

**AUTOMATED SYSTEMS FOR CARTOGRAPHIC  
INFORMATION RETRIEVAL USED IN CARTOGRAPHIC  
INFORMATION SERVICE DEPARTMENT OF THE  
MAPPING PRODUCTION ASSOCIATION  
« KARTOGRAFIA »**

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**Abstract:** Cartographic Information Service Department of Mapping Production Association « Kartografia » disposes of two systems destined for information search about :

- cartographic sources (maps, charts, atlases, etc.),
- features to map out (settlements, power plants, sea ports, airports, protected areas etc.).

Software has been implemented by Gbase Data Base Control System with adoption of Turbo Pascal Language.

Hardware is represented with a computer IBM PC/XT. Data output is issued in two operations :

- on user's demands when they may request any combination of retrieval keys,
- under catalogue arrangement conditions either in standard, or in arbitrary orders.

Cartographic Information Service Department (OSKS), incorporated in Mapping Production Association « Kartografia » (PKO « Kartografia »), disposes of two automated system intended for information retrieval about :

- cartographic sources (maps, atlases, reference materials, etc.),
- mapped features (settlements, electric power stations, airports, etc.),

These systems furnish data for personnel of :

- PKO « Kartografia », for purposes of map compilation and up-dating which are effected by the editors and other specialists with the use of a cartographic information,
- OSKS, for solutions of sample statistic problems, of matters with map depot stocks, of questions of cartographic documents selection for exhibitions, conferences, etc.

- Federal Service of Geodesy and Cartography of Russia (to serve the objectives of making of management decisions).

The above-cited systems could be used in potentiality by the cartographers working in the field of science and technology, and also by the specialists of building construction, exploration of mineral resources, ecology, planning, etc.

The automated system for retrieval of cartographic document information (so called KADIPS) is intended for data gathering about cartographic sources and operates on the bases of the following concepts :

1. The KADIPS data base includes information about the main cartographic sources presented with the maps and atlases being edited by the Federal Service of Geodesy and Cartography of Russia (one copy is sent without fail to OSKS address), and also the foreign cartographic publications demanded by the specialists of PKO « Kartografia », and proceeding from production requirements; these creations are purchased abroad.

In addition, the KADIPS data based includes the bibliographical description of a cartographic system (approximately 4 000 units), stored in the depot of the Russia State Library. In 1991, PKO « Kartografia » has completed the works regarding the bibliographical records conversion into the KADIPS format.

At present, the data base amounts 17 000 record units.

The information supplies are carried in the form of :

- maps and atlases catalogues with indexes (see Supplement 1,2)
- request grants with print out of the complete or condensed document description (see Supplement 3)
- information bulletins of the new accessions (see Supplement 4)
- before-mentioned information forms are recorded on the diskettes. The database for cartographic sources with software and instruction manuals are also offered for the markets.

The cartographic source description is executed on the bases of the descriptive language for information retrieval which was worked out for KADIPS specially and implemented with the « Thesaurus for information retrieval of the cartographic sources under territorial attribute », V.1, M.,1987 and the « Thesaurus for information retrieval of the cartographic sources under the map contents and projections », V.2, M.,1987. The using of the descriptive language for information retrieval with reflection of the generic, specific, synonym and associative connections between the significant information retrieval concepts such as area, contents and projection, ensure a single description of the sources

and then, push up the effectiveness of the required information retrieval. This is the example of the descriptive classes :

- 1 193 SEA WATERS DINAMICS
  - ☞ SEA AND OCEAN WATERS (192)
  - ☛ WIND-DRIVEN WAVES (195)
  - SEA AND OCEAN CURRENTS (197)
  - TIDES AND LOW-TIDES (199)
  - TSUNAMI (200)
  - II PERILOUS NATURAL PHENOMENA (385)
  
- 2 4989 IONIAN ISLANDS
  - ☞☺☺ Zakinthos (Zante) I.
  - Kerkira (Corfu) I.
  - Kefallinia (Cephalonia) I.
  - Sevkas I.
  - ☞ GREECE (4980)
  - II IONIAN SEA (1235)
  
- 3 53 CENTRAL PROJECTION
  - ▣ gnomonic
  - ☞ AZIMUTHAL (1)
  - II ORTHODROMIC (36)
  - PERSPECTIVE (38).

where « ☞ » designates correspondingly generic, « ☛ » specific, « II » associative, « ▣ » and « ☞☺☺ » synonym connections.

A number of concepts in the language for information retrieval amounts accordingly for the aspect « area » (6 000 units), « contents » (about 800 units), « projection » (approximately 200 units).

The language for information retrieval also includes, with a view of a list, the terms through the following aspects:

- form of a source (65 units),
- bibliographical standard (14 units),
- source pattern (20 units),
- purposes (36 units),
- relief representation method (25 units),
- language of an explanatory text (115 units),
- place of publication (country) (205 units),
- publishing house (600 units),
- surveying method (14 units),
- place of storage (300 units).

All above-cited aspects are under the retrieval besides the description format includes : « Title of the cartographic sources » (unretrieved key), « Scale », « Year of publication », « Coordinates », « Nomenclature », « Feature name » (retrieval keys).

All these keys form, in the whole, the retrieval image of a document and present the complete characterisation of the searched source. The memory capacity of the retrieval document image makes up 500 bytes. The demand for information retrieval could include either one or several retrieval keys in different combinations.

Practically, the number of the retrieval keys for a demand do not exceed 4 or 5.

The retrieval directions for a demand are being formed by means of the corresponding codes of the retrieval keys connected by the characters of the logical functions, also by the characters « equally », « more », « less », « unequally », « fall within an interval ». For example, the retrieval directions for the demand « Comprehensive atlases for the Africa territory » published from 1980, will be presented in the following way :

TR = 6000 & SD = 901 & VD = 1 & GP = 1980-1993.

Taking into account that some retrieval keys of KADIPS could have cartographic sets (for instance « year of publication », « area », etc.), it is provided that the information alternative is possible with first description of each block. It makes possible the choice on inquiry of priority information by called keys (of basic territory, basic contents, etc.), which code is indicated at first in accordance with the indexes regulations.

The most characteristic requests to the system are e.g. :

- Germany's cartographic documents retained in PKO « Kartografia »,
- tourist maps of UK publication
- cartographic materials published in 1985-1992, for the USSR territory with the following contents : vegetation, nature protection, soils, and stored in PKO « Kartografia ».

The KADIPS software is designed on the basis of the control system by database with usage of Turbo Pascal 6.0 language, and is intended for service in the operation conditions of the system MS-DOS of the edition 3.0 and more, which is functioning with PC/XT/AT and other overlapped computers.

The system GBASE makes available to carry out the following applications :

- data input and correction,
- data removal from the base,
- creation, correction and conduct of the vocabulary system (thesaurus),
- data selection from the base in line with specified criteria,
- catalogues formation and their read-out to a printer,
- catalogues index set-up and their output to a tape punch,
- data output without systematisation (responses on the demands).

2. Now, OSKS also implements the works on the creation of a factographic database for the following catalogues :

- electric power plant of the World countries (5 000 units),
- airports of the World countries (2 000 units),
- sea ports of the World countries (2 000 units),
- protected areas of the World (4 units),
- populated places of the system work formation countries (20 000 units),
- cites of the World over 1 000 000 inhabitants (160 units),
- settlements of the World countries and their capitals (about 200 units).

By this time, the database for the initial three above-mentioned catalogues has been created.

The software and hardware are the same as used in the case of the KADIPS system.

The list of basic retrieval keys for every mentioned system are cited below:

- Electric Power Plants - type, capacity, fuels, number and capacity of the power sets,

- Airports - name of city served by the airport, latitude, longitude, status, category,
- Sea Ports - category, freight turnover, latitude, longitude,
- Protected Areas - kind, surface area, latitude, longitude, administrative unit name of the first order,
- Populated places of the CIS countries - administrative significance, settlement pattern, year of foundation, number of inhabitants, map nomenclature, names of district, region, dates of decrees on renaming, abolishment, transference.
- Cities over 1 000 000 inhabitants - number of inhabitants, latitude, longitude.
- Settlements over 2 000 inhabitancy - status, number of inhabitancy, latitude, longitude, administrative units of the first and second order.
- Area and population of the World Countries and their capitals - area of a state, number of inhabitancy of a state, name of a capital, number of inhabitancy of a capital.

The names of the continents, countries, features are keyboarded in Russian and Roman alphabets for every system. The retrieval keys imply the title of cartographic and monographic sources which provide the proper information, some descriptive attributes, the parameters defining a feature position.

The program makes provisions of modifications output for every retrieval key in 2 variants, concerning a feature : either all modifications (e.g. settlement renaming, variation of the sea port turnover etc.), or data output applied only to a latest change (see Supplements 5,6).Information for every factographic system could be presented in the form of a catalogue of standard or unspecified mode, which is systematised by the territorial attribute. In case of name change, the user is referred to a new name (see Supplements 7,8).The program allows the factographic data base exportation in the format DFB.

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