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Lincoln Laboratory

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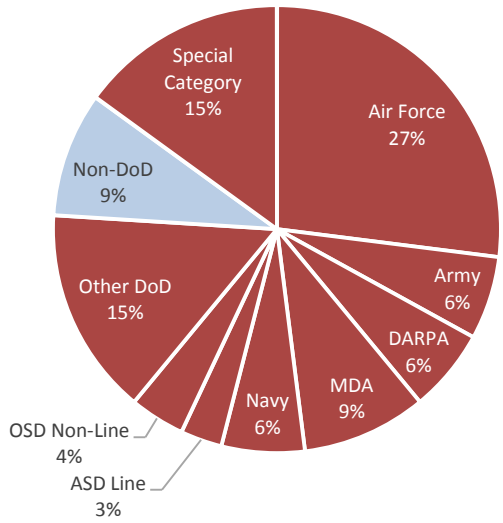
Lincoln Laboratory

MIT Lincoln Laboratory is a federally funded research and development center (FFRDC) operated by the Institute under contract with the Department of Defense (DoD). The Laboratory's core competencies are in sensors, information extraction (signal processing and embedded computing), communications, integrated sensing, and decision support, all supported by a strong program in advanced electronics technology.

Since its establishment in 1951, MIT Lincoln Laboratory's mission has been to apply technology to problems of national security. The Laboratory's technology development is focused on its primary mission areas—space control; air and missile defense technology; communication systems; cyber security and information sciences; intelligence, surveillance, and reconnaissance systems and technology; advanced technologies; tactical systems; and homeland protection. In addition, Lincoln Laboratory undertakes government-sponsored, nondefense projects in areas such as air traffic control and weather surveillance.

Two of the Laboratory's principal technical objectives are (1) the development of components and systems for experiments, engineering measurements, and tests under field operating conditions and (2) the dissemination of information to the government, academia, and industry. Program activities extend from fundamental investigations through the design process, and finally to field demonstrations of prototype systems. Emphasis is placed on transitioning systems and technology to industry.
MIT Lincoln Laboratory also emphasizes meeting the government's FFRDC goals of maintaining long-term competency, retaining high-quality staff, providing independent perspective on critical issues, sustaining strategic sponsor relationships, and developing technology for both long-term interests and short-term, high-priority needs.

Authorized Funding by Sponsor FY2014*
Total Authorized Funding = $931.8 million

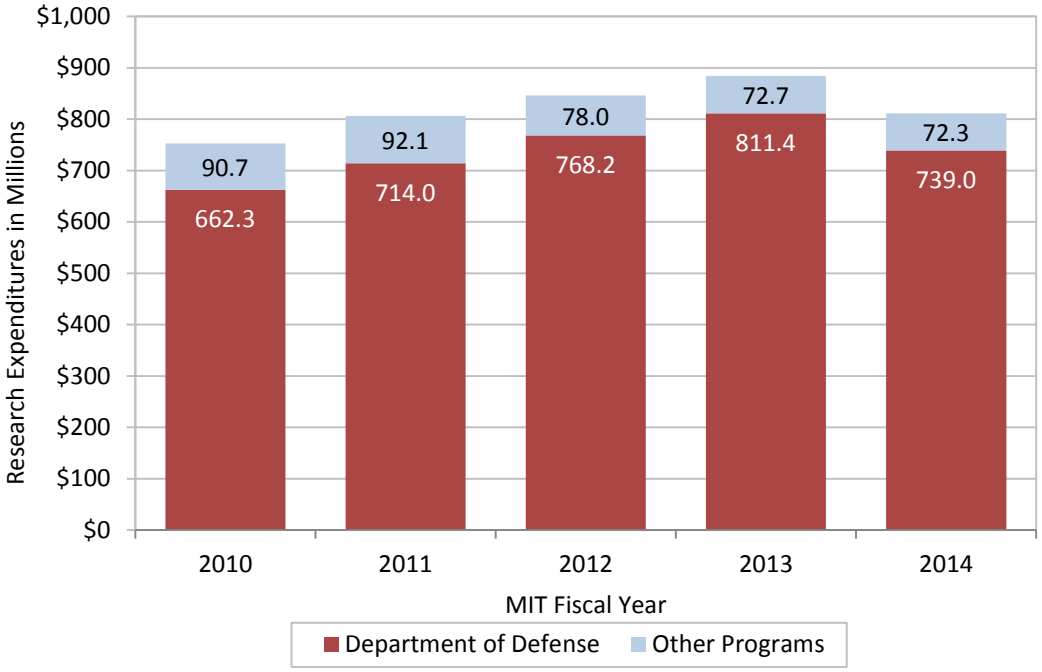


DARPA: Defense Advanced Research Projects Agency
DoD: Department of Defense
MDA: Missile Defense Agency
OSD Non-Line: Office of the Secretary of Defense
ASD Line: Assistant Secretary of Defense
Special category consists of other Government agencies

*Lincoln Laboratory fiscal year runs concurrent with the U.S. Government fiscal year, October 1–September 30.

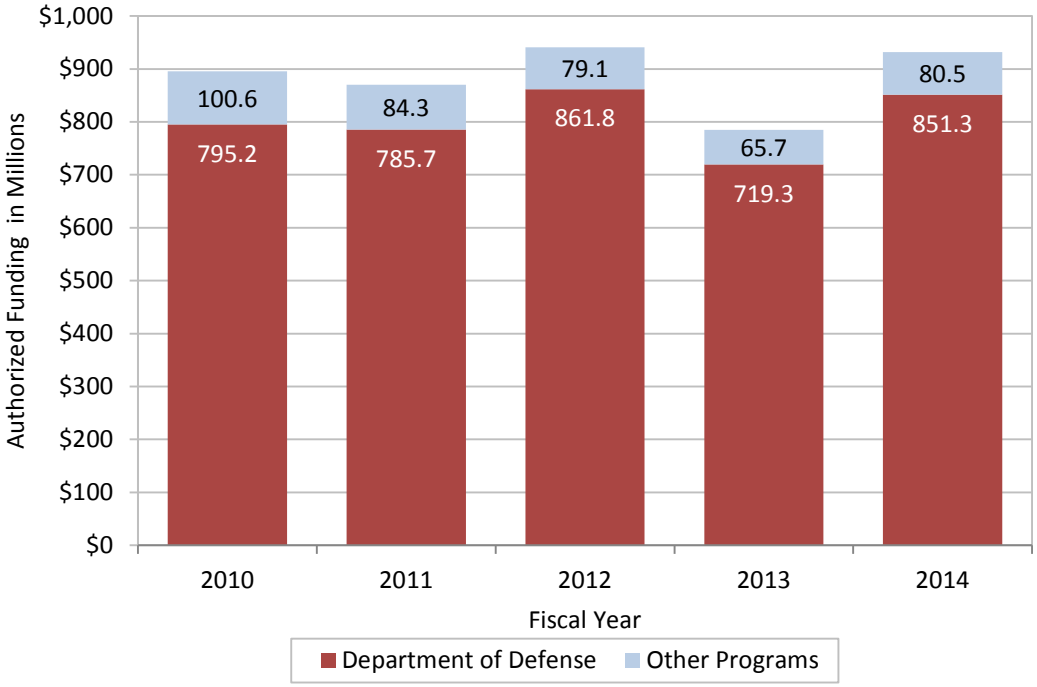
Note, the mission charts on the following pages have been restated to Lincoln Laboratory's current mission areas and include all sponsored research, DoD, and non-DoD.

Research Expenditures
MIT Fiscal Years 2010–2014*



*Research expenditure data are for the MIT fiscal year, July 1–June 30.

Authorized Funding
Fiscal Years 2010–2014†



†Lincoln Laboratory fiscal year runs concurrent with the U.S. Government fiscal year, October 1–September 30.

Lincoln Laboratory's Economic Impact

Lincoln Laboratory has generated and supported a range of national business and industrial activities. The charts below show the Laboratory's economic impact by business category and state. In FY2014, the Laboratory issued subcontracts with a value that exceeded $363 million; New England states are the primary beneficiaries of the outside procurement program.

Goods and Services (including subcontracts) Expenditures Fiscal Year 2014* (in $millions)

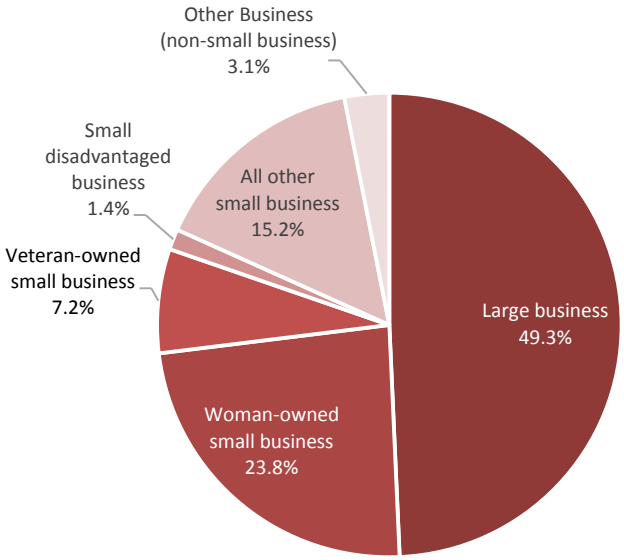
Type	Amount
Large business	179.1
Woman-owned small business	86.3
Veteran-owned small business	26.3
Small disadvantaged business	5.2
Other small business	55.1
Other Business (non-small business)	11.3
Total	**363.3**

Top Seven States	Amount
Massachusetts†	185.3
California	30.1
New Hampshire	28.1
Texas	23.0
Kentucky	12.1
New Jersey	11.8
Colorado	11.3

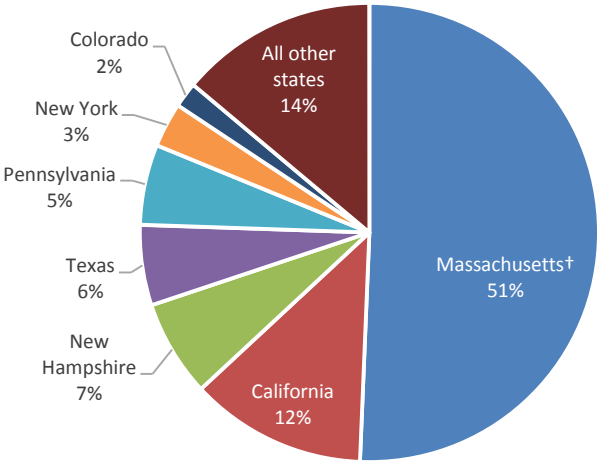
Other New England States	Amount
Connecticut	5.7
Rhode Island	1.2
Vermont	0.3
Maine	0.1

*Lincoln Laboratory fiscal year runs concurrent with the U.S. Government fiscal year, October 1–September 30.
†Does not include orders to MIT ($21.1 million)

Goods and Services Expenditures by Type Fiscal Year 2014*

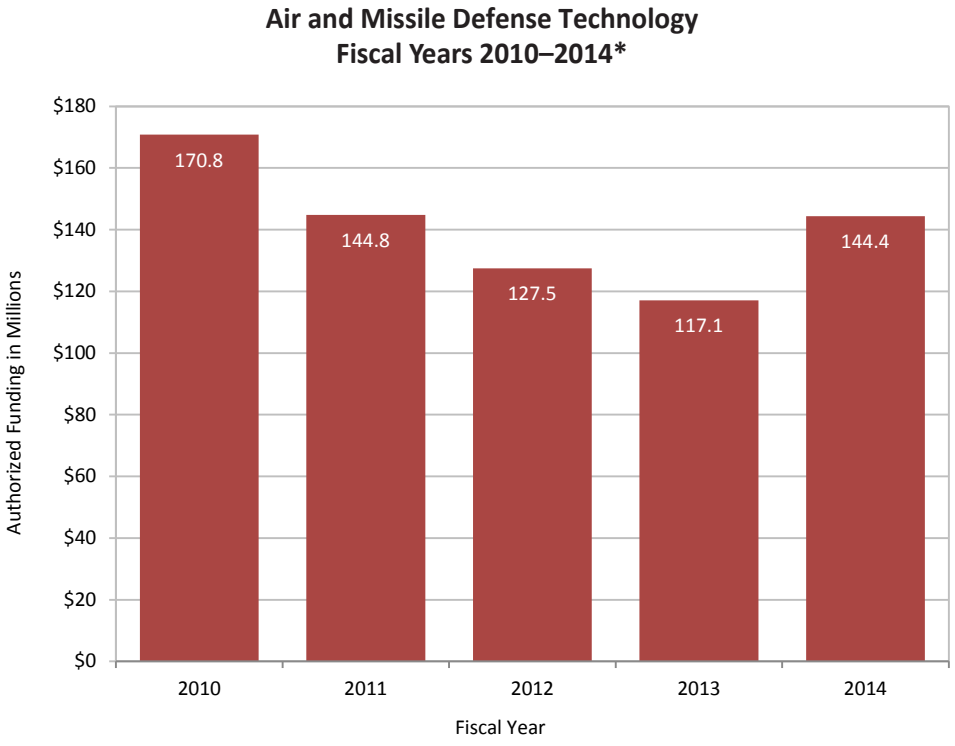


Goods and Services Expenditures by State Fiscal Year 2014*



Air and Missile Defense Technology

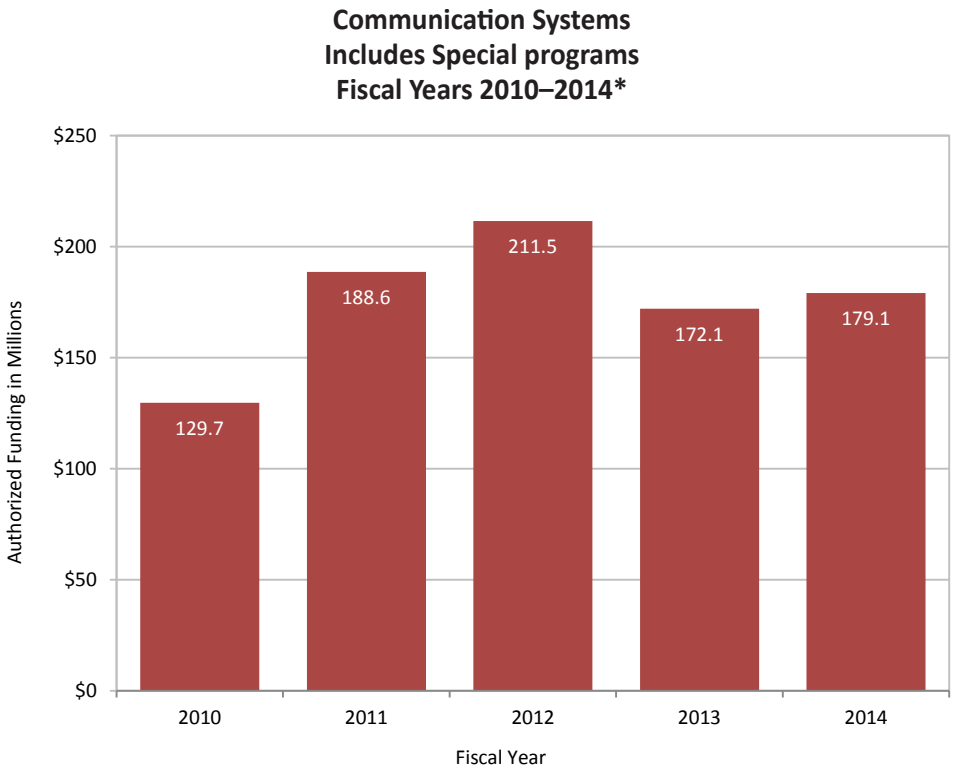
In the Air and Missile Defense Technology mission, Lincoln Laboratory develops and assesses integrated systems for defense against ballistic missiles, cruise missiles, and air vehicles in tactical, regional, and homeland defense applications. Activities include the investigation of system architectures, development of advanced sensor and decision support technologies, development of flight-test hardware, extensive field measurements and data analysis, and the verification and assessment of deployed system capabilities. A strong emphasis is on rapidly prototyping sensor and system concepts and algorithms, and on transferring resulting technologies to government contractors responsible for developing operational systems.



*Lincoln Laboratory fiscal year runs concurrent with the U.S. Government fiscal year, October 1–September 30. Historic years are restated to represent current Lincoln Laboratory mission areas.

Communication Systems

Lincoln Laboratory is working to enhance and protect the capabilities of the nation's global defense networks. Emphasis is placed on synthesizing communication system architectures, developing component technologies, building and demonstrating end-to-end system prototypes, and then transferring this technology to industry for deployment in operational systems. Current efforts focus on radio-frequency military satellite communications, free-space laser communications, tactical network radios, quantum systems, and spectrum operations.



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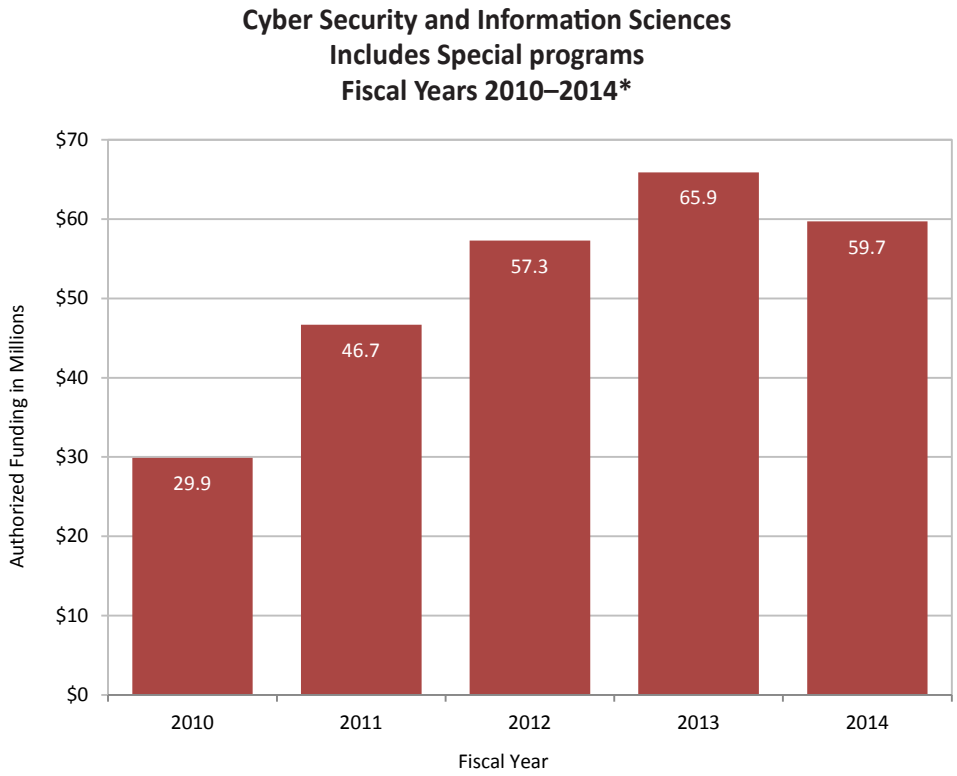
Cyber Security and Information Sciences

Lincoln Laboratory conducts research, development, evaluation, and deployment of prototype components and systems designed to improve the security of computer networks, hosts, and applications. Efforts include cyber analysis; creation and demonstration of architectures that can operate through cyber attacks; development of prototypes that demonstrate the practicality and value of new techniques for cryptography, automated threat analysis, anti-tamper systems, and malicious code detection; and, where appropriate, deployment of prototype technology to national-level exercises and operations. To complement this work, advanced hardware, software, and algorithm technologies are developed for processing large, high-dimensional datasets from a wide range of sources. In the human language technology area, emphasis is placed on realistic data and experimental evaluation of techniques for speech recognition, dialect identification, speech and audio signal enhancement, and machine translation



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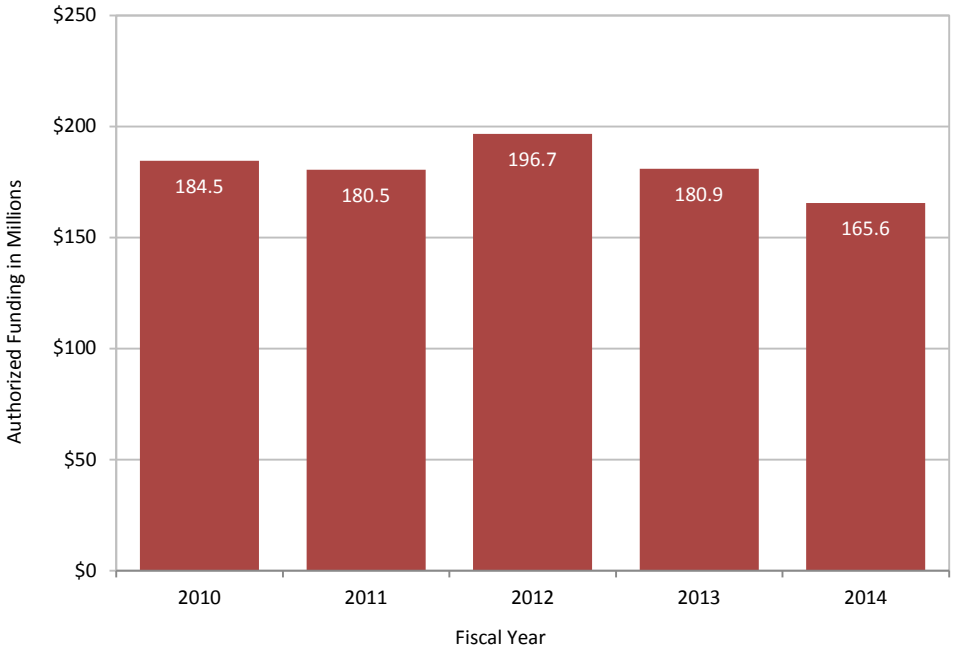
Intelligence, Surveillance, and Reconnaissance Systems and Technology

To expand intelligence, surveillance, and reconnaissance (ISR) capabilities, Lincoln Laboratory conducts research and development in advanced sensing, signal and image processing, automatic target classification, decision support systems, and high-performance computing. By leveraging these disciplines, the Laboratory produces novel ISR system concepts for both surface and undersea applications. Sensor technology for ISR includes passive and active electro-optical systems, surface surveillance radar, radio-frequency geolocation, and undersea acoustic surveillance. Increasingly, the work extends from sensors and sensor platforms to include the processing, exploitation, and dissemination technologies that transform sensor data into the information and situational awareness needed by operational users. Prototype ISR systems developed from successful concepts are then transitioned to industry and the user community.

Tactical Systems

In the Tactical Systems mission, Lincoln Laboratory assists the Department of Defense (DoD) in improving the development and employment of various tactical air and counterterrorism systems through a range of activities that include systems analysis to assess technology impact on operationally relevant scenarios, detailed and realistic instrumented tests, and rapid prototype development of U.S. and representative threat systems. A tight coupling between the Laboratory's efforts and DoD sponsors and warfighters ensures that these analyses and prototype systems are relevant and beneficial to the warfighter.

Intelligence, Surveillance, and Reconnaissance Systems and Technology and Tactical Systems
Includes Special programs
Fiscal Years 2010–2014*



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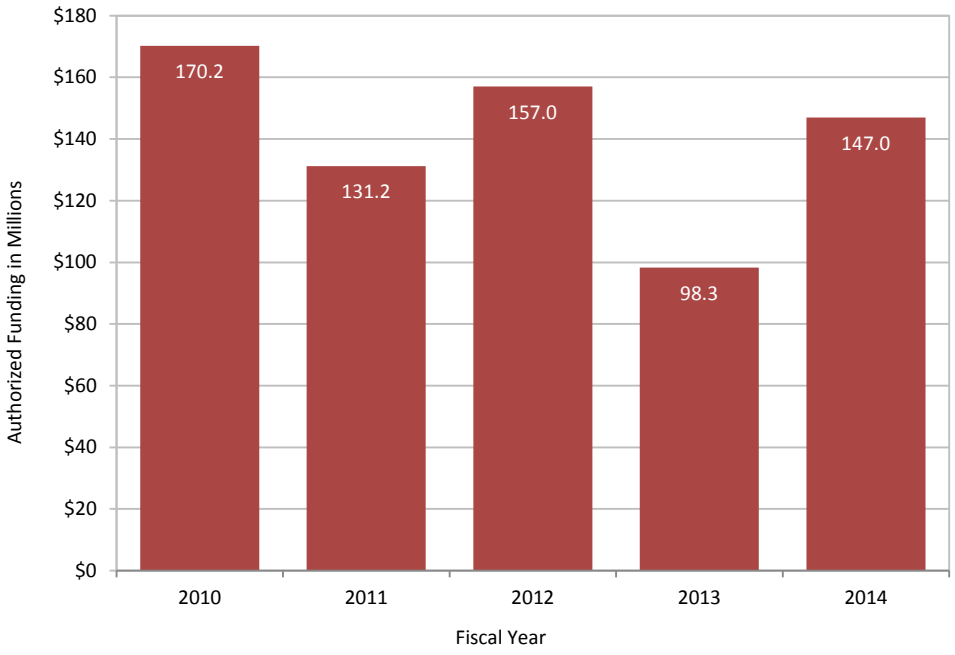
Space Control

Lincoln Laboratory develops technology that enables the nation's space surveillance system to meet the challenges of space situational awareness. The Laboratory works with systems to detect, track, and identify man-made satellites; collects orbital-debris detection data to support space-flight safety; performs satellite mission and payload assessment; and investigates technology to improve monitoring of the space environment, including space weather and atmospheric and ionospheric effects. The technology emphasis is the application of new components and algorithms to enable sensors with greatly enhanced capabilities and to support the development of net-centric processing systems for the nation's Space Surveillance Network.

Space Control
Includes Special programs
Fiscal Years 2010–2014*



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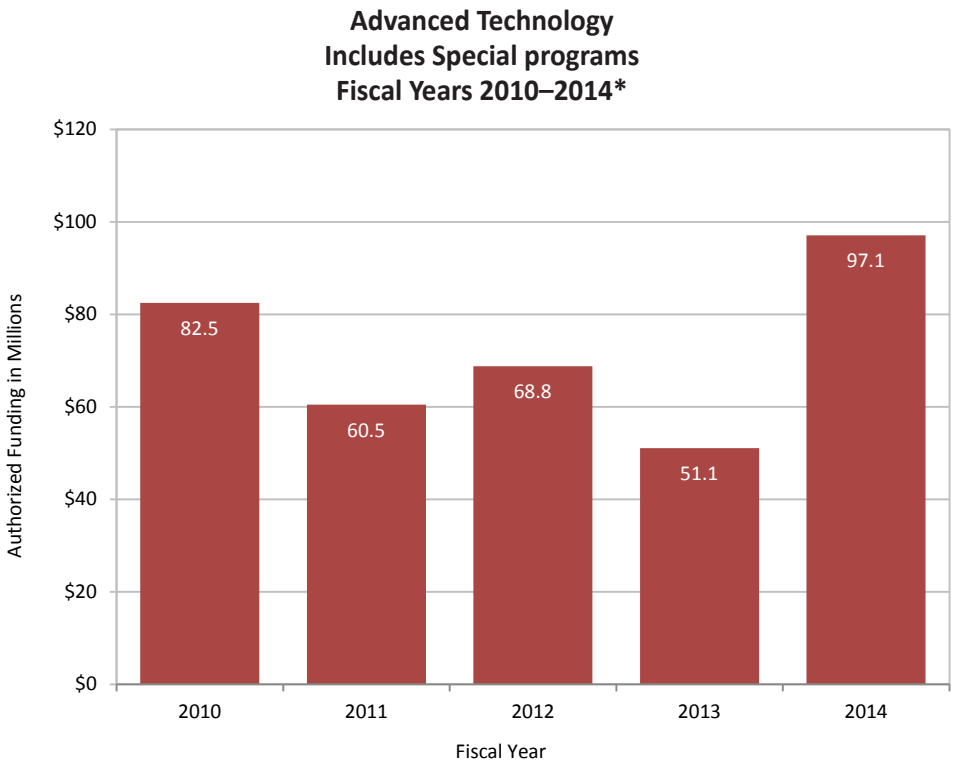
Advanced Technology

The Advanced Technology mission supports national security by identifying new phenomenology that can be exploited in novel system applications and by then developing revolutionary advances in subsystem and component technologies that enable key, new system capabilities. These goals are accomplished by a community of dedicated employees with deep technical expertise, collectively knowledgeable across a wide range of relevant disciplines and working in unique, world-class facilities. This highly multidisciplinary work leverages solid-state electronic and electro-optical technologies, innovative chemistry, materials science, advanced radio-frequency technology, and quantum information science.



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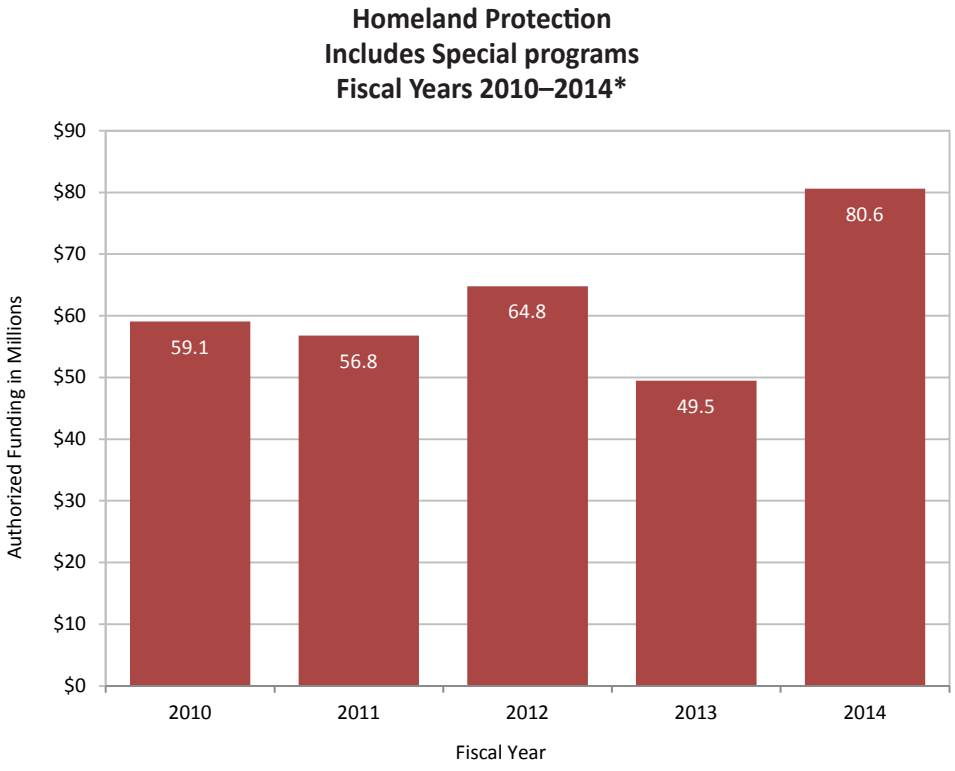
Homeland Protection

The Homeland Protection mission supports the nation's security by innovating technology and architectures to help prevent terrorist attacks within the United States, to reduce the vulnerability of the nation to terrorism, to minimize the damage from terrorist attacks, and to facilitate recovery from either man-made or natural disasters. The broad sponsorship for this mission area spans the DoD, the Department of Homeland Security (DHS), and other federal, state, and local entities. Recent efforts include architecture studies for the defense of civilians and facilities, new microfluidic technologies for DNA assembly and transformation and for gene synthesis, improvement of the Enhanced Regional Situation Awareness system for the National Capital Region, the assessment of technologies for border and maritime security, and the development of architectures and systems for disaster response.



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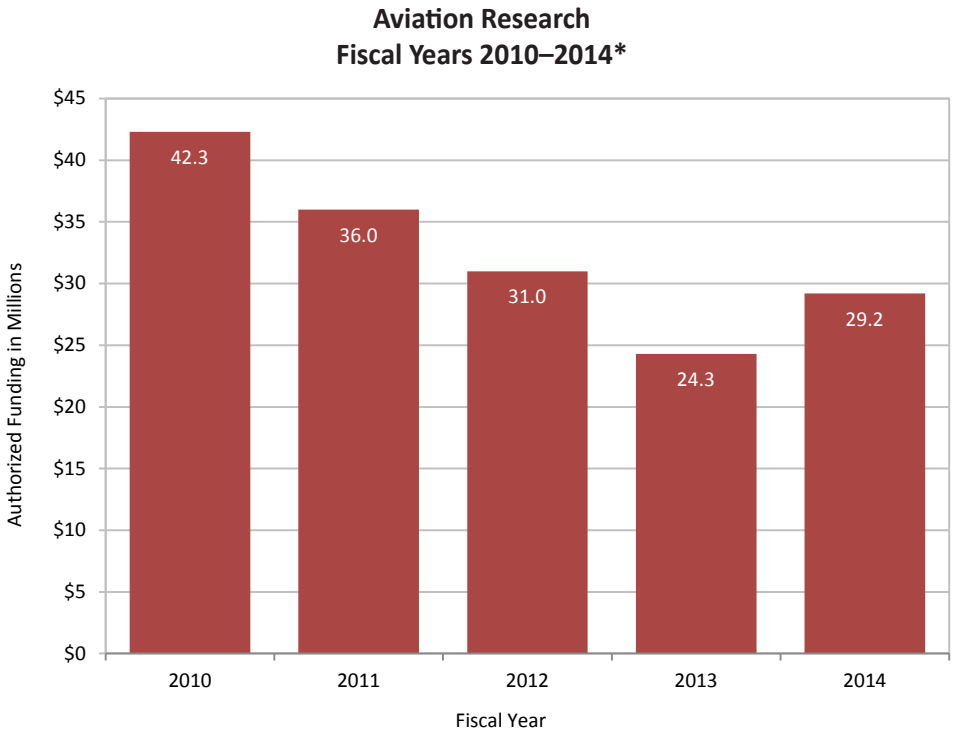
Aviation Research

Since 1971, Lincoln Laboratory has supported the Federal Aviation Administration (FAA) in the development of new technology for air traffic control. This work initially focused on aircraft surveillance and weather sensing, collision avoidance, and air-ground data link communication. The program has evolved to include safety applications, decision support services, and air traffic management automation tools.

The current program is supporting the FAA's Next Generation Air Transportation System (NextGen). Key activities include development of the next-generation airborne collision avoidance system; refinement and technology transfer of NextGen weather architectures, including cloud-processing and net-centric data distribution; and development of standards and technology supporting unmanned aerial systems' integration into civil airspace.



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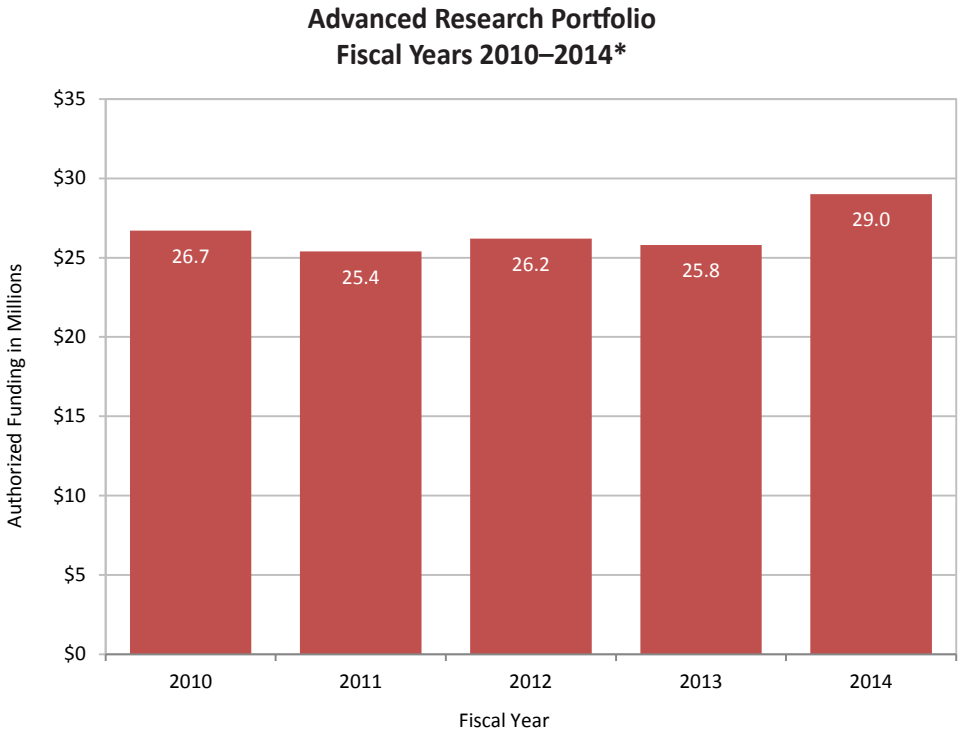
Advanced Research Portfolio

Internal research and development at MIT Lincoln Laboratory is supported through a Congressionally appropriated source of funding, known as the Line, that is administered by the office of the Assistant Secretary of Defense for Research and Engineering (ASD[R&E]). The Line is the Laboratory's primary source of relatively unconstrained funding and is used to fund the long-term strategic technology capabilities of established and emerging mission areas. Line projects form an Advanced Research portfolio that focuses on addressing technology gaps in critical problems facing national security. Successful projects often result in advanced capabilities that lead to further sponsored program development.

The projects supported by the Line are organized according to technology categories that have been selected to address gaps in existing and envisioned mission areas. Nine technology categories were selected to include both core and emerging technology initiatives. There are currently five core-technology areas in the Advanced Research Portfolio: advanced devices; optical systems and technology; information, computation and exploitation; RF systems and technology; and cyber security. In addition, there are four emerging-technology initiatives: novel and engineered materials, quantum system sciences, biomedical sciences, and autonomous systems.



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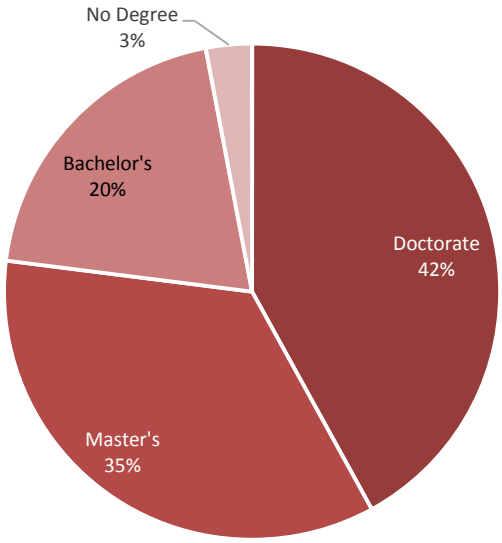
Lincoln Laboratory Staffing

Lincoln Laboratory employs 1,740 technical staff, 433 technical support personnel, 1,055 support personnel, and 520 subcontractors. Three-quarters of the technical staff have advanced degrees, with 42% holding doctorates. Professional development opportunities and challenging cross-disciplinary projects are responsible for the Laboratory's ability to retain highly qualified, creative staff.

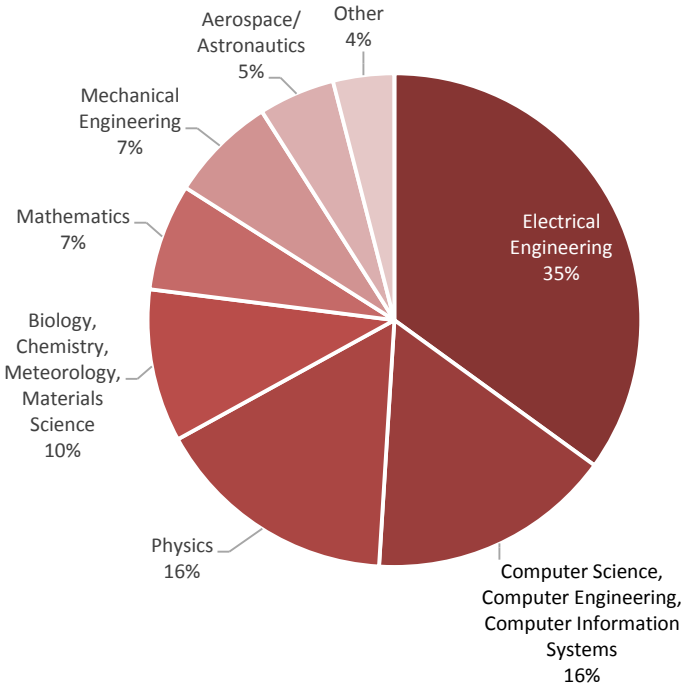
Lincoln Laboratory recruits at more than 60 of the nation's top technical universities, with 65 to 75% of new hires coming directly from universities. Lincoln Laboratory augments its campus recruiting by developing long-term relationships with research faculty and promoting fellowship and summer internship programs.

Professional Technical Staff Profile

Degrees Held by Lincoln Laboratory Professional Technical Staff



Academic Disciplines of Lincoln Laboratory Professional Technical Staff



Test Facilities and Field Sites

Hanscom Field Flight and Antenna Test Facility

The Laboratory operates the main hangar on the Hanscom Air Force Base flight line. This ~93,000-sq-ft building accommodates the Laboratory Flight Test Facility and a complex of state-of-the-art antenna test chambers. The Flight Facility houses several Lincoln Laboratory–operated aircraft used for rapid prototyping of airborne sensors and communications.

Hanscom Field Flight and Antenna Test Facility

Millstone Hill Field Site, Westford, MA

MIT operates radio astronomy and atmospheric research facilities at Millstone Hill, an MIT-owned, 1,100-acre research facility in Westford, Massachusetts. Lincoln Laboratory occupies a subset of the facilities whose primary activities involve tracking and identification of space objects.

Millstone Hill Field Site, Westford, Massachusetts

Reagan Test Site, Kwajalein, Marshall Islands

Lincoln Laboratory serves as the scientific advisor to the Reagan Test Site at the U.S. Army Kwajalein Atoll installation located about 2,500 miles WSW of Hawaii. Twenty staff members work at this site, serving two- to three-year tours of duty. The site's radars and optical and telemetry sensors support ballistic missile defense testing and space surveillance. The radar systems provide test facilities for radar technology development and for the development of ballistic missile defense techniques.

Reagan Test Site, Kwajalein, Marshall Islands

Other Sites

Pacific Missile Range Facility, Kauai, Hawaii
Experimental Test Site, Socorro, New Mexico