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THE IMPORTANCE OF SATELLITE IMAGES IN CREATING A GEO-INFORMATION MAP

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The development of information technologies at the present stage has led to their active use in the interests of studying the earth's surface and subsurface. One of the main products of research in this area is cartographic work, which allows you to clearly demonstrate the totality of certain natural phenomena, depending on the results of human activity.The use of information technologies provides a quantitative representation of the logical and mathematical characteristics of objects on the earth's surface and the relationship between them. This approach allows us to use high-performance computing systems for mathematical and cartographic modeling [1]. Every year, an array of information about objects on earth is growing. The need to store and accumulate cartographic information requires improving the means and methods of forming a cartographic data Bank. The volume of map data in the inventory, measured by a Gigabit of digital information, first raises questions about automation of information support.

The tasks of storing, collecting and processing cartographic information are effectively solved by creating geoinformation maps based on the latest achievements in technical Cybernetics.The term" geographic information mapping (GIS) " means the creation and use of a map based on geographic information systems (GIS) and cartographic data and knowledge bases. The GC value is a model of information mapping[2, 3].

Geo-information mapping technology based on satellite images. As a result of geoinformation mapping and studying the possibilities of creating geoinformation maps taking into account the requirements developed at the present stage, as well as on the basis of experience in this field, the technology of geoinformation mapping based on satellite images has been developed.

The technology was developed taking into account the choice of optimal parameters of the following basic principles:]:

- The parameters of geo-information products: (the subject of map, scale, projection, coordinate system, shooting system and nomenclature used by the classifier, the value of the products)
- The parameters of the original materials:
- The primary card (the topic of map, scale, projection, coordinate system, system of filming and nomenclature used by the classifier, the value of) –
- Remote sensing materials: (survey vehicles, ground resolution, spectral solution, type of survey, type of data representation, cost);
- Materials used, databases and catalogs (including the Internet));
- Parameters for scanning source maps and remote sensing materials (scanner resolution used, bit-to-pixel ratio, raster format, use of data compression tools, raster processing);
- Possibility and parameters of working with stereo pairs;
- Features of creating a digital database;
- The use of digital samples of the terrain;
- Methods for determining the coordinates of objects;

- Conversion method;
- Possibility of drawing up a photo plan;
- Support parameters for a personal library;
- Method for combining BB materials with the map;
- Decryption methods and parameters;
- The input parameters of the attributes of local objects;
- The precision of the Coordinates;
- How to organize the relationship between metric data and its attributes;
- Used spatial analysis tools;
- Data aggregation features and parameters;
- Ability and parameters for intersecting a sheet;
- Quality control mechanism;
- Features and parameters for updating the GEODATA;
- Providing the technology with regulatory and technical documentation;
- Product delivery and support capabilities;
- Computing platform and minimal hardware configuration;
- Basic software package;
- Database management system (DBMS));
- Cost of works;
- Order term;
- The number and qualification of personnel sufficient to maintain the technological process.

Figure 1 shows the extended structure of the technology. In order for the process chain to be clear, the set of technological processes is divided into five logical blocks:

Let's look at each block separately:

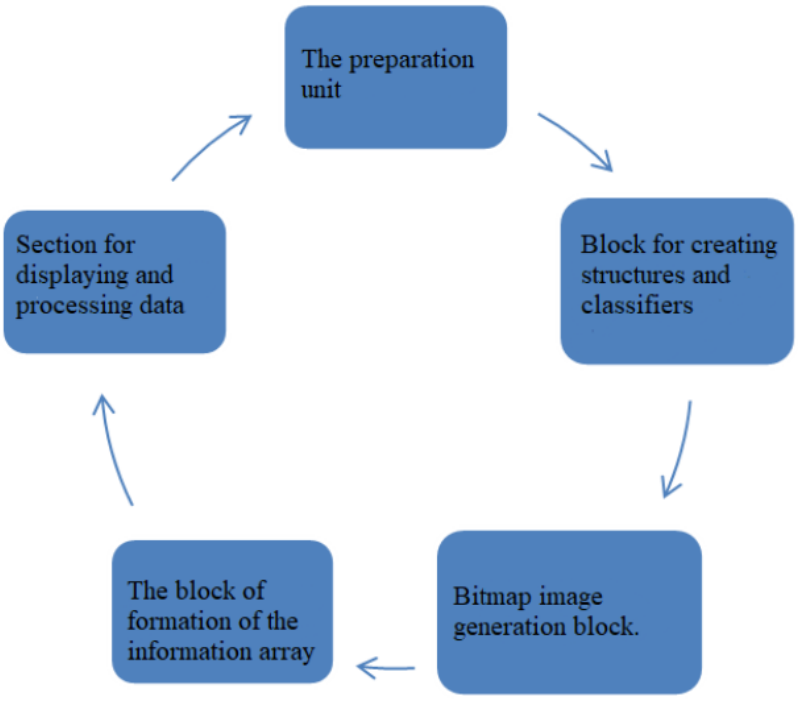

Figure 1. Extended technology structure

The preparation unit. The manufacturing block includes the following actions:

- data collection, research and analysis;

- adaptation of the hardware and software network and configuration complex;
- bring the source information to a single view;
- preparation of a topographic base [5].

*Block for creating structures and classifiers.*Since primary data and software and hardware have been developed, they begin to form the structures and classifiers necessary for a geo-information map. This task block includes the following processes:

- creating the theme structure;
- creating or adapting a thematic classifier;
- defining elements for harmonizing objects in the theme layer;
- forming the structure of the database of objective attributes.

Bitmap image generation block. The bitmap generation block includes scanning, filtering, linking, and converting scanned materials to a predefined projection. Technologically, this block contains the preparation block (1) described above, and the block for creating structures and classifiers (2) and the block for receiving and accumulating (4) discussed below. In other words, bitmap operations can be requested at three different stages of the GC, so they are divided into a separate block. This sub-item deals with the issues of binding and transformation of a bitmap image at the preparatory stage of scanning [8].

The block of formation of the information array. The block of formation of the information array includes a visual and interactive outreach, as well as vectorization of the raster image and filling the attributes of the object in the database. At this stage, in addition to receiving and accumulating data, primary processing of geo-information is performed.

Section for displaying and processing data. At the last stage of the technological chain, data is demonstrated in the form of cartographic compositions, data analysis and processing, as well as activities aimed at printing or releasing paper in digital form.

Implementation of the technology proposed for a geo-information map based on satellite images based on the example of GIS-Aral.

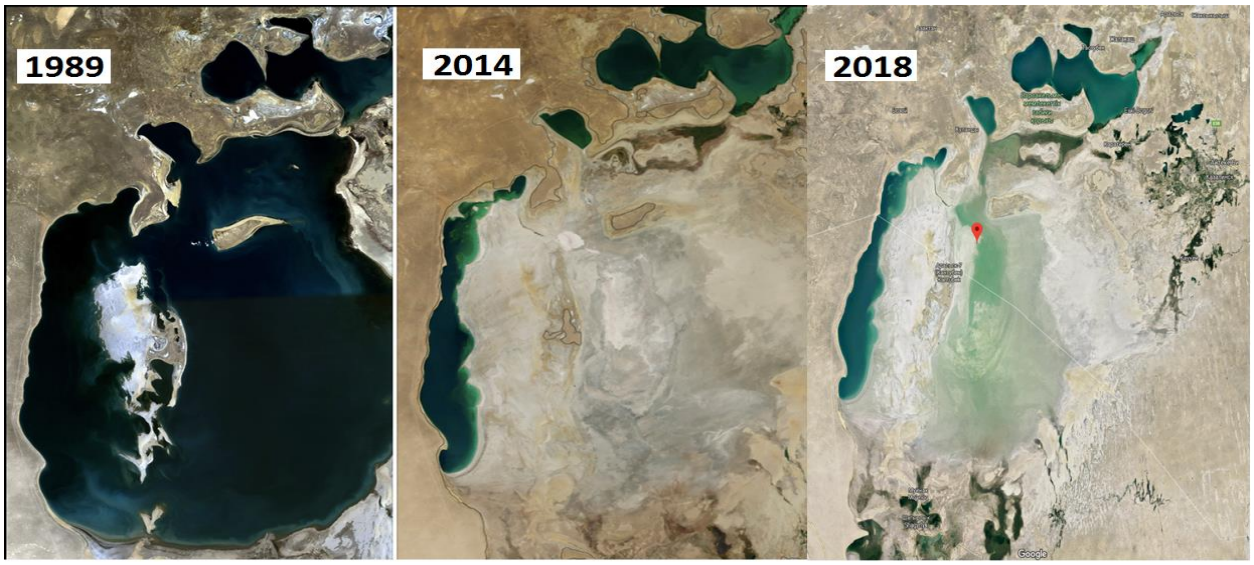

Figure 2. in the NASA picture of the Aral sea, respectively, 1989, 2014, 2018

In figure 3, the map of the Aral sea is based on data from SRTM (international digital type data acquisition (DEM) mission of the Earth's territory-Shuttle radar topographic mission using the ArcGIS program).

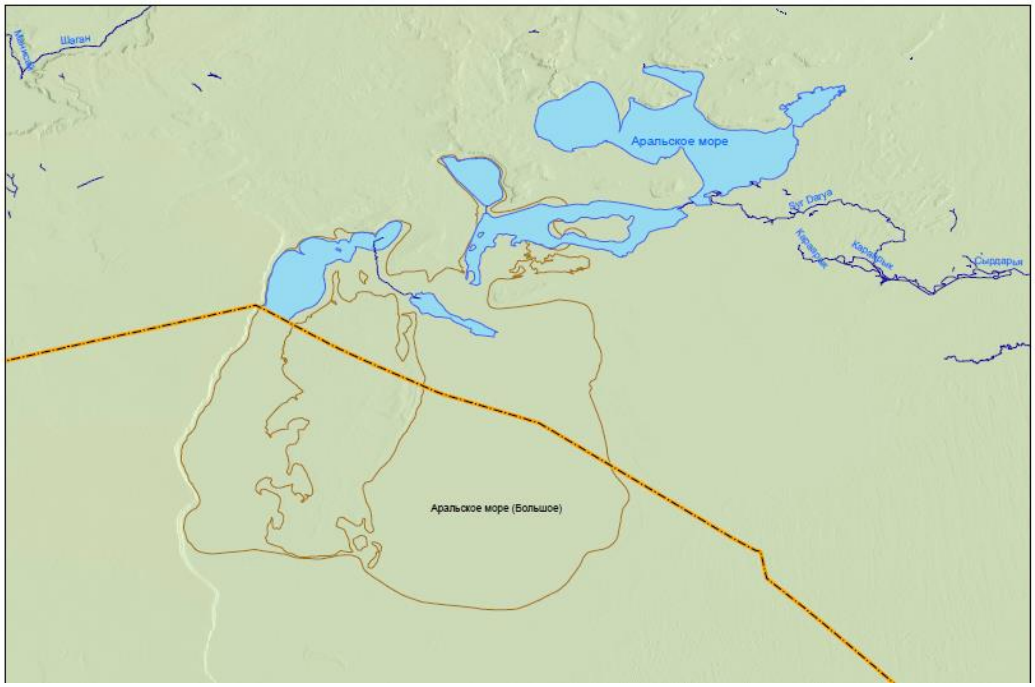

Figure 3. Creating a Map of the Aral sea based on SRTM data from the ArcGIS program, data for March 2018

- interstate relations;
- water line;
- reservoir;
- water pipes.

The article describes the Technology of geoinformation cartography based on satellite images, taking into account the choice of optimal parameters for the main positions. Geo-informational cartography based on satellite images was obtained using the example of a GIS island.

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