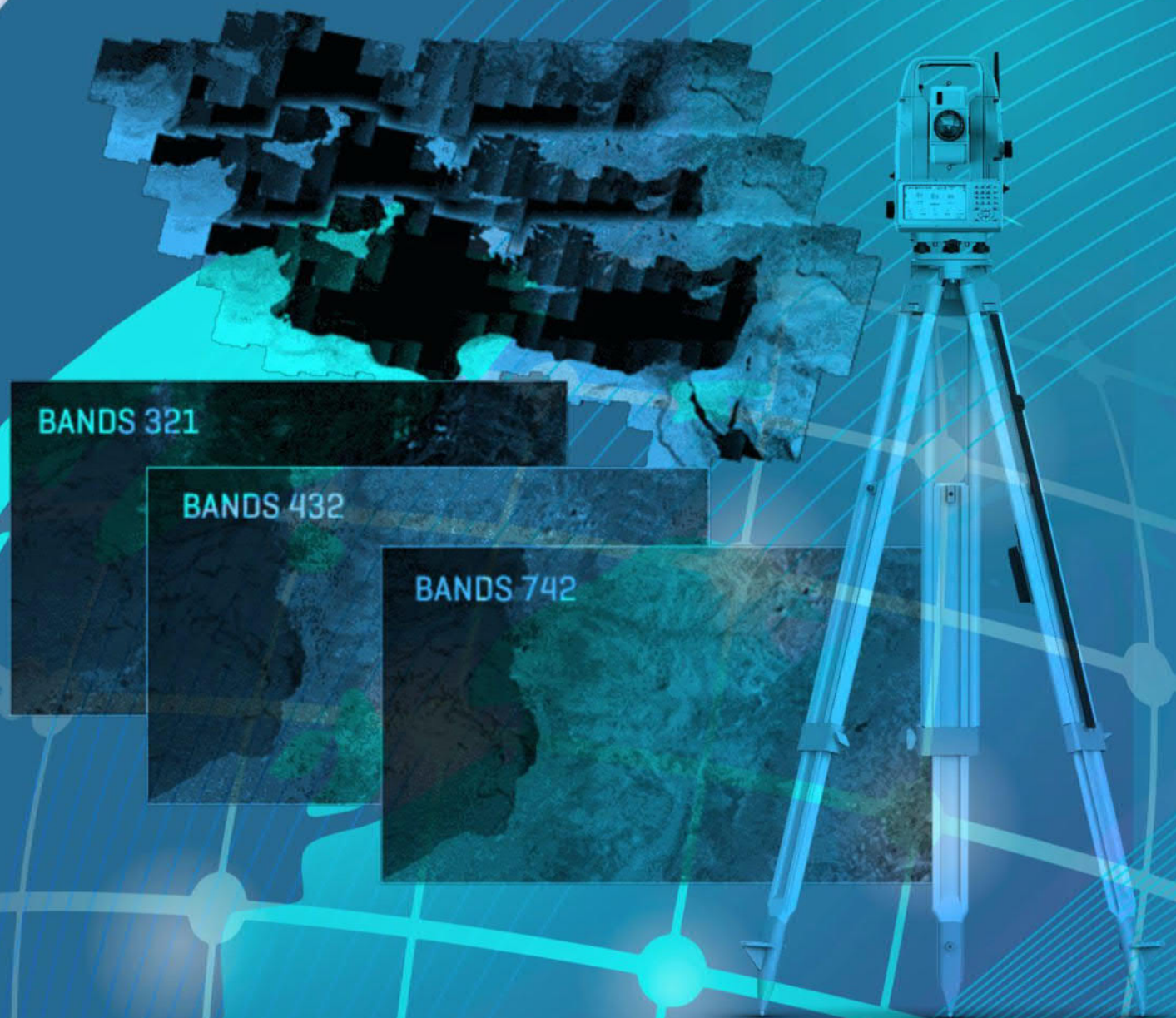


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Chop etilgan maqola mazmuni va unda keltirilgan ma‘lumotlarning to‘g‘riligiga muallif javob beradi

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DEVELOPMENT OF ANIMATING CONVENTIONAL SIGNS USING COMPUTER TECHNOLOGIES

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Annotatsiya. Ushbu maqolada asosan tematik xaritalarda hodisalar dinamikasini vaqt yoki makonda etkazish uchun ishlatiladigan kartografik animatsiya belgilari muhokama qilinadi. Bu nafaqat hodisalarning tuzilishini, balki yer qobig'i, atmosfera, gidrosfera va biosferada, eng muhimi, ularning aloqa va o'zaro ta'sir zonalarida sodir bo'ladigan jarayonlarning mohiyatini ham ko'rsatish muhimdir.

Kalit so'zlar: tematik xaritalar, belgilar, animatsiya, animatsion belgilar, multimedia, operativ kartografiya

Аннотация. В данной статье рассматриваются картографические анимационные символы, которые в основном используются на тематических картах для передачи динамики явлений во времени или пространстве. Важно отобразить не только структуру явлений, но и

сущность процессов, происходящих в земной коре, атмосфере, гидросфере и биосфере и, главное, в зонах их соприкосновения и взаимодействия.

Ключевые слова: тематические карты, символы, анимация, анимированные символы, мультимедиа, оперативная картография

Annotation. This article discusses cartographic animation symbols, which are mainly used on thematic maps to convey the dynamics of phenomena in time or space. It is important to display not only the structure of phenomena, but also the essence of the processes occurring in the earth's crust, atmosphere, hydrosphere and biosphere and, more importantly, in the zones of their contact and interaction.

Key words: thematic maps, symbols, animation, animated symbols, multimedia, operational cartography.

Introduction. When animation is introduced into cartography, the tasks of presenting geographical processes and phenomena easily observed in nature in a form understandable to any user are solved. When introducing animation and animated symbols into cartography, the tasks of presenting geographical processes and phenomena easily observed in nature in a form understandable to any user are solved. With the help of animation, they solve the problems of warning (alarming) about unfavorable or dangerous processes, monitor their development, promptly make recommendations and forecasts, choose control options, ways of stabilizing or interfering in the process in a variety of areas - from environmental situations to political events.

Animation is -

- dynamic sequence of frames (scenes, flat or three-dimensional screen geo-images), which creates the effect of movement during a quick demonstration;
- the process of creating a moving and (or) modified computer image. Synchronization of the receipt of information and the process of constructing computer animation allows you to receive animation in real (scale) time.

Animation mapping was formed as a branch of operational geoinformation mapping. Animations were initially used to monitor, evaluate, manage and control rapidly changing processes and phenomena. The most popular example is showing the movements of atmospheric fronts, cyclones, anticyclones and precipitation zones in daily television weather forecasts. These are very clear, although rather primitive animations in which high- and low-pressure patches move around the map field without changing shape. This example, where animation was used, was limited to only showing phenomena that changed in time or space, i.e. with its help showed the dynamics of phenomena. The image of the

landscape practically remained static, although any visible landscape cannot be static: trees sway in the wind, cars drive along the roads, the river flows. To change the static appearance of the landscape, animation symbols began to be used. Such dynamic phenomena cannot be shown on paper thematic maps.

Reliable visualization of the virtual world plays an important role in creating a sense of reality for the user. After analyzing the currently existing examples of the use of animation, we can conclude that its use is limited only to showing phenomena or objects that change in time or space. Thus, with its help show the dynamics of phenomena.

The introduction of animated symbols is based on the foundations of geoinformation systems and technologies; when using animated symbols on thematic maps, it is necessary to perform current, dynamic, cartometric, statistical calculations, extrapolations and other transformations.

However, the process of cartographic automation gives grounds to assert that dynamic geoimages have become no less common means than aerospace images, printed cartographic products and computer maps. Their introduction marks the transition to a new level - space-time mapping, which does not replace traditional cartography, but supplements it with new tools.

Purpose and tasks of the work.

The purpose of the article is to show the advantage of using animated symbols to show the phenomenon on thematic maps using the example of creating maps of reserves and national parks, i.e. creating an animated map of a static landscape. With the help of animated symbols, show on such maps the movement of animals, birds, the distribution of vegetation, relief so that the consumer has an interest in such maps and can gain knowledge on such maps using animated symbols. Painstaking manual labor when creating a traditional

map using flat symbols has been replaced by visual animated symbols using GIS technologies.

Main part. Cartography, as the science of displaying and studying the phenomena of nature and society through cartographic images, is one of those areas where the introduction of computer technology entails significant changes in technology.

To convey the whole variety of map content, the following visual means are used (Fig. 1) [5]:

- dashed (dots, lines, off-scale symbols, inscriptions);
- background (fills and grids);
- halftone (hillshade, icons of special content).



Fig.1. An example of the use of flat symbols of all types used on the map

With the development of computer technologies and certain programs, there was a need to use animated conventional signs on thematic maps, which create the attractiveness and visibility of the map.

To test the development of the methodology and determine the content of the animated map of the static landscape, maps of reserves and national parks were selected [2]. The territories of national parks have such a combination of natural and cultural-historical resources that provides them with a special place in the country. Attractive nature and favorable ecological situation, favorable geographical position, availability of qualified personnel - all this creates real prerequisites for the development of

regulated recreation and tourism of the population.

One of the main tasks of national parks is the preservation of nature and its monuments and the ecological, historical and cultural education of the population. The created map is designed to help in solving these problems. It is aimed at high school students and ordinary visitors to the park. It is this group of visitors that is the most numerous, and, therefore, has a significant impact on the area..

The first stage will be the creation of a general geographical basis [1]. For this, you can use a satellite image (Fig. 2).

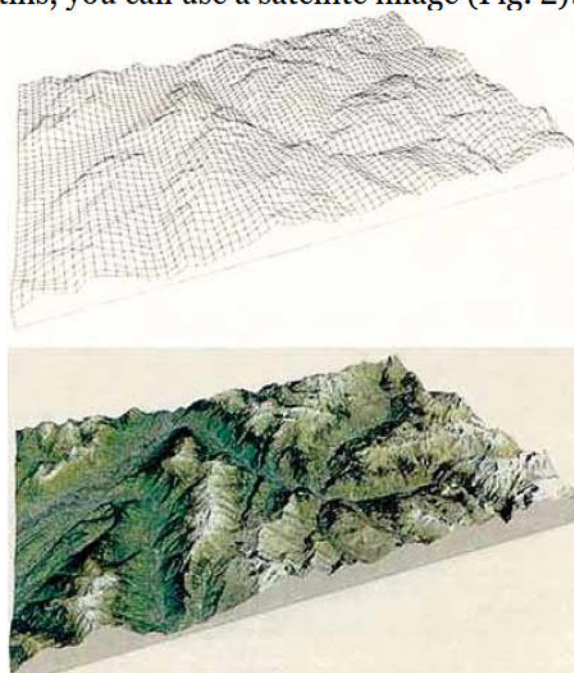


Fig.2. Building a photo-block diagram. Above - a satellite image, in the middle - a digital block diagram of the relief of the same area, below - a block diagram with a photo image "stretched" on it.

In the ArcGIS 9.1 program, it was tied to a set of control points, and then all elements of the general geographic base were digitized by visual interpretation.

The next step was the visualization of the relief (Fig. 3). Contours were obtained from the digital elevation model for this territory. For greater attractiveness, on one of the variants of the map for showing the relief, the contour lines are supplemented with layered coloring and hillshade. In the process of

work, several variants of the scale for layer-by-layer coloring were created, but in the end, one, the most suitable one, was chosen [6].

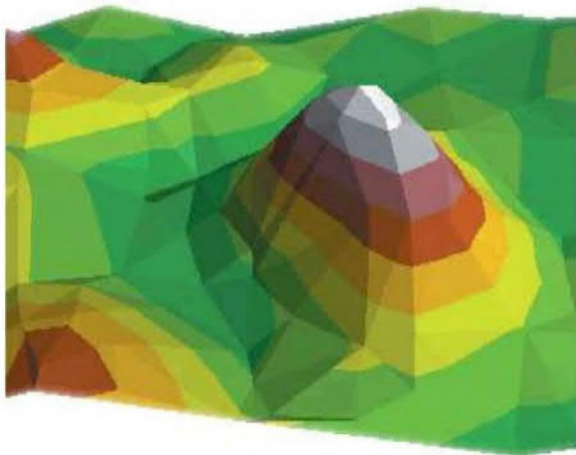
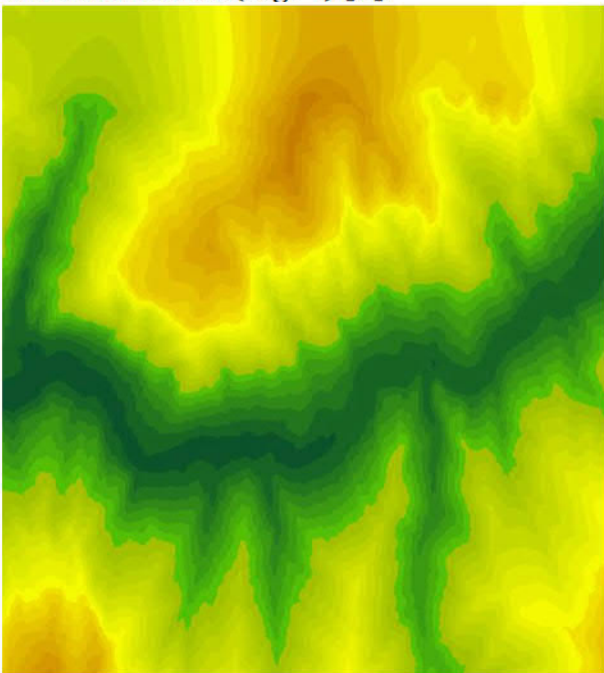


Fig.3. Building a relief model with layered coloring

In traditional cartography using flat symbols, the image of the relief, especially mountains, will not look so clear and informative (Fig. 4) [2].

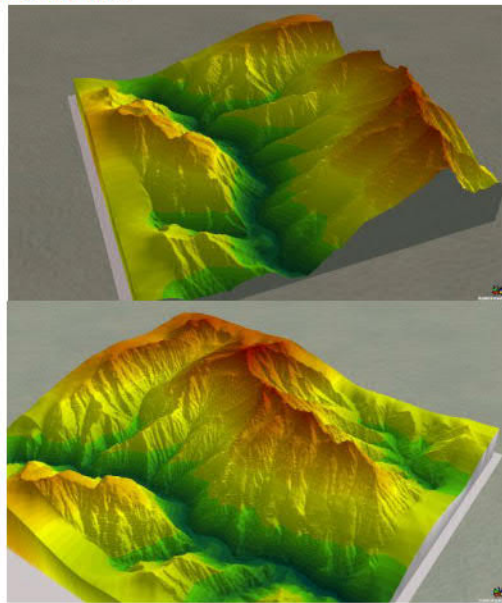


Rice. 4. Layered coloring of the relief in a flat image

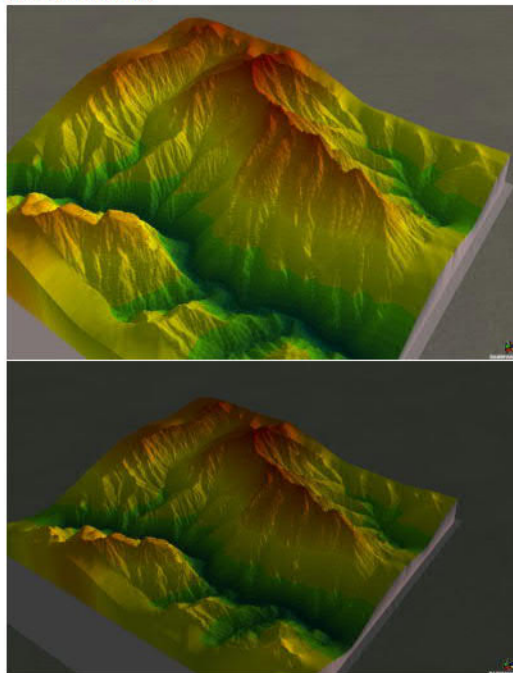
With the use of animated symbols, you can create mountain models that create a virtual reality of a static landscape.

On the models of mountains, you can see how, during a virtual flight, they turn to the observer in different directions and the relief is shown at different times of

the day (Fig. 5). The user can slow down, descend over them and see the landscape in more detail.



a) morning
b) at 12 noon



c) after 12 noon
d) after 7 pm

Images . 5 (a, b, c, d). Types of relief at different times of the day and its illumination by the sun

The most significant stage is the development and creation of animated icons[2]. It should be noted that not only elements of thematic content are animated on the created map, but also some objects of the general geographical basis (glare

from the sun on the river, cars drive along the roads) (Fig. 6).



Fig.6. Vehicle movement on the road

Then animation symbols are created, which create movements by changing the set of images. That is, there are several images of the same object or phenomenon, but slightly modified. With their rapid change, the effect of a continuous change in appearance is created (Fig. 7).



Fig.7. An example of animal movement

The last step is map matching. The general geographic base was loaded into the final map of national parks, which consisted of the relief and elements that were not animated, and animated elements were also applied. To create the effect of moving around the map, guide curves were applied, which are not visible, but represent the trajectory of the object's movement.

Conclusions. The article presents such a variant of the static landscape of maps of reserves and national parks, which will attract the attention of tourists and will contribute to the study of not only this territory, but also the interaction of man with nature. Do not forget that modern schoolchildren and consumers are well acquainted with computer technologies, so the ability to download the created map to a laptop computer and take it with you increases its attractiveness and information content.

This article is an example of the use of animated symbols to show the static landscape of nature reserves and national parks. In addition, a model of mountains

was shown at different times of the day with layered coloring of the relief; it is also possible to show different seasons and different weather conditions on the map. In the future, you can use sound on such maps - the rustle of grass and leaves, the singing of birds, the sounds of animals, the wind.

There is no doubt that the development of animation mapping can no longer be limited to new technological solutions.

It is necessary to carry out appropriate organizational measures, and the most important among them is the inclusion of relevant sections in educational programs. There is reason to believe that modern cartographic science and production have been replenished with a special section dedicated to the creation and use of software-controlled cartographic animations - special spatio-temporal models of the surrounding world. The ever-increasing introduction of new technologies in cartographic production at all stages of creating maps can significantly shorten the production cycle, increase production efficiency and the quality of the created cartographic products. In this regard, in the theory and practice of cartography, it became necessary to rethink, revise and clarify old and develop new theoretical provisions, technologies and improve terminology.

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FAZOVIY MODELLASHTIRISH MA'LUMOTLARINI RAQAMLI KARTALAR TUZISHDAGI O'RNI

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Annotatsiya. GAT yordamida ma'lumotlarni tahlil qilishni modellashtirish asosida tezkor ravishda ma'lumotlarni aniqlash yuzasidan tahliliy ishlar bajarilishi amaliy ahamiyatga ega. Ushbu maqolada joylarda demografik jarayonlarni, jumladan aholi bilan bog'liq bo'lgan turli ma'lumotlarni onlayn tarzda GAT texnologiyalari ma'lumotlar bazasiga avtomatik tarzda masofadan turib uzatish orqali aholi soniga nisbatan zich joylashgan hududlarni modellashtirish jarayonini ko'rib chiqamiz.

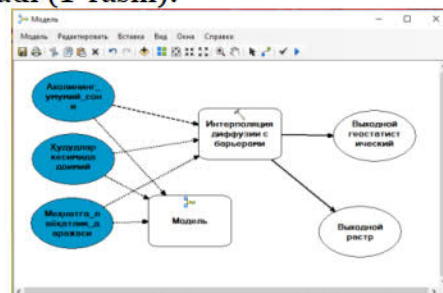
Аннотация. Практическое значение имеет оперативное выполнение аналитических работ по определению данных на основе моделирования анализа данных с помощью GAT в данной статье мы рассматриваем процесс моделирования густонаселенных территорий путем автоматической и дистанционной передачи на месте демографических процессов, в том числе различных данных, связанных с населением, в базу данных GAT-технологий в режиме онлайн.

Annotation. Of practical importance is the rapid implementation of analytical work to determine data based on modeling data analysis using GAT in this article, we consider the process of modeling densely populated areas by automatic and remote transfer of demographic processes, including various

population-related data, to the database GAT-technologies online

Asosiy qism. Birinchi navbatda yaratiladigan modelning bajaradigan vazifasini aniq belgilab olish zarur. Misol uchun hududiy chegaralarning geografik joylashuvi o'rganish kabi ko'pgina masalalarni aniqlashda bu tizim keng imkoniyat yaratadi. Buning uchun hududiy chegaralarning geografik joylashuvini o'rganish zaruriy geodezik qurilmalar yordamida aniqlanadi va vektor ko'rinishida shakllantiriladi. Hududdagi aholi yashash joylarida aholiga tegishli bo'lgan statistik ma'lumotlar aniqlanadi va geokodlashtiriladi. Aniqlangan ma'lumotlar maxsus darsturlar yordamida atributlashtiriladi. Hosil bo'lgan ma'lumotlar onlayn tarzida bazaga yuboriladi.

Respublika miqyosida kelib tushgan vektor ko'rinishidagi geokodlar "ArcGIS" dasturiga import qilinadi. "Model Builder" darchasi yordamida mavzuli qatlamlar ketma-ket yoki zanjir shaklida instrumentlar paneli buyruqlariga ulanadi (1-rasm).



1-rasm. "Model Builder" darchasining ishchi holati