STANDARDS AND SURVEYORS: FIG'S PAST AND FUTURE RESPONSE

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ABSTRACT

It is now four years since FIG's Task Force on Standardisation began its work in earnest at the FIG Congress in Brighton in 1998. The ending of a quadrennial is an appropriate time at which to reflect on work achieved and remaining challenges. 2002 is also likely to see a recasting of the Task Force into some more permanent organisational form within FIG. This paper can therefore be seen as a report on the work of the Task Force (successes and failures) and a summary of the outstanding work for its successor.

Some elements of this paper have appeared before in a variety of guises – in conference papers, in journal articles, on the FIG website, in FIG input to standardisation bodies, and so on. No apology is made for repeating relevant work already published: one of the key lessons from the four years of the Task Force's existence is that repetition of key facts and issues is essential if the dry and apparently peripheral topic of standards and standardisation is to be properly recognised as one of the most crucial issues for surveyors in the early years of the twenty-first century.

The discussions in this paper must, of course, be set within a social, technological, economic, political and environmental context. Many summaries of recent developments on these fronts can be found in the pages of journals and other media. An overview of issues pertinent to surveyors is given by Greenway (2000). In summary, the rapid advance of technology and increased customer expectations point to the need to specify required results and methodologies clearly. In addition, as professionals, we have staked a claim to provide an expert service of value to *society* (rather than simply to our 'customer'). We therefore have responsibilities to clients, employers, colleagues and the general public. The often-conflicting expectations of these elements reinforce, for professionals, the need for clear statements of how and what. A common language is needed for this dialogue. Standards attempt to provide this language, so providing reassurance to all stakeholders.

A further profound change in the business environment is the globalising of the world's economy. Our duty as a profession (if not individually), therefore, is to the international community. This reinforces the need for us to view issues internationally, rather than regionally or nationally. This in turn raises the profile of international standards rather than their regional or national equivalents (a trend clearly seen in standardisation work in the last decade); and the role of international professional bodies such as FIG.

This paper sets out the importance of standards and standardisation, summarises the information gathered and conclusions drawn by FIG to date, and moves on to plans for the future. In doing so, it paper provides further explanation of how, and where, surveyors must overcome shortcomings in the standardisation process so as to benefit all of the stakeholders of the profession of surveying.

In summary, standards provide a tool which can help us meet the various demands on us a profession. As posited by the chairman of the ISO Committee for Consumer Protection (Ringstedt, 2001), '[complaints] can be substantially reduced by the provision of comprehensive, comparable and transparent information… Global standards can have a direct impact on the market, on society and on prosperity. Widespread adoption of International Standards in the field of services would mean that suppliers could base the development of their activity on specifications that have worldwide acceptance. This would be to the advantage of both consumers and businesses.' Standards are therefore of great relevance (however dry they may seem) to us as individual practitioners; and we rightly have an expectation that our professional bodies (particularly international bodies such as FIG) will provide us with a clear lead and guidance in this area.

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1. WHY ARE STANDARDS IMPORTANT?

This is perhaps the most fundamental question which this paper must answer. There are perhaps three ways in which to make a case that standards *are* important.

Firstly, the breadth of standardisation activities. To put some numbers on this, the International Organisation for Standardisation (ISO) has 135 national standardisation bodies as members, and 2,867 technical bodies. At the end of 1999, there were 12,524 ISO standards in print, amounting to 356,427 pages. The current standard set includes:

- ISO 2172 – Fruit juice – determination of soluble solids content – Pycnometric method
- ISO 2729 – Woodworking tools – chisels and gouges
- ISO 6806 – Rubber hoses and hose assemblies for use in oil burners – specification
- ISO 8192 – Water quality – test for inhibition of oxygen consumption by activated sludge
- ISO 11540 – Caps for writing and marking instruments intended for use by children up to 14 years of age – safety requirements
- ISO 12857 – Optics and optical instruments – geodetic instruments – field procedures for determining accuracy

Secondly, there are the benefits of standardisation. Recent research undertaken by the Technical University of Dresden and the Fraunhofer Institute for Systems and Innovations (DIN, 1999) found that:

- The benefit to the German economy from standardisation amounts to more than US$ 15 billion per year;
- Standards contribute more to economic growth than patents and licences;
- Companies that participate actively in standards work have a head start on their competitors in adapting to market demands and new technologies;
- Transaction costs are lower when European and International Standards are used; and
- Research risks and development costs are reduced for companies contributing to the standardisation process.

These figures provide a very significant justification for standardisation – but point to the very real need to ensure that the process works as effectively as possible, producing workable, timely documents that ease the processes of trade and commerce, and benefit suppliers, purchasers and citizens – a small inefficiency in any stage of the processes will significantly reduce the economic and related benefits.

Thirdly, at a very practical level, the attendance of each delegate at this meeting required standardisation in very many fields: in telecommunications, to ensure that our booking forms were received correctly; in aeronautics, to ensure that safe and efficient fuel was used in the aeroplane; in IT, so that overheads could be projected successfully by speakers. Perhaps the difficulties caused by the lack of standardisation in some areas make the benefits more clear: how many times have any of us forgotten our international plug adapter and been unable to charge electronic equipment in another country? And how often have we all been frustrated (or worse) by the American insistence on using a different standard paper size (and a different measurement system) from the rest of the world?

Turning more specifically to the field of surveying, many of the disciplines within the profession have not to date been subject to *de jure* international standards. Some standards have existed for land survey instruments (for instance ISO 12857 cited above), but these have not been widely used. In the valuation field, national standards have long existed for the process of valuing a building. For the suppliers and users of geographic information, however, this is a very important time, with the continuing publication of standards in the series ISO 191xx being developed by ISO Technical Committee (TC) 211, covering a broad range of issues relating to geographic information. Further information on the work of TC211 can be found in Hothem et al (2001) and Ostensen (2001) or from the TC211 web site. Particularly through TC211 (but also through other activity mentioned later in this paper, including in the valuation area), standardisation is therefore becoming increasingly relevant to the surveying profession.

The German research referred to above shows the potential positive power of standards. Such positive results, however, do not occur without effort by the stakeholders of the field in question. The next issue to address, therefore, is the identity of the key actors in the standardisation process.

2. WHO CREATES STANDARDS?

There are many organisations creating standards. This section provides some information on the main players.

ISO is the key player in international official standards. The International Organisation for Standardisation (ISO) is a worldwide federation of national standards bodies from 135 countries. It was established in 1947. The mission of ISO is *to promote the development of standardisation and related activities in the world with a view to facilitating the international exchange of goods and services, and to developing co-operation in the spheres of intellectual, scientific, technological and economic activity*. ISO's work results in international agreements which are published as International Standards.

The official goals of ISO are to facilitate trade, exchange and technology transfer through:

- enhanced product quality and reliability at a reasonable price;
- improved health, safety and environmental protection, and reduction of waste;
- greater compatibility and interoperability of goods and services;
- simplification for improved usability;
- reduction in the number of models, and thus reduction in costs; and
- increased distribution efficiency and ease of maintenance.

National standardisation bodies are generally government-run or supported in part, in recognition of their work in supporting free competition, trade and public order. Their key tasks are the production of national standards where this will support the national economy and/or protect citizens, and the promotion of the use of relevant international standards – with the growth of global trade, the latter role is increasingly important and fewer national official standards are being produced. They are generally encouraged to cover part of their costs through selling materials, offering certification services, etc. In addition to national and international standardisation bodies, there are some regional standardisation bodies such as Comit■ Europ■en de Normalisation (CEN) for Europe. Increasing globalisation is reducing the general impact of these bodies.

A number of other international standardisation bodies exist, the most relevant of which for surveyors is the International Valuation Standards Committee (IVSC). The IVSC was founded in 1981 and its membership comprises professional valuation associations from around the world, with almost 50 countries currently represented. IVSC's objectives are *'to formulate and publish, in the public interest, valuation Standards for property valuation and to promote their world-wide acceptance; to harmonise Standards among the world's States; and to identify and make disclosure of differences in statements and/or applications of Standards as they occur'*.

In July 2000, the IVSC published the International Valuations Standards 2000 (IVS 2000), the first publication under the three-year IVSC Standards Project. This project began in January 2000 and aims to have produced, by 2002, *'a set of comprehensive and robust international*

standards that will facilitate cross-border transactions involving property and contribute to the vitality of global markets by promoting transparency in financial reporting'.

Moving to the field of legal standards, national governments are important sources of regulations for cadastral surveyors, in their role as protectors of the right to hold land (on which so much economic development and stability depends). As with official standardisation activities, such laws can lag significantly behind technical developments and, through setting input controls, can inhibit effective use of resources.

A whole raft of other legislation affects surveyors as business people and employers, for instance legislation on health and safety, taxation, etc. The move to globalisation has also affected legislation, with the role of the European Union being the prime example. At a global level, the Organisation for Economic Cooperation and Development (OECD) attempts to spread good practice around the world. In the surveying field, organisations such as EuroGeographics attempt to ensure that European National Mapping Authorities work together to best effect.

Commercial firms are becoming increasingly important in the development of *de facto* standards. Microsoft (MS) is a classic example – other software manufacturers need to ensure that their programmes interface successfully with Windows and other MS products if they are to be successful.

A number of other international bodies have an interest in standardisation activities. Of particular interest in the surveying arena are:

- The OpenGIS Consortium (OGC), a commercial body representing the manufacturers of GIS hardware and software, and the providers of geographic data. As its name suggests, the OGC is working towards the adoption of open standards, allowing the flow of data between different GI systems;
- The International Cost Engineering Council (ICEC) which created an International Standards Working Group in 2000 *'to promote and manage the development and promulgation of world-wide best practices and/or standards in cost management as represented by the fields [of] cost engineering, quantity surveying and project management';*
- The International Hydrographic Organisation (IHO) which creates international standards covering hydrography; and
- The International Association of Geodesy (IAG) and the International Cartographic Association (ICA), which have both in recent years increased their focus on standardisation activities and adjusted their structures accordingly, and the International Society for Photogrammetry and Remote Sensing (ISPRS).

The World Trade Organisation (WTO) is a very interested party in standardisation. The WTO, based in Geneva, has more than 130 governments as members, between them accounting for over 90% of world trade. It is the only international organisation dealing with the global rules of trade between nations. Its main function is to ensure that trade flows as smoothly, predictably and freely as possible. It does this through the creation of trade agreements, which

are ratified by members' parliaments. The result is assurance: consumers and producers know that they can enjoy secure supplies and greater choice of the finished products, components, raw materials and services that they use. In addition, producers and exporters know that foreign markets will remain open to them. The result is, in theory, a more prosperous, peaceful and accountable economic world. The missions of ISO and WTO point to their needing to co-operate – standards underpin free trade and they need to work together to achieve this. This is formalised in the Agreement on Technical Barriers to Trade (TBT), which sets out how international standards should be used by governments to facilitate trade.

3. THE VOICE OF THE SURVEYOR – WHY IS IT NEEDED?

This question might most effectively be addressed by starting with the shortcomings in the standardisation process. The shortcomings are seen increasingly clearly by ISO (and by other standardisation bodies), and are well encapsulated by ISO's Strategies 2002-04 (for more information see ISO, 2001). These strategies are:

- 'Making a dream come true: one standard, one test and one conformity assessment process accepted everywhere;
- Assuaging anxiety about globalisation;
- Consolidating and promoting the position of [the main standardisation bodies] as the primary source of International Standards in the WTO context;
- Deciding on further steps for developing countries to participate more effectively in international standardisation work;
- Attracting more effective representation of consumers and social forces in standardisation;
- Ensuring market relevance; and
- Increasing the knowledge of all those participating in the ISO process at all levels.'

Key responses to many of these challenges are significantly supported by the involvement of practitioners (including surveyors). Such involvement will:

- Broaden the base and the knowledge of those involved in the standardisation process as to what material already exists and can be incorporated, and what initiatives for developing commonality are already underway;
- Shorten the timescales needed to develop standards, allowing them to respond more quickly to market requirements; and
- Coalesce the key elements of standards users within the main standardisation bodies, allowing issues to be resolved during the development of standards, rather than through a revision (or avoidance) process.

FIG as an organisation is able to participate in the activities of standardisation bodies. With some of the newer bodies, informal processes suffice but ISO formally recognises Liaison bodies. Such organisations can participate fully in the process of developing standards, with the single exception that they do not have voting rights (whereas national standardisation bodies – the members of ISO – do have such rights). There are currently over 500 liaison bodies recognised by ISO, including Consumers International, the European Aluminium Association, the International Association of the Manufacturers of Stocks and Soups, and Visa International. In the surveying field, FIG, ICA, IAG and ISPRS are all registered as Liaison bodies to ISO and are active (to differing extents) in relevant ISO activities. Further details of

the way in which ISO operates can be found in Greenway (2000, 2001) and in the FIG Guide on Standardisation (FIG, 2002).

4. FIG's RESPONSE – PAST

Following representations from various internal communities as to the importance of standards for surveyors, FIG decided to establish a Task Force on Standardisation. The Task Force started work in earnest in 1998. It created a work plan which covered a wide range of activities. A key input to the work plan was a questionnaire on standards, distributed to FIG member associations and others in early 1999. Over 50 responses were received, a very heartening result. The results provided information on the priorities of FIG members. In summary, the following points are worthy of note:

- The important geographical level for standard setting was seen to be international (ISO); two regional bodies were mentioned – CEN in Europe and PASC covering Asia and Australia – but these were seen as of declining importance in surveying fields.
- The key ISO activities were seen as those in Technical Committees 59 and 172 (on survey instruments), TC211 (Geographic Information/ Geomatics), and TC204 on transport information and control systems.
- The ISO standards in greatest use amongst surveyors were the ISO 9000 series on quality management, those on modelling languages, and those defining entities such as codes, dates and time.
- The key relevant activities of national standards bodies reported in the questionnaire replies were data exchange standards, tolerances, digital maps, and GIS standards.
- In the arena of *de facto* standards, exchange formats such as DXF and RINEX were particularly mentioned.
- The focus proposed for the Task Force was to gain more influence in ISO TC211, to ensure that practitioners have more impact as standards are developed, and to make surveyors more aware of existing standards (so as to avoid duplication of effort).

The Task Force has spent much time understanding how ISO works (recognising that the scale and scope of ISO's operations dwarfs that of most other standardisation bodies). This has included active involvement in ISO TC 211, attending meetings, commenting on work in progress, and reporting on FIG activity. The impetus behind TC211's work is the ability that technology has brought to manipulate and combine geographic information (information which forms the basis of around 80% of decision-making). It is therefore essential to have rules and protocols for global use in such manipulation and combining, if erroneous results are not to be created. The survey community, as a key creator (and user) of geographic information, is a vital contributor to the process of developing and promoting the TC211 standards.

FIG has a longer history of involvement with ISO TCs 59 and 172 covering the general field of survey instrumentation. Professor Jean-Marie Becker (Chair of FIG Commission 5) is actively involved in this work, attempting with a good degree of success to simplify the current standards and make them more relevant to practising surveyors (for more information, see Becker et al, 2000 and Zeiske, 2001).

Another particular success for the professional surveying associations in the last few years has been to turn the proposed ISO standardisation work on the qualification and certification in the geographic information area (ISO project 19122), into an informative report (Knoop, 2001). FIG's increased understanding of the workings of ISO and how most effectively to lobby it had a significant impact in this case, with the decision to alter the status of the work being taken after a meeting at the FIG Congress in Brighton in 1998. Following further active and constructive participation by FIG, the draft report's recommendations are that the work of certification and qualification is best left to international professional bodies. This success therefore presents a challenge to the profession to act in this area.

Compare this with a similar situation in the area of valuation, where a registration process is now being put in place in Europe under EuroNorm (EN) 45013, whereby a body who has passed accreditation under the Norm must then apply to TEGoVA (the European Group of Valuers' Associations) to be 'Approved by TEGoVA' – being a professionally qualified valuer/ surveyor is no longer sufficient for some clients. This development will have a profound effect on the valuation market in Europe. It is a development in which professional bodies have not taken a strong part, and the outcome is likely to be to the detriment of valuers and other stakeholders.

During 2000 and 2001, FIG has also been working closely with IVSC, to gain a voice in the process of developing international valuation standards. IVSC is a much younger and less complex body than ISO and more rapid progress has therefore been possible, with the professional surveying community seen as providing an important input to the process and being invited to do so. This will, hopefully, lead to a formal recognition of this role for FIG within IVSC in the near future.

Working with ISO and IVSC, and within FIG, the Task Force has developed an FIG Guide on Standardisation, to provide a clearer understanding of how professional bodies such as FIG can influence the development of standards. The Task Force also proposed the FIG Statement on the Cadastre (FIG, 1995) to ISO for fast tracking to become an international standard. It has not been accepted for fast-tracking, on the basis that it is a field generally covered by national legislation. Working with TC211, therefore (and supported by a formal TC211 resolution), FIG Commission 7 has included in its plans for 2002-06 to use the area of the cadastre as a 'test bed' for the TC211 standards, to ensure that they support this vital area and to highlight any additional need for standards in this area.

The Task Force is also currently considering what other FIG material might be suitable for fast-tracking. One active area at the moment is on determining how the FIG Multi-Lingual Dictionary can be consolidated to best effect with ISO terminology activity in the surveying field (see Graeff, 2001). A number of meetings have taken place to discuss this area further, and a good working relationship has been established.

On the educational side, the Task Force has set up an area of the FIG web site and maintains it, providing information on current standardisation activities. The number of papers about standards activities at FIG meetings is also increasing, as the topic gains profile in the surveying community.

At this stage, it is fair to say that FIG's increased focus on standardisation has created a higher profile for FIG within this field, and for standardisation within FIG. A number of strong personal relationships have been developed, providing a good basis on which to build strong institutional relationships. Much greater coordination of activity, within and beyond FIG, is however needed to build the efforts to date into meaningful, concrete progress. FIG's resources are limited, and a clear focus throughout FIG, and with its sister societies, is therefore essential if progress is to be made.

5. FIG's POLICY

In light of the learning to date, FIG has created a policy on standardisation. The key parts of that policy read as follows:

'Overall, FIG's aim in the field of standards is to assist in the process of developing workable and timely official and legal standards covering the activities of surveyors. FIG is also committed in its objectives to developing the skills of surveyors and encouraging the proper use of technology, activities which are becoming increasingly shaped by standards.
FIG will generally seek to ensure that *de facto* standards become official standards as technology matures, or at the very least that all relevant official, legal and *de facto* standards are produced in full knowledge of all other related material.

FIG sees the following roles for professionals in the standardisation process:

- Assisting in the production of workable and timely standards by proposing material which can be transformed into international standards (rather than relying on work developed by others) and by participating in the process of developing standards; and
- Disseminating information and creating explanatory material and guidance notes to ensure that all members of FIG are aware of the most recent standardisation activities, standards and regulations, and their implications for surveyors.'

6. NECESSARY STRANDS OF ACTIVITY

As described in the previous sections, some solid work has been done in a number of areas since the creation of the FIG Task Force. For the future, there are a number of key tasks for the Task Force's successor. The general areas are summarised in this section; further information is available in the FIG Guide on Standardisation (FIG, 2002).

6.1 Interpreting and promoting published standards

Standardisation work items have to progress through a complex and lengthy process before they become published standards. It is unrealistic for FIG to be able to control the progress of individual standards. FIG should, however, be well aware of the needs of its 250,000 individual members and can therefore expect standardisation bodies to listen to it. To achieve the greatest degree of success, therefore, FIG needs to coordinate its efforts, and to recognise the needs of the standardisation bodies as well as those of FIG's members.

Standards tend to be fairly dry documents, with lengthy glossaries and definition sections. It is unlikely that the average person in the street or even the average professional has read any

standards, or is aware first hand of their requirements. For further advice, individual practitioners will often turn to their national professional association. In turn, they will often look to international bodies to provide guidance to them, and so FIG and in particular its Commissions need to ensure that they are fully aware of key standards and are able to provide timely guidance to FIG's Member Associations on necessary activity and priorities. In this way, FIG can provide a service to its Member Associations, can avoid duplication of effort at a national level, and will be well placed to feed back suggestions for improvement to the relevant standardisation body. This activity is particularly relevant currently to the work of ISO TC211, and of TC59/ TC172.

Another role for national and international professional associations is the pooling of best practice, which may often be ahead of the content of standards. For instance, many professional institutions produce best practice material which can be used by all practitioners and clients as a basis for defining requirements. FIG is keen to spread knowledge of such documents, developed by individual member associations, throughout its membership.

6.2 Influencing the existing work programmes of standardisation bodies

FIG needs to coordinate the inputs it makes to the creation and development of standards by the various standardisation bodies. This is both at international level (through FIG continuing to work with ISO and IVSC) and at national level (through FIG's member associations lobbying their national standardisation bodies).

At the international level, FIG (as a Liaison body to ISO) can appoint Experts to ISO's working groups. In this way, FIG has commented on a number of the key TC211 documents and has influenced ISO's work on survey instrumentation. Funds, however, are limited, and it is vital to prioritise activity. FIG will therefore focus its activities in the immediate future on TC172/ TC54's work on survey instruments, and certain items of TC211's work (including qualification and certification, terminology, and the marketing of the standards).

It takes time for individuals to understand the sometimes arcane ISO processes and language. It is also vital, if Experts are to have the greatest possible effect and influence, for them to be involved in the relevant drafting activity from the beginning. This means that FIG must maintain an up-to-date list of possible Experts, with their field of expertise. It is also important that the many FIG members who represent their national standardisation bodies in ISO activity are aware of FIG's requirements and views, as they can input views to the process without the need for FIG funding. Influence at a national level is crucial if FIG is to achieve as much as possible with its limited budget, and FIG needs to work further with its Member Associations to determine how to combine activity to best effect.

6.3 Proposing new work areas for international standardisation

The work of ISO grew out of manufacturing. It is therefore of no surprise that the activities of the technical commissions of FIG are well-covered by international standards, even if these at times are out of date or don't allow for new technology. Recent work around the world on national and global spatial data infrastructures has catalysed ISO work (particularly in TC211) in this area but has left open the possibility that such infrastructures will be adversely impacted by standards.

Some of FIG's other Commissions, however, are less well covered by ISO activity and may well be working in areas where there are not international standards, and where they believe that there should be. These are therefore particular areas where FIG can consider the submission of material to ISO for fast-tracking.

In this area in particular, but across its range of work, FIG should continue to review the needs of the market in terms of published standards before drawing up its work programmes, and continue to liaise with the Secretariats and Technical Committees of standardisation bodies over particular gaps in activity. Wherever possible, these gaps should be filled through the development of material by FIG, in close liaison with the relevant standardisation body, so that the completed FIG work can successfully be fast-tracked to become a standard, and so that the timing of the production of FIG's deliverables fits with the needs of the standardisation body (and the market).

6.4 Coordination of activities

It is important for FIG to co-ordinate its influencing and informative efforts with other international NGOs to ensure that the combined efforts are coordinated to best effect. This can probably best be achieved through the Memoranda of Understanding (MOUs) that FIG is developing with sister societies, and FIG should continue to seek to ensure that standardisation issues are covered by such MOUs. A Round Table discussion is planned at the FIG Congress in Washington and this may build into more formal cooperation, including the possibility of joint representations to the ISO Central Secretariat on areas of interest.

Within FIG, the need for an ongoing focus on standards and standardisation is likely (subject to General Assembly ratification) to lead to an FIG Standards Network, consisting of nominated representatives from each of FIG's Commissions. This Network will provide a central coordinating role within FIG on standards issues, providing guidance to Commissions, and maintaining overall FIG's relationship with standardisation bodies. It will also coordinate FIG's relations, with regard to standards, with sister societies. This new arrangement will provide a clearer linkage between Commission activity and standards, whilst building on the centre of expertise in standards that the Task Force has become in the last four years.

7. CONCLUSIONS

It is the author's strong belief that standards are very important to surveyors – the economic benefit to Germany of standardisation to the tune of $US 15 billion per year is clear evidence of the importance of standards to all businesses and professionals.

The process of creating a standard, however, is complex and time-consuming. Many professionals do not give a high priority to understanding the processes, or to getting involved. This means that the standards created can ignore work or documents which have already been produced, and can be unworkable in practice or not taken up because they are produced at the wrong time. The involvement of surveyors in the standardisation process can help to overcome these shortcomings, and therefore to produce more effective documents. ISO recognises this, and allows for the involvement of professional bodies through mechanisms such as Liaison body status, and fast-tracking of documents.

FIG has responded to this need for surveyors to become involved in standardisation processes. The Task Force which was set up to coordinate this activity has learned a good deal over the and has produced various material to assist surveyors in understanding the processes. One of the results is a FIG Guide on Standardisation. The Task Force has also been building links with FIG's national member associations, and with other international NGOs which represent surveyors, to ensure the most effective use of limited resources in this work.

The overall conclusion is that surveyors need standards, and that standards need surveyors. The work done to date, however, is a fragile plant and one which is not naturally of interest to professional businessmen. Continuing effort will therefore be needed to convince surveyors of why they should be interested in, and get involved in, standardisation. FIG intends to continue this work, forming a Standards Network to support its Commissions and Member Associations in their work.

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Further information can be found at the ISO (www.iso.org), WTO (www.wto.org), FIG (www.fig.net), IVSC (www.ivsc.org) and ISO TC211 (www.isotc211.org) websites.

BIOGRAPHICAL NOTE

Iain Greenway joined Ordnance Survey of Great Britain in 1986 after completing an M.A. in Engineering at Cambridge University and an M.Sc. in Land Survey at University College London. During the late 1980s and early 1990s, he worked in geodetic and topographic survey, including short-term consultancies supporting land reform in eastern Europe. After completing an MBA at Cranfield University in 1994/95, which included a term studying at Macquarie University, Sydney, he worked for Ordnance Survey in strategic planning and pricing, sales and marketing, as well as completing a number of management consultancy inputs in Swaziland and Lesotho. He subsequently undertook a secondment to Her Majesty's Treasury, working on the improvement of public sector productivity in the UK.

Since the summer of 2000, Iain has been the Deputy Director of Ordnance Survey Ireland, responsible for much of the day-to-day management of a national mapping agency undergoing profound changes in status, structure, processes and culture.

Iain is a Chartered Surveyor (MRICS) and a member of the Chartered Institute of Marketing (MCIM). He is the head of the RICS delegation to FIG, and Chair of the FIG Task Force on Standardisation and of Working Group 1.2 (Business Practices). He is also a member of the Management and Editorial Boards of the journal Survey Review.

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