



C O M M I S S I O N    I V

TOPOGRAPHIC AND CARTOGRAPHIC APPLICATIONS OF PHOTOGRAMMETRY

P r e s e n t e d    P a p e r

NATIONAL REPORT - BRASIL

DYNAMIZATION OF CARTOGRAPHY - DINCART - BRASIL

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Zusammenfassung:/Abstract:/Sommaire:

Systematic Topographic Mapping of Brasil, in 1977, was scheduled to enter the XXIst century yet uncomplete. The Government of Brasil decided to face the challenge. By means of the Commission of Cartography, Brasil - COCAR - the Program of Dynamization of Cartography - DINCART - was started in 1978. The goal of such Program is, in 1985, to conclude to the topographic mapping of Brasil within the scales of 1/100 000 and 1/250 000.

The present paper deals with the structure of the Commission of Cartography - Brasil - COCAR, its administrative and technical support by its Secretariat-Executive and the history, goals and achievements of DINCART after two years of existence.

## DYNAMIZATION OF CARTOGRAPHY - DINCART - BRASIL

### NATIONAL CARTOGRAPHIC POLICY - BRASIL

National Cartographic Policy - Brasil is oriented towards production of cartographic information with twofold purpose:

- supporting the economical and social development of the Country, covering peculiarities of all sectors of national economy;
- supporting the national security policy, especially in identifying and materializing boundaries, as well as pinpointing sites of security interest.

Cartography brings essential support to social, agricultural and energetic areas, now selected as top-priority areas by the Brazilian Government. Cartography is helping to face the great challenges, posed to the Government such as: national integration, development of economic poles, regional, urban and land-use policies, strategy of occupation for uninhabited areas, production-flow and consequently the lay-out of supply and exportation corridors and terminals; identification and pinpointing of sources of energy, nuclear and spacial programs, habitational and energetic policies, land demarcation and reclamation, information on the environment and natural resources, as well as marine and aerial navigation.

Due to the scarcity of financial sources, selective, progressive and coordinated action, must be pursued, according to mean and long-term national strategy, cross-checked with minimal technical criteria, acceptable by all potential and actual users.

### CARTOGRAPHIC COORDINATION - BRASIL - BRIEF HISTORY

The formulation of Directives and Basic Standards for the Brazilian Cartography is not a recent theme.

The need for a coordinating agency, orienting the cartographic activities, is a long-sought aspiration of the cartographic professionals in Brasil.

The first attempt of systematic survey of the Country started about 1873, when the Commission of the General Chart of the Empire of Brasil was created. In 1890 the Republic of the United States of Brasil created the Military Geographic Service to elaborate the General Chart of the Republic of Brasil, within the Army Major Staff; this Commission was the starting point of the Army Geographic Service - SGE, created in 1932.

The hydrographic surveys started at prior date and the Hydrographic Office in 1876 was already in operation; this Office originated the today Directorate of Hydrography and Navigation - DHN.

In 1936 the Brazilian Institute of Geography and Statistics (IBGE) was created and in 1937 the first private company was founded, dedicated to aerophotogrammetric surveys.

In 1941 the Ministry of Aeronautics was founded and the aeronautical cartographic services continued, originated from Military and Naval Aviations; the Aeronautical Cartographic Plan took shape, based on the "standard and recommended practices" of the ANNEX IV to the Convention of ICAO.

After several attempts of Cartographic Coordination, at the end of 1966 and beginning of 1967, by initiative of President Castelo Branco, a working-group met, for the establishment of Directives and Bases of Cartography and of the National Cartographic Policy. Such group, working full-time, presented the base of the today Decree-by-Law 243/67, in force to date, which states "The Directives and Bases of Brazilian Cartography" and creates the Commission of Cartography - BRASIL - COCAR.

The Decree-by-Law prescribed that COCAR would be part of IBGE (Brazilian Institute of Geography and Statistics);

in 1975 the President of the Republic, concerned about the importance of the nation-wide Cartographic Coordination, with about 52% of the national territory still to be mapped topographically, raised COCAR to the level of the Secretary of Planning - Presidency of the Republic, nominating its Secretary-General as President of COCAR.

The generally accepted parameters of Cartographic Coordination became operational:

1. Direct subordination to the Presidency of the Republic;
2. Level of status above the executing agencies;
3. Equidistance among the executing agencies;
4. General Plan of Mapping for the Country;
5. Acceleration of the establishment of Fundamental Geodetic network;
6. Improvement of equipment in the Cartographic Organizations;
7. Widening of interagency cooperation;
8. Incentive to the formation and improvement of cartographic tuition and research;
9. Centralization of Cartographic Information;
10. Standardization and regulation of cartographic activities.

All these requirements are provided by the now-existing legislation.

#### COMMISSION OF CARTOGRAPHY - BRASIL - COCAR

COCAR was created on February 28, 1967, and included within the Secretary of Planning - Presidency of the Republic - since September 6, 1976 with the duties of coordinating the execution of the National Cartographic Policy, with other attributes related to the cartographic activities.

The Secretariat-Executive-COCAR was created with the duty of providing administrative and technical support to

the Commission of Cartographic. Only after August 1st, 1978 it came into existence when Lt Col Engineer (Brazilian Air Force) FERNANDO RODRIGUES DE CARVALHO (M.S. Ohio State University - Geodetic Science) was nominated Secretary-Executive by the Minister - Secretary of Planning, with the duties of organizing and initializing its activities.

COCAR's structure is illustrated in the attached table with representatives of:

- Major Staff of the Armed Forces (EMFA)
- Navy
- Army
- Air Force
- Agriculture
- Mines and Energy
- Interior
- Brazilian Institute of Geography and Statistics-IBGE
- National Association of Aersurvey Enterprises (Private Companies)

under the Presidency of Secretary-General, Ministry of Planning.

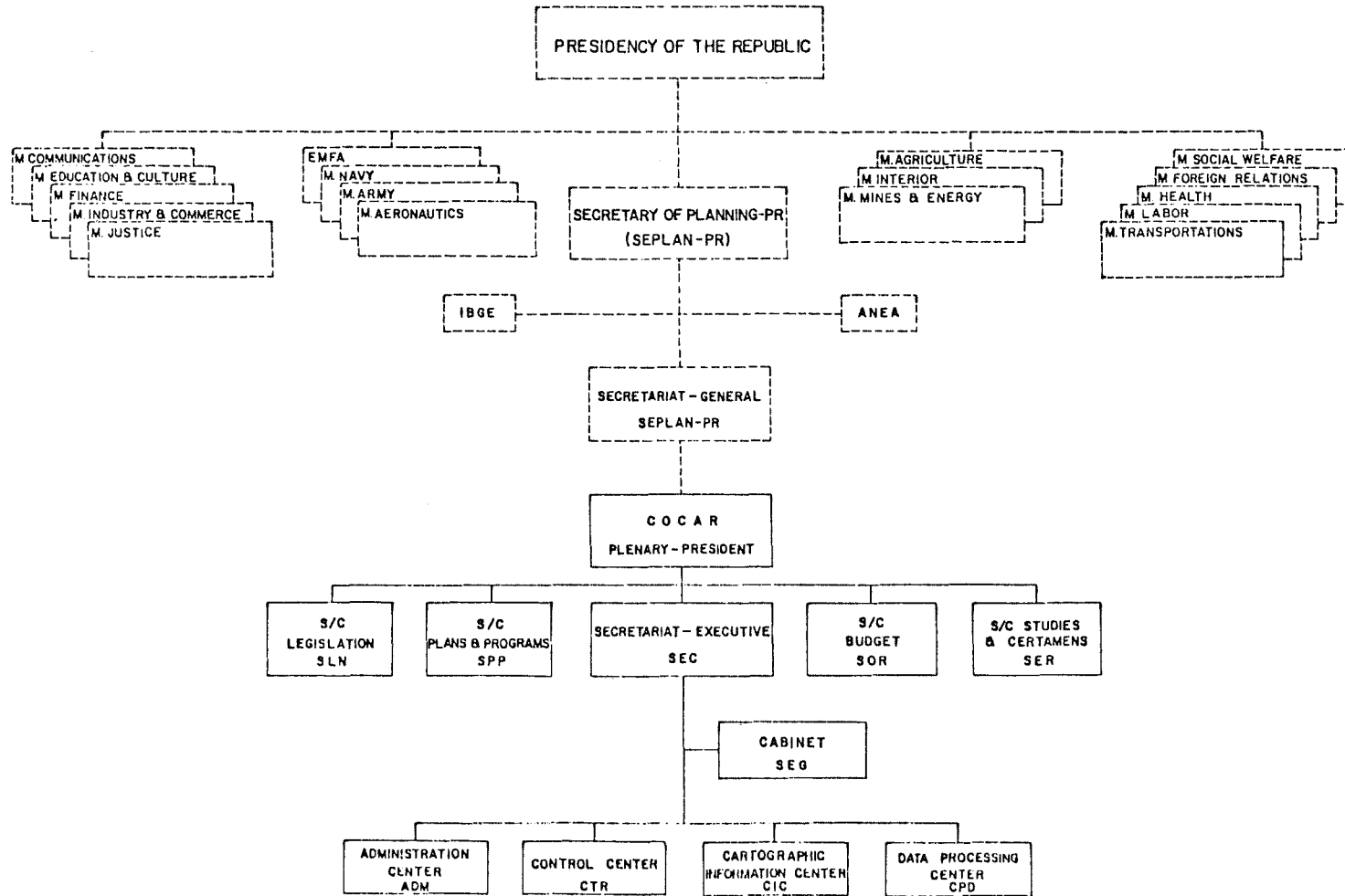
#### PROGRAM OF DYNAMIZATION OF CARTOGRAPHY - PDC - DINCART

Upon the first meeting of COCAR under the chairmanship of the Secretary-General (1976), he announced the decision of the President of the Republic to shorten the time for completion of the topographic mapping of Brasil.

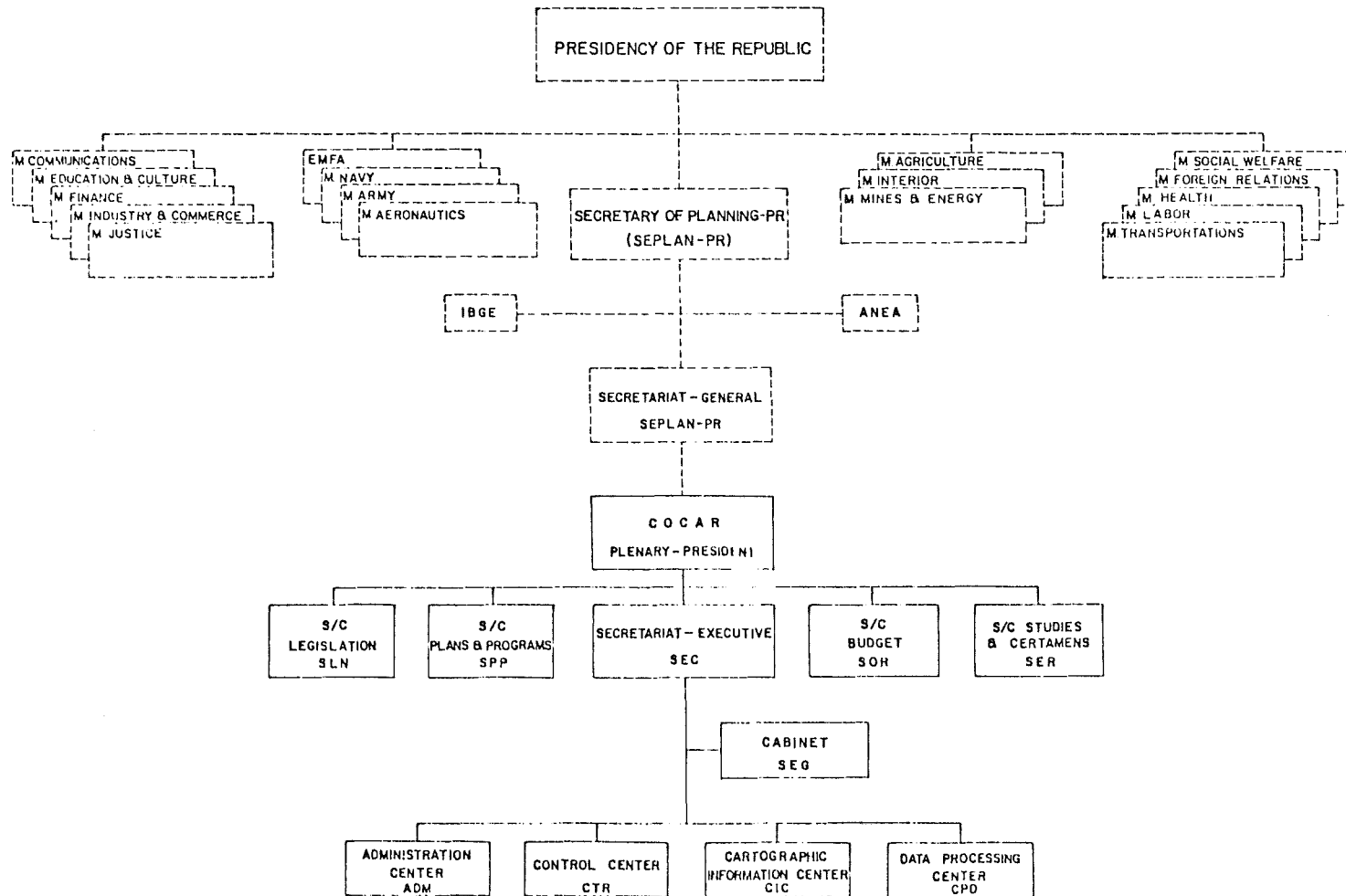
In order to achieve a comprehensive and thorough picture of the situation, it was decided to set forth "feasibility study" by the Subcommission of Plans and Programs-COCAR (Navy, Air Force, IBGE, Interior); a full and profound study of the situation offered three lines of action, by means of aerophotogrammetric methods:

1. Maintaning the "status quo" - 20 years
2. Doubling the effort - 8 years
3. Tripling the effort - 5 years

BRASIL  
 COMMISSION OF CARTOGRAPHY - COCAR  
 COMMISSION STRUCTURE  
 HIERARCHAL LINK



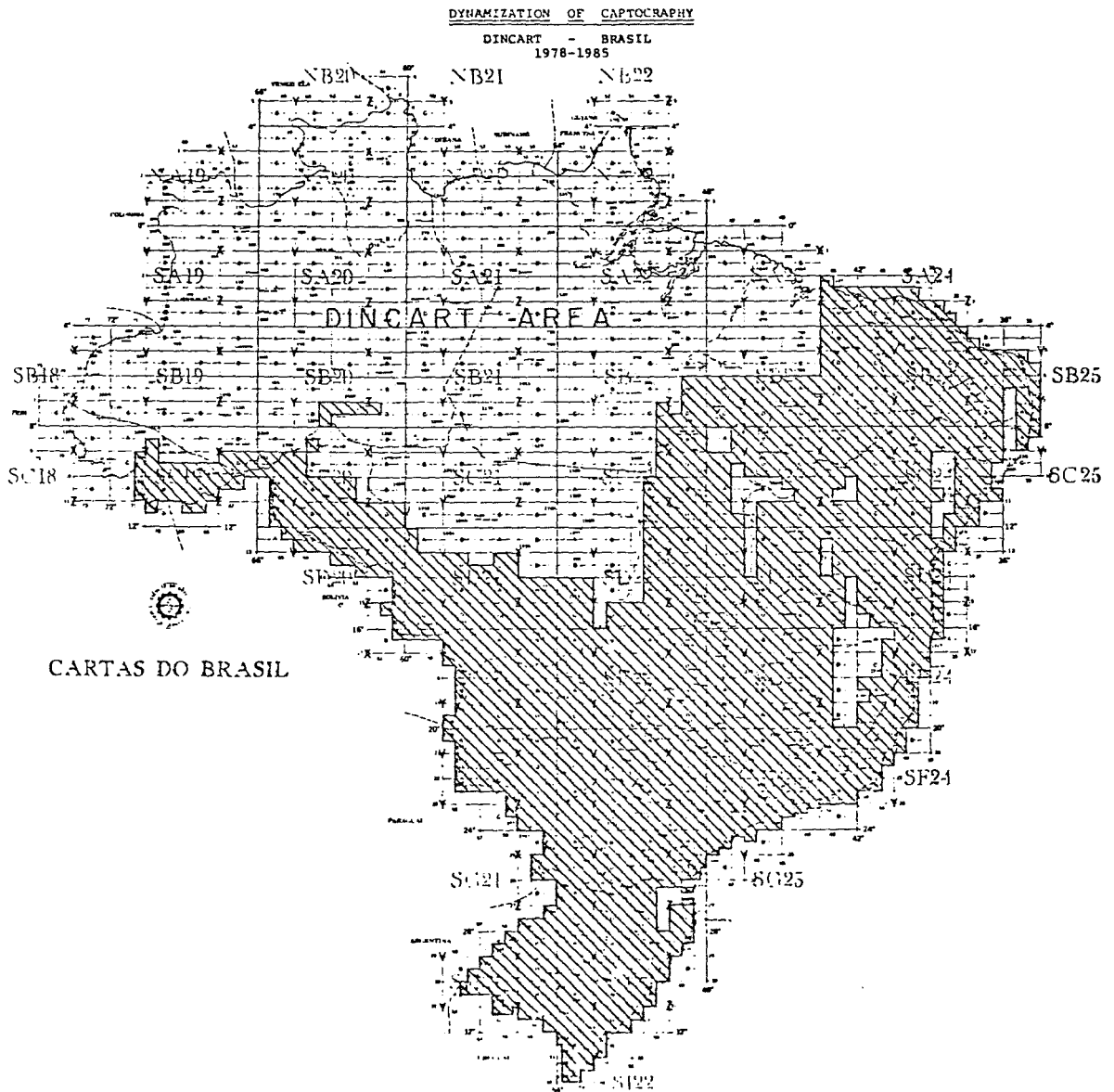
BRASIL  
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DYNAMIZATION OF CARTOGRAPHY

DINCART - BRASIL

1978 / 1985





The Plenary Assembly - COCAR decided for the second alternative, accounting for the excessive investment and costing of the third alternative. Yet the aerophotographic work in Amazonia, always a bottleneck in Brasil due to the climatologic conditions, would interfere with the schedule of five years, since, with the available aerophoto capacities, the aerophotography itself was scheduled for about five years; the 8-years-program was reckoned feasible and sensibly sound.

The decision was in accordance with the financial sources, devised by the Ministry of Planning. In addition, the Dynamization Program was devised as an AID to the budgetary provisions, already existent, in each of the involved agencies AND NOT a self-sufficient program.

By April 1978 the Government approved the SPECIAL PROGRAM OF DYNAMIZATION OF THE NAUTICAL, AERONAUTICAL AND TERRESTRIAL CARTOGRAPHY by photogrammetric survey (DINCART).

The SIDE LOOKING RADAR program, RADAM, had already covered the whole country in scale 1:250.000, with planimetric representation; photogrammetric process, through DINCART, should provide full topographic mapping.

The program, started by October 1978 with US\$ 10.4 millions, in 1979 US\$ 8.0 millions were assigned and for 1980 we have US\$ 8.2 millions, somehow short off the feasibility study which at 1976 prices estimated the annual disbursement at about US\$ 9.0 millions a year. The world oil crisis and inflation account for this shortage.

By Presidential mandate, the Commission of Cartography - COCAR was set in charge of coordinating this Program.

Aside of the Dynamization Program, COCAR is in charge of Coordinating another traditional Program: Coordination of the Execution of Cartographic Policy.

The Secretariat-Executive - COCAR takes care of the administrative and technical support of the activities and

liaison with executing agencies, namely:

- Navy - Directorate of Hydrographic and Navigation-DHN
- Army - Directorate of Geographic Service - DSG
- Air Force - Directorate of Electronics and Projection to the Flight - DIREPV
- Planning - Brazilian Institute of Geography and Statistics - IBGE

#### OBJECT OF DINCART

To maintain accelerated the mapping of the country (Nautical, Aeronautical, Terrestrial) starting at 1978 and, in the next seven years to finish total coverage of the territory.

#### STRATEGIES OF DINCART

To introduce progressively new technologies as well as to re-equip the Government mapping agencies, mobilizing in addition the private enterprises.

To implant modern methods of managerial behaviour, including cost estimation and analysis, throughout all the mapping phases, accompanying their execution.

To adjust the Program to national needs, as diagnosed in the feasibility study.

To guarantee the quality control of the products in order to benefit the different users.

To support with topographic charts all the national development poles, yet lacking this kind of maps.

To guarantee the safety of the maritime and air traffic with updated charts, in accordance with international compromises assumed by Brasil.

#### CARTOGRAPHIC INFORMATION

One of the permanent scopes pursued by COCAR is bringing the users and easing producers the interchange of cartographic information.

graphic information, in order to avoid expensive and undesirable overlaps; in this sense COCAR is striving to set up a system of updating and disseminating cartographic informations in a way devised to be the most reliable, quick, efficient and of least possible cost.

CIC - Cartographic Information Center, one of the branches of Secretariat-Executive - COCAR is taking care of this task with intensive use of automatic data processing - ADP.

#### CARTOGRAPHIC PRODUCTION

DINCART is at full force in its third year and offers basic numbers of production as follows:

- at December 1977 we had 4.158 millions km<sup>2</sup> equivalent to 46% of the National Territory;

- at December 1978 we had a fairly good result in terrestrial cartography in spite that the program started at the second semester - 378 thousand km<sup>2</sup> were mapped; additionally the Army produced 180 000 km<sup>2</sup>, recycling old maps in the southern border; IBGE produced additionally 2 000 municipal topographic maps for census purposes.

Air Force in joint-venture with IBGE edited 46 sheets of Brazilian World Aeronautic Chart - WAC at 1/1.000.000 scale.

Navy edited additionally eight charts on Paraguai and Solimões (high Amazon) rivers.

It is a known fact that the time elapsed between the beginning and termination of a cartographic project, by photogrammetric survey, is of about 5 years. Presently we have about 89% of the territory mapped or under mapping process. As compared with 1977 when we had 46% mapped, we can already predict the accomplishment of DINCART, hopefully before 1985.

#### TERRESTRIAL CARTOGRAPHY

Employing photogrammetric methods, the ultimate goal is to have the topographic mapping of the whole country

(8 511 965 km<sup>2</sup>) finished until 1985.

It should be noticed that southern Brasil from 20°S parallel down to the southern border is being mapped at 1/50.000 scale; the remainder is being mapped at 1/100.000 and Amazonian areas, devoid of imminent development plans, are being mapped at 1/250.000 scale.

For planning purposes the territorial space was divided into 3 036 squares of 30 minutes of arc, equivalent to a sheet at the 1/100.000 scale.

#### NAUTICAL CARTOGRAPHY

The priority is oriented towards the updating of the basic charts for the maritime area, elaboration of new charts for the fluvial area on the basin of the most important navigable rivers, especially the Amazon and Paraguai rivers. The investment is aimed at the re-equipment of the oceanographic and hydrographic ships with new instrumentation, in accordance with the technical developments of the state of the art.

#### AERONAUTICAL CARTOGRAPHY

Its priorities contemplate, beyond the specific activities of Air Cartography, the support in Aerophotography and Aerogeodesy, comprised in this latter activity the air transportation and airborne geodetic activities to be adopted during the execution of the program. Aerophotography and Aerogeodesy should increase according to the pace of the terrestrial mapping.

The final goal of Air Cartography is to support the system of Air Defense and Air Traffic - DACTA and Protection to the Flight - SPV, through specific charts and documents.

#### INSTITUTIONAL RESOURCES - EXECUTING AGENCIES

DINCART counts, under coordination of COCAR, with unrestricted support of the governmental agencies in charge of cartographic work. Special emphasis is to be given to

IBGE - Foundation (Brazilian Institute of Geography and Statistics - the civilian mapping agency in Brasil), Directorate of Geographic Service (DSG-ARMY), Directorate of Hydrography and Navigation (DHN-NAVY), Directorate of Electronics and Protection to the Flight (DIREPV-AIR FORCE) and General Command of the Air (COMGAR-AIR FORCE). Working by contract with governmental agencies, the private photogrammetric and survey companies contribute to the common effort of mapping the country.

### USERS

The clients to directly benefit from DINCART will be the regional organizations, namely the Superintendencies of Development of: Amazonia - SUDAM, Northeast - SUDENE, and Midwest - SUDECO; The National Institute of Colonization and Agrarian Reform - INCRA, Brazilian Institute of Forest Development - IBDF, The National Foundation of the Indian - FUNAI, national security organizations, Marine and Air Navigation as well as the programs dealing with agriculture, high ways and natural energetic and socio-economic researches; it should be mentioned yet that, in order to support their peculiar demands of charts, in scales greater than 1/20.000, these clients contract, with the private sector, substantial volume of cartographic services in these scales, known as engineering or advisory and detail charts.

### LOGISTICS

DINCART counts with outstanding contribution from the Brazilian Institute of Geography and Statistics - IBGE. This Foundation provides the Secretariat-Executive - COCAR with all the logistics support in personnel, material and equipment.

### MEANS & WAYS LEGISLATION

The Dynamization Program is also aimed at rendering compatible the National Cartographic Plan with the several existing legal instruments in the cartographic area. The goal

is to update and support procedures in use, as well as to enforce and accelerate the activities of coordination and accompaniment of cartographic works.

#### CONCLUSION

Exploiting existing and validated experience of accompaniment and evaluation in the execution of priority Governmental programs, DINCART is being accompanied step by step in its fisic and financial phases. Such a procedure permits the feed-back, necessary in a field of activity with changing parameters and multivariate constraints.

Once again Photogrammetric Method is rendering possible the mapping of a Country, contributing the development of Brasil and the welfare of its people.

DYNAMIZATION OF CARTOGRAPHY

DINCART - BRASIL  
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