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Sustainable Geomatics?

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Summary

We take it for granted that we can accurately and unambiguously describe our neighbourhood, our towns and our country. We can use this to define who owns what and where our boundaries lie. It is almost impossible to imagine life without being able to do this. It underpins all aspects of the functioning of a modern economy and society. We do this using maps that are accurate and that are kept up to date.

Yet, it is not something that can be taken for granted across the world. While huge amounts of aid are lavished on major development projects, the RICS Geomatics Faculty and the RICS Foundation were concerned that little attention was being given to the mapping needs of developing countries. The research paper entitled “Getting it together – the geography jigsaw” was commissioned by RICS to look at: “improving our understanding of the processes and procedures available for the support of mapping infrastructure in developing and transitional economies”. This paper sets out to illustrate some of the areas covered by the research.

Sustainable Geomatics?

This research was prompted by requests from RICS members in many parts of the world for help with understanding the current environment in which ‘mapping’ needs to be provided. This is very different from the situation of 20 years ago when large bi-lateral aid packages were churning out maps for the developing world albeit often prompted in both East and West by ‘cold war’ considerations.

Today we have dramatic improvements in the quantity of raw data available from aerial and satellite remote sensing as well as much more sophisticated methods for handling this raw data and interpreting it for a wide variety of end users. But if you ask for an up-to-date map of a Caribbean island or of an African city you may get a tourist map (if it is a tourist area) and, if you know where to go, you may get an aerial photo mosaic or a satellite image. But ask for a map with settlement names, road numbers and a consistent interpretation of ground features for administration purposes and you will most likely get, at best, a 20 year old map with no updates and with a grid that is incompatible with modern GPS equipment.

There are many people and organisations that will buy the aerial and satellite imagery, analyse it for their own specific purposes and throw it away. This applies to exploration companies, aid agencies and the military. Around them will be a local civil administration that cannot afford the imagery, has no facility to interpret it but would probably love to have a hard copy of what the others have put in the bin.

Was all that money spent on mapping in the post war years completely wasted? Or was it necessary at the time – before satellites – and is no longer required by anyone? Or are we now wasting a lot of money on duplicating the general interpretation of imagery in specialist organisations instead of having a general purpose map (or SDI) available for everyone at a reasonable cost? Expressed in those terms this research may be considered relevant to the developed world as well. We are constantly arguing about who should pay and about the role of the private sector? It could be argued, for example, that the developed world (or that part which has well maintained mapping) has merely delayed the advent of the same problem. Right now we see that the agricultural programmes are beginning to move towards high resolution imagery as well as (or instead of?) large scale maps or vector data.

The researchers looked at the different parties involved with the production and use of 'mapping infrastructure' – national mapping agencies, funding agencies, contractors and consultants. The main conclusions reached will come as no surprise to this audience:

- The need to increase awareness of the cross-disciplinary benefits of mapping/SDI to governments and funding agencies.
- The need effectively to present mapping/SDI benefits to other disciplines.
- The need to identify gaps in support offerings – particularly with regard to the specification of useful cross disciplinary programmes and products.
- The demand for 'coaching' (not just training) of local professionals and departments in cost effective methodologies and procurement processes.
- The need to spread best practice – particularly from similar scenarios.

Recently one of the authors has been working in the Caribbean where an island requires a revaluation of all of its land and property for taxation purposes. At present the Valuation List has developed property (buildings) shown as labelled symbols on 20 year old large scale paper maps. Properties constructed since the 1980's have been approximately located on the map by valuers unskilled in land surveying and not equipped with GPS or aerial photos. The net result is that we have found 15% to 20% of properties missing, and a significant proportion of the rest tens of metres out of position. Some of the missing buildings are worth hundreds of thousands of dollars and many of the wrongly located buildings are small and very close together. It is therefore evident that the lack of up-to-date mapping or imagery available to the Valuation Department is a severe handicap, is devastating for staff morale and is preventing the government from fairly collecting a basic tax.

We also noted that all of the utilities and government departments are in the same position. Only the telecommunications company (privately owned and arguably on the basis of monopoly profits) had implemented a GIS – using scanned versions of the 20 year old maps but with new buildings entered and with pop-up photos when a subscriber number is entered. The Lands & Surveys Department is under-staffed and under-resourced, it just keeps up with its primary function of conducting and checking land surveys for conveyancing. It has not been able to revise the basic 1:2500 topographic maps since they were made. The Planning Department has had a set of 1:10,000 photography for the last 3 years which were unknown or unavailable to any other departments. There are no street addresses on the island and there is no Land Register.

However it is believed that there is money available from at least one multilateral agency to fund mapping and SDI. But there appears to be a lack of political will to do anything about the situation. Unless this high level backing is forthcoming the result will be piecemeal development of unstructured and incompatible datasets with either hidden inefficiencies in many organisations or considerable waste of resources with duplication of effort.

The need is for mapping and GI professionals to be able to understand their customers' needs and to deliver solutions which are cost effective and make sensible use of new technologies where relevant is paramount. And current imagery and field data collection tools are making it much easier to demonstrate the benefits of new technology in ways which have been difficult with the previous generation of digital mapping systems and expensive GPS equipment.

We presented the preliminary results of this research to a multi-disciplinary audience at the Global Alliance for Building Sustainability in Johannesburg last year. That audience of planners, architects, engineers and other property professionals were able immediately to see some of the benefits of a co-ordinated SDI policy. The final Johannesburg conference resolutions contain many fine words, including some directly alluding to mapping infrastructure. They need to be followed up with well directed actions to which we can all contribute.