Benefits in Using SIRGAS2000 [1]

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What benefits come from the adoption of SIRGAS2000? What activities can be beneficiated by it? Is there any product that supports the migration to SIRGAS2000? What can we do today? These questions will be discussed in this article.

With the emergence and adoption of SIRGAS 2000 as the new coordinate system of Brazil a question arises: What are the benefits in using it?

The SIRGAS2000 exists to be used in the activities of topography, mapping, GIS, remote sensing, natural resources management, land management, agrarian reform, etc. Benefits with its use can be felt in a short, medium and long run.

Georeferencing, when linked to the activities above, can be compared to blood donation. There is the donor and there is the receiver. The donors, in our case, represent information collection activities, the field surveys made using various equipment ranging from total stations to satellite signal tracking devices. The receiver consists of the storage and use of the geospatial information, through maps, data bank and geographical information systems.

In another way, donor and receiver can be maps or data banks. We can use it to migrate information between maps and/or data bank. However, if they are not compatible, the outcome is shocking.

As in blood donation, there should be compatibility between donor and receiver, with the risk of severe complications to the receiver if this compatibility does not exist. On the contrary of blood donation where the complications happen rapidly, the manifestation of problems with geospatial information, in the majority of cases, will occur in a slower way, in a way that will be difficult to identify the problem and even attenuate it. In some cases, however, the "death of the patient" is immediate. Let's see some examples.

On June 15, 2001 the Construtora Galvão, when working at km 20 of Castelo Branco Highway, one of the main roads in São Paulo State, punctured a GLP pipe from Petrobrás. This accident occurred despite the fact that Galvão company was using modern positioning technology, however, there was incompatibility with the map that was showing the pipes location. The road was closed and there were no victims from the incident. Galvão, however, was fined in R$ 98.000,00 by Cetesb, the State of São Paulo Environmental Agency.

Cleaning after the GLP pipeline accident at the margins of Castelo Branco Highway.

This example demonstrates the problem that exists today, from the lack of compatibility between positioning and maps processes.

We have arrived then at the *first benefit in adopting the SIRGAS2000*: **the surveys talk directly with the maps.**

More and more, positioning and navigation use the satellites from the Global Positioning System, GPS, as mentioned in movies and even in cartoons, and more and more found in automobiles. Other satellite positioning systems already exist or are being developed, which bring us to the conclusion that satellite positioning is here to stay.

The problem is that the maps and data banks that currently exist, in its majority, are not compatible with SIRGAS2000. The current solution is to use a series of mathematical stratagems to make sure that the position becomes compatible with maps (in a certain way, deteriorating it). The definitive solution will be to transform the maps and databanks to SIRGAS2000, a transformation to be done in a single shot). After these maps and databank transformations have been done, the current incompatibility problem will cease to exist.

Let us see another example of using "incompatible blood". On September 5, 2006, the Rio de Janeiro Water and Sewage Company (CEDAE) punctured a pipe from the State Gas Company (CEG), on Bandeirantes Road, in Jacarepaguá neighbourhood, in Rio de Janeiro. As reported by *O Globo* newspaper and *RJ TV*, the incident, that resulted in an explosion and injury to 5 employees, could have been prevented if the geospatial information had been shared between the concessionaries.

This example calls our attention to the lack of compatibility between maps.

We have arrived then at the *second benefit in adopting the SIRGAS2000*: **the maps are consistent among themselves.**

Maps and databanks are used today in the most diverse applications, such as mapping (topographic, urban, service concessionaires equipments), agrarian reform, indigenous lands delimitation, environmental and forest management, to mention a few. These maps and databanks were built using geospatial information from systems such as Córrego Alegre, SAD69 (there are others systems used in very specific situation, therefore neglected here).

The problem in using information between several systems is that mathematical stratagems are again necessary. The worst is when information from among several systems (for example Córrego Alegre and SAD69 are put together without the databank management knowledge – this situation, lamentable to say, happens in practice, not being the intention of this article to discuss it). From the example of the first benefit on SIRGAS2000 adoption, the definitive solution will be to transform the maps and databanks to SIRGAS2000. And since all of them are in SIRGAS2000, the incompatibility ceases to exist.

It is seen then that to obtain SIRGAS 2000 benefits, uniformity and compatibility between geospatial information (benefits one and two), will be necessary for the transformation of maps and databanks.

It is the PIGN and IBGE intention to promote mechanisms that facilitate this transformation. A program specifically dedicated to the transformation between the Córrego Alegre, SAD69 systems from/to SIRGAS2000 is being elaborated and will be available possible within one year.

But, what should users do until this transformation program between systems is available? Well the alternatives are as follows:

(a) If the user is not in a hurry, if his/her activities can continue being done today on the same way that it was done yesterday, then, continue as it is without altering its operation and wait for the transformation program to be available.

(b) If the user will contract a new mapping, the ideal situation would be that this new mapping was already made in SIRGAS2000. In the case that the mapping is made in Córrego Alegre or SAD69, at least the ground control points should have coordinates also in SIRGAS2000 with the purpose of field support.

(c) Activities that have legal implications should start to have new surveys and databanks built directly in SIRGAS2000 immediately. This is the case of agrarian reform activities done by INCRA, MDA and Land Institutes.

Currently, the program TCGeo is available at IBGE's site. The *link* is http://www.ibge.gov.br/home/geociencias/geodesia/param_transf/default_param_transf.shtm. Program TCGeo is a first approximation of the final transformation program that is available. TCGeo serves for activities that have the necessity in using SIRGAS immediately, and have limits up to the scale of 1:50,000. The user should note that the TCGeo indicates the precision of the transformation.

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