Annual Report on Technology Transfer: Approach and Plans, Fiscal Year 2010 Activities and Achievements

U.S. Department of Commerce

Report prepared by:

National Institute of Standards and Technology
National Oceanic and Atmospheric Administration
National Telecommunications and Information Administration
Institute for Telecommunication Sciences

Pursuant to the
Technology Transfer and Commercialization Act of 2000 (Pub. L. 106-404)

January 2011

This page is intentionally left blank

FOREWORD

This report summarizes technology transfer activities and achievements of the Department of Commerce's federal laboratories for fiscal year (FY) 2010. At the Department of Commerce, technology transfer is a significant part of the mission and programmatic activities of the National Institute of Standards and Technology (NIST), the National Oceanic and Atmospheric Administration (NOAA), and the National Telecommunications and Information Administration's (NTIA) Institute for Telecommunication Sciences (ITS). Accordingly, this report focuses on the activities of these agencies.

This report is in response to the statutory requirement for an annual "agency report on utilization" (15 U.S.C. Section 3710(f)) process established by the Technology Transfer Commercialization Act of 2000 (Pub. L. 106-404). All federal agencies that direct one or more federal laboratories or conduct other activities under Section 207 and 209 of Title 35, United States Code are subject to the requirements of this statute.

This report summarizes the Department's overall and laboratory- specific approaches, and its plans for technology transfer. The report focuses on current year activities and accomplishments, but provides statistical information from FY 2006 through FY 2010.

This report has been organized and prepared with the participation of the NIST, NOAA and ITS technology transfer offices. An electronic version of this report and versions from previous fiscal years are available online at: **http://www.nist.gov/tpo/transfer_20101013.cfm**

This page is intentionally left blank

TABLE OF CONTENTS

CHAPTER 1 - Department of Commerce Overview **1**
Summary of Technology Transfer Activities FY 2006 – FY 2010 ..... **2**

CHAPTER 2 - National Institute of Standards and Technology **5**
Approach and Plans for Technology Transfer **5**

Additional Details in FY 2010 ..... **10**

Downstream Outcomes from NIST Technology Transfer Activities **14**

CHAPTER 3 - National Oceanic and Atmospheric Administration **17**
Approach and Plans for Technology Transfer **17**

Additional Details in FY 2010 ..... **19**

Downstream Outcomes from NOAA Technology Transfer Activities **24**

CHAPTER 4 - National Telecommunications and Information Administration
Institute for Telecommunication Sciences **29**
Approach and Plans for Technology Transfer **29**

Additional Details in FY 2010 ..... **31**

Downstream Outcomes from ITS Technology Transfer Activities **35**

SUMMARY **36**

This page is intentionally left blank

CHAPTER 1

Department of Commerce Overview

Technology transfer plays an important role in the Department of Commerce's (hereinafter, the Department) mission to advance economic growth and job opportunities within the United States. The Department works in partnership with businesses, universities, state governments, and communities to promote innovation and to improve the nation's overall competitiveness in the global economy. The Department pursues these objectives through policies and programs directed at strengthening the nation's economic infrastructure, facilitating the development of cutting-edge science and technology, providing critical scientific information and data, and managing national resources.

The Department conducts research and development (R&D) in numerous areas of fundamental and advanced science and technology at the National Institute of Standards and Technology (NIST), the laboratory facilities of the National Oceanic and Atmospheric Administration (NOAA), and the National Telecommunications and Information Administration's (NTIA) Institute for Telecommunication Sciences (ITS). Technology transfer is a key part of the programmatic activities in each of these agencies' federal laboratory systems. Technology transfer is about connecting the technological advances from the Department's science and engineering programs to the American economy.

In addition to the technology transfer efforts of the Department's own laboratories, the Department is responsible for coordinating the technology transfer activities across federal agencies. Through NIST, the Department hosts the Interagency Workgroup for Technology Transfer, which facilitates interagency discussion on policy, new approaches to technology transfer, and lessons learned from agency technology transfer programs. NIST also serves as the host agency for the Federal Laboratory Consortium for Technology Transfer, the nationwide network of federal laboratories that provides a forum to develop strategies and opportunities for linking laboratory mission technologies and expertise with the marketplace.

The Department also has a leading role in leveraging the resources of the federal government to enhance the understanding and promotion of innovation, entrepreneurship and commercialization in America. In an effort to advance these goals, NIST and the Economic Development Administration (EDA) are coordinating a multi-agency effort to understand the current state of affairs in commercializing technologies developed in federal laboratories. This high-level study is helping to set the stage for future collaborative work between the Department of Commerce bureaus and other federal agencies.

More information about Department of Commerce technology transfer is available on the following websites:
NIST: http://www.nist.gov/tpo/index.cfm; NOAA: http://www.noaa.gov/
ITS: http://www.its.bldrdoc.gov/programs/tech_transfer/

Summary of Technology Transfer Activities FY 2006 – FY 2010

This annual report provides comprehensive statistics on the technology transfer activities of the Department's federal laboratories. This information covers intellectual property (patents/licenses), cooperative research and development relationships, and other technology transfer mechanisms. This report also highlights examples of successful downstream results (e.g., commercially significant technologies) from these technology transfer activities.

The Department's technology transfer activities include more than cooperative R&D agreements (CRADAs), patenting, and licensing. Technology transfer is also accomplished through technical publications, technical support development for industrial standards and materials, other public dissemination such as meetings and workshops, and opportunities for guest researchers, post-doctoral fellows, students and other collaborating professionals from across the United States to participate in federal laboratory activities.

The Technology Transfer Commercialization Act of 2000 (Pub. L. 106-404, codified in 15 U.S.C. Section 3710(f)) requires each federal agency to report to Congress the results of its technology transfer activities. This information is also required by Office of Management and Budget Circular A-11. The following tables present the required data. The information presented in this report is based on a stable framework of metrics that has been used traditionally to evaluate the effectiveness of technology transfer. The Department continues to explore the development of better metrics for technology transfer statistics.

Invention Disclosure and Patenting

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
● New inventions disclosed					
NIST	10	29	40	36	30
NOAA	4	3	0	5[2]	4
ITS	0	0	0	0	0
Department	14	32	40	41[2]	34
● Patent applications filed					
NIST	4	6	18	18	15
NOAA	0	2	3	1	1
ITS	1	0	0	0	0
Department	5	8[1]	21	19	16
● Patents issued					
NIST	6	3	1	7	7
NOAA	0	0[1]	1	0	0
ITS	1	0	0	0	0
Department	7	3	2	7	7

(1) Reflects correction of data from FY 2007 Report.
(2) Reflects correction of data from FY 2009 Report.

Licensing – Profile of Active Licenses

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
● All Department of Commerce licenses	111[(1)]	222[(1)]	29	40	41
Patent licenses					
NIST	24[(1)]	30[(1)]	23	33	35
NOAA	5	6	6	7	6
ITS	7	10	0	0	0
Department	35	46[(1)]	29	40	41
Other invention licenses					
ITS	75	176	0	0	0

(1) Reflects correction of data from FY 2008 Report.

Characteristics of Licenses Bearing Income

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
● All income-bearing licenses					
Department	30	35	25	27	24
- Patent licenses					
NIST	18	21	21	22	22
NOAA	5	4	4	5	4
ITS	7	10	0	0	0
▫ Exclusive, partially exclusive, non-exclusive					
NIST	16, 0, 2	16, 0, 5	14, 0, 7	15, 0, 7	15, 0, 7
NOAA	1, 0, 4	0, 0, 4	0, 0, 4	0, 0, 5	0, 0, 4
ITS	0, 0, 7	0, 0, 10	0, 0, 0	0, 0, 0	0, 0, 0
Department	17, 0, 13	16, 0, 19	14, 0, 11	15, 0, 12	15, 0,11

Income from Licensing

		FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
● **Total income**	Department	$194,393	$224,847	$292,647	$335,889	$237,259
	NIST	$156,793	$195,347	$223,640	$197,445	$202,216
	NOAA	$13,100	$22,000	$69,007	$138,444[(2)]	$35,043
	ITS	$24,500	$7,500	$0[(3)]	$0	$0

(2) Increase is due to a license with The Walt Disney Company for NOAA's Science on a Sphere for a one-time royalty of $75,000. (3) ITS no longer licenses Video Quality Metric (VQM) technology. This software is available free of charge via open-source download.

Collaborative Relationships for Research and Development

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
● **CRADAs***					
▪ Traditional CRADAs					
NIST	135	140	121	65[(1)]	65
NOAA	6	5	4	5	5
ITS	8	9	6	7	7
Department	149	154	131	77	77
▪ Non-traditional CRADAs					
NIST	2,353	2,348	2,224	2,284	2,297
ITS	506	276	35[(2)(3)]	25	25
Department	2,895	2,510	2,259	2,309	2,309

*CRADA = Cooperative Research and Development Agreement
(1) Decrease in CRADAs attributed to successful conclusion of multi party CRADA Consortiums. (2) In 2008 ITS removed some of its telecommunication analysis services from the Web. These services provided network-based access to research results, models, and databases supporting applications in wireless system design and analysis. As a result, there was a significant decrease in the number of CRADAs between the government and industry that allowed for improvement to these models. ITS is working on a newer geographic information system- (GIS-) based platform for the modeling services, which will be available in the future.
(3) Reflects correction of data from FY 2007 Report.

Later chapters provide agency-specific information and details on the above metrics.

CHAPTER 2

National Institute of Standards and Technology

Approach and Plans for Technology Transfer

The National Institute of Standards and Technology (NIST) has a broad mission to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve the quality of life.

An important part of NIST's activities is to anticipate future measurement and standards needs of U.S. industry. Rapidly evolving sectors like nanotechnology, biotechnology, homeland security, information technology, and advanced manufacturing need sophisticated technical support systems in order to flourish and grow. NIST laboratories develop measurement techniques, reference data, test methods, standards, and other technologies and services that support U.S. industry, scientific research, and the activities of many other federal agencies. In carrying out its mission, NIST works directly with industry partners (individual companies and consortia), universities, other domestic and foreign associations, and other government agencies.

NIST's technology transfer activities are designed to disseminate the Institute's fundamental research results and its measurements and standards research results to industry and other interested parties. In order to provide leading-edge scientific and technical work, NIST is required to have expertise in multiple disciplines, to maintain high levels of collaboration with organizations and people with diverse capabilities, and have highly specialized facilities and tools. For more than a century, NIST laboratories have successfully collaborated with others to provide the measurement techniques and technical tools needed by America's innovators. NIST uses many different collaboration mechanisms to promote innovation and ensure that the resulting technologies are broadly disseminated.

Additional details on NIST's technology transfer program are available at: http://www.nist.gov/tpo/index.cfm.

NIST uses the following mechanisms to transfer its knowledge, intellectual property and other technical assets:

- Patents and licenses
- Cooperative Research and Development Agreements (CRADAs)
- Research Agreements
- International Cooperation Agreements
- Guest Researchers
- Small Business Innovation Research (SBIR)
- User Facilities
- Technical publications

- Standard Reference Materials
- Standard Reference Data
- Calibration and Accreditation Services
- Software tools
- Conferences, workshops, and inquiries
- Participation in Documentary Standards Committees

Patents and Licensing
NIST actively seeks to identify commercially valuable inventions that result from its research. A Patent Review Committee evaluates each reported invention's potential to promote U.S. innovation and industrial competition. NIST will seek patent protection when a patent: (1) would enhance the potential for an invention's commercialization; (2) would have a positive impact on a new field of science or technology and/or the visibility and vitality of NIST (3) would further the goals of a Cooperative Research and Development Agreement (CRADA) or other agreement. NIST conducts periodic informational sessions and meetings with NIST staff to emphasize the importance of NIST invention policies and procedures, and the use of these policies and procedures to advance their research and fulfill NIST's mission. (See: http://tsapps.nist.gov/techtransfer/)

Cooperative Research and Development Agreements (CRADAs)
Cooperative research and development between federal laboratories, academia and outside partners is an effective means for technology transfer. Beyond the improved know-how and new technologies that result, these joint efforts often help collaborators to leverage each other's resources and technical capabilities. They also provide mechanisms for collaborators to gain new technical competencies and acquire new skills. Cooperative Research and Development Agreements (CRADAs) are a mechanism for establishing joint relationships with industry academia, and state and local governments. A CRADA is an agreement between a federal laboratory and one or more partners to collaborate on defined R&D projects. The legal authority for CRADAs was created by the Federal Technology Transfer Act of 1986 with the aim of encouraging federal laboratories to participate in R&D partnerships to advance promising new technologies toward commercialization. (See: http://www.nist.gov/tpo/collaborations/crada.cfm)

Guest Researchers
Each year thousands of researchers visit NIST to participate in collaborative projects. (See: http://www.nist.gov/tpo/collaborations/guestresearchers.cfm). Technology transfer involves not only inventions, innovations, data, patents and licenses, but also "people." While inventions with commercial potential are an important element of technology transfer, hosting innovative guest scientists at NIST are of equal importance in accomplishing NIST's technology transfer mission. NIST hosts many term appointment researchers and non-NIST employees working as guest researchers, collaborators, student fellows, and post-doctoral fellows. After their tenures at NIST, many will seek career opportunities in academia, the private sector, or the federal government. While some guest researchers' work at NIST may result in inventions, all of them will leave NIST with technical and research skills that place them on the cutting edge of their disciplines. Each individual brings to their new careers and their new employers these skills,

knowledge and a desire to employ them in innovative ways. Moreover, these "NIST alumni" bring to their new employers knowledge of how to collaborate with federal laboratories and knowledge of federal resources that are available to assist companies as they create and develop new and improved technologies. This focus on NIST alumni reflects NIST's view that technology transfer involves "people" transferring new knowledge as well as innovative "things."

NIST has been recognized[1] as a vital contributor to encouraging and supporting the nation's efforts in science, technology, engineering and mathematics (STEM) education. As part of its mission, and to help create a long-term and well-qualified workforce for standards and measurement research, NIST has several education outreach programs and partnerships that enrich basic research programs such as:

- the Summer Undergraduate Research Fellowship (SURF) program (See: http://www.nist.gov/surfgaithersburg/index.cfm);
- the Summer High School Internship (SHIP) program (See: http://www.nist.gov/hrmd/staffing/ship.cfm); and
- the NIST Summer Institute for Middle School Science Teachers (See: http://www.nist.gov/iaao/teachlearn/index.cfm).
- the Professional Research Experience Program (PREP) (See: http://www.boulder.nist.gov/bdprepo.htm).

NIST has also begun a program to provide students and post-doctoral fellows with information on the use of science in industry, including co-sponsoring a career fair with other agencies and Rockville Economic Development, Inc.

In addition, NIST jointly operates the following research organizations established to promote cross-disciplinary collaborations (see: http://www.nist.gov/locations.cfm):

- JILA[2], Boulder, CO, a world-class physics research institute jointly operated by NIST and the University of Colorado at Boulder
- Center for Advanced Research in Biotechnology, Rockville, MD, an interdisciplinary partnership in cutting-edge biotechnology between NIST and the University of Maryland Biotechnology Institute
- Joint Quantum Institute, College Park, MD, a new institute for advancing quantum physics research that is jointly operated with the University of Maryland
- Hollings Marine Laboratory, Charleston, SC, a national center for coastal ocean science, in which NIST is one of five federal, state, and university partners

Small Business Innovation Research (SBIR)

[1] The Federal Laboratory Consortium (FLC) gave its 2011 award for excellence in the support of STEM education to six NIST employees.

[2] When first established by NIST and the University of Colorado-Boulder, JILA stood for "Joint Institute for Laboratory Astrophysics." At present, according to common usage, JILA stands for "JILA," a joint NIST-UC research institute.

NIST's Small Business Innovation Research (SBIR) program provides funding to small high technology U.S. firms. The program offers qualified small businesses the opportunity to propose innovative ideas that meet specific NIST research and development needs, and have the potential for commercialization. (See: http://www.nist.gov/tpo/sbir/index.cfm)

User Facilities
To support U.S. industry, academic institutions, NIST, and other government laboratories, NIST operates two unique and valuable laboratory facilities – the NIST Center for Neutron Research (NCNR) and the Center for Nanoscale Science and Technology (CNST). The NCNR is a national center for research using thermal and cold neutrons. Many of its instruments rely on intense beams of cold neutrons emanating from an advanced liquid hydrogen moderator. The CNST supports the development of nanotechnology from discovery to production. The Center operates a national shared-use nanofabrication and measurement facility (the NanoFab), complemented by a multidisciplinary research staff creating the next generation tools for advancing nanotechnology. (See: http://www.nist.gov/user-facilities.cfm)

Technical Publications
Technical publications are one of the major mechanisms NIST uses to disseminate the results of its research to industry, academia, and other agencies. NIST staff author more than 1,200 publications in peer-reviewed journals each year. (See: http://nvl.nist.gov/)

NIST publicizes its planned, ongoing and recently completed work in the trade and technical press, which is typically followed by the organizations most likely to have an interest in NIST's research and services. In addition to news releases, websites and contacts with the media, NIST publishes *Tech Beat*, a biweekly plain language newsletter of recent research results. (See: http://www.nist.gov/public_affairs/tech-beat/index.cfm)

Standard Reference Materials
Standard Reference Materials (SRMs) are a definitive source of measurement traceability in the United States. Measurements made using SRMs can be traced to a common and recognized set of basic standards that provide the basis for measurement compatibility among different laboratories. (See: http://www.nist.gov/srm/index.cfm)

Standard Reference Data
The Standard Reference Data (SRD) Program provides critically evaluated numeric data to scientists and engineers for use in technical problem-solving, research and development. This data is extracted from scientific and technical literature, or from measurements done at NIST laboratories, and critically evaluated by for accuracy and reliability. NIST's SRD databases cover many areas of science, including analytical chemistry, atomic and molecular physics, biotechnology, and materials sciences. (See http://www.nist.gov/srd/index.cfm)

Calibration and Accreditation Services
The NIST laboratories provide physical measurement services for their customers, including calibration services, special tests, and measurement assurance programs. NIST's calibration services are designed to help manufacturers and users of precision instruments achieve the

highest possible levels of measurement quality and productivity. (See: http://www.nist.gov/calibrations/index.cfm)

The National Voluntary Laboratory Accreditation Program (NVLAP) is a voluntary and fee-supported program to accredit laboratories that are found competent to perform specific tests or calibrations, or types of tests or calibrations. Through laboratory accreditation, NIST efficiently leverages its primary calibration services to support a broader base of secondary calibrations conducted within the private sector. (See: http://www.nist.gov/pml/nvlap/index.cfm)

Software Tools
NIST provides a wide variety of application software programs and testing tools to U.S. industry, academia and other interested users. NIST develops standards, conformance tests, tools, and methods to evaluate the quality of software and the software's conformation to standards.

Conferences, Workshops, and Inquiries
Some of the most important mechanisms for technology dissemination are communication, education, and interaction among researchers, developers and users of technology. NIST hosts numerous conferences, workshops, and other meetings each year to facilitate the transfer of technology. During FY 2010, NIST hosted 83 conferences with more than 8300 conference participants. Further, NIST staff was made available to answer over 6,564 e-mail, telephone, and mail inquiries from the public, including inquiries from researchers requesting information and details about NIST technical developments and research results.

Participation in Documentary Standards Committees
NIST transfers technology through active participation in documentary standards developing organizations, which develop consensus standards on a range of technologies. NIST participation enables its scientists and engineers to bring NIST technology and know-how directly into standards setting bodies. NIST also reports these activities to the Office of Management and Budget and to Congress, as required by the National Technology Transfer and Advancement Act of 1995. (See: http://gsi.nist.gov/global/index.cfm/L1-1)

Training
Over the past five years, approximately 6,100 students have participated in NIST Seminars. During FY 2010, about 1,200 students participated in over 60 NIST measurement and documentary standards seminars. These seminars were taught by: scientists from other National Metrology Institutes in the Americas; officials from U.S. federal agencies; weights and measures officials from state government; laboratory staff from U.S. industry calibration laboratories; and middle-school science teachers. In addition to laboratory and classroom courses, NIST offers special webinars to participants.

NIST Training (FY2006 through FY2010): Focus on Measurement and Standards

Fiscal Year	Number of Classes	Number of People Trained
2006	60	1029
2007	61	1812
2008	63	1302
2009	44	792
2010	61	1202

Additional Details in FY 2010

Pursuant to the reporting requirements of the Technology Transfer Commercialization Act of 2000 and other relevant legislation, NIST provides the following data on its transfer of knowledge and technology to the private sector. The data provides collaborative relationships for research and development (CRADAs and other kinds of relationships), invention disclosures, patenting, and licensing. The data includes other technology transfer mechanisms utilized by the NIST laboratories, e.g., Standard Reference Materials, Standard Reference Data, technical publications produced, calibration tests, and guest researcher collaborations.

NIST regularly assesses the downstream impact of its research projects and technologies. NIST utilizes a diverse, yet complementary, set of performance indicators and measures to evaluate its programmatic performance over time. NIST's performance evaluation system accommodates the Institute's diverse products, and addresses the intrinsic difficulty of measuring the results of federal investments in scientific and technological products and services. NIST evaluates its performance and plans its work through: economic impact studies; peer review and other forms of external assessment; customer feedback; and quantitative output metrics. From 2000 to 2009, 14 economic impact studies were conducted on NIST research programs. These studies show that the ratio of overall return on investment is 36:1. [3]Additional details on NIST economic performance measures are available online at http://www.nist.gov/director/planning/impact_assessment.htm. NIST also reports its performance through Department of Commerce Government Performance and Results Act of 1993 (GPRA) documents, and the NIST Financial Statements.

Collaborative Relationships for Research and Development

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
● **CRADAs*, total active in the fiscal year** (1)	2,488	2,488	2,343	2,343	1465
- New, executed in the fiscal year	1,646	1,585	1,575	1,492	1390
▪ Traditional CRADAs, (2) total active in the fiscal year	135	140	121	65[5]	66
- New, executed in the FY	74	20	12	19	16
▪ Non-traditional CRADAs, (3) total active in the fiscal Year	2,353	2,348	2,224	2,284	1399
- New, executed in the fiscal year	1,572	1,565	1,565	1,473	1374
● **Other types of collaborative R&D relationships**					
▪ Guest scientists and engineers during the fiscal year (4)	2,114	2,672	2,816	2,828	2,897

*CRADA = Cooperative Research and Development Agreement.
(1) "Active" means agreements in force at any time during the fiscal year. "Total active" is comprehensive of all agreements executed under CRADA authority (15 U.S.C. 3710a).
(2) CRADAs involving collaborative research and development by a federal laboratory and non-federal partners.

[3] Various internal NIST studies performed by Dr. Gregory Tassey, Senior NIST Economist during the period 2000 through 2009.

(3) CRADAs used for special purposes, such as laboratory accreditation, materials transfer or technical assistance that may result in protected information.
(4) "Guest scientists and engineers" includes foreign and domestic guest researchers and researchers working at NIST under Intergovernmental Personnel Act (IPA) agreements, CRADAs, and Facility Use Agreements.
(5) The decrease in CRADAs is attributable to the successful conclusion of multi-CRADA Consortiums.

Licensing Details

Multiple inventions included in a single license are counted as one license. Licenses that include both patents and copyrights (hybrid licenses) are reported as patent licenses and are not counted as copyright licenses.

Profile of Active Licenses

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
● **All licenses**, number total active in the fiscal year (1)	24	30	23	33	35
▫ New, executed in the fiscal year	3	5	2	11	5
▪ **Invention licenses**, total active in the fiscal year	24	30	23	33	35
▫ New, executed in the fiscal year	3	5	2	11	5
- Patent licenses, (2) total active in the fiscal year	24	30	23	33	35
▫ New, executed in the fiscal year	3	5	2	11	5
- Material transfer licenses (inventions), total active	0	0	0	0	0
▫ New, executed in the fiscal year	0	0	0	0	0
- Other invention licenses, total active in the fiscal year	0	0	0	0	0
▫ New, executed in the fiscal year	0	0	0	0	0
▪ **Other IP licenses**, total active in the fiscal year	0	0	0	0	0
▫ New, executed in the fiscal year	0	0	0	0	0
- Copyright licenses (fee-bearing)	0	0	0	0	0
▫ New, executed in the fiscal year	0	0	0	0	0
- Material transfer licenses (non-inventions), total active	0	0	0	0	0
▫ New, executed in the fiscal year	0	0	0	0	0

(1) "Active" means in force at any time during the fiscal year.
(2) Includes pending patent applications.

Licensing Management

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
● **License negotiation time,**[1] licenses granted in the fiscal year					
▪ **Invention licenses** (Patent licenses) [2]					
▫ Average, months	6.0	2.0	10.5[3]	4.8	3
▫ Minimum	1.0	1.0	3.0[3]	3	2
▫ Maximum	13.0	3.0	2.0	7	4
● **Licenses terminated for cause,** number in the fiscal year					
▪ **Invention licenses** (Patent licenses) [2]	0	0	0	0	0

(1) Date of license application to date of license execution. (Date of license application is the date the laboratory formally acknowledges the written request for a license from a prospective licensee and agrees to enter into negotiations.)
(2) Patent licenses include pending patent applications.
(3) These numbers reflect an increase in income-bearing licenses, which take longer to negotiate than royalty-free research licenses.

Income from licensing comes from a variety of sources: license issue fees; earned royalties; minimum annual royalties; paid-up license fees; reimbursement for full-cost recovery of goods; and services provided by the laboratory to the licensee (including patent costs).

Characteristics of Licenses Bearing Income

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
● **All income bearing licenses,** [1] total number	18	21	21	22	22
▫ Exclusive	16	16	14	15	15
▫ Partially exclusive	0	0	0	0	0
▫ Non-exclusive	2	5	7	7	7
▪ **Invention licenses** (Patent licenses),[1] [2] total distributed, income bearing	18	21	21	22	22
▫ Exclusive	16	16	14	15	15
▫ Partially exclusive	0	0	0	0	0
▫ Non-exclusive	2	5	7	7	7
▪ **Other IP licenses**, income bearing	0	0	0	0	0
● **All royalty bearing licenses,** [3] total number	18	21	21	22	22
▪ Invention licenses, royalty bearing	18	21	21	22	22
- Patent licenses,[2] royalty bearing	18	21	21	22	22
▪ **Other IP licenses,** royalty bearing	0	0	0	0	0

(1) Detailed statistics are required under the Technology Transfer Commercialization Act of 2000 (Pub. L. 106-404) [15 U.S.C. Section 3710 (f)].
(2) Patent licenses include licenses of pending patent applications.
(3) Royalties are only one component of total license income.

Income from Licenses

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
● **Total income,** all licenses active in FY [1]	$156,793	$195,347	$223,640	$197,445	$202,216
▪ **Invention licenses** (patent licenses) [2]	$156,793	$195,347	$223,640	$197,445	$202,216
▪ **Other IP licenses,** total active in the	0	0	0	0	0
● **Total Earned Royalty Income** (ERI) [3][4]	$156,793	$195,347	$223,640	$197,445	$202,216
▫ Median ERI	$5,000	$15,000	$20,000	$15,625	$3,438
▫ Minimum ERI	$640	$1,280	$640	$320	$1,245
▫ Maximum ERI	$85,403	$169,067	$100,000	$100,000	$100,000
▫ ERI from top 1% of licenses	dw	dw	dw	dw	dw
▫ ERI from top 5% of licenses	dw	dw	dw	dw	dw
▫ ERI from top 20% of licenses	dw	dw	dw	dw	dw
▪ **Invention licenses** (Patent licenses) [2][4]	$156,793	$195,347	$223,640	$197,445	$202,216
▫ Median ERI	$5,000	$15,000	$20,000	$15,625	$3,438
▫ Minimum ERI	$640	$1,280	$640	$320	$1,245
▫ Maximum ERI	$85,403	$169,067	$100,000	$100,000	$100,000
▫ ERI from top 1% of licenses	dw	dw	dw	dw	
▫ ERI from top 5% of licenses	dw	dw	dw	dw	dw
▫ ERI from top 20% of licenses	dw	dw	dw	dw	dw
▪ **Other IP licenses,** total active in the	$0	$0	$0	dw	dw

"n/a" means that the data is not available from the agency at time of this report.
"dw" means data withheld to protect proprietary information.

(1) Total income includes license issue fees, earned royalties, minimum annual royalties, paid-up license fees, reimbursement for full-cost recovery of goods and services provided by the laboratory to the licensee including patent costs and Standard Reference Data.
(2) Patent license tally includes licenses to pending patent applications.
(3) "Earned royalty" is a royalty based on use of a licensed invention (usually, a percentage of sales or of units sold). Not a license issue fee or a minimum royalty.
(4) Detailed statistics are required under the Technology Transfer Commercialization Act of 2000 (Pub. L. 106-404) [15 U.S.C. Section 3710 (f)].

Disposition of Invention License Income

	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
● **Income distributed** [1] ▪ **Invention licenses,** (Patent licenses), [2] total distributed	$123,348	$156,793	$195,347	$223,640	$197,445
- To inventor(s)	$48,148 (39%)	$47,536 (30%)	$65,100 (33%)	$75,140 (33%)	$66,757 (34%)
- To NIST [3]	$75,199 (61%)	$109,257 (70%)	$130,247 (67%)	$148,500 (66%)	$130,688 (66%)

(1) Income includes royalties and other payments received during the fiscal year.
(2) Patent licenses include licenses on pending patent applications.
(3) NIST only in FY 2001-2004. Percentages indicate amounts of total licensing income to inventors and to NIST

Other Performance Measures Deemed Important by the Agency

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010[4]
Standard Reference Materials (SRMs) available (1)	1,302	1,285	1,282	1,283	1283
Standard Reference Materials (SRMs) units sold (2)	31,195	32,614	33,373	29,769	31,667
Standard Reference Data (SRD) titles available (3)	113	109	102	120	120
Number of calibration tests performed (4)	13,127	27,489*	25,944	18, 609	17,697
Technical publications in peer-reviewed journals(5)	1,163	1,272	1,271	1,463	1,243

* The number of calibration tests performed in FY 2007 was significantly higher than the number of tests performed in FY 2005 and FY 2006 due principally to a surge in calibration testing for the military and its contractors.

(1) Direct and verifiable count of SRMs available to customers at the close of the fiscal year. The number of SRMs available for sale illustrates the breadth of measurements supported by NIST. Over time, NIST expects slight growth in the number of SRMs available.

(2) Direct and verifiable count of NIST SRM units sold during the fiscal year. In recent years, NIST had been expecting a continuing slight decline in the number of SRM units sold, as NIST made greater use of highly leveraged SRM services over time, including accreditation of Nationally Traceable Reference Material producers. However, in FY 2005, the number of SRMs sold increased. Some possible contributing factors include the implementation of new Environmental Protection Agency (EPA) regulations, environmental activities, an increase in construction projects, and the availability of previously out-of-stock SRMs.

(3) Direct and verifiable count of SRD products developed and disseminated by NIST. NIST expects continued modest growth in the total number of SRD titles available. Of those titles currently available, about 40% are available for sale, and 60% are free online systems. Over time, a larger percentage of SRDs will be distributed via the Internet. New growth in online systems was anticipated for FY 2008-09 with the release of fee-based titles for the Internet.

(4) Calibration tests performed by the NIST laboratories.

(5) Annual number of NIST's technical publications appearing in influential scientific peer-reviewed journals.

Downstream Outcomes from NIST Technology Transfer Activities

Advanced Combinatorial Testing Suites

A NIST software testing tool, the "Advanced Combinatorial Test Suites" (ACTS), is available to industry, academia and other government agencies. The software provides a systematic means for testing complex software failure modes, caused by the interaction of changing software parameters, during high user/high data volume operations. A 2002 study[5] by the US Department of Commerce found that ineffective or incomplete software testing costs US industry $59.5 billion a year. Thus, the need for dramatic improvements in software testing is a top priority for the Department.

[5]Gregory Tassey, "The Economic Impacts of Inadequate Infrastructure for Software Testing," Planning Report 02-3, May 2002, http://www.nist.gov/director/prog-ofc/report02-3.pdf

ACTS generates failure test suites based on possible modes of system failure defined by various combinations of system operating parameters. ACTS can accommodate combinations of 2 to 6 different parameter. Prior to ACTS, construction of test scenarios for combinations of 2 to 6 parameters, even with the fastest processors, required many hours or days for large and/or complex configurations. The ACTS tool represents a breakthrough in software testing technology; it constructs smaller test suites in a fraction of the time required than other available tools.

The NIST ACTS team used an innovative approach – distribution of test copies via world-wide-web – to field test the ACTS software. In January 2009 the ACTS team initially distributed 185 copies of ACTS on an open- source basis to targeted federal agencies, academic institutions, and private sector firms including Microsoft, Lockheed Martin, Cisco, SAP, AT&T and SAIC. Recipients were urged to share the technology with others having an interest in software testing. Through the use of innovative social networking based marketing, the number of systems deployed increased to more than 800. As a part of the overall technology transfer effort, NIST team members were available to all recipients for technical consultation and collaboration. At present, the total number of ACTS units deployed throughout the world, both through target distribution and user sharing, is estimated to be in excess of 5,000 and growing.

RoboCrane® Erects New Safe Confinement Structure for Chernobyl Nuclear Plant

A modified version of the RoboCrane®, a unique floating platform developed by NIST, will be used for cleanup operations over the destroyed reactor number four at the former Chernobyl nuclear power plant in northern Ukraine. PaR Systems, a company based in Minneapolis/St. Paul, Minn., licensed the computer-controlled roving tool platform for use in the area immediately surrounding the exploded reactor core to help erect the New Safe Confinement structure for the reactor.

The RoboCrane®, developed at NIST in the 1990s, expands on the principle of a Stewart platform, a device that uses three sets of paired winches (motor-driven spools of cable) to suspend and manipulate a platform with six degrees of freedom (lateral, longitudinal, vertical, roll, pitch and yaw). Stewart platforms are commonly used as the base for flight simulators. The platform's precision maneuverability throughout a large space, and its ability to accommodate a large variety of tools, make it ideal for this type of cleanup operation. PaR will affix a variety of interchangeable tools to the end of the spine, including a robotic arm, drill, jackhammer, shear, high-power vacuum system and closed circuit television viewing system, all of which will be operated remotely.

Integrated Colony-Counting Software Solution to Pneumonia Vaccine Testing Problems

NIST scientists have found a way to improve the efficiency of a pneumonia vaccine testing method developed at the University of Alabama at Birmingham (UAB). Pneumonia is the world's leading cause of death in children under five years of age, and it poses a serious risk to elderly adults. The leading cause of pneumonia worldwide is the pneumococcus bacterium, which also causes meningitis, sepsis and other complications. Pneumococcus has more than 90

strains that vary by geographic region and change over time. Consequently, ongoing testing is necessary to monitor existing vaccines and advance new ones.

One novel high-throughput testing method involves culturing the bacteria along with a vaccinated person's blood serum and human white blood cells. If the vaccine is effective, the white cells kill the pneumococci and very few of the bacteria survive. Scientists can determine the vaccine's effectiveness by counting the number of surviving pneumococcus colonies. Therefore, rapid, accurate and standardized counting of these colonies is critical to this testing method. At present, the most commonly used counting process is manual counting, which is time-consuming and exhausting. Automated counting devices exist, but they require customized image acquisition methods that are expensive and not readily available in developing countries. NIST researchers have created software, NIST's Integrated Colony Enumerator (NICE), that addresses the above concerns and works on any common imaging device. NICE receives a digital image as input and counts colonies grown from single pneumococcal cells.

NIST Software Security Patent to Improve Health IT Privacy

Role-Based Access Control (RBAC) Workflow is an algorithm that can be incorporated into a larger software designed to control access to information systems. For example, patient admission procedure at a hospital involves a number of steps and, at each step, someone requires access to patient medical records for specific purposes, such as registering a patient or verifying a patient's insurance information or medical history before initiating emergency treatment.

This technology was developed with the assistance of a SBIR award. Virtual Global, a provider of enterprise cloud solutions, has used the RBAC technology to develop a Health IT platform ("HealthCapsule") for improving patient privacy.

In 2010 HealthCapsule will enter SBIR Phase III stage, during which HealthCapsule will undergo additional validation. After validation, VirtualGlobal will launch the HealthCapsule for commercial use.

Individual Staff Researcher Awards with Technology Transfer Impact

In 2010 NIST researchers received numerous external awards for their achievements in science and technology. One such award includes the election of the following NIST researchers as IEEE Fellows, a distinction reserved for select few with extraordinary record of accomplishments in any of the IEEE fields of interest:

- James Baker-Jarvis, NIST Boulder, CO Campus, for contributions to dielectric measurement and analysis of microwave measurement structures.
- Samuel Paul Benz, NIST Boulder, CO Campus, for contributions to quantum-based Josephson junction array waveform synthesizer.
- Christopher L. Holloway, NIST Boulder, CO Campus, for application of new material in the field of electromagnetic compatibility.
- Nicholas G. Paulter, NIST Gaithersburg, MD Campus, for contributions to ultra-high speed waveform measurements.

CHAPTER 3

National Oceanic and Atmospheric Administration

Approach and Plans for Technology Transfer

The National Oceanic and Atmospheric Administration's (NOAA) mission is to: understand and predict changes in climate, weather, oceans, and coasts; to share that knowledge and information with others; and to conserve and manage coastal and marine ecosystems and resources. This mission will become ever more critical in the 21st century as national issues related to climate change; limited freshwater supply, ecosystem management, and homeland security intensify.

NOAA is one of the nation's premier scientific agencies. NOAA science and technology impact the daily lives of the nation's citizens, and have a significant impact on the national economy. About one-third of the U.S. economy (approximately $3 trillion) is weather sensitive. Industries related to agriculture, energy, construction, health, travel, and transportation are almost entirely weather dependent. Weather data and forecasts play a critical role in these major economic sectors. Weather related information is transferred to the industry and the public via the media, internet, and NOAA Weather Radio. Federal, state, and local governments and the public use weather warnings to save lives and prevent destruction of property. Television stations, and many weather related firms, use weather data and forecasts in their daily operations. Industry uses NOAA data in home construction and design, crop selection, disease control, and fuel delivery and supply. Weather data have been used for deciding such diverse applications as automobile fuel delivery system design, the best time to market umbrellas, and even for determining optimum conditions for breeding honeybees. Accurate and longer range weather forecasts depend on an ongoing program of research and development.

Research by NOAA's laboratories is primarily aimed at assisting NOAA's operational components. Recent examples demonstrating the direction of NOAA's research are weather forecasting, solar emission forecasting, estimating fish stocks, predicting water resources, tsunami warning, and charting ocean bottom topography. Research results are transferred to NOAA's operational components to improve prediction, management, and other mission activities.

NOAA provides details of its research and technology to the public in the form of information products and services. These include weather and climate forecast data, El Niño prediction and monitoring, tides and currents, satellite imagery, fishery statistics, information on protected species, air quality, coastal conditions, beach temperatures, nautical charts, and databases on climate, oceans, ice, atmosphere, geophysics and the sun.

NOAA's primary technology transfer mechanism has historically been the open dissemination of scientific and technical information to individuals, industry, government, and universities. This means of transfer is consistent with the agency's mission and scientific tradition. Although NOAA finds this method of technology transfer to be more efficient and economical, NOAA continues to transfer certain intellectual property through licenses and Cooperative Research and Development Agreements (CRADAs) when it provides a competitive edge to U.S. companies.

In FY 2010 NOAA's technology transfer program disseminated applications resulting from its meteorological and oceanographic technologies to individuals, industry, government, and universities. In addition, NOAA provided daily weather forecasts and warnings through the media and NOAA Weather Radio. NOAA also transferred its technology through presentations at scientific meetings, publication in peer-reviewed scientific journals, and through NOAA scientific and technical publications.

NOAA collaborates with other federal research agencies on topics of joint interest in science and technology development. For example, NOAA and the Environmental Protection Agency (EPA) teamed up to provide new experimental air quality forecast guidance that enables state and local agencies to issue more accurate and geographically specific air quality warnings to the public. The annual cost of poor air quality to the U.S. from air pollution-related illnesses has been estimated at $150 billion.

To ensure that United States benefits from and fully exploits scientific research and technology developed abroad, NOAA collaborates and shares information with organizations in countries throughout the world. Through these international relationships, NOAA receives technology that may eventually benefit U.S. industries and public users. For example, the understanding and forecasting of global phenomena that occur in the atmosphere, oceans, and on the sun require worldwide collaboration and information sharing. This is accomplished through formal agreements with individual countries and participation in international organizations, such as the World Meteorological Organization (WMO), the Intergovernmental Oceanographic Commission (IOC), and the International Astronomical Union (IAU). NOAA participates in international scientific programs, such as in the Global Earth Observation System, and shares technology and scientific data. This effort involves nearly 50 countries, the European Commission, and 29 international organizations. NOAA also provides technical assistance and training to individuals from other countries, and participates in an international visiting scientist program. Further, NOAA shares environmental data through its participation in the World Data Center program.

In the future, NOAA will continue to direct its technology transfer and international collaboration activities toward four mission goals:

1. **Climate Adaptation and Mitigation:** An informed society anticipating and responding to climate and its impacts;
2. **Weather-Ready Nation:** Society is prepared for and responds to weather-related events;
3. **Healthy Oceans:** Marine fisheries, habitats, and biodiversity are sustained within healthy and productive ecosystems; and
4. **Resilient Coastal Communities and Economies:** Coastal and Great Lakes communities are environmentally and economically sustainable.

Additional Details in FY 2010

Collaborative Relationships for Research & Development

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
● **CRADAs*,** total active in the fiscal year (1)	6	5	4	5	6
- New, executed in the fiscal year	0	0	1	2(4)	2
▪ Traditional CRADAs,(2) total active in the fiscal year	6	5	4	5	6
- New, executed in the fiscal year	0	0	0	0	0
▪ Non-traditional CRADAs,(3) total active in the fiscal year	0	0	0	0	0
- New, executed in the fiscal year	0	0	0	0	0
● **Other types of collaborative R&D relationships**	0	0	0	0	0

CRADA = Cooperative Research and Development Agreement.

(1) "Active" = legally in force at any time during the fiscal year. "Total active" is comprehensive of all agreements executed under CRADA authority (15 USC 3710a).
(2) CRADAs involving collaborative research and development by a Federal laboratory and non-Federal partners.
(3) CRADAs used for special purposes, such as material transfer or technical assistance that may result in protected information.
(4) FY 2009: Correction made to "newly executed" CRADAs; there were two not one as previously reported.

Licensing

Profile of Active Licenses

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
● **All licenses**, number total active in the FY (1)	5	6	6	7	6
▫ New, executed in the FY	1	3	0	1*	0
▪ **Invention licenses**, total active in the FY	5	6	6	7	6
▫ New, executed in the FY	1	3	0	0	0
- Patent licenses,(2) total active in FY	5	6	6	7	0
▫ New, executed in the FY	1	3	0	0	0
- Material transfer licenses (inventions), total active	0	0	0	0	0
▫ New, executed in the FY	0	0	0	0	0
- Other invention licenses, total active in the FY	0	0	0	0	0
▫ New, executed in the FY	0	0	0	0	0

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
▪ **Other IP licenses**, total active in the FY	0	0	0	0	0
▫ New, executed in the FY	0	0	0	0	0
- Copyright licenses (fee bearing)	0	0	0	0	0
▫ New, executed in the FY	0	0	0	0	0
- Material transfer licenses (non-inventions), total active	0	0	0	0	0
▫ New, executed in the FY	0	0	0	0	0
- Other, total active in the FY	0	0	0	0	0
▫ New, executed in the FY	0	0	0	0	0

Multiple inventions in a single license are counted as one license. Licenses that include both patents and copyrights (hybrid licenses) are reported as patent licenses and are not included in the count of copyright licenses.
(1) "Active" = legally in force at any time during the FY.
(2) Patent license tally includes patent applications which are licensed.
* One-Time License only with one-time flat fee royalty

Licensing Management

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
● **Elapsed execution time**,(1) licenses granted in the FY					
▪ **Invention licenses** ▫ Average, months ▫ Minimum ▫ Maximum	7.0	5.0 6.0 7.0	*	7.0	7.0
- Patent licenses (2) ▫ Average, months ▫ Minimum ▫ Maximum	7.0	5.0 6.0 7.0	*	7.0	7.0
● **Licenses terminated for cause**, number in the FY					
▪ Invention licenses	0	0	0	0	0
- Patent licenses (2)	0	0	0	0	0

Data included in this table (intentionally) addresses only invention licenses, with patent licenses distinguished as a sub-class.
* No new licenses were executed in FY 2004, FY 2005, 2008.
(1) Date of license application to the date of license execution. (Date of license application is the date the lab formally acknowledges the written request for a license from a prospective licensee and agrees to enter into negotiations.)
(2) Patent license tally includes patent applications which are licensed.

Characteristics of Licenses Bearing Income

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
● **All income bearing licenses**, total number	5	4	4	5	4
▫ Exclusive ▫ Partially exclusive ▫ Non-exclusive	1 0 4	0 0 4	0 0 4	0 0 5	0 0 4
▪ **Invention licenses**, income bearing	5	4	4	5	4
▫ Exclusive ▫ Partially exclusive ▫ Non-exclusive	1 0 4	0 0 4	0 0 4	0 0 5	0 0 4
- Patent licenses,(1) income bearing	5	4	4	5	4
▫ Exclusive ▫ Partially exclusive ▫ Non-exclusive	1 0 4	0 0 4	0 0 4	0 0 5	0 0 4
▪ **Other IP licenses**, income bearing	0	0	0	0	0
▫ Exclusive ▫ Partially exclusive ▫ Non-exclusive					
- Copyright licenses (fee bearing)					
▫ Exclusive ▫ Partially exclusive ▫ Non-exclusive					
● **All royalty bearing licenses**,(2) total number	5	4	4	5	4
▪ **Invention licenses**, royalty bearing	5	4	4	5	4
- Patent licenses,(1) royalty bearing	5	4	4	5	4
▪ **Other IP licenses**, royalty bearing	0	0	0	0	0
- Copyright licenses (fee bearing)	5	4	4	5	4

In general, license income can result from various sources: license issue fees, earned royalties, minimum annual royalties, paid-up license fees, and reimbursement for full-cost recovery of goods and services provided by the lab to the licensee including patent costs.

(1) Patent license tally includes patent applications which are licensed.

(2) Note that royalties are one component of total license income.

Income from Licenses

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
● **Total income**, all licenses active in the FY [1]	$13,100	$22,000	$69,007	$138,444[4]	$35,043
▪ **Invention licenses**	$13,100	$22,000	$69,007	$138,444	$35,043
- Patent licenses [2]	$13,100	$22,000	$69,007	$138,444	$35,043
▪ **Other IP licenses**, total active in the FY	0	0	0	0	0
- Copyright licenses					
● **Total Earned Royalty Income** (ERI) [3]	$13,100	$22,000	$69,007	$138,444	$35,044
▫ Median ERI	$1,000	$4,000	$9,007	$19,000	$5,000
▫ Minimum ERI	$100	$1,000	$1,000	$1,000	$1,000
▫ Maximum ERI	$5,000	$9,000	$25,000	$75,000	$17,044
▫ ERI from top 1% of licenses	$5,000	$9,000	$25,000	$75,000	$17,044
▫ ERI from top 5% of licenses	$5,000	$9,000	$25,000	$75,000	$17,044
▫ ERI from top 20% of licenses	$5,000	$9,000	$25,000	$75,000	$17,044
▪ **Invention licenses**	$13,100	$22,000	$69,007	$138,444	$35,044
▫ Median ERI	$1,000	$4,000	$9,007	$19,000	$5,000
▫ Minimum ERI	$100	$1,000	$1,000	$1,000	$1,000
▫ Maximum ERI	$5,000	$9,000	$25,000	$75,000	$17,044
▫ ERI from top 1% of licenses	$5,000	$9,000	$25,000	$75,000	$17,044
▫ ERI from top 5% of licenses	$5,000	$9,000	$25,000	$75,000	$17,044
▫ ERI from top 20% of licenses	$5,000	$9,000	$25,000	$75,000	$17,044
- Patent licenses [2]	$13,100	$22,000	$69,007	$138,444	$35,044
▫ Median ERI	$1,000	$4,000	$9,007	$19,000	$5,000
▫ Minimum ERI	$100	$1,000	$1,000	$1,000	$1,000
▫ Maximum ERI	$5,000	$9,000	$25,000	$75,000	$17,044
▫ ERI from top 1% of licenses	$5,000	$9,000	$25,000	$75,000	$17,044
▫ ERI from top 5% of licenses	$5,000	$9,000	$25,000	$75,000	$17,044
▫ ERI from top 20% of licenses	$5,000	$9,000	$25,000	$75,000	$17,044
▪ **Other IP licenses**, total active in the FY	0	0	0	0	0

(1) Total income includes license issue fees, earned royalties, minimum annual royalties, paid-up license fees, and reimbursement for full-cost recovery of goods & services provided by the lab to the licensee including patent costs.

(2) Patent license tally includes patent applications which are licensed.

(3) "Earned royalty" = royalty based upon use of a licensed invention (usually, a percentage of sales or of units sold). Not a license issue fee or a minimum royalty.

(4) Increase is due to a license with Walt Disney for NOAA's Science on a Sphere for a one-time royalty of $75,000.

Disposition of License Income

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
● **Income distributed** (1)					
▪ **Invention licenses**, total distributed	$13,100	$22,000	$69,007	$138,444	$35,044
- To inventor(s)	$7,500 (57%)	$12,200 (55%)	$21,802 (32%)	$45,153 (33%)	$14,514 (41%)
- To other	$5,600 (43%)	$9,800 (45%)	$46,205 (68%)	$93,291 (67%)	$20,530 (59%)
- Patent licenses, (2) total distributed	$13,100	$22,000	$69,007	$138,444	$35,044
- To inventor(s)	$7,500 (57%)	$12,200 (55%)	$21,802 (32%)	$45,153 (33%)	$14,514 (41%)
-To other	$5,600 (43%)	$9,800 (45%)	$46,205 (68%)	$93,291 (67%)	$20,530 (59%)

Invention licenses are the chief policy interest regarding disposition of income; content of table reflects this focus.
(1) Income includes royalties and other payments received during the FY.
(2) Patent license tally includes patent applications which are licensed.

Other Performance Measures Deemed Important by the Agency:

	FY 2006	FY 2007*	FY 2008*	FY 2009*	FY 2010
Journal articles published	444	909	838	789	709
Technical reports published	148	284	258	186	158

*Publication counts have been recently updated by the NOAA Laboratories for FY 2007, FY 2008 and FY 2009.

GREAT LAKES ENVIRONMENTAL RESEARCH LABORATORY	FY 2007	FY 2008	FY 2009	FY 2010
Website hits (HTML pages) (M)	2,244,420	3,086,605	2,790,351	2,941,319
Website downloads (PDF pages)—brochures, research papers, technical memos, etc.	65,740	110,880	93,400	95,137

*Update made for FY2007 and FY 2008 on number of articles published and reports published.

Prestigious Awards for NOAA's Scientific Technology received in FY 2010

NOAA Technology Transfer Award:
Harold Barnet, National Marine Fisheries Service, NOAA – In recognition for the development and commercialization of a process for transforming fish processing wastes into high quality fish meal and oil aquaculture feeds.

Dusan Zrnic, Office of Ocean and Atmospheric Research, NOAA – In recognition for developing a novel method to measure linear orthogonal polarimetric variables without a switch. NOAA transferred the patented method to the private sector causing significant savings in the implementation of commercial dual polarization radars.

NOAA Silver Medal Award:
Alan Leonardi, Deputy Director, NOAA/OAR/AOML
For exemplary leadership in building a first-of its-kind partnership with Google to disseminate NOAA ocean data and information through Google Earth.

Alan had a productive and fascinating assignment in 2009 – a detail in California with Google. His efforts helped incorporate NOAA's vast ocean data into Google Earth, to include NOAA (& worldwide) Bathymetry Data, NOAA Content for Google's "Explore the Ocean Layer," and NOAA Data in the Google Earth Observations Layer. This unique partnership between NOAA and Google is another opportunity to make publicly-owned data easily available and put it in a form that people can use with ease. The CRADA between NOAA and Google was signed January 6, 2010.

Downstream Outcomes from NOAA Technology Transfer Activities

Tsunami Training
NOAA's Pacific Marine Environmental Laboratory (PMEL) Center for Tsunami Research (NCTR) has developed training programs to assist states and collaborating countries to improve tsunami readiness for their citizens. Training includes instruction in the development and implementation of tsunami forecast systems, and in providing "train the trainer" classes for improving tsunami readiness at the local level.

- **Tsunami Awareness Training**
  The NCTR and the Natural Disaster Preparedness Training Center (NDPTC) at the University of Hawaii have developed a training course for emergency management officials. The course focuses on tsunami mitigation, risk analysis, preparedness, and recovery. In 2010, 125 students attended three courses presented in Honolulu (HI), Pago Pago (American Samoa), and Camp Murray, (WA).
- **ComMIT Training**
  A Community Model Interface for Tsunami (ComMIT) is a major avenue to transfer modeling expertise and capabilities from NOAA to other countries, primarily countries in the

Indian Ocean. ComMIT can also be used to transfer modeling information between these countries. The community model is a critical tool for building tsunami-resilient communities. It provides tools for the construction of tsunami inundation maps under different scenarios and for real-time tsunami forecast applications. The United Nations Educational Scientific and Cultural Organization and the United States Agency for International Development provided funds to PMEL/NOAA to develop ComMIT, and it allows nations access modeling tools via an internet-enabled interface. ComMIT enables government agencies and others in the region to run tsunami models, using data from local or remote databases. This approach allows nations without a significant cadre of trained modelers to build tsunami modeling capability for forecast and hazard assessment. Further, it allows nations with restrictions on sharing geo-spatial data to input that data locally and not share it with other web-based model users. Most importantly, the internet-based approach creates a virtual regional and global community of modelers using the same tools and approaches to understand tsunami threats. In 2010, seventeen scientists received training in ComMIT at Daejeon, Republic of Korea.

- **Tsunami "Train the Trainer" Training**
  The Washington State Train-the-Trainer program aims to develop an educational curriculum to train qualified Tsunami Public Education Instructors. The Train-the-Trainer program is a joint effort of the NOAA Center for Tsunami Research (NCTR) and the Washington state Emergency Management Division (WA EMD). On 3 June 2010, WA EMD hosted the 2nd Annual Train-the-Trainer Workshop in Port Angeles, Washington. NCTR and WA EMD taught the workshop with the objective of training qualified Tsunami Public Education Instructors. This objective is a critical component to the National Tsunami Hazard Mitigation Program (NTHMP) Educational Plan. A total of 20 participants from various coastal Washington jurisdictions attended the Workshop. Attendees included personnel from county and community organizations such as Emergency Management and Community Emergency Response Team.

Cooperative Agreement between NOAA and the University of New Hampshire
NOAA's Center for Coastal and Ocean Mapping (CCOM)/ Joint Hydrographic Center (JHC) is a University of New Hampshire program aimed at creating a national center for expertise in ocean mapping and hydrographic sciences. Guided by a Memorandum of Understanding, with funding from the National Oceanic and Atmospheric Administration (NOAA) under a CRADA, the JHC operates in partnership with NOAA's National Ocean Service. The CCOM is a University center that expands the scope of interaction and cooperation with the private sector, universities and other government agencies including the US Geological Survey, the Office of Naval Research, the Naval Research Lab, Defense Advanced Research Projects Agency and National Science Foundation. The centers focus their activities on two major tasks, an educational task, aimed at creating a learning center that will promote and foster the education of a new generation of hydrographers and ocean mapping scientists, and a research task aimed at developing and evaluating a wide range of state-of-the-art hydrographic and ocean mapping technologies and applications.

Below are a few examples of the work that's being done under this Cooperative Agreement:

- The Combined Uncertainty and Bathymetric Editor (CUBE) multi-beam sonar data processing algorithm, developed by UNH, is licensed to several major hydrographic software firms and is widely used in their commercial packages. This algorithm is rapidly becoming the standard for processing multi-beam sonar data worldwide. To date, 11 companies have licensed CUBE, but there were no CUBE licenses issued in 2010. The JHC and Science Applications International Corporation (SAIC) have entered into an agreement for licensing software for the conversion of CUBE Bathymetry Format encoded data to Generic Sensor Data format (CBF2GSF).
- Several software packages have adopted NOAA's Navigation Surface algorithm for managing CUBE's multi-beam data. This technology is now open-source and managed world-wide through an "open navigation surface working group" consisting of representatives from government, academia, and industry. NOAA has licensed the Geocoder software for seafloor character mapping and acoustic sediment size determination to several sonar and software companies. The software is widely used by the private sector and governments worldwide. To date, there are six companies licensing Geocoder with several more being negotiated.
- Recently, JHC and the New Hampshire Innovation Research Center successfully transferred technology for processing and visualizing mid-water targets from single and multibeam sonar data. This software has seen wide use in the Gulf of Mexico at the Deepwater Horizon spill site, where it was used to map gas seeps, search for deep oil plumes, and monitor the wellhead for leaks.

Transforming Fish Wastes into Useful Products

Scientists at NOAA's Northwest Fisheries Science Center (NWFSC) have partnered with the State of Alaska's Industrial Development and Export Authority (AIDEA) and a private sector fish processing plant in Sitka, AK to develop a process for economically transforming fish processing wastes into high quality fish meal and oil for aquaculture feeds. The process uniquely combines a double drum dryer process commonly used in other industries and includes a plant design from a previous (NWFSC) research. The process was successfully piloted at the Center and demonstrated to industry.

This new technological breakthrough includes: 1) it creates a method to stabilize the waste enabling managers to "bank" the material when it is either in excess or under the amount needed for efficient processing, 2) it uses a mobile plant to handle multiple fisheries and operate more days per year, and 3) it uses drum dryers to gently dehydrate the meal and preserve quality. The process produces high quality fishmeal, oil, gelatin, and bone meals that perform well in fish feeds and pet food.

The process can be used in a variety of remote and seasonal fisheries that cannot use existing waste refining technology. It promises to reduce coastal nutrient pollution from seafood processing plants worldwide while providing an environmentally sound source of fishmeal and oil for aquaculture and the animal feed industries. With funding from AIDEA, several seafood processors in Sitka, Alaska plan to build a plant that will transform the 17 million pounds of waste dumped into Sitka harbor every year into useful products having an estimated annual value of at least $3.5 million.

Improved Modeling of Circulation in the Nearshore Zones of Lakes
In 2010 NOAA's Great Lakes Environmental Research Laboratory (GLERL) hosted a visiting scientist from the Budapest (Hungary) University of Technology and Economics to collaborate on lake modeling. Lake St. Clair was used to develop a one-dimensional wind model to improve the modeling of circulation in the nearshore zones of lakes. The model accounts for sudden changes in surface temperature and roughness at the shoreline, and the atmospheric boundary layer providing non-uniform wind shear stress input to lake models. It was found that nearshore circulation is very sensitive to the non-uniformity of the wind with important consequences for pollutants and sediments. In order to validate the approach, measurements are being made on currents close to the main public beach in Detroit, MI. Upon returning to Hungary, the visiting scientist will apply these hydrodynamic modeling and forecasting techniques to his work on European lakes and rivers.

Early Warning of Hypoxia and Internal Waves
The NOAA GLERL's Real-time Environmental Coastal Observations Network (ReCON) buoy array brings together a team of NOAA and Great Lakes institutes to construct experimental and integrated environmental observing systems. The integrated environmental observatory provides real-time observations of chemical, biological, and physical parameters. Observations from the ReCON buoy array have supported the Cleveland Water Department in early warning of hypoxia and internal waves at water supply intakes.

The Cleveland Water Department (CWD) provides drinking water to approximately 1.5 million people in 72 communities in Northeast Ohio. The water system gets its source water from the Lake Erie Central Basin through four water intakes covering approximately 27 miles of shoreline in the greater Cleveland area. Water treatment plants can be exposed to hypoxic waters from Lake Erie compromising water quality in the system. When these waters reach CWD intakes, pre-treatment operations are disrupted and corrosion control strategies are affected. Low oxygen conditions also result in an increase in anaerobic bacteria that contribute high levels of manganese leading to drinking water taste and odor problems. Project researchers and CWD drinking water processing managers receive real-time information including hourly updates of decreasing dissolved oxygen and internal wave status. This gives managers time to prepare alternate processing methods.

Seagrass Restoration
In January 2010 the Qatar Ministry of Environment invited NOAA's National Centers for Coastal Ocean Science (NCCOS) staff to participate in a week-long workshop on preparing a conservation and restoration protocol for seagrasses. Qatari government staff, university scientists, United Nations Environmental Program advisors, and regional contractors were briefed on conservation and restoration tools developed by NCCOS scientists. The workshop program included an evaluation of potential seagrass restoration sites among Qatar's rich and diverse coastal marine resources at two locations where seagrasses were impacted by dredging and filling operations. Following the workshop, NCCOS staff prepared a seagrass restoration guidelines document for the Ministry of Environment.

NOAA's National Centers for Coastal Ocean Science (NCCOS) Domoic Acid Detection Kit

At the request of the French government, NOAA scientists trained researchers from the French Research Institute for Exploitation of the Sea (IFREMER) on how to incorporate the domoic acid detection kit developed by NOAA scientists into the French national shellfish monitoring system. Domoic acid is a potent neurotoxin produced by bloom-forming microalgae, which accumulates in shellfish and causes amnesic shellfish poisoning. It is a major problem in both the United States and France. The detection kit developed by NOAA, and commercialized by Mercury Science, provides a rapid, accurate and cost-effective method for monitoring this toxin.

CHAPTER 4

National Telecommunications and Information Administration
Institute for Telecommunication Sciences

Approach and Plans for Technology Transfer

The Institute for Telecommunication Sciences (ITS) is the chief research and engineering arm of the National Telecommunications and Information Administration (NTIA).

ITS supports NTIA telecommunications objectives of promoting advanced telecommunications and information infrastructure development in the United States, enhancing domestic competitiveness, improving foreign trade opportunities for U.S. telecommunications firms, and facilitating more efficient and effective use of the radio spectrum. ITS also serves as a principal federal resource for solving telecommunications concerns of other federal agencies, state and local governments, private corporations and associations, and international organizations.

In 2003 ITS added a new metric under the "Other Performance Measures" category: number of publications approved through the Editorial Review Board (ERB) process. This metric provides a useful working indicator of the number of quality publications released to the public. In 2004 ITS added a measure for participation on standards committees. In 2006 ITS added another metric: the total number of hits on the publications listed on the "ITS Online Documents." This metric more directly provides an indication of ultimate benefit to the public.

ITS uses three principal means for achieving technology transfer: cooperative research and development; technical publications; and leadership and technical contributions in the development of telecommunications standards.

Cooperative Research and Development
CRADAs, based on the Federal Technology Transfer Act (FTTA) of 1986, are a means through which ITS aids the private sector. The FTTA provides the legal basis for, and encourages, shared use of government facilities and resources with the private sector in advanced telecommunications technologies.

These partnerships aid in the commercialization of new products and services, as well as enhance the capabilities of ITS laboratories. They also provide insights into industry's needs for productivity growth and competitiveness. This enables ITS to adjust the focus and direction of its programs for effectiveness and value.

In FY 2010 ITS' efforts in technology transfer and commercialization fostered cooperative telecommunications research in areas where U.S. companies can directly benefit from improved competitiveness and market opportunities. These efforts will continue in future years. ITS also participated—as it has for a number of years—in CRADAs with private-sector organizations to design, develop, test, and evaluate advanced telecommunication concepts. The private industry

partner benefits through such cooperative relationships, as does the Institute, because the partner is able to research in commercially important areas that it would not otherwise undertake.

To date, major contributions to personal communication services (PCS), local multipoint distribution service (LMDS), ultra wideband (UWB), and Broadband over Power Line (BPL) technologies have been achieved through CRADAs. These have aided U.S. efforts to rapidly introduce new socially constructive communications technologies. More recently, CRADAs in the areas of objective audio and video quality, advanced antennas for wireless systems, and remote sensing and global position (GPS) technology have allowed ITS to contribute to the development of new products and services.

Technical Publications
Publication has historically been the means through which ITS has transferred research results to other researchers, the commercial sector, and government agencies. Many of these publications—both internal reports and monographs and peer-reviewed articles in external scientific journals—have become standard references in several telecommunications areas.

Technical publication remains a principal means for ITS technology transfer. Most of these technical publications are released only after going through an internal peer review process managed by the ITS Editorial Review Board (ERB). Of the publications released through the ERB process in recent years, approximately one-half were approved for external publication in the scientific literature.

Development of Telecommunication Standards
This method of ITS technology transfer directly addresses improvement of U.S. competitiveness in telecommunications. For several decades, ITS has provided leadership and technical contributions to organizations, both national and international, responsible for developing telecommunication standards. For example, a plurality of the technical recommendations of the International Telecommunication Union (ITU), a treaty organization, are based on research conducted at ITS. Also, key national quality-of-service standards developed under the American National Standards Institute (ANSI) T1 committee for video, audio, and digital data incorporate research results obtained at ITS.

ITS continues to chair numerous committees and working groups in the ITU, ANSI T1 (now ATIS – Alliance for Telecommunications Industry Solutions), and other telecommunication standards organizations, providing technical leadership that is trusted by the commercial-sector participants. ITS's technical inputs are relied upon as technically advanced and sound, and as unbiased by commercial interests.

In FY 2010 ITS continued its technical leadership and contributions to communications standards for public safety, particularly for first responders. ITS's primary area of contribution has been interoperability standards and testing procedures. ITS's objective video quality measurement method has been made a national standard by ANSI. This method was also the best-performing metric in comparison testing by the ITU with other methods from around the world.

Additional Details in FY 2010

Collaborative Relationships for Research & Development

	FY 2006	FY 2007	FY 2008 (1)	FY 2009	FY 2010
● **CRADAs,** total active in the fiscal year (1)	514	285	41	32	42
- New, executed in the fiscal year	512	280	7	8	16
▪ Traditional CRADAs,(2) total active in the fiscal year	8	9	6	7	29
- New, executed in the fiscal year	6	4	6	7	8
▪ Non-traditional CRADAs,(3) total active in the fiscal year	506	276	35	25	13
- New, executed in the fiscal year	506	276	1	1	8
● **Other types of collaborative R&D relationships**					
▪ Collaborative standards contributions,(4) (5) total active in FY	16	25	25	20	21
-New, executed in the fiscal year	5	9	10	5	1

CRADA = Cooperative Research and Development Agreement.

(1) In 2008 ITS took down from the Web some of its telecommunication analysis services. These services provided network-based access to research results, models, and databases supporting applications in wireless system design and analysis. As a result, the number of CRADAs between the government and industry, which allowed for improvement to these models, were down significantly. NTIA-ITS is working on a newer geographic information system- (GIS-) based platform for the modeling services, which will be available in future years.

(2) "Active" means in force at any time during the fiscal year. "Total active" includes all agreements executed under CRADA authority (15 USC 3710a).

(3) CRADAs involving collaborative research and development by a Federal laboratory and non-Federal partners.

(4) ITS' Telecommunications Analysis Services (TA Services) is Internet-accessible through Web-based electronic CRADAs. TA Services provides analysis support to private industry and public agencies in the areas of wireless system design and evaluation, and site selection. The service is provided on a cost-reimbursable basis, 24 hours a day, 7 days a week, throughout the year. TA Services currently reaches numerous government and private-sector users across the nation, providing the latest versions of ITS-developed telecommunications models, databases, and tools. Use of the CRADA makes TA Services available to users in a short time and on a cost-reimbursable basis. Additionally, CRADA partners provide useful evaluations of the ITS software used. This information aids ITS to improve existing software tools for wireless system design and analysis and to develop new ones, benefiting both ITS' own research capabilities and the resources that outside users can draw upon. The CRADA agreement also allows ITS to gain valuable insights from users' feedback about the rapidly changing needs of industry and government in telecommunications technology.

(5) ITS works with industry to apply research results to the development of telecommunication performance standards and guidelines. In FY 2010 ITS worked collaboratively with the ITU, the Telecommunications Industry Association, the ATIS, and various Federal public safety groups to interpret and analyze standards and regulations.

Invention Disclosure and Patenting

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
● New inventions disclosed in the fiscal year [(1)]	1	0	0	0	0
● Patent applications filed in the fiscal year [(2)]	0	1	0	0	0
● Patents issued in the fiscal year	0	1	0	0	0
● Active patents, end of the fiscal year	6	8	7	7	2

(1) New invention disclosed and provisional patent filed.
(2) Includes: U.S. patent applications, foreign patent applications filed on cases for which no U.S. application was filed, divisional applications, and continuation-in-part applications. Excludes: provisional, continuation, duplicate foreign, and PCT applications.

Licensing

Profile of Active Licenses

	FY 2006	FY 2007	FY 2008*	FY 2009	FY 2010
● **All licenses,** number total active in the fiscal year [(1) (2)]	82	186	0	0	0
▫ New, executed in the fiscal year	79	179	0	0	0
▪ **Invention licenses,** total active in the fiscal year	82	186	0	0	0
▫ New, executed in the fiscal year	79	179	0	0	0
- Patent licenses,[(3)] total active in the fiscal year	7	10	0	0	0
▫ New, executed in the fiscal year	4	3	0	0	0
- Material transfer licenses (inventions), total active	0	0	0	0	0
▫ New, executed in the fiscal year	0	0	0	0	0
- Other invention licenses, [(4)] total active in the fiscal year	75	176	0	0	0
▫ New, executed in the fiscal year	75	176	0	0	0
▪ **Other IP licenses,** total active in the fiscal year	0	0	0	0	0

Multiple inventions in a single license are counted as one license. Licenses that include both patents and copyrights (hybrid licenses) are reported as patent licenses and not included in the count of copyright licenses.
* This number of licenses for FY2008 through FY 2010 is zero because ITS no longer licenses Video Quality Metric (VQM) technology. Instead, ITS has made this software available via open-source download.
(1) "Active" = legally in force at any time during the fiscal year.
(2) As of FY 2008 VQM software is available for download without a license.
(3) Patent license tally includes patent applications that are licensed.
(4) International copyright licenses (non-fee-bearing) for VQM technology

Licensing Management

	FY 2006	FY 2007	FY 2008*	FY 2009	FY 2010
● **License Negotiation time**,[1] licenses granted in the fiscal year					
▪ **Invention licenses** (Patent licenses) [2]	1.5	1.0	0	0	0
▫ Average (or median), months	1.0	0.5	0	0	0
▫ Minimum	2.0	1.5	0	0	0
▫ Maximum					
● **Licenses terminated for cause,** number in the fiscal year					
▪ **Invention licenses** (Patent licenses) [2]	0	0	0	0	0

Data included in this table (intentionally) address only invention licenses, with patent licenses distinguished as a subclass.

* This number of licenses for FY 2008 through FY2010 is zero because ITS no longer licenses Video Quality Metric (VQM) technology. Instead, ITS has made this software available via open-source download.

(1) Date of license application to the date of license execution. (Date of license application is the date the laboratory formally acknowledges the written request for a license from a prospective licensee and agrees to enter into negotiations.)

(2) Patent licenses include patent applications that are licensed.

Characteristics of Licenses Bearing Income

	FY 2006	FY 2007	FY 2008*	FY 2009	FY 2010
● **All income-bearing licenses,** total number	7	10	0	0	0
▫ Exclusive	0	0	0	0	0
▫ Partially exclusive	0	0	0	0	0
▫ Non-exclusive	7	10	0	0	0
▪ **Invention licenses,** (Patent licenses), [1] income-bearing	7	10	0	0	0
▫ Exclusive	0	0	0	0	0
▫ Partially exclusive	0	0	0	0	0
▫ Non-exclusive	7	10	0	0	0
▪ **Other IP licenses,** income-bearing	0	0	0	0	0
● **All royalty-bearing licenses,** [2] total number	7	0	0	0	0
▪ **Invention licenses,** (Patent licenses) [1] royalty-bearing	7	0	0	0	0
▪ **Other IP licenses,** royalty-bearing	0	0	0	0	0

In general, license income can result from various sources: license issue fees, earned royalties, minimum annual royalties, paid-up license fees, and reimbursement for full-cost recovery of goods and services provided by the laboratory to the licensee including patent costs.

* This number of licenses for FY 2008 through FY2010 is zero because ITS no longer licenses Video Quality Metric (VQM) technology. Instead, ITS has made this software available via open-source download.

(1) Patent licenses include patent applications that are licensed.

(2) Note that royalties are one component of total license income.

Income from Licenses

	FY 2006	FY 2007	FY 2008*	FY 2009	FY 2010
● **Total income,** all licenses active in the fiscal year [1]	$24,500	$7,500	$0	$0	$0
▪ **Invention licenses** (Patent Licenses) [2]	$24,500	$7,500	$0	$0	$0
▪ **Other IP licenses,** all active licenses in FY	$0	$0	$0	$0	$0
● **Total Earned Royalty Income** (ERI) [3]	$0	$0	$0	$0	$0
▪ **Invention licenses** (Patent licenses) [2]	$0	$0	$0	$0	$0
▫ Median ERI	$0	$0	$0	$0	$0
▫ Minimum ERI	$0	$0	$0	$0	$0
▫ Maximum ERI	$0	$0	$0	$0	$0
▫ ERI from top 1% of licenses	$0	$0	$0	$0	$0
▫ ERI from top 5% of licenses	$0	$0	$0	$0	$0
▫ ERI from top 20% of licenses	$0	$0	$0	$0	$0
▪ **Other IP licenses,** total active in the fiscal year	$0	$0	$0	$0	$0

* This number of licenses for FY2008 through FY2010 is zero because ITS no longer licenses Video Quality Metric (VQM) technology. Instead, ITS has made this software available via open-source download.

(1) Total income includes license issue fees, earned royalties, minimum annual royalties, paid-up license fees, and reimbursement for full cost recovery of goods and services provided by the laboratory to the licensee including patent costs.

(2) Patent licenses include patent applications which are licensed.

(3) "Earned royalty" means royalty based upon use of a licensed invention (usually, a percentage of sales or of units sold). Not a license issue fee or a minimum royalty.

Disposition of License Income

	FY 2006	FY 2007	FY 2008*	FY 2009	FY 2010
● **Income distributed** [1] ▪ **Invention licenses,** (Patent licenses), [2] total distributed	$24,500	$7,500	$0	$0	$0
- To inventor(s)	$15,750 (64%)	$5,050 (67%)	$0	$0	$0
- To other [3]	$8,750 (36%)	$2,450 (33%)	$0	$0	$0

Invention licenses are the chief policy interest regarding disposition of income; the content of this table reflects this focus.

* This number of licenses for FY2008 through FY2010 is zero because ITS no longer licenses Video Quality Metric (VQM) technology. Instead, ITS has made this software available via open-source download.

(1) Income includes royalties and other payments received during the fiscal year.

(2) Patent license tally includes patent applications which are licensed.

(3) To ITS/NTIA.

Other Performance Measures Deemed Important by the Agency

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Technical publications produced	8	3	15	12	17
Total number of hits on online publications	1,116,573	1,426,125	1,526,409	3,020,629	3,667,000

See "Technical Publications" above in the first section of this report for additional information on this topic.

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Technical publications produced – ITS	8	3	15	12	12
Collaborative contributions - ITS	16	25	25	20	20

Downstream Outcomes from ITS Technology Transfer Activities

The following are examples of downstream outcomes from ITS technology transfer efforts:

Table Mountain Research
The Table Mountain Field Site and Radio Quiet Zone supports fundamental research in the nature, interaction, and evaluation of telecommunication devices, systems, and services. Each year, private companies, universities and other organizations conduct research at Table Mountain under Cooperative Research and Development Agreements (CRADAs). The following are brief descriptions of some of these recent CRADAs:

- For the past four years, the University of Colorado's Research and Engineering Center for Unmanned Vehicles has conducted measurements on the performance of ad hoc wireless networks with both ground-based and airborne terminals at Table Mountain.
- In FY 2010 several companies have performed antenna, Light Detection and Ranging (LIDAR)/Global Positioning Satellite(GPS), and other testing at the Table Mountain turntable facility under a CRADA.
- Lockheed Martin Coherent Technologies is in its eleventh year field-testing and characterizing components, subsystems and systems for eye-safe coherent laser radar. This has benefited NTIA and the Department of Defense.
- In FY2010, ITS performed testing for the National Weather Service to identify the strengths and weaknesses in commercial NOAA weather radio receivers.

SUMMARY

Technology transfer is an essential mission of the Department of Commerce, using our nation's innovation and investment in science and technology to strengthen our economy and competitiveness in world markets. This report details the results of technology partnering activities originating from the Department of Commerce's federal laboratories. Federal research is a complex process that provides the opportunity for new ideas and innovations to be successfully marketed to serve citizens. The success stories in this report provide examples of how society benefits from technology transfer activities across the Department of Commerce's federal laboratories. As knowledge advances and the needs of the economy change, the Department of Commerce will continue to play a role in keeping America in the forefront of innovation and supporting our economy by aiding in the transfer and commercialization of knowledge.