

## PRESENT AND FUTURE MAPPING IN CATALUNYA

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### **ABSTRACT:**

This paper resumes and intends to synthesize the strategic planification, both productive and technological, of the Institut Cartogràfic de Catalunya (ICC) during the period 1989-2000. The general objective, strategic lines, objectives, sub-objectives and actions conforming the master action lines serving as a guide to all the activities of the ICC, are herewith presented and evaluated.

### **I. ICC'S TECHNOLOGICAL AND PRODUCTIVE STRATEGIC PLAN**

#### **1.1 The Strategic Plan. Concepts and Benefits**

[1] This Strategic Plan is an ordered effort to produce and ease decision making when conforming and guiding the activity of the ICC.

[2] The strategic planification contemplates the surge and comprehension of new tendencies, discontinuities and new technological offers, rather than a mere extrapolation of the present, inherent to a long-term planification.

[3] Technological advance within the sciences of the Earth is so multi-disciplinary, fast and innovating that it calls for a strategic attitude which is comprehensively all-embracing and less norm-oriented, geared towards a systematically adapting innovation.

[4] This strategic plan intends to obtain the following benefits:

\* Of an external nature:

- To clarify and explain the institutional future.
- To aid the budgetary decision-taking (yearly and fourthyearly).
- To be adaptable to surrounding and operativity changes.
- To assist in solving organisational and Institutional problems.

\* Of an internal nature:

- To facilitate communication.
- To stimulate participation.
- To integrate technological activities.
- To increase the synergy of actions.
- To order decisions and actions.

[5] This strategic plan has been devised to be put forward to, enriched by and coordinated with, to the following instances and organisms:

- *Departament de Política Territorial i Obres Públiques* of the *Generalitat* Government (D.P.T.O.P.).
- *Consell Rector* and *Comissió Tècnica* of the ICC.
- *Intervenció General* and *Sindicatura de Comptes* of the *Generalitat* of Catalunya.
- *Consejo Superior Geográfico* of Spain.

## 1.2 Stages of the Plan

[6]For administrative reasons, the execution of this Plan is divided into stages with a double synchrony: yearly, for budgetary reasons, and four-yearly to effects of mid-term planification. The latter is divided into three stages: 1989-1992 (currently under way), 1993-1996 and 1997-2000.

[7]The first four-yearly plan was effected during the second semester of 1988 and its strategic planification during the period 1989-1990.

## 1.3 Contents of the Plan

[8]The Technological and Productive Strategic Plan is made-up as follows:

- One Central Objective
- Four Strategic Lines
- Ten Specific Objectives
- Twenty-three Sub-objectives
- Sixty Actions-Projects

[9]The Central Objective of the Plan is a political objective within the framework of the ICC and Catalunya's history of cartographic tradition. It responds to both the lackings experienced in Catalunya in the domain of thematic basic cartography and those existing in the educational and regulated research of the sciences and techniques connected to the cartography in Catalunya.

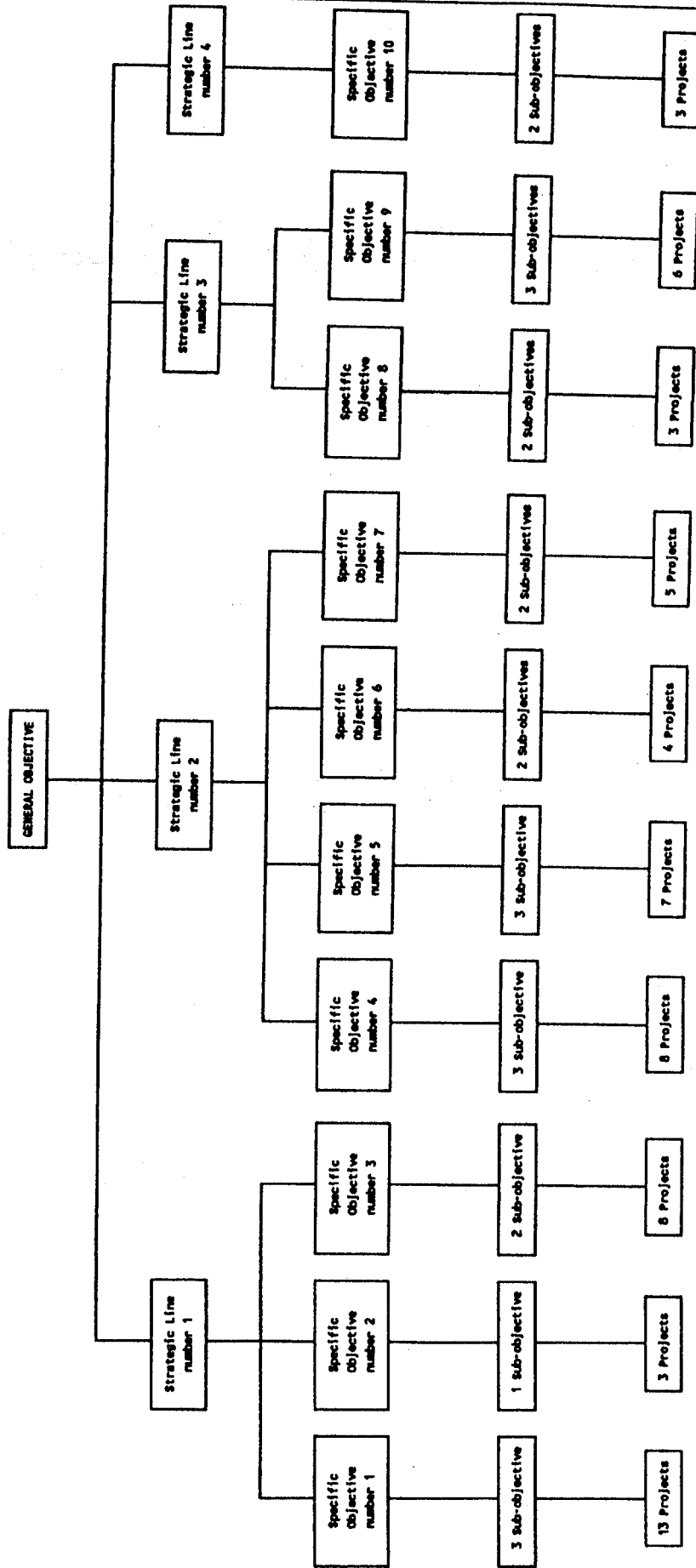
[10]The four Strategic Lines are the branches leading to fulfill the Central Objective. They are in fact, the key action channels, linked and ordered by precedence. They are the strength-ideas in terms of expressing and executing the Plan. These Strategic Lines can be visualised in Scheme I.

[11]The Specific Objectives and Sub-objectives correspond however, to levels neighbouring the structures or organic services which will render them accomplished. They are in fact, the research, projects of cartographic series and other which bear a sense of completion or unicity.

[12]The Sub-objectives are groups of actions and/or projects, measures or instruments which have to be fulfilled in order to reach the Specific Objectives of each strategic line.

[13]The explicative scheme of the Plan is as follows:

Scheme 1: Configuration of the  
Technological and Productive Strategic  
Plan of the ICC 1989-2000



23 Subobjectives  
60 Projects

1 General Objective  
4 Strategic Lines  
10 Specific Objectives

[14]The proposals of action or projects are accompanied by descriptive and synthetic cards with the following generic content: a) description, b) justification, c) connection with the objective, d) completion dates.

[15]It can be noticed that the concrete data on the cards is not absolutely homogeneous, the main reason being that the actual projects or actions are not homogeneous themselves either. In some instances the projects are quite advanced in their prevision and/or completion and, therefore without quantification or configuration drawbacks. Others however, may be actions without yet the maturity of the projects.

[16]The Strategic Plan of the ICC has been conceived by the directive team of the ICC, which is the ultimate responsible for its material execution with the assistance of the instances described in paragraph [5].

#### 1.4 Significance of the Plan

[17]The accomplishment of this Plan once fulfilled successfully, will mean the approachment of Catalunya to the standards of cartographic information availability know to the advanced European regions.

[18]It will purport the consolidation of the ICC as an Institution of production, technology and education, which are three key slants in its activity towards the society of Catalunya.

[19]The feasibility of the Plan also leans towards its own content. Ambitious as it may be, it is also well-meditated and reflected upon so as to render its proposals, diverse as they are in terms of enforcement of completion deadlines, a well-founded task of continuity of the ICC since 1982.

[20]Lastly, the very fulfillment of this Plan, signifies the accomplishment of one of the milestones to be reached, such as is the consolidation and growth of information, products and cartographic services which is the central objective of the Plan.

## II. GENERAL OBJECTIVE AND STRATEGIC LINES OF THE PLAN

### 2.1 General Objective

[21]Catalunya is a nation within the framework of the Spanish constitution and with an Autonomous Statute which bestows it with a vast volume of political and administrative competences in the most diverse area of activities, specially within the sector of Territorial Politics and Public Works. The surface area of Catalunya (32.000 Km<sup>2</sup>) and its population (over 6.000.000 citizens) account for it being a medium-sized European region. Its macroeconomic variants place Catalunya in the top ranks of Spain and of Southern Europe.

[22]Ever since there has been a self-government in Catalunya during this century (*Mancomunitat* of 1924 and Republican Statute 1932), one of the first measures taken by the self-government has been the creation of a Geographical or Cartographical Service. The latest national recovery with the Statute of 1979, generated the creation of a

Cartographical Service in 1979 and of the *Institut Cartogràfic de Catalunya* in 1982 by law 11/82 of the *Parlament de Catalunya*.

[23] To recover from the accrued deficit is the aim that guided the *Parlament de Catalunya* to equip itself with the necessary cartographic Institution so as to become the tool used by the Government of the Generalitat to make the above-mentioned recovery possible. It conferred it a modern legal formulation of a commercial nature as well as financial and industrial so as to be able to act freely and to finance itself.

[24] The Strategic Lines are ordered according to priorities even if they conform a whole which constitutes the Plan. Lines 1 and 2 lean on each other, given that the ICC as an Institution, carries out final technological research given to backup cartographic output. Lines 3 and 4 are relatively independent.

## 2.2 First Strategic Line: Cartographic Production

[25] It is the first priority and it needs, in some cases, to essentially make up for the existing cartographic deficits. Priorities are effected by following the sequence of the Catalunya Topographic Map (M.T.C.) 1:5.000 ortho and line, 1:25.000 orthophoto and carto-topographical projects done in order to service the D.P.T.O.P. and the Local Administration.

[26] The strategic Plan contemplates a total reinforcement of the series 1:5.000, 1:10.000, 1:50.000 and 1:100.000 on the entire territory of Catalunya, with up to date re-editions wherever required.

[27] The geological map bases its being made on availability of data to be supplied by the *Servei Geològic de Catalunya*.

[28] General flights are updated every two years (scales 1:70.000) and every four years (scales 1:22.000), whilst other flights are globally programmed in the four-yearly plans and, in particular, in the yearly plan.

## 2.3 Second Strategic Line: Technonological Research

[29] The symbiosis production-development is a basic criterium in the advancement of the ICC. To onset the production of tools developed with own means, allows for power, versatility, economy and increase of production standards.

[30] The development of own software systems in geodesy and digital photogrammetry systems will enable, at the end of the plan, an installation of production completely digitalized which will replace the current analogical and analytical stereoplotters.

[31] Production of cartographical information with topological intelligence will become an evolutive constant in the development of the Plan, this with a double objective: to facilitate publication and to shift cartographic information produced in surroundings of geographical information systems.

[32]The photogrammetric synergic digital image process will be promoted with the aim to facilitate fusion of data between the areas of spaceborne remote sensing, information systems and areal photogrammetry.

[33]Several aerial electro-optical sensors will be experimented with, this with criteria both photogrammetric and cartographical, and information will be obtained which is georeferenced, about active and passive sensors.

#### 2.4 Third Strategic Line: Infrastructure

[34]Distribution, knowledge and usage of cartographical products will be brought closer to the Catalan territory.

[35]Digital bases of scales 1:5.000 and 1:50.000 will be transformed with its inherent definition of standards.

[36]Compiling a modern and contemporary collection of cartography will be promoted in the *Cartoteca de Catalunya*.

#### 2.5 Fourth Strategic Line: Education and Research

[37]Tied to the availability of buildings under project and from 1996, a study plan will be generated: The *Pla d'Estudis de l'Escola d'Enginyeria Geogràfica* attached to the *Universitat Politècnica de Catalunya*.

[38]*L'Escola d'Enginyers Geògrafs* will initially organize Departments with laboratories which will have their own research programmes.

### III. STRATEGIES, OBJECTIVES, SUB-OBJECTIVES AND ACTIONS

#### 3.1 Table resume of strategy, objectives, sub-objectives and actions

<p><b>Strategic Line number 1 : Cartographic Production.</b></p> <p>Specific objective number 1: Basic cartography.</p> <p>-Sub-objective number 1: Series of topographic cartography.</p> <p>1.1 Topographic map series 1:5.000              1.2 Topographic map series 1:10.000              1.3 Comarcal map series 1:50.000              1.4 Topographic map series 1:100.000              1.5 Topographic Map of Catalunya 1:250.000</p> <p>-Sub-objective number 2 : Cartography series, Orthophoto.</p> <p>2.1 Orthophotomap 1:5.000              2.2 Orthophotomap 1:25.000              2.3 Orthophotomap 1:50.000              2.4 Orthophotomap 1:100.000</p> <p>-Sub-objective number 3 : Carto-topographics projects.</p> <p>3.1 Viability projects 1:1.000              3.2 Urbanism projects 1:1.000              3.3 City projects 1:500 / 1:1.000              3.4 Metropolitan projects 1:2.000</p> <p><b>Specific objective number 2 : Thematic cartography</b></p> <p>-Sub-objective number 4 : Thematic series</p> <p>4.1 Thematical series 1:250.000              4.2 Land Use and Cover Map 1:100.000              4.3 Geological Map 1:100.000</p> <p><b>Specific objective number 3 : Photogrammetric flights.</b></p> <p>-Sub-objective number 5 : Global coverage Catalunya.</p> <p>5.1 Great height flights B/W 1:70.000              5.2 Great height flights Colour 1:70.000              5.3 Great height flights IRC 1:70.000              5.4 Orthophoto flights B/W 1:22.000</p> <p>-Sub-objective number 6 : Specific territorial coverage</p> <p>6.1 Planning flights 1:6.000 B/W              6.2 Viability flights 1:5.000 B/W              6.3 Flights urban nuclei 1:5.000 B/W &amp; colour.              6.4 Metropolitan flights 1:8.000 B/W &amp; colour.</p>	<p><b>Strategic Line number 2 : Technological research</b></p> <p>Specific Objective number 4 : Cartographic Geodesy</p> <p>-Sub-objective number 7 : Positioning systems</p> <p>7.1 Geodesic nets              7.2 Geodesic calculus              7.3 GPS systems</p> <p>-Sub-objective number 8 : Mathematical photogrammetry.</p> <p>8.1 Aerotriangulation systems              8.2 Data base MDI              8.3 Image correlation systems</p> <p>-Sub-objective number 9 : Developing photogrammetric systems.</p> <p>9.1 Orthophotographic systems              9.2 Photogrammetric digital stations.</p> <p><b>Specific objective number 5 : Automatic Cartography.</b></p> <p>-Sub-objective number 10 : Digital photomechanic.</p> <p>10.1 Digital photomechanic series 1:5.000              10.2 Digital photomechanic series 1:10.000              10.3 Digital photomechanic series 1:25.000</p> <p>-Sub-objective number 11 : Cartographic series.</p> <p>11.1 Automatic symbolisation systems              11.2 Cartographic generalisation</p> <p>-Sub-objective number 12 : Systems for Map publishing.</p> <p>12.1 Cartographic Topography. Map Publishing              12.2 Orthophotomaps. Map Publishing B/W &amp; colour</p> <p><b>Specific objective number 6 : Geographic Information Systems.</b></p> <p>-Sub-objective number 13 : SIG with cartographic model</p> <p>13.1 SIG topographic structures              13.2 Thematic SIG structures</p>	<p>-Sub-objective number 14: Carto-geographic publications</p> <p>14.1 Revista Catalana de Geografia              14.2 Atlas and Micro-Atlas</p> <p><b>Specific objective number 7: Remote Sensing</b></p> <p>-Sub-objective number 15: Systems of cartographic production.</p> <p>15.1 Spacial ortoinage series              15.2 Thematic series              15.3 Experimental series</p> <p>-Sub-objective number 16 : Unconventional sensors.</p> <p>16.1 Electro-optical aerial systems              16.2 Active systems</p> <p><b>Strategic Line number 3 : Infrastructure</b></p> <p><b>Specific objective number 8: Distribution of products.</b></p> <p>-Sub-objective number 17 : Network of distribution.</p> <p>17.1 Lleida, Girona and Tarragona</p> <p>-Sub-objective number 18 : Digital products</p> <p>18.1 Digital product 1:5.000              18.2 Digital product 1:50.000</p> <p><b>Specific objective number 9 : Cartoteca de Catalunya</b></p> <p>-Sub-objective number 19 : Historical cartography</p> <p>19.1 Acquisitions programme              19.2 Catalan catalogues</p>	<p>-Sub-objective number 20 : Modern Cartography.</p> <p>20.1 Horizon 500.000              20.2 Computerised cataloguing</p> <p>-Sub-objective number 21: Photographic Library</p> <p>21.1 Photographic library, cataloguing and access.              21.2 Conservation and reproduction systems</p>
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**Strategic Line number 4 : Education and Research.**

Specific objective number 10 : Escola Enginyeria Geogràfica

-Sub-objective number 22 : High education.

22.1 Creation of School of Cartographic Engineering  
 22.2 Geodesy, Photogrammetry and Remote Sensing Departments.

-Sub-objective number 23 : Laboratory Research and Development

23.1 Research programmes.

### 3.2 CARDS DEFINING ACTIONS OF PLAN (1)

<p><b>Project 1.1 Topographic Map Series 1:5.000</b>  <b>Description:</b> Publication of 4.200 sheets with overall coverage  <b>Justification:</b> Basic map for economic and multidisciplinary uses with digital metric base.  <b>Connection with the Objective:</b> <i>Priority</i>, basic for foreprojects of all kinds  <b>Terms:</b> Enforcement 89-93, updating 94-99</p>	<p><b>Project 2.2 Ortophotomap 1:25.000</b>  <b>Description:</b> Publication of the 304 sheets with overall coverage  <b>Justification:</b> Basic map for economic use. Essential for updating small scales  <b>Connection with the Objective:</b> <i>Priority</i>  <b>Terms:</b> Enforcement 91-92 (B/W), updating 93-95 (colour)</p>
<p><b>Project 1.2 Topographic Map Series 1:10.000</b>  <b>Description:</b> Publication of the 1.050 sheets with overall coverage  <b>Justification:</b> Derived map of 1.5.000 for general use. National series. Printed  <b>Connection with the Objective:</b> Complement to cover of mediums scales  <b>Terms:</b> Enforcement 92-94, updating 95-99</p>	<p><b>Project 2.3 Ortophotomap 1:50.000</b>  <b>Description:</b> Publication of the 84 sheets with overall coverage  <b>Justification:</b> Made with spacial satellite images SPOT-1 &amp; SPOT 2  <b>Connection with the Objective:</b> Fast coverage orthophotographic at small scale  <b>Terms:</b> Enforcement 89-90 (B/W), updating 92-95 (Colour)</p>
<p><b>Project 1.3 Comarcal Map Series 1:50.000</b>  <b>Description:</b> Printed publication of the 41 sheets of the territorial topographic map  <b>Justification:</b> Comarca geographical map. National series. Printed  <b>Connection with the Objective:</b> <i>Priority</i>, great importance geographical and administrative  <b>Terms:</b> Enforcement 91-93, updating 94-99</p>	<p><b>Project 2.4 Ortotommap 1:100.000</b>  <b>Description:</b> Publication of the 27 sheets with overall coverage  <b>Justification:</b> Made with spacial images LANDAST -5  <b>Connection with the Objective:</b> Fast infra-red colour coverage.  <b>Terms:</b> Enforcement 89-90 (IR), updating 92-93 (colour)</p>
<p><b>Project 1.4 Topographic Map series 1:100.000</b>  <b>Description:</b> Printed publication of the 27 sheets with overall coverage  <b>Justification:</b> National topographic Series. Printed  <b>Connection with the Objective:</b> Basic map at small scale  <b>Terms:</b> Enforcement 93-95, updating 96-99</p>	<p><b>Project 3.1 Viality projects 1:1.000</b>  <b>Description:</b> Production three-dimensional cartographic tracings.  <b>Justification:</b> Serve to assist systems of assisted design for civil works of DPTOP  <b>Connection with the Objective:</b> <i>Institutional Service</i>  <b>Terms:</b> Production of 10.000 Hes. yearly.</p>
<p><b>Project 1.5 Topographic Map series 1:250.000</b>  <b>Description:</b> Geographical Map of the Catalunya area in one sheet  <b>Justification:</b> Cartographic base of the derived cartographic series  <b>Connection with the Objective:</b> Official Map of Catalunya  <b>Terms:</b> Updating 93-97</p>	<p><b>Project 3.2 Urbanism Projects 1:1.000</b>  <b>Description:</b> Production of digital cartography 2D  <b>Justification:</b> Give metric bases to planning of DPTOP  <b>Connection with the Objective:</b> <i>Institutional Service</i>  <b>Terms:</b> Production of 3.000 Hes. 1:1.000 yearly.</p>
<p><b>Project 2.1 Ortophotomap 1:5.000</b>  <b>Description:</b> Publication of the 6.400 sheets with overall coverage  <b>Justification:</b> Basic map for economic use, multidisciplinary  <b>Connection with the Objective:</b> <i>Priority</i>, basic map complementing Topographic Map  <b>Terms:</b> Enforcement 87-93, updating 94-99</p>	<p><b>Project 3.3 City Projects 1:500/1:1.000</b>  <b>Description:</b> Production of digital cartography 2D  <b>Justification:</b> Give metric bases for Local Administration  <b>Connection with the Objective:</b> <i>Institutional Service</i>  <b>Terms:</b> 3.000 Hes. 1:500 and 1:1.000 yearly</p>



3.2 CARDS DEFINING ACTIONS OF PLAN (2)

<p><b>Project 3.4 Metropolitan projects 1:2.000</b>                  Description: Digital Cartographic Urban Production 2D High density                  Justification: To accord metric bases to metropolitan areas                  Connection with the Objective: Institutional Service                  Terms: Production of 5.000 Hes. yearly.</p>	<p><b>Project 5.3 Great height flights IRC 1:70.000</b>                  Description: Photogrammetric flight, global coverage for land control                  Justification: For photointerpretation of vegetation with cartographic and thematic purposes.                  Connection with the Objective: Aid to thematic aspects of topographical map 1:25.000                  Terms: Along the Plan every 2-3 years</p>
<p><b>Project 4.1 Thematic series 1:250.000</b>                  Description: National Thematic Series printed                  Justification: To give expression to metric specific global variants                  Connection with the Objective: Institutional Services.                  Terms: Along the Plan every 2-3 years</p>	<p><b>Project 5.4 Orthophoto flights B/W 1:22.000</b>                  Description: Photogrammetric flight, global coverage for land control                  Justification: For compiling orthophotomap and topographic map 1:5.000                  Connection with the Objective: Prerequisite of project 3.2                  Terms: Along the Plan every 4 years</p>
<p><b>Project 4.2 Land Use and Cover Map 1:100.000</b>                  Description: Publication of the 27 sheets for uses and occupations of land                  Justification: Publication of information Project CORINE                  Connection with the Objective: Basic cartography of multidiscipline use                  Terms: Enforcement 91-93, updating 94-96</p>	<p><b>Project 6.1 Planning flights 1:6.000 B/W</b>                  Description: Photogrammetric flights partial coverage                  Justification: For compiling digital cartography 2D                  Connection with the Objective: Prerequisite for project 3.2                  Terms: Same as project 3.2</p>
<p><b>Project 4.3 Geological Map 1:100.000</b>                  Description: Publication of the basic map Institut Geològic de Catalunya                  Justification: National Series printed                  Connection with the Objective: Institutional Services                  Terms: Along the Plan</p>	<p><b>Project 6.2 Viability flights 1:5.000 B/W</b>                  Description: Photogrammetric flights partial coverage                  Justification: For compiling viability cartography 3D                  Connection with the Objective: Prerequisite for project 3.1.                  Terms: Same as project 3.1</p>
<p><b>Project 5.1 Great height flights B/W 1:70.000</b>                  Description: Photogrammetric flight, global coverage for land control                  Justification: Compiling of photograph B/W &amp; topographic map 1:25.000                  Connection with the Objective: Prerequisite of project 2.2                  Terms: Along the Plan every 2-3 years.</p>	<p><b>Project 6.3 Flights urban nuclei 1:5.000 B/W &amp; Colour</b>                  Description: Photogrammetric flights partial coverage                  Justification: For compiling urban cartography 1:1.000 and 1:500                  Connection with the Objective: Prerequisite for project 3.3                  Terms: Same as project 3.3</p>
<p><b>Project 5.2 Great height flights colour 1:70.000</b>                  Description: Photogrammetric flight, global coverage for land control                  Justification: Compiling of orthophotomap colour &amp; topographic map 1:25.000                  Connection with the Objective: Prerequisite of project 2.2                  Terms: Along the Plan every 2-3 years</p>	<p><b>Project 6.4 Metropolitan flights 1:8.000 B/W &amp; Colour</b>                  Description: Photogrammetric flights partial coverage                  Justification: For compiling cartography of metropolitan areas                  Connection with the Objective: Prerequisite for project 3.4                  Terms: Same as project 3.4</p>

3.2 CARDS DEFINING ACTIONS OF PLAN (3)

<p><b>Project 7.1 Geodesic nets</b> Description: Establishing geodesic territorial nets supported by state ones Justification: Carrying out cartographic projects at small and large scale Connection with the Objective: Prerequisite for projects 3.3, 3.4 and others Terms: Along the Plan</p>	<p><b>Project 9.1 Orthophotographic systems</b> Description: Amending systems for photogrammetric models producing orthophoto Justification: Digital systems of output with own design and development. Connection with the Objective: Analogical system elimination with own technology Terms: Operational 1989 with ongoing development</p>
<p><b>Project 7.2 Geodesic calculus</b> Description: Furnishing the ICC with calculus systems allowing geodesic compensation Justification: To know and develop complete systems of geodesic calculus for cartographic use Connection with the Objective: Prerequisite of project 7.1 Terms: Along the Plan</p>	<p><b>Project 9.2 Photogrammetric digital stations</b> Description: Establishing stations of photogrammetric restitution on digital models Justification: Establishing a production line totally digital Connection with the Objective: Increase of integration, precision and high output Terms: 1992 enforcement, developing along Plan.</p>
<p><b>Project 7.3. GPS Systems</b> Description: Obtention of Observation necessary systems for establishing nets Justification: Self-management in observation and calculus allow experimental developments Connection with the Objective: Prerequisite of projects 7.1 and 7.2 Terms: Along the plan</p>	<p><b>Project 10.1 Digital photomechanic Series 1:5.000</b> Description: Digital system for merchandising entire cartographic photomechanics Justification: Reduction of material and occupational costs with increase of output Connection with the Objective: Massive production of 8-10 sheets daily Terms: Operational 1990, continuous development</p>
<p><b>Project 8.1. Aerotriangulation systems</b> Description: Development and use of aerotriangulation photogrammetric systems Justification: Own development which allows establishing own production systems Connection with the Objective: Prerequisite of project 9.1 Terms: Operational 1989, an ongoing development</p>	<p><b>Project 10.2 Digital Photomechanic Series 1:10.000</b> Description: Digital system for merchandising the entire cartographic photomechanics Justification: Reduction of material and occupational costs with increase of output Connection with the Objective: Massive production of 8-10 sheets daily Terms: Operational 1992, continuous development</p>
<p><b>Project 8.2. Data base MDT</b> Description: Data structures storing analytical description of relief Justification: Metric control and Operational Structures of the MDT Connection with the Objective: Prerequisite for projects 9.1 and 9.2 Terms: Operational 1989 an ongoing development</p>	<p><b>Project 10.3 Digital photomechanic Series 1:25.000</b> Description: Digital system for merchandising the entire cartographic photomechanics Justification: Reduction of material and occupational costs with increase of output Connection with the Objective: Massive production of 8-10 sheets daily Terms: Operational 1993, continuous development</p>
<p><b>Project 8.3 Image correlation systems</b> Description: Correlation system development to obtain MDT Justification: To substantially reduce the efforts of photographic MDT compiling Connection with the Objective: Obtention of 3D altimetry of quality Terms: Developing along the programme</p>	<p><b>Project 11.1 Automatic Symbolisation Systems</b> Description: Software development for generating maps from BCN Justification: Use of numerical cartographic bases common to various series Connection with the Objective: Publication of National series printed Terms: Along the Plan</p>

3.2 CARDS DEFINING ACTIONS OF PLAN (4)

<p><b>Project 11.2 Cartographic generalisation</b> Description: Generation of interior scales from close BCN Justification: Substantial compilation savings of MDT and BCN from derived scales Connection with the Objective: Obtention of derived scales 1:10.000 and 1:100.000 Terms: Along the plan</p>	<p><b>Project 14.2 Atlas &amp; Micro-Atlas</b> Description: Publication of monographies both in book and digital form about Comarques Justification: To give units of cartogeographic information in a Comarcal format Connection with the Objective: Institutional service in the Comarques Terms: Along the Plan</p>
<p><b>Project 12.1 Cartographic Topography. Map publishing</b> Description: Publishing systems for topographic digital cartography Justification: Analysis and parametrics of cartographic design and its filtration of bases Connection with the Objective: Publication of National Series printed Terms: Along the Plan</p>	<p><b>Project 15.1 Spatial Ortoimage Series</b> Description: Development of ortocartographic production systems from special observation sensors Justification: Fast generating of multi-spectral images Connection with the Objective: Complement to the National Cartographic Series Terms: Along the Plan</p>
<p><b>Project 12.2 Orthophotomaps. Map publishing B/W &amp; Colour</b> Description: Digital Cartographic Publication Systems Justification: Analysis and parametrics of cartographic design and its filtration of bases Connection with the Objective: Publication of National Series printed Terms: Along the Plan</p>	<p><b>Project 15.2 Thematic Series</b> Description: Development of analysis and classification systems of spatial images Justification: To enable synoptic and statistical analysis of output Connection with the Objective: Generating thematic series of global coverage Terms: Along the plan</p>
<p><b>Project 13.1 SIG topographic structures</b> Description: To give digital cartographic bases with topology oriented towards SIG. Justification: Compiling numerical bases with multidiscipline uses with projects SIG Connection with the Objective: Institutional Service Terms: Along the Plan</p>	<p><b>Project 15.3 Experimental Series</b> Description: Study of experimental sensors Justification: To maintain development and study of new sensors Connection with the Objective: Maintained technological development Terms: Along the Plan</p>
<p><b>Project 13.2 Thematic SIG structures</b> Description: To give thematic metric bases oriented towards SIG. Justification: Compiling numerical bases with multidiscipline uses with projects SIG Connection with the Objective: To carry out specific projects Terms: Along the Plan</p>	<p><b>Project 16.1 Electro-optical aerial Systems</b> Description: Development of electro-optical systems Justification: Use on aerial platforms with output above spatial Connection with the Objective: Implementation in large scale projects and fast follow-up Terms: Experimentation 1991, enforcement along the Plan</p>
<p><b>Project 14.1 Revista Catalana de Geografia</b> Description: Publication relative to the geocartographic sciences Justification: A means for technical expression of the ICC and other authors Connection with the Objective: Broadcasting Forum for cartogeographical Terms: Three issues yearly</p>	<p><b>Project 16.2 Active Systems</b> Description: Study of active sensors both aeronautical and spatial Justification: Research of new possibilities for territorial analysis Connection with the Objective: Technological development upkeep Terms: Along the Plan</p>

### 3.2 CARDS DEFINING ACTIONS OF PLAN (5)

<p><b>Project 17.1 Lleida, Girona and Tarragona</b>  <b>Description:</b> <i>Implementation in three Catalan capitals of broadcast and sales outlets</i>  <b>Justification:</b> <i>To promote, broadcast and make available cartography to the citizen</i>  <b>Connection with the Objective:</b> <i>Institutional service</i>  <b>Terms:</b> <i>Girona 1991, Lleida 1992, Tarragona, 1993</i></p>	<p><b>Project 20.2 Computerised cataloguing</b>  <b>Description:</b> <i>To create cartographic catalogues of the Cartoteca in a computerised form</i>  <b>Justification:</b> <i>Aid to analysis, study and broadcast of the document collection</i>  <b>Connection with the Objective:</b> <i>Institutional service</i>  <b>Terms:</b> <i>Along the Plan, following the increase of the collection</i></p>
<p><b>Project 18.1 Digital product 1:5.000</b>  <b>Description:</b> <i>To make available to the public the Basic Map 1:5.000 with digital support</i>  <b>Justification:</b> <i>To ease the standards of format, structure of data, precision and updating</i>  <b>Connection with the Objective:</b> <i>To promote the use of cartographic digital products</i>  <b>Terms:</b> <i>Along the plan following production</i></p>	<p><b>Project 21.1 Photographic library, cataloguing and access</b>  <b>Description:</b> <i>Structuring the aerial photographic collection produced at the ICC and its cataloguing</i>  <b>Justification:</b> <i>Creation of a document collection for territorial historic studies</i>  <b>Connection with the Objective:</b> <i>Institutional Service</i>  <b>Terms:</b> <i>Along the Plan</i></p>
<p><b>Project 18.2 Digital product 1:50.000</b>  <b>Description:</b> <i>To make available to the public the Basic Map 1:50.000 with digital support</i>  <b>Justification:</b> <i>To ease the standards of format, structure of data, precision and updating</i>  <b>Connection with the Objective:</b> <i>To promote the use of cartographic digital products</i>  <b>Terms:</b> <i>Along the plan following production</i></p>	<p><b>Project 21.2 Conservation and reproduction systems</b>  <b>Description:</b> <i>Deposit of documents concerning photogrammetric flights</i>  <b>Justification:</b> <i>To guarantee their historical conservation</i>  <b>Connection with the Objective:</b> <i>Institutional service</i>  <b>Terms:</b> <i>Along the Plan</i></p>
<p><b>Project 19.1 Acquisitions programme</b>  <b>Description:</b> <i>To promote donations and acquisitions of historical cartography</i>  <b>Justification:</b> <i>To create a collection of historical cartography and of related documents</i>  <b>Connection with the Objective:</b> <i>Give contents to the Cartoteca de Catalunya</i>  <b>Terms:</b> <i>Along the Plan</i></p>	<p><b>Project 22.1 Creation of School of Cartographic Engineering</b>  <b>Description:</b> <i>To give an educational and research structure within the framework of Sciences of the Earth</i>  <b>Justification:</b> <i>Its non-existence</i>  <b>Connection with the Objective:</b> <i>Give continuity and university levels</i>  <b>Terms:</b> <i>In the last third of the Plan</i></p>
<p><b>Project 19.2 Catalan Catalogues</b>  <b>Description:</b> <i>To publish cataloguing of Historical Catalan cartographic collection</i>  <b>Justification Broadcast and study of Catalan Historical cartography</b>  <b>Connection with the Objective:</b> <i>Institutional Service of the Cartoteca de Catalunya</i>  <b>Terms:</b> <i>Along the Plan</i></p>	<p><b>Project 22.2 Geodesy, Photogrammetry and Remote Sensing Departments</b>  <b>Description:</b> <i>To give an educational structure to the School</i>  <b>Justification:</b> <i>Generate regulated syllabi in the mentioned departments</i>  <b>Connection with the Objective:</b> <i>Extension of the project 22.1</i>  <b>Terms:</b> <i>In the last third of the Plan</i></p>
<p><b>Project 20.1 Horizon 500.000</b>  <b>Description:</b> <i>To promote exchange, donation and acquisition of contemporary cartography</i>  <b>Justification:</b> <i>To create a document collection aimed at study and consultation</i>  <b>Connection with the Objective:</b> <i>Institutional Service of the Cartoteca de Catalunya</i>  <b>Terms:</b> <i>Along the Plan every 2-3 years it is envisaged to compile 500.000 maps</i></p>	<p><b>Project 23.1 Research programmes</b>  <b>Description:</b> <i>To give the School a research structure</i>  <b>Justification:</b> <i>Generate research within the School Departments</i>  <b>Connection with the Objective:</b> <i>Extension of the project 22.1</i>  <b>Terms:</b> <i>In the last third of the Plan</i></p>