V. B. Mokin Dr. Sc. (Eng.), Prof.; M. S. Viktorov

THE OPTIMUM CHOICE OF GIS-PROGRAMS FOR INTERNET MAPPING OF THE ECOLOGICAL MONITORING DATA

There had been considered the problem of search of optimum software product for Internet mapping of the data of ecological monitoring, in particular for creation of geoinformation Internet systems (INTERNET-GIS). Criteria of optimality - the price and popularity of records in the Internet are chosen. Optimum commercial and free programs for creation the Internet-GIS on results of the analysis of the world resources as a whole, and, separately, only the Ukrainian web pages are determined. Recommendations as for the priority application of some of them are made.

Keywords: geoinformation systems, Internet mapping, ecological monitoring.

Urgency of the problem

In the present time of internet mappings we observe the rapid development of the geoinformation technologies (GIS-TECHNOLOGIES). The user got an opportunity to work with "a live" map - a map, which is created according to his needs and requirements, as the peculiarity of the developed cartographical resources is "customizing" – an individual adjustment of the target document according to the requirements of the user.

Internet mapping is necessary for achievement of the various ecological purposes and allows a greater audience to get familiarised with results of scientific researches.

At the same time, the choice of GIS-PROGRAMS which are to be used in creation of the Internet-GIS, requires the knowledge of all the peculiarities of their work, and only after a long application the user and the programmer can reveal all advantages and disadvantages of the software (SW). Rapid development of the new computer systems causes difficulties in revealing the specific peculiarities of the software for the necessary sphere of application, in this case – for Internet mapping of the data of ecological monitoring.

The purpose of the given work is to select the optimum programs for creation the Internet-GIS which will display the results of researches of ecological monitoring. Thus, the problem which is to be solved is formulated as: "Choose and estimate the Internet-GIS optimality criteria and choose the optimum program for creation of the ecological monitoring Internet-GIS".

The choice of programs optimality criteria for creation the ecological monitoring Internet-GIS

There are many methods for choosing the optimum software. We suggest to use the method suggested in work [1]. The programs are analyzed following the criteria, estimated under the data of Internet resources:
 • popularity;
 • price.
Popularity of programs for creation of Internet resources makes the final product convenient for majority of users, which is extremely important for computer systems. The choice of these criteria (popularity, price) is caused by the convenience of their quantitative representation. We suggest, as well as in work [1], to estimate the popularity of software as for the quantity of links and citing in the text documents in the Internet as it is the most accessible, dynamic and popular information resource which shows the changes on the software market very quickly.

We also suggest to use the following additional criteria during the analysis:
 • popularity in the sphere of commercial and free software;
 • popularity of commercial and free software in Ukraine.
It will enable us to conduct analyses more thoroughly.

The comparative analysis of the world known software for creation of cartographical Internet resource

Nowadays there are many software products for creation of cartographical Internet resources. Depending on manufacturers and functionality of the programs, the price limits are wide enough. Except for commercial software, there exists the free software which is disseminated with an open program code and allows to create the own applied programs. But the work with such programs requires considerable number of highly-skilled personnel and a lot of time to achieve the set objective.

The had been conducted the analysis of Internet sources (in the Ukrainian, Russian and English languages) as for the successful examples of building the real Internet-GIS of ecological monitoring with further revealing the software products and environments which enabled to create GIS. Table 1 presents the most known programs for creation of Internet-GIS of ecological monitoring, their manufacturers and the prices in USD equivalents.

Table 1

The most known programs for creation of Internet-GIS of ecological monitoring and their prices

Software	Manufacturer	Price in USD equivalents
Autodesk MapGuide	Autodesk, Inc., USA	1100
MapObjects Internet Map Server	ESRI, USA	150
ArcIMS	ESRI, USA	10 000
MapInfo MapXtreme	MapInfo Corporation, USA	360
GeoMedia Web Map	Intergraph Corporation, USA	10 000 on 2 CPU
WebMap	the Resident, the Russian Federation	-
GIS WebServer	Panorama Group, the Russian Federation	3600
AspMap	VDS Technologies, США	500
LiveMapGIS	GIS Team, USA	-
Geodesigner Web-Server	The Centre of geoinformation researches of Institute of geography of the Russian Academy of Sciences (CGR IG RAS) of the Russian Academy of Sciences), the Russian Federation 2000	2000
MOSMAP-GIS 4.1	Open Companies "MCM", the Russian Federation	800

To determine the criterion for software products "Popularity" we had used the results of records search in the world Internet resources in the three powerful search systems: Google, Yahoo, Yandex.

The obtained data for the commercial software is presented in table 2, and for free - in table 3.

Table 2

Number of records in the world Internet sources of the commercial software for creation the Internet-GIS

The Software	Google	Yahoo	Yandex	Total Amount
ArcIMS	616000	1620000	21000	2257000
AspMap	16700	44900	2515	64115
Autodesk MapGuide	268000	933000	95000	1296000
GeoMedia Web Map	287000	267000	5520	559520
GIS WebServer	2820	334	330	3488
Internet CSI-MAP Server	950	1060	177	2187
LiveMapGIS	96	60	1	157
MapInfo MapXtreme	125000	424000	7602	556602
MapObjects Internet Map Server	79000	168000	2403	249403
MOSMAP-GIS	211000	148000	66000	425000
WebMap Resident	17800	11600	402	29802
Geodesigner Web-Server	26	116	53	195

Fig. 1 presents the graphic representation of results of table 2.

Table 3

Number of records in world Internet sources of the free software for creation the Internet-GIS

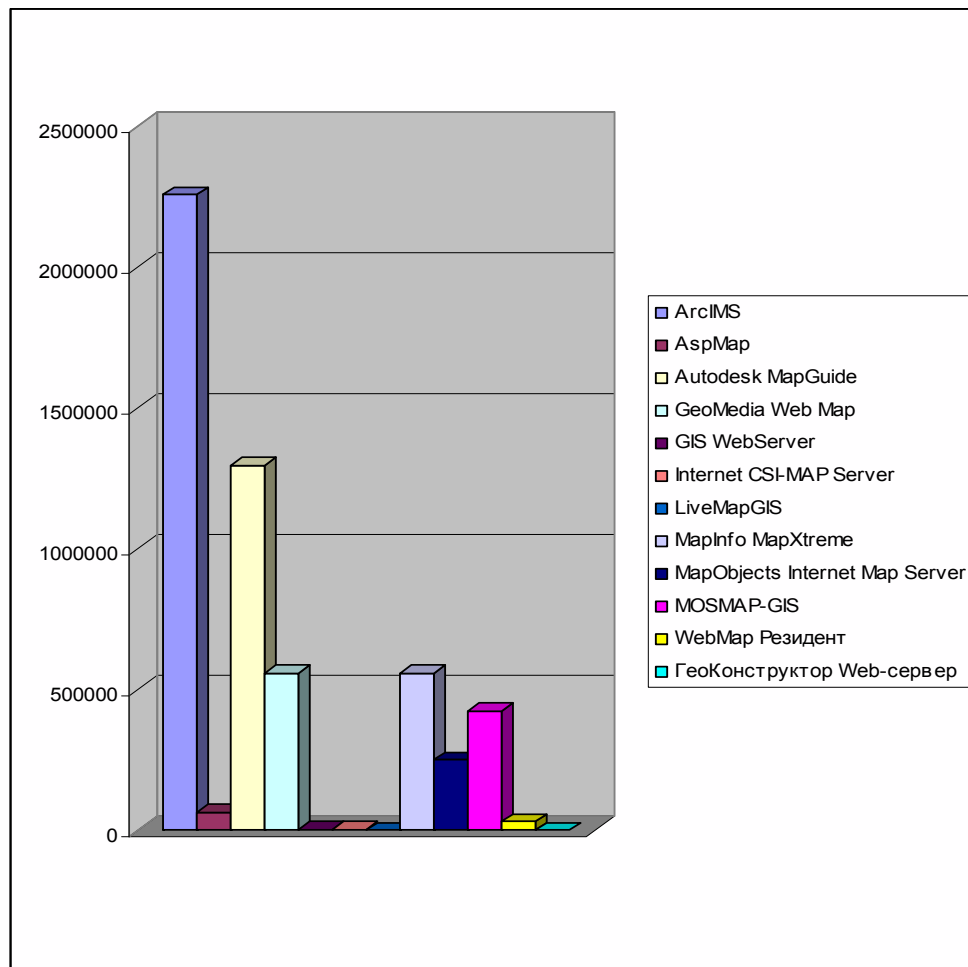| The Software	Google	Yahoo	Yandex	Total Amount
ALOV Map	16400	28900	959	46259
MapServer UMN	121000	547000	3477	671477
VNetGIS	927	458	558	1943

Fig. 1. The diagramme of popularity of the commercial software for creation of Internet-GIS

So, it is possible to see that the most popular software products are ArcIMS and Autodesk MapGuide. The given products are made by powerful corporations which spend much on advertisement and quality of a product.

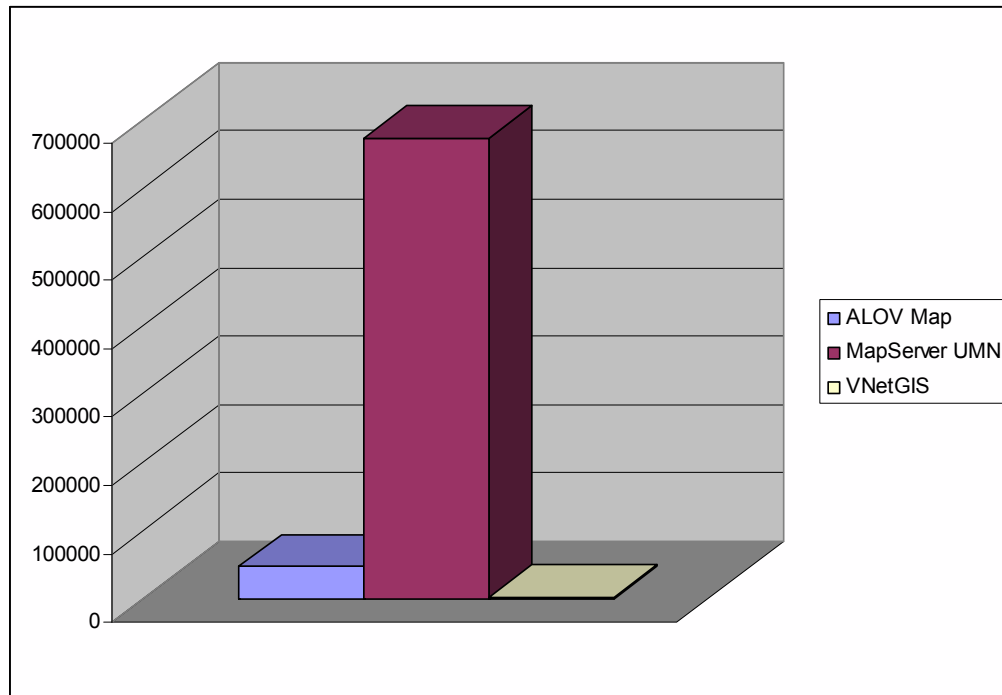Fig. 2 presents graphic representation of results of table 3.

Fig. 2. The diagram of popularity of the free software for creation the Internet-GIS

The diagram aanalysis on fig. 2 shows that foreign software ALOV Map and MapServer UMN is more popular, and Ukrainian VNetGIS considerably yields to popularity.

The comparative analysis of the known software in Ukraine for creation of a cartographical Internet resource.

Let us analyse the popularity of the considered software in Ukrainian Internet sources.

For the determination of the criterion "Popularity" in the Ukrainian Internet sources, there had been used the results of search in the most powerful search system Google. The obtained data for the commercial software is presented in table 4.

Table 4

Number of records in the Ukrainian Internet sources of the commercial software for creation the Internet-GIS

The Software	Google
ArcIMS	1720
AspMap	7
Autodesk MapGuide	747
GeoMedia Web Map	595
GIS WebServer	149
Internet CSI-MAP Server	0
LiveMapGIS	0
MapInfo MapXtreme	336
MapObjects Internet Map Server	8
MOSMAP-GIS	7
WebMap Резидент	7
ГеоКонструктор Web-Сервер	0

The received results of search for the free software are presented in table 5.

Table 5

Number of records in the Ukrainian Internet sources of the free software for creation the Internet-GIS

The Software	Google
ALOV Map	30
MapServer UMN	81
VNetGIS	827

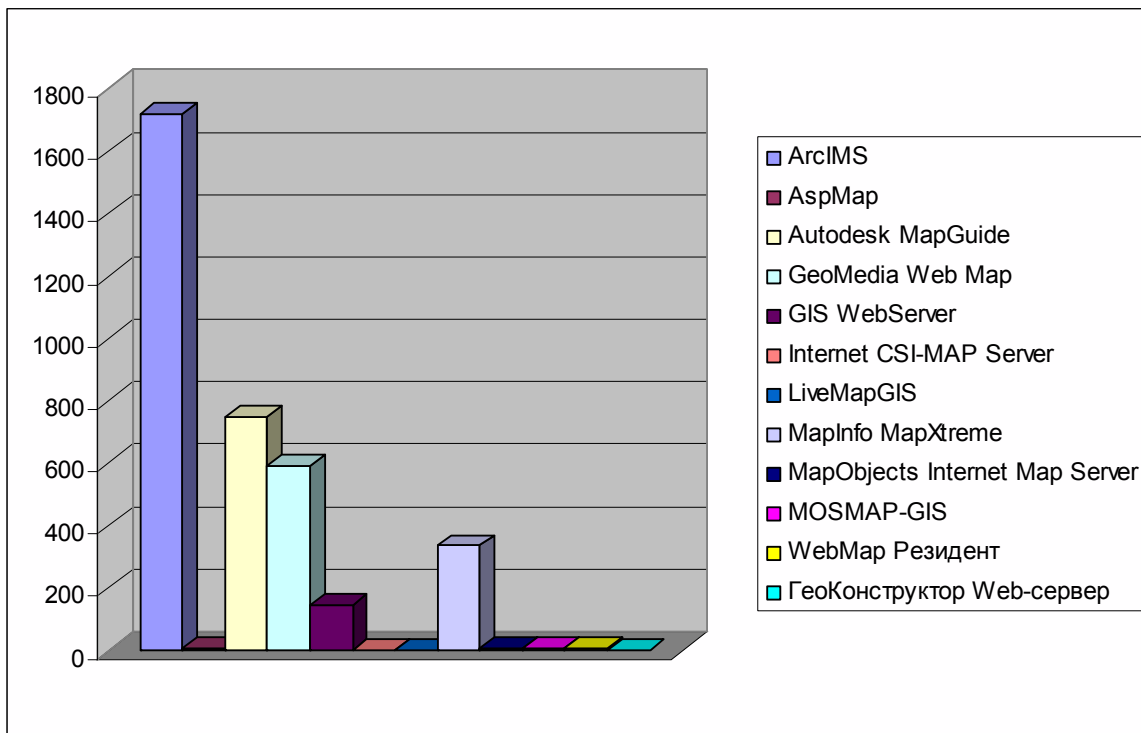Fig . 3 presents the graphic representation of the results of table 4

Fig. 3. The diagramme of commercial software popularity for creation of Internet-GIS in Ukraine

The diagramme analysis on fig. 3 shown that the software products GeoMedia Web Map, ArcIMS and Autodesk MapGuide are most popular on the Ukrainian Internet pages, that practically displays a situation as a whole. The software product of KB "Panorama" (Russian Federation) GIS WebServer, recently appeared on sale, also becomes more and more popular.

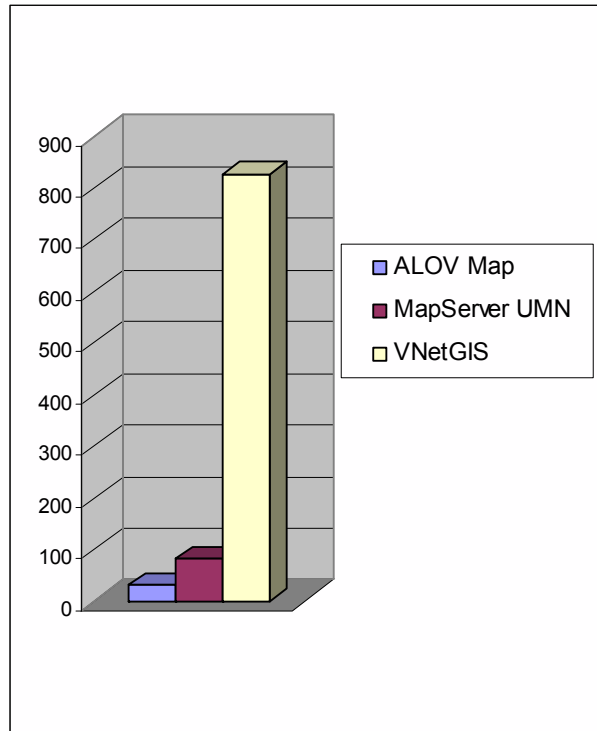Fig. 4 presents the graphic representation of results of table 5.

Fig. 4. The diagram of free software popularity for creation of Internet-GIS in Ukraine

The diagramme analysis on fig. 4 shows that in Ukraine the situation with the free software differs. The Ukrainian software product VNetGIS is more popular and leaves behind the foreign software.

Conclusions

As shows the analysis, the most powerful software is ArcIMS. It is optimum for creation of powerful Internet sites with a considerable quantity of data. Nevertheless, one of the essential disadvantages of the given software is its high (as for Ukraine) price. GeoMedia Web Map, ArcIMS, Autodesk MapGuide, MapInfo MapXtreme and GIS WebServer are powerful enough, owning similar toolkit and possibilities.

The considered above free software products, slightly concede on functionality to commercial products. There are certain features among them. ALOV Map and MapServer have more possibilities, they have the open program code, but nevertheless they require the availability of large number of highly-skilled personnel, considerable expenses and man-hours. At the same time VNetGIS is already completely generated product which can be used for solution of new tasks.

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Mokin Vitaliy – head of the department for simulation and monitoring of complex systems.
Vinnitsa National Technical University

Viktorov Marian – the leading engineer of department of water resources, Master of Ecology.
Basin management of water resources of the river Southern Boog