# Article

## Intellectual Property, Patents and Web Mapping

***A Historical Perspective on Claiming Innovation***

***By Carl Reed, Ph.D., Open GIS Consortium, Inc. (OGC), USA***

An interesting situation has arisen with respect to Web mapping: certain recently granted patents appear to give the patent owners rights with respect to almost all Web mapping software, as well as location services and Web-based distributed geoprocessing. The prospect of any group of individuals having a 'lock' on such an important set of technologies is disconcerting, to say the least. A review of the history of Web mapping suggests that these patents should never have been granted. It suggests too that they are unlikely to survive a legal challenge. An important step in securing the openness of the Spatial Web, with all its benefits for users, is to have information on prior art and inventions within our industry available to all OGC members and to the public.

There is an increasing emphasis on using the Web and Web Services as the preferred mechanism to deliver geospatial services and data to the end user. In my last GIM International article (July 2002) I discussed the OpenGIS interoperability and technology approach for geospatially-en-abled Web Services developed by the OpenGIS Consortium (OGC). I here discuss prior art, intellectual property and patents related to Web mapping. The situation involving Web mapping illustrates broader issues central to the viability of, and democratic access to, the Internet and the Web.

### Invention

History is critical to resolving issues related to patents. One needs to understand the reason patents are instituted and one also needs to understand the state of the art at the time a patent is applied for. A key issue is whether or not the invention is actually an innovation. I am not against a company protecting the value of its intellectual property. (Neither I nor the OpenGIS Consortium (OGC) is in anyway attempting to restrict the operating and business principals of any organisation. The OGC will not put forth a formal position statement regarding this or any other patent.) At the same time, one must question patents that are directed at the core technologies and growth areas in our industry. In this case, our industry is not in great danger, because the patents at issue are not, in fact, innovations.

### The Problem

In 2000 and 2001, patents related to making maps on the Inter-net called 'Computer system for identifying local resources' were awarded to the UK company MultiMap (European Patent EP0845124B and US Patent US6240360). There is also a patent awarded in Australia. The US Patent has a total of 47 claims and the European patent has a total of 21 claims. The original European Patent PCT (Patent Co-operation Treaty) was filed in August 1996 and granted in May 2000. The US PCT was filed in August 1996, with the formal filing in February 1998, and granted in May 2001. These MultiMap patents claim rights to the technology described as:

> "A map of the area of a client computer is requested from a map server. Information relating to a place of interest is requested from an information server by the client computer. The information is superimposed or overlaid on a map image at a position on the map image corresponding to the location of the place of interest on the map. The information (or 'overlay') server may contain details of, for example, hotels, restaurants, shops or the like, associated with the geographical coordinates of each location. The map server contains map data, including coordinate data representing the spatial coordinates of at least one point on the area represented by the map."

### Validity

The scope of protection provided by a patent is defined by its claims. The validity of the patent thus depends on the definition of the invention provided by the claims. If the invention does not meet the requirements for patent ability (in particular, if it is not a new invention, or would have been obvious at the priority date of the patent application) then the patent is invalid and may be revoked. Patents are defined by their claims, 'the invention' the patent holder asserts they developed. The validity of the patent depends on the definitions with-in the patent. If the invention does not meet the requirements for the granting of a patent (in particular, if it is not a new invention, or would have been obvious at the time the patent application was filed) then the patent is invalid and may be revoked.

### Prior Art

For a patent claim to be valid, the invention has to meet two criteria:

- Novel (new)
- Inventive (not obvious)

These criteria have to be judged against information publicly available at the date the patent application was filed - the 'priority date,' which was for the MultiMap patent 16th August 1995. Any information that was in the public domain prior to that date is known as 'prior art' and may be relevant to the validity of the patent. Any information that became public only after that date does not constitute prior art and does not affect validity. The prior art in this case includes thus any documents that were published before 16th August 1995, including conference papers, dissertations and published patents, as well as any information disclosed through public use or sale of similar systems. It does not, however, include any information that was confidential at that date, for example information arising from prior secret use of a similar system.

**Historical Perspective**

While the use of the Web is relatively new, the use of geography as an integrating framework for analysis and visualisation is not. For example, Guerry studied in 1832 in his 'Essai Sur la Statistique Morale de la France' (Paris) the spatial distribution of criminal activity using shaded maps. He then cross-correlated criminal activity with socio-economic factors to look for trends. In 1854, Dr Snow analysed cholera deaths using a map during an outbreak in London. If one put a Web interface on these two applications, they would not be much different from so many Web mapping applications in use today!

**Web Broker**

While I worked at Genasys, in 1993 and 1994 my company began working with applications that combined HTML forms with access to the GenaMap GIS client server architecture. Working with E-Systems (now Raytheon), we undertook our first Web project in 1994. The pilot project, for the Department of Agriculture, was a Web interface that combined mapping with the ability to search for and find documents of interest for given geographic regions. This was not nearly as sophisticated as the early projects in the 19th century! This work led to the development of the Genasys Spatial Web Broker in 1995. The Web Broker – released commercially in early 1996 – provided access to all the GenaMap vector and raster processing capabilities.

The following three sections provide well-documented referen-ces that represent Web Mapping prior art and invention. These examples were developed, demonstrated, and/or documented before August 1995. All documentation and Intellectual Property Rights (IPR) for these early implementations were placed in the public domain. Further information can be found either on the Web or in the author's personal archives.

**1993 – Xerox ParcMap**

The ParcMap is perhaps the definitive reference for Web Mapping. In June 1993, Steve Putz of Xerox created the ParcMap Viewer, as an experiment to provide interactive information retrieval via the World Wide Web. A paper describing the Map Viewer, which was available on-line from late 1993 until early 2002, was presented in May 1994 at the First International World-Wide Web Conference. The Map Viewer was implemented as a perl script that accepted requests for map renderings and returned an HTML document including an in line GIF image of the re-quested map. The map images were generated on-the-fly by the map writer program, a stand-alone Unix command that produced raster map images from either one of two publicly available vector map databases. Options controlling the map renderings were encoded into the URL strings and passed as command line arguments to the map writer program.

**1994 – Geoweb**

Geoweb is an early and excellent example of documentation and research using the Web for geospatial data sharing, using a clearinghouse and metadata. To prove the concepts outlined in a paper by Brandon Plewe published in the Electronic Proceedings of 'Second World Wide Web Conference '94: Mosaic and the Web' (October 18-20, 1994), the developers organised the Geoweb pilot, a working clearinghouse that demonstrated the concepts outlined in the paper. The paper states:

> "The second interface implemented was a map-based approach, where users can use a map of the United States in a WWW browser to specify the desired area. This map can be zoomed in and out, and panned in any direction, until the user finds the region needed. This is done using a link to the Xerox MapViewer that generates simple GIF-format maps based on user-supplied criteria. The map-browse script receives basic criteria from a query (i.e. 'http://...?lat=40 lon=-90 width=5') and generates an html page including the appropriate MapViewer image, and graphical 'buttons' for panning (i.e. the left button re-requests the same map-browse script, but with lon=lon-width/2 to pan half a screen to the West) and zooming (i.e. 'zoom in' re-requests the script with width=width*2). A small form allows users to enter the three pertinent criteria directly, and there is a link to the above gazetteer interface to center the map on an actual place. Using a combination of the interactive graphics, direct entry, and keyword lookup approaches, the user should be able to easily find the desired region."

**1995 – Tiger Map Surfer**

The Map Surfer (or TIGER Map Service) was built in 1995 as a proof of concept to see what it took to build a basic Web mapping application. It remains on the Web because

there are people who still find it useful today, in spite of its limitations.

**Generic Threat**

There was considerable activity in developing Web-mapping applications in the early to mid-1990s. And, because government agencies did most of this work, it remains in the public domain. The documents referenced for each of these early implementations provide an interesting history of a powerful and then new technology.

The Web mapping patents referenced in this article may be viewed as representative of a generic threat to the Web. If the law favours such patent holders, innovations now enjoyed by the public as part of the commonwealth may become subject to 'tolls'. The danger that other, as yet unknown, patents and intellectual property may emerge has a chilling effect on future innovation. Such a threat may potentially impede the development of true interoperability within the Web environment in general, and the geospatial world in particular. If these particular patent claims threaten to disrupt the already well established and rapidly growing Web mapping market, they need to be addressed by all Web mapping stakeholders.

**Best Practices**

This particular instance is an OGC problem, but it exemplifies a problem faced by all consortia dedicated to IT interoperability. Do the standards and specifications organisations take intellectual property seriously? Yes. Currently, many standards and specifications organisations are reviewing and redefining their process, procedures, and licensing approaches for IPR. The recent market thrust in Web Services has resulted in the issue of IPR (and the patents that protect a company's or individual's IPR) becoming a central concern not just for the OGC but also for other organisations. These include the IETF (Internet Engineering Task Force) and the W3C (World Wide Web Consortium). The OGC has just rewritten its IPR policy. A recent Open Group conference on Web Services had a keynote presentation on IPR and Web Services. The IETF, the grandfather of all the Internet and Web standards and specifications organisations, has set up a working group with the task of updating and clarifying its intellectual property rights policies. The W3C is constantly monitoring its IPR policy and requires that statements about possible patents related to any specification document be identified and documented. And lastly, all of these organisations are now talking to each other about IPR to determine best practices for the organisations, their members and, most importantly, the community.

**Concluding Remarks**

Both the OGC and its members work together to ensure that all of our specifications are unencumbered and therefore freely open and available to all for implementation, without fear of legal and/or financial reprisal.

**Web Sites**

- www.multimap.com
- http://tiger.census.gov/cgi-bin/mapsurfer
- www.ietf.org/html.charters /ipr-charter.html

**Biography of the Author**

Dr Carl Reed obtained his PhD in GIS from SUNY Buffalo in 1979. He is the Executive Director for the OGC Specification Program. Prior to this he held various other positions as independent GIS consultant, VP of Infrastructure Marketing at Intergraph, and President and CTO of Genasys II. He designed and implemented two major GIS packages – MOSS and GenaMap – has published dozens of papers and given numerous GIS conference presentations and keynotes.

*This article has also been published in the July 2003 issue of GIM International.*

# Interview

## 'An Obligation to Say What We Think'

***GIM International Interviews Prof. Dr. Holger Magel, President, FIG***

***By Christiaan Lemmen, Contributing Editor, GIM International***

The FIG Working Week, held in Paris, France from 13th to 17th April 2003, gave occasion for Prof. Dr. Holger Magel for the first time really to address the FIG community. Driven by his long experience in the surveying and land management profession, a desire to contribute to emerging civil societies world-wide and awareness of the successful work of previous FIG councils and FIG achievements in general, Professor Magel urged his audience not to 'rest on our laurels'. The need was instead to work together and look to the future. GIM International interviewed Professor Magel during the ensuing week.

His style is open, clear, to the point and with a feeling for humour. During the Working Week in Paris in which the 125th birthday of the FIG was celebrated (see the July 2003 issue of GIM International) the message of the opening address from Professor Magel was 'He who is not aware of the past cannot cope with the future'. He thus embarked

**Biography of Prof. Magel**

Prof. Dr. Holger Magel graduated in Geodesy from the Munich Technische Hochschule in 1968. He held several positions in the field of Land Consolidation, finally as director general for rural development in Bavaria. He was appointed honorary Professor for Rural Development at the Munich Technische Universität in 1993 and became an Advisor to the European Commission for Rural Development in Eastern Germany in 1992/93 and chairman of the German Bund-Länder Team for Village Renewal from 1984 – 1995.

He has acted as an expert in eastern and southern Europe, as well as in Asia and South America. Professor Magel has to his name about 210 expert publications.

Since 1st January 1998 he has been full-professor for Land Readjustment and Land Development and director of the Institute for Geodesy, Geoinformation and Land Management at the Technical University Munich, where he is Programme Director of the masters programme 'Land Management and Land Tenure'.

Professor Magel is Chairman of the working group for land readjustment and land markets of the highest German scientific institution, the German Geodetic Commission (DGK), and has since 1st January 2003 been President of the International Federation of Surveyors.

upon a new presidential period with the new Council from Germany, responsible for the Munich congress in 2006.

*What are the most relevant issues for the FIG community in the coming years?*

Our motto is 'shaping the change'. This is appropriate because the world and its societies are changing rapidly and so is the profession. The most essential changes for FIG are the continuing processes of democratisation world-wide and increasing commitment of the profession to sustainability and more equity in the world. This must occur in coincidence with the well-known principles of good governance and developments towards civil society. To protect and to develop the profession in both the international and national arena and to assist in the transition towards the already adopted new administrative structure of FIG, the important challenge for the new Council is to shape the change both within and outside the FIG.

A comprehensive working plan 2003-2006 was developed and adopted by the FIG General Assembly during the congress last year in Washington. This could be considered as the future agenda of the FIG; it comprises the vision and goals of the federation, a plan of work for the council and the administration and plans of work for the ten technical commissions. It is, however, the Council that has overall responsibility for fulfilling this plan in its role as executor, facilitator or co-ordinator.

The new Council set out some guiding principles to implement this. One clear message and principle for our member organisations is that we do not interfere in internal affairs but we feel an obligation to say what we think, to the best of our knowledge and belief.

*Guiding principles?*

Yes, guiding principles and ideas. We want to play our part in ensuring that the presence of FIG will be felt to the greatest possible extent in all regions of the world. A serious social responsibility rests on us, as a well-balanced technical and scientific association. We feel a moral and ethical obligation in the intensified co-operation sought with the institutions of the UN. We have as a target promotion of the profession of surveyors in FIG member countries, both in public and private practice, where we give a lot of attention to education. We believe that we can bring a lot of experience to the subjects of both urban and rural land development and sustainable management. We have to work with other disciplines to accomplish more than we could do as surveyors alone. Seeking contacts with politicians is of vital importance. We have to work on all this.

*Prof. Holger Magel and Christiaan Lemmen at the FIG Working Week in Paris*

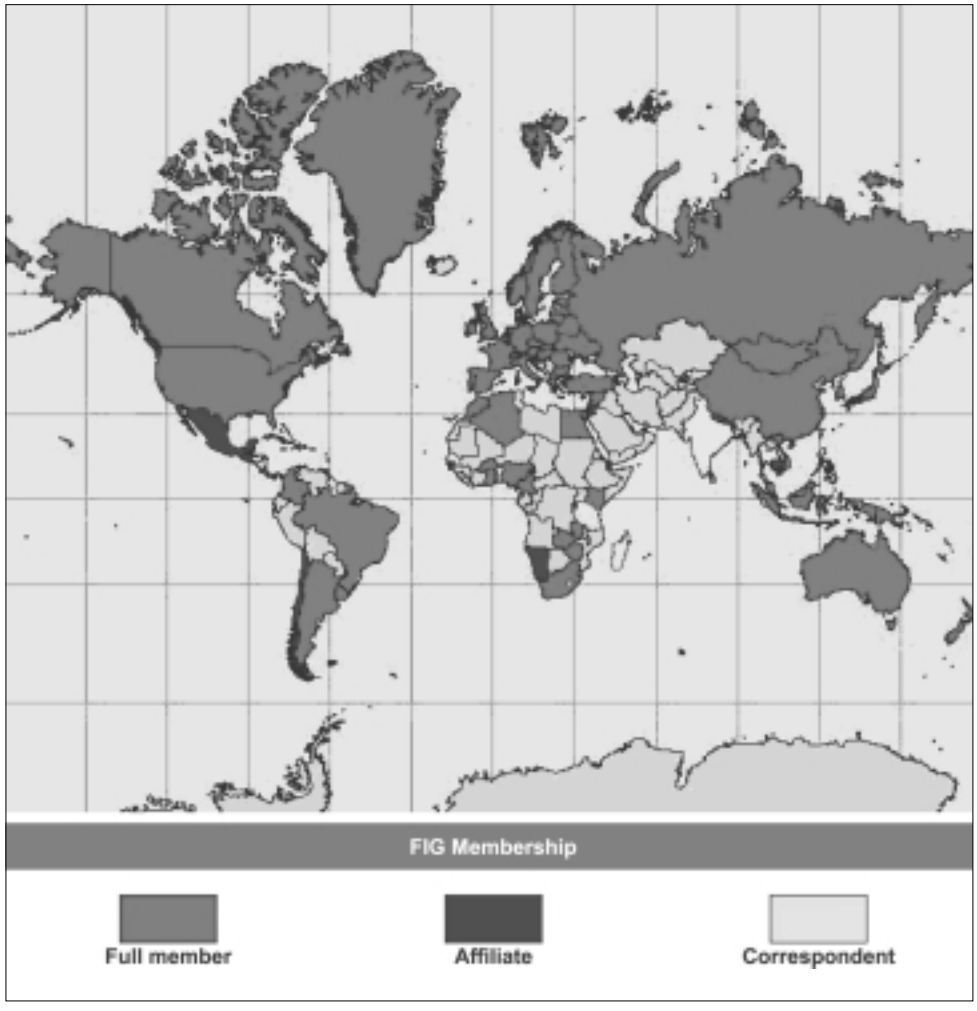


*FIG membership*

*Contacts with the UN are relevant here. How are you going to organise this?*

The Millennium Declaration is the framework that all nations and international and national organisations should aim for. This declaration recognises that we all have collective responsibilities. In its details we find many links to the surveyor's work: administration and management of land and natural resources, creating an environment conducive to development and the elimination of poverty are among them. Also access to land and secure tenure, improvement of the lives of slum dwellers, development of partnership with private sector and civil organisations, development of water management strategies, conflict resolution and bringing Africa into the mainstream of the world economy.
On the global level, the main partner of FIG is, of course, the UN. We already have intensive contacts and, as a non-governmental organisation without any economic interest and with a strong relation to the main tasks of the UN, we have a good approach.

*How should we attract the attention of politicians in national governments? I mean, land-related issues are becoming more and more important world-wide and politicians have a short-term horizon.*

We want to encourage the communication abilities not only of the FIG but also of as many surveyors as possible and, in particular, to improve the regular contact with the media and important social opinion makers. When we hold a major FIG event anywhere in the world we accordingly seek, as a matter of course, contact with politicians. I am really very concerned that we must better bridge the academic and the worlds of practitioners and politicians, otherwise we risk the academic-based profession of surveying or geomatics becoming more and more split apart until finally it perishes. Against the background of my former position at a state ministry, I would like to point out that FIG must stop this trend by bringing together all parties - and I am sure that all parties will finally benefit.
A very relevant issue in relation to politicians is Land Administration. We, the partners contributing to a sound

**Aim**
The aim of FIG is to be the premier international non-governmental organisation representing the interests of surveyors and users of surveying services in all countries in the world. It is a Federation of member associations all of whom seek excellence in the services that they deliver.

**Objectives**
The objectives of the Federation, as defined in its Statutes are:
1. Provision of an international forum for the exchange of information about surveying and for the development of fellowship between surveyors
2. Collaboration with the United Nations and other international and regional agencies in the formulation and implementation of policies affecting the use, development and management of land and marine resources
3. Promotion of the disciplines of surveying, particularly in developing countries and countries in economic transition
4. Promotion of the role of the surveyor in the management of natural and man-made environments
5. Promotion of the development of national associations of surveyors and of professional standards and codes of ethics and the exchange of surveying personnel
6. Promotion of high standards of education and training for surveyors and facilitation of Continuing Professional Development (CPD)
7. Encouraging the development and proper use of appropriate technology
8. Encouraging research in all disciplines of surveying and dissemination of results.

**Mission Statement**
The Mission of the International Federation of Surveyors is to ensure that the disciplines of surveying and all who practice them meet the needs of the markets and communities that they serve.

*Prof. Magel with his wife Ansi at the celebration of FIG's 125th anniversary in Versailles*

Land Administration in our countries, are all responsible for providing a service fitted to demand. We need to understand the customers needs. Good practises learnt from Land Administration activities in each of our countries have to be compiled. There is another example: in the future, four additional main activities have to be realised in the field of spatial data management. These are specialist and co-ordinator of the workflow for geodatasets, information manager, including databases and Web information, quality manager for geodata and expert in consulting and support for integrating business data and geodata across different professionals, for purposes of generating geoinformation for decision making.
Further, I would like to say that it is our aim to fill up blank areas on the map of FIG membership.

*Good education is a key issue world-wide. How may capacity be built?*

Of course, first of all we must start with our own future-oriented education and training in order better to understand our partners and ourselves play an efficient role. This means that our surveyors' education at universities and schools must be broadened to include the whole wide range of surveyors' activities. At my own university our ideal is as

follows: to offer an academic education in all fields, starting from the single parcel of land and even up to the planet Mars. Our second ideal for young surveyors' education is to get them well grounded as specialised generalists. I know that it is very hard to implement these ideals at the universities all over the world but I am convinced of its necessity; otherwise we risk surveyors' education disappearing from the academic scene. There is already a degree of concrete danger here. The consequences of this for the image and practical situation of surveyors would be awful. This could never happen to lawyers.
It is one of the most important goals of the FIG-council to better contact and come together with those academic colleagues at our universities who up to now are not integrated or interested in FIG. The first step in this approach will be a revision of our FIG definition of surveyors.

*You conclude?*

Surveyors have always been deeply involved in economic development. Their contributions are widespread. Important is the bridging role between general public and professions. We should consider this: the business of surveying, mapping, registration of land or land use planning and land management etc. is a team-oriented business. It requires co-operation within the surveying profession, as well as co-operation in particular between the professions of lawyers, land economists, agricultural experts, civil engineers etc. and surveyors. Our profession has to build bridges to the general public. A profession has to look for a sustainable contribution to society instead of a quick win. Only those products and services that really serve the customer or public demand will justify the long-lasting existence of our profession. FIG has therefore worked out and published its own FIG Agenda 21. I am very proud of it! Those professions that contribute to a further improvement in society develop far better than do others that are reluctant to change. Therefore the motto of the current FIG-Council is 'Shaping the Change'. All of us are contributing to an ecological, economic, social and cultural improvement of our society. We feel committed to a more sustainable and more equitable world. The customers and the public will feel the benefit from our service and they will know about it.

**Web-site**
FIG Working Plan, www.fig.net u

*Univ. Prof. Dr.-Ing. Holger Magel, Technische Universität München, Arcisstrasse 21, D-80290 München, Germany, E-mail: Magel@landentwicklung-muenchen.de*

*This article has also been published in the August 2003 issue of GIM International.*