

CARTOGRAPHIC WORK IN CATALONIA

THE "INSTITUT CARTOGRÀFIC DE CATALUNYA" (ICC) IS RESPONSIBLE FOR CARTOGRAPHIC INFORMATION. THE DEVELOPMENT OF DIGITAL CARTOGRAPHY IS ESPECIALLY REPRESENTATIVE OF THE CONSOLIDATION OF CURRENT PROGRAMMES AND OF THOSE WHICH DEFINE FUTURE TRENDS.



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FROM THE ORTHOPHOTOMAP OF CATALONIA 1:5,000.



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THE DIFFERENT STAGES OF MAP PRODUCTION, FROM PLANNING TO PUBLICATION, ARE FULLY AUTOMATIC.



THE CARTOGRAPHIC INSTITUTE.

The "Institut Cartogràfic de Catalunya" was set up in 1982 to undertake the technical work behind the preparation of cartographic information within the scope of the *Generalitat de Catalunya's* responsibilities.

Its work consists in:

The elaboration, reproduction and diffusion of all essential maps, a task which involves a series of work programmes throughout Catalonia. The first of these is the 1:5000 orthophotomap cartography programme, which it is intended will include the whole of the territory in a mosaic of some 6,000 sheets produced from the 1:50000 National Topographic Map. Another programme involves the preparation of the 1:2000 orthophotomap of the agricultural areas, as support for the registry of farmland in Catalonia. A third programme involves the 1:500 urban cartography, carried out in conjunction with the local authorities;

The reduction and preservation of the 2nd and 3rd order Geodesic Network, in conjunction with the "Instituto Cartográfico Nacional";

The completion of the necessary road cartography projects for the construction of roads and public works in Catalonia;

The execution of development programmes in thematic cartography and in cartography directed at the evaluation of resources. Every year, the ICC advances in its use of teledetection techniques: estimating areas affected by fire, soil use, geology, etcetera;

The creation, organization and management of the "Cartoteca de Catalunya", which co-ordinates the collection and analysis of the existing geographic and cartographic material, and is responsible for its preservation and diffusion, either directly or in collaboration with other, private or public organizations;

The creation of a cartographic data bank, with the object of using automatic map-making systems. The information which can be stored in the numerical cartography system not only allows the production of basic maps, but also their immediate use for services such as public works, land registry, etcetera;

The technical co-ordination of cartographic work carried out by public and private organizations, collaboration with public and private organizations working in similar fields, when necessary, and co-ordination with organizations doing similar work at state level; The publication and diffusion of projects carried out by the Institute and felt to be of public, scientific or general interest.

Digital Cartography

From the beginning, the "Institut Cartogràfic de Catalunya" opted for the mechanization of photogrammetric restitution, with the object of offering a cartographic product which went beyond the straightforward map printed or drawn on paper. The intention was to establish digital cartographic bases, in other words, to compile information about the territory and store it in digital format. In this context, presenting this information on paper has to be seen as the result of a particular treatment of this digital base.

In 1984, the ICC signed an agreement with the Barcelona City Council, in which it undertook to map approximately 4,600 hectares of the Barcelona municipal district at 1:500 scale. One of the most important aspects of this project is that it will involve the creation of a Digital Cartographic Base, in other words, the compilation of a data base on the municipal territory of Barcelona, using information-processing technology. This has meant, for example, the

organization of data in digital base, the design and implementation of computer methods and processes to support map production, etcetera.

This cartographic base was started in 1985 and completed in 1987. It was the first project of these characteristics to be carried out at the ICC and it was an excellent test for urban cartography projects. One of the most important conclusions to be drawn from it was that the use of tachymetry data in conjunction with photogrammetric information constitutes a production method with an attractive cost/quantity ratio. It allows the compilation of those elements of the territory which require a high level of accuracy and the use of tachymetry, and the rest of the information can be compiled by photogrammetry, which, though less accurate, is quicker and allows the compilation of information from the interior of city blocks, which is not accessible via tachymetry. From the technological point of view, it led to the introduction of a Methodology for the development of computer applications for the support of photogrammetric restitution and subsequent publication processes. It was also of use in consolidating the micro-processor base autonomous graphic stations, which, though functionally less powerful than the environment on micro-processor, have shown themselves to be excellent instruments in carrying out specific tasks, such as the process of publication. In fact, these methods have been of use as a point of departure in the realization of increasingly complicated and detailed projects, in both the cartographic and the technical aspects: 1:500 and 1:1000 scale maps for the municipal district of Mataró, etcetera. At the same time, the value of the digital cartographic base is now beyond doubt, since it has been shown that the associated technology allows quick and



TOPOGRAPHIC MAP 1:500.



ORTHOPHOTOMAP 1:5,000.

easy map reproduction, greater efficiency in publication, and the incorporation of the geometrical factor, with a territorial reference to the registry data bases. The digital approach has allowed the adaptation of the cartographic base to rapidly evolving technologies, and, at the same time, to the appearance of more and more applications for these technologies. At the present moment, it is already possible to have all the information compiled during the project readily available on a single optical disc, based on laser technology directly accessible to a micro-processor. This allows a broad distribution of the cartographic base for different uses. Also, the use of specialized software for the visualization of a three-dimensional col-

our model of the city is just one example of the benefits offered by the use of the cartographic base in town planning.

Integrated Assisted Design System

Following the normalization of cartographic production, and through the use of photogrammetry assisted by a digital graphic system, the ICC has developed a project which works along two lines: one is the establishment of a method for three-dimensional restitution on the basis of the digital model of the terrain, and the other is the selection and installation of a design packet for roads and civic works at the "Departament de Política Territorial i Obres Públiques de la Generalitat de Catalunya". The project's final objective is an integrated as-

sisted design system covering everything from data collection to the production of the plans for the project. The new restitution method is already in full production at the ICC and the chosen design system has also been installed. As a first step, it is now being put into general use in the Directorate General of Roads. Later on it is foreseen that the system be made available to the whole of the "Departament de Política Territorial i Obres Públiques". But we must continue to develop applied products in Catalonia, so as to supply the necessary cartographic tools and products to the technical sectors in which they are needed and make up for the serious shortage in basic information. ●