Geodata in a Broader Perspective

The Amsterdam Midsummer period, which started on 11th July and ended on 23rd July, was a very exciting time for me. It even had that taste of 'Magic' which the capital of The Netherlands is traditionally is associated with. From 16th July until 23rd July there was the ISPRS Congress. During this event, which is held once every four years, scientific and commercial progress and developments in the field of photogrammetry and remote sensing are discussed and presented. In my memory this year 2000 event will be kept as the one where high accuracy digital aerial cameras were put on the product lists of the leading manufacturers of photogrammetric equipment. I will limit my words on the ISPRS Congress in favour of the other exciting event taking place in Amsterdam: the Accuracy 2000 Conference. Those who want to know more about the ISPRS happening are served by the review on page 67.

Natural Phenomena

The Accuracy 2000 Conference took place in the week prior to the ISPRS event. Organised for the fourth time but for the first time in Europe, I had the honour to be a member of the organising committee. The conference brings together a large variety of earth scientists from all over the world, involved in studying natural phenomena, like soil erosion, land use potential, vegetation cover, forestry and quantitative and qualitative aspects of water management. These disciplines increasingly move their attention to governmental induced environmental issues.

Measuring Natural Phenomena

Usually one is unable to measure a natural phenomenon directly. For example, soil erosion is calculated by using a pre-defined computational model from observable quantities, amongst which digital elevation models, vegetation cover and yearly rainfall. The general form of approach to these problems is by means of the input-output model. The output consists of the required information about the phenomenon in study, e.g. soil erosion. The input consists of collected geodata, while the two are linked to each other by a computational process, representing the model.
Besides the actual information about, for example soil erosion, one of the main questions one wants to get an answer for is: 'What is the value of the output of this process?' Or, in other words: 'What is the value of the information derived from the data by passing it through the model?'

Value of Information

The value of information is strongly determined by its quality. That means: 'How sure can we be sure that the information reflects sufficiently well the corresponding part of the environment which we want to describe?' Indeed, surveyors/geodesists are undoubtedly authoritative experts concerning the description of uncertainty in geodata. Besides uncertainty in their data, geo-scientists are heavily confronted with uncertainty in their models. Of course, also surveyors/geodesists make use of models that describe natural phenomena such as atmospheric refraction and run time delay. However, the models used by geoscientists are often ill-defined and very limited.
In addition, the types of geodata collected by surveyors differ from those needed by geo-scientists. The major types of data collected by surveyors concern topographic objects, cadastral boundaries and construction works. That means, we as surveyors restrict ourselves to well-defined features.
This limited view enables us to reduce in a major sense the complexity of reality by considering it as a set of points to which we have to assign 2D or 3D co-ordinates and some quality measures. And we have been very successful by adopting this view.

Point Field

Once having reduced the world to a point field, the main factor determining uncertainty in our data stems from our measurement equipment. By describing the measurement uncertainty in noise terms, we are able to obtain sound descriptions of this uncertainty because we can use well-developed statistical techniques.
The geodata, needed by geo-scientists, are often characterised by completely different factors, because they are related to natural types of boundaries, which are by their very nature soft and fuzzy. The uncertainty introduced by the specific characteristics of natural phenomena are of another order than the measurement of uncertainty, while it is not yet clear how this uncertainty should be described and how it propagates through processes.

Magic of Amsterdam

The sketch given above gives an impression of the main issues the nearly 200 participants of Accuracy 2000 were discussing in Amsterdam. These are also issues which surveyors/geodesists will increasingly face. This is for the simple reason that the need for geodata of natural phenomena is rapidly growing, in view of the wide awareness that we have to take care of the fragile environment. Bearing this in mind I was very pleased that a number of surveyors/geodesists attended the conference; not to present papers, but to learn about the needs and issues of geodata in a broader perspective. To me this is an obvious sign that surveyors/geodesists have stepped into a transition from thinking in terms of point fields to thinking in terms of collecting geodata in a wider sense. For me that was the real 'Magic' of Amsterdam during the midsummer of 2000.

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