SAND2010-7251P

2011 FLC AWARD FOR EXCELLENCE IN TECHNOLOGY TRANSFER NOMINATION FORM

********* DEADLINE FOR SUBMISSIONS: THURSDAY, OCTOBER 14, 2010 *********

Member Agency Definitions of Technology Transfer

For this award, nominators are encouraged to define a technology transfer success based on their agency's mission and defining or demonstrating that success in their nomination package by highlighting the impact in the various criteria categories.

According to the FLC Technology Transfer Desk Reference, The FLC has developed the following definition that accommodates the technology transfer activities of a wide variety of federal agencies and their R&D laboratories and centers:

> *Technology Transfer is the process by which existing knowledge, facilities, or capabilities developed under federal research and development funding are utilized to fulfill public and private needs. In some cases, however, technology transfer also can occur between federal agencies, although the primary emphasis is on transfers to all types of nonfederal organizations. In addition, federal technology transfer activities are not always from a federal laboratory to another party. There are occasions when a technology transfer mechanism can be used by a federal laboratory to bring in from the outside technologies or knowledge that can assist the laboratory in achieving its mission goals.*

Based on the mission of each Federal Agency Technology Transfer success can be measured in various ways. Definitions of successful technology transfer are offered as examples from various Federal Agencies:

DEPARTMENT OF AGRICULTURE

Agricultural Research Service

(Our) nominations must demonstrate all of the following criteria: (1) the individual or group has demonstrated uncommon creativity and initiative in transferring the technology; i.e., the nominee's involvement in the technology transfer process was active rather than passive. Demonstrate how active the nominee was in gaining adoption and transfer of the technology. (2) The method or process used was particularly effective for the specific technology and clientele involved, e.g. cooperative research and development agreements (CRADAs), other types of cooperative agreements, patents and licensing, novel information dissemination techniques, releasing public varieties (must show how the researcher gained industry/commercial adoption of the variety) demonstration sites, field days, etc.; (3) Significant positive impact (commercial, environmental, food safety, etc.) of the technology transferred must have occurred within the past three years; and (4) the technology must have been adopted by customers or users outside of ARS. Plant varieties may also be nominated (and is strongly encouraged), but significant public impact of the variety should have occurred within the past three years. We are likely to push the time frame of demonstrated T2 to 5 yrs, perhaps more for plants.

********* DEADLINE FOR SUBMISSIONS: THURSDAY, OCTOBER 14, 2010 *********

DEPARTMENT OF COMMERCE

National Institute of Standards and Technology

Technology transfer is the process by which NIST research and development of advances in measurement science, standards, and technology are made available to and used by U.S. industry, academia, non-profit organizations, state and local government and other federal agencies to enhance economic security and improve our quality of life. The specific technology transfer processes used may include formal or informal collaboration, including those enabled by NIST SBIR funding, Guest Researcher Programs or Facility Use; training, the development and delivery of standard reference materials, data or software; participation in standard setting bodies; or the protection and licensing of intellectual property.

National Oceanic and Atmospheric Administration

NOAA's definition of technology (transfer) is technology that is developed within NOAA and transferred outside the bureau to American industry or business, universities, state or local governments, or other non-Federal parties. The technology must also be a value to the United States due to commercial applications.

DEPARTMENT OF DEFENSE

Overall

Technology Transfer (T2) is officially defined as:

The intentional communication (sharing) of knowledge, expertise, equipment, and other resources for application to military and nonmilitary systems. Domestic T2 activities shall include the following:

--- Spin-off activities that shall demonstrate DoD technology; e.g., commercial viability of technologies already developed or presently being developed for U.S. security purposes. The primary purpose of those activities, which encompass T2, shall be to promote and make available existing DoD-owned or –developed technologies and technical infrastructure to a broad spectrum of non-DoD applications.

--- Dual-use science and technology and other activities that develop technologies that have both DoD and non-DoD applications.

--- Spin-on promotion activities that shall demonstrate the U.S. security utility of technologies developed outside the Department of Defense. That goal shall be to incorporate the innovative technology into military systems to meet mission needs at a lower acquisition cost by taking advantage of the economies of scale by purchasing from a larger industrial base.

When is a technology a technology transfer success for DoD?

Essentially, success for DoD occurs when one or more of the technology transfer mechanisms available for use by DoD achieves goals or objectives described in the three (3) sub-components of the definition we have provided above. Based upon DoD's mission, DoD is not only a technology developer, but we are a technology consumer. Whether our technology becomes a product, is embedded in a product, becomes an improvement to a product, or provides a better way make a product, it's all viewed as a success when the technology produces a benefit not heretofore available. Whether a DoD technology is used in a commercial application, a dual-use commercial and military application, or for a uniquely military application, they should all be considered successes in terms of technology transfer. Long term successes such as the evolution of the ARPANET into today's internet or military development of GPS for military use versus the endless uses for GPS today certainly demonstrate that successfully transferring the technology should be the basis of determining the FLC's Excellence in Technology Transfer awards as opposed to trying to forecast the future breadth and scope of the technology being transferred. While DoD tries to develop better body armor for obvious reasons, the protection of others in the civilian population is just as important even though that is not the primary motivating factor for DoD.

Missile Defense Agency Technology Transfer

MDA funds Research and Development with the goal of eventual insertion of technologies into Missile Defense applications. Technology Transfer success comes in several forms:

- the R&D company (or a spin-off) becomes part of the supply chain for an MDA system
- the company is acquired by, or forms a strategic partnership with, an existing MDA supplier or contractor
- the technology is licensed or acquired by an existing MDA supplier

MDA recognizes that technologies developed under its SBIR/STTR programs may not be ready for program insertion; therefore the Agency provides mechanisms to encourage ongoing development via commercialization. Commercialization leverages the value of Intellectual Property to generate revenue, maintain corporate financial health, keep research teams intact, and make it possible for technologies to continue to develop and mature. MDA's Technology Applications (TA) program provides Outreach and Business Development assistance to MDA-funded researchers to assist them in commercializing their technologies.

********* DEADLINE FOR SUBMISSIONS: THURSDAY, OCTOBER 14, 2010 *********

DEPARTMENT OF ENERGY

Technology transfer refers to the process by which knowledge, intellectual property or capabilities developed at the Department of Energy's National Laboratories, single purpose research facilities, and other facilities are transferred to any other entity, including private industry, academia, state and local governments, or other government entities to meet public and private needs.

Measurements of technology transfer can include the number of interactions and their impact; speed of application; formation of new companies and new/ improved products and other realized economic benefits, e. g., sales; and the enhancement of the nation's energy security, national security, scientific discovery and quality of life.

DEPARTMENT OF HOMELAND SECURITY

Technology Transfer is a process that includes: research, invention, intellectual property, licensing, and commercialization. Technology Transfer can result in new products, new services, and new businesses. Partnerships at any of these steps in the process are considered a successful technology transfer.

********* DEADLINE FOR SUBMISSIONS: THURSDAY, OCTOBER 14, 2010 *********

2011 FLC Award for Excellence in Technology Transfer Submission Guidelines

THE FOLLOWING CHANGES—WHICH INCLUDE CHANGES TO CRITERIA AND SCORE DISTRIBUTION—HAVE BEEN MADE FROM THE 2010 FORM:

- **Page V**
  - **Eligibility**
    - **Nominees must be employees of FLC member laboratories and non-laboratory staff who were actively involved in the transfer process, including technology transfer professionals such as ORTAS.**
    - **The requirement which stipulates, "Non-laboratory staff may be included only when at least 50% of the transfer effort was funded by a federal laboratory or at least 50% of the staffing for the transfer effort was by in-house laboratory personnel," <u>HAS BEEN ELIMINATED</u>.**
- **Page VI**
  - **Complete Submission Procedures**
    - **Do not include proprietary information regarding the technology or its transfer**
    - **Content in both the Submission Cover Sheet and Submission Narrative must be written in layman's terms, as they will be used at the discretion of the FLC in promotional materials.**
- **Page VIII**
  - **Criteria**
    - **(3) Timeframe of the technology transfer has been added, thus this criterion is now titled "Technology Transfer Recipients and Timeframe." The point total for this criterion is now worth 5 points.**
    - **(4) "Nominee Involvement" is now worth 20 points.**
    - **(5) "Initiation of Technology Transfer Partnership" is now worth 20 points.**
- **Page 1-1**
  - **Submission Verification Checklist is now Section 1**
- **Page 2-1**
  - **Submission Cover Sheet is now Section 2**
- **Page 3-1**
  - **Submission Narrative is now Section 3**

<u>USE THIS FORM ONLY</u> – NOT A PREVIOUS YEAR'S – TO SUBMIT YOUR NOMINATION.

********* DEADLINE FOR SUBMISSIONS: THURSDAY, OCTOBER 14, 2010 *********

Eligibility

1. Nominee(s) must be employee(s) of FLC member laboratories and non-laboratory staff who were actively involved in the transfer process. A member laboratory is any federal laboratory that is a member of the FLC and has 200 or more full-time equivalent scientific, engineering and related technical positions. The laboratory must be owned, leased, or otherwise used by a federal agency and funded by the federal government, as established under 15 U.S.C. Section 3705 or 3707. - ***NEW***

2. Nominee(s) must be employee(s) engaged in science and technology and/or technology transfer activities at FLC member laboratories. This also includes technology transfer professionals such as ORTAs. If this submission is selected as a winner, at least one nominee will participate in the 2011 FLC Awards Ceremony in Nashville, Tennessee. - ***NEW***

3. Duplicate nominations of a single technology transfer effort (for an individual or group) are not allowed.

4. The nominated achievement must have taken place within the last five years.

Number of Submissions

Each laboratory may submit a maximum of **four** nominations.

Complete Submission Procedures

A complete submission will consist of the following sections:

- A completed Submission Verification Checklist, Section 1 (1 page) - ***NEW***
- A completed Submission Cover Sheet, Section 2 (3 pages) - ***NEW***
- A completed Submission Narrative, Section 3 (5 pages) - ***NEW***

General formatting for these sections should meet the following requirements:

- Use Arial or Times font styles that are no smaller than 10 points. Failure to do so will result in a disqualification of your submission.
- The completed nomination form must adhere to the electronic page format created by the FLC. Alterations to margins, or use of electronic page formats from previous versions of the nomination form, will result in an automatic disqualification of the nomination.
- If the page limit is exceeded, your submission will be disqualified.

********* DEADLINE FOR SUBMISSIONS: THURSDAY, OCTOBER 14, 2010 *********

- Graphics and photos are allowed to be used, provided they are included within the body of the Submission Narrative (Section 3). Graphics and photos included on separate attachment pages exceeding the 5 pages provided in the Submission Narrative (Section 3) will result in disqualification of the nomination.
- Wherever possible, provide quantitative data.
- Supporting documentation, including brochures, news articles, press releases and URL addresses will not be accepted with the submission.
- **DO NOT** include proprietary information regarding the technology or its transfer. All submissions will become the property of the FLC, which reserves the right to use the submission's content in its marketing and publications.
- **Content in both the Submission Cover Sheet (Section 2) and Submission Narrative (Section 3) must be written in layman's terms, as they will be used at the discretion of the FLC in promotional materials.** - ***NEW***
- Although forms may be duplicated, each form must be submitted as single-sided.

Each submission (**except** for Submission Verification Checklist, Section 1) must be submitted electronically at **mchambers@utrs.com**.

Each Submission Verification Checklist must be faxed to the FLC Management Support Office (attn: Michele Chambers) at **856-667-8009. Only the Submission Verification Checklist will be accepted by fax,** not completed submissions.

All submissions and checklists must be received by the FLC Management Support Office by 8:00 p.m. EDT (5:00 p.m. PDT) on **Thursday, October 14, 2010.** No submissions will be accepted after this time.

Contact Michele Chambers at 856-667-7727 x135, for additional information.

Announcement of Results

The winners of the 2011 Award for Excellence in Technology Transfer will be announced on **January 26, 2011.** Laboratories submitting nominations will be notified prior to the official announcement.

Award Ceremony

All award winners will receive a keepsake from the FLC commemorating their achievement. In addition, winners will be honored during an awards banquet to be held May 5, 2011 at the FLC National Meeting in Nashville, Tennessee.

********* DEADLINE FOR SUBMISSIONS: THURSDAY, OCTOBER 14, 2010 *********

2011 FLC Award for Excellence in Technology Transfer Award Criteria

USE THIS FORM ONLY – NOT A PREVIOUS YEAR'S – TO SUBMIT YOUR NOMINATION.

PLEASE READ CAREFULLY TO AVOID HAVING YOUR SUBMISSION DISQUALIFIED.

The highest score possible is 100 points. The total point score will be used for ranking. Scoring will be done by judging the Submission Narrative (Section 3) against the criteria listed on the following pages.

FLC Laboratory Representatives should carefully review the award criteria before preparing a nomination. It is important to understand that this award is specifically for **transferring technologies**; they are **not** given for a research effort that does not include an element of technology transfer—no matter how innovative it might be.

Because each item of the award criteria is worth points, each criterion must be addressed in the Submission Narrative in the section they are being asked or points may be deducted. If an item is not applicable, please indicate this in the narrative, and this will be taken into account by the judges. When writing your Submission Narrative, be as specific and concise as possible.

Carefully review the award criteria before writing your Submission Narrative. How closely you adhere to the guidelines provided may be the deciding factor in whether your laboratory is selected as a winner!

********* DEADLINE FOR SUBMISSIONS: THURSDAY, OCTOBER 14, 2010 *********

Criteria – FLC Award for Excellence in Technology Transfer

1. **Description of Technology (10 points)**
   a. Describe the technology transferred. Include advantages, benefits, and other relevant features.

2. **Technology Transfer Mechanisms and Innovations Used (25 points)**
   a. What technology transfer mechanisms were used to transfer the technology?
   b. Describe how this met the mission requirements of your laboratory.

3. **Technology Transfer Recipients and Timeframe (5 points)** - ***NEW***
   a. Who or what was the recipient of the transferred technology?
   b. When did the technology transfer take place? - ***NEW***

4. **Nominee Involvement (20 points)** - ***NEW***
   a. Describe **each** nominee's involvement in the technology transfer.
   b. Describe any innovation or creativity demonstrated by **each** nominee in transferring the technology.

5. **Initiation of Technology Transfer Partnership (20 points)** - ***NEW***
   a. Was the partnership for the technology initiated by the laboratory, the company or other entity?
   b. Why was a federal laboratory the best place to achieve the transfer?
   c. What were the specific **roles, goals, objectives,** and **expectations** of each partner?
   d. How well were the goals and expectations met?
   e. Describe any new relationships, such as new interactions with the public or private sector, which resulted from the transfer of the technology.

6. **Outcome of the Technology Transfer Effort (15 points)**
   a. What was the result of the technology transfer effort?

7. **Follow-on Activities (5 points)**
   a. Describe any additional activities or applications that might be developed to meet the mission requirements of the laboratory in the future. This might include continuing problem-solving efforts or further assistance with commercializing the technology or helping the public sector.

********* DEADLINE FOR SUBMISSIONS: THURSDAY, OCTOBER 14, 2010 *********

2011 FLC Award for Excellence in Technology Transfer
Frequently Asked Questions

1. **I want to nominate someone from a partnering company for this award. Would he/she be eligible?**

   Yes, non-laboratory staff is eligible for nomination.

2. **I want to be sure someone in our laboratory's technology transfer office who provided their expertise and assistance is recognized. Is this possible?**

   Yes, technology transfer professionals, including ORTAs, are eligible for nomination.

3. **One of my potential nominees is now retired/deceased. Can I still include their name in the submission?**

   Yes. Any individual who was employed at the laboratory at the time of the technology transfer is eligible to be nominated.

4. **Is there a limit on the number of individuals I can nominate?**

   No. All eligible individuals who were **actively** involved in the technology transfer process can be nominated, regardless of number. However, each individual effort must be specifically identified in the nomination write-up. Failure to do so may result in the individual being removed from the nomination or total nomination disqualification.

5. **Our laboratory just completed a joint technology transfer effort with another laboratory. Can I submit this joint project as a nominee?**

   Yes, joint technology transfer projects between federal laboratories are eligible for nomination, even if the laboratories are affiliated with different federal agencies. However, only one of the laboratories may submit a nomination. Please consider submitting this joint effort as an Interagency Partnership Award.

6. **The technology that my laboratory has produced has great potential, but has yet to be formally transferred. Can my submission be given serious consideration by the judges on basis of technology alone?**

   No. This award is given on the basis of successful technology transfer efforts, as opposed to the potential of the technology itself. It is advisable to only submit a technology for nomination once it has formally been transferred.

7. **The narrative I plan to submit is rather extensive and I don't want to leave anything out. Can I use more than five pages in Section 3?**

   No.

2011 FLC Award for Excellence in Technology Transfer Frequently Asked Questions (continued)

8. **I am running behind schedule in completing my submission? Is it acceptable to send the submission after October 14, 2010, provided I make arrangements to do so in advance?**

   No. An electronic copy of your submission and a faxed copy of the Submission Verification Checklist must be received by the FLC Management Support Office by 8:00 p.m. EDT (5:00 p.m. PDT) on **Thursday, October 14, 2010.** No submissions will be accepted after this time.

9. **Though the deadline has passed, it has come to my attention that a section of my submission is incomplete. Can I send the missing information?**

   No. It is important to make sure that your submission is completed and meets the necessary requirements before you send it. The Submission Verification Checklist (Section 1) exists for this reason.

10. **How will I know that my submission has been received?**

    Upon receipt of your submission, you will receive an electronic confirmation.

11. **I have included proprietary information in my submission. If my submission is selected as a winner, can this information be deleted?**

    The FLC reserves the right to use your entire submission as a resource document and for media and/or promotional purposes, so only include non-proprietary information in your submission.

12. **When will I be notified if my submission is selected as a winner?**

    Laboratories will be notified prior to the official public announcement of **January 26, 2011.**

13. **Do the winners receive a cash award?**

    The FLC does not distribute cash as part of award recognition.

14. **Does the FLC cover travel expenses for the winner?**

    The FLC does not cover travel expenses. However, award winners are eligible for discount fees pertaining to the National Meeting and award-related events.

********* DEADLINE FOR SUBMISSIONS: THURSDAY, OCTOBER 14, 2010 *********

2011 FLC Award for Excellence in Technology Transfer
Section 1 – Submission Verification Checklist

(This page will only be accepted via fax at 856-667-8009)

Laboratory Name:
Title of Nominated Technology Transfer:

Please review each item below and determine whether your nomination meets the stated requirements. For the last two items, you must simply agree to comply with these requirements in the event that the nomination is chosen as a winner.

- ❑ The technology transfer achievement took place in the last five years.
- ❑ The technology involved is clearly described in layman's language.
- ❑ The Submission Cover Sheet (Section 2) is completed per instructions.
- ❑ The nomination was reviewed and approved by all the nominators listed on the Submission Cover Sheet (Section 2).
- ❑ The Submission Narrative (Section 3) uses the page format established by the FLC, is typed in 10 point type or larger, addresses all items listed in the award criteria, and comprises pages 3-1 through 3-5 of the nomination.
- ❑ Section 2 and Section 3 of the nomination package are being submitted electronically to the FLC Management Support Office via mchambers@utrs.com by **Thursday, October 14, 2010.**
- ❑ No supporting documentation is attached.
- ❑ The nomination does not include any proprietary or confidential information and the FLC may use this entire submission as a resource document and for media purposes.
- ❑ In the event of being chosen as a winner, at least one nominee will participate in the award ceremony at the 2011 FLC National Meeting in Nashville, Tennessee.
- ❑ The nominee(s) will provide a poster display for an exhibit at the 2011 FLC National Meeting in Nashville, Tennessee.

As the nominating official and FLC Representative from this laboratory, I understand that entries not conforming to this checklist will be returned without consideration.

_____	_____	_____
Signature	Phone	Date

FOR FLC USE ONLY – DO NOT COMPLETE OR REMOVE

RECEIVED: **SUBMISSION NUMBER:**

2011 FLC Award for Excellence in Technology Transfer
Section 2 – Submission Cover Sheet

Laboratory Name: Sandia National Laboratories

Title of Nominated Technology Transfer: Entrepreneurial Separation to Transfer Technology (ESTT) Program

Dates that transfer took place: October 1994 through June 2010

Summary: In the space below, write a brief (450 words maximum) summary of the nomination that describes: the transferred technology, the role of the nominee(s) in the technology transfer process, the technology transfer process used, and the benefits of the transfer effort. Please write this paragraph in non-technical terms for a non-scientific audience. The information provided in the box below will be included in the FLC awards booklet if the submission is selected as a winner.

The National Competitiveness Technology Transfer Act of 1989 made technology transfer a mission of government-owned, contractor-operated (GOCO) laboratories and their employees. Traditionally successful technology transfer has been seen as:

- *Movement of scientific knowledge, processes, devices – intellectual property (IP) – from research laboratories to the commercial sector where these transfers are successfully marketed, which enhances the financial bottom line of the receiving companies, and creates jobs. Typically transfer mechanisms have been through cooperative research & development agreements (CRADAs), licenses, work for others (WFO) agreements, and transfer of people from labs to help start-up new companies or expand existing businesses.*
- *Technologies, products, or families of products with both commercial and federal applications being developed.*

Sandia's Entrepreneurial Separation to Transfer Technology (ESTT) Program has been achieving all of these traditional technology transfer success measures since its birth 16 years ago; however, in a non-traditional, but synergistic way. ESTT permits Labs scientists and engineers to terminate their employment for up to two years, with a third-year option, in order to start up new technology companies or to help expand existing companies. These entrepreneurs are guaranteed reinstatement by Sandia if they choose to return to the Labs before the ESTT expiration period. ESTT's success metrics are remarkable. Here are just a few:

- Licenses for Sandia intellectual property negotiated with ESTT companies total 42.
- Since ESTT began, 139 employees have participated. Fifty-six have left to start 44 new companies. Eighty-four left to help expand 48 companies.
- ESTT start-ups have acquired over $315M in venture funding and generated more than 3,600 jobs.
- Twenty-six ESTT companies have performed over $394M in contracts as suppliers to Sandia.
- Out of 18 ESTT start-ups since 2000, 15 are still thriving, an impressive survivability rate for any economy.

Technologies transferred via the ESTT Program fall into over 20 categories. Since 1994, 139 Sandia employees have left the Labs under ESTT, taking with them licenses of Sandia intellectual property (IP) or unique expertise in, for example, microelectromechanical systems (MEMS); advanced manufacturing, photovoltaic, hydrogen-based, and other forms of renewable energy; vertical-cavity surface-emitting laser (VCSEL) technology; auto airbag technology; and robotics.

Since 2005, ESTT entrepreneurs have taken numerous other technologies to market, including chemical and biological detection tools; medical sensors for the health care community; microphone technology integrated with optics and MEMS; sensor systems for border monitoring; robocasting technology; non-destructive test technology; high temperature electronics to enhance drilling efficiency in the geothermal, oil, and natural gas industries; software that enables users to modify their software environments without knowing any programming language; and concentrating solar power.

Simply put, ESTT is a stellar example of technology transfer and the most prolific and long-running entrepreneurial program within the DOE complex.

NOMINEE INFORMATION INSTRUCTIONS:

- List the names (including Mr., Ms., Miss, Mrs., Dr., etc.) and job titles of nominees below.
- Designate one nominee as the primary contact who will be responsible for disseminating information from the FLC to the rest of the team.
- If the address is a PO Box, also include the street address.
- If the project leader is not the primary contact, please provide their information below the primary contact section and designate them as the project leader.
- If any nominee(s) has a different address than the primary contact, provide this information.
- If there are more than two nominees, add their contact information below and on an additional page(s) within **Section 2 only** (if necessary)

Nominee/Primary Contact: Mr. Richard Fairbanks
Title: ESTT Program Leader
Organization: Sandia National Laboratories
Address: P.O. Box 5800/1515 Eubank Blvd. SE (87123)
City: Albuquerque State: New Mexico Zip: 87185-1495
Phone: 505-844-9462 Fax: 505-844-1389 E-mail: rrfairb@sandia.gov

Nominee:
Title:
Organization:
Address:
City: State: Zip:
Phone: Fax: E-mail:

NOMINATOR INFORMATION INSTRUCTIONS

- List the names (including Mr., Ms., Miss, Mrs., Dr., etc.) of the nominators below.
- If the nominator holds more than one of the positions listed below (e.g. FLC Representative and ORTA Representative) it is only necessary to list the name of the nominator in the entry of the second position.
- If the address is a PO Box, also include the street address.

THE FLC STRONGLY RECOMMENDS THAT ALL LISTED NOMINATORS HAVE AN OPPORTUNITY TO REVIEW AND APPROVE THE FINAL NOMINATION BEFORE IT IS SUBMITTED FOR JUDGING!!!

FLC Representative: Ms. Jackie Kerby Moore
Organization: Sandia National Laboratories
Address: P.O. Box 5800/1515 Eubank Blvd. SE (87123)
City: Albuquerque State: New Mexico Zip: 87185-1495
Phone: 505-845-8107 Fax: 505-844-1389 E-mail: jskerby@sandia.gov

Nominee Supervisor: Ms. Jackie Kerby Moore
Organization: Sandia National Laboratories
Address: P.O. Box 5800/1515 Eubank Blvd. SE (87123)
City: Albuquerque State: New Mexico Zip: 87185-1495
Phone: 505-845-8107 Fax: 505-844-1389 E-mail: jskerby@sandia.gov

ORTA Representative/
Technology Transfer Manager: Dr. Harold S. Morgan
Organization: Sandia National Laboratories
Address: P.O. Box 5800/1515 Eubank Blvd. SE (87123)
City: Albuquerque State: New Mexico Zip: 87185-0351
Phone: 505-844-7045 Fax: 505-284-3166 E-mail: hsmorga@sandia.gov

Laboratory Director: Dr. Paul J. Hommert
Organization: Sandia National Laboratories
Address: P.O. Box 5800/1515 Eubank Blvd. SE (87123)
City: Albuquerque State: New Mexico Zip: 87185-0101
Phone: 505-844-7261 Fax: 505-844-1120 E-mail: pjhomme@sandia.gov

2011 FLC Award for Excellence in Technology Transfer
Section 3 – Submission Narrative

Laboratory Name: Sandia National Laboratories
Title of Nominated Technology Transfer: Entrepreneurial Separation to Transfer Technology (ESTT) Program

Description of Technology (10 points)

Technologies transferred via the ESTT Program fall into over 20 types or categories. Since 1994, 139 Sandia employees have left the Labs as ESTT entrepreneurs, taking with them licenses of Sandia intellectual property (IP) or unique expertise in microelectromechanical systems (MEMS); advanced manufacturing, photovoltaic, hydrogen-based, and other forms of renewable energy; advanced optics; electrical beam technology to harden the surfaces of numerous materials; vertical-cavity surface-emitting laser (VCSEL) technology; auto airbag technology; specialized software; haptics (technology that interfaces with the user through the sense of touch); and robotics, to name a few.

In the past five years, ESTT entrepreneurs have taken numerous other technologies to market, including chemical and biological detection tools; medical sensors for the health care community; microphone technology integrated with optics and MEMS; sensor systems for border monitoring; robocasting technology to build three-dimensional structures using methods developed at Sandia; non-destructive test technology; high temperature electronics to enhance drilling efficiency in the geothermal, oil, and natural gas industries; software that enables users to modify their software environments without knowing any programming language; and utility-scale concentrating solar power.

Technology Transfer Mechanisms and Innovations Used (25 points)

The premise around which Sandia designed and has consistently managed its ESTT Program is that the success of a given technology transfer and commercialization effort is greatly enhanced when the inventor accompanies the technology into the marketplace. Certainly there are numerous other technology transfer options available to Sandia management, and it is not always feasible to use ESTT as the primary choice.

A Sandia Corporate Procedure specific to ESTT reads in part: *"ESTT is one of the vehicles Sandia uses to support DOE's technology transfer mission. The intent ESTT is to provide entrepreneurship as a viable mechanism for maturing certain Sandia technologies into commercial products that benefit national security and prosperity. If a license to use Sandia intellectual property is necessary to operate the proposed business, participation will also depend on the development of a sound business plan and successful negotiation of license terms."*

Those who quality for ESTT participation must:

- *Seek to obtain a license from Sandia to patents or copyrights to start their new company,*
- *Seek to join an existing small company that is a Sandia licensee in order to provide technical support, or*
- *Seek to start or expand a small technology-based company using technical expertise specifically developed at Sandia that is unique and cannot be obtained outside of Sandia.*

The primary method – nearly 50 percent – of tech transfer throughout ESTT's history is licensing of intellectual property created by Labs scientists and engineers. Since ESTT began, there have been 42 licenses of Sandia intellectual property issued to ESTT-facilitated companies. These have included mostly patents, but have also included some copyrights and trademarks. Use of follow-on cooperative research and development agreements (CRADAs), user facility and work-for-others (WFO) agreements, and follow-on licenses and license amendments have also occurred.

Sandia provides substantial full-time support for the program, including funding for technology transfer specialist and nominee, Dick Fairbanks, who is the ESTT Proram Leader responsible for managing the program. The Labs also provides a series of seven 90 minute training sessions for its employees who may be considering applying for ESTT or who simply have an interest in entrepreneurial efforts. Offered three times a year, the course addresses the realities of entrepreneurship, markets and marketing, effective business plans, financial management, legal implications, and venture capital acquisition.

An important innovation that has contributed to the tremendous success of the ESTT Program has been Sandia's partnership with Technology Ventures Corporation (TVC), whose mission is to help startup companies that are developing technology from the national laboratories. Early on in the 17-year history of technology transfer at Sandia, TVC teamed with the ESTT Program to assist ESTT applicants in market research, developing high quality business plans, how to prepare for licensing negotiations, and acquiring financing. The ESTT-TVC partnership has resulted in 35 joint start-ups (out of 44 total ESTT start-ups), including 5 during the past five years. See figure 1below for more details on this key working relationship.

Tech Transfer Recipients and Timeframe (5 points)

In the past five years, ESTT entrepreneurs left the Labs to start up eight new companies and expand another eight. Since the program started in 1994, ninety-two companies have been impacted by ESTT, including 44 direct start-ups and 48 companies that were expanded. Fifty-nine of these companies were located in New Mexico, and thirty-three were located in other states, including California, Arizona, Texas, Colorado, New York, Florida, Alabama, Virginia, Pennsylvania, Illinois, Washington, and Maryland. ESTT-enabled technology transfers have required as little as several weeks. Some, because of complex licensing negotiations, have taken up to two years. However, the majority have required an average of five months.

Figure 1

Entrepreneurial Separation to Transfer Technology

Sandia scientists and engineers who left on ESTT	139
To start up companies	55(40%)
To expand companies	84(60%)
Companies Impacted by ESTT	92
Start-ups	44
Expansions	48
Licenses for Sandia IP negotiated with ESTT companies	42
Economic impact of ESTT start-ups (16 respondents)	
Jobs directly created	277
In New Mexico	166
Outside New Mexico (CA)	111
Average salary – all 277 jobs	$60,556
Average salary – 166 NM jobs	$47,454
Average NM wage paid	$35,980
Average salary – 111 CA jobs	$80,150
Average CA wage paid	$50,182
Sales revenue of 16 companies in last FY	$22M
License fees paid to Sandia by ESTT companies in last FY	$242,500
Partnering with Technology Ventures Corporation (TVC)	
Joint clients of ESTT and TVC	35
Venture funding attracted by these 35 companies	$311M
Jobs created by these 35 companies	3,615
TVC funding events involving Sandia technology	42
Funding events for ESTT companies	28(67%)

Nominee Involvement (20 points)

The nominee, Mr. Dick Fairbanks, has been at the helm of the ESTT Program since late 2002 – more than half of the program's 16 year life. During his tenure, ESTT has undergone a number of changes and improvements, and Dick has played a key role in all of them. Recognizing the program was already 8 years old when he assumed responsibility for it, Dick began to research the relative success of ESTT companies that had been up and running for a number of years. He initiated ESTT's first economic impact survey in 2003 which pointed out several important achievements of the companies who responded, most notably the high average salaries paid to employees

of ESTT companies. He organized a data base and spread sheet to better track the program and uses it to this day when asked for information and data by Sandia management and/or the media.

Mr. Fairbanks fine-tuned the relationship between the ESTT Program and TVC, resulting in 6 successful start-ups involving 6 licenses and 2 technical advancement assignments from the DOE. During his tenure, Dick applied his business savvy, experience, and coaching skills to assure success of his ESTT clients. To date, 18 of the 19 ESTT companies (95%) started up or expanded since he began managing the program are still operating and are referred to by Dick as "quality deals."

Recognizing the value of having key metrics for tracking and measuring success, Dick established a number of them for use as decision making tools (See figure 1). For instance, in 2009, Dick and his manager designed and conducted a more extensive and improved ESTT economic impact study involving companies located in New Mexico and California. The results confirmed and greatly expanded upon the more informal study conducted in 2003. It demonstrated once again that ESTT company salaries were considerably higher than New Mexico and California averages. Also, it was learned that these companies had created an average of 17 new jobs each.

One of the more challenging projects managed by Mr. Fairbanks occurred in 2008 when Sandia management decided to evaluate the ESTT Program to determine whether it adequately supported Sandia's technology transfer mission. Dick used the metrics that had been established, along with additional research, to convince management that, indeed, the program should continue. He worked closely with Sandia attorneys, technology transfer managers, and key technical line stakeholders to improve the ESTT Corporate Procedure, strengthening the Labs approach to managing conflict of interest and assuring maximum involvement of all levels of management in ESTT decisions. At the request of technology transfer managers from four other federal labs and with Sandia management's approval, Dick has shared the ESTT Corporate Procedure with them for possible use at their own facilities.

Initiation of Technology Transfer Partnership (20 points)

Sandia's corporate culture has built into it a strong technology transfer awareness. That is, members of the management team are expected to continuously monitor technology transfer opportunities pertaining to the work of their organizations, teams, and technical staff members. To assist and encourage them, Sandia's technology transfer organization designs and delivers regular training sessions and briefings on various facets of technology transfer, including entrepreneurship. Also, Sandia has sponsored an Entrepreneur in Residence during the past five years to work on a full time basis to identify promising technologies and IP that might be best deployed and commercialized using ESTT.

It is fair to say that each of the 139 Sandia employees who have pursued ESTT did so for different reasons and with different expectations concerning their futures and their roles during and after the ESTT period. But, there are some common threads. In most cases, the Sandia scientists and engineers recognize they have an idea, have some basic research primed for applied work, or even a product in mind that is coupled with enough business acumen and entrepreneurial spirit to say, "I'm going to try it."

Also, because technology transfer is a defined mission of the Labs and because Sandia designates ESTT as one of several prime corporate mechanisms to transfer technology to the private sector, it is the responsibility of members of the Labs' management team to keep their staff members informed about ESTT. Indeed, Sandia managers, themselves, are expected to recognize technology transfer opportunities that might be best exploited using ESTT.

Finally, it is the expectation of any ESTT partner company that a new technology or product will be developed, tested to proof, deployed, and commercialized, resulting in "succeeding as a business, creating high-paying jobs, and enhancing quality of life."

Outcome of the Technology Transfer Effort (15 points)

The ESTT metrics included in figure 1 clearly demonstrate measurable results. Overall, the outcome of this method of transferring technology has been impressive. Few, if any, single technology transfer transactions can match the sheer volume and variety of those accomplished using Sandia's entrepreneurial model. Each ESTT case can demonstrate numerous levels of success against the expectations of the 1989 National Competitiveness Technology Transfer Act, including ***movement of scientific knowledge, processes, devices – intellectual property – from research laboratories to the commercial sector where these transfers are successfully marketed, which enhances the financial bottom line of the receiving companies, and creates jobs.***

New relationships forged between Sandia and ESTT-enabled companies are many and varied. For example, Sandia has an equity share in Novint Technologies, an ESTT start-up that is now publically traded. It develops, markets, and sells 3D haptics products and equipment, applications, and technologies that allow people to use their sense of touch to interact with computers. Other ESTT companies became suppliers to Sandia, such as Optomec Design, Ktech Corporation, TEAM Technologies, and Emcore, which also is a CRADA partner. The Labs has established WFO agreements with others such as California-based eSolar (See figure 2 below).

Figure 2

Key to eSolar's technology is precise, automated calibration and control of thousands of their mass-produced sun-tracking heliostats, or solar reflectors.

"eSolar is proving that California's environmental leadership is advancing carbon-free, cost-effective energy that can be used around the world."
– Arnold Schwarzenegger, Governor of California

Although technology transfer outcomes vary a great deal due to the large number of companies that have been affected by the ESTT Program, the case of start-up, WaveFront Sciences, Inc., is featured here as a good example of a positive outcome. Now called AMO Wavefront Sciences, this publicly traded company designs and manufactures binary/diffractive optics and wavefront sensor-based instrumentation. WaveFront experienced a series of positive outcomes over the years. Former Sandian Dr. Dan Neal co-founded Wavefront Sciences in 1996 with three licenses of Sandia technology related to wavefront sensor and binary optics technology. Wavefront grew from three employees to more than 40 and, since early 2009, has been part of Abbott Medical Optics, a division of global, broad-based Abbott Laboratories, which markets in over 130 countries and employs more than 72,000 people.

WaveFront Sciences designs and manufactures the industry's highest resolution Shack-Hartmann-based aberrometer (See figure 3 below), which precisely measures the total refractive error and wavefront aberrations of the human eye as part of the wavefront-guided custom laser vision correction procedure. They have sold over 800 aberrometers to ophthalmologists around the world. Dr. Neal, shown below in figure 4, recently stated, "I estimate that more than a million people see better today, and that's a very direct benefit of the technology that we developed."

Figure 3

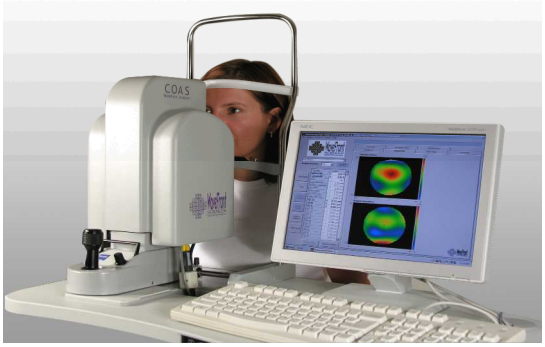

Figure 4

The most recent innovation and commercial application of Wavefront's technology was to design and build test stations for the James Webb Space Telescope, the largest and most ambitious space telescope ever to date. It has a 6.5 meter primary mirror that is made up of 18 1.5 meter hexagonal segments. These light weight beryllium mirrors segments were fabricated with contributions from Northrop Grumman, Ball Aerospace, L3-Com Tinsley, and WaveFront Sciences. This national asset will advance the science started with the Hubble Space Telescope. However, unlike the Hubble's low earth orbit, the James Webb Space Telescope will be placed in orbit at the Earth-Sun L2 point approximately 1 million miles from earth.

WaveFront Sciences solutions related to the James Webb Space Telescope provided tremendous gains in efficiency and can be traced back to technology commercialization efforts at Sandia. The basic sensor architecture, software analysis and measurement concepts are advancements to technology originally licensed from Sandia by WaveFront Sciences. These licenses enabled co-founders Dr. Dan Neal and Mr. Tim Turner to attract venture capital and develop products that have been commercially successful in the science, industrial and medical markets. The Scanning Shack-Hartman System expands these products to longer wavelengths and larger sizes to enable the development and reduce the cost of implementing this groundbreaking science program.

Follow-on Activities (5 points)

In August, 2010, Sandia held its inaugural "Entrepreneurial Spirit Award" celebration. Five former Sandia employees who continue to operate ESTT companies were honored, along with three current Sandia employees who returned to the Labs with valuable experience and skills acquired during their entrepreneurial ventures. It was decided by Sandia management that after 16 years and 139 departures under the ESTT Program, the Labs should begin to recognize outstanding achievements of the entrepreneurs. The awards luncheon was hosted by Sandia and sponsored by TVC. Along with numerous Sandia attendees, including the awardees, the event was attended by the President of TVC and officials from the U.S. Department of Energy and the NNSA Sandia Site Office. This award will be given annually.

Another important follow-on activity will be the continuation and fine tuning of the ESTT economic impact survey, alluded to earlier. The importance of this information cannot be overstated. It will not only serve as valuable decision-making information and data for Sandia management, but it will demonstrate return on investment to the tax payer.

In conjunction with TVC, Sandia will continue to provide the entrepreneurial training discussed above, with follow-on activities and projects such as creating an entrepreneurial networking group involving current ESTT entrepreneurs, those who chose to return from ESTT, those who have been attending the training sessions, and other experts and stakeholders from Sandia's management ranks and the outside commercial world. The purpose of this endeavor is to further strengthen the entrepreneurial and innovation culture at Sandia National Laboratories.

Finally, the ESTT Program will be the subject of regular internal Sandia news notes, Lab News articles, and briefings of managers and staff. In addition, Sandia has assigned a professional journalist to track Sandia's technology transfer accomplishments, including those associated with ESTT, and release them to major news outlets. Media coverage is another important method of keeping the tax payer informed.

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under Contract DE-AC04-94AL85000.