Pioneered the development of standards for exchanging product-related information, improving supply-chain interoperability in the automotive, aerospace, and shipbuilding industries saving more than $150 million annually.

Paved the way for the development and widespread adoption (by more than 500 manufacturers) of an open building automation and control standard (BACnet) that is delivering significant savings in energy usage and operating costs, worldwide.

Resulted in improved safety standards for industrial robots, while opening the way to more cost-effective use of the technology in smaller factories.

Led to 40 major and far-reaching changes in U.S. building codes that will improve the safety of buildings, occupants, and first responders—an outcome of EL’s investigation of the 9/11 collapse of the World Trade Center (WTC) and WTC 7.
Through its measurement-focused research and services, EL supplies critical enabling solutions to U.S. manufacturers, construction industry, and the broad array of businesses and other organizations that build, own, operate, or maintain the nation’s vast physical infrastructure. These technical contributions help U.S. industry to innovate, raise productivity, and to compete strongly in domestic and international markets.

EL’s full-time permanent staff of about 210 includes 174 engineers and scientists. Their expertise and research are complemented by more than 200 visiting scientists and engineers from U.S. universities and businesses and from around the world. Regular consultation and close collaboration with stakeholders are central to EL planning and operations.

Many of EL’s responsibilities have been assigned to NIST by Congress. These include fire prevention and control, earthquake hazards reduction, sustainable manufacturing and construction, and businesses and from around the world. Regular consultation and close collaboration with stakeholders are central to EL planning and operations. Regular consultation and close collaboration with stakeholders are central to EL planning and operations.

World-Class Expertise

With research interests that span from microsensors and nanomaterial-based fire retardants to solar arrays and skyscrapers, EL has assembled a rare blend of complementary core competencies. Recognized for excellence the world over, this expertise encompasses:

- Intelligent sensing and control, robotics, and automated systems;
- Systems engineering and integration;
- Smart manufacturing processes and enterprise integration;
- Energy-efficient and intelligent operation of buildings with healthy indoor environments;
- Sustainability, durability and service-life prediction of building and infrastructure materials;
- Fire protection and fire dynamics within buildings and communities; and
- Resilience and reliability of structures at risk to multiple hazards.

Smart, Sustainable, Efficient, Resilient

EL’s goals, strategies, and programs are closely aligned with critical national needs.

Key areas of focus are energy, manufacturing, and infrastructure. In all three of these priority areas, our nation faces significant—and, often, interrelated—challenges and opportunities. And in each, EL’s particular combination of measurement know-how and industry experience, along with its state-of-the-art facilities and, often, one-of-a-kind instruments, are key technical ingredients of a successful U.S. response.

With an emphasis on smart systems, several major EL research projects aim to speed development, adoption, and integration of leading-edge intelligent technologies. These innovations will boost U.S. manufacturing and construction capabilities as well as enhance the quality and durability of its cyber-physical infrastructure.

Another aim of EL research efforts is to further progress toward greater sustainability and energy efficiency in major industry sectors and across the built environment. One example is a project directed toward high-performance, net-zero-energy buildings—the means to substantially reduce energy consumption, since buildings account for 72 percent of electric power use. Another aims to enable an open, standards-based information infrastructure to support sustainable manufacturing practices across supply chains.

With a large percentage of the nation’s buildings and infrastructure clustered in disaster-prone regions, EL also is developing measurement methods, models, and predictive tools that will help to make buildings, infrastructural systems, and entire communities more resilient in the face of natural and human-made hazards.

Specialized Research Facilities

EL research on manufacturing, buildings, and cyber-physical systems benefits from nearly 20 advanced facilities and testbeds, which are housed on NIST’s Gaithersburg, Md., campus and also are available for cooperative and independent research.

NIST is expanding its National Fire Research Laboratory to accommodate testing full-scale structures—up to two stories high—and their components under realistic fire conditions.