Section 4
Lincoln Laboratory

Lincoln Laboratory

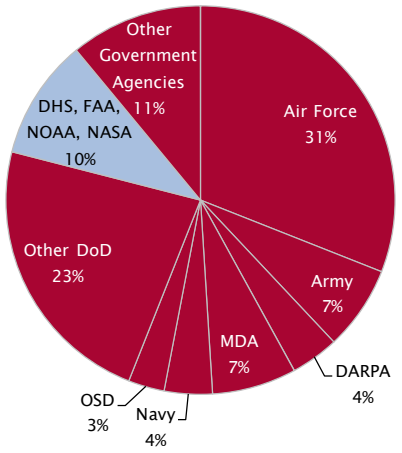
MIT Lincoln Laboratory is a federally funded research and development center (FFRDC) operated by the Institute under contract with the Department of Defense. The Laboratory's core competencies are in sensors, information extraction (signal processing and embedded computing), communications, integrated 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.

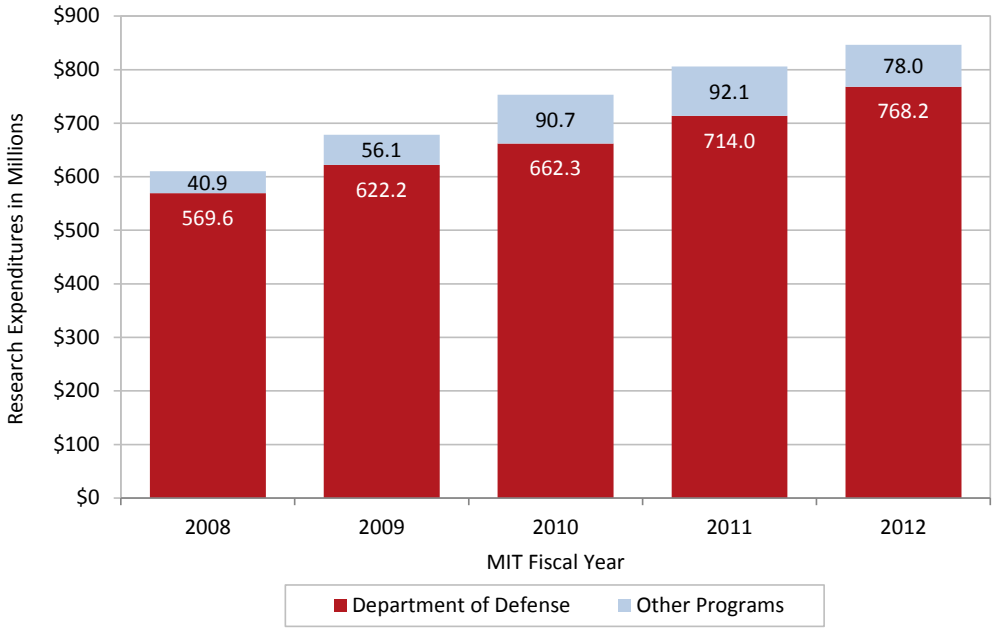
Authorized Funding by Sponsor FY2012*
Total Authorized Funding = $940.9 million



DARPA: Defense Advanced Research Projects Agency
DHS: Department of Homeland Security
DoD: Department of Defense
FAA: Federal Aviation Administration
MDA: Missile Defense Agency
NASA: National Aeronautics and Space Administration
NOAA: National Oceanic and Atmospheric Administration
OSD: Office of the Secretary of Defense

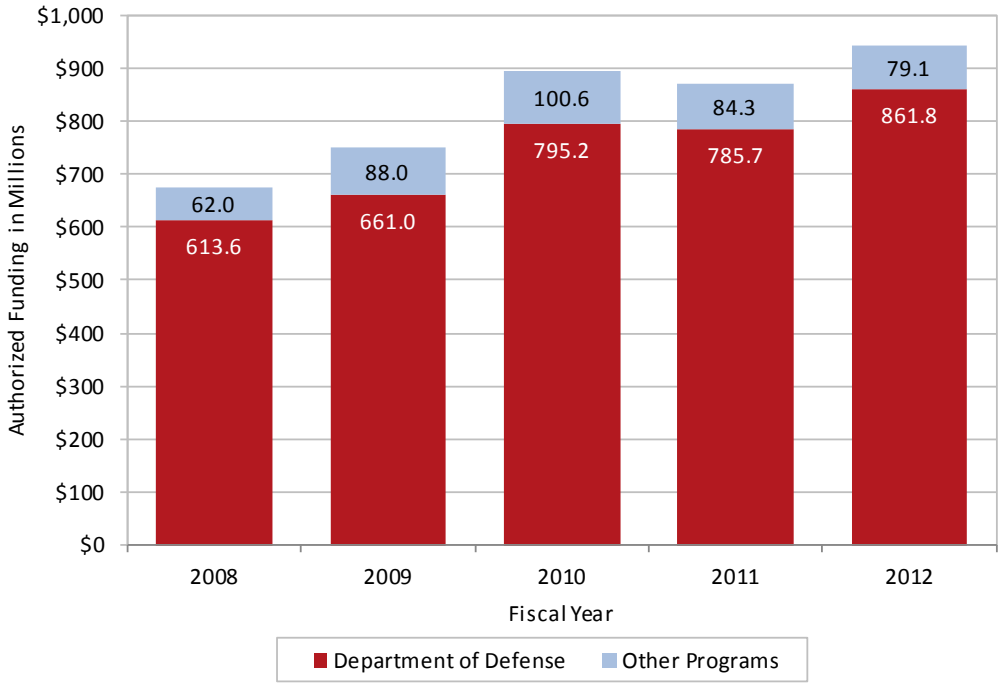
*Lincoln Laboratory fiscal year runs concurrent with the U.S. Government fiscal year, October 1–September 30.

Research Expenditures
MIT Fiscal Years 2008–2012*



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

Authorized Funding
Fiscal Years 2008–2012†



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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 FY2012, the Laboratory issued subcontracts with a value that exceeded $440 million; New England states are the primary beneficiaries of the outside procurement program.

Goods and Services (including subcontracts) Expenditures Fiscal Year 2012* (in $millions)

Type	Amount
Large business	208.7
Woman-owned small business	82.9
Veteran-owned small business	27.9
Small disadvantaged business	9.1
All other small business	114.3
Total	**442.9**

Top Seven States	Amount
Massachusetts†	186.4
California	51.5
Colorado	37.1
New Hampshire	25.2
Texas	22.1
Virginia	18.2
Arizona	15.4

Other New England States	Amount
Connecticut	6.4
Vermont	0.4
Maine	0.2
Rhode Island	0.0

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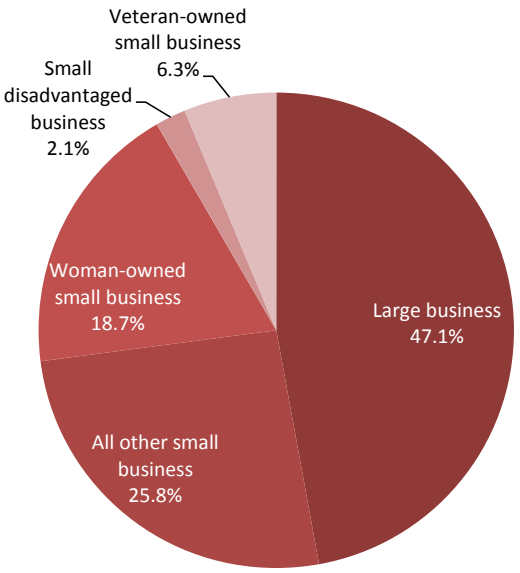
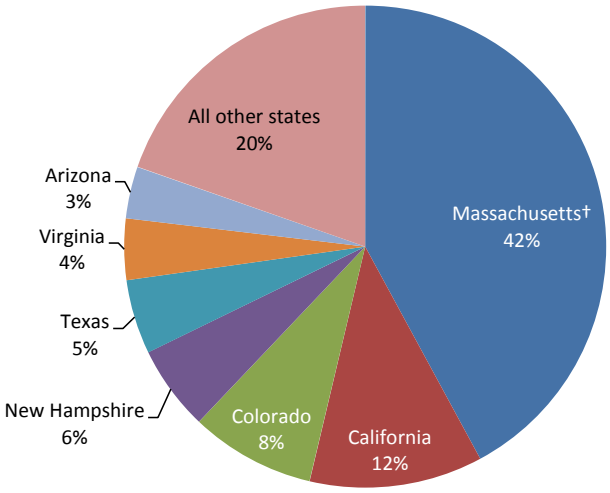
†Does not include orders to MIT ($9.3 million)

Goods and Services Expenditures by Type Fiscal Year 2012*

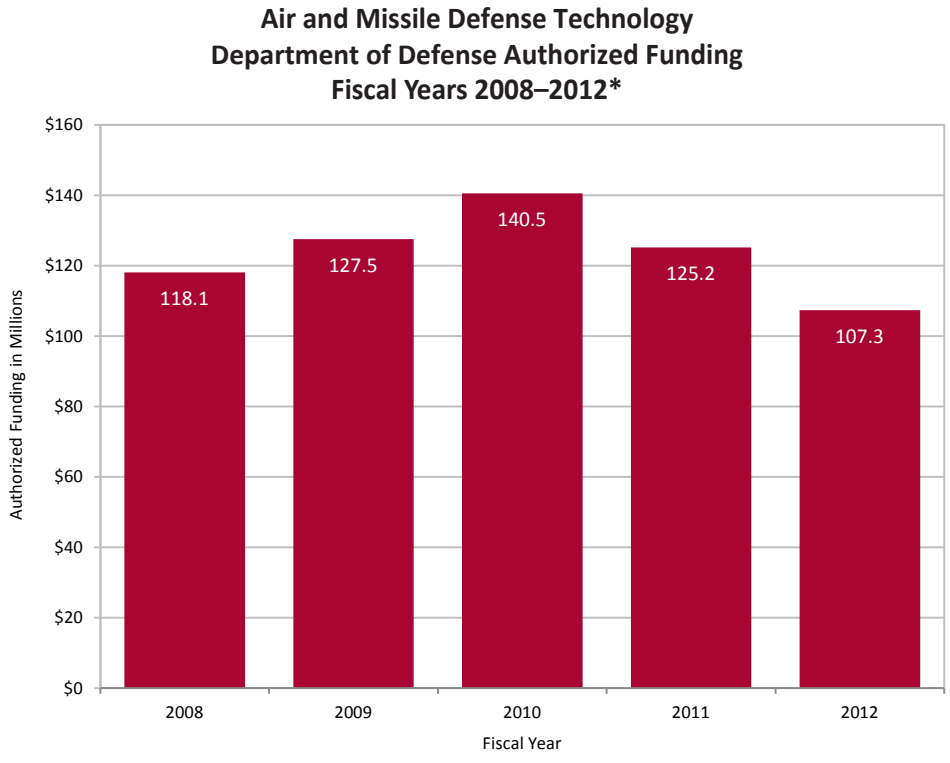


Goods and Services Expenditures by State Fiscal Year 2012*



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.



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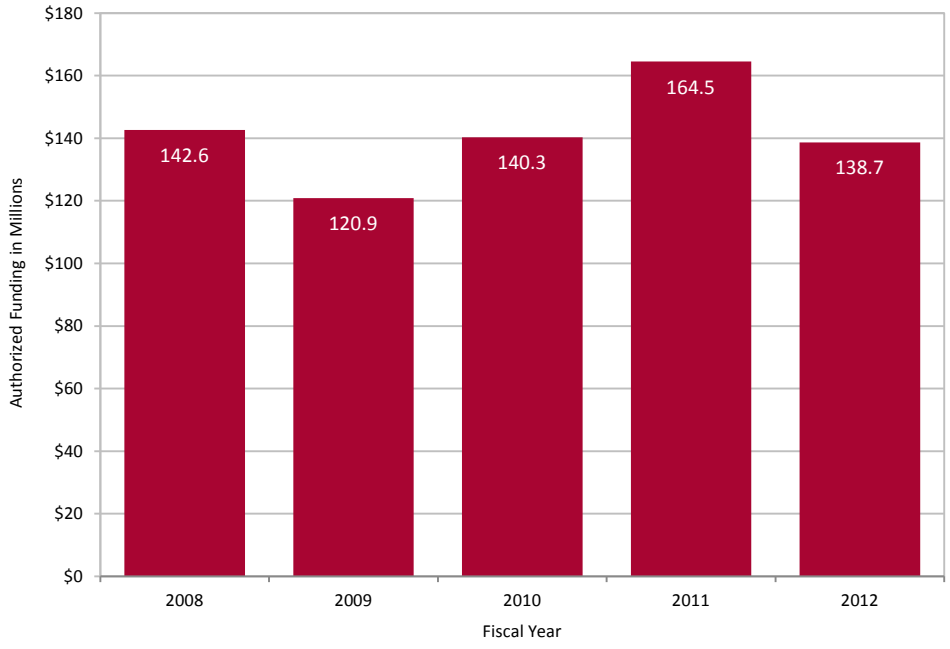
Communications Systems

Lincoln Laboratory is working to enhance and protect the capabilities of the nation's global defense networks. Emphasis is placed on synthesizing 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 span all network layers (from physical to application), with primary focuses on radio-frequency military satellite communications, free-space laser communications, and line-of-sight networking.

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.

Communication Systems and Cyber Security
Department of Defense Authorized Funding
Fiscal Years 2008–2012*



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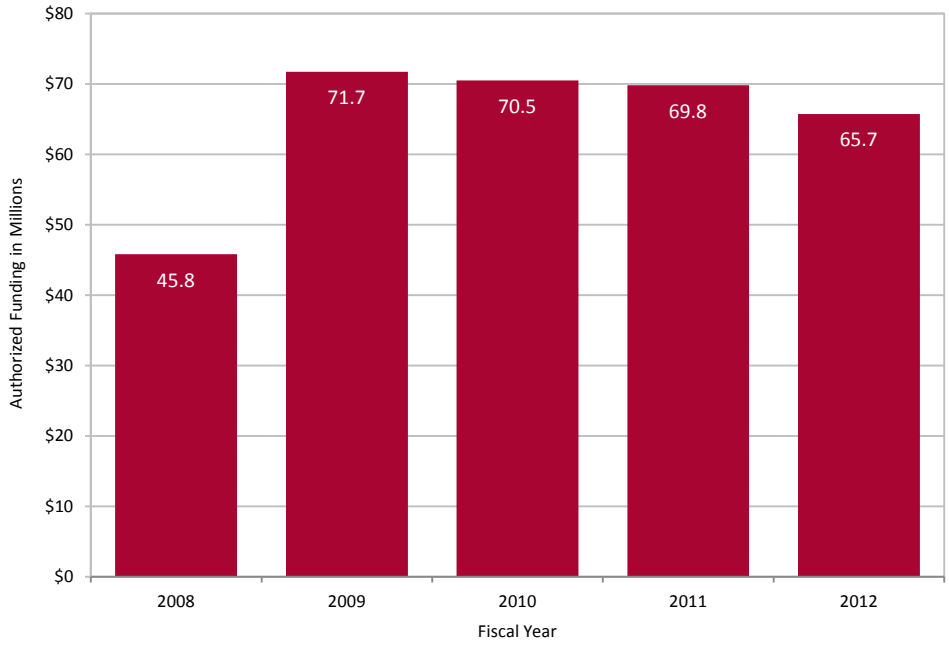
Intelligence, Surveillance, and Reconnaissance Systems and Technology

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 surveillance 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 architectures that connect sensors to operational users. Prototype ISR systems developed from successful concepts are then transitioned to industry and the user community.

Intelligence, Surveillance, and Reconnaissance Systems and Technology
Department of Defense Authorized Funding
Fiscal Years 2008–2012*



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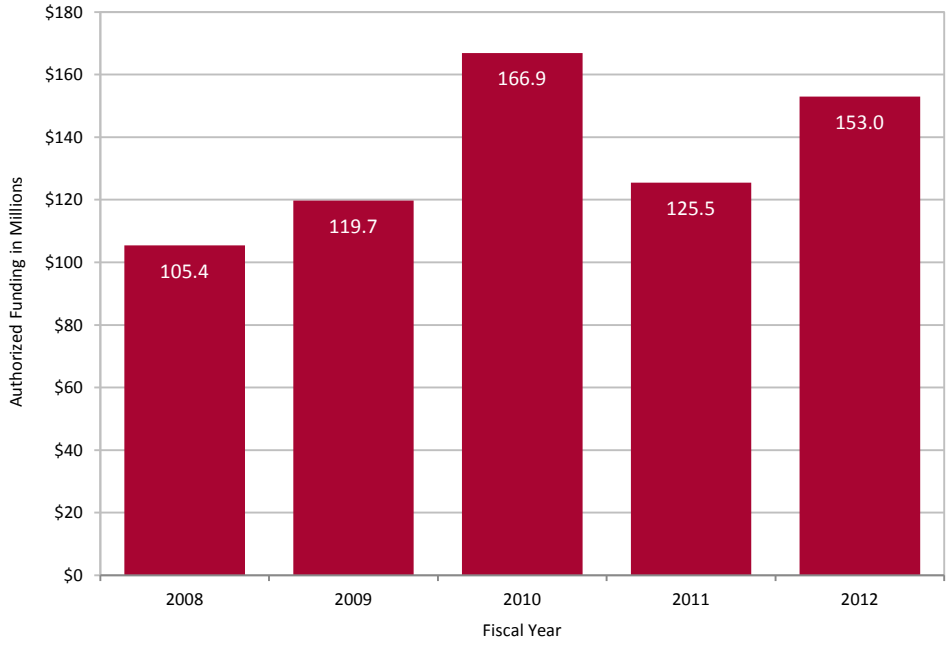
Space Control

The Space Control mission 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; 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
Department of Defense Authorized Funding
Fiscal Years 2008–2012*



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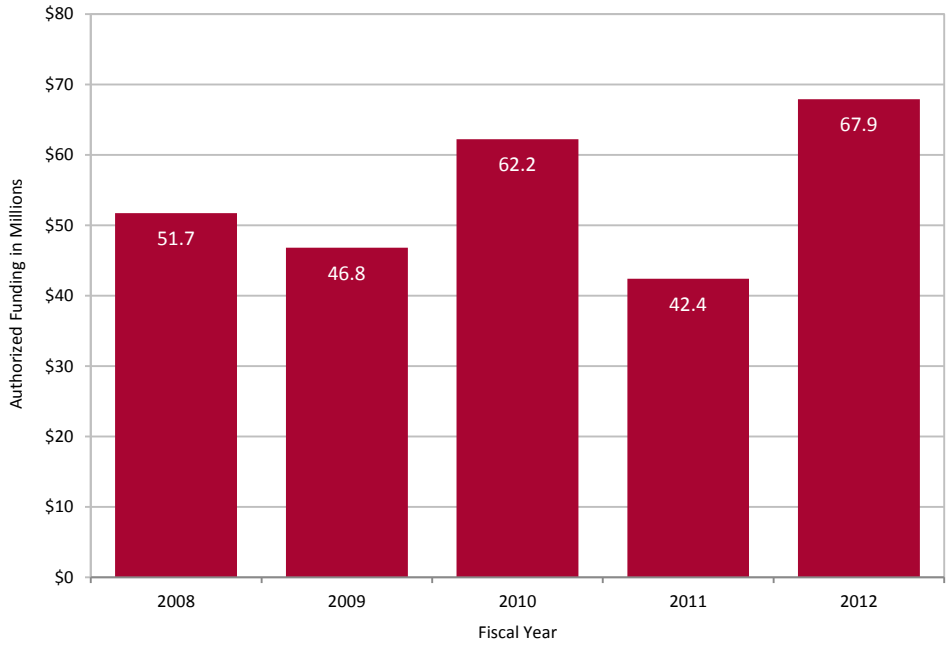
Advanced Technology

Research and development in Advanced Technology supports the entire Laboratory by identifying new phenomenologies that can be exploited in novel system applications and by developing revolutionary advances in subsystem and component technologies that enable new system capabilities. This work is highly multidisciplinary, leveraging solid-state electronic and electro-optical technologies, innovative chemistry, and advanced radio-frequency (RF) technology. Recent developments include world-class imagers and detectors, novel three-dimensional electronic-photonic integration techniques, unique digital and quantum information systems technology, novel engineered materials, chemical-agent sensors, state-of-the-art lasers and photonic devices, and advanced antenna arrays and RF transceivers.

Advanced Technology
Department of Defense Authorized Funding
Fiscal Years 2008–2012*



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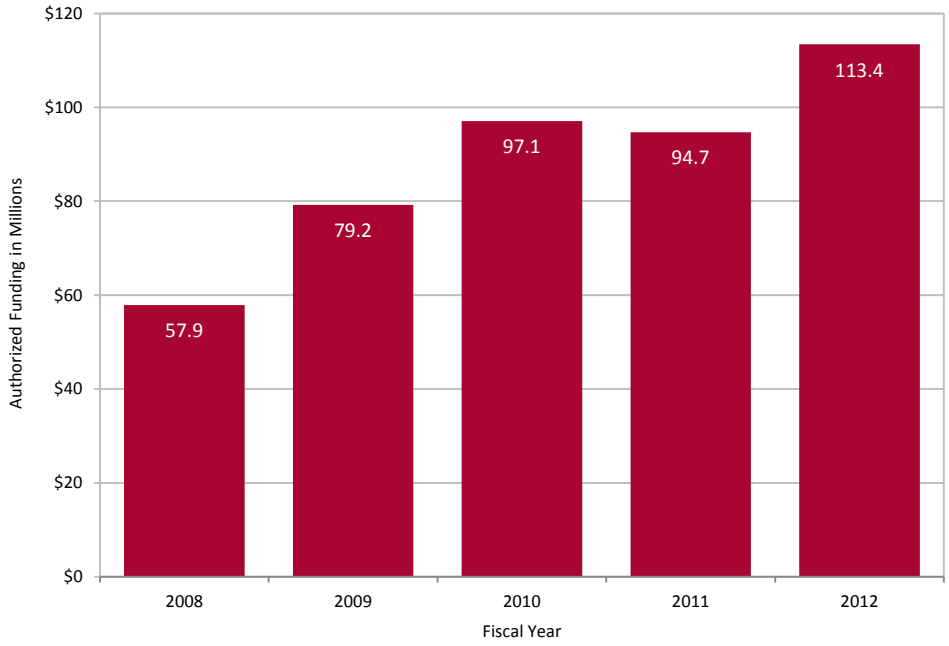
Tactical Systems

In the Tactical Systems mission, Lincoln Laboratory assists the Department of Defense in improving the acquisition and employment of various tactical air and counterterrorist systems by helping the U.S. military understand the operational utility and limitations of advanced technologies. Activities focus on a combination of systems analysis to assess technology impact in operationally relevant scenarios, rapid development and instrumentation of prototype U.S. and threat systems, and detailed, realistic, instrumented testing. A tight coupling between the Laboratory's efforts and the Department of Defense sponsors and warfighters involved in these efforts ensures that these analyses and prototype systems are relevant and beneficial to the warfighter.

Tactical Systems
Department of Defense Authorized Funding
Fiscal Years 2008–2012*



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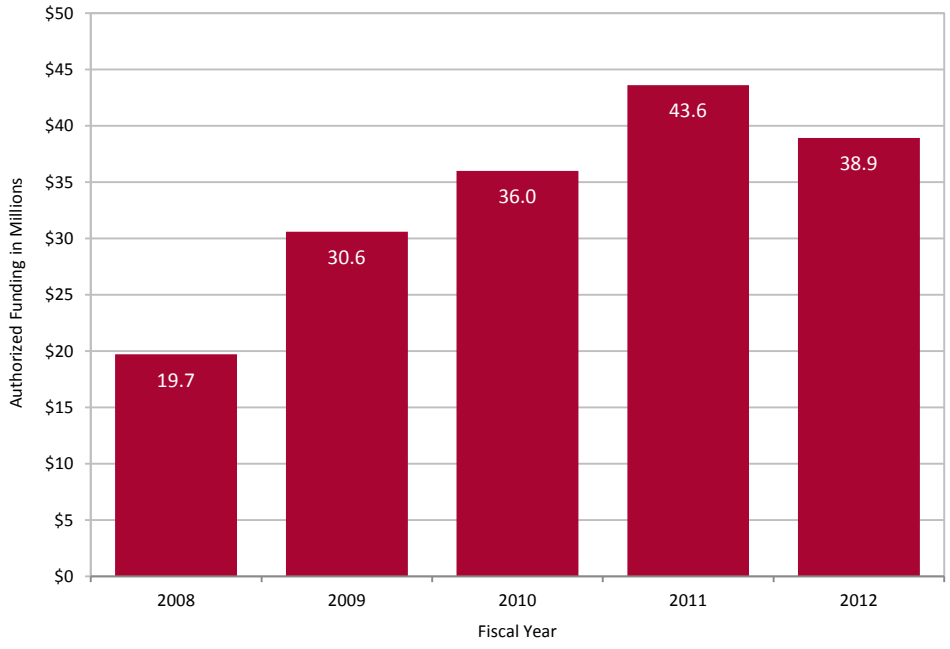
Homeland Protection

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 Department of Defense (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 against biological attacks, development 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.

Homeland Protection
Department of Defense Authorized Funding
Fiscal Years 2008–2012*



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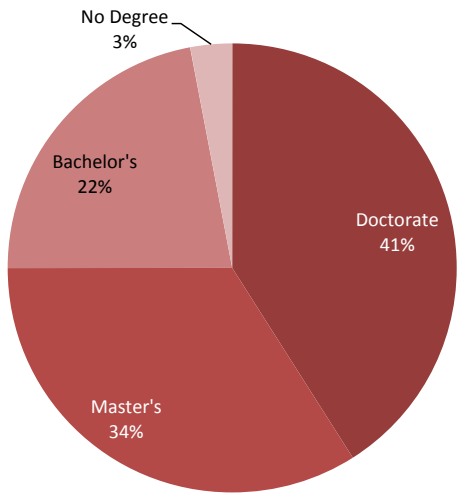
Lincoln Laboratory Staffing

Lincoln Laboratory employs 1,736 technical staff, 396 technical support personnel, 1,048 support personnel, and 573 subcontractors. Almost three-quarters of the technical staff have advanced degrees, with 41% holding doctorates. Professional development opportunities and challenging cross-disciplinary projects are responsible for the Laboratory's ability to retain highly qualified, creative staff.

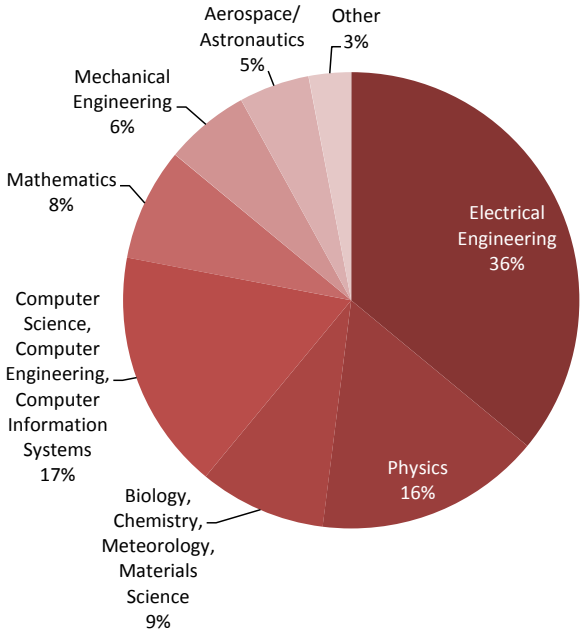
Lincoln Laboratory recruits at more than 60 of the nation's top technical universities, with 65 to 75% of new hires coming directly from universities. Lincoln Laboratory augments its campus recruiting by developing long-term relationships with research faculty and promoting fellowship and summer internship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