

## „Noi Topografii” –Online Topography

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**Abstract:** *As the time goes by, technology becomes more and more important in all the areas of engineering. The amount of information specific to any given field is growing exponentially, so the development of instruments dedicated to allowing the engineers to adapt to the new requirements is essential to their work. The science of topography is no exception, given the spectacular evolutions that it has witnessed of late. Thus was created an imperious need for new specific instruments, focused on allowing and facilitating the topographical engineer’s access to the expeditious exchange of information. In order to accomplish this goal, we have created an online instrument which allows any member to post their work in the shape of articles and tutorials, to communicate with other members through a forum, to post personal opinions on a dedicated blog, to share and visualise graphical representations and to upload and download useful documents. Moreover, this instrument puts at its users’ disposal a series of useful specialised links, structured under various categories, corresponding to different areas of interest. This online environment was translated in the shape of a topographical web site, which aims to become representative for the online community of the Romanian topographs and which can be found at [www.noitopografii.ro](http://www.noitopografii.ro).*

**Keywords:** *surveyors community, online topography, surveyors forum, projections systems, topography application.*

### 1. Introduction

The Internet has become an instrument which plays a vital role in all the fields of science and technology. Topography and its related fields (geodesy, cartography, cadastre, etc.) are no exception. A short survey on the information found on the Internet points out that the fields of science which have become crucial to mankind are well represented online, in the shape of various websites, forums and portals. Moreover, the advances in each field rely, to a certain extent, on the “science of the Internet”. However, if we refer strictly to topography, geodesy, cartography, cadastre, etc and the Romanian web sites which focus on these fields, we can assert that we still have a long way to go. This is why we decided to create a Romanian topographical portal, “Noi Topografii”, which can be found at [www.noitopografii.ro](http://www.noitopografii.ro). Throughout this paper we will describe the portal’s structure, some of its content and a couple of statistics related to the site’s activity.

### 2. Structure

The main purpose of “Noi Topografii” is to facilitate the exchange of data and information (see Diagram 1). The pieces of information on the website are organized depending on their nature (articles, tutorials, Internet resources, blog, image gallery and forum) and on the specific fields they belong to (topography, geodesy, cartography, cadastre, GPS, GIS, photogrammetry). The datum are organized depending on their form of presentation: maps, vectorial data, tables, etc. In order to allow the users to find the required information more easily, the site has a “search” option, which can filter content with the help of several search criteria: by certain key words, by author and by category. The site also offers

web feeds (RSS, Atom), which allow the users to track several activities: the posting of new articles, downloads and comments on the forum.

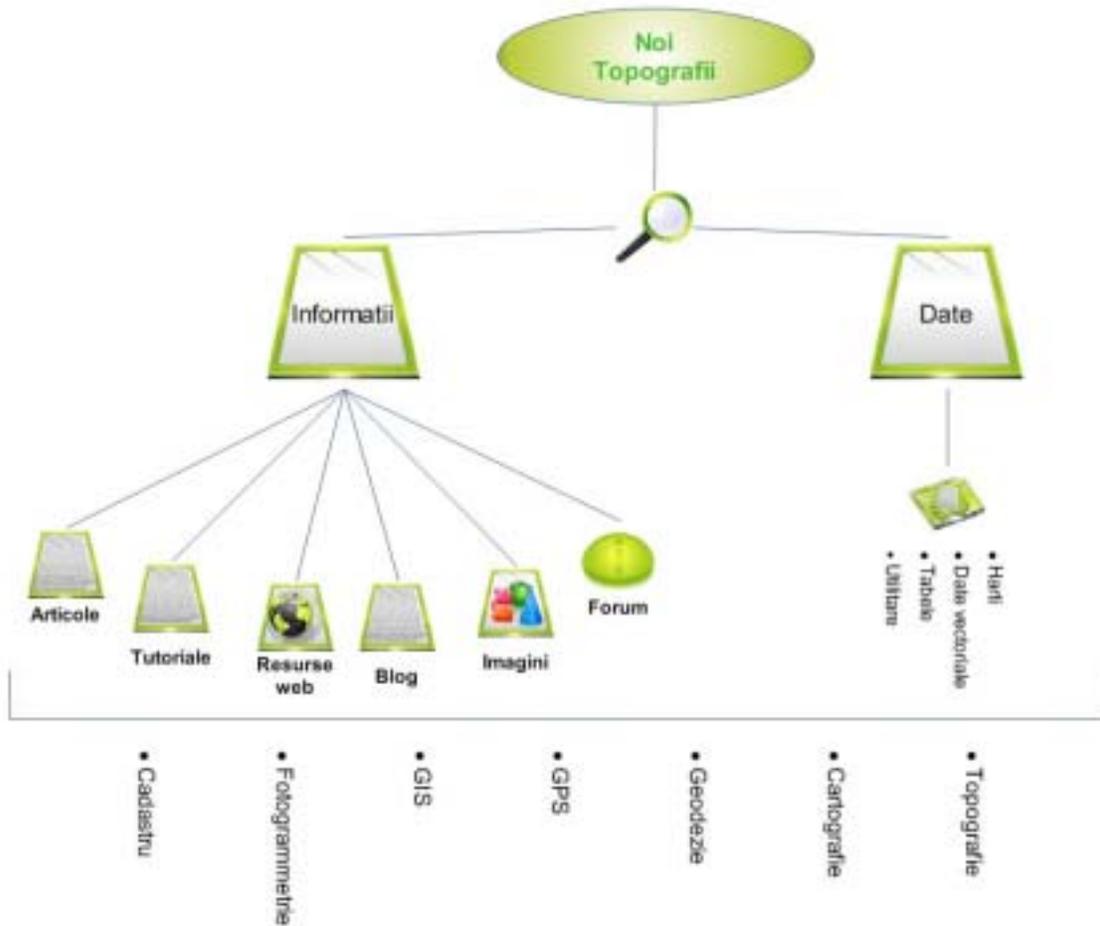


Diagram 1 – “Noi Topografii” structure

### 3. Content

The content of “Noi Topografii” was created over a period of eight months, during which 16 articles have been published, 15 documents have been added to the “Downloads” section and 44 images have been made public in the “Gallery” section. For the better understanding of the site’s content, we will proceed to a full presentation of it’s content (see table 1) and to a brief description of some of its elements:

**Table 1 – “Noi Topografii” Content**

<b>Document Section</b>	<b>Category</b>	<b>Title</b>	<b>Number of views</b>
Article	Cartography	The Distribution of Relative Linear Deformations Depending on the Role of the Terrain for the Stereographic 1970, Gauss-Krüger and UTM projections	688
		The Relative Linear Deformations in the “Stereographic 1970”, “Gauss - Kruger” and “UTM” Projection Systems and Comparisons between Them	1320
	GIS	The Integration in SIG application of Graphical and Numerical Information from the City Campulung Moldovenesc, in Suceva County	835
	Topography	The Differences between Sloped and Reduced Areas of the Romanian Counties	733
Download	Vectorial Data	The Trapezia (Chart and Plan Sheets) with a Nomenclature Specific to the “Stereographic 1970” Projection System, Transposed in Autocad	1195
	Autocad Macro	Autocad Macro – the Automatic Unification of the Points with the Same Code	1520
		Autocad Macros – Plotting of Coordinates	1239
		Autocad Macro – Designing the Rectangular Grating	440
	Statistics	The Inventory of the Chart Sheets which Include every Town in Romania, at a scale of 1:25.000	921
	Applications	The Identification of the Nomenclature Specific to a Trapezium to which a Point is Connected	782
Topo Side - Application for Processing the Topo-Geodetic Measurements		1136	
<b>Document Section</b>	<b>Category</b>	<b>Title</b>	<b>Number of views</b>
Tutorials	Autocad	The Use of Buttons in Autocad in Order to Create a Macro	481
		The Reversal of a Polyline Entity in Autocad	404
		Running a Macro in Autocad	948
	Site	Posting Articles on “Noi Topografii”	370

### **3.1. The relative linear deformations in the “Stereographic 1970”, “Gauss - Kruger” and “UTM” projection systems and comparisons between them.**

This article analyzes the relative linear deformations proper to the “Stereographic 1970”, “Gauss - Kruger” and “UTM” projection systems. For each of them is shown a sketch and a couple of significant details linked to the way in which the projection is done. There can also be found the calculus formulas and the graphics of the functions of the relative linear deformations. Starting from this information, there were created maps of Romania in which are shown the values of the relative linear deformations for each individual cell (a surface in the shape of a square with the side of 1 kilometer).

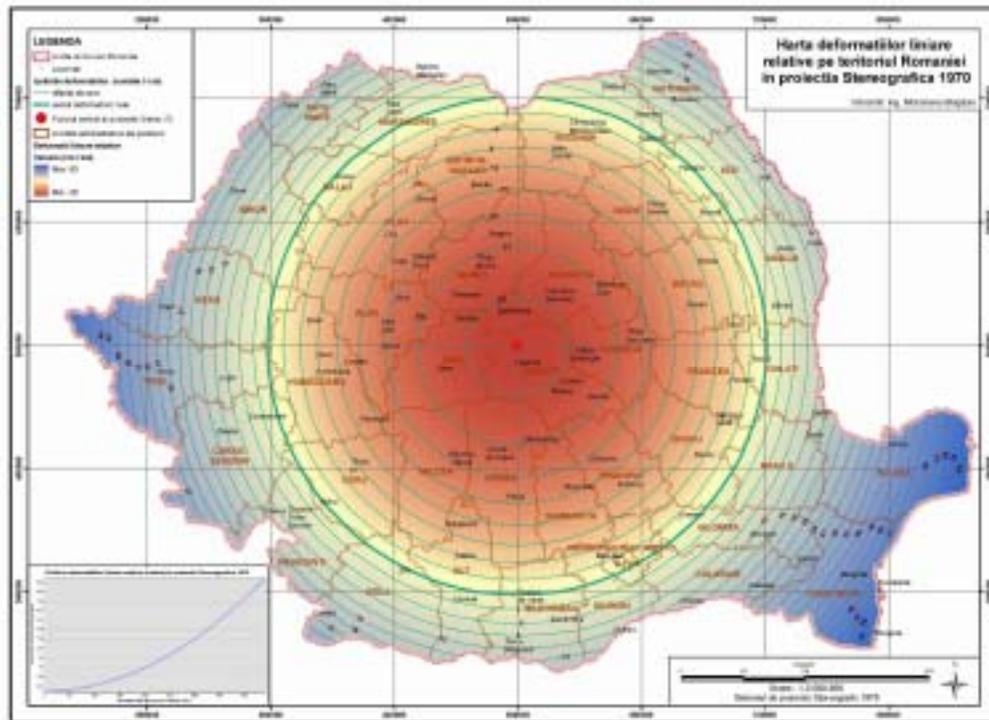


Diagram 2 – Map of relative linear deformations proper to the “Stereographic 1970” projection system.

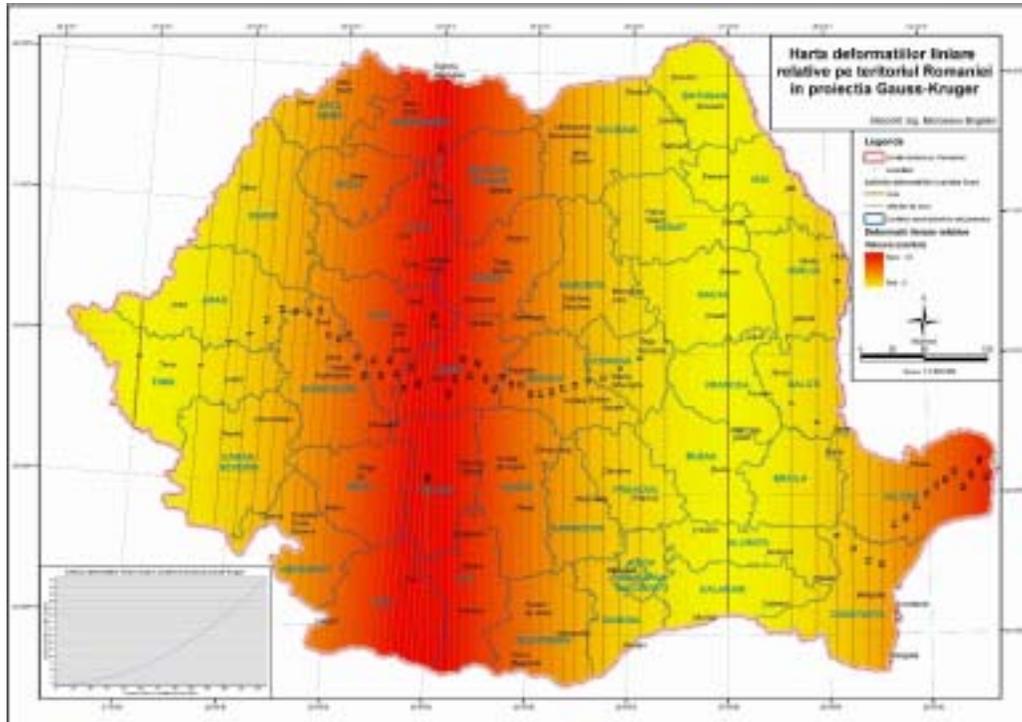


Diagram 3 – Map of relative linear deformations proper to the “Gauss-Kruger” projection system.

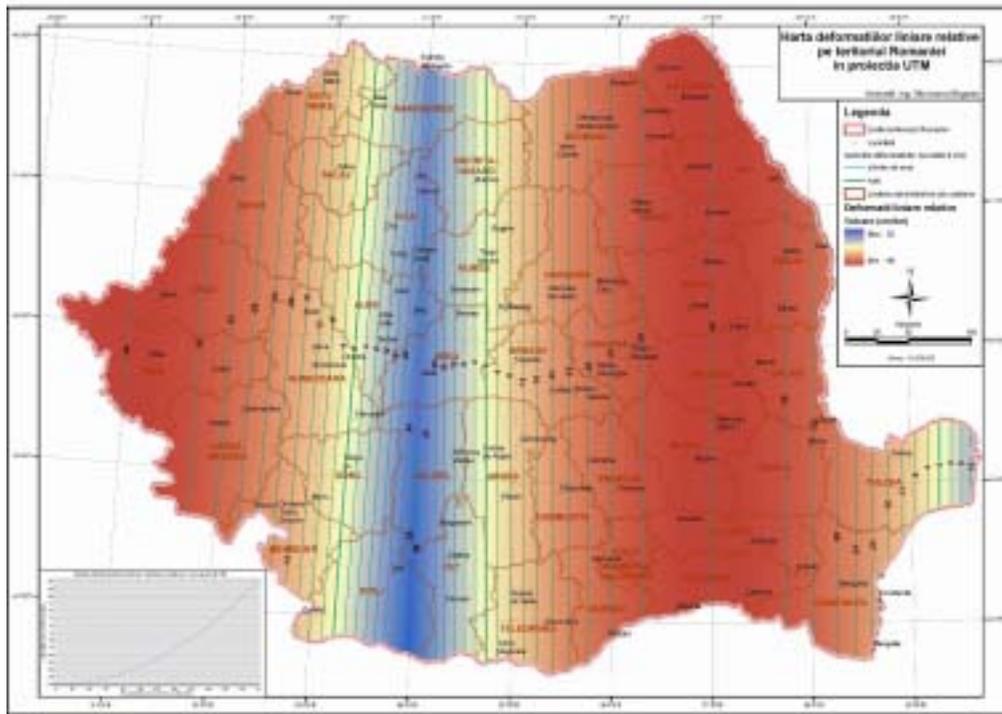


Diagram 4 – Map of relative linear deformations proper to the “UTM” projection system.  
With the help of the three previously described maps there has been created a map of the minimal relative linear deformations between the three systems of projections.

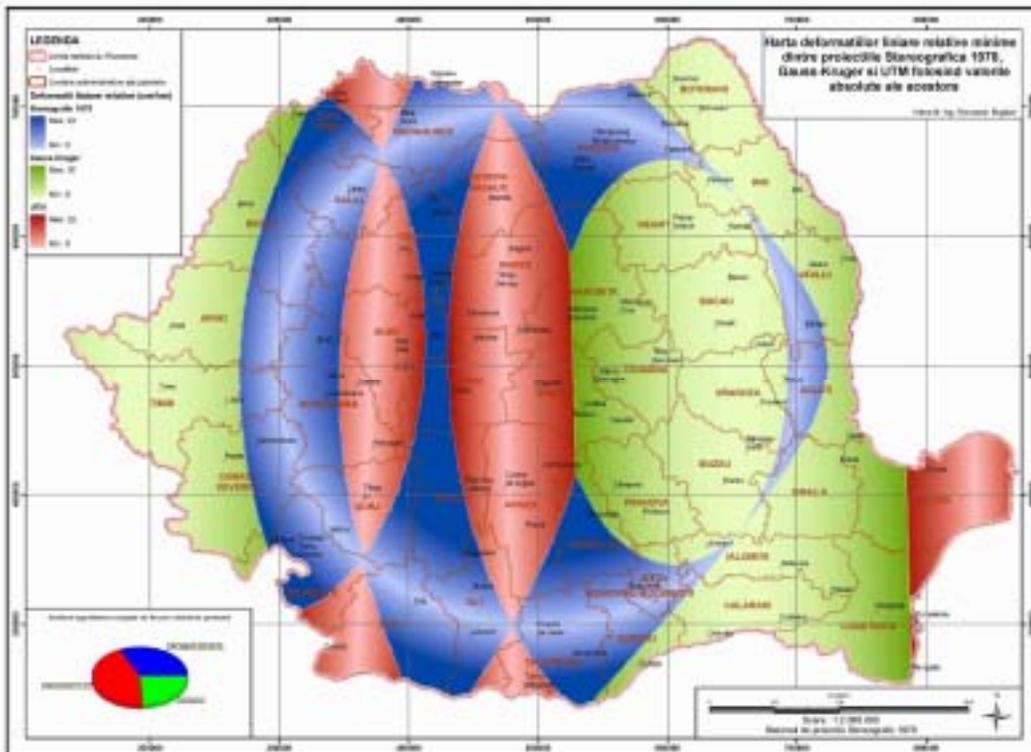


Diagram 5 – Map of the minimal relative linear deformations between the “Stereographic 1970”, “Gauss-Kruger” and “UTM” projection systems.

### **3.2. "Topo Side" – application for the processing of the topo-geodetic measurements**

The processing of the raw measurements (taken with a theodolite or with a total station) is one of the tasks which a topographical engineer is required to do on a constant basis. This task follows a specific algorithm, which has allowed the development of specialized software to handle it. The functions of such an application follow a couple of main steps:

- The transfer of the measurements from the topographical instruments (input data);
- Checking for the possible errors with the help of simple operations;
- Topographical calculus for establishing the approximate coordinates (intersections, traversings);
- The compensation of data through rigorous methods and the establishment of calculus and compensation ratios which are used to detect big errors;
- Generating specific graphical elements (sketch of sites, error ellipses, grid sketch, etc.);
- Exporting the processed data in the shape of graphical formats and text.

Given the conditions above, we have created an application, "Topo Side", which does the following:

- It imports the measurements;
- It determines the coordinates of the radiated points and generates calculus ratios;
- It determines the coordinates of the points of a traversing and generates calculus ratios;
- It exports the coordinates of the newly established points, in the shape of text files.

### **3.3. The trapeziums (chart and plan sheets) with a nomenclature specific to the "Stereografic 1970" projection system, transposed in Autocad**

The representation of Romania's surface is done on several chart and plan sheets. They are identified with a counting system made up of letters and numbers, specific to each projection and referred to as a nomenclature. For the "Stereografic 1970" projection system, the nomenclature has been devised based on the chart and plan sheets from the Gauss – Kruger projection. The nomenclature contains information referring to the geographical location, more exactly the coordinates of the corners of the trapezium which frame the chart or plan sheet. The use of this identification system raises two problems. The first is linked to the situation in which we already know the nomenclature and we want to obtain the coordinates of the trapezium's corners, and the second refers to the case in which we have the coordinates of a series of points and we want to find out what is the nomenclature of the chart or plan sheets to which they belong. A solution to these problems has been the representation in Autocad (see Diagram 6) of the chart and plan sheets from throughout Romania (encompassed by the 43° 20' lat. S și 48° 20' lat N parallels and the 20° long. E și 30° long. V meridians), for all scales (1:100.000, 1:50.000, 1:25.000, 1:10.000, 1:5.000).

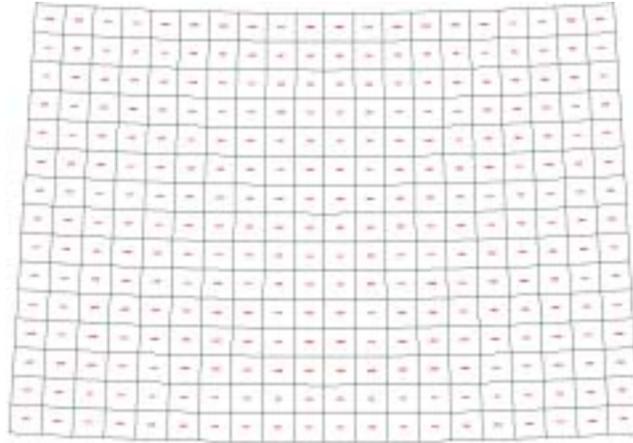


Diagram 6 – The representation of the chart sheets 1:100.000 in Autocad

#### 4. Statistics

Because we believe that the users' feedback to such an initiative is extremely important, we have included some statistics on the site's activity in the eight - month interval of its existence:

- Information concerning the number of visitors (see Diagram 7);
- Information concerning the traffic on the website (see Diagram 8);
- Information concerning the interest shown for each individual document (see Diagram 9);
- Information concerning the number of registered users and their location (see Diagram 10);
- The age of registered users (see Diagram 11).

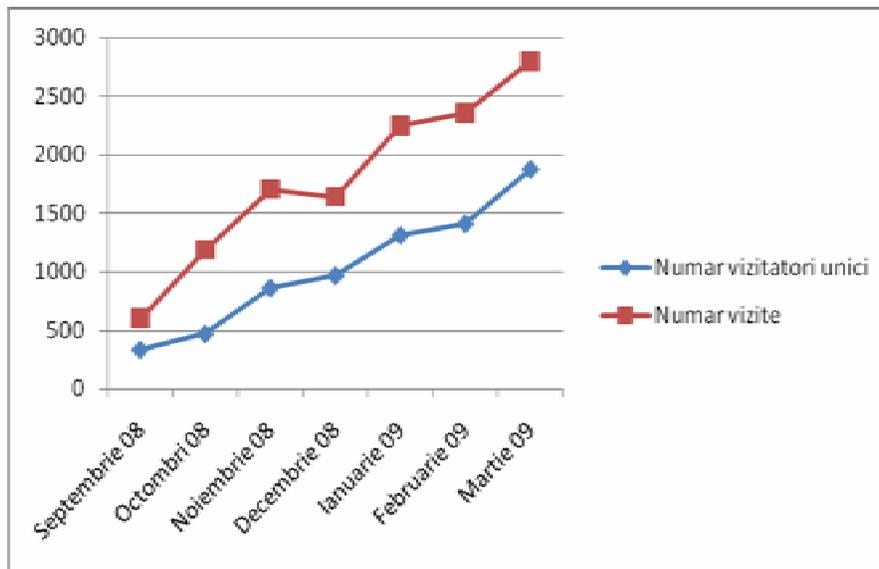


Diagram 7 – Number of visitors evidence.

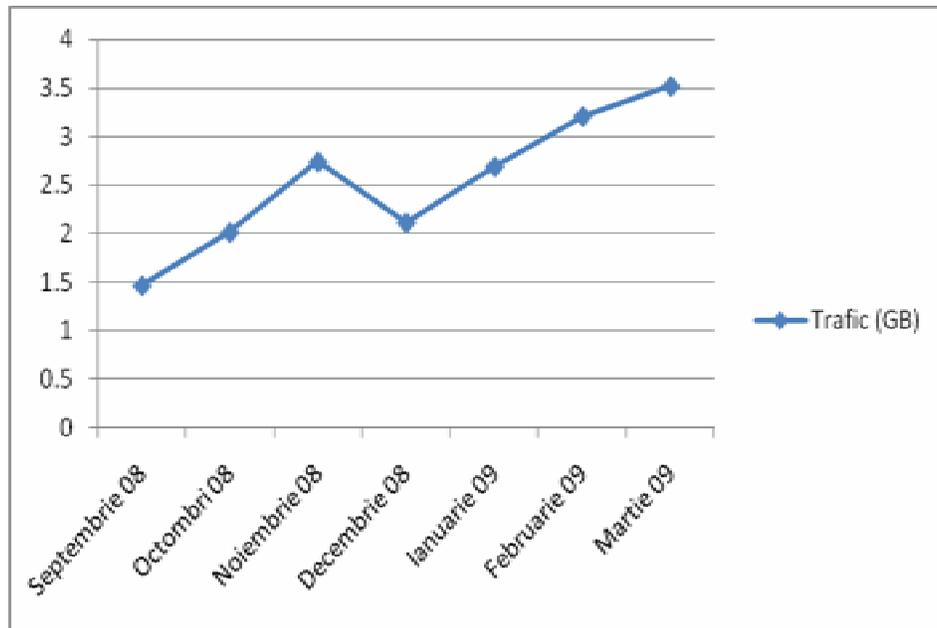


Diagram 8 – Site’s traffic evidence.

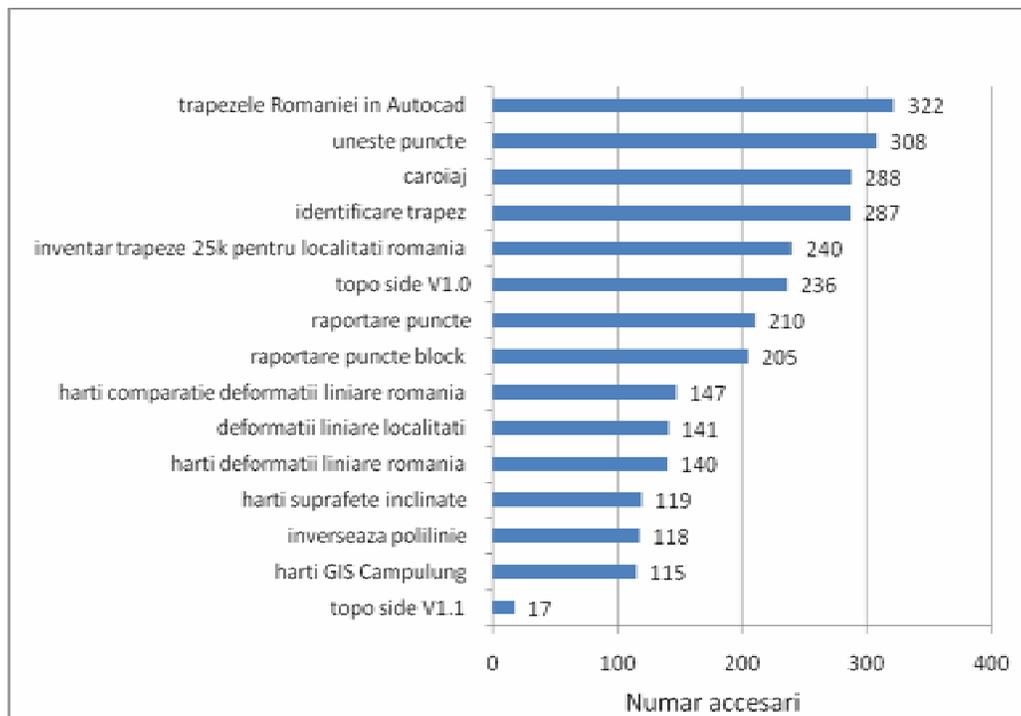


Diagram 9 – Interest shown for each individual document.

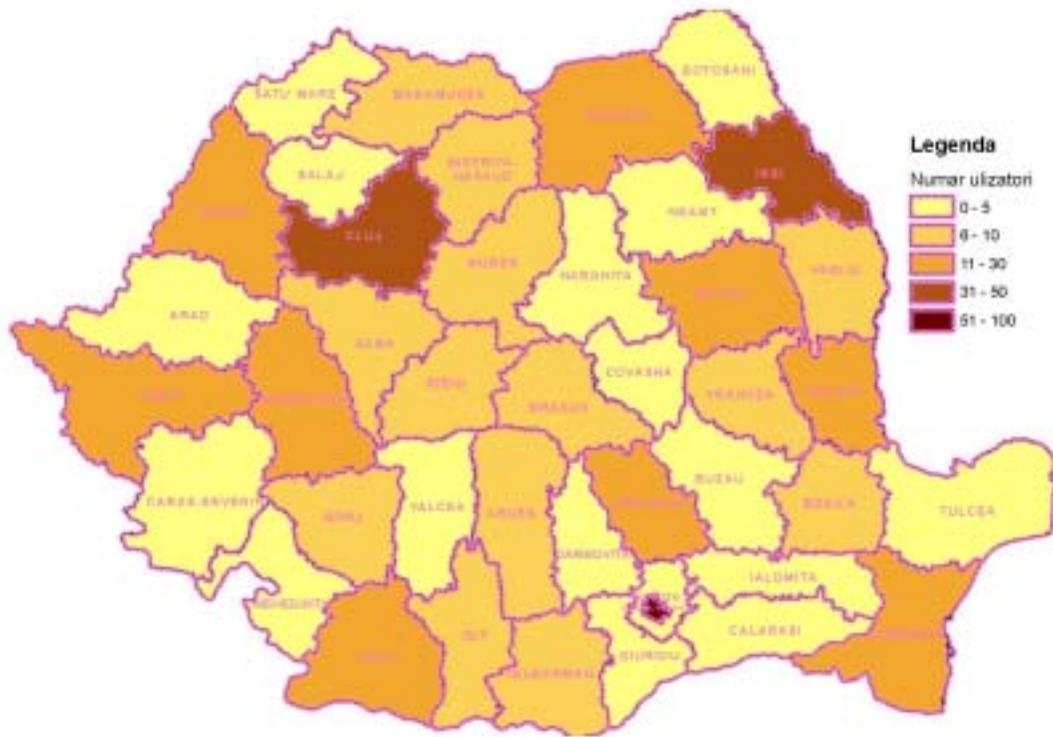


Diagram 10 – The location of the registered users.

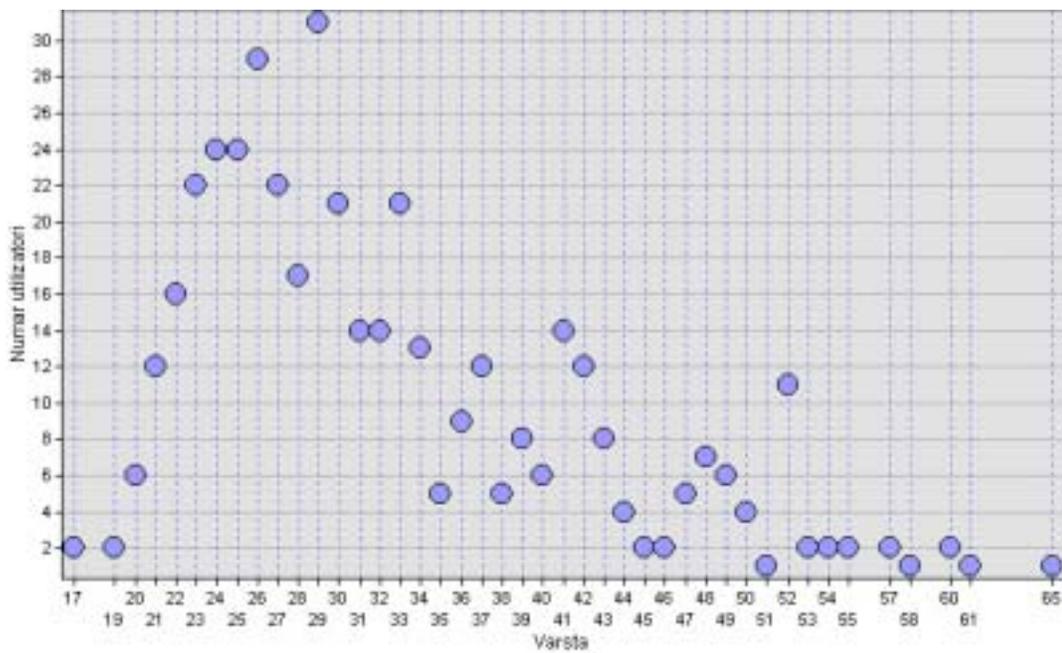


Figura 11 – The age of registered users.

## 5. Conclusions and proposals

Along with several other Romanian projects, "Noi Topografii" has opened the road to what we can call "online topography". This project is certainly not the best solution. It can be improved though and we hope that it will generate similar initiatives. Its main purpose is to create an online community of the Romanian topographical engineers, which will improve their activity.

## 6. References

1. \*\*\* - *Antonios A. - Virtual Communities and their Importance for Informal Learning*