

## ANIMATION PRESENTATION OF STATIC LANDSCAPE

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A geographic method of researches became the most effective instrument of a study of an appropriateness of spatial location and also a structure of geographic objects and events, their connections and dynamics of changes, using monitoring and prognostication.

Different ways of visualization are perceived by people in different ways. However when it is an untrained user, the accent is made on visualization and accessibility of information, and on the “not boring” way of its presentation. It is necessary that at first a user notices a map and then it was made as possible less efforts to understand the map. It is particularly important working with children. The more an image on a screen looks like the environment the more it makes an impression and is of benefit. Therefore elements of animation cartography, which attract eyes to a map, are used in this work. When elements which are not static de facto are animated, a created map approximates to the reality. Animation cartography is a high-capability means to visualize dynamic information, however it don't replace the traditional static cartography, but supplement it with new possibilities. That's why we propose to use it not only for a demonstration of a dynamic, but for an animation of landscape.

As a result of the research a map on the Jizdrinskii district of the national park “Ugra” was created, where besides the landscape the places, where one or another type of activity (for example, fishing, swimming) is allowed, are showed. The animation signs were created to attract the attention to the map and to increase the informativeness. Besides the thematic part some elements of the common geographic base were animated. So an elk, walking in forest, cars, driving on roads, and a factory are presents on the map. Thus the attention was focused also on the elements, which make worse the ecological situation. The whole thematic content is visualized using the animated signs: fisherman, tourists on a beach, birdwatcher, bicyclist and so on. They were created in the software Macromedia Flash 8 Professional using different methods. The created signs can be separated on 3 groups:

- signs, moving on the map, but not changing its shapes or colours in the process of movement,
- signs, moving on the nap and changing its shapes or colour in the process of movement,
- signs, not moving on the map, but changing its shapes or colour in a period.

The signs were animated in different ways. Two methods are possible. First is when a collection of images, which are changed insignificantly, are used; the effect of movement is achieved by quick replacement of these images. Second is when a vectorial image is changed using the different tools of the software. This function was applied to define the routes of movement of the signs.

We suppose that the generated by us map will attract attention of untrained users and they will begin to use more serious maps to learn the world in future. By-turn we are planning to develop and introduce new ways of geo visualization, which bring closer a map to the reality. An example of such methods can be using of sound (ringing of bells in a cloister), a change of day and night or seasons of a year.

Nowadays more and more significance is given to the visualization and attractiveness of images which present geographic information, and to the simplicity for untrained people. The rapid development of technology gives great possibilities for visualization of data and allows us to realize almost all the ideas connected with multimedia technologies, specifically with animation.

The aim of this work is to analyze existing animation maps, define of their places in the general classification and the role and value of these maps for different users. One of the tasks of the research was an attempt to create an animation map of static landscape.

The increased interest for cartographic animations is generated by the bent to represent not only the structure of events, but the essence of processes, occurring in the Earth's crust, the atmosphere, the hydrosphere, the biosphere and in the zones of contacts and communications, which is even more important. Animations help to solve the tasks of caution about inauspicious and dangerous processes, to realize tracking of their development, to make quick recommendations and forecasts, to select the options of control, the ways of stabilization and interference in the course of process in different spheres – from the ecological situation to political events.

Animation is 1) a dynamic sequence of frames (scenes, two-dimensional or three-dimensional geo-images), which create an effect of movement in a high-speed demonstration, 2) – a process of creating a travelling or modifying computer image. The synchronization of the receipt of information and the process of creation computer animations allows to get animations in real time.

Analyzing the history of development of the animation cartography, it should be said that the roots of the dynamic cartography can be found in the development of multiplication. It is based on the capability of the system “eye – brain” to save the image of objects in the high-speed change of frames on which these objects are painted with insignificant changes. It generates an illusion of movement. In connection with it, the dynamic cartography can be also called animation cartography.

At the same time, the term “animation cartography” or “animation map-making” is accepted, but dynamic series of maps are called “animation sequences” or only “animation”.

The animation map-making was formed as the brain of operational geo-information map-making. At first, animation was applied for monitoring, assessment, management and control of rapid changing processes and events. The most popular example is the demonstration of movement of atmospheric fronts, cyclones and zones of precipitation in daily forecast programs on the TV. They are very understandable, but quite elementary animations on which spots of high or low pressure move on a map without changing their forms.

After the examples of using cartographic animations for slow events such as making meanders on the rivers, growth in cities’ population and reconstructions of paleogeography and illustrations of tectonic processes, for example, modeling the crack of the mainland Gondvana and movement of appearing plates. Animation is used in economic, physical and social geography. It’s also possible to animate both the plots which have already happened and a prognostic version of the development of an event.

Having analyzed the existing examples of cartographic animation, the conclusion can be made. It is applied only for demonstration of events or objects which change in time or in space. Thus, it shows the dynamic of events.

Examples of applying animation technologies for a static landscape haven’t been found, though any visible landscape isn’t static. The presentation of such a landscape differs from certain conditionality on general geographic maps. There are some cyclic changes: the position of a shore line of rivers and seas. It has been displayed for rivers as an average characteristic for many years, but it changes during a year. For seas it’s shown as the highest level of water, which isn’t right for all seasons. There are also some random changes as well: trees swaying in the wind, cars going on roads, rivers flowing.

At present time a lot of attention is paid to the analysis of perception of information by different users. Animation images are also included in this investigation. The search for the best methods of demonstration of dynamic films presupposes special and wide experimental research. It is no coincidence, because it’s necessary to take into consideration how users will interpret a new way of visualization. A reliable visualization of the virtual world plays an important part in the process of creation of the sense of reality in the user’s imagination.

Scientists of Moldova State University have concluded that animations as a way of visualization of information are a very effective method, because they rest upon the human ability to see and take in rapid forms, connections, trends, movement and changes. Russian and foreign cartographers agree that the present-day methods of animation cartography are quite suitable for application. The existing problems

generally have a technical character. It's clear that the introduction of animation is impossible without the support of developed geoinformation systems and technologies, which can form all dynamic, appraisal and prognostic geo-images, make current, dynamic, cartometric and prognostic calculations, extrapolations and other transformations.

Jizdrinskii part of the national park "Ugra" was selected for applying the worked out method and identification of the content of an animation map of a static landscape. The territory of the national park possesses such a combination of natural, cultural and historical resources which ensure a special place not only in the region, but in the whole Central Russia. About 200 objects of tourist tour are counted in the park. The attractive nature and the favourable ecological situation, the advantageous geographical location, its transport connections and the proximity to Moscow, the availability of skilled workers – all these create premises for the development of regulated tourism and recreation.

On the map there were shown the types of activity which are allowed in the park: fishing, swimming, making a fire, camping ... Thus, the rules of behavior in the park and near it has been visualized, also the possibilities of recreation in the territory have been defined.

One of the main tasks for national parks is nature protection, its monuments and ecological, historical and cultural education of inhabitants. The generated map is called to solve exactly these tasks. It is aimed at pupils and ordinary visitors. Just this group of visitors is the most numerous, and as a result it significantly influences the area.

The generated map includes elements of common geographic base, which are objects, represented on topographic maps of the scale 1:50 000, and the thematic content which has a touristic character.

In connection with this set of the elements the generated map should be attributed to specialized maps with a complicated content. It refers to the maps with addition of images of individual objects which are not included in the accepted system of the conventional signs and sophisticated qualitative characteristics. This position of animated maps is far more conventional, as an animated image considerably differs from the static one. And maybe the best decision will be to separate them in an individual blok. But it's only the classification by the research of area, at the same time the generated map concerns maps made on a separate territory (classification on a special coverage) and large-scale maps (classification by scale).

The process of map creation can be divided into several steps. Different software and data were used for each step.

The first step was the creation of the common geographic base. For it, a remote sensing image was used. It was linked up by a collection of control points in ArcGIS 9.1, and then all elements of the common geographic base were digitized by visual deciphering. The location of the objects badly read on the remote sensing image was specified in the topographic maps of scales 1:100 000 and 1:200 000.

The second step was the visualization of the relief. The contours were taken from the DEM. This phase was conducted in the software Global Mapper. In one version of the map the contours were supplemented with a layerwise coloration and a washing. Several versions of scales for the layerwise coloration were created in the process of work, as a result, the most acceptable one was selected.

The third and the most significant step was the design and the creation of the animated signs. It should be said that not only the elements of the thematic content were animated, but also some of the elements of the common geographic base on the generated maps (patches of sunlight on a river, cars on roads).

All animations were created in Macromedia Flash 8 Professional. Three types of the signs can be marked out:

- signs, moving on the map, but not changing its shapes or colours in the process of movement,
- signs, moving on the map and changing its shapes or colour in the process of movement,
- signs, not moving on the map, but changing its shapes or colour in a period.

Some images were found on the Internet for the creation of several signs. These images were edited, designed and changed subsequently in Adobe Photoshop. The signs of the first type were animated on the last stage of the map creation.

The signs of the second and the third type are more interesting. The effect of movement is achieved by replacement of images. That means that several images of one object or event exist and they are insignificantly derated. The effect of continuous change of shape is achieved by their quick replacement (figure 1). Other signs of these types are animated in a different way. Only one image was used, but it was vectorial. Then individual elements of this image were marked out, and they were set in motion by such tools as Motion and Shape Tween (figure 2).



Figure 1. Frames from the animation “car”



Figure 2. Frames from the animation “elk”

The fourth and last step is compiling the map. The common geographic base, which consists of the relief and the elements which haven't been animated, was loaded in the total document and then, the animated elements were added. To make the effect of movement on the map the guide lines were created. They are invisible, but they are trajectories of movement of objects.

The assessment of visualization was also conducted during the work, which is why several versions of the map were created. The layerwise coloration and the washing of the relief replaced by the remote sensing image in one of the versions.

We hope that this version of a presentation of a static landscape will attract the attention of tourists and will assist not only to study this territory, but also to connect men and nature. It should not forget that modern pupils know computer technologies quite well, therefore the possibility to download the generated map to the portable computer and to take it with you improves its attractiveness.

This work is the first example of application of animations for demonstration of a static landscape and the first step in this project. In our subsequent work it's planned to apply a perspective image and also to create maps for different seasons of year and possibly for different weather conditions. It is necessary to pay greater attention to the location of shadows in the latter case. It is also planned to use sound for demonstration of some

phenomena. For example, bells can ring in two well-known cloisters, which are places of pilgrimage for thousands of visitors – Optina Pustyn and Shamordino.

There can be no doubt that the development of animation cartography can be limited now only to the new technological inventions. It's necessary to conduct respective organizational activities and most important of them includes the respective parts in the educational programs. There are reasons to consider that the present cartographic science widens the particular section which describes creation and use of software programmable cartographic animations – special space-time models of the environment.

### **References**

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