

1(6) Role of Voluntary Consensus Standards in International Standardization and Comparability of Meteorological Observing Systems

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ABSTRACT

At least two international voluntary consensus standards organizations, ISO and ASTM International, have subcommittees for meteorology that are developing and maintaining standards on testing of meteorological equipment. WMO holds a Liaison status on the ISO subcommittee, and has encouraged further progress in this area. Meteorological consensus standards are referenced by various regulatory organizations as a basic source of information on defining meteorological equipment characteristics and testing methods. The testing can apply to the primary development stage and also to subsequent testing to ensure continued proper operation. The standards provide an international common basis for equipment procurement specifications, evaluation protocols, and guidance on observation methods. Proposals for increased involvement by technical experts from member organizations to make further progress in developing standards are provided.

1.0 INTRODUCTION

The international meteorological community faces a substantial challenge in harmonizing observations typically made by governmental organizations working to national-level requirements and guidance. Even within some national organizations, differences can exist between procedures controlling observations made for different purposes, such as synoptic observations for forecasting purposes and careful documentation of conditions at sites intended to identify climatic changes. WMO guidance, discussed below, is a solid step in this harmonizing. Yet the meteorology field is only slowly catching up with much of the international commerce sector, in that true consensus standards have greater legal strength in some circles than does guidance. The fact that this meeting's primary topic (To Promote and Facilitate International Standardisation and Compatibility of Meteorological Observing Systems used by Members within the WMO Global Observing System to Improve Quality of Products and Services of Members) is stated as such seems to validate the statement that we still face challenges in ensuring compatibility of observations.

2.0 BACKGROUND

In the mid 1980's, WMO staff, representatives of conscientious manufacturers of meteorological equipment, and other dedicated individuals who all recognized the essential need for improvements in the quality of meteorological measurements made for a variety of purposes, identified the need to develop international consensus standards for meteorological measurements. Some national consensus standards organizations had developed their own standards in meteorological measurements, but the need for a subcommittee within the International Organization for Standardization (ISO) was recognized. Perhaps the fact that many nations had their own versions of standards is one reason why WMO encouraged this group of dedicated measurement experts to form an ISO subcommittee to develop consensus standards by a group that represent the world-wide international community. The small group worked with ISO staff in Geneva, Switzerland and formed Technical Committee 146 (Air Quality) Subcommittee 5 (Meteorology), ISO TC146/SC5. The Chair and Secretariat positions on SC5 have been occupied by experts from the USA, though significant contributions efforts have been made by German, French, and British members. SC5 is pleased to report the recent advancement in participation by our Asian colleagues from China and Japan. One more international organization deserves acknowledgement for promotion of participation in SC5 by international manufacturers of hydro-meteorological equipment, namely the Association of Hydro-Meteorological Equipment Industry, HMEI, based in Geneva, Switzerland.

Early progress on developing standards within SC5 was slow compared to other sectors of ISO that are made up of representatives from large companies with strongly vested commercial interests in international compatibility. Prior to today's powerful electronic communication tools, working together on draft standards meant people from small organizations traveling across the globe and sitting in small hotel meeting rooms, sometimes in locations with conflicting opportunities for observations of meteorological and oceanic features. SC5 is now responsible for three ISO standards and at least two more draft efforts which are discussed below. The only factor holding back producing more standards is participation by international experts who recognize the value of consensus meteorological measurement standards within ISO.

SC5 currently has 12 participating countries, and 11 observing countries. The primary difference between participating and observing is the higher level of voting status held by participating countries. SC5 has six working groups which are generally built around the technical areas such as wind instruments, temperature shields, etc. The three active ISO standards are:

- ISO 16622 on the use of sonic anemometers/thermometers for mean wind measurements
- ISO 17713-1 on wind tunnel test methods for rotating anemometer performance, and
- ISO 17714, test methods for comparing the performance of thermometer shields/screens.

Two draft standards are currently being developed. One will be ISO 17713-2, wind tunnel test methods for wind vanes. The other will be a visual range measurement technique using Lidar. The best source for detailed information on the structure of SC5 and the standards is the ISO web site, under technical committee 146 (air quality) and subcommittee 5 (meteorology).

We would be remiss not to mention other sources of meteorological standards. The organizations mentioned here are most familiar to the authors; other nations also have strong standards programs that include some in meteorology. One example is ASTM International, which is based in the United States of America (USA). ASTM subcommittee D22.11 administers 13 active standards, primarily in the field of sensor testing and specifications. Another example is the

cooperative work between the Standardization Administration of the People's Republic of China (SAC) and the China Meteorological Administration (CMA). CMA is responsible for drafting national and professional standards in meteorology in China. Since 1998, CMA has produced more than 100 professional standards, and over 200 more are in the drafting period. The role of China in ISO TC146/SC5 was recently advanced to the Participating member category. Talks are also underway to consider the China representatives to become involved in the ISO "twinning" process to share administration of the subcommittee.

3.0 WMO AND THE INTERNATIONAL STANDARDS COMMUNITY

The relationship between WMO and ISO dates back to 1954 when ISO was granted consultative status by the WMO Executive Council. WMO has held Liaison status with SC5, and has participated in some SC5 activities. ISO and WMO are currently working on a draft arrangement between themselves aimed to strengthen developing international standards and to avoid duplicating related standards. This step will require mutual caution by both groups. Some of the strength of consensus standards arises from the rigorous process used to develop the standards. WMO is highly respected for the guidance it produces, and ISO could be well advised to use the carefully developed technical material produced by WMO. Ultimately the ISO standards are tools of commerce, with applications broader than those within the WMO scope. So while the goal of harmonizing may be a duet, it is well to mind that there are two performers with different musical parts.

WMO staff and representatives of the Commission for Instruments and Methods of Observations (CIMO) have participated in SC5 efforts, and have encouraged the work of SC5 in developing international consensus standards. CIMO is best known to some for the classic reference document, WMO No. 8, Guide to Meteorological Instruments and Methods of Observations. Revision 7 to the WMO No. 8 Guide was released August 2008, showing on-going WMO efforts to bring the latest technology information to the field of meteorological observations for the stated purposes. Some specific portions of this Guide are discussed below to help clarify the potential relationship between the Guide and ISO Standards administered by SC5.

In Section 1.1.1 of Part I in the current Guide, the general purpose of the Guide is stated to support observation activities by "...giving advice on good practices for meteorological measurements and observations". Later sections the Guide on various measurements consistently direct users to other sources of advice, including national practices, and national and international standards. Part III, Chapter 4 on Testing, Calibration and Intercomparison refers to a purpose of WMO stated in Article 2(c) of the WMO Convention: "to promote the standardization of meteorological and related observations..." The Section goes on to state "National and international standards and guidelines exist for many aspects of testing and evaluation, and should be used where appropriate". Some references are made to some International Standards Organization (ISO) standards, though the Guide could use specific references to existing ISO standards on meteorological measurements, and to utilize these references to cover the basic specification and testing topics instead of separately covering that in Guide No. 8. This approach has been used successfully in some national standards and guidance in the United States, referencing standards produced by ASTM International.

4.0 RECOMMENDATIONS

The recommendations below are intended to be constructive statements about ways that meteorological measurement experts in the WMO, ISO and other organizations involved in meteorological standards can improve their communication and effectiveness in advancing the role of international standardization in meteorological and climatic observing systems.

First, it is time for the technical experts involved in WMO/CIMO and ISO TC146/SC5 to make real progress in communicating with each other on working directions and, and to agree on the role that ISO meteorological standards can play in the WMO mission.

Second, one step by WMO could be for the next revision to Guide No. 8 to be structured to acknowledge and utilize the ISO meteorological standards on equipment performance test methods by way of reference, rather than by separately developing these types of test methods. The Guide could still specify the frequency of testing, documentation requirements, and other quality aspects of the testing to suit WMO purposes.

Third, interested parties need to actively recruit experts from manufacturers, the user community, and academia who are willing to develop the much needed standards. You may contact one of the authors of this paper, or visit the ISO web site under technical committee TC146, subcommittee SC5, or the ASTM International web site under committee D22, subcommittee D22.11.

Finally, this paper is dedicated to the memory of the late Mr. Thomas J. Lockhart, CCM, CMet, who was an early pioneer in improving the quality of meteorological measurements. His vision and motivation provided much of the momentum that continues to keep this effort moving forward.