NISTIR 8007

A Review of U.S.A. Participation in ISO and IEC

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National Institute of Standards and Technology
U.S. Department of Commerce

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U.S. Department of Commerce
Penny Pritzker, Secretary

National Institute of Standards and Technology
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Foreword

The primary strategy for U.S.A. government engagement in standards development is "reliance on private sector leadership, supplemented by federal government contributions to discrete standardization processes as outlined in OMB Circular A-119, *Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities*."[1] Apart from standards development led by the private sector, the Trade Act of 1979 requires that the U.S.A. federal government shall inform, consult and coordinate with the U.S.A. Trade Representative with respect to international standards-related activities in order to keep each adequately informed and identify activities that may substantially affect U.S.A. commerce.

Based on Section 2543 of the Trade Agreements Act of 1979[2], the Department of Commerce (DOC) is responsible for monitoring the representation of United States interests before international standards organizations. As an agency of DOC, the National Institute of Standards and Technology (NIST) published two specific reports for this purpose. The first report, titled 'A Review of U.S.A. Participation in International Standards Activities (NBSIR 3698)', was published in January 1988, and covered the U.S.A. participation status in International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC) during 1966 to1986. The second report, 'A Review of U.S.A. Participation in ISO and IEC (NISTIR 6492),' was published 12 years later in February 2000, and covered U.S.A. participation from 1966 to 1998 with a focus on the latter years. These two reports are a few of the publicly available resources to track the history of U.S.A. participation in ISO and IEC.

For the same purpose served by the two previous reports in 1988 and 2000, this report in 2014 is designed to describe the U.S.A. participation in ISO and IEC standardization activities during the years 1966 to 2012. This report shows the U.S.A. memberships, secretariats, chairs, and convenors in standards development committees in ISO and IEC compared with previous years and other countries. Additionally, this report provides some data about the agreement-based cooperative activities of a few U.S.A.-domiciled standards developing organizations. The alignment status of American National Standards (ANS), approved by American National Standards Institute (ANSI), with ISO and IEC standards, is also included.

Disclaimer: Any mention of commercial products or organizations within this document is for information only; it does not imply recommendation or endorsement by NIST.

Keywords

U.S.A. Trade Agreement Act; WTO; TBT; Agreement on Technical Barriers to Trade; IEC; ISO; American National Standards Institute (ANSI); international standards; participation; trade; and,

[1] White House (January 17, 2012), Memorandum for the Heads of Executive Departments and Agencies – Principles for Federal Engagement in Standards Activities to Address National Priorities (M-12-08).

[2] Trade Agreements Act of 1979 (Section 2533: Representation of United States interests before international standards organizations).

United States National Committee (USNC).

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Acronyms

ACRONYMS	DESCRIPTIONS (Country or Organization)
ABNT	Brazilian Technical Standards Association (Brazil)
AENOR	Asociación Española de Normalización y Certificación (Spain)
AFNOR	Association française de normalisation (France)
ANS	American National Standard (USA)
ANSI	American National Standards Institute (USA)
API	American Petroleum Institute
ASI	Austrian Standards Institute (Austria)
ASRO	Romanian Standards Association (Romania)
ASTM	ASTM International
BEC	Belgian Electrotechnical Committee (Belgium)
BIS	Bureau of Indian Standards (India)
BSI	British Standards Institution (UK)
CEI	Comitato Elettrotecnico Italiano (Italy)
CES	Swiss Electrotechnical Committee (Switzerland)
CFR	Code of Federal Regulations (USA)
DIN	German Institute for Standardization (Germany)
DKE	Deutsche Kommission Elektrotechnik Elektronik Informationstechnik (Germany)
DMTF	Distributed Management Task Force, Inc.
DS	Danish Standards Foundation (Denmark)
GOST R	Federal Agency on Technical Regulating and Metrology (Russia)
IEC	International Electrotechnical Commission
IEC CAB	IEC Conformity Assessment Board
IEC CB	IEC Council Board
IEC CO	IEC Central Office
IEC EXCO	IEC Executive Committee
IEC MSB	IEC Market Strategy Board

IEC NC	IEC National Committee
IEC SMB	IEC Standardization Management Board
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Organization for Standardization
ISO CASCO	ISO Committee on Conformity Assessment
ISO COPOLCO	ISO Committee on Consumer Policy
ISO CS	ISO Central Secretariat
ISO CSC	ISO Council Standing Committee
ISO DEVCO	ISO Committee on Developing Country Matters
ISO GA	ISO General Assembly
ISO MB	ISO Member Body
ISO PDCs	ISO Policy Development Committees
ISO TMB	ISO Technology Management Board
JISC	Japanese Industrial Standards Committee (Japan)
KATS	Korean Agency for Technology and Standards (Korea)
NBN	Bureau voor Normalisatie/Bureau de Normalisation (Belgium)
NEN	Netherlands Standardization Institute (Netherlands)
NIST	National Institute of Standards and Technology (USA)
OASIS	Organization for the Advancement of Structured Information Standards
OGC	Open Geospatial Consortium (USA)
O-member	Observer Member (ISO, IEC)
OMG	Object Management Group
OVE	Oesterreichischer Verband für Elektrotechnik (Austria)
PKN	Polish Committee for Standardization (Poland)
P-member	Participating Member (ISO, IEC)
PSDO	Partner Standards Development Organization (ISO)
SA	Standards Australia (Australia)
SABS	South African Bureau of Standards (South Africa)
SAC	Standardization Administration of China (China)
SC	Subcommittee (ISO, IEC)
SCC	Standards Council of Canada (Canada)

SEK	SEK Svensk Elstandard (Sweden)
SESKO	Finnish Electrotechnical Standards Association (Finland)
SFS	Finnish Standards Association (Finland)
SIBR	Standards Incorporated by Reference (name of database , USA)
SIS	Swedish Standards Institute (Sweden)
SN	Standards Norway (Norway)
SNIA	Advancing Storage and Information Technology
SNV	Swiss Association for Standardization (Switzerland)
TA	Technical Advisor (USNC for IEC)
TAG	Technical Advisory Group (ANSI/USNC for ISO and IEC) (USA)
TC	Technical Committee (ISO, IEC)
TCG	Trusted Computing Group
UL	Underwriters Laboratories
UNI	Ente Nazionale Italiano di Unificazione (Italy)
UNMZ	Czech Office for Standards, Metrology and Testing (Czech Republic)
UPnP Forum	Universal Plug and Play Forum
USNC	United States National Committee (for IEC) (USA)
UTE	Union Technique de L'Electricite (France)
W3C	World Wide Web Consortium
WG	Working Group (ISO, IEC)

1. Introduction

1.1 Purpose

This report presents historical information on the extent of U.S.A. participation and leadership roles in two private-sector international standardization bodies, perspectives on the organizations involved, the present role of international standards in world trade, and the correlation between the U.S.A. position in international standardization activities and world trade.

This publication serves as an update to the original **NBSIR 88-3698**, *A Review of U.S.A. Participation in International Standards Activities*, as well as **NISTIR 6492,** *A Review of U.S.A. Participation in the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC).* It focuses on U.S.A. participation in technical committees (TC) and sub-committees (SC) within two private-sector international standards development organizations, namely ISO and IEC. Due to the volume of information involved, this publication does not address U.S.A. participation in any of the other activities within each of these organizations (e.g., the Committee on Conformity Assessment and the Committee on Consumer Policy in ISO, conformity assessment schemes in IEC). Specific mention is also made of the World Trade Organization's (WTO) Agreement on Technical Barriers to Trade. It should be noted that some U.S.A.-based standards developers have increased their international presence over this time period. The U.S.A. involvement with these developers may be more robust and may share common goals with regards to standards development.

U.S.A. participation in private-sector international standardization activities is voluntary. Direct involvement and payment of the associated expenses depends upon the perceived interests of the industries that may be affected by resultant standards. Consequently, some U.S.A. companies and industries have been very active in international standards-making committees, whereas others have not participated at all. The objective of this study was to collect, analyze, and present data that might summarize the extent of past and present U.S.A. participation in the activities of ISO and IEC over the 46-year period from 1966 to 2012. This information can help readers assess whether U.S.A. involvement and leadership activities are sufficient and what, if any, strategies or actions are necessary to strengthen the U.S.A. position in these organizations.

The following sections describe various NIST responsibilities, the significance of international standards in world trade, background on ISO and IEC, and how the United States is represented in those bodies. Separate sections briefly describe the WTO *Agreement on Technical Barriers to Trade* and *Annex 3* of that Agreement, *the Code of Good Practice for the Preparation, Adoption and Application of Standards*. A review of U.S.A. participation levels in ISO and IEC over the 46-year period from 1966 to 2012 is provided, followed by a comparison of U.S.A. exports with U.S.A. participation in ISO and IEC.

1.2 The Role of NIST in Standards Activities[3]

Title IV, Section 413 of the Trade Agreements Act of 1979 (19 U.S.A.C. 2531-2573), P.L. 96-39, authorized the implementation of all agreements negotiated during the General Agreement on Tariffs and Trade (GATT) Tokyo Round, including those relating to non-tariff barriers. Section 413 of the Act directs the Secretaries of Commerce and Agriculture to ensure that they are kept informed of the adequacy of representation in international standards-related activities, to identify any activities that might substantially affect the commerce of the United States, and to coordinate with the Special Representative (the Office of the United States Trade Representative, USTR) with respect to international standards-related activities. USTR is responsible for coordinating U.S.A. discussions and negotiations with other countries with respect to standards-related activities.

Title IV also specifies that the U.S.A. should be represented in non-treaty or private international standards organizations (e.g., ISO and IEC) by a recognized "organization member." Responsibility rests with the Secretaries of Commerce and Agriculture to determine and ensure that U.S.A. interests are being adequately represented and that U.S.A. commerce is not adversely affected by that organization member's participation in private international standards organizations. There are no guidelines or definitions given for what is deemed to be adequate representation of U.S.A. interests. ANSI serves as the U.S.A. member body to ISO and, through its U.S.A. National Committee, to IEC.

Within NIST, the Standards Coordination Office is responsible for carrying out several Title IV functions. These include maintaining an inquiry point on standards, conducting conformity assessments and technical regulations, and monitoring the adequacy of U.S.A. representation in private international standards activities, particularly with regard to the potential impact on international trade. The 1994 revision of the Trade Agreements Act (P.L. 103-465), also entitled the Uruguay Round Agreements Act, did not amend these responsibilities.

In addition to its responsibilities under the Trade Agreements Act, NIST serves as a coordinator of standards-related activities within the federal government as directed by *OMB Circular A-119*, which serves as implementation guidance for the *National Technology Transfer and Advancement Act (NTTAA) of 1995* (P.L. 104-113).

To ensure a coordinated effort between the public and private sectors in both domestic and non-treaty international standards activities, NIST and ANSI signed a Memorandum of Understanding (MOU)[4]. Revised and renewed in 2000, this MOU states that NIST and ANSI will serve as links between private-sector standards and conformity assessment interests and government interests. The ultimate objective of this cooperative effort is to enhance and strengthen the national voluntary consensus standards system of the United States while supporting continued U.S.A. competitiveness and economic growth. Other government agencies, U.S.A. and non-U.S.A.-based international standards developing organizations (SDOs), trade associations, and companies are members of ANSI. Representatives of these organizations participate in various ANSI fora which are, in part, responsible for determining ANSI policy and structure. These fora also

[3] The U.S. Laws concerned with NIST's role for standardization are summarized in **Annex 5**.

[4] Annex 6 contains the full text of the **MOU between ANSI and NIST**.

serve as mechanisms that facilitate discussion of current issues of interest.

1.3 Impacts of Standards on Trade

Standards are more important today than ever before. In the international marketplace, standards developed through voluntary processes are highly desirable because they represent a broad-based consensus of all interested parties, including producers (exporters), users (importers), governments, consumers, and academia. Nations that actively participate in developing international standards may be able to influence the provisions to favor their own products or those that they prefer for some reason. Since trading countries competing in the global marketplace are inclined to be aggressive in exploiting every opportunity to favor these products through the standards development process, it seems incumbent on the United States to participate vigorously in international standardization activities if it intends to maintain existing trade outlets and find new markets.

1.4 WTO TBT Agreement

The provisions of the Agreement on Technical Barriers to Trade (TBT Agreement) and of the *Code of Good Practice for the Adoption, Application and Preparation of Standards* (Code) have important implications for ISO and IEC member bodies.

Specific provisions under the TBT Agreement pertain to technical regulations, standards, conformity assessment practices, notification requirements, and standards developing bodies. In the area of technical regulations and standards, the TBT Agreement states that members should:

- accord the same treatment to imported products as like products of national origin;
- accord the same treatment to all like imported products, regardless of origin;
- ensure that any technical regulations and standards used to protect human, animal, or plant life or health or the environment are not more trade-restrictive than necessary;
- use, in part or in whole, relevant international standards as a basis for technical regulations whenever possible;
- participate in relevant international standards bodies to develop and adopt appropriate technical regulations and standards;
- recognize technical regulations of other members as equivalent provided these regulations meet the objectives of their own regulations;
- emphasize product performance requirements rather than design or descriptive requirements, and
- notify other members of proposed technical regulations and standards that might significantly affect trade.

Annex 3 of the **TBT Agreement** contains the Code. The Code is open to acceptance by any standardizing body within the territory of a WTO Member and outlines general guidelines for the preparation and use of standards. The Code encourages standards bodies to operate in a transparent manner, ensure nondiscrimination toward imported products, and align national standards with international standards whenever possible. Adoption of the Code is voluntary, but more than 100 standards bodies currently adhere to the Code. In the United States, ANSI is a signatory to the Code on behalf of its over 200 standards-

developing members.

1.5 The Politics and History of International Standardization

International trade is one of the most important factors in the growth of the world economy. Important objectives of international standardization and related activities are to facilitate trade and the exchange of goods and services at the international level and to promote cooperation in the areas affected by international standards.

Formal international standardization started over one hundred years ago in the electrotechnical field with the founding of the IEC in 1906. While some attempts were made in the 1930s to develop international standards in other fields, it was not until after World War II that the United Nations Standards Coordinating Committee, established by the United States, Great Britain, and Canada, provided the leadership that resulted in the formation of ISO in 1946.

During the 1950s and 1960s, international standardization work focused almost entirely on the development of international agreements on basic mechanics, such as screw threads, roller bearings, pipe sizes, shafts, couplings, and power transmissions. These early efforts addressed issues primarily related to international harmonization for interchangeability, vocabularies, and standards for units and symbols. In the 1960s and 1970s, there was an increase in using international standards in lieu of national standards. In the 1980s and 1990s, robust standardization work supporting the introduction of information and communications technologies was launched.

Concurrent with this evolution in standardization was a growing recognition of the role that standards and standards-related issues play in trade. It was recognized that the negotiation and adoption of technical standards for all classes of products and services can lead to the formation of economic and political coalitions among nations and regions and market segmentation among major producers. National and regional groups motivated by competing interests can use regulations and standards for political purposes.

Indeed, a General Agreement on Tariffs and Trade (GATT) working group concluded that technical barriers, such as standards, was the largest category of non-tariff measures faced by exporters. Voluntary adoption of the Standards Code to the GATT in 1979 reflected a growing acceptance of international standards for all classes of finished products, materials, and services.

With the establishment of the World Trade Organization in 1995 and the adoption of the Agreement on Technical Barriers to Trade, an integral part of the WTO Agreement, the importance of technical regulations, standards, and conformity assessments to trade was called out. All WTO members, 159 countries as of March 2013, are responsible for adhering to the provisions of the TBT Agreement to ensure that regulations, standards, and conformity assessment procedures do not create unnecessary obstacles to trade.

Three well-known standards development organizations operating in the international arena are ISO, IEC, and the International Telecommunication Union (ITU). ISO and IEC form the world's largest non-governmental forum for voluntary industrial and technical collaboration at the international level. Collectively, ISO and IEC are responsible for the development of over 25,000 international standards

in a wide variety of technical and business sectors. The third organization, the ITU, a treaty organization, is the United Nations specialized agency for information and communications technologies. U.S.A. participation in the ITU is coordinated by the U.S.A. Department of State. More information can be found at http://www.itu.int/en/Pages/default.aspx.

2. Comparison with Two Previous NIST Publications

This report is a successor of two previous NIST reports published in February 1988 and January 2000. The 1988 report, **NBSIR 3698**, describes the role of international standards, their increasingly significant importance in world trade, and the extent of past and current U.S.A. participation in the two major international standardization bodies: ISO and IEC. The degree of U.S.A. participation covers the 20-year period 1966 to 1986. The 2000 report, **NISTIR 6492**, describes the role of international standards, their importance in world trade, and the extent of U.S.A. participation in ISO and IEC over the period from 1966 to 1998 (with a focus on 1986 to 1998). Mention is also made of the WTO's Agreement on Technical Barriers to Trade.

This 2014 report, in principal, is an update of the two previous reports, covering U.S.A. participation status in ISO and IEC for the period from 1966 to 2012. The chapter for comparison of U.S.A. exports with U.S.A. participation in ISO and IEC is skipped because the correlation analysis was relatively uncertain. A new chapter included in this report, not existing in previous two reports, is Chapter 5, 'Agreement-Based Participation by US-Domiciled SDOs'. This chapter shows three examples of joint development or adoption of mutual standards by IEEE, ASTM International, and Open Geospatial Consortium (OGC). Another chapter included in the 1988 report but excluded from the 2000 report is Chapter 6, 'Alignment with ISO and IEC standards in the USA.' This chapter reviews the adoption or alignment of ISO and IEC standards as ANSI approved ANS. A comparison of topics of the reports in 1988, 2000, and 2013 is provided below in **Table 1**.

Table 1 Comparing Topics in Three NIST Reports (1988, 2000, 2013)

Contents	1988 report	2000 Report	2013 Report
Data Period	1966 to 1986	1966 to 1998	1966 to 2012[5]
Introduction, Background, ISO, IEC, WTO/TBT, Trade Agreement Act	Yes	Yes	Yes
ISO: membership, secretariat, convenor	Yes	Yes	Yes
IEC: membership, secretariat, chair	Yes	Yes	Yes
Agreement-based participation in ISO, IEC	No	No	Yes (new)
Alignment of ISO, IEC standards with ANS (ANSI)	Yes	No	Yes
Incorporation of ISO, IEC standards in the U.S.A. regulation	No	No	Yes (new)
Comparison of Export with Participation in ISO/IEC	Yes	Yes	No

3. U.S.A. Participation in ISO

3.1 About ISO

3.1.1 ISO Activities Since 1947[6]

ISO is a not-for-profit, non-governmental organization, founded in 1947. ISO originated from the union of two organizations, ISA (International Federation of the National Standardizing Associations) and UNSCC (United Nations Standards Coordinating Committee). After the union of the ISA (International Federation of the National Standardizing Associations) and the UNSCC (United Nations Standards Coordinating Committee), ISO was created through discussions held at a conference in London in October 1946, which included participation by 65 delegates from 25 national standards organizations.

The mission of ISO is "to promote the development of standardization and related activities in the world with a view to facilitating the international exchange of goods and services, and to developing cooperation in the spheres of intellectual, scientific, technological and economic activity." The first ISO standard was published in 1951. Upon its establishment in 1947, ISO membership consisted of 27 national standards bodies; at present, ISO is comprised of standards bodies from over 130 countries, of which 90 are participating member bodies, 36 are correspondent members, and 7 are subscriber members. There are 16 correspondent members that do not participate in technical work and do not have voting rights, but are

[5] Some data was from 2011 and 2013

[6] The first two paragraphs of the historical descriptions of this section is the summary of interview with Willy Kuert <The Founding of ISO (page 15-21)> in ISO (1997) "Friendship among Equals" – Recollections from ISO's first fifty years. More detailed history can be found at the following site: http://www.iso.org/iso/home/about/the_iso_story.htm.

allowed to attend meetings as observers. Subscriber members are countries that pay reduced membership fees for the same privileges as correspondent members. Table 1 in the Appendix lists current members of ISO.

The scope of ISO work extends over all fields except electrical and electronic standards, which are the responsibility of IEC. ISO addresses a wide variety of subjects ranging from screw threads to solar energy. As of December 2011, work in ISO was carried out through some 3,335 technical bodies: 224 Technical Committees (TCs), 513 Subcommittees (SCs), 2,516 Working Groups (WGs), and 82 Ad Hoc Study Groups published more than 19,000 ISO standards since its inception. In addition, 1,419 new work items were registered and 4,007 work items appear on the programs of work of the TCs in 2011. The list of ISO TCs is available in **Annex 2.1.**

Around 78 % of ISO member bodies are governmental institutions or organizations incorporated by public law, and the remaining 22 % are private sector standards organizations[7]. ANSI, the U.S.A. member body to ISO, is one of the private-sector member bodies. Under the ANSI-NIST MOU[8], ANSI is the recognized U.S.A. member body to ISO, and, through the USNC, to IEC.

ISO Central Secretariat in Geneva, Switzerland coordinates ISO operations, administers voting and approval procedures, and publishes international standards. The operational costs of ISO itself are estimated at 140 million Swiss francs per year[9]. Around 37 million Swiss francs represent the operational cost of ISO Central Secretariat, financed by membership fees (55 %), publications, and other services (45 %).

3.1.2 ISO Structure

The General Assembly of ISO is the ultimate authority for its work and is hosted annually by a member country. Principal Officers include the President, Vice-President (policy), Vice President (technical management), Vice-President (finance), Treasurer, and Secretary General.

Key bodies of ISO include the Council and its three Policy Developing Committees (PDCs), Council Standing Committees, Ad Hoc Advisory Groups, and the Technical Management Board (TMB). TMB manages the overall technical work of standards development, and establishes and dissolves Technical Committees (TC). Central Secretariat provides support services related to membership, technical committees, marketing, training and similar offerings. **Figure 1** presents the overall structure of ISO.

[7] ISO (2009), ISO members. The list of ISO members are in **Annex 1**, comparing with those of IEC.

[8] For the full ANSI-NIST MOU, see **Annex 6**.

[9] Approximately $150M U.S. dollars

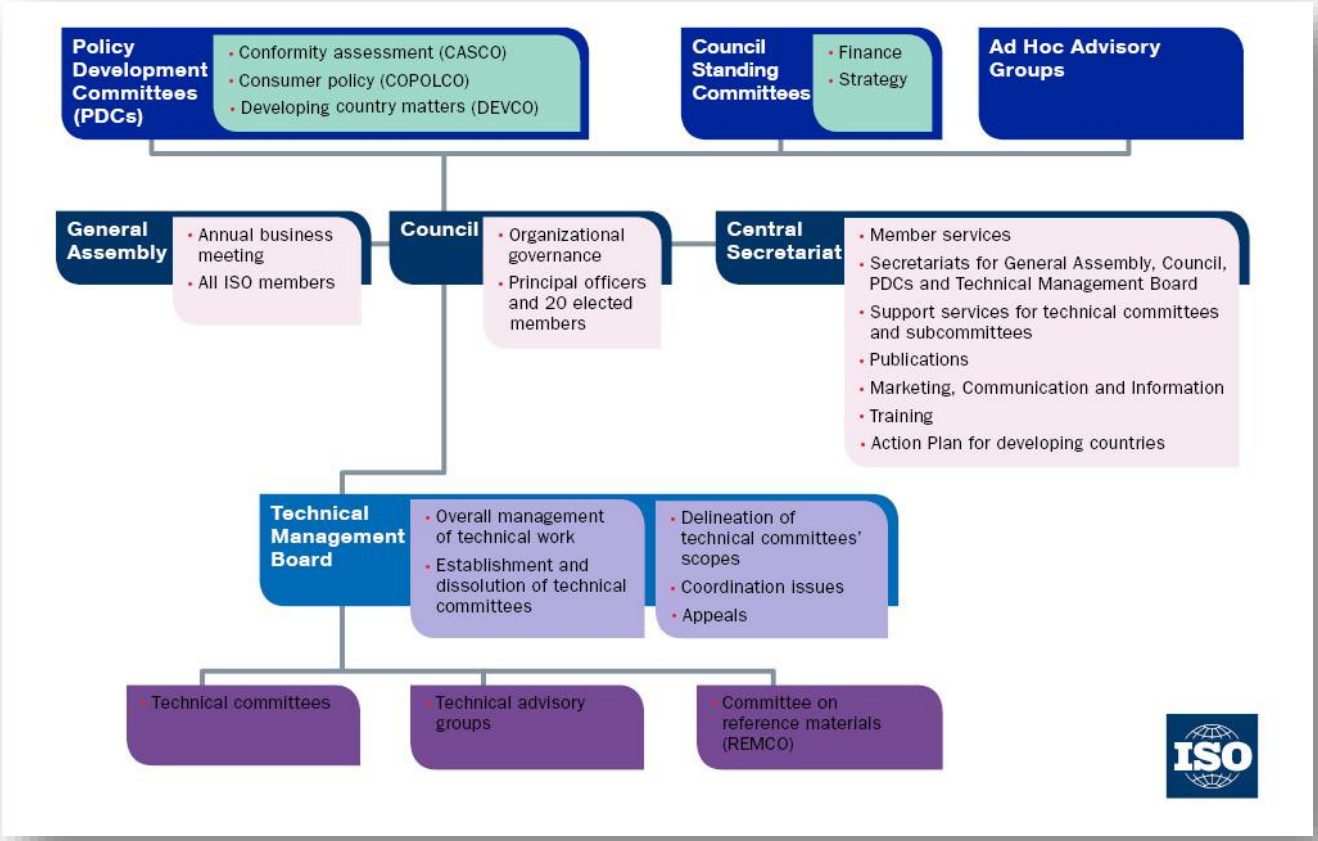

Figure 1 ISO Structure (source: www.iso.org, used with permission from ISO)

ISO members are categorized into three groups. Member bodies or full members participate in and influence ISO standards developing process; correspondence members attend and observe standards development; and subscriber members keep up to date on ISO's work. As of May 2014, ISO had 117 member bodies, 41 correspondent members, and four subscriber members.[10] Among the total 162 member countries, only three countries are not also members of United Nations – Hong Kong, China; Macau, China; and Palestine. All of the 82 IEC members are also ISO members. The list of IEC members is available in **Annex 1**.

3.2 U.S.A. Participation in ISO Technical Committees and Subcommittees

Since the foundation of ISO in 1947, the U.S.A. has been a member body and Council Member. ISO Council takes care of most governance issues. The Council meets twice a year and is made up of 20 member bodies. Among them, only two countries, United Kingdom and France, have been Council Members of ISO since its foundation in 1947. In 2013, the member bodies elected to the Council are the following:

[10] For more information, see http://www.iso.org/iso/home/about/iso_members.htm

ABNT/Brazil (2013), AFNOR/France (2014), ANSI/U.S.A. (2014), BDS/Bulgaria (2013), BIS /India (2013), BSI/United Kingdom (2013), CYS/Cyprus (2013), DIN/Germany (2014), DSM/Malaysia (2014), EOS/Egypt (2013), ESMA/United Arab Emirates (2014), INNORPI/Tunisia (2014), IPQ/Portugal (2014), IRAM/Argentina (2014), JISC/Japan (2013), MCCAA/Malta (2014), NEN/Netherlands (2013), SA/Australia (2013), SAC/China (2013), and SIS/Sweden (2013).

Under the Council are a number of bodies that provide guidance and management on specific issues. U.S.A. participates in all of the committees under the council, including the three PDCs:

- CASCO – providing guidance on conformity assessments;
- COPOLCO – providing guidance on consumer issues, and
- DEVCO – providing guidance on matters related to developing countries.

U.S.A. also participates in the Council Standing Committees that advise on financial and strategic matters of ISO.

ISO's Annual Report 2011 indicates that ISO had 3,335 technical bodies, including 224 TCs, 513 SCs, 2516 WGs, and 82 Ad Hoc Study Groups[11]. ISO member bodies may register as participating (P-member), observer (O-member), or not represent at committee level based on their interests and resources. P-members have the right to vote while O-members do not.

As shown in Table 2, by the end of 2012 the U.S.A. was participating in 620 (84%) out of the total 737 ISO TCs and SCs, placing it 12th in the ranks of committee participation. The U.S.A. had 583 P-members (171 TCs and 412 SCs), and 37 O-members (26 TCs and 11 SCs) of ISO. [12] By comparison in 1998, the U.S.A. participated in 74 % of TCs as a P-member, and 4 % of TCs as an O-member. In 1986, the U.S.A. was designated an active participant in 69 % of TCs, and an observer in 29 % of TCs.

[11] ISO Annual Report 2011, or ISO in figures for the year 2011 (as of Dec 31, 2012, published on Feb 16, 2012)

[12] ISO website http://www.iso.org/iso/home/about/iso_members.htm , accessed on Dec 31, 2012.

Table 2 Top 20 Countries in ISO Participation (P- and O-members) (Dec 2012)[13]

No.	**Country**	**Member Body**	**Membership Status**	**TC participation**
1	United Kingdom	BSI	Member body	726
2	France	AFNOR	Member body	724
3	Germany	DIN	Member body	718
4	Korea, Republic of	KATS	Member body	711
5	China	SAC	Member body	706
6	Japan	JISC	Member body	687
7	Romania	ASRO	Member body	687
8	Italy	UNI	Member body	666
9	Poland	PKN	Member body	643
10	Spain	AENOR	Member body	625
11	Russian Federation	GOST R	Member body	622
12	***USA***	***ANSI[14]***	***Member body***	***620***
13	India	BIS	Member body	610
14	Netherlands	NEN	Member body	596
15	Czech Republic	UNMZ	Member body	595
16	Finland	SFS	Member body	560
17	Belgium	NBN	Member body	545
18	Switzerland	SNV	Member body	540
19	Sweden	SIS	Member body	536
20	Austria	ASI	Member body	531

[13] ISO website http://www.iso.org/iso/home/about/iso_members.htm , accessed on Dec 31, 2012.

[14] ANSI is the only private-sector member body – the rest are governmental bodies.

3.4. U.S.A. Leadership in ISO TCs and SCs (Jan 2012)

ISO's Annual Report 2011 indicates that the U.S.A. held 117 secretariats (see Annex 3.1) of the 737 ISO TCs and SCs, and 509 convenors of the 2,516 WGs. The U.S.A. held 616 positions (19.2 %) out of 3,253 leadership positions in ISO in January 2012.

In theory, a secretariat should act in a purely international capacity, divesting itself of a national point of view. In practice, it could be advantageous to hold a Secretariat, at a minimum ensuring that its national body is represented in international discussions.

Table 3 below demonstrates the progression in secretariats and convenors held by the United States in the years 1966, 1986, 1998, and 2012. By 1998, the U.S.A. held the secretariats for 31 (16.8 %) of the 184 TCs, 110 (18.7 %) of the 587 SCs, and 431 (21.3 %) of the 2,020 Working Groups. These figures include the ISO/IEC Joint Technical Committee (JTC 1). When added together, the United States held 572 (20.5 %) of the 2,791 leadership positions available in ISO. Between 1998 and 2012 the number of ISO secretariats and convenors held by the U.S.A. decreased slightly by a little more than 1 %, primarily due to a decrease in the number of secretariats.

ISO Secretariat Responsibilities

"The secretariat is responsible for monitoring, reporting, and ensuring active progress of the work, and shall use its utmost endeavor to bring this work to an early and satisfactory conclusion. These tasks shall be carried out as far as possible by correspondence. In all circumstances, the secretariat shall work in close liaison with its TC/SCs chair, WG convenors and project leaders. The secretariat is responsible for ensuring that ISO/IEC Directives and the decisions of the technical management board are followed."

From: ISO/IEC Directive, Part I 'Procedures for the technical work' (ninth edition, 2012)

Table 3 ISO Secretariats and Convenors over Time (1966-2012)

Positions		**1966**[15]	**1986**	**1998**	**2012**
Secretariats	Total	118	809	771	737
	USA	10	85	141	117
	U.S.A. ratio (%)	*8.5 %*	*10.5 %*	*18.3 %*	*15.9 %*
Convenors	Total	n/a	1556	2020	2516
	USA	n/a	212	431	509
	U.S.A. ratio (%)	*n/a*	*13.6 %*	*21.3 %*	*20.2 %*
Total	Total	118	2365	2791	3253
	USA	10	297	572	626
	U.S.A. ratio (%)	*8.5 %*	*12.6 %*	*20.5 %*	*19.2 %*

Table 4 lists the top 20 countries in terms of the secretariats and convenors in ISO TC/SCs in ISO, where U.S.A. ranks the 2nd in secretariats and the 1st in convenors.

[15] For the year of 1966, the total number of committees does not include SC, but TC only.

Table 4 Top 20 Countries Holding ISO Secretariat and Convenor Roles in 2011

No.	Country (MB)	Secr.	Ratio	No.	Country (MB)	Conv.	Ratio
1	Germany (DIN)	130	17.6 %	***1***	***U.S.A. (ANSI)***	***509***	***20.2 %***
2	***U.S.A. (ANSI)***	***117***	***15.9 %***	2	United Kingdom (BSI)	355	14.1 %
3	United Kingdom (BSI)	70	9.5 %	3	Germany (DIN)	352	14.0 %
4	France (AFNOR)	69	9.4 %	4	France (AFNOR)	212	8.4 %
5	Japan (JISC)	67	9.1 %	5	Japan (JISC)	193	7.7 %
6	China (SAC)	45	6.1 %	6	Sweden (SIS)	88	3.5 %
7	Sweden (SIS)	25	3.4 %	7	Canada (SCC)	80	3.2 %
8	Australia (SA)	19	2.6 %	8	Netherlands (NEN)	78	3.1 %
9	Netherlands (NEN)	19	2.6 %	9	Australia (SA)	76	3.0 %
10	Switzerland (SNV)	18	2.4 %	10	Korea, Rep. of (KATS)	65	2.6 %
11	Canada (SCC)	17	2.3 %	11	China (SAC)	60	2.4 %
12	Italy (UNI)	16	2.2 %	12	Italy (UNI)	42	1.7 %
13	Korea, Rep. of (KATS)	16	2.2 %	13	Belgium (NBN)	34	1.4 %
14	Norway (SN)	11	1.5 %	14	Switzerland (SNV)	34	1.4 %
15	Russian Fed. (GOST R)	9	1.2 %	15	Norway (SN)	33	1.3 %
16	South Africa (SABS)	9	1.2 %	16	Denmark (DS)	26	1.0 %
17	Brazil (ABNT)	8	1.1 %	17	Brazil (ABNT)	21	0.8 %
18	India (BIS)	8	1.1 %	18	Spain (AENOR)	18	0.7 %
19	Denmark (DS)	7	0.9 %	19	Austria (ASI)	16	0.6 %
20	Spain (AENOR)	7	0.9 %	20	Finland (SFS)	16	0.6 %
-	Remaining Countries	50	6.8 %	-	Remaining Countries	208	8.3 %
-	***Secretariat Total***	***737***	***100.0 %***	**-**	***Convenor Total***	***2,516***	***100.0 %***

4. U.S.A. Participation in IEC

4.1 About IEC

4.1.1 IEC Activities Since 1906[16]

IEC is a not-for-profit, non-governmental organization, founded in 1906. In the late 19th century the lack of standardization of electrical equipment had become a worldwide problem, even though the importance of electrical measuring units had been universally recognized. With the development of economic generators,

[16] This section is based on the IEC history section of the website: http://www.iec.ch/about/history/overview/

filament lamps, fittings, and reliable cables, local authorities and distributors for the first time could choose between the merits of different designs. While the series of International Electrical Congresses, particularly those between 1881 and 1900, had been solely concerned with electric units and standards, it was at the 1904 St. Louis, USA, Congress that, in the interests of commercial transactions and trade, the proposal was made for establishing a permanent international commission to study the unification of electrical machines and apparatuses.

IEC is financed by a combination of membership dues and revenues from the sales of its publications. IEC's 2010 Annual Report indicates that the total membership dues amounted to US$11.65 million while revenues from sales (both direct sales and royalties) came to US$9.54 million, which along with other revenues resulted in a total net income of US$24 million.

IEC Central Office in Geneva, Switzerland coordinates IEC operations, administers voting and approval procedures, and publishes international standards. Similar to ISO, IEC NCs that participate in a TC or a SC are P-members, and NCs that want to be kept informed of ongoing work are O-members.

4.1.2 IEC Structure

The objective of IEC is to promote international cooperation on all questions of standardization in the fields of electrical and electronic engineering. IEC's members are National Committees (NC), and they appoint experts and delegates from industry, government bodies, associations, and academia to participate in the technical and conformity assessment work of IEC. Each NC is required to be as representative as possible of all electrical-related interests in its country including manufacturers, users, governmental authorities, and educational and professional bodies. Many NCs receive a large amount of support from industry; many are recognized and financially supported by their governments.

The work of IEC is currently carried out by 97 TCs and 111 SCs, and close to 1,200 working-level groups. The committees span a wide range of electrotechnical sectors and have developed 6,959 standards related documents, including 6,271 standards, 226 technical specifications, 407 technical reports, and 55 IEC Publically Available Specifications (IEC-PAS), and had 1,489 active projects as of December 2012[17]. The list of IEC TCs is provided in **Annex 2.2**.

The Council of IEC is a legislative body and is the supreme governing body of IEC. Its members include the Presidents of all IEC Full Member NCs, the current IEC Officers and all Past Presidents, and the Council Board members. The Council sets IEC policy and long-term strategic and financial objectives. It delegates the management of IEC work to the CB (Council Board), with specific management responsibilities in the spheres of standards, conformity assessment, and market strategy being assumed, respectively by the Standardization Management Board (SMB), the Market Strategy Board (MSB), and the Conformity Assessment Board (CAB). The structure of IEC is shown in **Figure 2**.

[17] Updates may be found at http://www.iec.ch/dyn/www/f?p=103:6:0##ref=menu

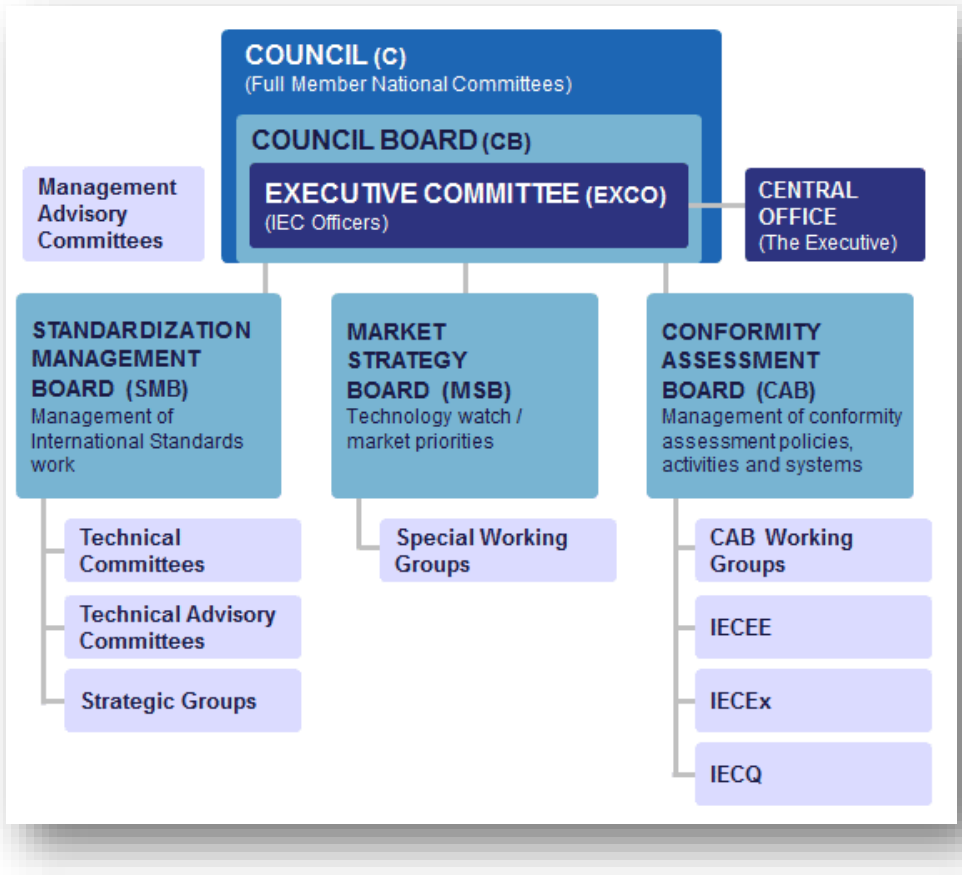

Figure 2 IEC Structure (source: www.iec.ch, used with permission of IEC)

IEC Council delegates the management and supervision of IEC's standards work to the SMB. The SMB is a decision-making body that reports to the CB. The SMB is responsible for setting-up and disbanding TCs and SCs, approving their scopes, appointing TC/SC chairmen and allocating secretariats, allocating standards work, timeliness of standards production, and approval and maintenance of the Directives, reviewing the need for and planning for IEC work in new fields of technology, and maintaining liaisons with other international organizations.

The MSB reports to the CB and identifies the principal technological trends and market needs in IEC's fields of activity.

The CAB is responsible for setting IEC's conformity assessment policy, promoting and maintaining relations with international organizations on conformity assessment matters, creating, modifying and disbanding conformity assessment systems, monitoring the operation of conformity assessment activities, and examining the continued relevance of IEC's conformity assessment activities in general.

4.1.3 ISO and IEC: Relationships including Joint Technical Committee (JTC) 1[18]

ISO and IEC have a formal agreement in place that establishes a non-duplicative and cooperative relationship between the two organizations. In accordance with this agreement, the two organizations complement each other in the field of international standardization. IEC is responsible for issues relating to international standardization in the electrical and electronic engineering fields, while other areas are the responsibilities of ISO. In areas that do not relate to a particular technology, ISO assumes responsibility for the work and ensures that any electrotechnical issues that arise are addressed in consultation with IEC.

The standards development processes of ISO and IEC are described in **Annex 4**.

4.2 U.S.A. an IEC Member Since Its Foundation in 1906[19]

Since IEC's foundation in 1906 in London, the U.S.A. has been an active member, participating in and leading IEC's standardization and conformity assessment activities. IEC Council Board includes the U.S.A. and 14 other national committees from Australia, Austria, Brazil, Canada, China, France, Germany, Italy, Japan, Korea, Netherlands, South Africa, Sweden, and United Kingdom. The U.S.A. or its individual experts have been vigorously involved in all of the major committees and groups of IEC including IEC SMB and IEC CAB.

The U.S.A. National Committee (USNC) of IEC manages U.S.A. participation in the technical work of IEC. ANSI provides secretariat services to the USNC, its executive committee, technical advisors, and technical advisory groups. It takes part in the Commission's entire technical program and holds secretariats of approximately 24 TCs and SCs. Among them are committees that develop international standards in the areas of semiconductor devices, household appliances, air-conditioning appliances, laser equipment, solar photovoltaic energy systems, fiber optics systems, design automation, and electrical insulation systems, among others.

The USNC appoints a technical advisor (TA) and a technical advisory group (TAG) to develop the U.S.A. position for each TC and SC. TAs and TC and SC delegates are drawn from U.S.A. professional societies, trade associations, companies, government agencies, testing laboratories, and other interested stakeholders concerned with the development of national electro-technical standards. The TA develops the U.S.A. position on IEC committee matters by consulting with the TAG. The TA is also responsible for ensuring that the U.S.A. position is presented to the appropriate IEC TC.

[18] This section is fully based on the previous 2000 NIST report (**NISTIR 6942**)

[19] More information about U.S. participation history in IEC can be found at http://www.ansi.org/standards_activities/iec_programs/governance_committees/history.aspx?menuid=3#.UQG85h1QXeB

4.1.4 ISO/IEC JTC 1[20]

ISO and IEC started work on information technology (IT) standardization around 1960 during the initial stages of computerization. As the industry took off with rapid innovation and widespread acceptance, both ISO and IEC worked to keep pace with the development of responsive standards. In the 1980s, IT technological innovations became more complex and far-reaching; the international standardization community recognized that a comprehensive venue in which to address all aspects of information and communication technology (ICT) standardization was needed; therefore, in 1987, JTC 1 was formed by the merger of ISO TC 97 (Information technology) and IEC TCs 47B (Microprocessor systems) and 83 (Information technology equipment). Bringing together the qualities and strengths of ISO and IEC, JTC 1 was positioned to speed progress and wide deployment and avoid the development of duplicative or possibly incompatible standards by the two organizations.

The JTC 1 is recognized as one of the largest and most prolific technical committees in the international standardization community. Its 19 active subcommittees[21] have produced over 2,600 published standards and continue to make tremendous impacts on the ICT industry worldwide.

The U.S.A. has played a leadership role in the work of JTC 1, with ANSI serving as secretariat. JTC 1 counts 37 countries among its participants (plus another 54 as observers), and over 2,000 experts from around the world represent their national body positions in collaboration to develop the most effective and relevant ICT standards. It is the efforts of these dedicated professionals that drive JTC 1's record of accomplishment.

This approach has enabled JTC 1 to make great progress in developing standards that cross a broad swath of technology sectors, particularly in rapidly expanding IT-related areas such as cloud computing, security, sustainability, and accessibility. JTC 1 is currently addressing such critical areas as teleconferences and e-meetings, cloud data management interface, biometrics in identity management, sensor networks for smart grid systems, and corporate governance of IT implementation.

4.3 U.S.A. Participation in IEC SCs and TCs (April 2013)

IEC has 172 committees consisting of 95 TCs and 77 SCs of which 187 are IEC-only committees and 21 are ISO/IEC joint committees. **Table 5** presents the 185 IEC-only committees, including 89 SCs with advisory or special committees as well as 96 TCs. These 185 committees contain 1,191 working-level groups: 437 working groups, 239 project teams, and 515 maintenance teams[22].

[20] This section is largely based on the ASNI's press release in JTC 1's 25 year celebration, released on June 28, 2012, available at http://www.ansi.org/news_publications/print_article.aspx?articleid=3270, and ISO's website

[21] The list of JTC 1 subcommittees is in **Annex 2.3**.

[22] Source: http://www.iec.ch/members_experts/refdocs/facts.htm (accessed on Dec 31, 2012)

Table 5 Number of IEC TCs and SCs as of April 2013 (source: www.iec.ch)

Class	Descriptions	Number of TCs	Number of SCs	Total
TCs and SCs		95	77	172
TAs	TC100/TAs	0	12	12
PCs	PC 118	1	0	1
Total		***96***	***89***	***185***

Among the 187 IEC committees, the U.S.A. is a participating member (P-member) in 162 committees (86.6 %), 89 TCs (93.7 %) and 73 SCs (79.3 %). This figure includes the CAB document voting. The U.S.A. does not participate as an observer member in any IEC committees. The U.S.A. is ranked 7th in the number of P-members in IEC committees. **Table 6** lists the top 20 countries sorted by the number of P-members in IEC committees. In 1998, the U.S.A. had 77 (74.4 %) P-members and no O-members out of 184 TCs/SCs; in 1986, there were 140 (68.9 %) P-members and 50 (24.6 %) O-members out of 203 TCs/SCs.

Table 6 Top 20 Countries in IEC P-memberships (Dec 2012)

Rank	Country	NC	Membership	P-Member	O-Member	P+O
1	China	SAC	Full Member	177	0	177
2	Germany	DKE	Full Member	177	0	177
3	Japan	JISC	Full Member	174	2	176
4	United Kingdom	BSI	Full Member	170	5	175
5	Italy	CEI	Full Member	166	11	177
6	France	UTE	Full Member	165	12	177
7	***USA***	***ANSI***	***Full Member***	***162***	***0***	***162***
8	Russian Federation	GOST R	Full Member	152	16	168
9	Korea, Republic of	KATS	Full Member	143	31	174
10	Finland	SESKO	Full Member	141	32	173
11	Spain	AENOR	Full Member	136	40	176
12	Sweden	SEK	Full Member	135	41	176
13	Netherlands	NEN	Full Member	126	33	159
14	Switzerland	CES	Full Member	125	22	147
15	Denmark	DS	Full Member	118	55	173
16	Austria	OVE	Full Member	115	50	165
17	Belgium	BEC	Full Member	105	63	168
18	Romania	ASRO	Full Member	93	69	162

19	Canada	SCC	Full Member	91	24	115
20	Australia	SA	Full Member	90	49	139

4.4 U.S.A. Leadership in IEC TCs and SCs (December 2012)

The U.S.A. held 24 TC/SC secretariats (12.8 %)[23] ranking 4th behind Germany, France, and Japan (see Annex 3.2) and 31 Chairs (16.6 %)[24] ranking 2nd behind Germany as summarized in **Table 7**. IEC does not provide statistics for convenors.

Table 7 Top 15 Countries in IEC Secretariats and Chairs in September 2012

	Secretariats				**Chairs**		
No.	Country	Sec.	Ratio	No.	Country	Chair	Ratio
1	Germany	34	18.2 %	1	Germany	37	19.8 %
2	France	24	12.8 %	***2***	***USA***	***31***	***16.6 %***
3	Japan	24	12.8 %	3	United Kingdom	22	11.8 %
4	***USA***	***24***	***12.8 %***	4	France	18	9.6 %
5	United Kingdom	20	10.7 %	5	Italy	13	7.0 %
6	Italy	13	7.0 %	6	Japan	9	4.8 %
7	China	6	3.2 %	7	Sweden	6	3.2 %
8	Sweden	6	3.2 %	8	Canada	5	2.7 %
9	Korea, Republic of	5	2.7 %	9	Finland	5	2.7 %
10	Spain	5	2.7 %	10	China	4	2.1 %
11	Canada	3	1.6 %	11	Denmark	3	1.6 %
12	Netherlands	3	1.6 %	12	Netherlands	3	1.6 %
13	Switzerland	3	1.6 %	13	Australia	2	1.1 %
14	Australia	2	1.1 %	14	Norway	2	1.1 %
15	Belgium, Norway, Russian Federation, South Africa (4 countries)	2 (8)	1.1 % (4.3 %)	15	Austria, Belgium, Brazil Switzerland, Spain Ireland, Israel, Korea New Zealand, Poland South Africa (11 countries)	1 (11)	0.5 % (5.9 %)
-	Remaining Countries	7	3.7 %	-	Remaining Countries	16	8.3 %
-	***Secretariat Total***	***187***	***100.0 %***	-	***Chair Total***	***187***	***100.0 %***

[23] IEC website as accessed on Dec. 31, 2012.

[24] The 2012 IEC Activity Report to IEC Council by General Secretary on Oct. 5, 2012 in Oslo, Norway.

Table 8 depicts the percentage of total IEC TC and SC Secretariats held by the U.S.A. from previous years, which increased from 8.5 % in 1966 to 16.8 % in 1998, but then slightly decreased to 12.8 % in 2011.

Table 8 IEC Change in Secretariats Held 1966 to 2012[25]

Positions		**1966**[26]	**1986**	**1998**	**2012**
Secretariats	Total	153	203	184	187
	USA	12	33	31	24
	U.S.A. Ratio (%)	*8.5 %*	*16.3 %*	*16.8 %*	*12.8 %*
	U.S.A. Rank	*4th*	*2nd*	*1st*	*4th*

4.5 U.S.A. Number of Experts and New Proposals in 2012

IEC 2012 Activity Report presents two additional important figures: the number of experts who participated in IEC work and the number of new proposals by country.[27] IEC created an Expert Management System in 2004 to track a participant's degree of participation as an Expert and their authorization to access the relevant documentation. The System provides the number of participating experts in IEC work since 2005. As displayed in **Table 9**, 1,646 U.S.A. experts participated in IEC work in 2012, and the U.S.A. ranked 2nd following Germany. In 2005, the U.S.A. ranked 1st with 1,090 experts who participated in IEC.

IEC also provides the number of new proposals for standards by the Secretariat and the national committees. 'New proposals for standards' are interpreted as being in the 'proposal stage,' and are not yet accepted as new projects or final standards. In 2012, around 30 % of the new proposals came from secretariats and 70 % from national committees. In 2012 the U.S.A. submitted 17 new proposals, ranking 4th among all members, and in 1999, ranked 3rd with 13 new project proposals as shown in **Table 10**.

Table 9 Top 10 Countries in IEC Participation of Experts (2005, 2012)

2005			**2012**		
Rank	**Country**	**Experts**	**Rank**	**Country**	**Experts**
1	***USA***	***1,090***	1	Germany	1,819
2	Germany	1,067	***2***	***USA***	***1,646***

[25] The data for Chairs is not available in the two previous NIST reports. Currently available data for IEC chairs is IEC General Secretary activity reports announced during the years of 2005 to 2012.

[26] For 1966, the total number of committees includes technical committees only, excluding subcommittees.

[27] Some of the early-year IEC activity reports were kindly provided by (Mr.) Jack Sheldon, Standardization Strategy Manager at IEC Central Office.

3	Japan	819	3	Japan	1,524
4	UK	716	4	UK	805
5	France	577	5	China	781
6	Italy	383	6	France	720
7	Sweden	257	7	Korea, Republic of	623
8	Canada	247	8	Sweden	476
9	Netherlands	188	9	Italy	468
10	Korea, Republic of	184	10	Switzerland	337

Table 10 Source of IEC New Proposals (1999, 2012) [28]

1999			**2012**		
Rank	Country	NPs	Rank	Country	NPs
-	Secretariat	70	-	Secretariat	58
1	Japan	16	1	Japan	22
2	Germany	14	2	Germany	21
3	***USA***	***13***	3	Korea, Rep of	20
4	UK	8	***4***	***USA***	***17***
5	Netherlands	7	5	China	15
6	France	4	6	France	10
7	Italy	2	7	Switzerland	8
8	Sweden	2	8	Netherlands	5
9-12	Austria, Poland, Spain, Switzerland	1	9-10	Denmark, Italy	3

5. Agreement-Based Participation by U.S.A.-Domiciled SDOs or Consortia

There are other levels of participation by U.S.A.-domiciled standards-developing organizations and consortia in ISO and IEC standardization activities. This section presents some examples of such because there is no comprehensive survey available in this regard.

5.1 IEEE's Partnerships with ISO and IEC [29]

The Institute of Electrical and Electronics Engineers, Inc. (IEEE) is the world's largest technical professional society. Through its more than 370,000 members in 160 countries, the organization focuses on

[28] Source: 1999 and 2012 IEC Activity Report by General Secretary, which represents the activities in Oct 1998 to September 1999 and October 2011 to September 2012 respectively. The ranking and the number of new proposals by countries is transformed from the visual chart in that report by authors and may include read-error.

[29] IEEE provides detailed information about the organization's level of collaboration with ISO and IEC. More information about IEEE's partnership with ISO and IEC is available at: http://standards.ieee.org/develop/intl/index.html.

a wide variety of areas ranging from aerospace systems, computers, and telecommunications to biomedical engineering, electric power, and consumer electronics, and has developed nearly 900 active industry standards.

5.1.1 ISO/IEEE PSDO Agreement Since 2008

ISO and IEEE have a Partner Standards Development Organization (PSDO) cooperation agreement in place to increase their cooperation in developing international standards. The PSDO cooperation agreement provides new opportunities to adopt and jointly develop international standards to serve the global marketplace. The agreement aims to optimize stakeholder resources in the development of standards where both ISO and IEEE have expertise, and to shorten time-to-market. The agreement facilitates processes for the joint development of standards and for the adoption of standards. The agreement currently focuses on the following three TCs and six SCs of ISO:

- ISO/TC 204 - Intelligent Transportation Systems
- ISO/TC 215 - Health Informatics
- ISO/IEC JTC 1
  - SC6 - Telecommunications and Information Exchange Between Systems
  - SC7 - Software and System Engineering
  - SC22 - Programming Languages, their Environments and System Software Interfaces
  - SC25 - Interconnection of Information Technologies
  - SC31 - Automatic Identification and Data Capture Techniques
  - SC36 - Information Technology for Learning, Education, and Training (ITLET)

IEEE documents 51 standards adopted or jointly developed as of December 2012 under the ISO/IEEE PSDO Agreement. These include standards for Health Informatics (12), Instrumentation and Measurement (4), Local and Metropolitan Networks (10), Microprocessors (6), Portable Operating System Interface (POSIX) (7), and Software and System Engineering (12).[30]

5.1.2 IEC/IEEE Dual Logo Agreement Since 2002

The IEC/IEEE Dual Logo Agreement originally aimed at identifying suitable IEEE standards and draft standards as candidates for processing through the IEC full-consensus procedure at the country level. The Agreement has been expanded to include the joint development of new or existing standards in parallel in both organizations. The Agreement involves a dual-logo arrangement in which the logos of both organizations will appear on documents adopted by and jointly developed with IEC.

IEEE documents 23 standards adopted or jointly developed as of December 2012 under the IEC/IEEE Dual Logo Agreement. These are in the areas of Design Automation (6), Dielectrics and Electrical Insulation (1), Instrumentation and Measurement (3), Nanotechnology (1), Nuclear Power Engineering (3), SCC20 - Test

[30] Additional information can be found at http://standards.ieee.org/develop/intl/dual.html

and Diagnosis for Electronic Systems (2), Switchgear (1), Test Technology (4), and Transformers (2).[31]

5.2 ASTM International's Partnerships with ISO Since 1999

ASTM International, formerly known as the American Society for Testing and Materials (ASTM), develops globally recognized international voluntary consensus standards. Today, some 12,000 ASTM standards are used around the world to improve product quality, enhance safety, facilitate market access and trade, and build consumer confidence.

There have been two separate formal partnership activities between ASTM International and ISO. The first partnership ran from 1999 to 2004 for dosimetry standards development, and the second began in 2011 for additive manufacturing standards development.

From 1999 to 2004, ISO and ASTM International conducted a pilot project, "Radiation Processing Dosimetry Standards," which successfully transformed 25 ASTM dosimetry standards[32] into ISO/ASTM standards. Implemented in 2001, detailed procedures enabled the ISO/ASTM standards to be reviewed and maintained by ASTM International with unrestricted participation and input from ISO. As part of the process, the revised standards were balloted independently by ISO and by ASTM International using their normal ballot procedures. These 25 standards included ISO/ASTM 51607-4 and ISO/ASTM 52116-02. Since the pilot program, all of the published standards have proceeded through the full maintenance cycle[33].

In 2011, ISO and ASTM International signed an agreement to increase their cooperation in the development of international standards for additive manufacturing[34] which refers to the process of joining materials to manufactured objects, usually layer upon layer, as opposed to "subtractive manufacturing" methods, such as machining. The Partner Standards Development Organization (PSDO) cooperation agreement provides new opportunities for the two organizations to adopt and jointly develop international standards that serve the global marketplace in the field of additive manufacturing. The decision to set up the PSDO agreement follows the recent creation of ISO/TC 261, Additive manufacturing. ASTM's committee F42, Additive Manufacturing Technology, had already initiated important work in this area and it was decided that both groups would benefit from combining their expertise. So far, three standards have been drafted for ballot under this PSDO agreement: ISO/ASTM DIS 52792, ISO/ASTM FDIS 52915, and ISO/ASTM 52921.

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[31] More information can be found at http://standards.ieee.org/develop/intl/joint.html

[32] For full list please see http://www.astm.org/DATABASE.CART/I.htm, and scroll down to ISO/ASTM listings. Also, the subcommittee-based list can be found at http://www.astm.org/COMMIT/SUBCOMMIT/E61.htm, standards under the jurisdiction of E.61.01-E.61.05.

[33] Grove, Jeff (July/August 2011) "Promoting Public-Private Collaboration in Standards Development - Recommendations for an Enhanced Government–SDO Partnership in the United States, ASTM Standardization News (available at http://www.astm.org/SNEWS/JA_2011/grove_ja11.html).

[34] More information can be found at http://www.iso.org/iso/home/news_index/news_archive/news.htm?refid=Ref1481

5.3 Approved PAS Submitters to JTC 1, Including Some US-Domiciled Consortia[35]

ISO and IEC publish different types of documents – international standards (IS), technical specifications (TS), technical reports (TR), guides, and publically available specifications (PAS) to achieve an optimum degree of order in a given context of standards development procedures and to describe where the document is used. PAS is a document published by ISO or IEC to respond to an urgent market need, representing either a) a consensus in an organization external to ISO or IEC, or b) a consensus of the experts within a working group[36].

JTC 1 has a transposition procedure whereby organizations accredited as valid PAS Submitters can send their specifications directly for country voting to become ISO/IEC standards[37]. There are now nine approved PAS Submitters as of Jan 2013[38] as **Table 11** shows. The majority of them are US-domiciled or US-originated standards development organizations, and 115 PASs have been approved so far through this PAS Submitter procedure for JTC 1[39].

Table 11 List of Approved PAS Submitters to JTC 1

No.	Organizations	Status
1	Advancing Storage and Information Technology (SNIA) http://www.snia.org/	Approved status through September 2018
2	Distributed Management Task Force, Inc. (DMTF) http://www.dmtf.org/	Approved status through January 2019
3	GS1 http://www.gs1.org/	Approved status through January 2016
4	Object Management Group (OMG) http://www.omg.org/	Reaffirmed through December 2014
5	Open Geospatial Consortium (OGC) http://www.opengroup.org/	Approved status through March 2014
6	Organization for the Advancement of Structured Information Standards (OASIS) http://www.oasis-open.org/	Reaffirmed through May 2015
7	The Open Group (The Open Group) http://www.opengroup.org/	Reaffirmed through July 2015
8	Trusted Computing Group (TCG) https://www.trustedcomputinggroup.org/home	Reaffirmed through February 2016
9	Universal Plug and Play Forum (UPnP Forum) http://www.upnp.org/	Approved status through August 2018

[35] More information can be found at http://isotc.iso.org/livelink/livelink/fetch/2000/2122/327993/755080/2317216/Approved_PAS_Submitters.html?nodeid=2315468&vernum=0

[36] ISO and IEC (2011) ISO/IEC Directives Part 2 - Rules for the structure and drafting of International Standards, 6th edition

[37] http://www.w3.org/2010/04/pasfaq#L373

[38] http://isotc.iso.org/livelink/livelink/fetch/2000/2122/327993/755080/2317216/Approved_PAS_Submitters.html?nodeid=2315468&vernum=0

[39] http://isotc.iso.org/livelink/livelink/fetch/2000/2122/327993/755080/2317216/JTC_1_PAS_Submitted_Standards.pdf?nodeid=7287210&vernum=0

10	World Wide Web Consortium (W3C) http://www.w3.org/	Reaffirmed through November 2017

5.4 OGC's Agreement with ISO/TC211 Since 1998 [40]

Other than traditional standards developing organizations, there are other forms of consortia that have worked closely with ISO or IEC committees for standards development. These may include EPCglobal (a joint venture between GS1 (formerly known as EAN International) and GS1 US (formerly the Uniform Code Council, Inc.) with JTC1/SC31 for Radio Frequency Identification (RFID) standards[41], and the Open Geospatial Consortium (OGC) with ISO/TC211 for geographic information system standards. The OGC is an international industry consortium of 478 companies, government agencies, and universities participating in a consensus process to develop publicly available interface standards (www.opengeospatial.org).

ISO/TC 211 (Geographic information/Geomatics) and the OGC established a cooperative agreement in 1998. The purpose of this agreement is to establish an understanding between ISO/TC 211 and the OGC. This agreement formalizes the intention of ISO/TC 211 and OGC to cooperate and enables the development of a series of agreed specifications based on other related standards.

Under this agreement, the OGC has adopted five ISO/TC 211 standards as abstract specifications on which to base its own work on implementation of specifications. Also, a number of standards initially developed by the OGC have been brought to ISO/TC 211 and, after further development, published as ISO International Standards. These include eight ISO/TC211 standards and two draft standards, including ISO 19123 and ISO 19142[42].

6. Use of ISO and IEC Standards in the USA

6.1 Adoption of ISO and IEC Standards as American National Standards (ANS)

6.1.1 Alignment of ANS with ISO and IEC Increased

In the U.S.A., the number of ISO and IEC standards adopted as ANS rapidly increased from 15 (0.2 %) out of some 8,500 standards in 1987, 150 (1.3 %) out of around 11,500 standards in 1996, to 1,576 (15.5 %) out of 10,144 ANS in May 2012 (See **Table 12**).

The current alignment ratio (15.5 %) of the U.S.A. is low compared to major trade partners of the U.S.A. Canada adopted 1,376 ISO standards, representing 36.4 % of its 3,776 national standards [43] at the end of Dec

[40] More information can be found at http://www.isotc211.org/Agreements/Agreement_OGC.pdf

[41] In July 2006, the EPC Gen 2 protocol was approved and adopted by the International Standards Organization as ISO 18000-6C standard.

[42] More information can be found at Standards Guide -- ISO TC 211 Geographic Information/Geomatics (see page 98), available at http://www.isotc211.org/Outreach/ISO_TC_211_Standards_Guide.pdf

[43] ISO, 2009, ISO Members

2008, and today it is estimated that around 35 % of national standards of Canada are harmonized with ISO and IEC[44]. Other trading partners have similar high rates of harmonization. In 2009, the rate of ISO/IEC harmonization was 28 % by China, 63 % by Japan, and 55 % by Korea.[45]. In Europe, 41.8 % of the European Committee for Standardization (CEN) and the European Committee for Electrotechnical Standardization (CENELEC) standards are identical to ISO and IEC standards, and 56.1 % are based on ISO and IEC standards[46]. The still relatively low formal adoption of ISO and IEC standards in the U.S.A. is likely an outcome of our unique and diverse standards system with some 230 ANSI-accredited standards developers, many of which develop ANS and other standards that are also used globally. ANSI, as the sole U.S.A. Member Body to ISO, and through the USNC to IEC, has the rights to nationally adopt ISO and IEC standards. However, ANSI does not develop or adopt standards itself and, instead, may assign its rights to nationally adopt an ISO or IEC document to an ANSI-Accredited Standards Developer (ASD). Eligible ASDs adopt identical or modified ISO and IEC documents as ANS.

Table 12 ANS[47] Adoption from ISO, IEC Standards (1987, 1996, 2012)

Total	1987[48]	1996[49]	May 2012[50]
ANS (ANSI)	8,500 (estimation)	11,500 (estimation)	10,144
ANS adoption from ISO, IEC	15	150 (estimation)	1,576
Adoption ratio (%)	0.2%	1.3%	15.5%

6.1.2 The Case of UL: Adoption or Alignment?

The adoption of ISO or IEC standards as ANS may not be a simple, one-way process, but an interactive cooperation or alignment process. In addition to the organizational agreement-based cooperation described in Section 5, there have been different types of cooperation by U.S.A.-domiciled SDOs. Such cooperation may result in alignment of ISO or IEC standards with the US-domiciled SDO's standards. The case described here of UL standards alignment with IEC standards is part of the 10,144 ANS adoption in **Table 12**.

[44] The Canadian Standards Strategy since 2000 has promoted the adoption of international standards.

[45] Two internal survey reports in 2005 and 2010 conducted by Korean Standards Association (KSA). This data was provided by the author Dr. Dong Geun Choi.

[46] CEN-CENELEC, 2012, CEN-CENELEC Quarterly Statistical Pack for 2012 Quarter 2, available at http://www.cencenelec.eu/aboutus/InFigures/Pages/default.aspx.

[47] ANSI approved standards. Its designation procedure is available at www.ansi.org.

[48] Cooke, Patrick W. (1988) "A Review of U.S. Participation in International Standards Activities (NBSIR 88-2698)", NIST: Gaithersburg.

[49] Toth, B. (1996). NIST Special Publication 912 "Profiles of National Standards-Related Activities" (See the section of the United States, page 144), available at http://gsi.nist.gov/global/docs/pubs/NISTSP_912.pdf

50 The statistics and comments are from personal communication with Gary Kushnier and Anne Caldas of ANSI.

6.1.2.1 52 UL-IEC Aligned Standards[51]

UL is a global independent company in existence for more than 100 years. UL has aligned quite a few of their standards with relevant IEC standards. As of Jan 2014, there are over 75 UL/IEC standards, as listed in UL's standards catalogue[52]. UL/IEC standards are U.S.A. adoptions of the IEC standards, with U.S.A. national differences. These 52 UL-IEC harmonized standards include UL 60065 'Standard for Audio, Video and Similar Electronic Apparatus - Safety Requirements' (IEC 60065) and UL 62108 'Concentrator Photovoltaic (CPV) Modules and Assemblies - Design Qualification and Type Approval' (IEC 62108).

6.2 Referencing ISO and IEC Standards in U.S.A. Regulations

Since the late 1990s, the NTTAA legislation and OMB Circular A-119 have served to significantly improve the efficiency of the U.S.A. federal government's use of standards in regulations by requiring federal agencies to select voluntary consensus standards whenever possible instead of developing unique government standards. NIST coordinates and monitors the implementation of the NTTAA within U.S.A. federal agencies, and maintains the Standards Incorporated by Reference (SIBR)[53] database for informational purposes. The SIBR notes the number of times an SDO has a standard incorporated into a regulation and how often the standard is referenced in the Code of Federal Regulations (CFR). A standard may be referenced more than once in the CFR. According to the SIBR, 3,644[54] voluntary consensus standards have been incorporated by reference, and these standards have been cited a total of 9,486 times in the CFR as of July 2012.

As indicated in **Table 13**, the number of ISO and IEC standards annually incorporated by reference into U.S.A. regulations more than doubled from 70 standards and 205 citations in January 2002 to 172 standards and 419 citations in July 2012. The total number of all standards incorporated by reference and cited in the CFR held steady during the years (3,763 standards, 9,477 citations in 2002 and 3,644 standards, 9,486 citations in 2012). Therefore the ratio of the total incorporated and cited ISO and IEC standards compared to all incorporated and cited standards in the CFR more than doubled from 1.86 % (70 out of 3,763) to 4.72 % (172 out of 3,644) incorporated, and from 2.16 % (205 out of 9,477) to 4.42 % (419 out of 9,486) cited. The use of ISO and IEC standards in the U.S.A. regulations has increased in actual numbers and in frequency.

[51] Source: http://ulstandardsinfonet.ul.com/catalog/

[52] Source: http://ulstandardsinfonet.ul.com/catalog/stduliec.html

[53] The SIBR Database Administration System is operated by NIST, available at http://standards.gov/sibr/query/index.cfm.

[54] The number of standards can vary by counting method for different parts of a standard, or old-newer versions of one standard.

Table 13 ISO and IEC Standards Incorporated by Reference in the U.S.A. Regulations[55]

Classification	Number of Standards		Instances of References	
Year	**2002**	**2012**	**2002**	**2012**
Total Standards Incorporated	3,763	3,644	9,477	9,486
Total ISO & IEC Standards Incorporated	70	172	205	419
Ratio of Total ISO & IEC Standards Incorporated Compared to All Standards Incorporated	1.86%	4.72%	2.16%	4.42%

7. Summary

7.1 Participation in ISO and IEC

This report compared the U.S.A.'s past and current participation with that of other countries in the two international standardization organizations, ISO and IEC.

As of Dec 2012, the U.S.A. has 71 (76.3 %) P-members out of 224 TCs in ISO, and 162 (86.6%) out of 187 TC/SCs in IEC. **Figure 3** shows that the P-memberships of the U.S.A. in ISO and IEC have increased since 1986. The ratio has been calculated by the number of TCs for ISO (1986, 1998, and 2012) and IEC (1998). The ratio for IEC in 1986 and 2012 were calculated with the number of TCs plus SCs due to the data availability.

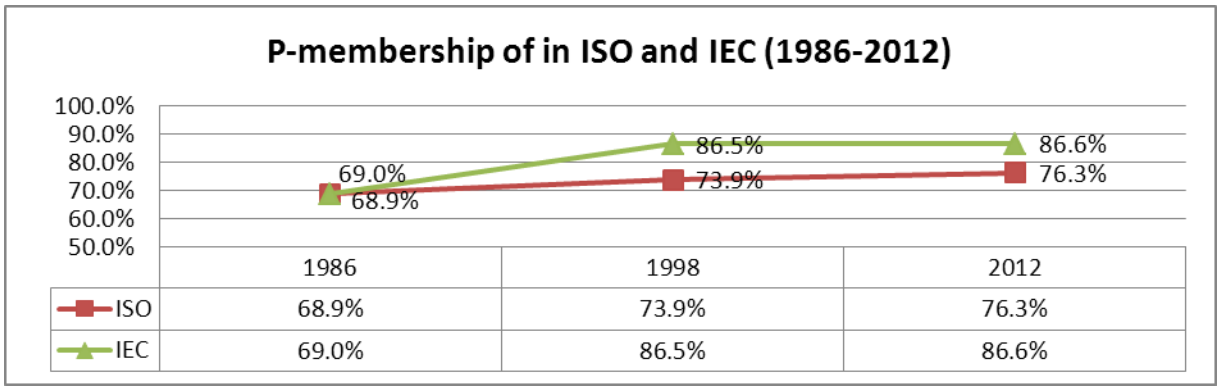

Figure 3 U.S.A. P-Memberships in ISO and IEC Increased in 1986 to 2012

U.S.A. holds 117 (15.9 %) out of 737 ISO secretariats, ranking 2nd behind by Germany; and 24th (12.8 %) out of 187 IEC secretariats, ranking 4th behind Germany, France, and Japan. **Figure 4** shows U.S.A. secretariats had increased by 1998, but declined from 1998 to 2012. The 2012 data for ISO is

[55] This table is based on the SIBR Database internally available at NIST. The 2002 data is as of January 2002, and the 2012 data is as of July 2012. While NIST makes every effort to continuously update the SIBR Database to reflect changes to standards referenced in the CFR, NIST cannot guarantee the accuracy or completeness of the SIBR Database.

based on its 2011 Annual Report (Jan 2012) and for IEC is based on its 2012 Activity Report (Sep 2012).

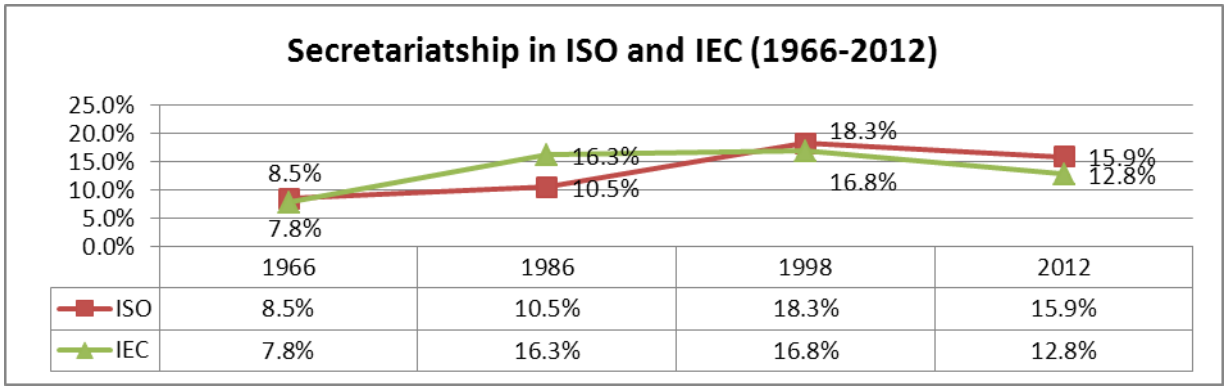

Figure 4 U.S.A. Secretariats Increased in 1966 to 1998, and Declined in 1998 to 2012

Also, U.S.A. holds 509 (20.2 %) out of 2,516 ISO WG convenors, ranking 1st in the world; and 31 (16.6 %) out of 187 IEC TC/SC chairs, ranking 2nd behind Germany. **Figure 5** shows that USA's convenors in ISO WGs have slightly decreased by 0.9 % while chairs in IEC TC/SCs have increased by 3.6% during 1998-2012. The 2012 data for ISO is based on its 2011 Annual Report (Jan 2012) and for IEC is based on its 2012 Activity Report (Sep 2012).

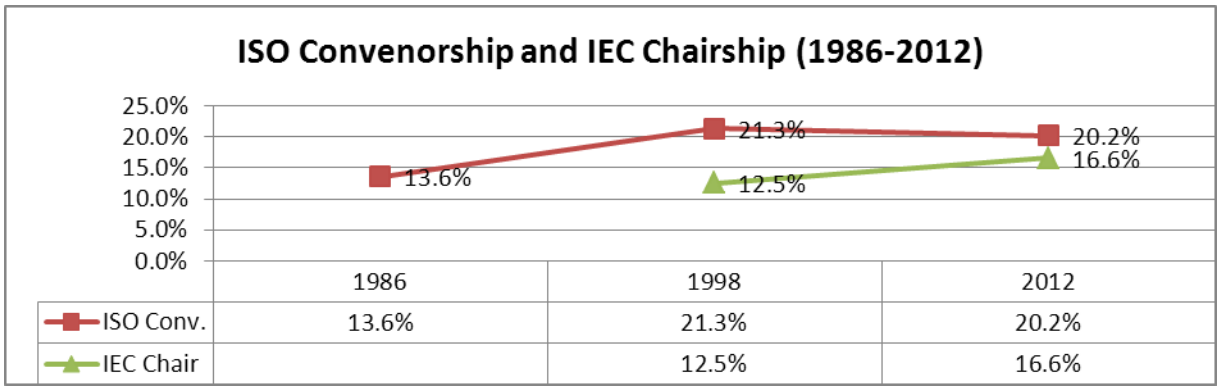

Figure 5 U.S.A. Convenor in ISO Decreased and Chair in IEC Increased in 1998 to 2012

7.2 Agreement-Based Participation in ISO and IEC

In addition to ANSI and USNC, the U.S.A. participates in ISO and IEC through cooperative agreements negotiated by U.S.A.-domiciled standards organizations. This report includes descriptions of five agreements by three standards developers. **Table 14** presents the five agreement-based SDO entities that jointly developed (adopted) 114 standards. In addition to these five agreements is the PAS Submitter procedure for JTC1, which produced 115 PASs.

Table 14 Agreement-Based Participation in ISO and IEC

SDOs	Agreement Type	Related Standards
IEEE-ISO	PSDO Agreement (2008 to present)	51 standards
IEEE-ISO	Dual Logo Agreement (2002 to present)	23 standards
ASTM-ISO (TC85)	Pilot Program (1999 to 2004)	25 standards
ASTM-ISO (TC261)	PSDO Agreement (2011 to present)	(under development)
OGC-ISO TC211	Cooperative Agreement (1998)	15 standards
		114 standards

7.3 U.S.A. Standards and Regulations Aligned with ISO and IEC Standards

In 1986, there were only 15 ANS adopted from ISO, constituting only 0.2 % of 8,400 ANS[56]. As presented in **Figure 6,** the number of ISO or IEC standards adopted as ANS increased to150 (1.3 %) out of 11,500 in 1996, and then to 1,576 (15.5 %) out of 10,144 ANS as of May 2012. The adoption of ISO or IEC standards as ANS may be a more interactive cooperation or alignment process; such cooperation may result in alignment of ISO or IEC standards with the standards of US-domiciled SDOs, including 85 API/ISO standards and 52 UL/IEC standards.

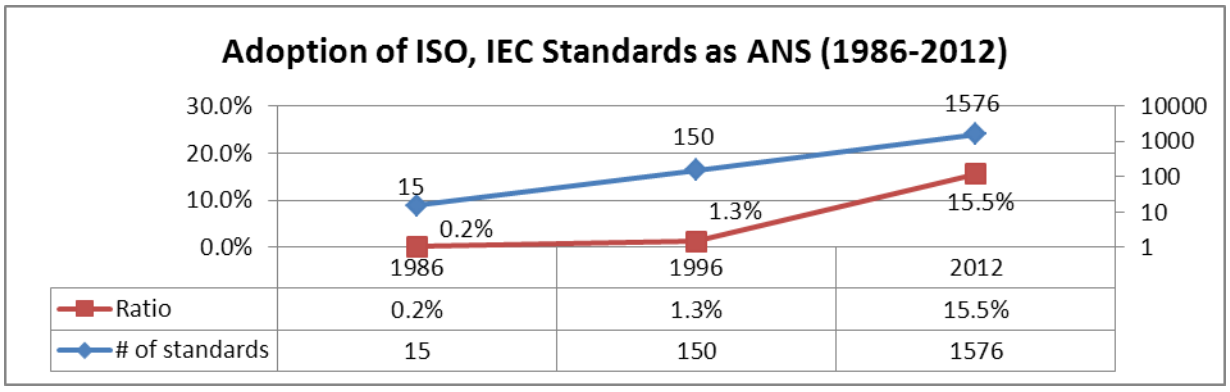

Figure 6 Adoption of ISO and IEC 1986-2012

According to the Standards Incorporated by Reference (SIBR)[57] database operated by NIST, the use of ISO and IEC standards in U.S.A. regulations has more than doubled during 2002 to 2012 in actual numbers and in its frequency. **Figure 7** proves that the frequency of ISO and IEC standards incorporated in the SIBR database more than doubled from 1.86 % (70 out of 3,763) to 4.72 % (172 out of 9,477) and from 2.16 % (205 out of 9,477) to 4.42 % (419 out of 9,486) by the number of standards referenced.

[56] The list of the 15 ANS/ISO standards is available at Table 5 (p. 61) in the Cooke, Patrick W. (1988). See **footnote 26**.

[57] The SIBR Database Administration System is operated by NIST, available at http://standards.gov/sibr/query/index.cfm.

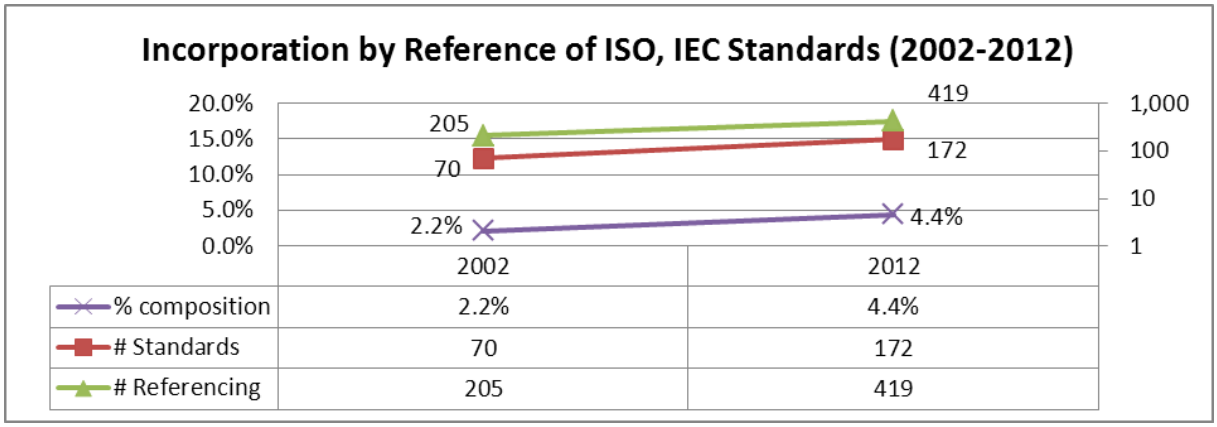

Figure 7 Incorporation by Reference of ISO and IEC 2002-2012

Annex 1. Membership Comparison of ISO, IEC, and UN (Dec 2012)

Membership comparison is based on the websites of ISO and IEC, both accessed on Dec 31, 2012.

Country	ISO[58] Memb.	IEC[59] Memb.	ISO[60] Comm.	IEC[61] Comm.	UN[62] Memb.
Afghanistan	Correspond	–	0	–	Yes
Albania	Correspond	Associate	4	2	Yes
Algeria	Full	Full	56	2	Yes
Andorra	–	–	–	–	Yes
Angola	Correspond	–	1	–	Yes
Antigua and Barbuda	Subscriber	–	0	–	Yes
Argentina	Full	Full	345	21	Yes
Armenia	Full	–	41	–	Yes
Australia	Full	Full	439	139	Yes
Austria	Full	Full	531	165	Yes
Azerbaijan	Full	–	10	–	Yes
Bahamas	–	–	–	–	Yes
Bahrain	Full	Associate	9	0	Yes
Bangladesh	Full	–	20	–	Yes
Barbados	Full	–	34	–	Yes
Belarus	Full	Full	163	40	Yes
Belgium	Full	Full	545	168	Yes
Belize	–	–	–	–	Yes
Benin	Correspond	–	1	–	Yes
Bhutan	Correspond	–	6	–	Yes
Bolivia	Correspond	–	12	–	Yes
Bosnia and Herzegovina	Full	Associate	90	2	Yes
Botswana	Full	–	30	–	Yes
Brazil	Full	Full	326	117	Yes
Brunei Darussalam	Correspond	–	5	–	Yes
Bulgaria	Full	Full	357	148	Yes
Burkina Faso	Correspond	–	2	–	Yes

[58] ISO Membership (164 countries); Full: Full member (member body) (112) (Correspond: Correspondent member (48); Subscriber: Subscriber member (4); –: not a member (32).

[59] IEC Membership (82 countries); Full: Full member (60); Associate: Associate member (22); –: not a member (114).

[60] ISO Committee participation: P-membership + O-membership.

[61] IEC Committee participation: P-membership + O-membership.

[62] UN Membership: UN has 193 members in 2012, and three ISO correspondent members listed here are not UN members – Hong Kong, China; Macau, China; Palestine.

Burundi	Correspond	–	2	–	Yes
Cambodia	Correspond	–	0	–	Yes
Cameroon	Full	–	33	–	Yes
Canada	Full	Full	361	115	Yes
Cape Verde	–	–	–	–	Yes
Central African Republic	–	–	–	–	Yes
Chad	–	–	–	–	Yes
Chile	Full	Full	115	2	Yes
China	Full	Full	706	177	Yes
Colombia	Full	Full	145	11	Yes
Comoros	–	–	–	–	Yes
Congo, The Democratic Republic of the	Full	–	16	–	Yes
Congo, the Republic of the	Correspond	–	1	–	Yes
Costa Rica	Full	–	28	–	Yes
Côte d'Ivoire	Full	–	51	–	Yes
Croatia	Full	Full	184	69	Yes
Cuba	Full	Associate	202	5	Yes
Cyprus	Full	Associate	78	2	Yes
Czech Republic	Full	Full	595	175	Yes
Denmark	Full	Full	324	173	Yes
Djibouti	–	–	–	–	Yes
Dominica	Correspond	–	0	–	Yes
Dominican Republic	Correspond	–	1	–	Yes
Ecuador	Full	–	93	–	Yes
Egypt	Full	Full	291	49	Yes
El Salvador	Correspond	–	9	–	Yes
Equatorial Guinea	–	–	–	–	Yes
Eritrea	Correspond	–	1	–	Yes
Estonia	Full	Associate	76	0	Yes
Ethiopia	Full	–	128	–	Yes
Fiji	Full	–	10	–	Yes
Finland	Full	Full	560	173	Yes
France	Full	Full	724	177	Yes
Gabon	Full	–	6	–	Yes
Gambia	Correspond	–	2	–	Yes
Georgia	Correspond	Associate	1	0	Yes
Germany	Full	Full	718	177	Yes
Ghana	Full	–	28	–	Yes
Greece	Full	Full	196	107	Yes

Grenada	–	–	–	–	Yes
Guatemala	Correspond	–	0	–	Yes
Guinea	Correspond	–	0	–	Yes
Guinea-Bissau	–	–	–	–	Yes
Guyana	Correspond	–	0	–	Yes
Haiti	–	–	–	–	Yes
Honduras	Subscriber	–	0	–	Yes
Hong Kong, China	2.Corr,	–	237	–	–
Hungary	Full	Full	480	140	Yes
Iceland	Full	Associate	152	2	Yes
India	Full	Full	610	155	Yes
Indonesia	Full	Full	223	67	Yes
Iran, Islamic Republic of	Full	Full	399	46	Yes
Iraq	Full	Full	35	7	Yes
Ireland	Full	Full	286	116	Yes
Israel	Full	Full	221	96	Yes
Italy	Full	Full	666	177	Yes
Jamaica	Full	–	101		Yes
Japan	Full	Full	687	176	Yes
Jordan	Full	Associate	22	4	Yes
Kazakhstan	Full	Associate	78	4	Yes
Kenya	Full	Associate	206	5	Yes
Kiribati	–	–	–	–	Yes
Korea, Democratic People's Republic	Full	–	95	–	Yes
Korea, Republic of	Full	Full	711	174	Yes
Kuwait	Full	–	7	–	Yes
Kyrgyzstan	Correspond	–	0	–	Yes
Lao People's Democratic Rep.	Subscriber	–	0	–	Yes
Latvia	Correspond	Associate	3	0	Yes
Lebanon	Full	–	20	–	Yes
Lesotho	Correspond	–	3	–	Yes
Liberia	Correspond	–	0	–	Yes
Libya	Full	Full	36	0	Yes
Liechtenstein	–	–		–	Yes
Lithuania	Full	Associate	61	0	Yes
Luxembourg	Full	Full	57	5	Yes
Macau, China	Correspond	–	0	–	–
Madagascar	Correspond	–	1	–	Yes
Malawi	Correspond	–	3	–	Yes
Malaysia	Full	Full	265	105	Yes

Maldives	–	–	–	–	Yes
Mali	Full	–	11	–	Yes
Malta	Full	Associate	40	4	Yes
Marshall Islands	–	–	–	–	Yes
Mauritania	Correspond	–	2	–	Yes
Mauritius	Full	–	67	–	Yes
Mexico	Full	Full	99	90	Yes
Micronesia (Federated States of)	–	–	–	–	Yes
Moldova, Republic of	Correspond	Associate	41	3	Yes
Monaco	–	–	–	–	Yes
Mongolia	Full	–	147	–	Yes
Montenegro	Correspond	Associate	11	0	Yes
Morocco	Full	Associate	74	0	Yes
Mozambique	Correspond	–	2	–	Yes
Myanmar	Correspond	–	0	–	Yes
Namibia	Full	–	17	–	Yes
Nauru	–	–	–	–	Yes
Nepal	Correspond	–	1	–	Yes
Netherlands	Full	Full	596	159	Yes
New Zealand	Full	Full	167	120	Yes
Nicaragua	Correspond	–	0	–	Yes
Niger	Correspond	–	0	–	Yes
Nigeria	Full	Associate	33	3	Yes
Norway	Full	Full	371	165	Yes
Oman	Full	Full	23	27	Yes
Pakistan	Full	Full	158	68	Yes
Palau	–	–	–	–	Yes
Palestine	Correspond	–	5	–	–
Panama	Full	–	2	–	Yes
Papua New Guinea	Correspond	–	1	–	Yes
Paraguay	Correspond	–	0	–	Yes
Peru	Full	–	23	–	Yes
Philippines, Republic of the	Full	Full	118	7	Yes
Poland	Full	Full	643	175	Yes
Portugal	Full	Full	348	127	Yes
Qatar	Full	Full	27	1	Yes
Romania	Full	Full	687	162	Yes
Russian Federation	Full	Full	622	168	Yes
Rwanda	Correspond	–	4	–	Yes
Saint Kitts and Nevis	–	–	–	–	Yes

Saint Lucia	Full	–	5	–	Yes
Saint Vincent and the Grenadines	Subscriber	–	0	–	Yes
Samoa	–	–	–	–	Yes
San Marino	–	–	–	–	Yes
Sao Tome and Principe	–	–	–	–	Yes
Saudi Arabia	Full	Full	160	19	Yes
Senegal	Full	–	6	–	Yes
Serbia	Full	Full	471	152	Yes
Seychelles	Correspond	–	3	–	Yes
Sierra Leone	Correspond	–	2	–	Yes
Singapore	Full	Full	139	96	Yes
Slovakia	Full	Full	444	101	Yes
Slovenia	Full	Full	77	93	Yes
Solomon Islands	–	–	–	–	Yes
Somalia	–	–	–	–	Yes
South Africa	Full	Full	431	127	Yes
South Sudan	–	–	–	–	Yes
Spain	Full	Full	625	176	Yes
Sri Lanka	Full	Associate	160	4	Yes
Sudan	Full	–	11	–	Yes
Suriname	Correspond	–	0	–	Yes
Swaziland	Correspond	–	13	–	Yes
Sweden	Full	Full	536	176	Yes
Switzerland	Full	Full	540	147	Yes
Syrian Arab Republic	Full	–	18	–	Yes
Tajikistan	Correspond	–	11	–	Yes
Tanzania, United Republic of	Full	–	141	–	Yes
Thailand	Full	Full	280	79	Yes
The former Yugoslav Republic of Macedonia	Full	Associate	10	1	Yes
Timor-Leste	–	–	–	–	Yes
Togo	Correspond	–	1	–	Yes
Tonga	–	–	–	–	Yes
Trinidad and Tobago	Full	–	72	–	Yes
Tunisia	Full	Associate	163	4	Yes
Turkey	Full	Full	365	91	Yes
Turkmenistan	Correspond	–	0	–	Yes
Tuvalu	–	–	–	–	Yes
Uganda	Full	–	22	–	Yes
Ukraine	Full	Full	337	160	Yes
United Arab Emirates	Full	Full	20	0	Yes

United Kingdom	Full	Full	726	175	Yes
Uruguay	Full	–	52	–	Yes
USA	Full	Full	620	162	Yes
Uzbekistan	Full	–	7	–	Yes
Vanuatu	–	–	–	–	Yes
Venezuela (Bolivarian Republic of)	–	–	–	–	Yes
Viet Nam	Full	Associate	73	4	Yes
Yemen	Full	–	5	–	Yes
Zambia	Correspond	–	6	–	Yes
Zimbabwe	Full	–	49	–	Yes
Total	***164 members***	***82 members***	–	–	***193 members***

Annex 2. List of ISO and IEC Technical Committees

A2.1 List of 224 ISO Technical Committees (Dec 2012)

TC #	TC's Title	Standards published	Work program
JTC 1	Information technology	2574	573
JPC 2	Joint Project Committee - Energy efficiency and renewable energy sources - Common terminology	0	2
TC 1	Screw threads	23	2
TC 2	Fasteners	188	7
TC 4	Rolling bearings	76	12
TC 5	Ferrous metal pipes and metallic fittings	67	2
TC 6	Paper, board and pulps	175	34
TC 8	Ships and marine technology	273	70
TC 10	Technical product documentation	144	18
TC 11	Boilers and pressure vessels	2	0
TC 12	Quantities and units	16	8
TC 14	Shafts for machinery and accessories	8	0
TC 17	Steel	316	56
TC 18	Zinc and zinc alloys - STANDBY	11	0
TC 19	Preferred numbers - STANDBY	3	0
TC 20	Aircraft and space vehicles	560	109
TC 21	Equipment for fire protection and fire fighting	98	7
TC 22	Road vehicles	745	198
TC 23	Tractors and machinery for agriculture and forestry	340	79
TC 24	Particle characterization including sieving	54	13
TC 25	Cast irons and pig irons	16	2
TC 26	Copper and copper alloys	38	0
TC 27	Solid mineral fuels	104	8
TC 28	Petroleum products and lubricants	247	24
TC 29	Small tools	418	88
TC 30	Measurement of fluid flow in closed conduits	44	7
TC 31	Tires, rims and valves	75	17
TC 33	Refractories	80	6
TC 34	Food products	796	82
TC 35	Paints and varnishes	234	37
TC 36	Cinematography	118	3
TC 37	Terminology and other language and content resources	39	16
TC 38	Textiles	356	56
TC 39	Machine tools	161	26
TC 41	Pulleys and belts (including veebelts)	81	20

TC 42	Photography	179	22
TC 43	Acoustics	196	40
TC 44	Welding and allied processes	292	50
TC 45	Rubber and rubber products	434	42
TC 46	Information and documentation	113	18
TC 47	Chemistry	118	0
TC 48	Laboratory equipment	110	0
TC 51	Pallets for unit load method of materials handling	15	5
TC 52	Light gauge metal containers	13	0
TC 54	Essential oils	129	9
TC 58	Gas cylinders	91	32
TC 59	Buildings and civil engineering works	112	16
TC 60	Gears	67	8
TC 61	Plastics	625	84
TC 63	Glass containers	29	3
TC 67	Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries	182	74
TC 68	Financial services	48	28
TC 69	Applications of statistical methods	93	28
TC 70	Internal combustion engines	63	12
TC 71	Concrete, reinforced concrete and pre-stressed concrete	30	22
TC 72	Textile machinery and accessories	184	11
TC 74	Cement and lime	8	0
TC 76	Transfusion, infusion and injection, and blood processing equipment for medical and pharmaceutical use	61	5
TC 77	Products in fiber reinforced cement	7	0
TC 79	Light metals and their alloys	114	4
TC 81	Common names for pesticides and other agrochemicals	10	2
TC 82	Mining	36	0
TC 83	Sports and recreational equipment	68	8
TC 84	Devices for administration of medicinal products and intravascular catheters	36	13
TC 85	Nuclear energy, nuclear technologies, and radiological protection	175	54
TC 86	Refrigeration and air-conditioning	23	12
TC 87	Cork	46	2
TC 89	Wood-based panels	42	8
TC 91	Surface active agents	77	4
TC 92	Fire safety	115	33
TC 93	Starch (including derivatives and by-products)	26	2
TC 94	Personal safety -- Protective clothing and equipment	109	46
TC 96	Cranes	103	14
TC 98	Bases for design of structures	20	5

TC 100	Chains and chain sprockets for power transmission and conveyors	17	3
TC 101	Continuous mechanical handling equipment	37	0
TC 102	Iron ore and direct reduced iron	71	21
TC 104	Freight containers	52	5
TC 105	Steel wire ropes	26	2
TC 106	Dentistry	162	40
TC 107	Metallic and other inorganic coatings	134	11
TC 108	Mechanical vibration, shock and condition monitoring	157	21
TC 109	Oil and gas burners	2	0
TC 110	Industrial trucks	54	17
TC 111	Round steel link chains, chain slings, components and accessories	20	3
TC 112	Vacuum technology	21	3
TC 113	Hydrometry	72	10
TC 114	Horology	32	1
TC 115	Pumps	24	3
TC 117	Fans	24	6
TC 118	Compressors and pneumatic tools, machines and equipment	69	15
TC 119	Powder metallurgy	74	9
TC 120	Leather	21	6
TC 121	Anesthetic and respiratory equipment	84	32
TC 122	Packaging	73	18
TC 123	Plain bearings	74	2
TC 126	Tobacco and tobacco products	68	10
TC 127	Earth-moving machinery	157	35
TC 129	Aluminum ores - STANDBY	17	0
TC 130	Graphic technology	70	21
TC 131	Fluid power systems	218	47
TC 132	Ferroalloys	31	0
TC 133	Sizing systems and designations for clothes	15	3
TC 134	Fertilizers and soil conditioners	30	5
TC 135	Non-destructive testing	71	26
TC 136	Furniture	25	2
TC 137	Footwear sizing designations and marking systems	1	1
TC 138	Plastics pipes, fittings and valves for the transport of fluids	309	37
TC 142	Cleaning equipment for air and other gases	8	14
TC 145	Graphical symbols	27	134
TC 146	Air quality	135	31
TC 147	Water quality	268	40
TC 148	Sewing machines	9	0

TC 149	Cycles	16	17
TC 150	Implants for surgery	135	36
TC 153	Valves	25	10
TC 154	Processes, data elements and documents in commerce, industry and administration	26	2
TC 155	Nickel and nickel alloys	55	2
TC 156	Corrosion of metals and alloys	63	28
TC 157	Non-systemic contraceptives and STI barrier prophylactics	13	1
TC 158	Analysis of gases	23	6
TC 159	Ergonomics	119	15
TC 160	Glass in building	40	9
TC 161	Control and protective devices for gas and/or oil burners and appliances	10	4
TC 162	Doors and windows	21	1
TC 163	Thermal performance and energy use in the built environment	104	26
TC 164	Mechanical testing of metals	81	37
TC 165	Timber structures	30	12
TC 166	Ceramic ware, glassware and glass ceramic ware in contact with food	6	0
TC 167	Steel and aluminum structures	4	0
TC 168	Prosthetics and orthotics	21	3
TC 170	Surgical instruments	6	0
TC 171	Document management applications	81	6
TC 172	Optics and photonics	290	60
TC 173	Assistive products for persons with disability	73	12
TC 174	Jewelry	17	12
TC 176	Quality management and quality assurance	22	6
TC 178	Lifts, escalators and moving walks	33	5
TC 179	Masonry - STANDBY	3	0
TC 180	Solar energy	16	6
TC 181	Safety of toys	5	8
TC 182	Geotechnics	48	17
TC 183	Copper, lead, zinc and nickel ores and concentrates	23	6
TC 184	Automation systems and integration	749	62
TC 185	Safety devices for protection against excessive pressure	14	6
TC 186	Cutlery and table and decorative metal hollow-ware	9	0
TC 188	Small craft	101	15
TC 189	Ceramic tile	26	21
TC 190	Soil quality	138	42
TC 191	Animal (mammal) traps - STANDBY	2	0
TC 192	Gas turbines	16	3

TC 193	Natural gas	53	9
TC 194	Biological evaluation of medical devices	30	2
TC 195	Building construction machinery and equipment	31	10
TC 197	Hydrogen technologies	17	6
TC 198	Sterilization of health care products	45	17
TC 199	Safety of machinery	44	13
TC 201	Surface chemical analysis	52	19
TC 202	Microbeam analysis	19	3
TC 203	Technical energy systems	5	0
TC 204	Intelligent transport systems	139	94
TC 205	Building environment design	17	7
TC 206	Fine ceramics	60	31
TC 207	Environmental management	29	10
TC 208	Thermal turbines for industrial application (steam turbines, gas expansion turbines) - STANDBY	2	0
TC 209	Cleanrooms and associated controlled environments	12	7
TC 210	Quality management and corresponding general aspects for medical devices	18	12
TC 211	Geographic information/Geomatics	65	20
TC 212	Clinical laboratory testing and in vitro diagnostic test systems	25	5
TC 213	Dimensional and geometrical product specifications and verification	117	46
TC 214	Elevating work platforms	8	3
TC 215	Health informatics	113	55
TC 216	Footwear	69	15
TC 217	Cosmetics	21	6
TC 218	Timber	59	16
TC 219	Floor coverings	73	10
TC 220	Cryogenic vessels	20	4
TC 221	Geosynthetics	34	13
TC 222	Personal financial planning - STANDBY	1	0
TC 223	Societal security	7	6
TC 224	Service activities relating to drinking water supply systems and wastewater systems - Quality criteria of the service and performance indicators	3	1
TC 225	Market, opinion and social research	2	0
TC 226	Materials for the production of primary aluminum	113	7
TC 227	Springs	4	2
TC 228	Tourism and related services	12	14
TC 229	Nanotechnologies	33	13
TC 232	Learning services for non-formal education and training	1	1
TC 234	Fisheries and aquaculture	3	8

TC 236	Project Committee: Project Management	1	0
TC 238	Solid biofuels	0	28
TC 240	Project Committee: Product recall	0	1
TC 241	Road traffic safety management systems	1	0
TC 242	Energy Management	1	5
TC 243	Project Committee: Consumer product safety	0	1
TC 244	Industrial furnaces and associated processing equipment	5	4
TC 245	Project Committee: Cross-border trade of second-hand goods	0	1
TC 247	Fraud countermeasures and controls	1	3
TC 248	Project committee: Sustainability criteria for bioenergy	0	1
TC 249	Traditional Chinese medicine	0	2
TC 250	Project committee: Sustainability in event management	1	0
TC 251	Project committee: Asset management	0	3
TC 252	Project committee: Natural gas fuelling stations for vehicles	0	2
TC 253	Project committee: Treated wastewater re-use for irrigation	0	5
TC 254	Safety of amusement rides and amusement devices	0	3
TC 255	Biogas	0	0
TC 256	Pigments, dyestuffs and extenders	84	0
TC 257	General technical rules for determination of energy savings in renovation projects, industrial enterprises and regions	0	4
TC 258	Project, program and portfolio management	0	1
TC 259	Project committee: Outsourcing	0	1
TC 260	Human resource management	0	2
TC 261	Additive manufacturing	0	7
TC 262	Risk management	2	1
TC 263	Coalbed methane (CBM)	0	0
TC 264	Fireworks	0	0
TC 265	Carbon dioxide capture, transportation, and geological storage	0	0
TC 266	Biomimetics	0	3
TC 267	Facilities management	0	2
TC 268	Sustainable development in communities	0	2
TC 269	Railway applications	0	0
TC 270	Plastic and rubber machines	0	0
PC 271	Compliance programs	0	1
PC 272	Forensic sciences	0	1
PC 273	Customer contact centers	0	0
TC 274	Light and lighting	0	0

A2.2 List of 97 IEC Technical Committees (Dec 2012)

TC #	TC's Title	P- & O-Members	Standards published	Work program
ISO/IEC JTC 1	Information technology	0	498	0
ISO/IEC JPC 2	Energy efficiency and renewable energy sources - Common international terminology	40	0	2
TC 1	Terminology	38	110	8
TC 2	Rotating machinery	45	63	9
TC 3	Information structures, documentation and graphical symbols	31	44	13
TC 4	Hydraulic turbines	34	32	3
TC 5	Steam turbines	26	7	0
TC 7	Overhead electrical conductors	37	30	5
TC 8	Systems aspects for electrical energy supply	44	7	4
TC 9	Electrical equipment and systems for railways	39	84	39
TC 10	Fluids for electrotechnical applications	40	53	4
TC 11	Overhead lines	38	16	1
TC 13	Electrical energy measurement, tariff- and load control	47	53	16
TC 14	Power transformers	47	45	9
TC 15	Solid electrical insulating materials	39	219	15
TC 17	Switchgear and controlgear	49	0	0
TC 18	Electrical installations of ships and of mobile and fixed offshore units	30	42	13
TC 20	Electric cables	53	209	15
TC 21	Secondary cells and batteries	42	43	9
TC 22	Power electronic systems and equipment	38	10	2
TC 23	Electrical accessories	52	5	2
TC 25	Quantities and units	27	38	10
TC 26	Electric welding	29	19	9
TC 27	Industrial electroheating and electromagnetic processing	27	31	10
TC 28	Insulation co-ordination	38	10	1
TC 29	Electroacoustics	36	63	10
TC 31	Equipment for explosive atmospheres	46	41	17
TC 32	Fuses	43	2	0
TC 33	Power capacitors and their applications	36	25	10
TC 34	Lamps and related equipment	48	3	1
TC 35	Primary cells and batteries	38	8	1
TC 36	Insulators	45	11	2
TC 37	Surge arresters	43	14	3

TC 38	Instrument transformers	44	10	9
TC 40	Capacitors and resistors for electronic equipment	30	198	19
TC 42	High-voltage and high-current test techniques	40	14	6
TC 44	Safety of machinery - Electrotechnical aspects	34	25	8
TC 45	Nuclear instrumentation	33	37	2
TC 46	Cables, wires, waveguides, R.F. connectors, R.F. and microwave passive components and accessories	39	37	13
TC 47	Semiconductor devices	31	87	13
TC 48	Electromechanical components and mechanical structures for electronic equipment	33	0	0
TC 49	Piezoelectric, dielectric and electrostatic devices and associated materials for frequency control, selection and detection	25	82	12
TC 51	Magnetic components and ferrite materials	25	83	1
TC 55	Winding wires	34	141	21
TC 56	Dependability	36	64	10
TC 57	Power systems management and associated information exchange	44	119	40
TC 59	Performance of household and similar electrical appliances	43	25	3
TC 61	Safety of household and similar electrical appliances	53	187	8
TC 62	Electrical equipment in medical practice	44	4	0
TC 64	Electrical installations and protection against electric shock	50	74	9
TC 65	Industrial-process measurement, control and automation	40	15	13
TC 66	Safety of measuring, control and laboratory equipment	35	21	10
TC 68	Magnetic alloys and steels	28	42	5
TC 69	Electric road vehicles and electric industrial trucks	39	8	20
TC 70	Degrees of protection provided by enclosures	37	5	1
TC 72	Automatic electrical controls	33	28	3
TC 73	Short-circuit currents	35	19	2
TC 76	Optical radiation safety and laser equipment	37	29	7
TC 77	Electromagnetic compatibility	50	15	1
TC 78	Live working	40	68	10
TC 79	Alarm and electronic security systems	37	40	17
TC 80	Maritime navigation and radio communication equipment and systems	33	49	9
TC 81	Lightning protection	47	15	4
TC 82	Solar photovoltaic energy systems	48	64	38
TC 85	Measuring equipment for electrical and	36	62	21

	electromagnetic quantities			
TC 86	Fiber optics	42	20	6
TC 87	Ultrasonics	34	40	9
TC 88	Wind turbines	38	25	13
TC 89	Fire hazard testing	36	48	17
TC 90	Superconductivity	25	15	6
TC 91	Electronics assembly technology	32	180	36
TC 94	All-or-nothing electrical relays	31	19	6
TC 95	Measuring relays and protection equipment	33	24	6
TC 96	Transformers, reactors, power supply units, and combinations thereof	31	23	3
TC 97	Electrical installations for lighting and beaconing of aerodromes	24	5	1
TC 99	System engineering and erection of electrical power installations in systems with nominal voltages above 1 kV a.c. and 1,5 kV d.c., particularly concerning safety aspects	30	2	2
TC 100	Audio, video and multimedia systems and equipment	44	439	65
TC 101	Electrostatics	32	23	7
TC 103	Transmitting equipment for radio communication	29	41	5
TC 104	Environmental conditions, classification and methods of test	27	118	9
TC 105	Fuel cell technologies	31	13	7
TC 106	Methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure	34	15	9
TC 107	Process management for avionics	19	17	12
TC 108	Safety of electronic equipment within the field of audio/video, information technology and communication technology	41	31	3
TC 109	Insulation co-ordination for low-voltage equipment	33	10	1
TC 110	Electronic display devices	26	103	28
TC 111	Environmental standardization for electrical and electronic products and systems	33	7	13
TC 112	Evaluation and qualification of electrical insulating materials and systems	30	68	9
TC 113	Nanotechnology standardization for electrical and electronic products and systems	32	4	17
TC 114	Marine energy - Wave, tidal and other water current converters	22	2	9
TC 115	High Voltage Direct Current (HVDC) transmission for DC voltages above 100 kV	23	0	2
TC 116	Safety of motor-operated electric tools	45	83	6
TC 117	Solar thermal electric plants	22	0	0

PC 118	Smart grid user interface	25	0	0
TC 119	Printed Electronics	18	0	0
TC 120	Electrical Energy Storage (EES) Systems	20	0	0
CISPR	International special committee on radio interference	40	0	0

A2.3 List of Subcommittees in ISO/IEC JTC 1 and JPC 1 (Dec 2012)[63],[64]

Committee	Description	Secretariat	Chairman	Publications
JTC 1	**Information technology**	**ANSI**	**USA**	**498**
- SC 2	Coded character sets	JISC	Japan	35
- SC 6	Telecommunications and information exchange between systems	KATS	Korea	346
- SC 7	Software engineering	SCC	Canada	150
- SC 17	Cards and personal identification	BSI	UK	105
- SC 22	Programming languages, their environments and system software interfaces	ANSI	USA	85
- SC 23	Optical disk cartridges for information interchange	JISC	Japan	107
- SC 24	Computer graphics and image processing	BSI	Korea	75
- SC 25	Interconnection of information technology equipment	DIN	Germany	255
- SC 27	IT security techniques	DIN	Germany	128
- SC 28	Office equipment	JISC	Japan	31
- SC 29	Coding of audio, picture, multimedia and hypermedia information	JISC	Japan	487
- SC 31	Automatic identification and data capture techniques	ANSI	USA	101
- SC 32	Data management services	ANSI	USA	61
- SC 34	Document description and processing languages	JISC	Korea	59
- SC 35	User interfaces	AFNOR	France	59
- SC 36	Information technology for learning, education and training	KATS	USA	28
- SC 37	Biometrics	ANSI	USA	75
- SC 38	Distributed Application Platforms and Services (DAPS)	ANSI	USA	5
- SC 39	Sustainability for and by Information Technology	ANSI	USA	0

[63] More information about JTC 1 is available at http://www.iso.org/iso/home/standards_development/list_of_iso_technical committees/iso_technical_committee.htm?commid=45020

[64] More information about JTC 2 (JPC 2) is available at http://www.iso.org/iso/home/standards_development/list_of_iso_technical_committees/iso_technical_committee.htm?commid=585141

JTC 2 (JPC2)	**Energy efficiency and renewable energy sources - Common international terminology**	**AFNOR**	**France**	**0**

Annex 3. List of U.S.A. Secretariats in ISO and IEC

A3.1 List of 121 ISO TC/SCs Whose Secretariat is the U.S.A. (Dec 2012)[65]

JTC 1 - Information technology
JTC 1/SC 22 - Programming languages, their environments and system software interfaces
JTC 1/SC 31 - Automatic identification and data capture techniques
JTC 1/SC 32 - Data management and interchange
JTC 1/SC 37 - Biometrics
JTC 1/SC 38 - Distributed application platforms and services
JTC 1/SC 39 - Sustainability for and by Information Technology
TC 4/SC 6 - Insert bearings
TC 4/SC 9 - Tapered roller bearings
TC 4/SC 11 - Linear motion rolling bearings
TC 5/SC 10 - Metallic flanges and their joints
TC 8/SC 1 - Lifesaving and fire protection
TC 8/SC 2 - Marine environment protection
TC 8/SC 3 - Piping and machinery
TC 10/SC 1 - Basic conventions
TC 11 - Boilers and pressure vessels
TC 17/SC 11 - Steel castings
TC 17/SC 12 - Continuous mill flat rolled products
TC 18/SC 3Stand by - Zinc metal
TC 20 - Aircraft and space vehicles
TC 20/SC 13 - Space data and information transfer systems
TC 20/SC 14 - Space systems and operations
TC 20/SC 15 - Airframe bearings
TC 21/SC 5 - Fixed firefighting systems using water
TC 22/SC 10 - Impact test procedures
TC 22/SC 11 - Safety glazing materials
TC 22/SC 13 - Ergonomics applicable to road vehicles
TC 22/SC 19 - Wheels
TC 23/SC 2 - Common tests
TC 23/SC 13 - Powered lawn and garden equipment
TC 23/SC 14 - Operator controls, operator symbols and other displays, operator manuals
TC 28 - Petroleum products and lubricants
TC 28/SC 2 - Measurement of petroleum and related products

[65] Source: http://www.iso.org/iso/home/about/iso_members/iso_member_participation_tc.htm?member_id=2188. ISO Annual Report 2011 indicates that the number of U.S.A. Secretariats is 117 as of Dec 31, 2011. However, ISO website provides more recent data for secretariats. As of Dec 31, 2012, the U.S.A. held 121 secretariats as listed here.

TC 28/SC 7 - Liquid Biofuels
TC 31 - Tires, rims and valves
TC 31/SC 8 - Aircraft tires and rims
TC 34/SC 16 - Horizontal methods for molecular biomarker analysis
TC 36 - Cinematography
TC 39/SC 2 - Test conditions for metal cutting machine tools
TC 41/SC 4 - Synchronous belt drives
TC 42 - Photography
TC 43/SC 3 - Underwater acoustics
TC 44/SC 3 - Welding consumables
TC 46/SC 9 - Identification and description
TC 58/SC 4 - Operational requirements for gas cylinders
TC 60 - Gears
TC 67/SC 4 - Drilling and production equipment
TC 68 - Financial services
TC 69/SC 1 - Terminology and symbols
TC 69/SC 4 - Applications of statistical methods in process management
TC 71 - Concrete, reinforced concrete and pre-stressed concrete
TC 71/SC 4 - Performance requirements for structural concrete
TC 79/SC 9 - Symbolization
TC 85/SC 6 - Reactor technology
TC 86 - Refrigeration and air-conditioning
TC 86/SC 1 - Safety and environmental requirements for refrigerating systems
TC 86/SC 2 - Terms and definitions
TC 86/SC 3 - Testing and rating of factory-made refrigeration systems
TC 86/SC 6 - Testing and rating of air-conditioners and heat pumps
TC 86/SC 7 - Testing and rating of commercial refrigerated display cabinets
TC 86/SC 8 - Refrigerants and refrigeration lubricants
TC 92/SC 2 - Fire containment
TC 92/SC 3 - Fire threat to people and environment
TC 94/SC 1 - Head protection
TC 96/SC 6 - Mobile cranes
TC 96/SC 8 - Jib cranes
TC 104 - Freight containers
TC 106/SC 2 - Prosthodontic materials
TC 106/SC 8 - Dental implants
TC 108 - Mechanical vibration, shock and condition monitoring
TC 108/SC 5 - Condition monitoring and diagnostics of machine systems
TC 113/SC 5 - Instruments, equipment and data management
TC 113/SC 8 - Ground water
TC 115/SC 3 - Installation and special application
TC 119/SC 5 - Specifications for powder metallurgical materials
TC 121 - Anesthetic and respiratory equipment

TC 121/SC 2 - Airways and related equipment
TC 121/SC 3 - Lung ventilators and related equipment
TC 121/SC 4 - Terminology and semantics
TC 121/SC 6 - Medical gas systems
TC 127 - Earth-moving machinery
TC 127/SC 2 - Safety, ergonomics and general requirements
TC 131 - Fluid power systems
TC 131/SC 4 - Connectors and similar products and components
TC 131/SC 9 - Installations and systems
TC 145/SC 3 - Graphical symbols for use on equipment
TC 146/SC 2 - Workplace atmospheres
TC 146/SC 3 - Ambient atmospheres
TC 146/SC 5 - Meteorology
TC 150/SC 2 - Cardiovascular implants and extracorporeal systems
TC 150/SC 5 - Osteosynthesis and spinal devices
TC 150/SC 6 - Active implants
TC 160/SC 2 - Use considerations
TC 164/SC 4 - Toughness testing -- Fracture
TC 164/SC 5 - Fatigue testing
TC 171 - Document management applications
TC 171/SC 2 - Application issues
TC 180/SC 4 - Systems - Thermal performance, reliability and durability
TC 184/SC 4 - Industrial data
TC 184/SC 5 - Interoperability, integration, and architectures for enterprise systems and automation applications
TC 185 - Safety devices for protection against excessive pressure
TC 189 - Ceramic tile
TC 192 - Gas turbines
TC 193/SC 3 - Upstream area
TC 198 - Sterilization of health care products
TC 201/SC 1 - Terminology
TC 201/SC 2 - General procedures
TC 202/SC 1 - Terminology
TC 204 - Intelligent transport systems
TC 205 - Building environment design
TC 207/SC 4 - Environmental performance evaluation
TC 209 - Cleanrooms and associated controlled environments
TC 210 - Quality management and corresponding general aspects for medical devices
TC 212 - Clinical laboratory testing and in vitro diagnostic test systems
TC 214 - Elevating work platforms
TC 215 - Health informatics
TC 236 - Project Committee: Project Management
TC 242 - Energy Management

TC 247 - Fraud countermeasures and controls
TC 258 - Project, program and portfolio management
TC 260 - Human resource management

A3.2. List of 24 IEC TC/SCs Whose Secretariat is the U.S.A. (Dec 2012)[66]

TC 15 - Solid electrical insulating materials
TC 22/SC 22G - Adjustable speed electric drive systems incorporating semiconductor power converters
TC 37 - Surge arresters
TC 37/SC 37A - Low-voltage surge protective devices
TC 37/SC 37B - Specific components for surge arresters and surge protective devices
TC 46 - Cables, wires, waveguides, R.F. connectors, R.F. and microwave passive components and accessories
TC 48 - Electromechanical components and mechanical structures for electronic equipment
TC 48/SC 48B - Connectors
TC 55 - Winding wires
TC 61 - Safety of household and similar electrical appliances
TC 61/SC 61D - Appliances for air-conditioning for household and similar purposes
TC 62/SC 62A - Common aspects of electrical equipment used in medical practice
TC 62/SC 62D - Electromedical equipment
TC 65/SC 65B - Measurement and control devices
TC 65/SC 65E - Devices and integration in enterprise systems
TC 72 - Automatic electrical controls
TC 76 - Optical radiation safety and laser equipment
TC 82 - Solar photovoltaic energy systems
TC 86 - Fiber optics
TC 86/SC 86C - Fiber optic systems and active devices
TC 100/TA 2 - Color measurement and management
TC 108 - Safety of electronic equipment within the field of audio/video, information technology and communication technology
TC 116 - Safety of motor-operated electric tools
CISPR/CIS/A - Radio-interference measurements and statistical methods

[66] Source: http://www.iec.ch/dyn/www/f?p=103:34:0::::FSP_ORG_ID,FSP_LANG_ID:1046,25. Both IEC Activity Report and Annual Report (Oct 5, 2012) and IEC website (Dec 31, 2012) indicates that the number of U.S. Secretariats is 24 as listed here.

Annex 4. ISO and IEC Standards Development Stages[67]

This annex refers to ISO/IEC Directives, Part 1: Procedures for the technical work. An International Standard is the result of an agreement between the member bodies of ISO or national committees of IEC. It may be used as such, or may be implemented through incorporation of national standards in different countries. International standards are developed by ISO or IEC technical committees (TC) and subcommittees (SC) by a six-step process.

A4.1 Proposal Stage

The first step in the development of an international standard is to confirm that a particular international standard is needed. A new work item proposal (NP) is submitted for vote by the members of the relevant TC or SC to determine the inclusion of the work item in the program of work.

The proposal is accepted if a majority of the P-members of the TC/SC votes in favor and if at least five P-members declare their commitment to participate actively in the project. At this stage a project leader responsible for the work item is normally appointed.

A4.2 Preparatory Stage

Usually, a working group of experts, the chairman (convener) of which is the project leader, is set up by the TC/SC for the preparation of a working draft. Successive working drafts may be considered until the working group is satisfied that it has developed the best technical solution to the problem being addressed. At this stage, the draft is forwarded to the working group's parent committee for the consensus-building phase.

A4.3 Committee Stage

As soon as a first committee draft is available, it is registered by ISO Central Secretariat. It is distributed for comment and, if required, voting, by the P-members of the TC/SC. Successive committee drafts may be considered until consensus is reached on the technical content. Once consensus has been attained, the text is finalized for submission as a draft international standard (DIS).

A4.4 Enquiry Stage

The DIS is circulated to all ISO member bodies by ISO Central Secretariat for voting and comments within a period of five months. It is approved for submission as a final draft international standard (FDIS) if a two-thirds majority of the P-members of the TC/SC are in favor and not more than one-quarter of the total number of votes cast are negative. If the approval criteria are not met, the text is returned to the originating

[67] More details of ISO and IEC standards development procedures and relevant rules can be found at the website: http://www.iso.org/iso/home/standards_development/resources-for-technical-work/iso_iec_directives_and_iso_supplement.htm

TC/SC for further study and a revised document will again be circulated for voting and comment as a DIS.

A4.5 Approval Stage

The final draft international standard (FDIS) is circulated to all ISO member bodies by the ISO Central Secretariat for a final Yes/No vote within a period of two months. If technical comments are received during this period, they are no longer considered at this stage, but registered for consideration during a future revision of the international standard. The text is approved as an international standard if a two-thirds majority of the P-members of the TC/SC is in favor and not more than one-quarter of the total number of votes cast are negative. If these approval criteria are not met, the standard is referred back to the originating TC/SC for reconsideration in light of the technical reasons submitted in support of the negative votes received.

A4.6 Publication Stage

Once a final draft international standard has been approved, only minor editorial changes, if necessary, are introduced into the final text. The final text is sent to the ISO Central Secretariat, who publishes the international standard.

A4.7 Review of International Standards (Confirmation, Revision, Withdrawal)

All international standards are reviewed at least every five years by all ISO member bodies. A majority of the P-members of the TC/SC decides whether an international standard should be confirmed, revised, or withdrawn.

A4.8 Fast-Track Procedure

If a document with a certain degree of maturity is available at the start of a standardization project, for example a standard developed by another organization, it is possible to omit certain stages. In the so-called "fast-track procedure," a document is submitted directly for approval as a draft international standard (DIS) to ISO member bodies (stage 4) or, if the document has been developed by an international standardizing body recognized by ISO Council, as a final draft international standard (FDIS, stage 5), without passing through the previous stages.

A4.9. ISO and IEC standards development codes[68]

STAGE	SUBSTAGE						
				90 Decision Substages			
	00 Registration	20 Start of main action	60 Completion of main action	92 Repeat an earlier phase	93 Repeat current phase	98 Abandon	99 Proceed
00 Preliminary stage	00.00 Proposal for new project received	00.20 Proposal for new project under review	00.60 Close of review			00.98 Proposal for new project abandoned	00.99 Approval to ballot proposal for new project
10 Proposal stage	10.00 Proposal for new project registered	10.20 New project ballot initiated	10.60 Close of voting	10.92 Proposal returned to submitter for further definition		10.98 New project rejected	10.99 New project approved
20 Preparatory stage	20.00 New project registered in TC/SC work programme	20.20 Working draft (WD) study initiated	20.60 Close of comment period			20.98 Project deleted	20.99 WD approved for registration as CD
30 Committee stage	30.00 Committee draft (CD) registered	30.20 CD study/ballot initiated	30.60 Close of voting/ comment period	30.92 CD referred back to Working Group		30.98 Project deleted	30.99 CD approved for registration as DIS
40 Enquiry stage	40.00 DIS registered	40.20 DIS ballot initiated: *5 months*	40.60 Close of voting	40.92 Full report circulated: DIS referred back to TC or SC	40.93 Full report circulated: decision for new DIS ballot	40.98 Project deleted	40.99 Full report circulated: DIS approved for registration as FDIS
50 Approval stage	50.00 FDIS registered for formal approval	50.20 FDIS ballot initiated: *2 months*. Proof sent to secretariat	50.60 Close of voting. Proof returned by secretariat	50.92 FDIS referred back to TC or SC		50.98 Project deleted	50.99 FDIS approved for publication
60 Publication stage	60.00 International Standard under publication		60.60 International Standard published				
90 Review stage		90.20 International Standard under periodical review	90.60 Close of review	90.92 International Standard to be revised	90.93 International Standard confirmed		90.99 Withdrawal of International Standard proposed by TC or SC
95 Withdrawal stage		95.20 Withdrawal ballot initiated	95.60 Close of voting	95.92 Decision not to withdraw International Standard			95.99 Withdrawal of International Standard

[68] http://www.iso.org/iso/stage_codes.pdf (used with permission from ISO)

Annex 5. U.S.A. Laws Concerning NIST's Role in Standardization

A5.1 Trade Agreements Act of 1979[69]

[Sec. 2532.] Federal standards-related activities

No Federal agency may engage in any standards-related activity that creates unnecessary obstacles to the foreign commerce of the United States, including, but not limited to, standards-related activities that violate any of the following requirements:

(1) Nondiscriminatory treatment: Each Federal agency shall ensure, in applying standards-related activities with respect to any imported product, that such product is treated no less favorably than are like domestic or imported products, including, but not limited to, when applying tests or test methods, no less favorable treatment with respect to (A) the acceptance of the product for testing in comparable situations; (B) the administration of the tests incomparable situations; (C) the fees charged for tests; (D) the release of test results to the exporter, importer, or agents; (E) the siting of testing facilities and the selection of samples for testing; and (F) the treatment of confidential information pertaining to the product.

(2) Use of international standards: (A) In general, except as provided in subparagraph (B) (ii), each Federal agency, in developing standards, shall take into consideration *international standards* and shall, if appropriate, base the standards on *international standards*. (B)Application of requirement. For purposes of this paragraph, the following apply: (i) *International standards* not appropriate. The reasons for which the basing of a standard on an international standard may not be appropriate include, but are not limited to, the following: (I) National security requirements. (II)The prevention of deceptive practices. (III) The protection of human health or safety, animal or plant life or health, or the environment. (IV) Fundamental climatic or other geographical factors. (V) Fundamental technological problems.(ii) Regional standards In developing standards, a Federal agency may, but is not required to, take into consideration any international standard promulgated by an *international standards* organization the membership of which is described in section 2571(6)(A)(ii) [1] of this title. (3) Performance criteria Each Federal agency shall, if appropriate, develop standards based on performance criteria, such as those relating to the intended use of a product and the level of performance that the product must achieve under defined conditions, rather than on design criteria, such as those relating to the physical form of the product or the types of material of which the product is made.

[Sec. 2543.] Representation of United States interests before international standards organizations

(a) Oversight and consultation: The Secretary concerned shall - (1) inform, consult, and coordinate with, the Trade Representative with respect to *international standards*-related activities identified under paragraph (2); (2) keep adequately informed regarding *international standards*-related activities and identify those that may substantially affect the commerce of the United States; and (3) carry out such

[69] Source: gsi.nist.gov/global/docs/TradeAgreementsAct1979.pdf

functions as are required under subsections (b) and (c) of this section.

(b) Representation of United States interests by private persons: (1) Definitions, For purposes of this subsection - (A) Organization member, The term "organization member" means the private person who holds membership in a private *international standards* organization. (B) Private *international standards* organization, The term "private *international standards* organization" means any *international standards* organization before which the interests of the United States are represented by a private person who is officially recognized by that organization for such purpose. (2) In general, Except as otherwise provided for in this subsection, the representation of United States interests before any private *international standards* organization shall be carried out by the organization member. (3) Inadequate representation If the Secretary concerned, after inquiry instituted on his own motion or at the request of any private person, Federal agency, or State agency having an interest therein, has reason to believe that the participation by the organization member in the proceedings of a private *international standards* organization will not result in the adequate representation of United States interests that are, or may be, affected by the activities of such organization (particularly with regard to the potential impact of any such activity on the international trade of the United States), the Secretary concerned shall immediately notify the organization member concerned. During any such inquiry, the Secretary concerned may solicit and consider the advice of the appropriate representatives referred to in section 2547 of this title. (4) Action by organization member, If within the 90-day period after the date on which notification is received under paragraph (3) (or such shorter period as the Secretary concerned determines to be necessary in extraordinary circumstances), the organization member demonstrates to the Secretary concerned its willingness and ability to represent adequately United States interests before the private *international standards* organization, the Secretary concerned shall take no further action under this subsection. (5) Action by Secretary concerned, If - (A) within the appropriate period referred to in paragraph (4), the organization member does not respond to the Secretary concerned with respect to the notification, or does respond but does not demonstrate to the Secretary concerned the requisite willingness and ability to represent adequately United States interests; or (B) there is no organization member of the private *international standards* organization; the Secretary concerned shall make appropriate arrangements to provide for the adequate representation of United States interests. In cases where subparagraph (A) applies, such provision shall be made by the Secretary concerned through the appropriate organization member if the private *international standards* organization involved requires representation by that member.

(c) Representation of United States interests by Federal agencies: With respect to any *international standards* organization before which the interests of the United States are represented by one or more Federal agencies that are officially recognized by that organization for such purpose, the Secretary concerned shall - (1) encourage cooperation among interested Federal agencies with a view toward facilitating the development of a uniform position with respect to the technical activities with which the organization is concerned; (2) encourage such Federal agencies to seek information from, and to cooperate with, the affected domestic interests when undertaking such representation; and (3) not preempt the responsibilities of any Federal agency that has jurisdiction with respect to the activities undertaken by such organization, unless requested to do so by such agency.

A5.2 The National Technology Transfer and Advancement Act (NTTAA) of 1995[70]

The National Technology Transfer and Advancement Act (NTTAA) directs Federal agencies with respect to their use of private sector standards and conformity assessment practices. The Act's objective is for Federal agencies to adopt private sector standards, wherever possible, in lieu of creating proprietary, non-consensus standards.

The Act directs the National Institute of Standards and Technology (NIST) to bring together Federal agencies, as well as State and local governments, to achieve greater reliance on voluntary standards and decreased dependence on in-house standards. Progress toward accomplishing NTTAA aims is summarized in annual reports prepared by NIST, in collaboration with the Interagency Committee on Standards Policy (ICSP).

A5.3 OMB Circular No. A-119[71]

OMB Circular A-119 establishes policies on Federal use and development of voluntary consensus standards and on conformity assessment activities. Pub. L. 104-113, the "National Technology Transfer and Advancement Act of 1995," codified existing policies in A-119, established reporting requirements, and authorized the National Institute of Standards and Technology to coordinate conformity assessment activities of the agencies. OMB is issuing this revision of the Circular in order to make the terminology of the Circular consistent with the National Technology Transfer and Advancement Act of 1995, to issue guidance to the agencies on making their reports to OMB, to direct the Secretary of Commerce to issue policy guidance for conformity assessment, and to make changes for clarity.

This Circular establishes policies to improve the internal management of the Executive Branch. Consistent with Section 12(d) of P.L. 104-113, the "National Technology Transfer and Advancement Act of 1995" (hereinafter "the Act"), this Circular directs agencies to use voluntary consensus standards in lieu of government-unique standards except where inconsistent with law or otherwise impractical. It also provides guidance for agencies participating in voluntary consensus standards bodies and describes procedures for satisfying the reporting requirements in the Act. The policies in this Circular are intended to reduce to a minimum the reliance by agencies on government-unique standards. These policies do not create the bases for discrimination in agency procurement or regulatory activities among standards developed in the private sector, whether or not they are developed by voluntary consensus standards bodies. Consistent with Section 12(b) of the Act, this Circular directs the Secretary of Commerce to issue guidance to the agencies in order to coordinate conformity assessment activities. This Circular replaces OMB Circular No. A-119, dated October 20, 1993.

[70] For more information: http://www.nist.gov/standardsgov/nttaa.cfm

[71] Source: http://www.nist.gov/standardsgov/omba119.cfm

Annex 6. MOU between ANSI and NIST[72]

A6.1 - 1.0 Purpose

1.1 The underlying purpose of this Memorandum of Understanding (MOU) is to enhance and strengthen the national voluntary consensus standards system of the United States and to support continued U.S.A. competitiveness, economic growth, health, safety, and protection of the environment.

1.2 The National Institute of Standards and Technology (NIST) of the Department of Commerce and the American National Standards Institute (ANSI) agree on the need for a unified national approach to develop the best possible national and international standards, as reflected by the U.S.A. National Standards Strategy adopted by ANSI on August 31, 2000. This approach requires the best technical efforts of the United States in standards to ensure that our needs and interests are considered as national and international standards are developed, so that our international competitiveness is strengthened.

1.3 ANSI and NIST agree on the need for better communication within and between the private sector and Federal Government on voluntary standards and conformity assessment. There is a need to ensure the timely flow of relevant information about developments that affect those interests, and for improved liaison to facilitate decision-making and implement actions on standards and conformity assessment at the national and international levels. It is also critical that affected U.S.A. Government agencies are encouraged to contribute to the development and implementation of national and international voluntary standards.

This MOU is intended to facilitate and strengthen the recognition of ANSI as the representative of U.S.A. interests at the international level by all participants, improve domestic communication and coordination among both private and public sector parties in the United States on voluntary standards issues, and increase the effectiveness of U.S.A. Government agency participation in the national and international voluntary standards-setting process. It is also intended to facilitate the implementation by both parties of the National Standards Strategy.

A6.2 - 2.0 Agreement

2.1 ANSI is the recognized U.S.A. member body to the International Organization for Standardization (ISO), and, through the U.S.A. National Committee, to the International Electrotechnical Commission (IEC). It is also the U.S.A. member body to the Pacific Area Standards Congress (PASC), the Pan American Standards Commission (COPANT), and the International Accreditation Forum (IAF). As the U.S.A. representative to these bodies, ANSI shall participate in the related policy-making groups and committees of ISO, IEC, PASC, COPANT, and IAF, and shall convene delegations and appoint technical groups of a broad spectrum of experts to represent the United States voluntary standards community in the deliberations of relevant Boards, ad hoc groups, individual Technical Committees, and Working Groups of these organizations.

2.2 ANSI and NIST agree to provide a communications conduit between the voluntary, private sector, and government standards and conformity assessment interests. They will work together to ensure the

[72] Source: http://gsi.nist.gov/global/docs/ANSINISTMOU2000.pdf

flow of relevant information about developments that affect those interests, and provide a liaison service to facilitate decision-making and implementation of needed actions at the national and international levels.

A6.3 - 3.0 ANSI Responsibilities

3.1 ANSI is responsible for ensuring that U.S.A. interests are represented at all policy and technical levels within ISO and IEC. It must convene accountable and competent delegations to develop and present U.S.A. positions for all ISO and IEC committees for which the United States holds Technical Advisory Groups, including ISO and IEC Council and ISO General Assembly committees. It will encourage strong and effective participation by appropriate U.S.A. stakeholders in all relevant committees, subcommittees, and working groups. ANSI will facilitate the building of consensus on standards issues and provide information about international standardization activities. ANSI is responsible for ensuring that the various U.S.A.-based Standards Developing Organizations (SDOs) are informed about ISO and IEC activities and given every opportunity to participate. ANSI shall take into account the positions of all affected interests and shall work with them to develop and promote a single, coordinated U.S.A. position in all activities of the international, non-treaty organizations referenced in 2.1.

3.2 This MOU recognizes the desirability of direct cooperation among ANSI, SDOs, and any given Federal agency. Cooperation among domestic entities responsible for standards is essential to ensure the international competitiveness and effective representation of U.S.A. interests in private international standards organizations. The intent of this MOU is to recognize ANSI as the focal point for the exchange of information and development of representative U.S.A. positions for consideration at the international, non-treaty voluntary organizations referenced in 2.1.

3.3 ANSI accredits SDOs to develop and publish American National Standards in accordance with the principles of openness, balance of interests, due process, and consensus. ANSI works through its accredited standards development process to avoid duplication and overlap in proposed standards. ANSI is further responsible for approving proposed standards as American National Standards, and thereby meeting the obligations of the World Trade Organization Code of Good Practice.

3.4 ANSI accredits Management Systems Registrars and Product Certification Organizations in accordance with the relevant ISO Committee on Conformity Assessment guides and standards.

3.5 ANSI implements the National Standards Strategy through consultation with SDOs, industry, consumers, and government agencies.

A6.4 - 4.0 NIST Responsibilities

4.1 NIST's role, under the *National Technology Transfer and Advancement Act of 1995* (Public Law [P.L.] 104-113) and as delegated by the Secretary of Commerce in the *Office of Management and Budget Circular A-119* and the *Trade Agreements Act of 1979* (P.L. 96-39), is to coordinate Federal activities in voluntary standards and to ensure adequate representation of U.S.A. interests in all relevant international standards organizations. NIST coordinates standards activities with responsible government agencies to use voluntary standards to the extent practicable, to participate appropriately in their development, and to ensure that they meet Federal agency needs. This MOU recognizes the responsibilities of individual

agencies and does not preempt the responsibility of any Federal agency or take away any authority from any Federal agency to pursue its legislated regulatory programs.

4.2 NIST develops and implements means for facilitating, coordinating, and communicating information on voluntary standards activities among government agencies. NIST ensures that Federal agencies are aware of and support ANSI activities within ISO, IEC, or other private sector, international non-treaty standards and conformity assessment bodies such as COPANT, PASC, and the IAF. Finally, NIST will encourage agencies to use ANSI accredited SDOs to the extent feasible.

4.3 NIST facilitates information exchange between Federal agencies and the private sector on voluntary standards activities, using electronic means of communication to the extent feasible. It works with ANSI, Federal agencies, and the private sector to ensure that U.S.A. interests can participate appropriately in international standards activities to enhance U.S.A. international competitiveness. NIST provides technical experts to participate in the standards development process, both nationally and internationally, and encourages appropriate participation by other Federal agencies.

4.4 NIST recognizes accreditation programs for U.S.A. private sector conformity assessment activities in accordance with the National Voluntary Conformity Assessment System Evaluation Program (15 CFR Part 286). For laboratory accreditation programs, NIST accepts those laboratory accreditation bodies found competent by the National Cooperation for Laboratory Accreditation (NACLA) recognition process in accordance with the terms of the NIST-NACLA MOU, signed July 13, 2000.

A6.5 - 5.0 Strategies

5.1 NIST and ANSI will work on appropriate strategies for the success of the short- and long-term national goals for standards and conformity assessment, outlined in this MOU.

5.2 ANSI will support implementation of the National Standards Strategy and will meet U.S.A. obligations in ISO, IEC, COPANT, and PASC.

A6.6 - 6.0 Other Agreements

This MOU does not take precedence over any other MOUs that ANSI may have with individual Federal agencies such as the Occupational Safety and Health Administration, or that NIST may have with other private sector bodies.

A6.7 - 7.0 Annual Meeting

The Director of NIST, ANSI's Chairman of the Board, and ANSI's President and Chief Executive Officer agree that they and other appropriate representatives from their organizations shall meet annually to review this MOU and its implementation.

A6.8 - 8.0 Termination

Either party may terminate this agreement with written notice to the other party.