ICC
Institut Cartogràfic de Catalunya

Generalitat de Catalunya

Newsletter 36

ICC completes 25 years of photogrammetric flights

After the creation of the ICC in 1982, the first photogrammetric flights still were entrusted to various companies that perform aerial work of this kind, before the decision was made, that the ICC should equip itself with the infrastructure required for primary data capture and work with its own equipment and personnel.

Cessna Caravan 208B

In 1983, the ICC acquired its first aircraft, the Partenavia P-68C Observer, and its first photogrammetric camera, the Wild RC10, which started operations in 1984. Since then, the activities of ICC's flight department were focused on the preparation, completion and control of these flights, which represent the first step in the cartographic production chain using photogrammetric techniques.

In 1987 operations with a second aircraft, a Cessna Citation 501 SP, were begun. This represented a big step forward in terms of quality, because that type of pressurized jet aircraft was capable to reach high altitudes, with are required to put cartographic production over the entire territory of Catalonia into effect. The plane was also modified to carry two cameras on board, which could work simultaneously.

Thanks to the characteristics of the two aircrafts, the ICC could now carry out photogrammetric flights at any scale over Catalonia: using the Partenavia, flights could be made for cartography at 1:500-1:2 000 scales, and using the Citation 501, at 1:5 000-1:50 000 scales.

In 1988, a hangar was built at the airport of El Prat in Barcelona, which became the air operations center of the ICC and also the aeronautical maintenance center with license CMA-113 for the aircrafts owned by the Institute.

Production of photogrammetric flights, 1984-2008

	Total
No. flights	3 885
No. photographs	653 437
Total flight hours	14 148
Partenavia flight hours	6 814
Citation flight hours	5 450
Caravan flight hours	1 776
Flight hours with other aircraft	108

Along with the arrival of new technologies for primary data capture, namely multispectral sensors and altimetric sensors with laser technology, in 2003, a Cessna Caravan 208B aircraft was acquired, which allows multisensor flights with a combination of up to 4 sensors.

In 2004 a technological breakthrough of great significance occurred, which deserves particular mention: analogical photography made way for digital photography, and the latest generation Wild RC30 and Zeiss RMK Top 15 analogical cameras were replaced by DMC digital cameras. This innovative spirit and commitment to the latest technology allowed the ICC to maintain the high level of service required for complete the missions it has been assigned. ■

Timeline of the most important events relating to photogrammetric flights undertaken by the ICC

1982	Creation of the ICC.
1984	Started operations with the Partenavia P-68C Observer photogrammetric aircraft and the first RC-10 analogical photogrammetric camera.
1985	Creation of the flight department.
1987	Started operations with the Cessna Citation I aircraft and the second RC-10 analogical photogrammetric camera.
1988	The hangar was built at the airport of El Prat.
1990	First GPS receivers. "Urgell Test".
1991	Started development in black and white. Installation of the third analogical photogrammetric camera, the RMK Top 15. Aeronautical maintenance center license obtained.
1992	Installation of the fourth analogical photogrammetric camera, the RC-30, and first photogrammetric flight with GPS.
1994	Installation of the fifth analogical photogrammetric camera, the RC-30, and of the CASI multispectral sensor.
1995	Implementation of the CCNS4 navigation system.
1996	Installation of the Litton inertial system.
1997	Development of the SISA orientation software.
1998	Integration of the SISA-Litton to orient the CASI sensor.
2000	Applanix inertial system.
2001	Installation of the lidar laser altimeter for high precision measurement of terrain heights.
2003	Started operations with the Cessna Caravan 208B aircraft and of color development.
2004	Installation of the first DMC digital aerial camera, thereby dispensing with analogical film processing, and replacement of the CASI with the CASI 550.
2005	Installation of the second digital aerial camera and closure of the photographic laboratory.
2006	Implementation of automatic quality control.
2007	Installation of the ALS50-II laser altimeter.
2008	Manufacture of the thermal sensor for the ICC TASI begins.
2009	25 years of photogrammetric flights.

Completion of the Geospatial database of industrial estates in Catalonia

The *Base de dades geospacial de polígons industrials de Catalunya* (BDGPolInd) constitutes the corpus of information for the future Information system on business estates in Catalonia (SIPAE), which is promoted by the Ministries of Innovation, Universities and Enterprise (DIUE) and Town and Country Planning and Public Works (DPTOP), with the collaboration of the Ministries of Environment and Housing, Governance and Public Administration, the ICC and Pacte Industrial de la Regió Metropolitana de Barcelona (PIRMB, Industrial Pact of Barcelona Metropolitan Area).

The database contains the delimitation of the business estates in Catalonia, understood as the delimited area of industrial and mixed land use (industrial with tertiary) covering a minimum area of 0.5 ha. Furthermore, each estate has a name and an identifying code.

THE 1 940 INDUSTRIAL ESTATES INVENTORIED IN THE DATABASE ARE LOCATED IN 480 MUNICIPALITIES AND COVER A TOTAL AREA OF 36 053 HA

These data, compiled by the ICC, form part of the data planned for inclusion in the technical specifications of the BDGPolInd, which will also contain a series of indicators relating to the identification, location and geographic environment of the estate, mobility, information and communication technologies, supplies, sanitation and waste, for which the bodies that are promoting and taking part in the project are responsible. Finally, inclusion is also anticipated of the georeferenced establishments in the Register of Industrial Establishments of Catalonia, for which the Secretariat for Industry and Enterprise of the DIUE is responsible.

The main sources of information for the production of the current database have been, on the one hand, the data relating to business estates compiled by the Institute of Regional and Metropolitan Studies of Barcelona (IERMB) as part of an assignment commissioned by the Secretariat for Territorial Planning of the DPTOP; and on the other hand, the database of PIRMB. This information, together with the information from other sources consulted, has been homogenized and reinterpreted, taking the *Base topogràfica de Catalunya 1:5 000* (topographic database), the *Ortofoto de Catalunya 1:5 000* (orthophoto) and the *Base de carrers de Catalunya* (streets database) as a basis for reference and as additional support. Finally, the information has been distributed to the municipal councils to be checked and validated. To date, a reply has been received from 327 councils, and the observations made have been entered in the database. In this way, 73% of the estates have been validated. ■

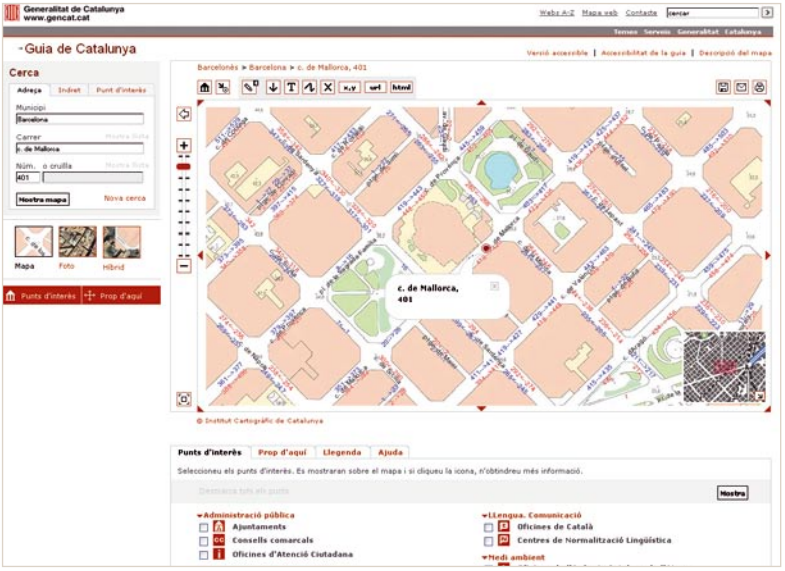
SOON THE SIPAE WILL BE AVAILABLE FOR CONSULTATION BY INTERNET

Industrial estates in Terrassa

Catalonia Guide v.3

The *Guia de Catalunya* is a project that has been undertaken in conjunction with the Directorate General of Citizen Care. This is an interactive guide with which it is possible to locate all the streets of Catalonia, toponyms, services and other points of interest on the official cartography produced by the ICC. Once the element has been located, users can browse the cartography and perform a variety of actions, including: adding texts, measuring distances, saving the map resulting from the enquiry, and printing and sending it by email. The guide can be consulted at:

www.icc.cat
www.gencat.cat/guia



As at October 2009, 3 versions have been developed (v.1: November 2004-December 2006, v.2: January 2006-April 2009 and v.3: from April 2009). With each version, the database has been improved and given continuity, while the functions of the application have also been enhanced.

In the production of the guide, the initial point of reference was the *Base de carrers de Catalunya* (streets database) (see ICC Newsletter No. 30), which consists of 2 main entities: streets (which contain the node-like street axes – sections – at each crossing) and crossings (which contain the junctions of two or more streets).

Summary of database v.3

	Total
Number of streets	96 017
Length of streets	24 352,6 km

WITH RESPECT TO V.1 OF THE GUIDE, V.3 HAS INCREASED THE NUMBER OF DATABASE FUNCTIONS BY 115.4% AND THE NUMBER OF POINTS OF INTEREST SHOWN BY 203%

The database contains information about the entire territory of Catalonia. At present, the existing data is being updated and completed with comprehensive inclusion of residential and industrial estates.

Sources of information (April 2009)

	% length of streets	% municip.
ICC	67%	84%
Municipal councils	21%	2%
Barcelona Regional Council	12%	14%

The information that is requested can be viewed on the orthophoto at 1:5 000 and 1:25 000; the topographic database at 1:5 000; the topographic map at 1:10 000, 1:50 000, 1:250 000, 1:500 000 and 1:1 000 000 (with limited toponymy and without reduction); and on the satellite image at 1:250 000. ■

Evolution of the PEFCAT project, 2009

Within the framework of the River Area Planning of Catalonia (PEFCAT) project (see ICC Newsletter No. 21), the ICC signed an agreement with the Catalan Water Agency to carry out flooding risk studies of some of the principal basins in Catalonia. The objective is to establish a delimitation of the flood-prone areas that updates the present one and which will be useful in the resolution of town planning issues, the preparation of municipal plans of action to combat water inflow, and the planning of infrastructure.

Flash flood studies will be made of the following river basins: the upper and middle sections of the Llobregat, the Cardener, the upper Ter, the lower and middle sections of the Segre, the upper Segre and the Valira, the Ebre, the Noguera Pallaresa and the Noguera Ribagorçana. The total length of these river sections is 1 326 km.

This project is divided into three stages: stage 1 consists of planning and pre-calculating the flood-prone areas; stage 2 includes pre-processing, hydraulic calculation and post-processing; and stage 3 comprises revision, final delimitation of the flood-prone areas and drawing up the definitive documents. ■

AS AT SEPTEMBER 2009 STAGES 1 AND 2 HAVE BEEN COMPLETED. IT IS PLANNED TO COMPLETE STAGE 3 IN DECEMBER 2009

Brief notes

NEW DOWNLOADS AVAILABLE AT THE DIGITAL MAP LIBRARY

The first version of the series *Ortofotomapa de Catalunya 1:5 000* (1986-1992), consisting of 6 318 sheets, and *Mapa d'imatge satèl·lit 1:100 000* (1985-1988), consisting of 34 sheets, are now available for browsing and downloading in high resolution.

The collection of 73 photographs of Noguera Pallaresa taken by engineer Antoni Barrie between 1914 and 1916 has been added to the library.

http://cartotecadigital.icc.cat

ICC ONLINE LIBRARY BECOMES MORE ACCESSIBLE

The Cartoteca de Catalunya (CTC, Map Library) has successfully completed the migration from the old VTLS software to the new Virtua software for management and online browsing of the catalogue of its bibliographic resources (consisting of more than 43000 volumes).

This catalogue is fully integrated in the Collective Catalogue of Universities of Catalonia (CCUC), which was created by the Consortium of University Libraries of Catalonia (CBUC).

http://www.icc.cat/cartoteca

This newsletter is a free publication available in Catalan, Spanish and English.

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Municipal boundaries in Catalonia

The municipality is the basic entity of territorial organization in Catalonia. The municipal area is the territory in which the municipal council exercises its powers. The precise definition of the municipal areas is essential in order to organize, manage and plan our territory, both at a local level and at a general level relating to Catalonia as a whole.

Today, the municipalities require precise demarcation of their municipal area; the non-availability of this information leads to problems in territorial management and planning. On the other hand, constant human action (residential estates, road infrastructure, etc.) leads to constant geographical changes. All this makes it vital to be aware of, maintain and update the municipal boundaries of Catalonia.

The Government of Catalonia is mindful that these issues affect the operation of the Catalan municipalities and that there is a need to generate precise geographic information. Therefore, it has set two projects in motion whose objective is to reach a new and specific demarcation of municipal boundaries:

1. **Topographic Review** Project. The ICC is currently engaged in a topographic review of the municipal boundaries in Catalonia, in accordance with the agreement signed on 30 December 2005 with the Department of Governance and Public Administration (DGAP). This review is being made with reference to the documents located in the archives of the National Geographic Institute (IGN). The timescale anticipated for this project is from 2005 to 2011. As at September 2009, 1 265 of the 1 920 items for review included in this agreement have been considered (65.9%).

2. **Municipal Map** Project. On 6 November 2007, the Catalan Government passed Decree 244/2007, which outlines the procedure to be followed in the work to define municipal boundaries in Catalonia. On behalf of the Government of Catalonia, technicians from the ICC and the Directorate General for Local Administration (DGAL) are engaged in this work and attend the meetings relating to it. The procedure involves entering up new demarcation records, signing the boundary line reconnaissance papers, writing reports on the topographic work, and finally approving the Municipal Map of each of the municipalities, following due consideration by the Comissió de Delimitació Territorial de Catalunya (territorial boundaries). To date, the ICC has played a part in 429 delimitations. ■