by the Army.

Although the products were never procured by the military, New England Ropes intended to sell the products to the general public. Unfortunately similar items were available commercially at lower cost, making the micro rappel system undesirable in the commercial sector.

Value/Benefits to DoD

According to the licensee, DoD benefits from the licensing fees negotiated for the patents which include a \$2,000 per year flat fee or a percentage of the sales, depending on which amount is higher.

The Rappel Rope Storage and Deployment System uses a smaller diameter, stronger rope than previous rappel systems and meets a new Army requirement.

Benefits to Licensee

New England Ropes could benefit financially if the Army adopts the Micro Rappel System sometime in the future. Other potential users of this technology include fire departments and search and rescue teams to aid in rappelling natural obstacles (cliff, ledge) and man made obstacles (building, bridge).

B. Selected Navy PLAs

PLA Number	PLA Title
N1	Nonexclusive License with Nova Engineering, Inc.
N2	Nonexclusive License with Keopsys
N3	Nonexclusive License with Microphase Corporation
N4	Nonexclusive License with Moldex
N5	Partially-Exclusive License with Lake Shore Cryotronics, Inc

N1

PLA Title: Nonexclusive License with Nova Engineering, Inc.

Patent Titles: U.S. Application Serial Number: 09/266,868 Adaptive Routing Method for a Dynamic Network and U.S. Application Serial Number: 09/513,245 A Method for Eliminating Synchronized Clocks in Distributed Routing Methods that are Dependent on Temporal Ordering of Events.

DoD Organization: U.S. Naval Research Laboratory (NRL)

Inventor POC: Mr. Vincent Park

Licensee: Nova Engineering, Inc.

Licensee POC: Mr. Don Boyd

Date of License: August 2000

Type of License: Nonexclusive

Summary

Nova Engineering is a digital and wireless communication systems company that designs, develops and manufactures high-speed data processing and transmission equipment. Nova Engineering licensed a suite of two patents centered around a technology called Temporally-Ordered Routing Algorithm (TORA). Traditional routing algorithms used in networks today are designed for operation in relatively static hardwired networks and are not well suited for use in emerging mobile wireless networks. TORA is a novel approach to routing that is tailored for use in dynamic wireless networks.

TORA possesses the essential aspects of traditional approaches, but also possesses unique attributes that make it better suited for use in the more dynamic and bandwidth-constrained wireless networks needed to support an increasingly mobile society. The protocol is designed to minimize communication overhead, therefore preserving the precious bandwidth and resources of wireless systems. TORA establishes a multipath routing structure to improve robustness and reduce the frequency of protocol reactions to network dynamics. When protocol reaction is required, it is designed to adapt efficiently and converge quickly.

As a result of the working relationship between the University of Maryland (UMD) and the U.S. Naval Research Laboratory (NRL) and a prior working relationship between NRL and Nova from earlier work on network voice applications, Mr. Park was able to prompt license negotiations between NRL and Nova Engineering. He assisted in writing two patent applications, the first of which was submitted by UMD and the second by NRL. The NRL Office of Technology Transfer then negotiated a formal nonexclusive license agreement with Nova Engineering. NRL included UMD in the negotiations and the license agreement. Mr. Park helped Nova with transferring the technology on his own time.

Nova Engineering is a small business with about 60 employees. Negotiating a licensing deal with DoD was a new experience for Nova. Nova was a bit intimidated at first for they did not think that they would be on equal footing; however, that turned out not to be the case. Nova was able to negotiate a lower up-front fee in exchange for higher royalty payments on products sold. Being a small business, this arrangement offered lower risk.

Nova invested money and human resources to transition the TORA technology into a product, the NovaRoam 9000, which is a wireless router that provides a new type of networking. The Nova Roam 9000 is used to connect computers and exchange data in a wireless environment

Since the TORA routing algorithm essentially provides for a new capability, it is difficult to quantify the potential benefits. Extending these capabilities to previously unreachable areas or users has the potential for a significant impact on industry and the public. Public health could be impacted by providing timely and important information to emergency workers on the move, in remote areas, or providing disaster relief. Transportation services could benefit by improving communications and networking services to travelers, or by increasing the timeliness or availability of traffic/weather information to pilots/drivers. Delivery services could also benefit by increasing the availability of tracking information or facilitating more dynamic re-routing of packages during transit.

Value/Benefits to DoD

NRL as well as UMD are entitled to royalties from the license. In addition, militarily relevant technology was successfully transitioned to a COTS product, the NovaRoam 9000. Edwards Air Force Base recently procured a small quantity of the NovaRoam 9000.

TORA is an enabling technology for the development of mobile wireless networks. It facilitates the deployment and use of computer and communication networks in new environments and for new applications where networking was previously not possible. The range of potential applications includes disaster mobilization, emergency connectivity, fleet management, data acquisition/monitoring in remote or high-risk environments, forward-deployed military operations, and factory automation.

Value to Licensee

The NovaRoam 9000, based on TORA technology, is now commercially available from Nova Engineering for military as well as commercial markets. This product will allow the rapid deployment of mobile networks capable of supporting Internet-type services with little or no preexisting infrastructure. Nova Engineering realizes profits from the sale of NovaRoam 9000 and will realize additional profits from the sale of future products containing the TORA technology.

N2

PLA Title: Nonexclusive License with Keopsys

Patent Title: U.S. 5854865 Method and Apparatus for Side Pumping an Optical Fiber

DoD Organization: U.S. Naval Research Laboratory (NRL)

Inventor POC: Mr. Lew Goldberg

Licensee: Keopsys (subsidiary of Optocom Innovation)

Licensee POC: Mr. Lew Goldberg

Date of License: December 9, 1999

Type of License: Nonexclusive

Summary

Single mode fiber amplifiers are one of the key elements in fiberoptic communication systems operating at a wavelength of 1.5 μm . To achieve optical gain, the single mode core of the amplifier fiber is doped with rare earth elements such as Er or Er/Yb, and pump light is introduced into the core to cause stimulated amplification of the weak input signal. Amplifiers with near-ideal gain and noise characteristics are currently in system use. Fiber amplifiers are, however, relatively expensive and the maximum power generated is relatively low, typically less than 100 mW. These drawbacks are a consequence of the fact that the single mode fibers require diffraction limited pump lasers in the form of single mode pigtailed laser diodes. Single mode laser diodes are characterized by low output power and are relatively high cost.

The U.S. Naval Research Laboratory (NRL) demonstrated a simple technique for side-pumping fiber amplifiers using low cost and high power laser diode arrays. Side pumping is carried out through the use of imbedded V-grooves fabricated directly into the fiber side-wall. The method can be used to generate high power 1.5 μm emission, as well as other wavelengths, such as 1 μm or 2.0 μm , corresponding to different core dopants.

Side pumped fiber amplifiers have several important advantages over conventional devices: 1) the technique allows the use of large active area, high power laser diode array pump lasers, resulting in tenfold increase in the amplifier output power; 2) the very low laser diode array pump cost results in a tenfold reduction in the amplifier cost; 3) side pumping makes it unnecessary to use wavelength division multiplexing couplers for combining the pump light with the signal, required in conventional fiber amplifiers; and 4) unlike end-pumping arrangement, the side pumping technique leaves the fiber end free for fusing to other fibers. These factors make it possible to produce fiber amplifiers with multi-watt output powers at a cost substantially lower than currently available single mode laser diode pumped amplifiers generating powers below 100 mW.

Keopsys negotiated a nonexclusive license with NRL for the side pumping technology. An individual, while working for another company that had licensed a technology from NRL, became aware of the technology during one of his visits to NRL. This individual left the company where he was working and started a new company based on this NRL technology.

The licensed technology is used in producing side pumped fiber amplifiers and fiber lasers. Fiber amplifiers are used in fibers for telecommunication systems while fiber lasers are typically used as a research tool for laboratory component testing of power handling capability.

Value/Benefits to DoD

High power, low cost fiber amplifiers are required in optical fiber communication and distribution systems, Electronic Warfare systems, remote sensing, chemical sensing, free-space communications and medical applications.

DoD has purchased the fiber lasers for laboratory use. They receive royalty-free use of this technology.

Benefits to Licensee

The company was started based on this DoD technology. Currently, there are about a half-dozen products that contain this technology. The licensee will benefit from the sales of these products.

N3

PLA Title: Nonexclusive License with Microphase Corporation

Patent Titles: U.S. 4763272 Automated and Computer Controlled Precision Method of Fused Elongated Optical Fiber Coupler Fabrication; U.S. 5652819 Method for Tuning Fiber Optic Couplers and Multiplexers; and U.S. 5121453 Polarization Independent Narrow Channel Wavelength Division Multiplexing Fiber Coupler and method for producing Same.

DoD Organization: U.S. Space and Naval Warfare Systems Center (SPAWAR)

Inventor POC: Mr. Matthew McLandrich

Licensee: Microphase Corporation

Licensee POC: Mr. Steve Capasso

Date of License: October 2000

Type of License: Nonexclusive

Summary

Microphase Corporation licensed a suite of three patents from the Navy centered around one technology, a Fused Optic Wavelength Divider Multiplicity (WDM).

In the early 1980s SPAWAR began research into developing optical couplers and power dividers with single mode optical fibers, which were just starting to become commercially available. This early work led to the development of the flame-brush technique for fusing two optical fibers together and tapering them until optical power couples from one optical fiber to the other. These beginning studies also enabled a better understanding of the physics behind coupling in fused fiber devices, and resulted in the first demonstration of optical fiber core dopant diffusion during the fiber tapering process. The wavelength dependent nature of the coupling in tapered fused fiber devices led to the development of wavelength division multiplexers (WDMs) capable of combining light in two wavelength bands onto a single fiber, and later separating light in these wavelength bands for detection.

Interest in using these fused fiber WDM for undersea surveillance applications resulted in continuing support throughout the early to mid 1990's, leading to additional technology developments. Most notable were increased control over the WDM fabrication process, allowing the development of WDMs with very narrow channel spacings, and techniques to greatly reduce the polarization sensitivity of these narrow channel devices. The enhanced performance of these polarization insensitive narrow channel (PINC) WDMs generated interest in using them in the next generation of surveillance arrays, and ManTech funding was established, which led to more process improvements and increased yields and reduced fabrication costs to enable viable commercial production of the devices. Additional studies investigated extensions of PINC WDM technology and led to the development of models describing the temperature and index of refraction dependencies of PINC WDMs, and the first demonstration of fine tuning of WDM wavelengths in fused fiber couplers by ultraviolet (UV) light processing.

The licensing process involved a third party who was working independently with Microphase and SPAWAR. This individual provided the segue into the relationship between Microphase and the SPAWAR inventor. Microphase first visited SPAWAR to observe a demonstration of the technology. Following this visit Microphase prepared a business plan and filed an application for a nonexclusive license.

Microphase is a supplier of highly engineered hardware for operational and advanced military systems. Microphase is a designer and manufacturer of high performance filters, diplexers, multiplexers, detectors, microwave amplifiers, integrated assemblies, and subassemblies for telecommunications, advanced military, and avionics systems. Products incorporating the patented technology are fiber optic components for telecommunications and data systems.

At the time of licensing, the technology was at the prototype stage. Microphase is providing the production engineering and qualification necessary to fully commercialize the technology and meet environmental standards. Under a CRADA that is currently being negotiated, Microphase and SPAWAR will work toward extending the components and devices. Under the terms of the CRADA, Microphase is providing "funds-in" and will be able to attain an exclusive license for any technology discovery.

Value/Benefits to DoD

The license involves an up-front licensing fee plus royalties when products are sold. Military applications incorporating the patented technology include any fiber optic data network whether it be terrestrial, undersea, or shipboard. The technology can be used in military receivers in the battlefield, on jets, and on aircraft carriers.

The working relationship that has evolved as a result of the patent license agreement has fostered cooperative research with private industry.

Benefits to Licensee

Microphase is mainly a military supplier; however, they are trying to increase their presence in commercial markets. This licensing effort will help Microphase establish a foothold in the commercial sector. They anticipate it will take two years to start reaping financial rewards from this technology.

N4

PLA Title: Nonexclusive License with Moldex

Patent Title: U.S. 5400296 Acoustic Attenuation and Vibration Damping Materials

DoD Organization: U.S. Naval Aerospace Medical Research Laboratory

Inventor POC: Gerry Thomas

Licensee: Moldex

Licensee POC: George Viksne

Date of License: June 1995

Type of License: Nonexclusive

Summary

The patented technology is a process for developing acoustic attenuation and vibration damping materials. This invention resulted from an R&D effort that focused on improving ear protection for Navy helicopter pilots. The resulting technology was a small ear cup and a hose.

Moldex first learned of the technology while on a tour of the Navy Aerospace Medical Research Laboratory hosted by the Gulf Coast Alliance for Technology Transfer (a partnership of Federal laboratories, state universities, and community colleges in Northeast Florida and Southern Alabama). Moldex was interested in optimizing the material for the automotive industry. Moldex licensed this technology and developed an exhaust gas recycling hose used in the auto industry to dampen noise. Moldex sold these hoses to the "big 3" auto makers.

A CRADA was established to allow the inventor and licensee to collaborate on the technology development. The licensee and inventor are currently working on making large surface area sheets of the material. The ability to manufacture large sheets of the material will have unlimited potential in the marketplace for under carpet mats, head liners for cars, and barriers for superhighways.

Value/Benefits to DoD

The U.S. Naval Aerospace Medical Research Laboratory has realized significant royalty revenue as a result of the automotive hoses sold by Moldex. In addition, research in damping materials has been furthered via the CRADA that resulted from the licensing arrangement.

Benefits to Licensee

Moldex has realized a profit from the sale of the automotive hoses. Moldex stands to profit from the unlimited market potential for the larger sheet material.

N5

PLA Title: Partially-Exclusive License with Lake Shore Cryotronics, Inc.

Patent Titles: U.S. 5789931 Quantitative Mobility Spectrum Analysis of Magnetic-Field-Dependent Hall and Resistivity Data; U.S. 6100704 Improved Quantitative Mobility Spectrum Analysis of Magnetic-Field-Dependent Hall and Resistivity Data

DoD Organization: U.S. Naval Research Laboratory (NRL)

Inventor POC: Dr. Jerry Meyer

Licensee: Lake Shore Cryotronics, Inc.

Licensee POC: Michael Swartz

Date of License: April 16, 1996

Type of License: Partially-Exclusive

Summary

The licensed technology, Quantitative Mobility Spectrum Analysis (QMSA), is a new method for characterizing the fundamental electrical properties of layered semiconductor structures. From electrical measurements as a function of magnetic field, QMSA can determine simultaneously the properties of as many as ten different charge carriers in a complex multilayered structure. These properties are directly related to the performance of semiconductor-based devices, such as high-speed computer circuits, making QMSA a valuable new tool for R&D, diagnostics, and quality control in the areas of semiconductor manufacture and research.

The original QMSA was invented in the late 1980s and early 1990s. In 1993, the U.S. Naval Research Laboratory (NRL) established a collaboration with the University of Western Australia (UWA) in order to develop the more comprehensive and automated QMSA approach leading to a co-authored patent for the QSMA.

Lake Shore Cryotronics, Inc. learned of the NRL QMSA technology after performing a literature search. They initially contacted NRL's research partner at UWA who then brought NRL into the fold. The QMSA was licensed to Lake Shore in 1996 in a three-party license agreement between NRL, Lake Shore, and UWA. In addition, a CRADA was negotiated between NRL and Lake Shore to further develop the technology for the company's application. The first commercial QMSA package was released in 1998. Under the CRADA, improvements to the technology were made that furthered its usefulness as a commercial product. The CRADA resulted in another patent, issued in 2000, with inventors from all three organizations. The new patent allows a broader range of materials to be successfully characterized.

The CRADA gave Lake Shore a free nonexclusive license to the subject invention. That license was actually superfluous because there was an inventor from Lake Shore on the subject invention patent, so Lakeshore had title through that inventor. However, they have elected not to exercise their exclusive license option because their partially-exclusive license to the first patent gives them sufficient market protection.

The direct users of the technology include any of the thousands of commercial, university, and government (both military and non-DoD) facilities that perform electrical characterization of semiconductors. In industrial settings, the technology can be used for quality monitoring during

semiconductor manufacture. By using QMSA to monitor materials in near real-time, manufacturers can increase product quality and decrease the number of wafers that fail to meet specifications, leading to an overall reduction in cost. In research laboratories, the ability to better characterize various complex semiconductors will further the development of new materials and of uses for existing ones.

Value/Benefits to DoD

The license that Lake Shore negotiated involves a minimum yearly royalty plus a percentage of sales once the minimum has been met. DoD benefits from the royalty revenue resulting from the sale of the Lake Shore products that incorporate the licensed technology. Customers who have purchased the licensed technology and perform work indirectly for DoD include TRW, Redondo Beach, CA and University of California, Santa Barbara, CA.

The license agreement led to a CRADA where the research in this area led to a follow-on patent.

Benefits to Licensee

Lake Shore has used the license granted in the CRADA to cement their intellectual property position with this product. The QMSA software is now sold as both a stand-alone package and as an option in the Lake Shore Models 7504 and 7507 Hall Effect/Electronic Transport Measurement Systems.

C. Selected Air Force PLAs

PLA Number	PLA Title
AF1	Exclusive License with Beam Tech Corporation
AF2	Nonexclusive License with Advanced Micro Devices, Inc.
AF3	Exclusive License with SAIC
AF4	Exclusive License with Den-Tal-Ez, Inc.
AF5	Nonexclusive License with Sandia National Laboratories

AF1

PLA Title: Exclusive License with Beam Tech Corporation

Patent Titles: U.S. 4948975 Quantitative Luminescence Imaging System; U.S. 5003050 Diazoluminomelanin and a Method for Preparing Same; U.S. 5028541 Flow-Through Cell Cultivation System; U.S. 5156971 Rapid Identification of Environmental Bacillus; U.S. 5374811 Blood and Tissue Rewarming Device; and U.S. Patent Application No. 07/779,694

DoD Organization: U.S. Air Force Research Laboratory, Human Systems Effectiveness Directorate

Inventor POC: Dr. David Erwin

Licensee: Beam Tech Corporation, San Antonio, TX

Licensee POC: Dr. Martin Meltz

Date of License: 1996

Type of License: Exclusive

Summary

Beam Tech is a small business that was established in conjunction with Air Force inventors to further develop and commercialize a series of patented technologies for the rapid detection of viable anthrax. Beam Tech's intention was to take these licensed technologies consisting of the synthesis and production of a growth medium for the rapid detection of E.coli, and apply it to the rapid identification of viable anthrax. The inventors worked with a local university technology transfer representative and the City of San Antonio's technology incubator to establish the company. Air Force employees involved in the establishment of the new company have fully disclosed their involvement and have removed themselves from all situations that may have the appearance of a conflict of interest.

Beam Tech Corporation exclusively licensed a suite of patents from the Air Force that involved new chemical, instrumentation, blood and tissue rewarming, and anthrax cultivation systems. Through these license agreements, Beam Tech is pursuing microbial applications of a special medium for accelerating the germination and growth of anthrax bacteria from spores in environmental samples, in order to rapidly identify a biological warfare or terrorist agent such as anthrax in plenty of time for medical intervention.

The Air Force's Human Effectiveness Directorate designed culture techniques to rapidly isolate and identify "live" anthrax from suspected environmental release. The special medium, 3AT, allows for discrimination between closely related bacteria and non-pathogenic strains of anthrax. The samples require minimum processing because this medium suppresses the growth of many other contaminating microbes, while allowing the anthrax to grow into colonies more rapidly. As the bacteria grow, they self-label with a luminescent and fluorescent polymer that acts as an indicator of viability and as a marker for antibody capture. Furthermore, the DNA is recoverable from the anthrax for polymerase chain reaction (PCR) amplification. Finally, other bacterial, animal, and human cells, naturally or through genetic engineering, can be induced to produce this labeling polymer. Therefore, the detection and diagnostic properties of this medium can be extended to other microbes beyond anthrax and provide the critical time needed for early intervention and medical treatment.⁴⁸

Beam Tech has negotiated a CRADA with the Air Force and is building upon the Air Force research efforts using the 3AT medium. 3AT is not competitive with PCR, or some strips that

can identify anthrax spores in 15 minutes. Beam Tech's technique can make a determination of whether the agent is viable. One can use this technology with PCR; if the PCR identifies plates of interest, one can use Beam Tech's medium to determine its viability.

Value/Benefits to DoD

When this technology is commercialized, the military will be able purchase the medium royalty-free to rapidly identify live anthrax.

Benefits to Licensee

Being a small business, it is oftentimes difficult to take a fairly immature technology and mature it to the point where it becomes a commercial product. However, Beam Tech has further experimented with the 3AT and has plans in the very near future to market a growth medium that can identify viable anthrax in 6-12 hours. Potential customers for this technology include the public health sector as well as the military. Beam Tech is awaiting notification from the CDC for validation of the growth medium for use in identifying viable anthrax.

AF2

PLA Title: Nonexclusive License with Advanced Micro Devices, Inc.

Patent Title: U.S. 4698587 Method of Characterizing Critical Timing Paths and Analyzing Timing Related Failure Modes in Very Large Scale Integrated Circuits

DoD Organization: U.S. Air Force Research Laboratory, Information Directorate

Inventor POC: Mr. Daniel Burns

Licensee: Advanced Micro Devices, Inc.

Licensee POC: Mr. David Bennett

Date of License: July 1998

Type of License: One year Nonexclusive

Summary

The cell timing tester is a method of characterizing critical timing paths and analyzing timing related failure modes in very large scale integrated circuits. This microcircuit design evaluation method is a novel solution to the problem of characterizing critical timing paths in finished microcircuits. Such a method is useful for screening both old and new designs for correctable, performance limiting timing problems, for acceptance testing of finished products where distributions of circuit node timing margins may be effected by materials and processing variations, and for analyzing failed parts which exhibit frequency sensitive failure modes. A focused laser spot is used to photo-generate leakage current which is collected by reverse biased transistors at an internal circuit node. This added leakage current modifies transition times. Power supply voltage, test frequency, and photo-current level may be varied during a series of functional tests to obtain relative rankings of timing robustness at various nodes. Possible difficulties of this method are that heavy photo-currents may induce latch-up in some technologies, and that an unobstructed "window" into silicon is needed to introduce photo-currents near specific transistors. Even so, this method is useful from the chip backside using infrared wavelengths, and may be attractive because alternatives such as circuit simulation, mechanical die probing, and electron beam probing have their own sets of limitations.

The development of this method was the subject of a contract with the University of Central Florida which worked to further develop it. Advanced Micro Devices learned of the Air Force technology through a consortium of chip makers which included Sandia National Laboratory and Advanced Micro Devices. Researchers at the Air Force Research laboratory chanced across members of this consortium at a research conference leading to commencing discussions with Sandia. Sandia, in turn, provided the segue that led to interest in the technology by Advanced Micro Devices. A CRADA between Sandia National Laboratory and Advanced Micro Devices was undertaken to evaluate the method for commercial applications. Since the intention of Advanced Micro Devices was to use the licensed patent as background technology and did not have intentions of commercializing the technology, they negotiated a one-time \$45K nonexclusive license fee paid by AMD to AFRL for a 12 month evaluation period to further develop the invention internally. Advanced Micro Devices still has a CRADA with Sandia. Sandia has a government use license with the Air Force and is working to further develop the technology to the point where it can be commercialized.

Value/Benefits to DoD

According to the licensee, the Air Force received a one-time up-front fee of \$45K paid over three years. Advanced Micro Devices has moved the technology forward. The advancement in the

engineering technology supports the development of next generation microelectronic chips which will be used in many DoD systems.

Benefits to Licensee

In further developing the technology, Advanced Micro Devices has patented subsequent developed technology. This tool is used in enhancing the design of their products.

AF3

PLA Title: Exclusive License with SAIC

Patent Title: U.S. 5942157 Switchable Volume Holograms

DoD Organization: U.S. Air Force Research Laboratory, Materials and Manufacturing Directorate

Inventor POC: Dr. Wade Adams

Licensee: Science Applications International Corporation (SAIC)

Licensee POC: Mr. Richard Sutherland

Date of License: June 28, 2000

Type of License: Exclusive

Summary

Polymer dispersed liquid crystals are a complex mixture of chemicals which, when exposed to laser light, can be used to produce holograms. When the hologram is exposed to an electric field, it can switch off and on. This technology was being investigated for use in military applications to control laser light beams. Although some progress was made toward this goal, the commercial sector was achieving faster response times with solid state devices. Therefore, this liquid crystal technique was considered to be too slow for military applications.

SAIC negotiated an exclusive license with the Air Force on this patented liquid crystal technology. SAIC co-invented the technology while working under an onsite contract; therefore, the technology was co-authored with Government employees. SAIC has since licensed the Air Force portion of the patented technology to further develop the technology and to enter into partnerships with other interested parties.

SAIC has since exclusively licensed the patented technology to a start-up company, DigiLens, Inc., who is working toward applications in the display arena, such as the development of lighter, low cost projectors. DigiLens is also applying the liquid crystal technology to develop lighter, lower cost projectors. In the past, computer projector displays used a rotating wheel. However, with this new technology, three colors can be switched on and off without moving parts. These new projectors are smaller and quieter than traditional projectors that use mechanical color wheels and provide unparalleled image contrast and the ability to switch between video and computer monitor modes required by PCTV.

Value/Benefits to DoD

In addition to receiving an up-front licensing fee, future royalties will be collected on products sold. There are a number of potential benefits to the military. The military is considering this liquid crystal technology for electro-optic switches for communications on ships. Potential applications also exist in wearable displays as a replacement for helmet-mounted displays. The military can also benefit from the new lighter and lower cost projectors for general use, such as in conference rooms.

Value to Licensee

SAIC has an equity position in the sub-licensee, DigiLens, Inc., and will receive royalty income once products are sold. DigiLens has used the technology to develop new lighter, lower cost projectors. Further development of this technology may lead to improved digital computer projection for conference room use. Future applications that DigiLens is working toward include

projection directly onto the retina which could lead to a replacement for helmet-mounted display technology. A potential big pay-off down the road is in applying the technology to replace CRT displays.

AF4

PLA Title: Exclusive License with Den-Tal-Ez, Inc.

Patent Title: U.S. 5700147 Air Controlled Sterile Irrigation System (ACSIS)

DoD Organization: U.S. Air Force School of Aerospace Medicine, Brooks AFB

Inventor POC: Barry L Oakes

Licensee: Den-Tal-Ez, Inc.

Licensee POC: Frank Oellig

Date of License: July 14, 1998

Type of License: Exclusive

Summary

In looking for a means of delivering sterile irrigating solution to dental sites during restorative and surgical procedures, an Air Force scientist created the Air Controlled Sterile Irrigation System (ACSIS). At the time of this invention, tap water was being used in the dental process.

Using a standard intra-venous bag with sterile solution that is pressurized by an infuser bag, the new sterilizable handpiece line adapter is connected between the prior art dental handpieces and the dental unit air-water hoses. The handpiece line adapter includes an input port and output port for the sterile irrigating solution, thereby, replacing the prior art outlet port for tap water.

The dentists at the Air Force Aeronautical Systems Center had an existing relationship with Den-Tal-Ez, Inc., which sells dental equipment to the military dentists at the base. Den-Tal-Ez was approached by the Air Force to manufacture the air controlled sterile irrigation apparatus. Den-Tal-Ez, Inc. obtained an exclusive license to manufacture and sell the ACSIS to the Air Force. The manufacture of the ACSIS involved using new materials and developing new manufacturing processes.

The ACSIS is now available to Air Force dentists as well as commercial companies to meet general dentistry or dental surgery needs.

Value/Benefits to DoD

Air Force dental practices now have access to the new ACSIS. DoD receives royalties on systems sold.

Benefits to Licensee

Den-Tal-Ez realizes a profit from sales of the ACSIS to both military and commercial dental practices. The system has been approved for both general dentistry and dental surgery.

AF 5

PLA Title: Nonexclusive License with Sandia National Laboratories

Patent Titles: U.S. 5944913 High-efficiency Solar Cell and Method for Fabrication

DoD Organization: U.S. Air Force Research Laboratory, Space Vehicles Directorate

Inventor POC: Mr. Kitt Rheinhardt

Licensee: Sandia National Laboratories

Licensee POC: Angelo Salamone

Date of License: February 25, 1999

Type of License: Nonexclusive

Summary

Sandia National Laboratories and the U.S. Air Force Research Laboratory worked together and patented the high-efficiency solar cell and method for fabrication. This patented technology is a design that integrates several light-sensitive materials into a high-efficiency, "four-junction" solar cell that converts more of the light spectrum into electricity, as much as 35-40 percent of the sun's energy. This breakthrough is significant, for current conversion efficiencies run approximately 25 percent for solar cells sold today. The overall result is more power without increasing spacecraft weight.

The Air Force licensed their portion of the patent to Sandia who has the responsibility of marketing the jointly owned patent. The Air Force and Sandia share equally in any royalty income realized from licensing. The news about the new technology spread at conferences and through networking. Lockheed Martin approached Sandia to partner via a CRADA to improve upon the patented technology. The CRADA allows Lockheed Martin entitlement to the rights of new technology developed while working under the CRADA. At the same time, a start-up company, EMCORE Corporation was working with and producing high-efficiency solar cells. Lockheed and EMCORE partnered to further mature the technology. Lockheed/EMCORE negotiated a nonexclusive license for the technology that entitles them to produce, use, and sell the solar cell technology based on "foreground" technology, i.e. that technology which has been developed since the CRADA between Lockheed and Sandia was negotiated.

In the meantime, the Air Force Research Laboratory contracted with Spectrolab Inc. to work on further maturing the solar cell technology. Spectrolab received a nonexclusive license to the "background" technology, i.e. the original patented technology before the CRADA was signed with Lockheed Martin. This particular patent has generated significant royalty revenues.

Value/Benefits to DoD

More and more electrical energy is needed to run increasingly complicated and diverse payloads in space. This patented "4-junction" solar cell design generates an increase in power without increasing spacecraft weight. Licensing this technology has stimulated the research in this area which has pushed the envelope toward the next generation in efficient solar cell technology. The more efficient "3-junction" solar cells are currently available for DoD space missions. The Air Force will be using these solar cells in five satellite programs: Global Positioning System (GPS), Spaced Based Infra-Red Surveillance (SBIRS) High, SBIRS Low, Advanced Extremely High Frequency (EHF), and Gap-Filler.

This patented technology was the base technology for two start-up companies, creating competition in the industry. This competitive environment brought the price of the solar cell down from \$700 per watt to \$365 per watt which reduces the price to DoD. In addition, the Air Force has received significant royalty income from this patented technology.

The patented design for the "four-junction" solar cell was modeled and then fabricated in the laboratory. To date a "3-junction" solar cell has been produced and strides are being made to reduce the patented "4-junction" solar cell to practice.

Benefits to Licensee

Sandia benefits from the royalties generated by the jointly authored patented design of the "4-junction" solar cell technology. As a result of this joint research endeavor, Sandia entered into a "funds-in" CRADA with Lockheed Martin to work toward furthering the development of this technology area. These additional funds augmented research in an area of critical importance to DoD.

D. INTERVIEW GUIDES

Interview Guide for Inventor POC

1. Name of technology
2. What type of license is involved?
 - Exclusive
 - Nonexclusive
 - Commercial Evaluation
 - Internal Commercial
 - Biological Materials
3. When did you patent your technology?
 - Was a technology market assessment performed?
4. How long did it take to get technology patented?
 - Is the process for patenting well known in your organization?
 - Was the process easy to follow?
 - Are there awards associated with patenting at your organization?
 - How long did it take to go from application to patenting?
 - How long did it take to go from patent issuance to licensing?
5. How was the patent marketed?
 - Web site?
 - Partnership Intermediary?
6. Were you involved in the licensing of the patent?
 - Did you have any interactions with the company licensing the technology?
 - Before they licensed it?/Since they have licensed it?
 - Any lessons learned from the licensing process?
 - How can the licensing process be improved?
7. Did the patent license involve a "flat fee" or a percentage (royalty-based)?
 - How is the decision typically made? Criteria?
8. Have you received any royalty income from the license?
 - After inventors are paid, has the remaining royalty income gone to support R&D or TT?
 - Are all the inventors still working for DoD?
 - Was the invention a co-invention with industry such as through a CRADA?
9. Did you receive any awards for patenting?
10. Is your technology innovation currently a:
 - Commercial product? (get name of product)
 - Part of a larger system?
 - Used in a military system?

Interview Guide for Licensee

1. Name and brief description of technology licensed
2. What type of license is involved?
 - Exclusive
 - Nonexclusive
 - Commercial Evaluation
 - Internal Commercial
 - Biological Materials
3. How did you become aware of the patented technology?
 - Literature search?
 - Conference?
 - DoD Lab web site?
 - Other web site?
4. Do you think that DoD markets their patented technologies well?
 - How can their marketing be improved?
5. When did you license the technology?
 - How long did it take to license the technology (initial written inquiry to actual license)?
 - Were there any challenges encountered during the licensing process?
 - Was the process easy to follow
6. Were you involved in the licensing process of the patent?
 - Did you have any interactions with the DoD inventor during the process?
 - Before they licensed it? Since they have licensed it? (working under a CRADA?)
 - Any lessons learned from the licensing process?
 - How can the licensing process be improved?
7. Did the patent license involve a "flat fee" or a percentage (royalty-based)?
 - How was the decision for that fee structure decided on?
 - Royalties paid to date (if willing to provide that information)?
8. Was this the first time your company has licensed a DoD technology?
9. How is the technology being used? (product description)
 - Commercial product? (name of product)
 - Part of a larger system? (name of system)
 - Part of a military system? (name of system)
10. What have been some of the benefits of licensing technology to the company?
 - Increased jobs?
 - Critical part of a larger system?
 - Advanced R&D?

Patent Marketing Process Interview Guide

1. Office background
 - size and role of staff
2. Does your organization have a specific process for marketing patented technology?
 - Describe
 - Web site? (brokers, subscription services, lab's web site)
 - Partnership Intermediary?
 - Direct mailing to relevant companies?
 - Who is typically the first POC for licensee (TLO, inventor)?
 - How involved does the inventor get in the process?
 - Do you try to get a licensee lined up before proceeding with patenting?
3. How do you select technologies for patenting?
 - Invention Evaluation Board?
 - Technology Assessments?
 - Market Assessment?
4. Who performs technology/market assessments?
 - Internal staff? (qualifications of staff)
 - Contractors?
 - Partnership Intermediary?
 - Business School?
5. Does your organization have a patent prioritization process and/or criteria?
 - What is your policy on paying the patent maintenance fees?
6. How long does it typically take to go from :
 - Patent application to patent issue?
 - Patent issue to licensing?
 - Date of license request to license?
7. Do you strive to be "fully cost reimbursable?" (i.e. whether royalties and fees generated cover costs associated with patenting and licensing)
8. How are royalties disbursed?
 - Inventor?
 - OTL?
 - R&D?
 - Awards?

E. POC LISTS

Army PLA Interview POCs

PLA Title	DoD Organization	Inventor POC	Telephone Number	Licensee	Licensee POC
Nonexclusive License with Kessler Soils Engineering	U.S. Army Engineer Research and Development Center	Steve Webster	601-634-2282	Kessler Soils Engineering, Springfield, VA	Mr. Ken Kessler
Exclusive License with Baird and Associates	U.S. Army Engineer Research and Development Center	Jeff Melby/ George Turk	601-634-2062	Baird and Associates, Madison, WI	Mr. David Werren
Nonexclusive License with Rheinmetall Industries AG	U.S. Army Armaments Research Development and Engineering Center	Stewart Gilman Anthony Farina	973-724-6145	Rheinmetall Industries AG	N/A
Nonexclusive License with Pharmacia & Upjohn Company	U.S. Army Soldier Chemical Biological Command	Mark Guelta	410-436-3747	Pharmacia & Upjohn Company, Kalamazoo MI	Davis Mulder
Exclusive License with Paratek Microwave, Inc.	U.S. Army Research Laboratory	Louise Sengupta Michael Rausa	443-259-0140 410-278-5028	Paratek Microwave, Inc.	Louise Sengupta
Exclusive License with New England Ropes	U.S. Army Natick Soldier System Center	Jim Sadick	508-233-5261	New England Ropes	Chris Dutra

Navy PLA Interview POCs

PLA Title	DoD Organization	Inventor POC	Telephone Number	Licensee	Licensee POC
Nonexclusive License with Nova Engineering, Inc.	U.S. Naval Research Laboratory	Vince Park	202-767-5098	Nova Engineering, Inc	Don Boyd
Nonexclusive License with Keopsys	U.S. Naval Research Laboratory	Lew Goldberg	703-359-6480	Keopsys (Subsidiary of Optocom Innovation)	Lew Goldberg
Nonexclusive License with Microphase Corporation	U.S. Space and Naval Warfare Systems Center	Matt McLandrich	619-553-1066	Microphase, Inc.	Steve Capasso
Nonexclusive License with Moldex	U.S. Naval Medical Research Center	Gerry Thomas	850-452-2038	Mold-Ex	George Viksne
Partially-Exclusive License with Lake Shore Cryotronics, Inc.	U.S. Naval Research Laboratory	Jerry Meyer	202-767-3276	Lake Shore Cryotronics, Inc.	Michael Swartz

Air Force PLA Interview POCs

PLA Title	DoD Organization	Inventor POC	Telephone Number	Licensee	Licensee POC
Exclusive License with Beam Tech Corporation	U.S. Air Force Research Laboratory, Human Systems Directorate	Dr. David Erwin	210-536-2003	Bean Tech Corporation	Dr. Martin Meltz
Nonexclusive License with Advanced Micro Devices, Inc.	U.S. Air Force Research Laboratory, Information Directorate	Daniel Burns	315-330-2335	Advanced Micro Devices, Inc.	David Bennett
Exclusive License with SAIC	U.S. Air Force Research Laboratory, Materials Directorate	Dr. Wade Adams	937-255-6825	Science Application International Corporation (SAIC), San Diego, CA	Richard Sutherland
Exclusive License with Den-Tal-Ez, Inc.	U.S. Air Force Aeronautical Systems Center, Brooks, AFB	Barry Oakes	210-536-3327	Den-Tal-Ex, Inc.	Frank Oellig
Nonexclusive License with Sandia National Laboratories	U.S. Air Force Research Laboratory, Space Vehicles Directorate	Kitt Reinhardt	505-846-2637	Sandia National Laboratories	Angelo Salamone

Marketing Process Interview POCs

Organization	Point of Contact	Telephone Number
U.S. Army Natick Soldier Systems Center	Bob Rosenkrans	508-233-4928
U.S. Army Research Laboratory	Michael Rausa	410-278-5028
U.S. Army Engineer Research and Development Center (ERDC)	Phil Stewart	601-634-4113
U.S. Army Soldier Biological Chemical Command	Blake Sajonia	410-273-5062
U.S. Army Medical Research and Materiel Command	Pual Mele	301-619-6664
U.S. Naval Research Laboratory	Cathy Cotell	202-404-8411
U.S. Naval Surface Warfare Center, Carderock Division	Richard Bloomquist	301-227-4299
U.S. Naval Medical Research Institute	CDR Charles Schagel	301-319-7428
U.S. Air Force Research Laboratory, Information Directorate	Frank Hoke	315-330-3470
U.S. Air Force Research Laboratory, Munitions Directorate	Paulette Risher	850-882-8591
U.S. Air Force Research Laboratory, Space Vehicles Directorate	Ponzona Ferraraccio	505-846-2707
Montana State University TechLink	Joan Wu-Singel	406-994-7705
National Institutes of Health	Steve Ferguson Ted Roumel	301-496-7735 Ext. 266
U.S. Department of Agriculture	Michael Ruff	301-720-3973
Massachusetts Institute of Technology	Don Kaiser	617-253-6966
Stanford University	Imelda Oropeza	650-723-0651
University of Virginia	Robert McWright	804-924-2175

Other POCs

Organization	Point of Contact	Telephone Number
Department of Commerce	John Raubitschek	202-482-8010
U.S. Army Research Laboratory	James Wanko	301-394-2529
U.S. Office of Naval Research	John Wynn	703-696-4004
U.S. Office of Naval Research	David Spevak	703-696-4007
U.S. Office of Naval Research	Thomas McDonald	703-696-4000
U.S. Secretary of the Air Force	Randell Heald	703-588-5091
U.S. Army Armaments Research, Development & Engineering Center	Timothy Ryan	937-724-7953
National Institutes of Health	Dr. Barbara Alving	301-435-0080
Transon, LLC	Dennis O. Leuer	N/A
Tactical Medical Solutions, LLC	William P. Wiesmann	N/A

F. ENDNOTES

- ¹Stephen A. Dugan, "The Licensing Payoff from U.S. R&D," *Research-Technology Management*, April 1999, p. 22.
- ²AAAS Table Historical Data on Federal R&D, FY 1976-2001. OMB and Agency R&D Budget Data, Dec. 2000 – Revised.
- ³Kevin G. Rivette, and David Kline. *Rembrandts in the Attic: Unlocking the Hidden Value of Patents*. Harvard Business School Press, 2000, p. 4.
- ⁴Kevin G. Rivette, and David Kline. *Rembrandts in the Attic: Unlocking the Hidden Value of Patents*. Harvard Business School Press, 2000, p. 5.
- ⁵Stephen A. Dugan, "The Licensing Payoff from U.S. R&D," *Research-Technology Management*, April 1999, p. 22.
- ⁶AAAS Table Historical Data on Federal R&D, FY 1976-2001. OMB and Agency R&D Budget Data, Dec. 2000 – Revised.
- ⁷Kevin G. Rivette, and David Kline. *Rembrandts in the Attic: Unlocking the Hidden Value of Patents*. Harvard Business School Press, 2000, p. 4.
- ⁸Kevin G. Rivette, and David Kline. *Rembrandts in the Attic: Unlocking the Hidden Value of Patents*. Harvard Business School Press, 2000, p. 5.
- ⁹David J. Roessner, "What Companies Really Want from the Federal Labs." *Chemtech* Nov. 1993, p. 12.
- ¹⁰David J. Roessner, "What Companies Really Want from the Federal Labs." *Chemtech* Nov. 1993, p. 13.
- ¹¹"Effective Partnering: A Report to Congress on Federal Technology Partnerships," U.S. Department of Commerce, Office of Technology Policy, April 1996, p. 11.
- ¹²William J. Perry, "DoD Domestic Technology Transfer/Dual Use Technology Development Domestic Technology...", June 2, 1995.
- ¹³Technology Transfer: Number and Characteristics of Inventions Licensed by Six Agencies, GAO Report, RCED-99-173, June 1999.
- ¹⁴Stevenson-Wylder Technology Innovation Act of 1980. Public Law: 96-480, October 21, 1980.
- ¹⁵Technology Innovation, Chapter 63, United States Code Annotated, Title 15, Commerce and Trade, Sections 3701-3715, prepared for: Federal Laboratory Consortium for Technology Transfer, West Publishing Co., p. 40-41.

- ¹⁶Technology Innovation, Chapter 63, United States Code Annotated, Title 15, Commerce and Trade, Sections 3701-3715, prepared for: Federal Laboratory Consortium for Technology Transfer, West Publishing Co., p. 49.
- ¹⁷Technology Innovation, Chapter 63, United States Code Annotated, Title 15, Commerce and Trade, Sections 3701-3715, prepared for: Federal Laboratory Consortium for Technology Transfer, West Publishing Co., p. 50.
- ¹⁸Technology Innovation, Chapter 63, United States Code Annotated, Title 15, Commerce and Trade, Sections 3701-3715, prepared for: Federal Laboratory Consortium for Technology Transfer, West Publishing Co., p. 51.
- ¹⁹Technology Innovation, Chapter 63, United States Code Annotated, Title 15, Commerce and Trade, Sections 3701-3715, prepared for: Federal Laboratory Consortium for Technology Transfer, West Publishing Co., p. 51.
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H. ACRONYMS

ACSIS	Air Controlled Sterile Irrigation System
AFRL	U.S. Air Force Research Laboratory
AMD	Advanced Micro Devices
ARDEC	U.S. Army Armament Research, Development and Engineering Center
ARL	U.S. Army Research Laboratory
ASTM	American Society for testing and Materials
AUTM	Association of University Technology Managers
CDC	Centers for Disease Control
CEO	Chief Executive Officer
CRADA	Cooperative Research and Development Agreement
CRT	Computer Remote Terminal
COTS	Commercial Off-the-Shelf
CTO	Chief Technology Officer
DDR&E	Director Defense Research and Engineering
DoC	Department of Commerce
DoD	Department of Defense
DoJ	Department of Justice
DTT	Domestic Technology Transfer
DUTD	Dual Use Technology Development
EHF	Extremely High Frequency
ERDC	U.S. Army Engineer Research and Development Center
FDA	Food and Drug Administration
FTTA	Federal Technology Transfer Act
GCATT	Gulf Coast Alliance for Technology Transfer
GPS	Global Positioning System
HEPA	High Efficiency Particulate Air
IP	Intellectual Property
LMDS	Local Microwave Distribution Systems
MEP	Manufacturing Extension Partnership
MIT	Massachusetts Institute of Technology
MMDS	Multipart Microwave Distribution Systems
MSU	Montana State University
MTA	Material Transfer Agreement
NASA	National Aeronautics and Space Administration
Natick	U.S. Army Soldier Systems Center
NIH	National Institutes of Health
NIST	National Institute of Standards and Testing
NRL	U.S. Naval Research Laboratory
NSWC	U.S. Naval Surface Warfare Center
NTSTEC	New York State Technology Enterprise Corporation
ORTA	Office of Research and Technology Applications
OSD	Office of the Secretary of Defense
OTL	Office of Technology Licensing
OTT	Office of Technology Transfer
PCR	Polymerase Chain Reaction
PCS	Personal Communication System

PHS	Public Health Service
PI	Partnership Intermediary
PINC	Polarization Insensitive Narrow Channel
PL	Public Law
PLA	Patent License Agreement
POC	Point of Contact
QMSA	Quantitative Mobility Spectrum Analysis
R&D	Research and Development
RDT&E	Research Development Testing and Engineering
SAIC	Science Applications International Corporation
SBIRS	Spaced Based Infra-Red Surveillance
SPAWAR	U.S. Space and Naval Warfare Systems Center
TI	Texas Instruments
TLO	Technology Licensing office
TORA	Temporally-Ordered Routing Algorithm
T2	Technology Transfer
TT	Technology Transfer
UMD	University of Maryland
U.S.	United States
USAFSAM	U.S. Air Force School of Aerospace Medicine
UV	Ultraviolet
UWA	University of Western Australia
WDM	Wavelength Division Multiplexers
WTN	Wright Technology Network
XIPO	Xerox Intellectual Property Operations