AMERICAN NATIONAL STANDARDS INSTITUTE

Advancing U.S. Industry and Competitiveness for 100 Years and the Innovative Future Ahead

IMPACT ★ LEADERSHIP ★ STANDARDIZATION

100 ANSI

1918 - 2018

FOR 100 YEARS, THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) HAS BEEN PROUD TO LEAD COLLABORATIVE VOLUNTARY STANDARDS AND CONFORMITY ASSESSMENT ACTIVITIES THAT RESPOND TO THE EVOLVING NEEDS OF U.S. BUSINESS AND INDUSTRY, THE HEALTH AND WELFARE OF CITIZENS, AND THE PRIORITIES OF THE NATION. THIS RESPONSIVE LEADERSHIP HAS HELPED MAKE THE HIGHLY COLLABORATIVE U.S. STANDARDIZATION SYSTEM THE MOST DYNAMIC AND IMPACTFUL IN THE WORLD.

10 DECADES OF PROGRESS

The history of the American National Standards Institute (ANSI) and the U.S. voluntary standards system is collaborative, dynamic, and evocative of the market-driven spirit that continues today.

1910s

In 1918, a group of five engineering organizations and three federal agencies formed an impartial national body as a public-private partnership to coordinate U.S. standards development—then called the American Engineering Standards Committee (AESC) and now known as ANSI. The first standard approved was for screw threading sizes on pipes, reflecting the rapid advancement of plumbing technology as housing demand and urbanization surged after World War I.

1920s

As industrialization intensified, AESC began the coordination of national safety codes to replace the many laws and recommended practices that were hampering accident prevention. The first American Standard Safety Code was approved in 1921 and covered head and eye protection for industrial workers. AESC also approved national standards that that helped modernize the U.S. mining, engineering, and construction industries and develop critical infrastructure. In 1928 AESC reorganized as the American Standards Association (ASA).

1930s

Continuing development of standards for occupational safety included guidance for preventing hazards in the factories where many Americans worked. At the same time, household technology was rapidly modernizing, and many standards developed in this decade addressed the safety of home appliances. During this period, ASA grew to a level of international influence, helping to establish the forerunner of the International Organization of Standardization (ISO) and formalizing its relationship with the International Electrotechnical Organization (IEC).

1940s

During the second World War, ASA played a key role in the U.S. war effort by setting standards needed to increase industrial efficiency for war production. Nearly 1,300 engineers worked on special committees to produce American War Standards for quality control, safety, photographic supplies, and equipment components for military and civilian radio, fasteners, and other products.

1950s

This was a time of great technological growth and optimism, including new areas of industry that had never been seen before. ASA helped to guide industry through the development of fields like nuclear energy, along with the electronics innovations and early computers that paved the way for the Information Age. As consumer culture in the United States grew, so did an increasing reliance on standardization to ensure that the new products were safe and reliable.

1960s In 1961, ASA led the formation of the Accredited Standards Committee X3 on Information Technology as the central U.S. forum for the development of IT standards. Emerging from this period of innovation and growth as the American National Standards Institute (ANSI), the Institute launched its first accreditation mark, for manufacturers whose products were judged by an independent test to comply with an approved American National Standard.

1970s ANSI and the Occupational Safety and Health Administration (OSHA) established a joint coordinating committee for private-public sector voluntary standards activities affecting safety and health in the workplace in 1976. A few years later, its success led to the formation of a similar joint committee with the Consumer Product Safety Commission (CPSC), focused on coordination of standards for consumer products.

1980s With the rise of globalization and free-trade agreements, standards and conformity assessment became more vital than ever. And in 1987, the Institute accepted responsibility for the most significant innovation in global standard-setting: administration of ISO/IEC Joint Technical Committee 1 on Information Technology (JTC 1), the world's largest and most prolific standardization committee.

1990s ANSI launched a Strategic Development Initiative to help U.S. companies develop best practices for utilizing standards strategically to gain a competitive advantage in global markets. The National Competitiveness Act of 1993 asserted that strong U.S. leadership and participation in international standardization was critical to long-term U.S. competitiveness. And the watershed National Technology Transfer and Advancement Act of 1995 mandated that all federal agencies rely upon voluntary consensus standards wherever possible.

2000s Around the nation, prominent safety recalls for products such as children's toys brought to light the importance of standards and conformity assessment in keeping consumers safe. And ANSI broadened its accreditation services offerings to serve even more customers, including personnel credentialing bodies and greenhouse gas validation and verification bodies.

2010s ANSI established an affiliate organization—Workcred—focused on strengthening the U.S. workforce by improving the quality, effectiveness, and market value of credentials. And in 2018, ANSI further grew its accreditation portfolio by integrating management systems, laboratories, and forensics programs as the newly unified ANSI National Accreditation Board (ANAB).

IMPACT TODAY & TOMORROW

The strength of the U.S. economy is highly dependent upon continued growth in five key industry sectors: energy, manufacturing, healthcare, transportation, and agriculture. Intertwined with those sectors is a vast and expanding array of services and information and communications technology (ICT) advancements that fuel further innovation and growth. Every one of these interdependent systems, processes, products—and the personnel enabling their implementation—requires standards and conformity assessment solutions.

MANUFACTURING
ENERGY
TRANSPORTATION
HEALTHCARE
AGRICULTURE
INFORMATION
COMMUNICATIONS
TECHNOLOGY

With a recognition of the long history of cooperative work at its foundation, ANSI takes a high-level look at some of the recent standards and conformity assessment activities the Institute has led, in collaboration with members and partners, to drive U.S. competitiveness, innovation, and quality of life in these key sectors and beyond.

MANUFACTURING

EVERY DOLLAR SPENT IN MANUFACTURING ADDS $1.89 OF GROWTH IN OTHER SUPPORTING SECTORS

Source: National Association of Manufacturers, *Top 20 Facts about Manufacturing*, 2018

To help ensure U.S. manufacturing continues to adapt and strengthen its global position, ANSI leads collaborative standardization activities that enable implementation of emerging technologies, fortify supply chain quality and security, and help develop the workforce resources our modern manufacturing environment needs today and tomorrow.

ANSI Drives 3-D-Printing Standardization Advancement

Additive manufacturing, or "3-D printing," has the potential to open up vast opportunities for highly efficient production, maintenance, and R&D across the manufacturing sector. To help coordinate and accelerate the development of standards and conformance solutions needed for 3-D-printing as it is increasingly deployed in innovative technology cases across industries, the ANSI and America Makes Additive Manufacturing Standardization Collaborative (AMSC) worked with 170 ANSI members and other partners to develop a Standardization Roadmap for Additive Manufacturing. The roadmap identifies existing standards, assesses gaps, and makes recommendations for priority areas where additional standardization is needed to move the technology forward.

TOP TEN ADVANCED MANUFACTURING TECHNOLOGIES FOR U.S. COMPETITIVENESS

PREDICTIVE ANALYTICS
SMART, CONNECTED PRODUCTS (IOT)
ADVANCED MATERIALS
SMART FACTORIES (IOT)
DIGITAL DESIGN, SIMULATION, INTEGRATION
HIGH-PERFORMANCE COMPUTING
ADVANCED ROBOTICS
ADDITIVE MANUFACTURING (3-D PRINTING)
OPEN-SOURCE DESIGN
AUGMENTED REALITY

Source: Deloitte, *The Future of Manufacturing*

92%

OF COMPANIES USING 3-D PRINTING IN 2018 REPORT SEEING COMPETITIVE ADVANTAGES, INCLUDING REDUCED TIME-TO-MARKET AND FLEXIBILITY TO SUPPORT SHORTER PRODUCTION RUNS FOR CUSTOMERS.

Source: Sculpteo, *The State of 3-D Printing, 4th edition*

Workcred Helps Align Quality Credentials with Workforce Opportunities

ANSI's Workcred affiliate is quickly gaining a reputation for excellence in developing resources, data, and innovative solutions that will improve the quality and efficacy of our nation's complex credentialing system. Among many key partnership initiatives, in 2018 Workcred and the National Institute of Standards and Technology (NIST) Hollings Manufacturing Extension Partnership (MEP) released a widely read report detailing how credentialing can be improved to meet the changing workforce needs of manufacturers.

U.S. Leadership in IEC Smart Manufacturing Activities

The U.S. National Committee (USNC) of the International Electrotechnical Commission (IEC), a committee of ANSI, was approved by the IEC Standardization Management Board to take the IEC Secretariat role for the newly established IEC Systems Committee (SyC) on *Smart Manufacturing*. This committee is working to provide coordination and guidance to harmonize and advance Smart Manufacturing activities in the IEC, other standards developing organizations, and consortia. This marks the first time that a National Committee has been approved to take on this type of IEC SyC leadership role.

Nanotechnologies Drive Manufacturing Innovations

The leadership ANSI provides in domestic and international nanotechnology standardization activities has enabled the Institute to influence the advancement of innovative nano-manufacturing applications. Domestically, the ANSI Nanotechnology Standards Panel (NSP) serves as the cross-sector coordinating body for facilitating the development of standards needed to drive nanotechnology implementation across sectors. And in the global arena, the Institute administers the U.S. Technical Advisory Group (TAG) to ISO TC 229 on *Nanotechnologies*, ensuring the U.S. is strongly represented throughout TC 229's areas of activity. As the potential reach of nanotechnologies continues to grow, TC 229's work will play an ever-greater role in the global advancement of nanotechnology standardization for advanced manufacturing.

> "Breakthroughs in nanotechnology provide ever-expanding opportunities to commercialize novel materials at the nanoscale. These materials are critical for propelling advanced manufacturing forward, improving product performance, and creating new, innovative products that enhance manufacturing.
>
> Source: Gray Engineering, *Nanotechnology and Manufacturing: The Future Is Bright*

ENERGY

REDUCTIONS IN TECHNOLOGY COSTS AND POLICIES THAT ENCOURAGE THEIR ADOPTION HAVE DRIVEN DOWN THE COSTS OF RENEWABLE ENERGY TECHNOLOGIES IN THE U.S.

Source: U.S. Energy Information Administration, *Annual Energy Outlook 2018*

Advancements in energy efficiency power the U.S. economy, fuel job creation, increase competitiveness, and boost security. Realizing the promise of energy efficiency demands close coordination between the public and private sectors. ANSI has been highly active in fostering collaborative standards and conformance activities to drive energy initiatives.

> "The residential sector consumes the most energy, with cooling accounting for the largest share of energy use.
>
> Source: National Journal

A Framework for Increased Energy and Water Efficiency in Buildings

Responding to needs identified nationwide, the ANSI Energy Efficiency Standardization Coordination Collaborative (EESCC) published a roadmap of standards and conformity assessment programs required for a more energy- and water-efficient built environment, followed by a progress report two years later. Developed through the collaborative work of 160 public- and private-sector experts, this national framework has provided concrete guidance to help advance standardization activities foundational to U.S. energy efficiency.

Measurable Success in Improved Energy Performance

ANSI and ANAB have been recognized by the U.S. Department of Energy as third-party accreditors for certification bodies that conduct Sustainable Energy Performance (SEP) audits. The SEP program provides industrial facilities that are ISO 50001:2011-certified with a roadmap for achieving ongoing energy performance gains without sacrificing financial competitiveness. ANSI and ANAB are also recognized accreditation bodies for the EPA EnergyStar program, among other certification programs that are helping to assure U.S. energy goals can be met through a collaborative approach across government and industry.

6.4 MILLION

AMERICANS ARE EMPLOYED IN THE TRADITIONAL ENERGY AND ENERGY EFFICIENCY SECTORS IN THE UNITED STATES TODAY

Source: U.S. Department of Energy, 2017 U.S. Energy & Employment Report

87 QUADRILLION

BTUS OF ENERGY WERE PRODUCED IN THE UNITED STATES IN 2017

Source: U.S. Energy Information Administration

Standards Alliance Helps Developing Regions Implement Energy Progress

ANSI is entering its 7th year in partnership with USAID on the highly successful Standards Alliance initiative. The program is designed to provide capacity building assistance to developing countries by coordinating subject-matter experts from throughout the private-sector-led U.S. standardization system for delivery of training and other technical assistance to interested Standards Alliance countries. Energy access, electrical grids, and sustainability are frequent topics of focus for events hosted in areas that have included Mexico, Central America, Peru, Colombia, Indonesia, East, West, and Southern Africa, the Middle East, and the Asia-Pacific region. ANSI member participants gain the valuable benefits of information gathering, access and relationship-building, and opportunities for influence in developing markets.

Regional Development Assistance Partnerships Promote Increased Energy Access, Efficiency, and Global Opportunities

In a very successful partnership with the U.S. Trade and Development Agency (USTDA), ANSI hosts frequent workshops for industry and government from the United States and Sub-Saharan Africa to share information and cooperate on advancing standardization infrastructure and solutions for clean energy technologies. ANSI's work in the U.S.-India Standards and Conformance Cooperation Program (SCCP) is helping India develop a standards and conformance system that will support its energy targets, while creating a level playing field for solutions and services from U.S. industry. And the Institute recently began implementing Phase V of the U.S.-China SCCP, whose cross-sector workshops have focused on energy performance contracting, green building, and environmental technology.

> "Electricity is the rising force among worldwide end-uses of energy, making up 40% of the rise in final consumption to 2040—the same share of growth that oil took for the last twenty-five years.
>
> Source: International Energy Agency, *World Energy Outlook 2017*

TRANSPORTATION

TOTAL SPENDING ON DRONES WORLDWIDE IS PROJECTED TO SOAR TO $90 BILLION BY 2025

Source: Inc.

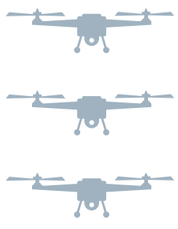
Transformative technologies are poised to create a dramatically different U.S. transportation landscape in the next 10 years. Already, vehicle sharing and electrification are widespread, and autonomous vehicles have begun to enter our roads, rails, waters, and airspace and accelerate change everywhere.

ANSI Establishes Collaborative to Assure Safety and Support Rapid Drone Market Growth in U.S.

ANSI established the Unmanned Aircraft Systems Standardization Collaborative (UASSC) in 2017 to facilitate the safe integration of drones into the U.S. national airspace system (NAS), with an additional focus on international coordination and adaptability to foster the growth of the U.S. market. Under ANSI's leadership, the collaborative delivered an aggressive timeline, from the initial kickoff meeting to publication of the UASSC Standardization Roadmap for Unmanned Aircraft Systems in December 2018–in just over a year.

The UASSC is moving swiftly to prepare for the impact of drones and leverage the advantages of the technology, and the roadmap will accelerate standardization activities that support that advancement. ANSI's leadership role in the collaborative promotes harmonization of standards and regulatory requirements in ways that benefit U.S. businesses, encourage public-private collaboration by identifying a path forward toward standards development, and support safety in U.S. airspace. Participation and funding from the Federal Aviation Administration (FAA) and the U.S. Department of Homeland Security, Science & Technology Directorate, have been foundational to the success of this project, along with the participation of 175 ANSI member and other organizations.

The U.S. transportation system comprises more than 270 million vehicles–land, air, and water conveyances of all sorts and sizes–that circulate on a complex system of highways, railroads, airports and airspace, public transit systems, waterways, and pipelines. As autonomous vehicles such as drones and driver-less cars increasingly enter this system, collaborative, coordinated standards and conformity assessment activities developed among the vast community of members, partners, and stakeholders ANSI is proud to support are more critical than ever for safety, performance, interoperability, and U.S. innovation and competitiveness.



7,000,000

DRONES ARE PREDICTED TO BE IN THE U.S. BY 2020

Source: Federal Aviation Administration

Standardization Roadmap for Electric Vehicles Identifies Needs for Infrastructure and Wide Deployment

In 2013 the ANSI Electric Vehicles Standards Panel (EVSP) took up the challenge of articulating a roadmap of needed areas of standardization that would help foster consumer adoption of electric vehicles in the United States. Following the roadmap, the panel published a progress report providing a snapshot of the current state of work by those developing standards for all-electric and plug-in hybrid vehicles and the charging infrastructure needed to support them. Over the course of its work, the ANSI EVSP demonstrated a commitment to fostering coordination and collaboration on standardization matters among public and private sector stakeholders to enable the safe, mass deployment of electric vehicles and associated infrastructure in the United States with international coordination, adaptability, and engagement.

> "Spurred by lower costs, longer ranges, and government incentives, worldwide sales of electric vehicles are rapidly escalating, fueling investment in lithium-battery technology.
>
> Source: International Energy Agency, *World Energy Investment 2018*

Standards Support Safety, Performance, and Innovation in Transportation Technology in the U.S. and Globally

It would be a daunting task to try to estimate the number of standards involved in transportation. From cars to trains to subways and airplanes, roads, waterways, trucking, shipping–not to mention the incredibly complex variety of infrastructure, processes, systems, and people that enable all that transportation to happen. And the thousands of international standards from IEC and ISO are just the tip of the iceberg.

ANSI is proud to support and facilitate the work of the hundreds of standards developers striving to meet industry, government, and societal needs. To date, ANSI has approved more than 12,000 documents as American National Standards across all industry sectors, and accredited 240 standards developers. Our focus on continuous program improvements in our domestic activities, as well as strong leadership in global forums, are a powerful benefit the the U.S. standardization system overall, making it stronger and more responsive to the changing needs of our innovation nation.

HEALTHCARE

INNOVATIVE TECHNOLOGIES ARE DRIVING LESS EXPENSIVE, MORE EFFICIENT, AND MORE ACCESSIBLE CARE DELIVERY ON A GLOBAL SCALE.

The application of cutting-edge technologies will increasingly enhance the ability of the U.S. healthcare system to provide effective and efficient medical treatment to all Americans. Machine learning and analysis of big data will help improve diagnostics; electronic health records (EHRs) can be accessed in any medical facility, and can automatically alert the provider to known conditions, allergies to medicines, or other potential issues; and a central and standardized system throughout the entire healthcare industry can drastically improve vital communications–for example, identifying a viral outbreak or bacterial infection quickly.

ANSI and ANAB Are ONC/HHS-Approved to Accredit Health IT Certification Programs

As new technologies rapidly enter the healthcare arena, the demand for enhanced data security around proprietary information has become a priority for hospitals, healthcare providers, and patients. ANSI and ANAB are helping to support data security efforts nationwide as the sole approved accreditor appointed by the Office of the National Coordinator (ONC) within the the U.S. Department of Health and Human Services (HHS) for the ONC Health Information Technology (HIT) Certification Program. This program works to enhance the transparency, reliability, and efficiency of processes used to certify electronic health record (EHR) technology, and ANSI is responsible for assessing applicant certification bodies against international standards to assure quality and integrity. This is just one of many instances where government agencies have chosen to rely on ANSI and ANAB accreditation to demonstrate value and assure competency for important national priorities.

> The global dietary supplements market–valued at $133.1 billion in 2016–is projected to see tremendous growth and reach $220 billion by 2021.
>
> Source: Zion Research

Coordinated Collaboration for Healthcare Advances

Through the hosting of a number of recent partnership events, ANSI is actively bringing together the cross-sector stakeholders needed for collaborative progress in advancing standardization and progress in various aspects of intelligent healthcare. For example, in partnership with the National Institute of Standards and Technology (NIST) and the Association for the Advancement of Medical Instrumentation (AAMI), ANSI co-hosted a Capitol Hill event on "Smart Health: Using intelligent systems to improve the quality and delivery of healthcare."

And most recently, the Institute organized a cross-stakeholder event with the Global Retailer and Manufacturing Alliance (GRMA) on safety, quality, and trust in the dietary supplements supply chain. A wide range of stakeholders including manufacturers, retailers, government agencies, trade and professional associations, and consumer interest groups discussed industry-led efforts and new opportunities and solutions to identify and address gaps where needed.

> Adoption of industry standards for electronic health records and other aspects of health IT is a key recommendation for federal and state agencies to increase efficiency and interoperability across providers.
>
> Source: Office of the National Coordinator for Health Information Technology, *Strategy on Reducing Regulatory and Administrative Burden Relating to the Use of Health IT and EHRs*

The Health Information Technology for Economic and Clinical Health (HITECH) Act was signed into law in 2009 as part of the American Recovery and Reinvestment Act. Administered by the the Office of the National Coordinator (ONC), the goal of the HITECH Act is to improve the manner in which healthcare is delivered and patients are served by investing in progressive health information technologies, including electronic health records (EHRs). According to the Centers for Medicare and Medicaid Services, meaningful EHR technology will produce these benefits:

- **Empowered individuals**
- **Better clinical outcomes**
- **Increased transparency and efficiency**
- **Improved population health outcomes**
- **More robust research data on health systems**

ANSI Steps Up to Maintain U.S. Leadership of ISO Health Informatics

Fortifying U.S. influence in international standardization for healthcare, ANSI staff recently assumed the secretariat duties of ISO TC 215, *Health Informatics*. This committee is responsible for standardization to facilitate the capture, interchange, and use of health-related data, information, and knowledge to support and enable all aspects of the health system.

U.S. Facilitates Global Advances in Sanitation Technologies

ANSI played a key leadership role in driving the development of the first international standard for "reinvented" toilets that remove pathogens and do not require traditional infrastructure such as sewer, water connection, or electricity. ISO 30500 was published in 2018, and ANSI continues to focus on its widespread implementation, working to make it available to manufacturers, governments, and NGOs; enabling opportunities for U.S. companies to get involved; and potentially helping save millions of lives.

AGRICULTURE

As demand for U.S. agriculture increases, the science behind it evolves and intersects with other disciplines such as engineering, ICT, and advanced production. Precision agriculture uses big data and predictive analytics to yield greater results with fewer resources, and technology enables increasingly reliable tracking throughout the supply chain. Advanced machinery and IoT connectivity make smart agriculture increasingly efficient and implementable.

Creating a Food Safety System That Prevents Contamination

Working closely with the U.S. Food and Drug Administration (FDA), ANSI earned recognition as an accreditation body under their rules for the Food Safety Modernization Act (FSMA) in 2018. The goal of the FSMA is to create a food-safety system that focuses on preventing contamination rather than reacting to problems after they have already occurred. And third-party accreditation like ANSI's rigorous program is critical to providing assurance that food safety conformity assessment bodies verify that practices meet essential requirements throughout the global supply chain.

> "17 million agricultural IoT wireless devices were installed globally in 2016, and that number is forecasted to grow to 27.4 million by 2021.
>
> Source: Alpha Brown

Standards for Agricultural Safety and Innovation

The U.S. has provided continual leadership of International Organization for Standardization (ISO) Technical Committee (TC) 127, *Earth moving machinery,* since the committtee's inception in 1968, with ANSI serving as the secretariat and U.S. industry at the helm as committee chair. Over that time, ISO TC 127 and its Subcommittees (SCs) have published more than 100 standards to address the commercial needs and safety of tractors and earth-moving machines used in agriculture and forestry, as well as in a vast array of critical infrastructure, construction, and mining applications, with significant support from U.S. manufacturers as well as research laboratories, test organizations and notified bodies, and government health and safety agencies participating in the standards development projects.

In addition, ANSI has approved a large number of American National Standards (ANS) published by our members and standards developers that are helping to modernize and maximize U.S. agricultural production in never-before-seen ways. For example, the recently published ANSI/ASABE S632-3, *Precision Agriculture Irrigation Language: Irrigation System Operations*, provide guidelines for an industry-wide communications format for precision-irrigation operations, facilitating interoperability between smart agricultural machinery.

U.S. AGRICULTURAL EXPORTS FOR 2019 ARE PROJECTED AT $141.5 BILLION

Source: U.S. Department of Agriculture, *Outlook for U.S. Agricultural Trade,* November 2018

Clean Water for Sanitary Irrigation

More than 35% of the world's population lacks access to adequate sanitation systems, resulting in wastewater crop irrigation that risks the health of nearly a billion people. To help assure safety, performance, and sustainability for safer sanitation and irrigation, ANSI is serving as the Secretariat to International Organization for Standardization (ISO) Project Committee (PC) 318 on *Community-scale resource-oriented sanitation treatment systems.* In partnership with Kenya and with the help of numerous ANSI members and international stakeholders, the Institute has hosted a series of international workshops for the development of a new international standard, ISO/CD 31800, *Community scale resource oriented sanitation treatment systems.* Once finalized and implemented, this standard will enhance efforts to widely manufacture, market, and deploy the technology where it is needed most and improve the health and safety of millions of people.

TOP U.S. AGRICULTURAL EXPORTS IN 2017

Soybeans	$21.6 B
Corn	$9.1 B
Tree nuts	$8.5 B
Beef	$7.3 B
Pork	$6.5 B
Wheat	$6.1 B
Prep. food	$5.9 B
Cotton	$5.8 B
Dairy	$5.4 B
Fruit	$4.7 B

Source: U.S. Department of Agriculture

Global Collaboration on Smart Agriculture

ANSI co-sponsored a U.S.-German Standards Panel in 2018 to explore global progress in smart agriculture, re-affirming a commitment to international standards to help deliver profitable and sustainable agricultural production by equipping farmers with new technologies, knowledge, and mechanisms to gain fair access to markets. Globally relevant standards contribute to the sustainable, cost-effective, and environmentally friendly production of agricultural products for countries around the world.

> The world will need to produce about 70 percent more food by 2050 to feed an estimated 9 billion people.
>
> Source: World Bank

ICT

SPENDING ON ARTIFICIAL INTELLIGENCE IS FORECASTED TO REACH $52.2 BILLION IN 2021—A 46% COMPOUND ANNUAL GROWTH RATE

Source: IDC

At a time when disruptive technologies like artificial intelligence, blockchain, and augmented reality are redefining business models and processes, IT's traditional reactive, silo-ed ways of working cannot support the rapid-fire change driving business today. Organizations will need to transform their technology ecosystems from collections of working parts into high-performance, interconnected engines that deliver speed, impact, and value. The convergence of transformational technologies will bring change across every aspect of society. And ANSI is hard at work alongside our members supporting myriad standardization activities that enable that progress.

ISO/IEC JTC 1 Leads Global IT Standardization, with ANSI Leadership

ISO/IEC Joint Technical Committee (JTC) 1 on *Information Technology* is a highly productive collaboration between the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) working in areas such as 3-D printing and scanning, IT security, IoT, cloud computing, biometrics, and artificial intelligence. More than 4,500 experts from 32 participant member countries come together to develop mutually beneficial standards that advance IT and global trade. And since the committee was formed more than 30 years ago, the U.S. has served as its chair, with ANSI as the secretariat. One of the largest and most prolific technical committees in the entire international standardization community, ISO/IEC JTC 1 has had direct responsibility for the development of over 3,000 published ISO/IEC standards, with more than 500 currently under development–making a tremendous, ongoing impact on the global ICT industry at every level across every sector.

Whether it be in computer systems, medical devices, or agricultural machinery, toys, appliances, safety equipment or myriad other areas, the U.S. has always been one of the most active, influential members of both ISO and IEC. And it is a key priority for ANSI to ensure it retains that activity, leadership, and influence.

An estimated 40% of digital transformation initiatives will use artificial intelligence in 2019.

Source: IDC

ANSI Assumes Secretariat of ISO/IEC Subcommittee on Artificial Intelligence

A powerful expansion of U.S. influence in international ICT standardization activities arose when the U.S. assumed leadership in 2018 of the newly formed ISO/IEC JTC 1 Subcommittee 42 on *Artificial Intelligence*, with ANSI serving as the secretariat. This is a first-of-its-kind standardization committee looking at the full AI IT ecosystem. And it will have a tremendous global impact, with the U.S. in a key leadership position, as AI plays an increasingly critical role in nearly every sector. From transportation to healthcare, financial services to retail, robotics, manufacturing, and much yet to come, AI will increasingly drive global innovation to new heights. And as it does, the importance of U.S. leadership in collaborative global standardization work like this can't be underestimated.

Leadership in International Biometrics Standardization

Recognizing the critical importance of biometrics standardization to the security of citizens and nations, ANSI is serving in a key leadership role as the international secretariat of ISO/IEC JTC 1, Subcommittee (SC) 37, *Biometrics*. SC 37 develops standards that support a wide range of systems and applications for reliable verification and identification of individuals, whether in airports, office buildings, schools, law enforcement agencies, government offices or countless other venues and applications. In one prominent example, the International Civil Aviation Organization (ICAO) relies on SC 37 standards for facial recognition, fingerprints, and iris scanning in its official travel documents.

SINCE 1990, EMPLOYMENT OPPORTUNITIES IN SCIENCE, TECHNOLOGY, ENGINEERING, AND MATH HAVE GROWN

79%

Source: U.S. Bureau of Labor Statistics, 2017

"The number of internet-enabled devices–as in the internet of things–is expected to grow five-fold, to 25 billion worldwide by 2025.

Source: GSMA, *The Mobile Economy 2018*

Accreditation of ICT Programs

Workers seeking to enhance their career opportunities in information and communication technologies have a sea of training programs and certifications to choose from. But increasingly, employers, job-seekers, and governments rely on ANSI National Accreditation Board (ANAB) programs to verify the quality of personnel certification programs. In addition, the U.S. government relies on ANSI/ANAB for accreditation of telecommunications product certification bodies (TCBs) under a Federal Communications Commission (FCC) program to enforce rules for the manufacture of telecommunications and radio equipment, in accordance with the Mutual Recognition Agreement of the Asia-Pacific Economic Cooperation (APEC MRA). Third-party accreditation by ANSI/ANAB provides rigorous, standards-based assessment, creating a distinction that only a quality certification program can achieve.

ANSI merged its accreditation services programs with those of ANAB in 2018, creating the ANSI National Accreditation Board (ANAB)–a global leader in conformity assessment with a broad portfolio including programs for product certification bodies, personnel credentialing organizations, management systems, certification bodies, lab-related accreditation, and forensic accreditation.

INCREASED FOCUS ON

SERVICES

The "services sector" comprises those economic activities that do not result in tangible ownership. Very broadly defined, a service may be any valuable action, deed, or effort performed to satisfy a need or to fulfill a demand. Thousands of domestic and international standards and conformance activities impact the ways in which services meet demand.

Services are tremendous contributors to the global economy. But the services sector is quite diverse, from utilities, IT, and finance to tourism, healthcare, education, and retail. Even the manufacturing sector has a significant services component–from training, to transit and logistics, to customer satisfaction. Each of these areas has different priorities, and it can be a challenge to identify standardization needs, where they overlap, and where they diverge.

While many service providers already rely upon standards and conformance to help them grow their business and access new markets, some are missing out. In fact, there are whole sectors that aren't using standards, and many more that aren't using them optimally.

THE SERVICES SECTOR ACCOUNTS FOR AN ESTIMATED 80% OF THE U.S. GDP, AND NEARLY 80% OF U.S. JOBS—AND THOSE NUMBERS ARE ONLY EXPECTED TO RISE.

Source: Deloitte, *The services powerhouse*

What is ANSI doing to support the services sector?

The Institute is working with our members and partners to identify the needs of the services sector, the ways in which all sectors are becoming increasingly service-oriented, and the role that standards and conformity assessment can play.

Through a series of ongoing outreach activities, ANSI is looking to answer these questions:

- How are service providers currently using standards?
- How can we identify service-related standardization needs?
- Are there commonalities among the services-related needs of various sectors?
- How we can reach out to those that aren't already engaged?
- Is it possible to develop a strategy that responds to such a broad group of stakeholders?
- What can the U.S. and international standardization communities do to better serve these stakeholders?

13 KEY SECTORS COMPRISING SERVICES, ACCORDING TO THE U.S. CENSUS BUREAU

- Utilities
- Transportation & Warehousing
- Information
- Finance and Insurance
- Real Estate and Rental & Leasing
- Professional, Scientific, & Technical Services
- Management of Companies & Enterprises
- Waste Management & Remediation Services
- Educational Services
- Healthcare & Social Assistance
- Arts, Entertainment, & Recreation
- Accommodation & Food Services
- Other Services (except Public Administration)

SMALL BUSINESSES FOCUSED ON INNOVATIVE APPROACHES ARE ON THE RISE, CREATING JOBS AND FUELING U.S. COMPETITIVENESS

WHAT'S ON THE HORIZON?

The rapid pace of increasingly connected technologies transforming every industry makes standards and conformity assessment more important than ever for U.S. competitiveness in the global market, calling for even greater investment, leadership, and engagement.

As the continual adoption of the latest innovations continues at break-neck speed, there are tremendous opportunities for U.S. businesses in emerging markets. Considering that "hot" technologies like AI, blockchain, and IoT barely existed five years ago, effective, responsive standardization and credentialing take on even greater importance to U.S. organizations and workers seeking to leverage innovative solutions across every sector.

THE NEXT TRANSFORMATIVE TECHNOLOGIES SET TO CHANGE THE WORLD

- 3-D metal printing
- Smarter smart cities
- AI for everybody
- Dueling neural (AI) networks
- Near-real-time language translation ear buds
- Zero-carbon natural gas
- Perfect online privacy (zero-knowledge proof)
- Genetic health prediction
- Materials' quantum leap
- Artificial embryos

Source: MIT Technology Review 2018

- Augmented reality
- Personalized medicine
- AI-led molecular design of drugs and materials
- Increasingly capable digital helpers
- Implantable drug-making cells
- Gene drive
- Algorithms for quantum computers
- Plasmonic materials
- Lab-grown meat
- Electroceuticals

Source: World Economic Forum, 2018

What is ANSI doing to support the increasing demands of rapid, transformative technologies?

ANSI is committed to supporting the standards and conformity assessment activities required to keep pace and foster the powerful benefits that standardization can provide, including:

- Facilitating the development of new markets and trade by helping to establish reliable implementation of technologies, increasing consumer confidence, and enabling critical mass for acceptance
- Facilitating the sharing of investments and risks associated with the development of new technologies and applications
- Fostering innovation and increasing efficiency through collaboration
- Providing a basis for the dissemination of information and an accepted framework for protection of intellectual property

To keep up, ANSI will be looking at solutions that enable faster and more efficient standardization with even greater collaboration and cooperation across traditional and non-traditional stakeholder groups, governments, small and medium enterprises, consumers, and all relevant interests. And ANSI will continue strengthening its role as coordinator of cross-sector standardization solutions that meet these needs through flexible, collaborative models that include:

- Assessment of research and trends to anticipate key standards development needs for the U.S. by linking emerging technologies with identified industry and national and global priorities
- Coordination of development and implementation of standardization roadmaps to identify existing standards, gaps, and recommended activities in emerging technology areas that may sound like science fiction to us today

As the voice of the U.S. standards and conformity assessment system, the American National Standards Institute (ANSI) empowers its members and constituents to strengthen the U.S. marketplace position in the global economy while helping to assure the safety and health of consumers and the protection of the environment. The Institute oversees the creation, promulgation, and use of thousands of norms and guidelines that directly impact businesses in nearly every sector: from acoustical devices to construction equipment, from dairy and livestock production to energy distribution, and much more. A membership organization, ANSI represents and serves the diverse interests of more than 270,000 companies and organizations and 30 million professionals worldwide.

In the conformity assessment arena, the ANSI National Accreditation Board (ANAB) has a wide portfolio of accreditation programs that assess the competence of organizations determining conformance to standards. And as the U.S. member to the International Organization for Standardization (ISO) and, via the U.S. National Committee, the International Electrotechnical Commission (IEC), among other global and regional standardization forums, ANSI enables a strong and effective U.S. representation in international standardization.

ANSI's mission is to enhance both the global competitiveness of U.S. business and the U.S. quality of life by promoting and facilitating voluntary consensus standards and conformity assessment systems, and safeguarding their integrity.

American National Standards Institute

Headquarters

1899 L Street, NW
Eleventh Floor
Washington, DC 20036
202.293.8020

New York Office

25 West 43rd Street
Fourth Floor
New York, NY 10036
212.642.4900