BULGARIAN CARTOGRAPHY: FROM PAPER TO VIRTUAL REALITY

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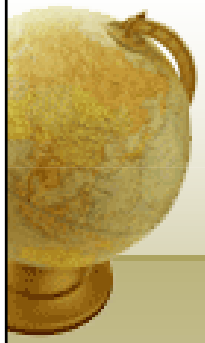
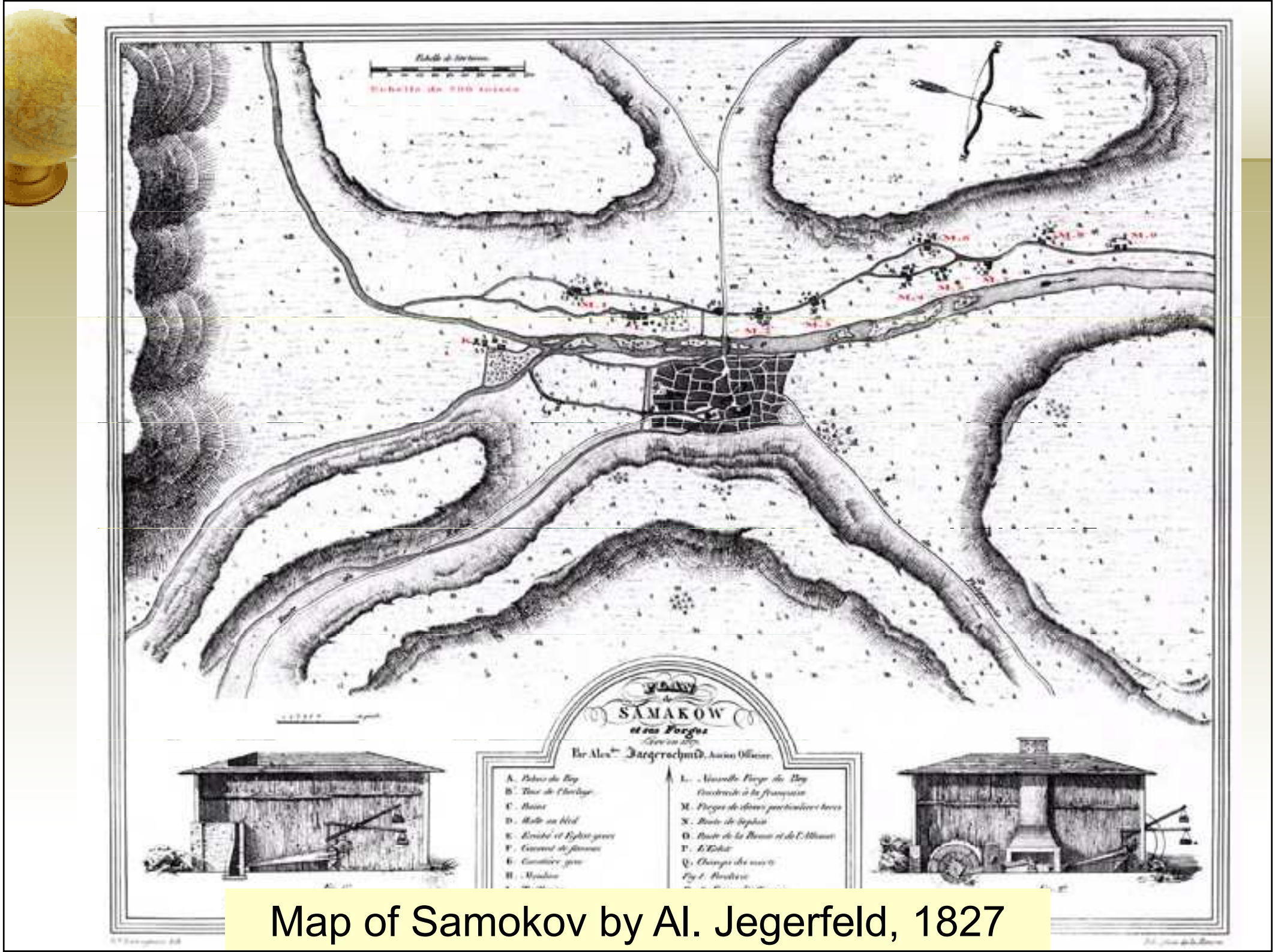


MAPPING OF BALKAN PENINSULA AND BULGARIA

- created ancient and mediaeval geographical maps are in small scale;

- incomplete and inaccurate maps in their contents;

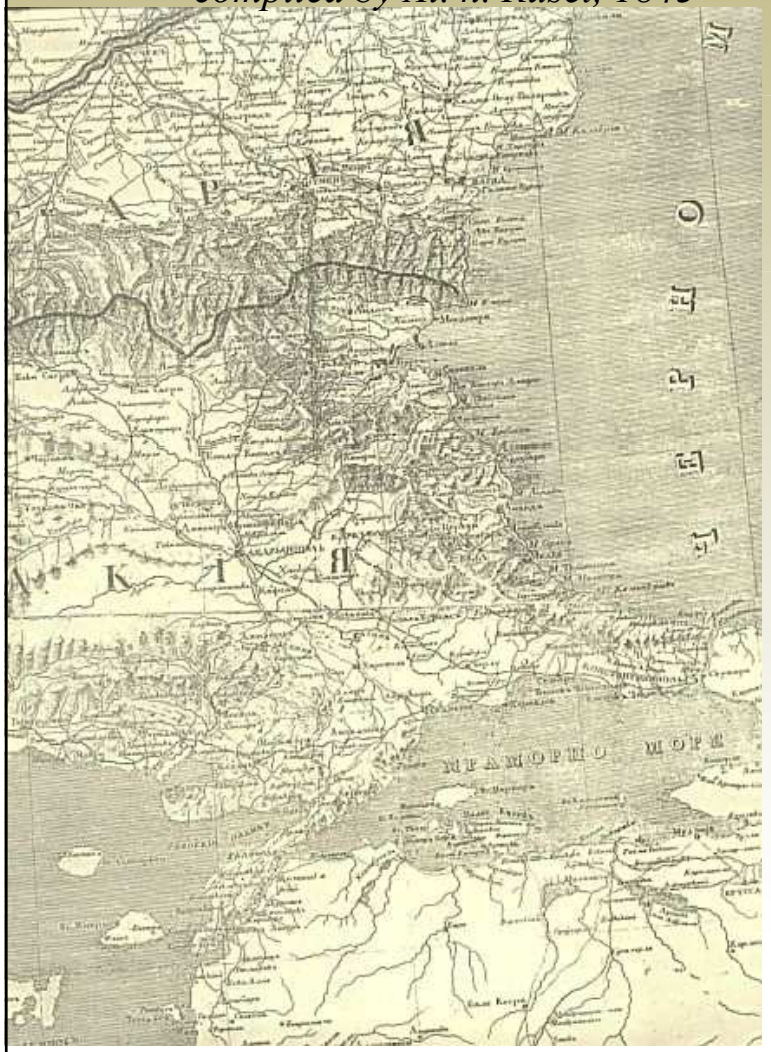
- in the end of XVII c. and after the great researches of Mercator, Sanson, Snellius the beginning of accurate geodetic measurements is established.



Map of Samokov by Al. Jegerfeld, 1827

MAPPING OF BALKAN PENINSULA AND BULGARIA

A fragment of the first map in Bulgarian language compiled by Al. h. Ruset, 1843



- trips to different part of the world, also in Ottoman Imperia have been started;

- main purpose: defined as the supplying of “white territory” on existing maps with cartographic information;

- geodetic measurements are made during the Russian-Turkish war and accurate and precise maps are compiled;

- the first map compiled in Bulgarian language - XIX c. “Map of Present Bulgaria, Thrace and Macedonia and their territories in 4 sheets”.

MAPPING OF BALKAN PENINSULA AND BULGARIA

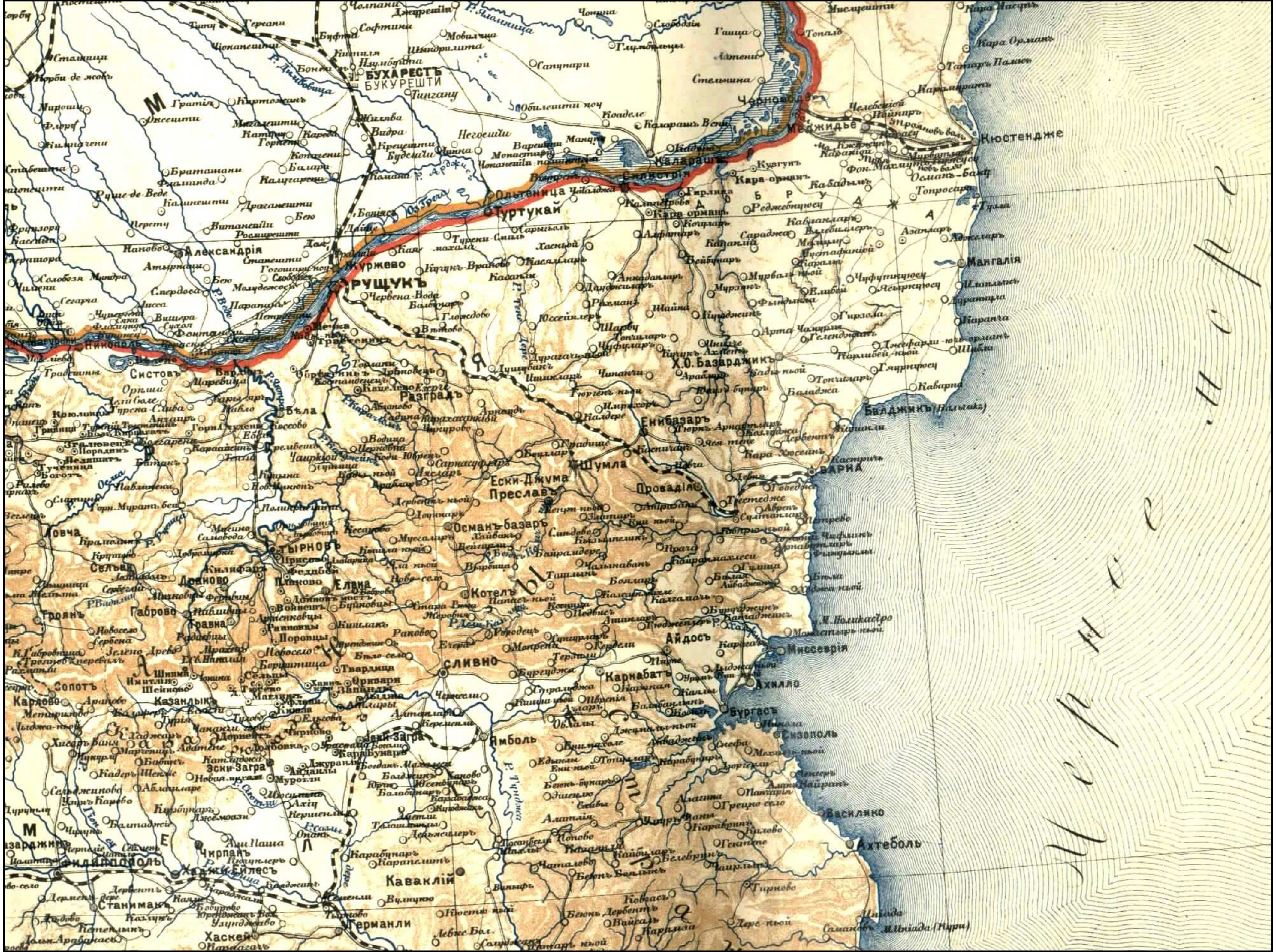
The period of Russian-Turkish war in 1877-78 and years of establishing of new Bulgarian state on Balkan Peninsula can be considered as the beginning of modern Bulgarian cartography.

Russian Topographic maps from the period of Russian-Turkish war

Russian topographic corpus did the first detailed measurements and large-scale mapping.

Result of the topographic – geodetic works is multi-sheets map of the country in the scale 1:42 000.

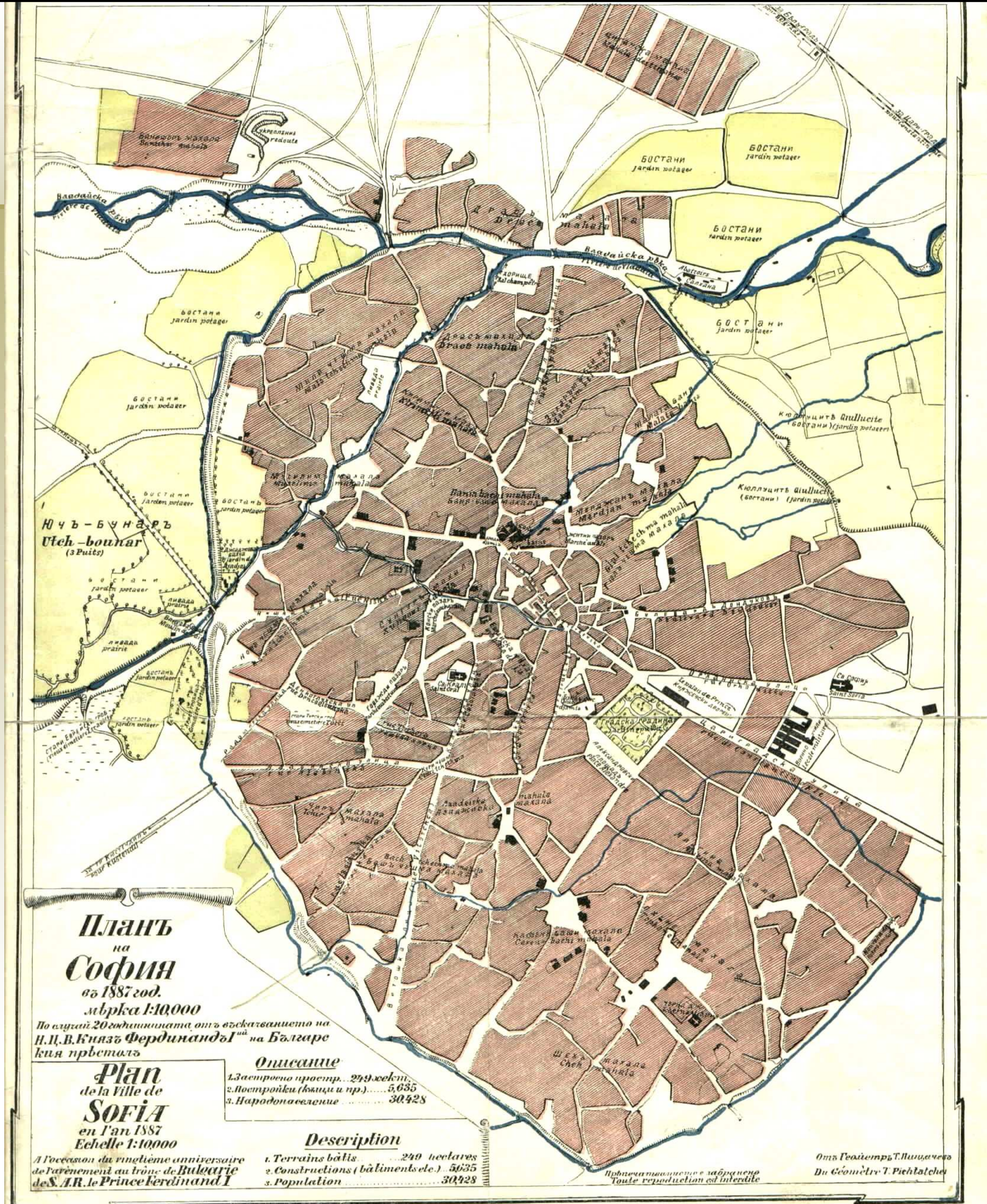
- maps in the scale 1:126 000 and 1:210 000 and other


БУХАРЕСТЪ
БУКУРЕШТИ
Александрія
Журжево
Рущукъ
Олтеница
Туртукай
Калараши
Силистрія
Меджидье
Кюстендже
Мангалія
Х.О. Базарджикъ
Балджикъ
Никополь
Систовъ
Разградъ
Енибазаръ
Шумла
Провадія
Варна
Ески-Джума
Преславъ
Осман-базаръ
Тырновъ
Ловча
Сельви
Дряново
Габрово
Троянъ
Трявна
Елена
Котелъ
Сливно
Айдосъ
Миссеврія
Карнабатъ
Ахиоло
Бургасъ
Сизополь
Василико
Ахтеболь
Сопотъ
Карлово
Казанлыкъ
Эски-Загра
Ени-Загра
Ямболь
Чирпанъ
Филиппополь
Станимакъ
Хаскей
Кавакліи
Германли

OLD MAPS COLLECTED IN THE BULGARIAN MUSEUMS AND MONASTERIES

National Polytechnic Museum

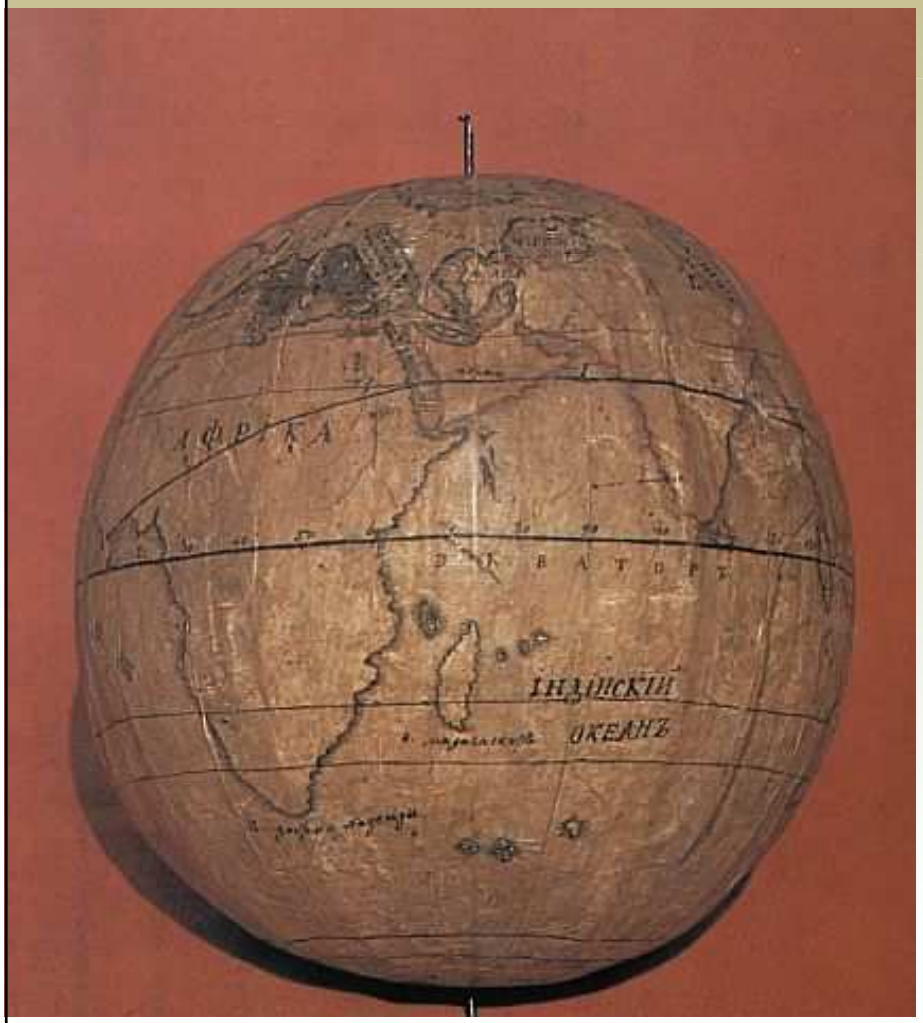
1. Geographical map of Ottoman Imperia by Giacomo Gantelli da Vignolla, Roma, 1679;
2. Geographical map of Balkans, 1692- 1694;
3. Plan of Sofia on engineering fabric, produced in occasion of 20 years of Prince Ferdinand ascension in Bulgarian throne. Produced by Toma Pishtachev, 1907, presenting the Sofia in 1887;
4. Plan of old Sofia in 1879 and its regulation project in 1881 by Toma Pishtachev;
5. Anniversary map of electric centrals and power transmission lines in Kingdom Bulgaria. It is produced in occasion 20 years of King Boris III ascension in Bulgarian Throne 1918-1938, Scale 1: 400 000; Publisher: Ministry of social buildings, roads and urbanization;



Планъ
на
София
въ 1887 год.
мѣрка 1:10,000
По случай 20 годишнината отъ възкачването на
Н.Ц.В. Князъ Фердинандъ I-ий на Българс
кия прѣстолъ
Plan
de la Ville de
Sofia
en l'an 1887
Echelle 1:10,000
A l'occasion du vingtième anniversaire
de l'avènement au trône de Bulgarie
de S.A.R. le Prince Ferdinand I
Описание
1. Застроено простр. ... 249 хект.
2. Постройки (къщи и пр.) 5,635
3. Народонаселение 30,428
Description
1. Terrains bâtis .... 249 hectares
2. Constructions (bâtiments etc.) .. 5635
3. Population 30,428
Бостани
jardin potager
Юч-Бунаръ
Utch-bounar
(3 Puits)
Bania bachi mahala
Банябашия махала
Отъ Геометръ Т. Пишачевъ
Du Géomètre T. Pichtatchev
Toute reproduction est interdite

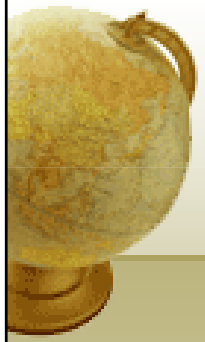
The first map published in Bulgaria by D. Angelidov

OLD MAPS COLLECTED IN THE BULGARIAN MUSEUMS AND MONASTERIES



Other maps & cartographic products:

- **map archive of National library,**
- **National and regional Museums,**
- **private collections,**
- **General Department of Archives at the council of Ministers of Republic of Bulgaria**
- **The first globe was created by Neofit Rilski (1836) and it is kept in Rila Monastery and its copy in National Museum of History in Sofia.**



WHERE ARE CARTOGRAPHICAL EDUCATIONAL CENTERS IN BULGARIA?

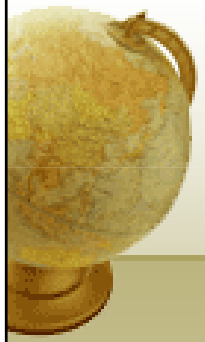
- University of Architecture, Civil Engineering and Geodesy, Sofia
- Sofia University “St. Kl. Ohridski”
- National Military University “V. Levski”, V. Tarnovo
- Southwest University, Blagoevgrad
- University of Forestry, Sofia

WHERE ARE CARTOGRAPHICAL EDUCATIONAL CENTERS IN BULGARIA?

University of Architecture, Civil Engineering and Geodesy, Faculty of Geodesy,

Department of Photogrammetry and cartography has the following subjects in educational process:

- **Topographic cartography 1/ 2;**
- **Cartography 1 (map projection);**
- **Cartography 2;**
- **Visualization of Geo-data;**
- **Project in cartography;**
- **Map production;**
- **Thematic cartography;**
- **Virtual cartographic modeling**
- **Navigation mapping;**
- **Cartographic standards;**
- **Automatic mapping.**

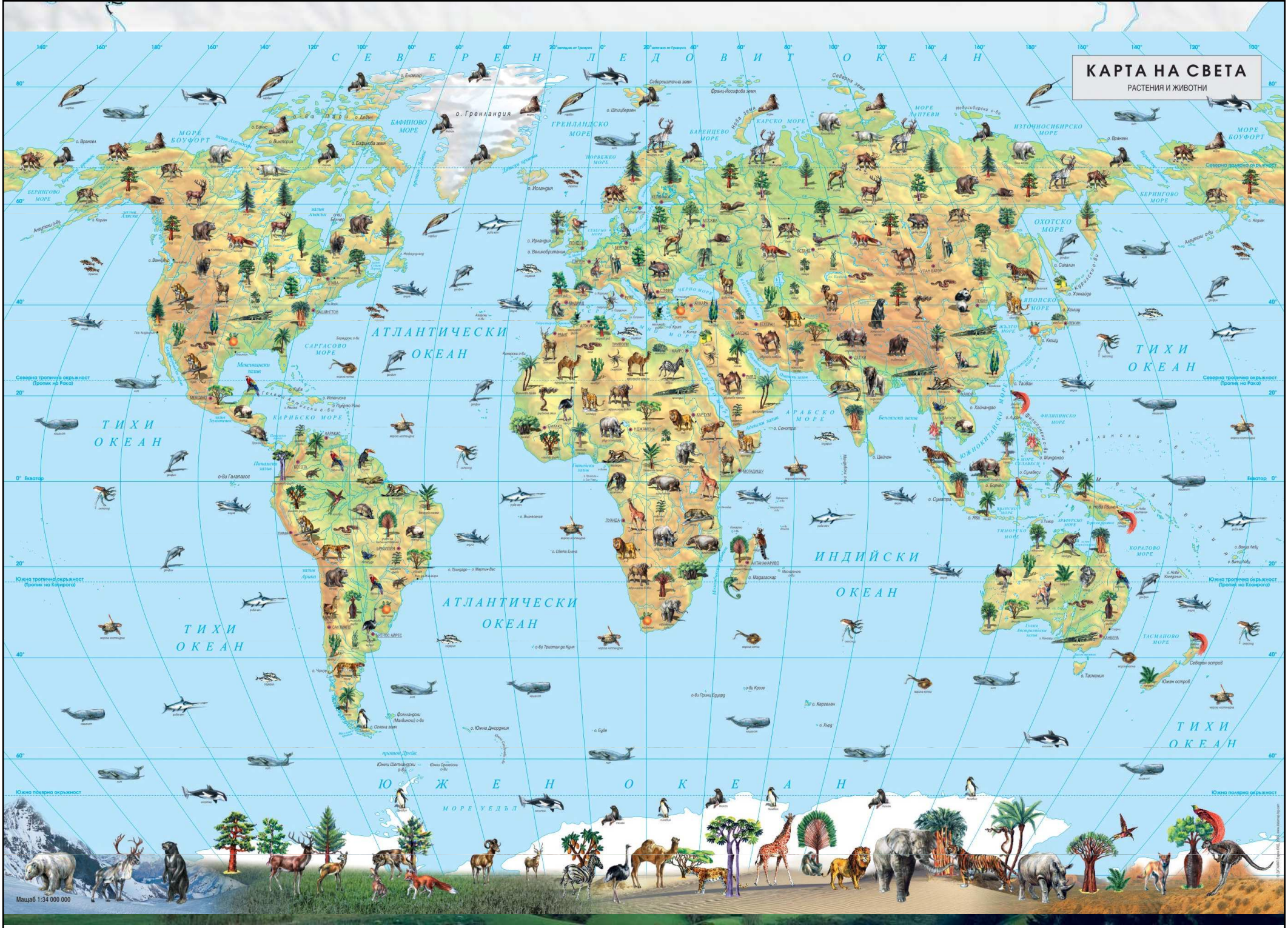


CARTOGRAPHY IN THE SCOOLS

We are living in a time of rich information society in a global world with many communication possibilities.

Cartography is developing incredibly in the technology aspect. Old paper version products started to be not enough attractive to students, especially in high education.

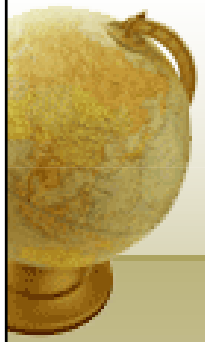
The tasks of cartographers should be to find closer way of communication with students in geographical lessons and this could be achieved by quality information representation and attractiveness of cartographic products.


КАРТА НА СВЕТА
РАСТЕНИЯ И ЖИВОТНИ
С Е В Е Р Е Н Л Е Д О В И Т О К Е А Н
Т И Х И О К Е А Н
А Т Л А Н Т И Ч Е С К И О К Е А Н
И Н Д И Й С К И О К Е А Н
Ю Ж Е Н О К Е А Н
Северна тропична окръжност (Пропик на Рака)
Южна тропична окръжност (Пропик на Козирога)
Екватор
Северна полярна окръжност
Южна полярна окръжност
Мащаб 1:34 000 000

CARTOGRAPHY IN THE SCOOLS

How can we start?

- Are there any reasons to change the exciting old Atlas?
- Who are our users?
- Do we have enough data base?
- Do we have a team of experts?
- Do we have an idea and program?
- Do we have a technology for realization of our project?
- How to get to our users?



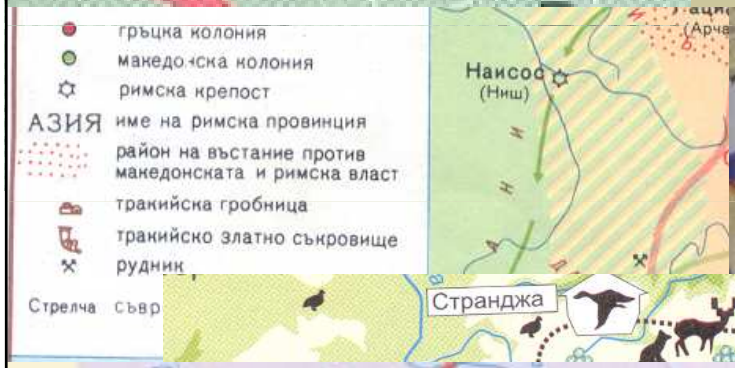
Situation in Bulgaria
7-8 years ago

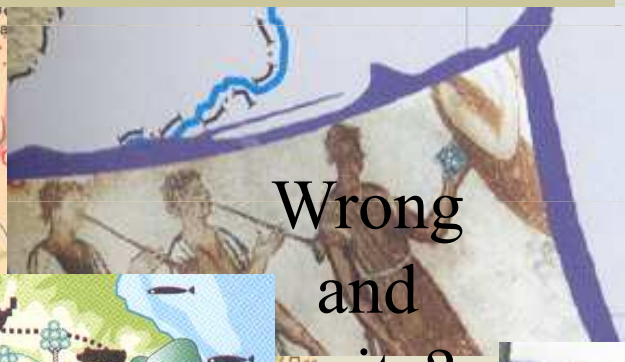
- not satisfying - old contents and design
- school curriculum was changed some times during the last 15 years
- cartographic firms have not been able to give what was necessary for the educational process
- still nowadays many schools have old wall maps with old contents, cartographic information and design; other ones do not have maps for every continent

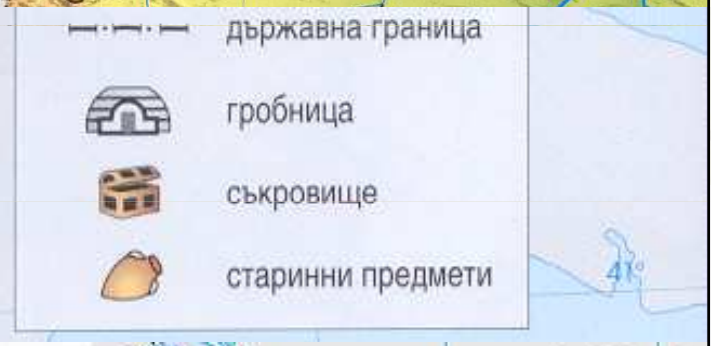
Are there any reasons to change the exciting old Atlas?

River visualization

Symbol system

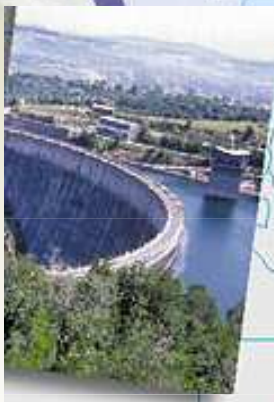


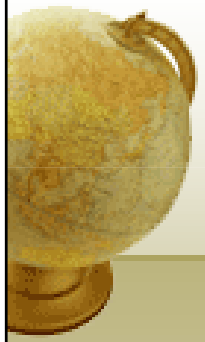




Wrong and write?

texts





Example –

why do we need a new Atlas for 7 grade

- Bulgaria in European Union
- the examinations in Geography
- the complicated school curriculum approved by Ministry of Education
- The outline maps are used very successfully for assimilation of knowledge

Are there any reasons to change the exciting old Atlas?

Levels of geography education

Primary	Secondary	High
1-2 grade 7-8 years old	5 grade 11 years old	9 grade 15 years old
3-4 grade 9-10 years old	6 grade 12 years old	10 grade 16 years old
	7 grade 13 years old	11-12 grade 17-18 years old
	8 grade 14 years old	

Who are our users?

Sources for Atlas creation

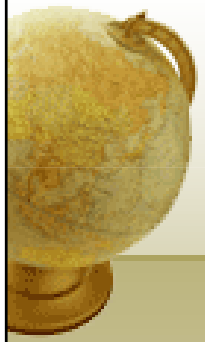
- Curriculum in Geography
- Min 3-4 text books in geography
- Existing maps and atlases for these ages
- GIS vector data for the territory
- Statistical data, raster data (photos, pictures), etc.

Do we have enough data base?

Who participates in the process

- Cartographers – authors and mapmakers
- Specialists in GIS
- Geographers, expert's advice
- Schoolteachers - ideas and efforts
- University professors as reviewers
- Professional artists
- Designers
- Ministry of Education

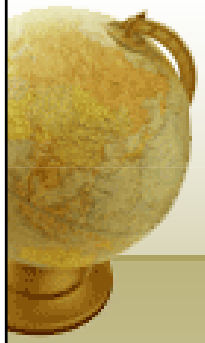
Do we have a team of experts?



Students' help in maps and Atlases designing

- The purpose - find a way for the best communication with students
- Children's knowledge and information - use in the process of maps and atlases designing
- "The cartographer must learn how the non cartographer draws a map, what they want to communicate, what symbolism they use and what is their logic" *Morita, T.1997*

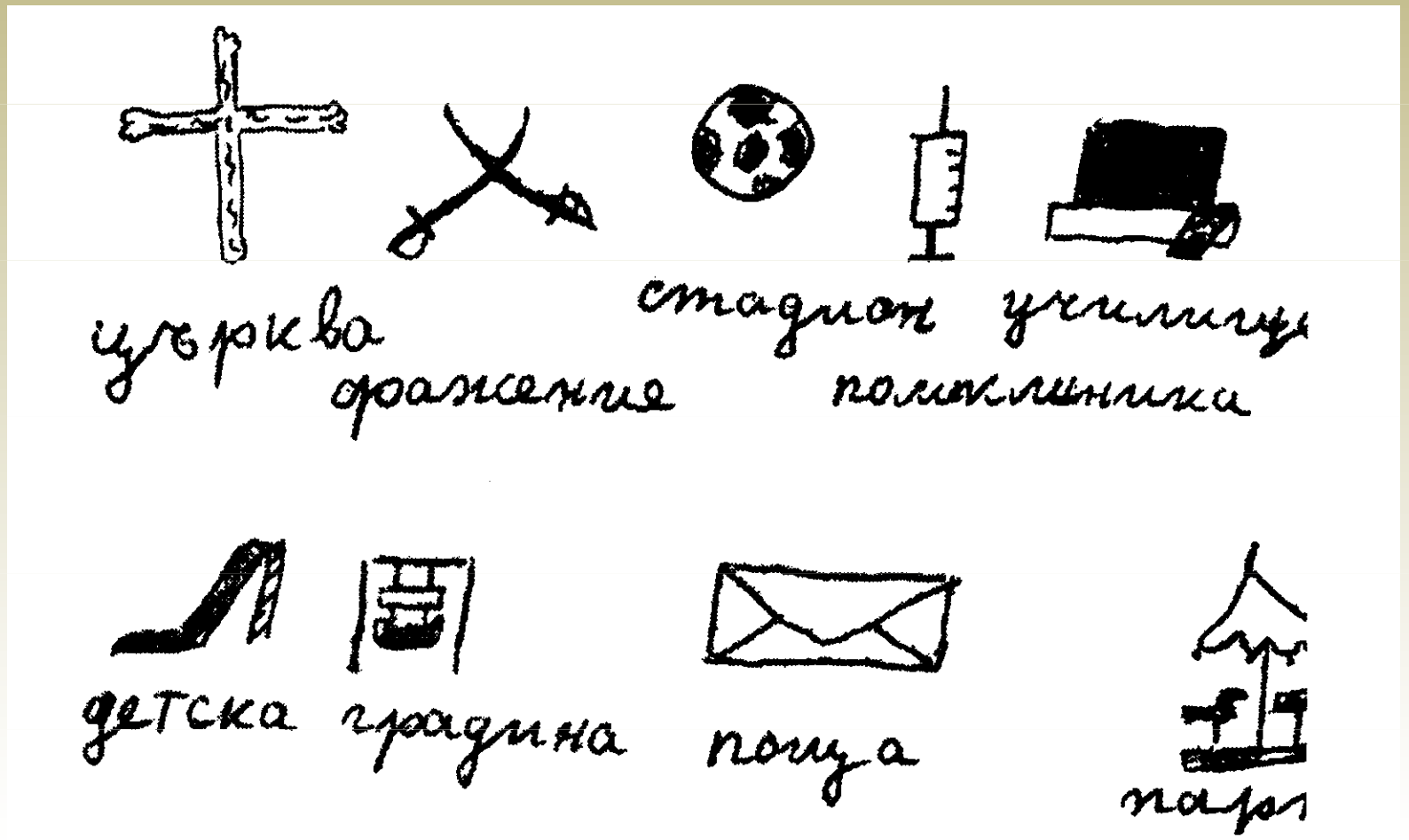
How to get to our users?



Experimental work with children in maps making for their education

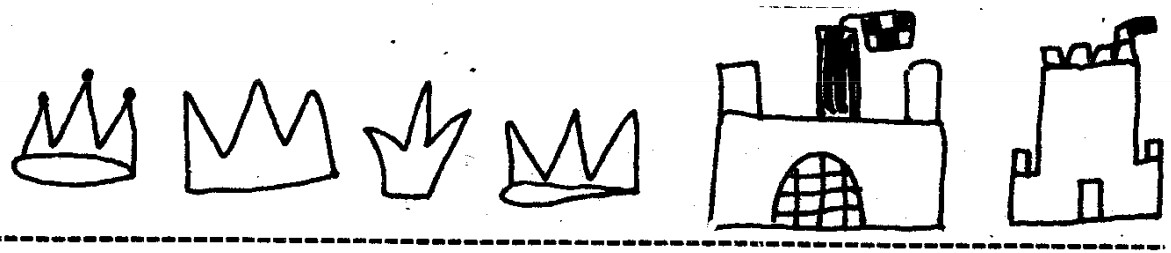
- 80 (first and second school year) pupils in Sofia
- Children are not acquainted with the use and reading of maps
- Children show great interest for the experiments and have a desire and possibility to use maps

Symbols are drawn by a student 7 years old



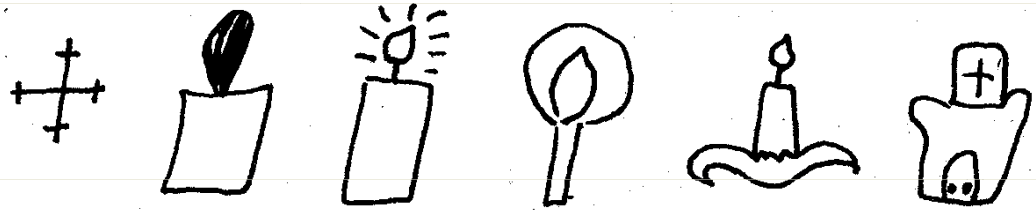
Palace

Дворец



Church

Църква

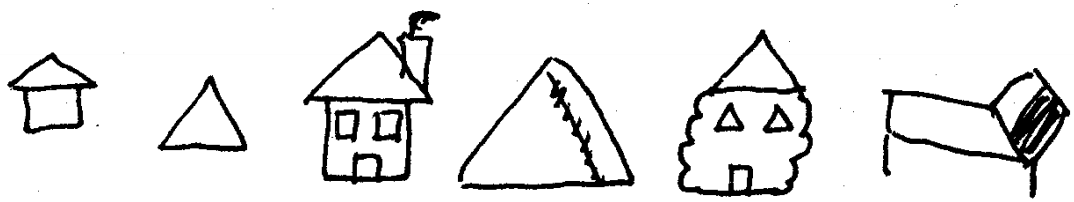


Golden treasure

Златно съкровище

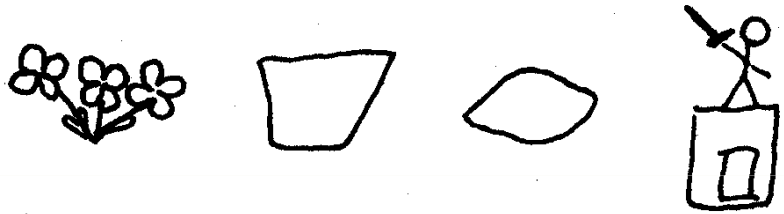
Hut

Хижа



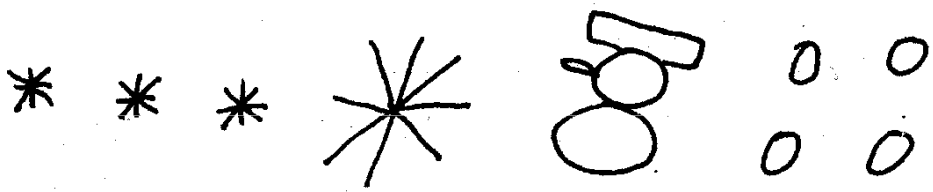
Monument

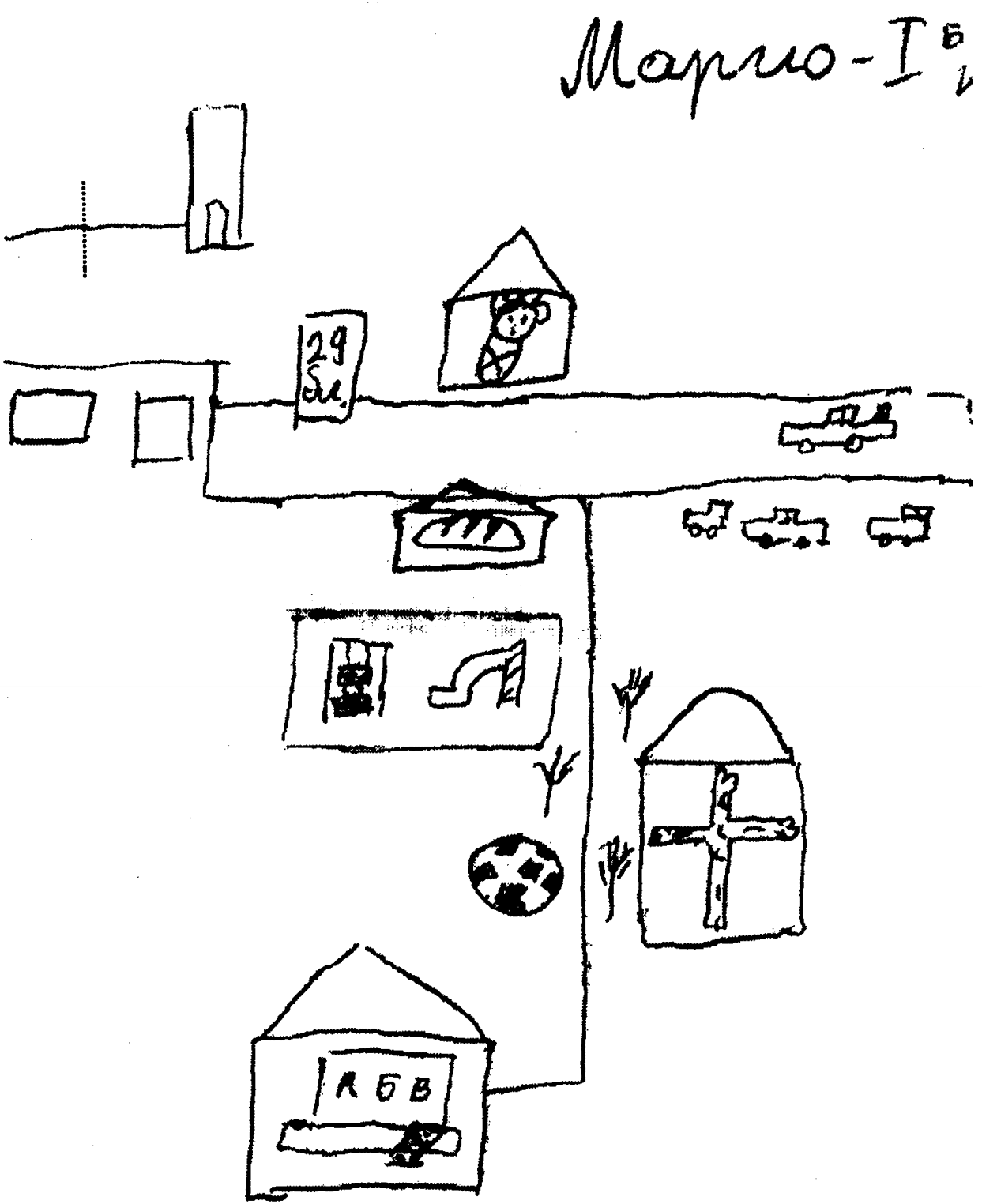
Паметник



Snow

Сняг

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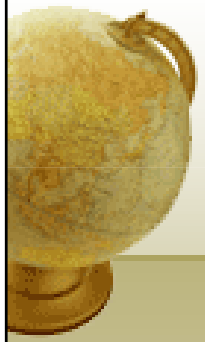
Research on students' knowledge of main cartographic topics - 194 students

1. What is the scale of the map?

- 2. How many *km* is the real distance which correspond to 2 *cm* of a map on scale of

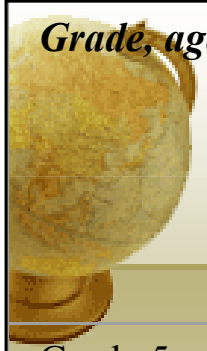
  1:1 000 000?
- 3. What kind of scale do you know?
- 4. How do you understand the concept "map projection"?
- ……
- The students are asked to do a short description of a map from their atlas and to write what they dislike on that map.



Research into students' knowledge of main cartographic topics

- 194 students

- The questionnaire was made for students within a large age range of 11-18.
- 29 students from grade 5,
- 34 – from grade 6,
- 12 - from grade 7,
- 23 – from grade 8,
- 35 – from grade 9,
- 53 – from grade 10 and
- 8 – from grade 11 took part in the research.



Grade, age	*Number of students, gender*	*1.What is the scale of the map?*	*2.Determinig the real distance on the map*	*3. What kinds of scale do you know?*	*4. What do you understand under the concept "map projection"?*
Grade 5, 11-12 years old	12, F	83% true 17% false	8% true 92 % false	92% - numeral and linear 8% ----------	100% --------
	17, M	65% true 25% false	12% true 88% false	59% numeral and linear 41% ----------	100% --------
Grade 6, 12-13 years old	16, F	94% true 6 % false	50 % true 50% false	81% - numeral и linear 12% - horizontal and vertical 7% ----------	19% - attempt for true reply 81% ----------
	18, M	56% true 44% false	45% true 55% false	39% - numeral and linear 33% - horizontal and vertical 28% ----------	100% ----------

Results from the questionnaire

- 1) What is the scale of the map?
- 2) How many *km* is the real distance which correspond to
- 2 *cm* of a map on a scale of
- 1:1 000 000?

- gender differentiations - the girls are better in definitions and the boys - in calculations;
- teachers have not attracted the necessary attention of students to the practical use of the map scale;
- all students in grade **11** gave a correct response.

Results from the questionnaire

3) What kinds of scale do you know?

- text scale, numerical and linear

- most students – numerical and linear;
- other responses – horizontal and vertical; large, medial and small scale;

- girls have managed better with the theoretical part and the boys – with the practical one;
- difference between the percentage of correct and incorrect answers of girls and boys decreases in grades 10 and 11 .

Results from the questionnaire

4) How do you understand the concept “map projection”?

5) How can we present the ellipsoid Earth on the map plane?

- 37% of the girls and 33% of the boys gave the right response - **grade 8**
- 8% of the girls and 9% of the boys gave the right response - **grade 9**
- 8% of the girls and 22% of the boys gave the right response - **grade 10**

icosiedar – student's helper

Results from the questionnaire

6) What is the shape of the Earth?

- The percent of the right response is the highest in grade 8

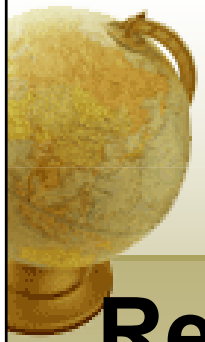
  F – M 100% - 75%

7) What does it connect map language with?

Point out the right answer: a/ land and seas, b/ symbols, c/ colors on the map, d/ map projection.

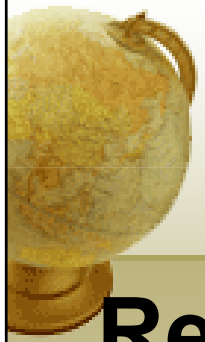
The boys gave more true answers in the all steps of the education.

The most probably fact is their understanding for objects' design on the maps as symbols' presentations.



Results from the questionnaire

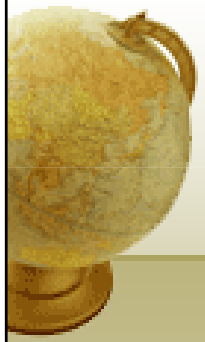
- 8) What objects would you present on the transport map of Bulgaria?
- 9) In what way would you present the relief on the map of Bulgaria?
- 10) What purpose do you use maps for?
- 11) What map would you like to make up?
- 12) Have you seen 3D maps? Where?



Results from the questionnaire

- - generally the **boys** are better at answers in older groups;
- - the **boys** are peculiarly original in their ideas of what map would they be make up;

- - the **girls** are better in definitions; color and symbol system, object representation.



Conclusions

- The experiment gives a clear concept about the students' knowledge about the maps and their skills to extract information from them.

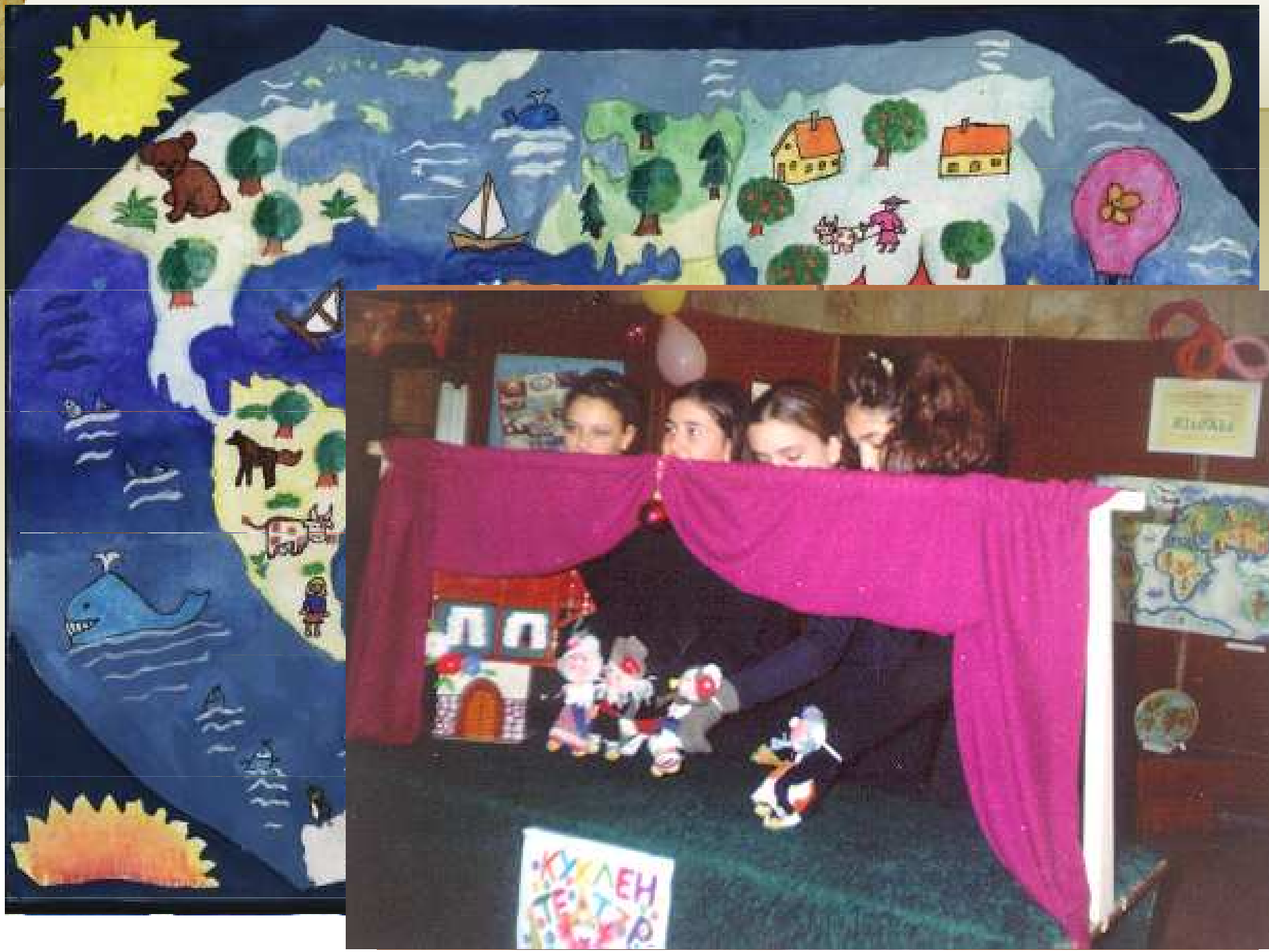
- The following conclusions could be made on the basis of the results from the research:

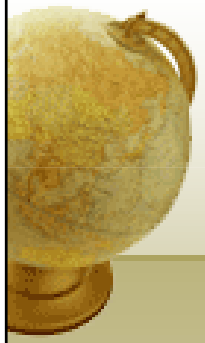
Barbara Petchenik Competition in National level

Bulgaria in ICA

- primary schools cartographic products are often designed by children's drawing from local entries to the Barbara Petchenik map competition
- Example: Atlas for 3-4 grade – themes of geography and history

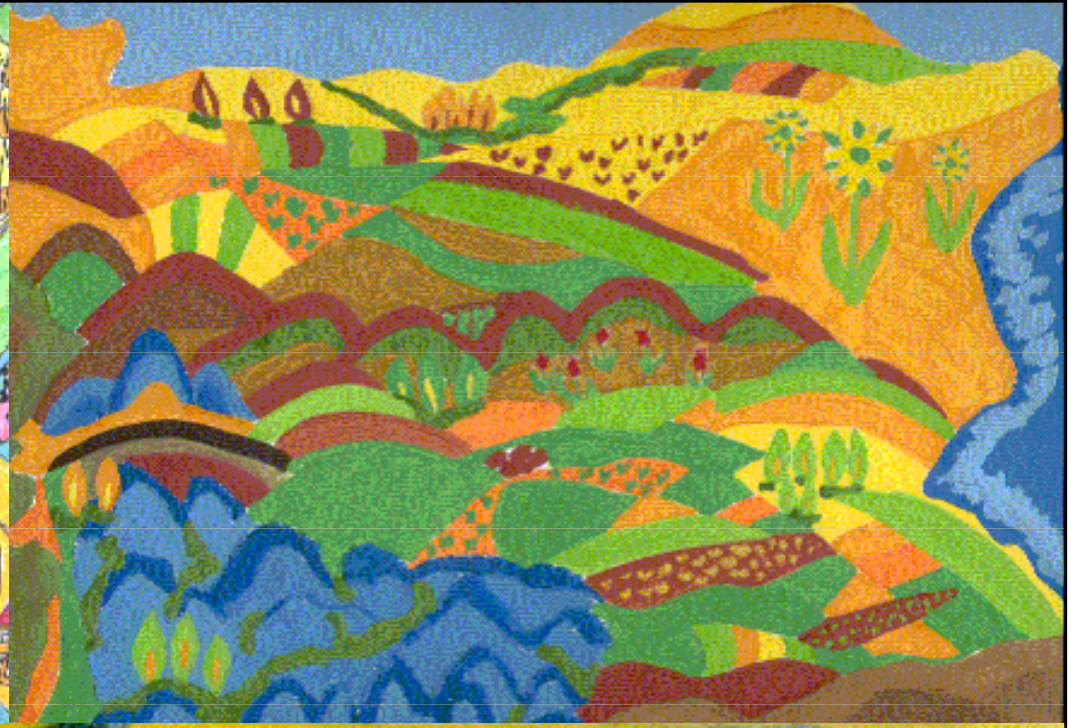
Barbara Petchenik Competition - Bulgaria



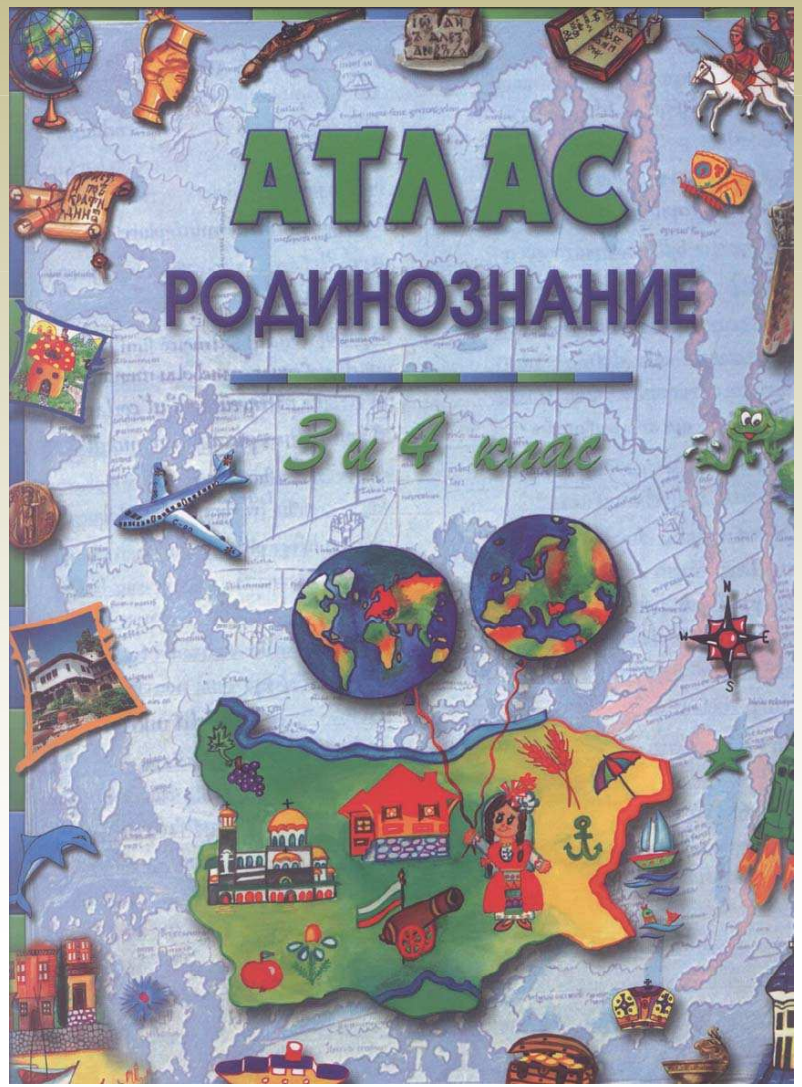


National Competition "Map of Bulgaria"

- above 700 drawings
- from 50 settlements in Bulgaria
- It shows children's love to learned national geography and history as well their ability to use cartographic visualisation methods



Atlas 'The Person and the Society' - school years 3-4



- first introduction to the world of maps
- scales, symbols, selection of geographical and historical maps
- It is a “handbook” which is both fun to use and easy to understand.
- blank maps help students to understand the geographical features
- the design - combines children’s drawings, photos, and artists’ illustrations


СЕЛСКО СТОПАНСТВО
19
Р Е П У Б Л И К А С Р Ъ Р М А К Е Д О Н И Я
Ю Г О С Л А В И Я
Р У М Ъ Н И Я
Т У Р Ц И Я
Г Р Ъ Ц И Я
Ч Е Р Н О М О Р Е
Дунав
Видин
Лом
Оряхово
Белоградчик
Монтана
Берковица
Враца
Своге
Ботевград
Трън
СОФИЯ
Перник
Самоков
Дупница
Кюстендил
Благоевград
Разлог
Петрич
Сандански
Гоце Делчев
Велинград
Пазарджик
Пловдив
Панагюрище
Пирдоп
Карлово
Казанлък
Стара Загора
Нова Загора
Чирпан
Асеновград
Димитровград
Хасково
Свиленград
Харманли
Момчилград
Мадан
Смолян
Чепеларе
Кърджали
Тетевен
Троян
Ловеч
Севлиево
Габрово
Велико Търново
Свищов
Плевен
Левски
Русе
Силистра
Исперих
Разград
Попово
Търговище
Шумен
Нови пазар
Добрич
Балчик
Варна
Провадия
Котел
Сливен
Карнобат
Несебър
Бургас
Ямбол
Средец
Царево
Искър
Вит
Огоста
Скът
Лом
Малък Искър
Янтра
Росица
Бели Лом
Черни Лом
Сива р.
Провадийска р.
Варненско ез.
Варненски залив
Гол. Камчия
Калчия
Луда Камчия
Тунджа
Мочурица
Бургаски залив
Бургаско ез.
Средецка р.
Поповска р.
Велека
Струма
Места
Марица
Тополница
Джерман
Доспат
Арда
Съзлийка
Овчарица
Цепеларска р.
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яз. Искър
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яз. Копринка
яз. Батак
яз. Доспат
яз. Жребчево
яз. Тракиец
яз. Ивайловград
яз. Кърджали
яз. Студен кладенец
яз. Тича
яз. Цонево
яз. Камчия
яз. Мандра
яз. Овчарица
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Царевица
Слънчоглед
Памук
Рози
Зеленчуци
Лозя
Овощни градини
Тютюн
Едър рогат добитък
Овце
Свине
Птици
Коне

Atlas on Geography - school year 5

5 chapters:

- **Cartography;**
- **The Earth - a planet in the Solar system;**
- **Nature of the world;**
- **World population;**
- **Economy.**


СЕВЕРЕН ЛЕДОВИТ ОКЕАН
о. Гренландия
о. Елсмиър
МОРЕ БОУФОРТ
БАФИНОВО МОРЕ
о. Бафинова земя
о. Виктория
ГРЕНЛАНДСКО МОРЕ
БАРЕНЦОВО МОРЕ
НОРВЕЖКО МОРЕ
о. Шпицберген
Нова земя
КАРСКО МОРЕ
МОРЕ ЛАПТЕВИ
ИЗТОЧНОСИБИРСКО МОРЕ
Новосибирски о-ви
п-в Таймир
Северна земя
СРЕДНО-СИБИРСКО ПЛАТО
ЗАПАДНО-СИБИРСКА НИЗИНА
ИЗТОЧНО-ЕВРОПЕЙСКА РАВНИНА
ИЗТОЧНОСИБИРСКИ ПЛАНИНИ
ОХОТСКО МОРЕ
БЕРИНГОВО МОРЕ
Алеутски о-ви
о. Сахалин
о. Исландия
о. Ирландия
о. Великобритания
СЕВЕРНО МОРЕ
СРЕДНОЕВРОПЕЙСКА НИЗИНА
ЕВРОПА
АЛПИ
КАРПАТИ
Пиренейски п-в
ЧЕРНО МОРЕ
Ефбрус 5642
п-в Мала Азия
СРЕДИЗЕМНО МОРЕ
АЛТАЙ
САЯНИ
АЗИЯ
ПУСТИНЯ ГОБИ
ПУСТИНЯ ТАКЛАМАКАН
ПАМИР
ТИБЕТСКА ПЛАНИНСКА ЗЕМЯ
ХИМАЛАИ
Еверест 8848
ИРАНСКА ПЛАНИНСКА ЗЕМЯ
ЗАГРОС
п-в Арабия
ПУСТИНЯ РУБ АЛ-ХАЛИ
ГОЛЯМА КИТАЙСКА НИЗИНА
ЮЖНОКИТАЙСКИ ПЛАНИНИ
ЯПОНСКО МОРЕ
Японски о-ви
ИЗТОЧНО-КИТАЙСКО МОРЕ
ЮЖНОКИТАЙСКО МОРЕ
п-в Индостан
о. Цейлон
п-в Индокитай
Филипински о-ви
МАЛАЙСКИ АРХИПЕЛАГ
о. Калимантан
о. Суматра
о. Ява
о. Нова Гвинея
Микронезия
Северозападна котловина
ТИХИ ОКЕАН
АРАБСКО МОРЕ
Арабско-Индийски хребет
ИНДИЙСКИ ОКЕАН
о. Мадагаскар
АТЛАСКИ ПЛАНИНИ
САХАРА
ЛИБИЙСКА ПУСТИНЯ
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АФРИКА
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КОНГОАНСКА КОТЛОВИНА
Кибо (Ухуру) 5895
ПУСТИНЯ НАМИБ
КАЛАХАРИ
нос Добра Надежда
Игулен нос
Канарски о-ви
нос Алмади
Гвинейски залив
АТЛАНТИЧЕСКИ ОКЕАН
СЕВЕРНА АМЕРИКА
зал. Хъдсън
Лабрадор
о. Нюфаундленд
ГОЛЯМ БАСЕЙН
МИСИСИПСКА НИЗИНА
АПАЛАЧИ
САРГАСОВО МОРЕ
Мексикански залив
о. Куба
о. Испаньола
КАРИБСКО МОРЕ
Бахамски о-ви
Северо-източна котловина
Панамски залив
о-ви Галапагос
ЮЖНА АМЕРИКА
АМАЗОНСКА НИЗИНА
ГВИАНСКА ПЛАНИНСКА ЗЕМЯ
БРАЗИЛСКА ПЛАНИНСКА ЗЕМЯ
АНДИ
ГРАН ЧАКО
ЛАПЛАТА
нос Кабу Бранку
Фолклендски о-ви
о. Южна Джорджия
нос Хорн
Магеланов проток
проток Дрейк
ЮЖЕН ОКЕАН
АВСТРАЛИЯ
ГОЛЯМА ПУСТИНЯ ВИКТОРИЯ
ГОЛЯМ ВОДОРАЗДЕЛЕН ХРЕБЕТ
КОРАЛОВО МОРЕ
МОРЕ ФИДЖИ
ТАСМАНОВО МОРЕ
о. Тасмания
о-ви Нова Зеландия
о. Кергелен
АНТАРКТИДА
връх, височина в метри
дълбочина в метри
депресия в метри
канал
пясъчни пустини
шелфов ледник
ледена покривка
Полезни изкопаеми
Горивни
въглища
нефт
природен газ
Рудни
желязна руда
манганова руда
медна руда
никелова руда
оловно-цинкова руда
уранова руда
волфрам
злато
сребро
Нерудни
диаманти
графит
калиева сол
дълбочини и височини в метри
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8000 6000 4000 2000 200
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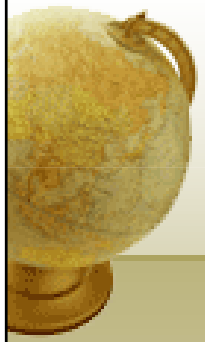


Atlas on Geography - school year 6

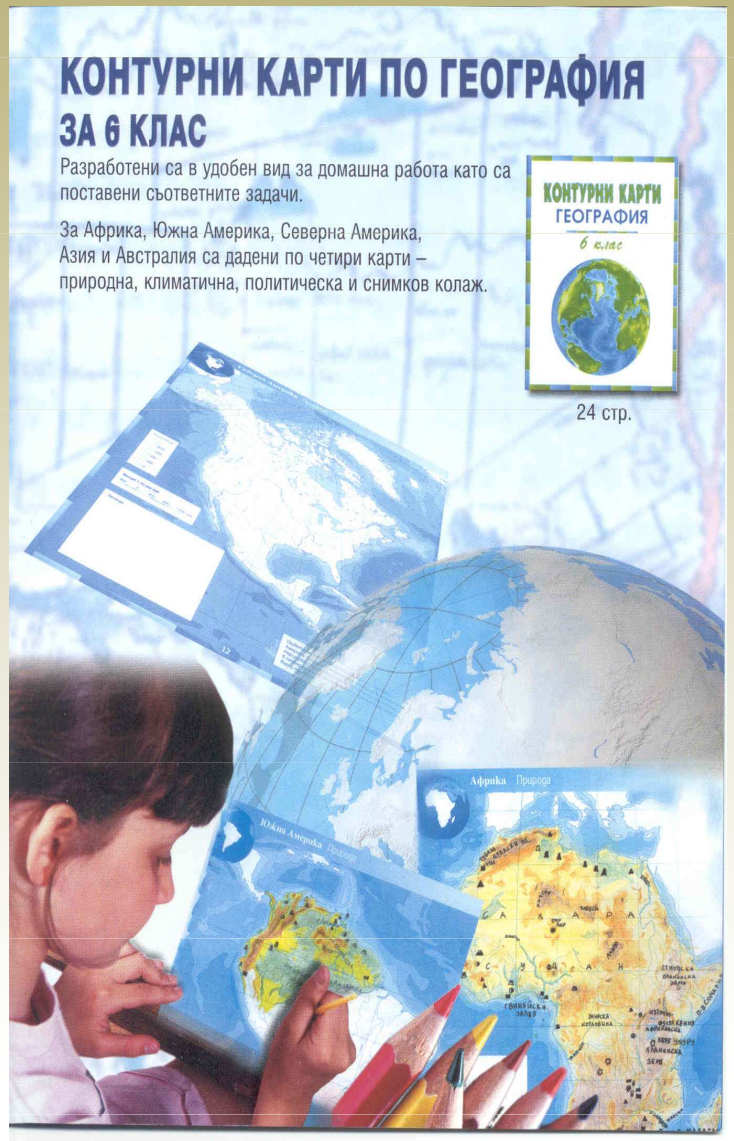
- Thematic maps on nature, climate, hydrography and soils, plants and animals, population and races of all continents excluding Europe

- Realistic pictures represent people, plants and animals

Blank Maps - school year 6

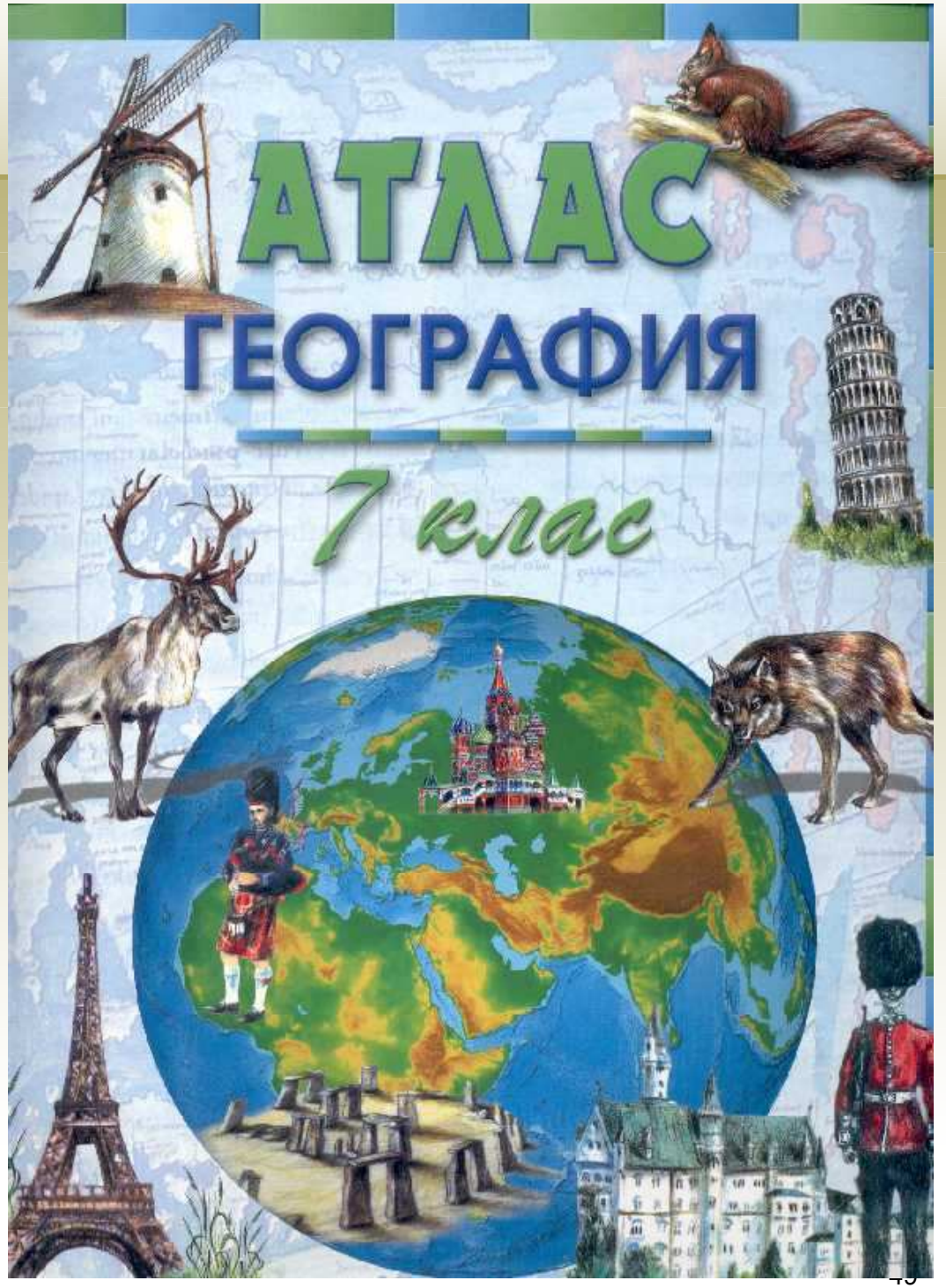
- intended for homework
- 4 types of map - Nature, Climate, Countries and Photos show Africa, South America, North America Asia and Australia.

- The tasks are clearly indicated with easy instructions.



Atlas on Geography –

school year 7



Административно деление България

РУМЪНИЯ

СЪРБИЯ И ЧЕРНА ГОРА

МАКЕДОНИЯ

ГЪРЦИЯ

ТУРЦИЯ

ЧЕРНО МОРЕ

ВИДИН · МОНТАНА · ВРАЦА · ПЛЕВЕН · ЛОВЕЧ · ВЕЛИКО ТЪРНОВО · ГАБРОВО · СОФИЯ · ПЕРНИК · КЮСТЕНДИЛ · БЛАГОЕВГРАД · ПАЗАРДЖИК · ПЛОВДИВ · СМОЛЯН · ХАСКОВО · КЪРДЖАЛИ · СТАРА ЗАГОРА · ЯМБОЛ · СЛИВЕН · БУРГАС · РАЗГРАД · ШУМЕН · ТЪРГОВИЩЕ · ДОБРИЧ · ВАРНА · СИЛИСТРА · РУСЕ

Мащаб 1:2 000 000

20 0 20 40 60 км

1 см от картата отговаря на 20 км от местността

- София — столица
- Варна — областен център
- Троян — общински център
- държавна граница
- областна граница
- общинска граница

ВИДОВЕ КАРТИ

според мащаба

Едромащабни (под М 1:200 000)
топографска, М 1:50 000

Средномащабни
(М 1:200 000 - 1:1 000 000)
общогеографска, М 1:1 000 000

Дребномащабни
(над М 1:1 000 000)
административна, М 1:1 700 000

според съдържанието

Общогеографски
България, М 1:1 000 000

Тематични - природогеографски
Свят, М 1:100 000 000

Тематични - социално-
икономически
Свят, М 1:100 000 000

според визуализацията

Карти на хартия
гр. Бургас

2D карта на екран
електронен атлас на България

3D карта на екран
София - център

КАРТОГРАФИРАНЕ

етапи

Аерофотоснимка и ортофотокарта
М 1:100 000

Ортофотокарта
М 1:5 000

Ортофотокарта и кадастрална
карта, М 1:2 000

Ортофотокартите са произведени от GEODIS BRNO, Ltd.

Atlases include pages corresponding on school curriculum

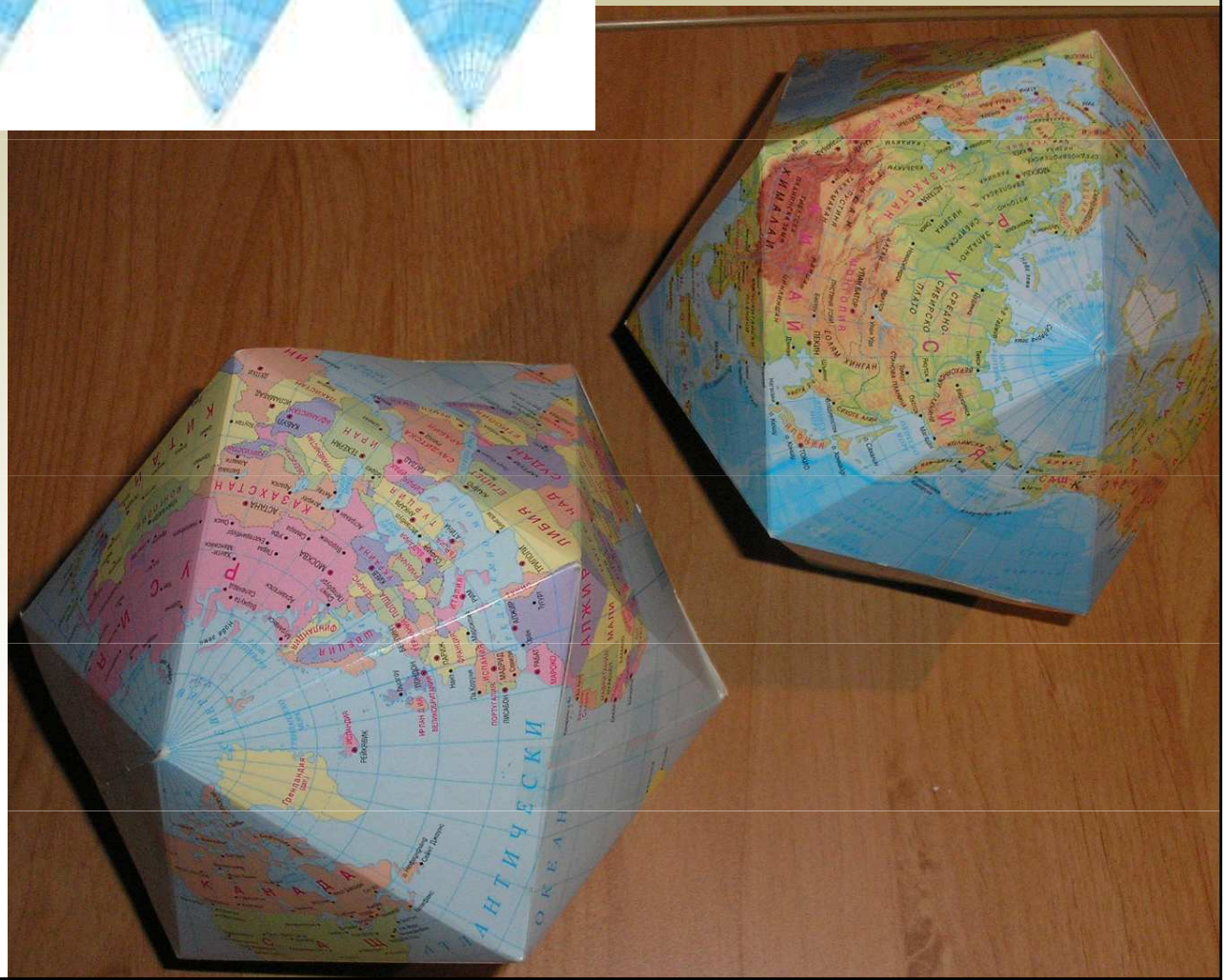
Methodology of Atlas creation

1. *Idea;*
2. *School curriculum and its analyses;*
3. *Atlas and outline (blank) maps' contents;*
4. *Currently statistical and text data and GIS cartographic vector data base;*
5. *Draft representation of the contents;*
6. *Test analyses on the base of student reaction and information extraction;*
7. *Atlas and blank maps compiling;*
8. *Modern design;*
9. *Editor process and process of Approving by Ministry of Education;*
10. *Pre-publishing and Publishing processes.*

Do we have a technology for realization of our project?

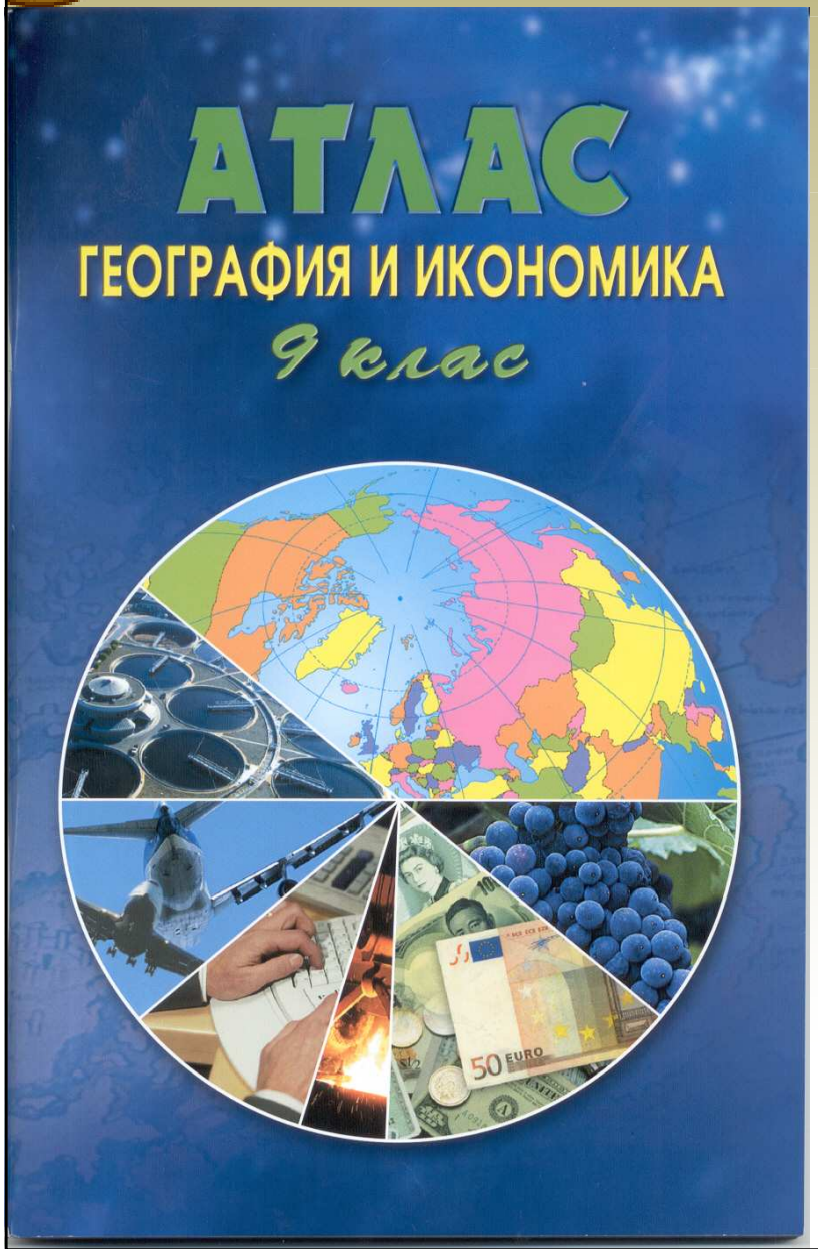
Theory of Map projections

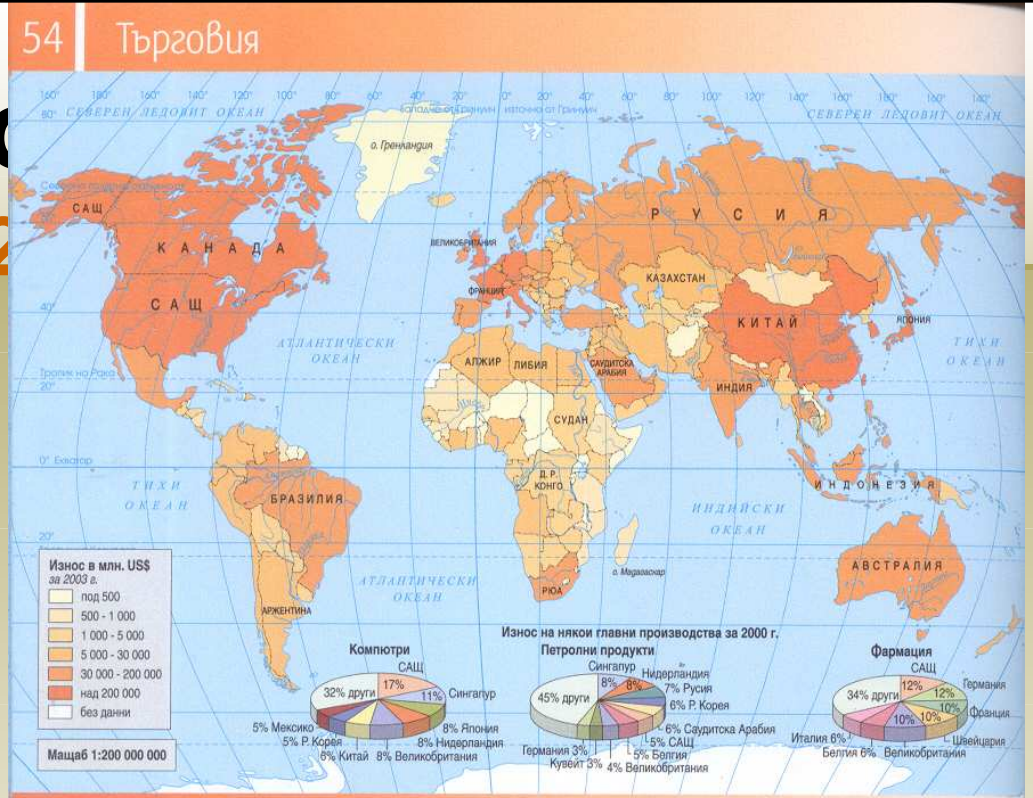
The icosahedrons an puzzles of map of the world are used to be explained theory of map projections to students from high and higher schools.

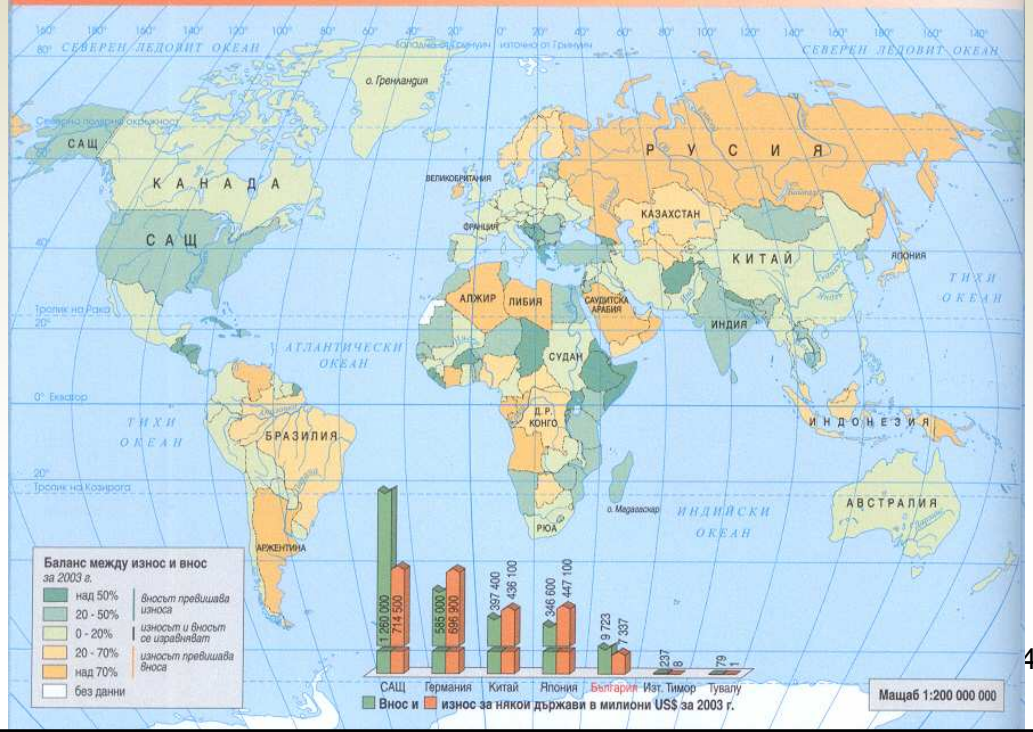


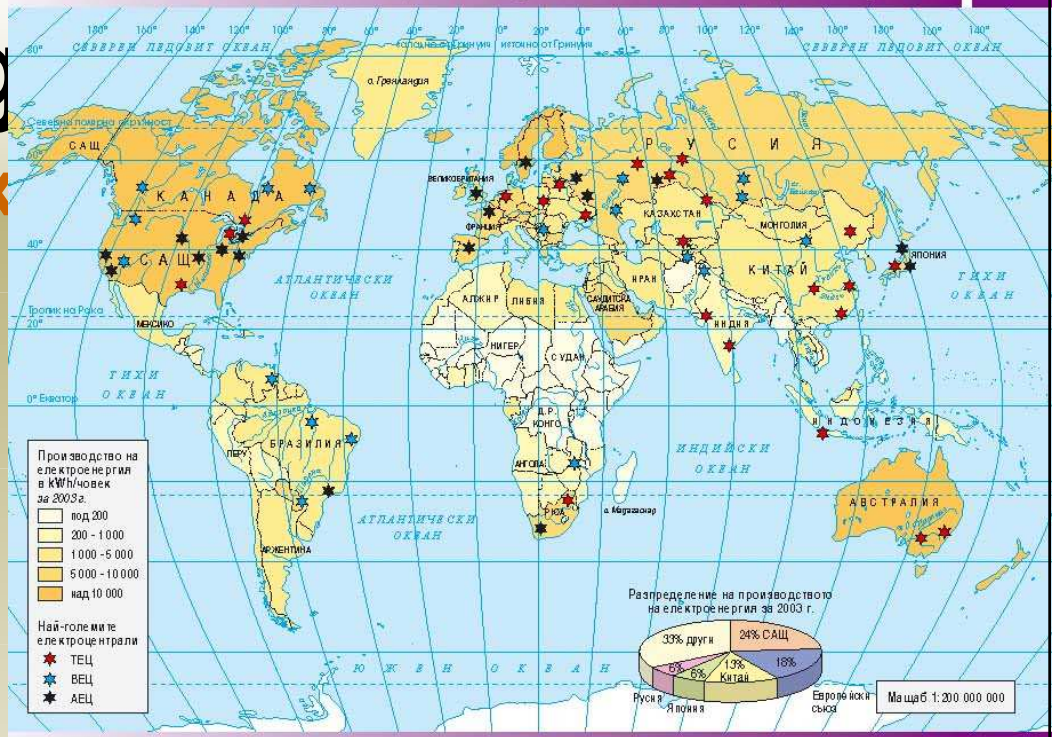
Atlas on Geo

(80 pages, sizes 2

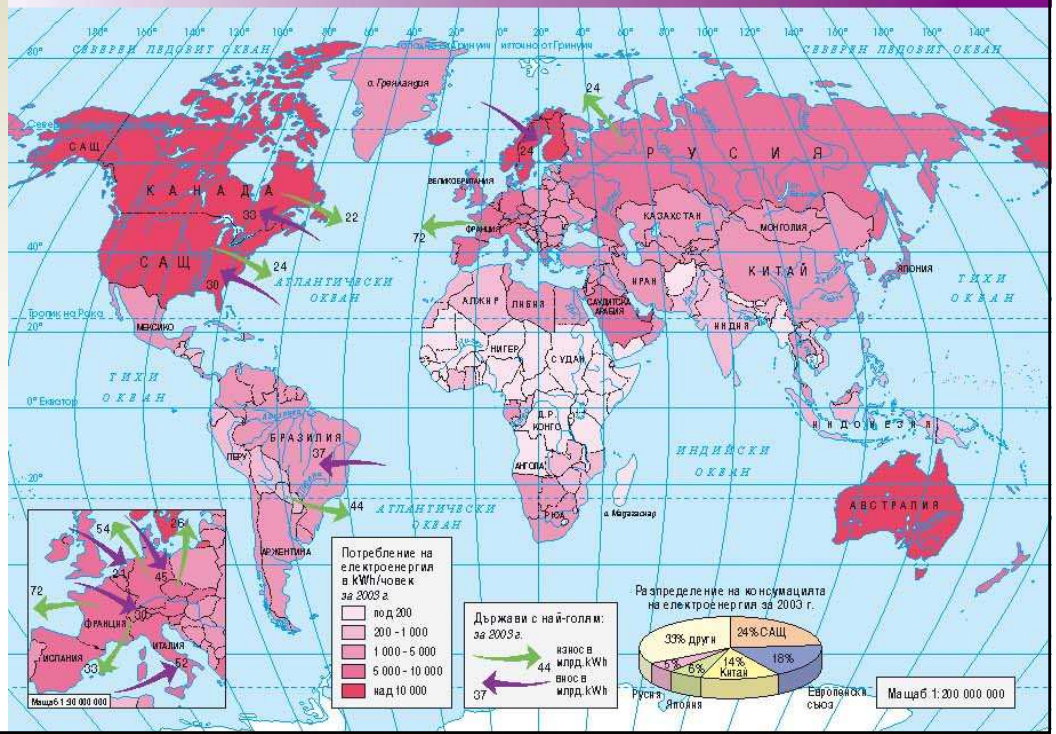


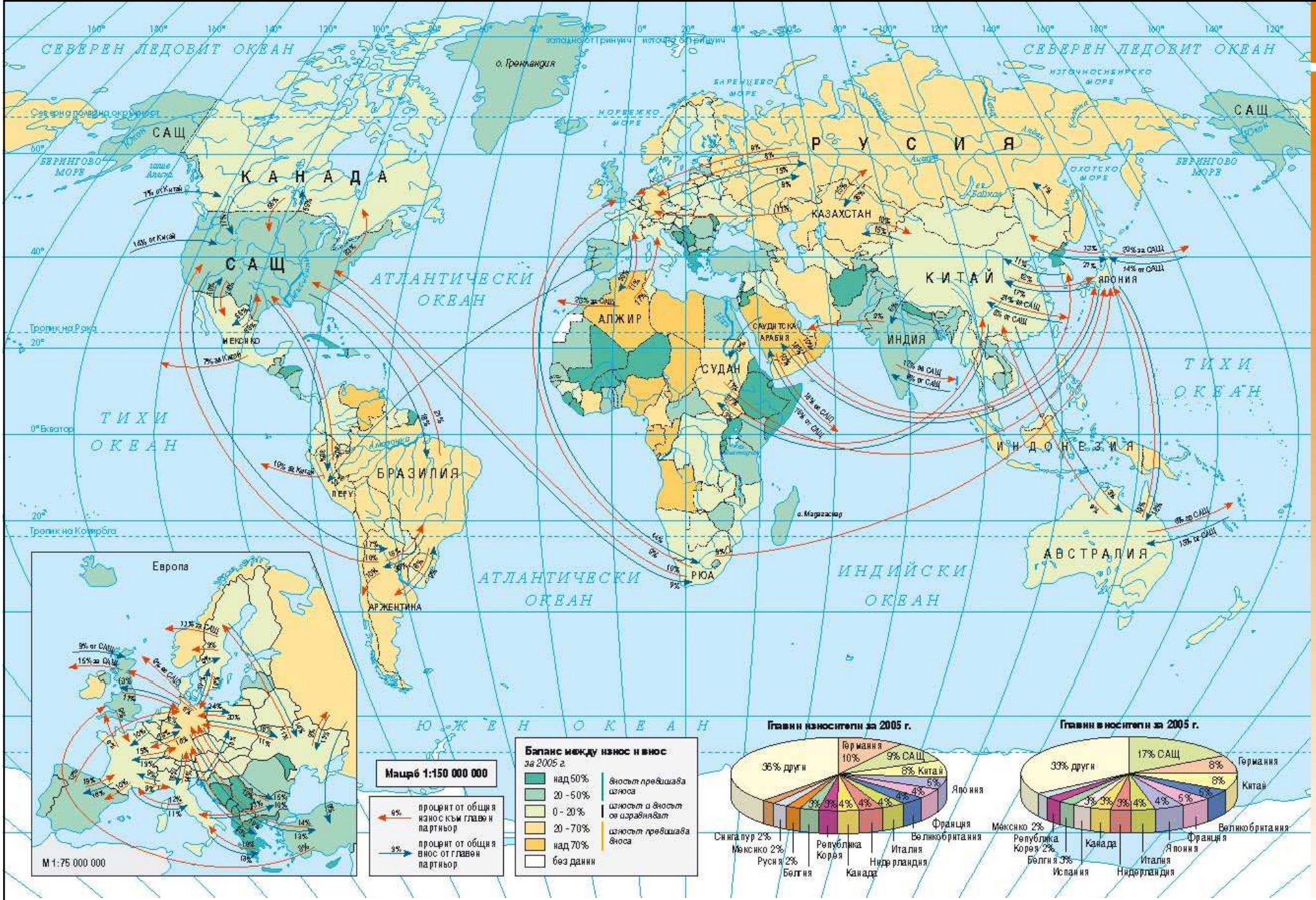




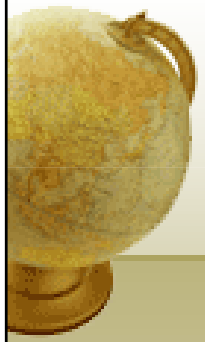


Потребление на електроенергия





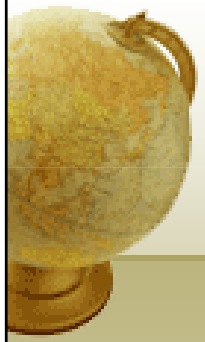
How we start and compile a map?



Map compiling…

- Data base for geographical elements…
- Thematic data for specific contents of any map
- Appropriate map projection, scale and symbol system
- Map design

  The map should be a part of a common issue under a common idea, content, design, …



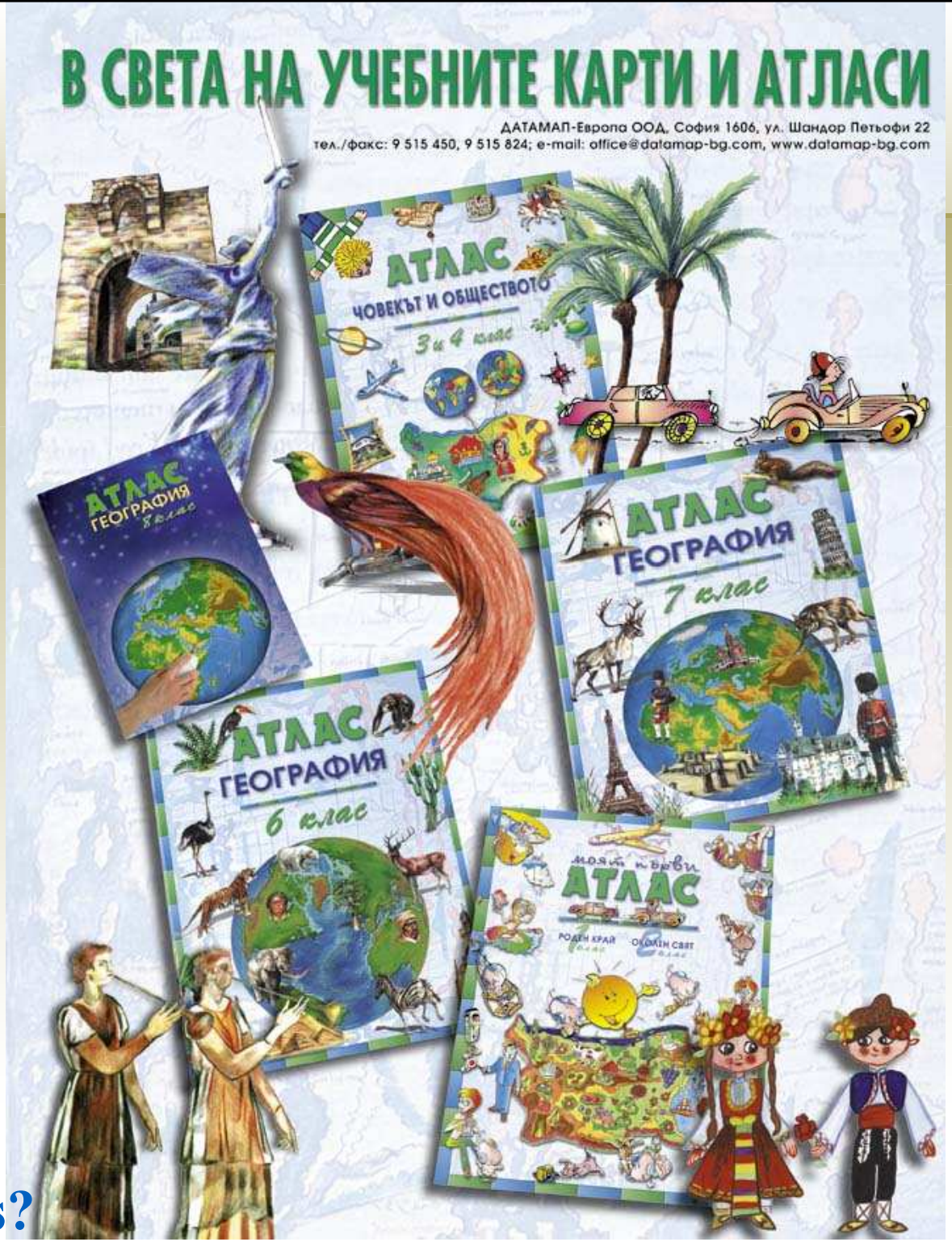
How to get to our users?

POSTER

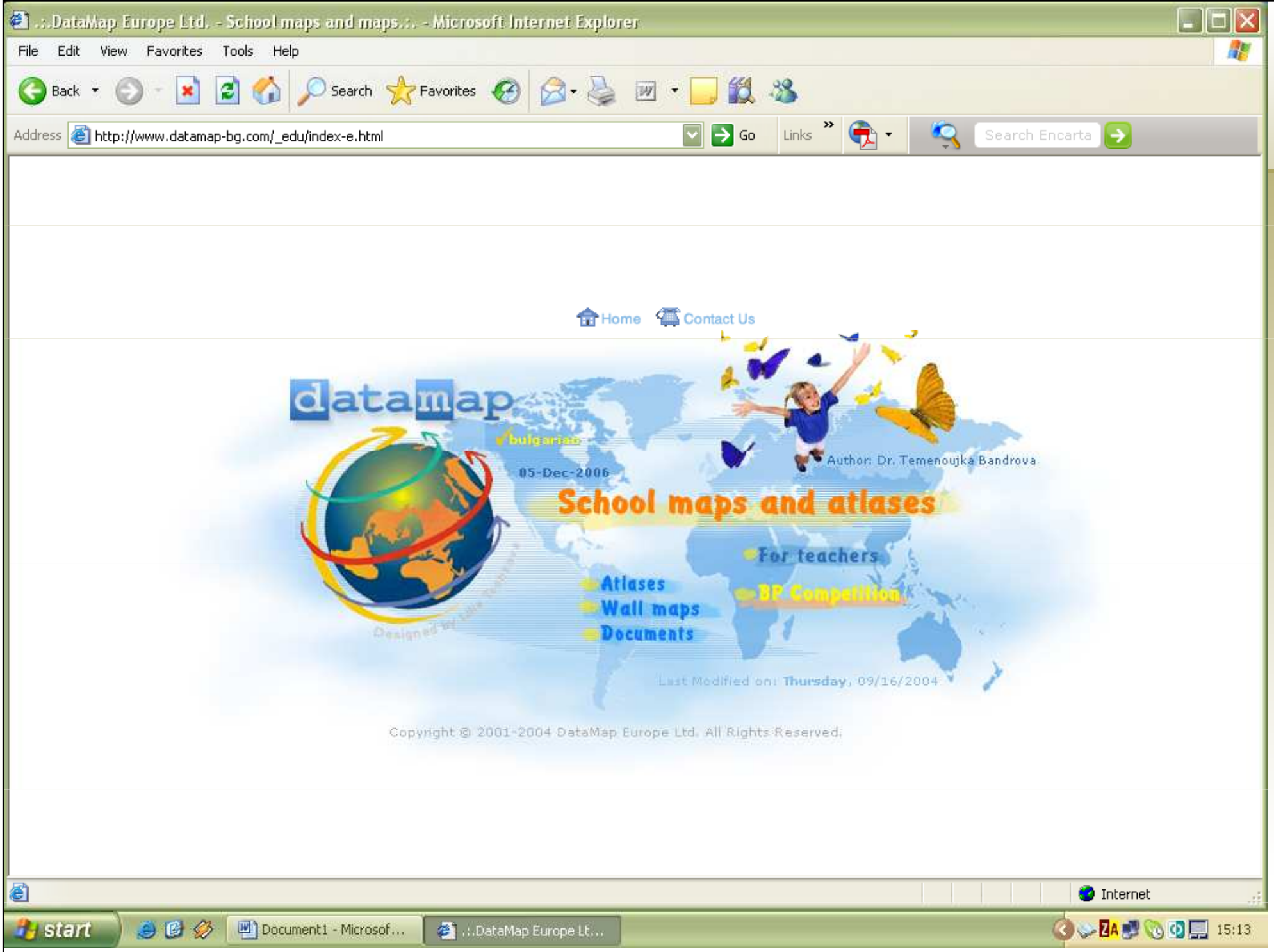
Atlases on geography

Author: T. Bandrova

Publisher: DataMap-Europe



How to get to our users?



www.datamap-bg.com

ATLAS ON GEOGRAPHY (40 pages) - school year 7

Seventeen maps of Europe, 7 of the Balkan Peninsula and 11 of Bulgaria present the school programme in geography in both depth and breadth. Nature and Economy are presented using the most recent data and detailed electronic map bases.

"Landscapes" from Europe are presented professionally by relief shading and realistic drawings of plants, animals and famous buildings. The atlas is a rich source of information and helps students appreciate the beauty of maps.

Three wall maps **(100 x 140 cm)** are offered for every continent.

AFRICA, SOUTH AMERICA, NORTH AMERICA and ASIA
1. Nature
2. Climate. Hydrograph. Plants and Animals
3. Countries. People

The maps are based on the requirements of the school geography curriculum for the 6th year of education. They have been tested with 85 students to ensure they can be effectively read and interpreted.

The maps look good and they support students and teachers alike in learning and teaching geography. They are made from quality material for long-term use in school.

.:.School maps and atlases - Documents.:. - Microsoft Internet Explorer

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datamap 05-Dec-2006

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DOCUMENTS

http://www.datamap-bg.com - Одобрение - АТЛА...

...е чл. 52, ал. 1 и ал. 3 от Наредба № 5 (обн., ДВ, бр. 49 от ...доп., бр. 72 от 15.08.2003 г., бр. 46 от 28.05.2004 г.) и Протокол № 4 на комисията по чл. 44 Ви уведомяваме за **одобрения** в Министерството на образованието и науката проект на учебно помагало, получил обща оценка **"Съответства на държавните образователни изисквания за учебниците и учебните помагала"**:

входящ номер	УЧЕБЕН ПРЕДМЕТ/ОБРАЗОВАТЕЛНО НАПРАВЛЕНИЕ/МОДУЛ	КЛАС	НАИМЕНОВАНИЕ НА ПРОЕКТА НА УЧЕБНО ПОМАГАЛО
1220-185/04.05.05	ГЕОГРАФИЯ И ИКОНОМИКА	9	учебно помагало по география и икономика за 9. клас "Учебен атлас по география и икономика за 9. клас"

На основание чл. 54, ал. 1 от Наредба № 5 върху това учебно помагало може да се постави текст:

"Учебното помагало е одобрено със Заповед № РД 09-1513/05.08.2005 г. на министъра на образованието и науката.".

На основание чл. 54, ал. 2 от Наредба № 5 сте задължени да предоставите в Министерството на образованието и науката три екземпляра от одобреното учебно помагало.

Done Internet

Last Modified on: **Tuesday**, 09/13/2005

Internet

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АТЛАС
ГЕОГРАФИЯ
КОНТУРНИ КАРТИ
ГЕОГРАФИЯ
ЕВРОПА И
БЪЛГАРИЯ
СОФИЯ
ВАРНА
ПЛОВДИВ
SOFIJA
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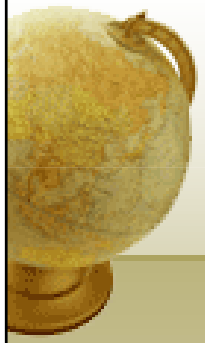
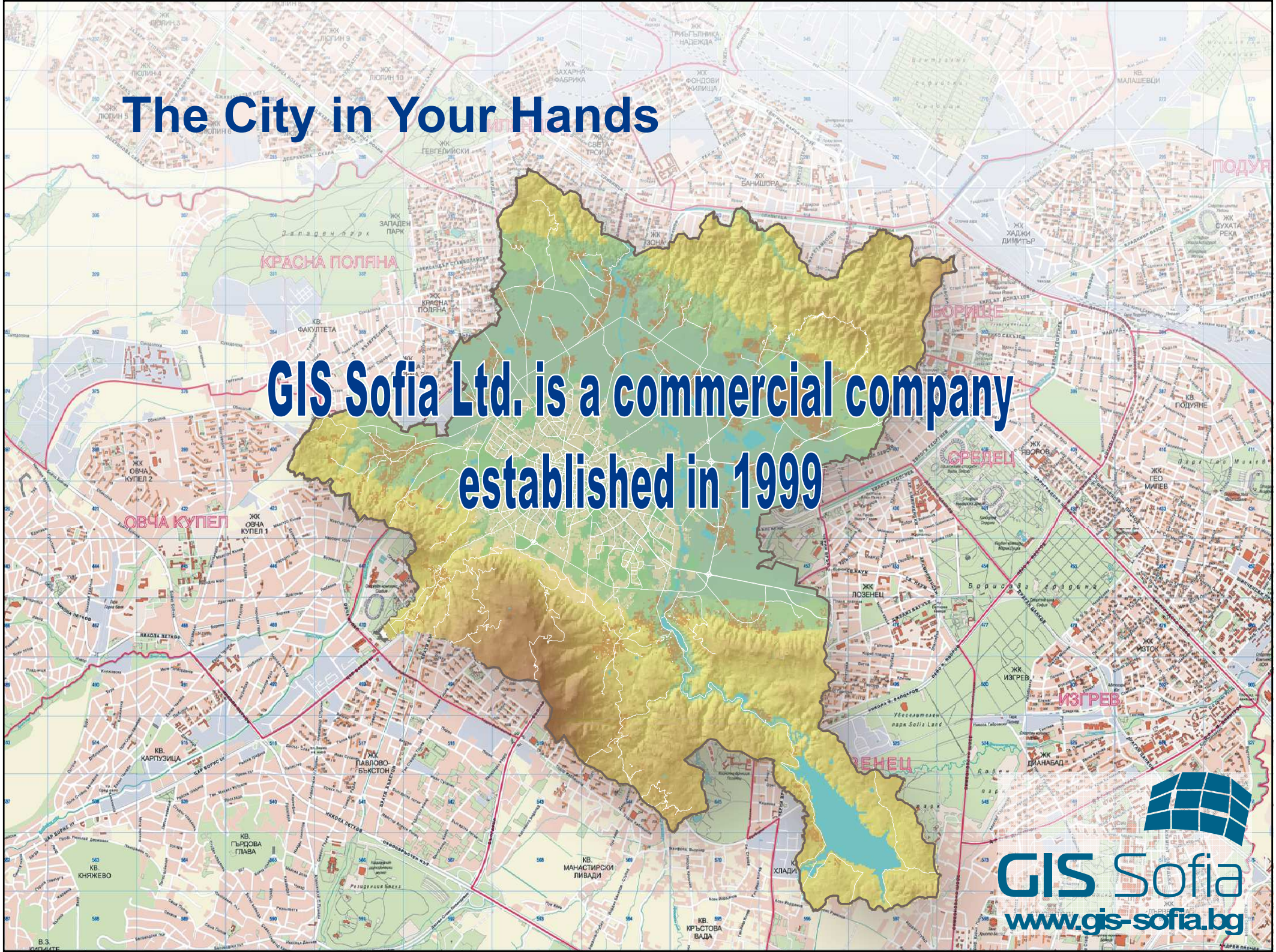
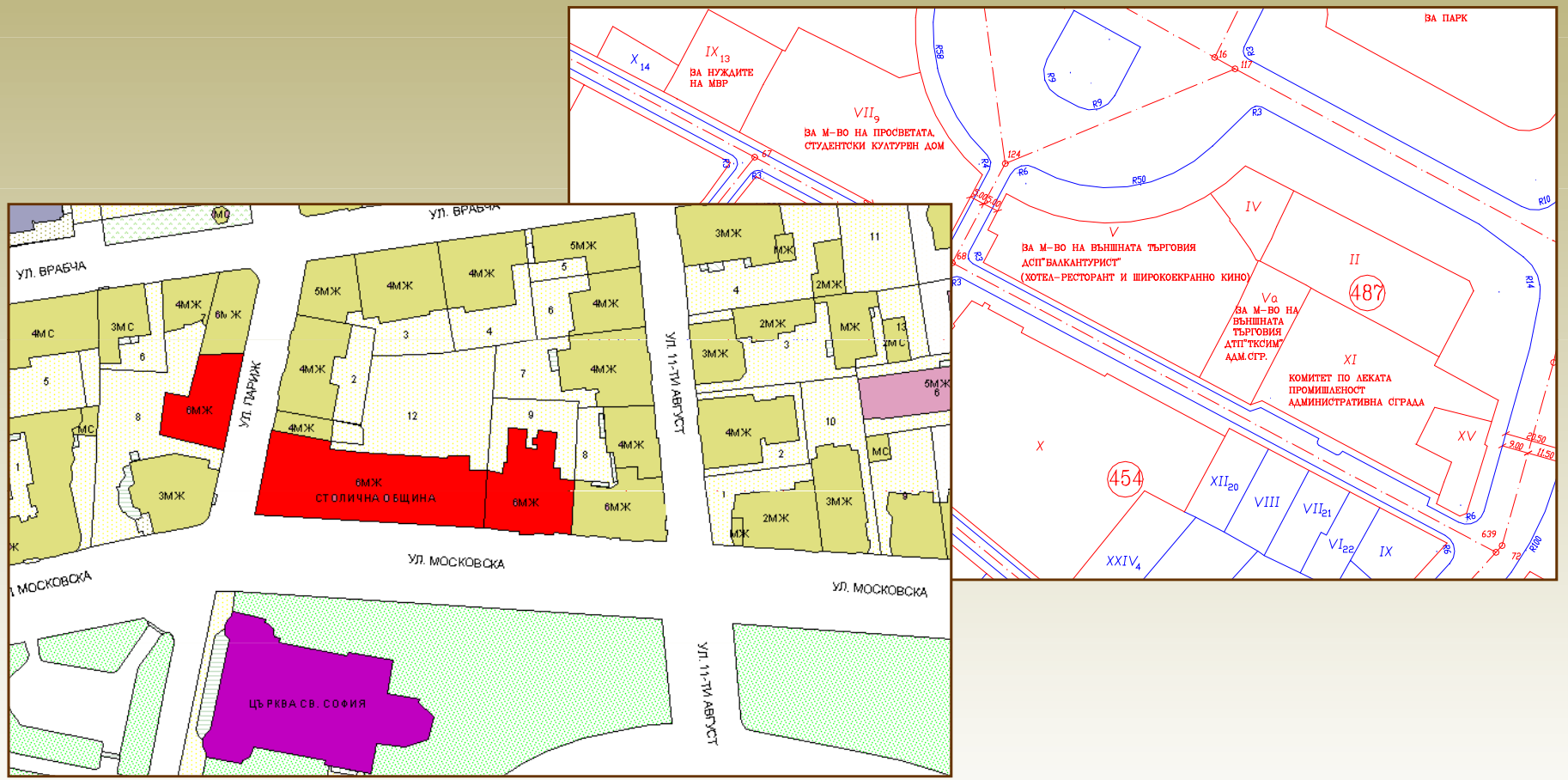


Cartographic Companies, firms and organizations

- Agency of Geodesy, Cartography and Cadastre – Bulgaria
- DataMap-Europe Ltd.
- Kartografia Ltd.
- Military Topographic Service
- GIS Sofia Ltd.
- International Trade and Cultural Center “Geopan”
- DavGeo Ltd.


The City in Your Hands
GIS Sofia Ltd. is a commercial company established in 1999
GIS Sofia
www.gis-sofia.bg

Cadastral map and Zoning Plan



The company creates and maintains updated digital cadastral map of Capital Municipality and is a leading company in the field of GIS

GIS Sofia
www.gis-sofia.bg

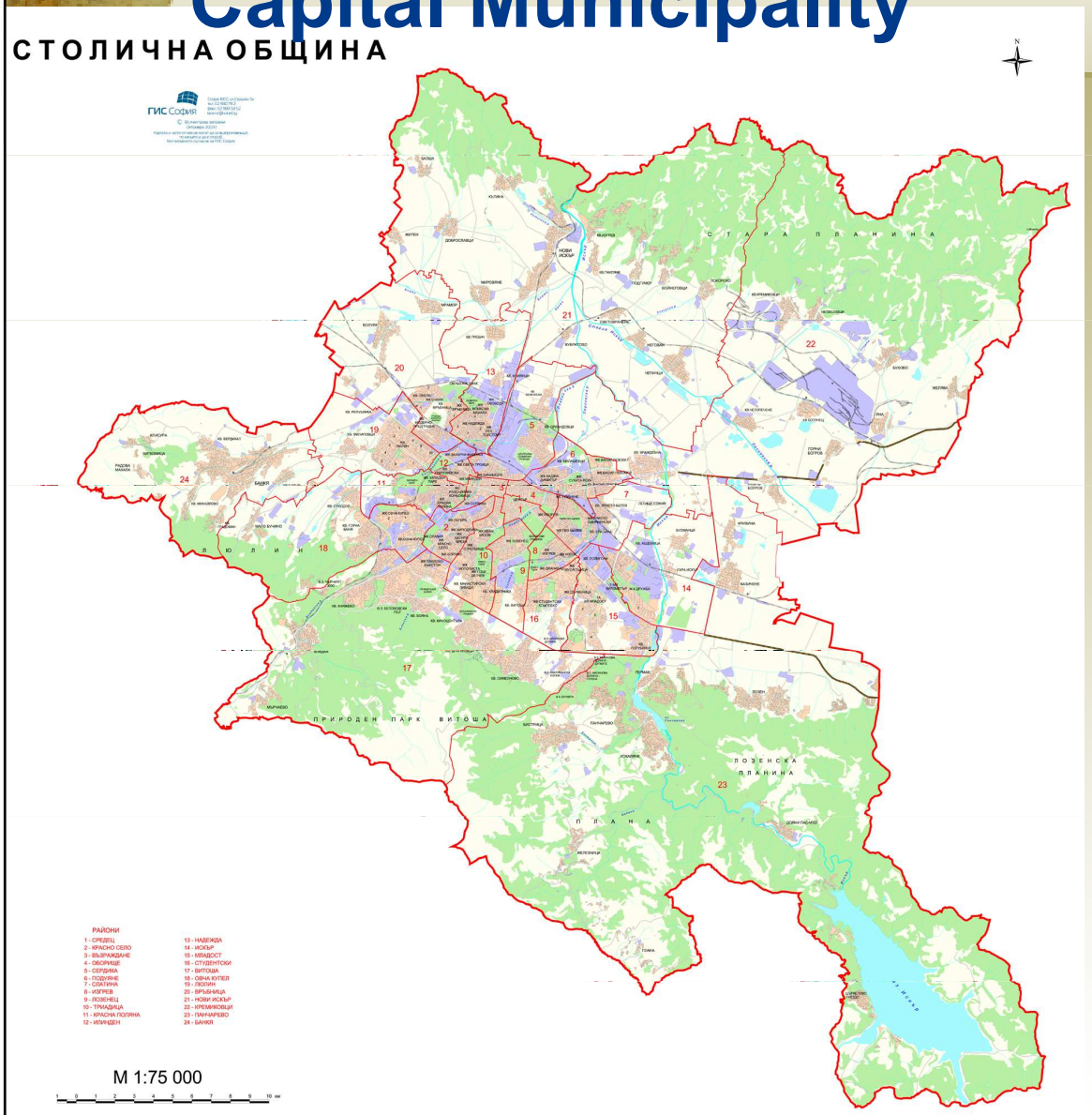
Cartography Activity

The Cartography Department carries out activities providing the development of various specific maps of Sofia and Capital Municipality

- Development of maps for the needs of the municipal administration and the government
- Development of maps for the citizens and visitors of Sofia
- Development of customized subject specific maps by customer's order

GIS Sofia
www.gis-sofia.bg

Capital Municipality



- 24 districts
  - The City
  - 3 towns
  - 35 villages
- Area
  - 180 km^2 the City
  - 1100 km ^{2} whole territory
- Cadastral coverage
  - 1:1000 – urban territory
  - 1:500 - the City
- Number of cadastral sheets
  - 1600 at 1:1 000 scale
  - 2400 at 1:500 scale

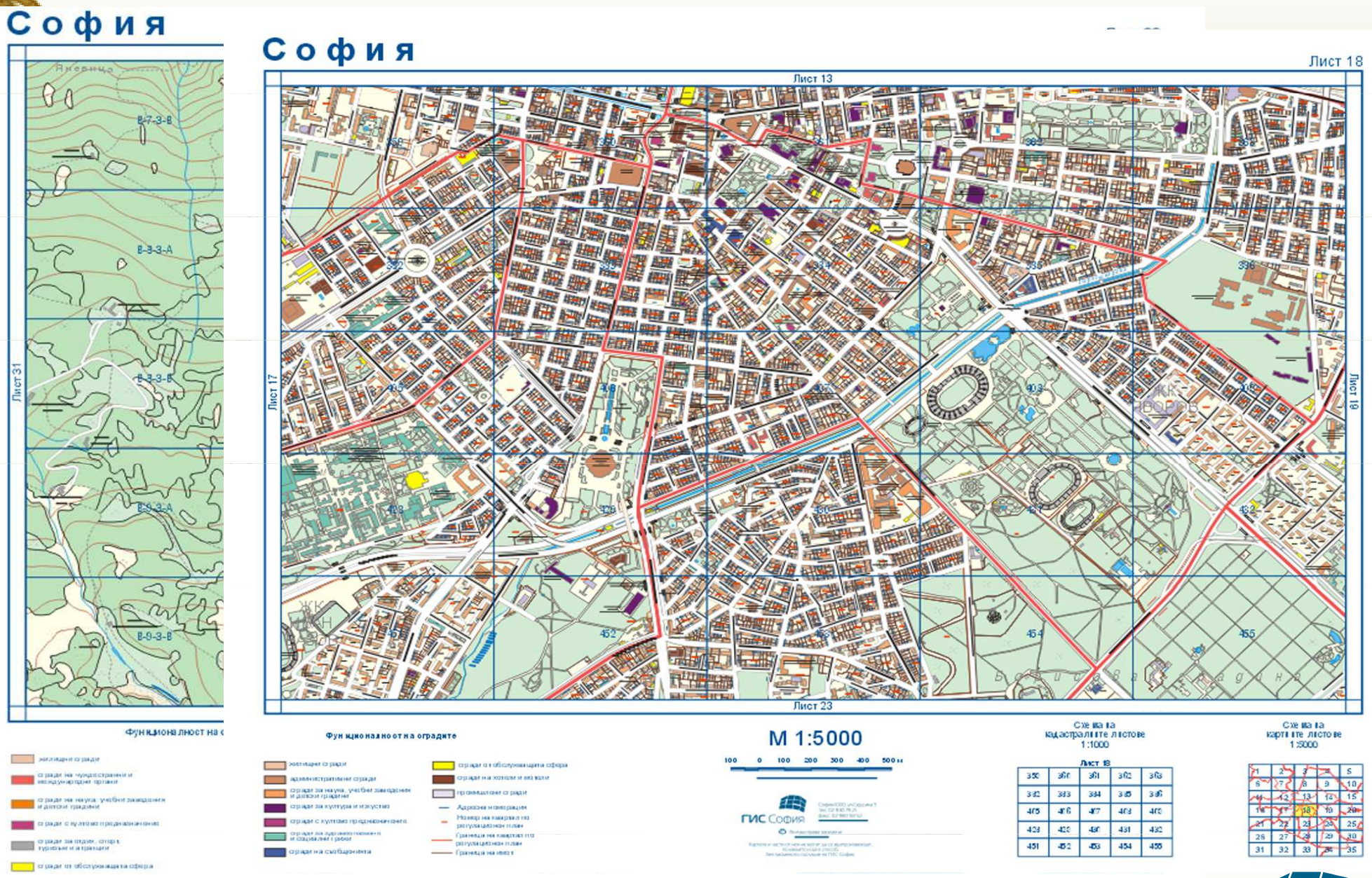
GIS Sofia
www.gis-sofia.bg

Map of one administrative district

Company GIS - Sofia has maps of all 24 administrative districts of the Capital Municipality.

GIS Sofia

www.gis-sofia.bg

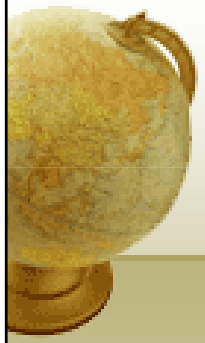


The Cartography Department carries out activities providing the development of various maps of Sofia

GIS Sofia
www.gis-sofia.bg

3D Maps for Architectural Purposes

GIS Sofia
www.gis-sofia.bg



New cartographic fields – 3D maps and animation

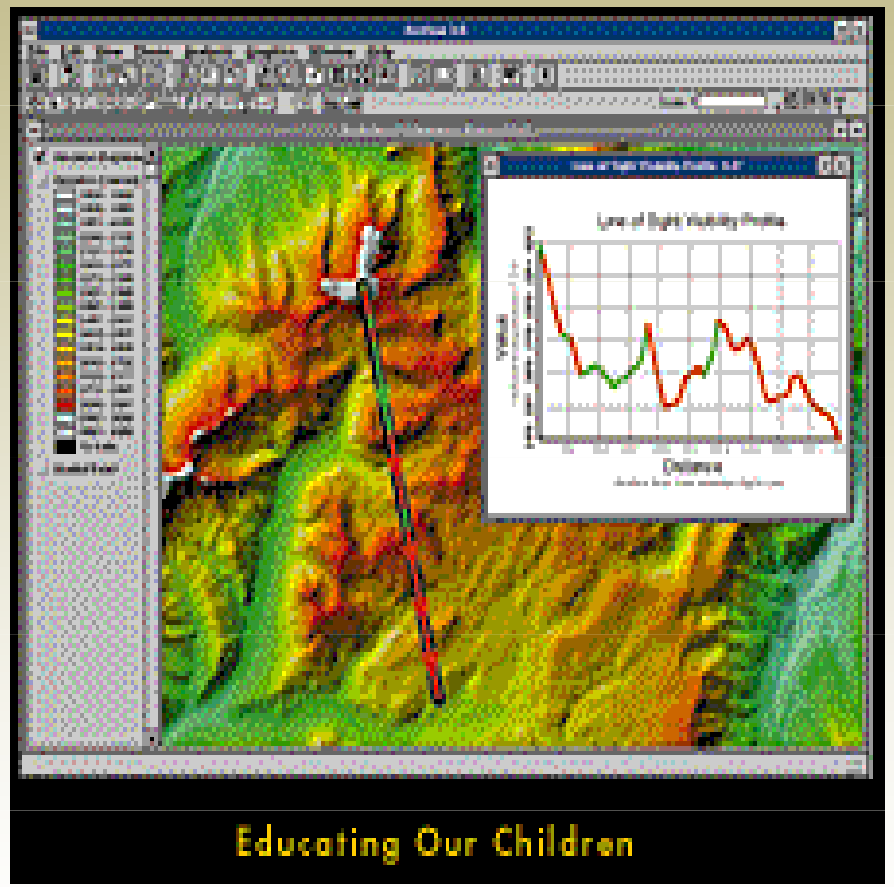
- Users of 3D maps
- “From Paper to Virtual Map” – a cheap technology for easy creation of 3D maps
- 3D cartographic symbol system
- Animation of 3D maps

3D maps – USERS

City planning and architecture

3D modelling of a part of Varna city in Bulgaria by DavGeo Ltd.

3D maps – created for different usage



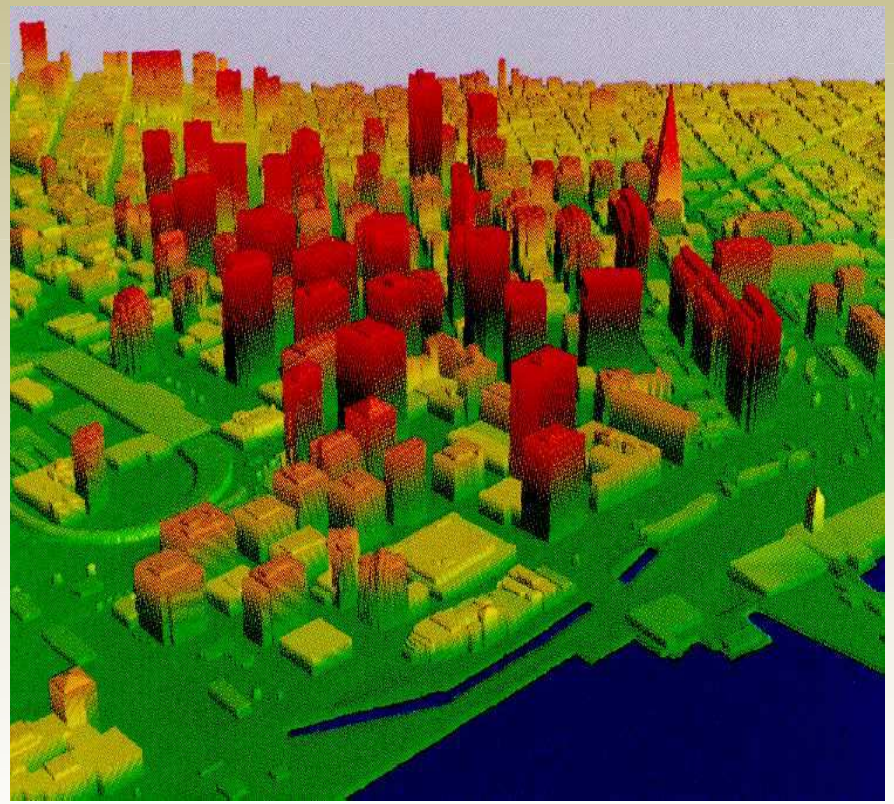
- **Education in schools and universities**

3D maps – created for different usage

- **Land use**

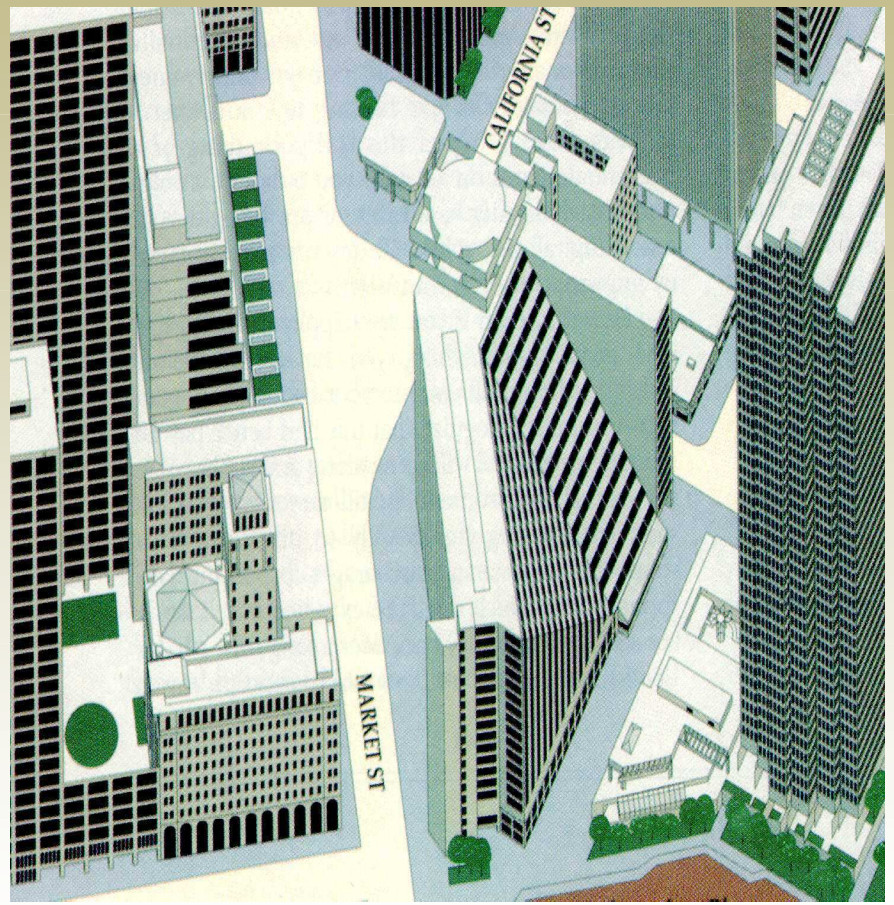
3D modelling of a part of Varna city in Bulgaria by DavGeo Ltd.

3D maps – created for different usage



- Land management and cadastre

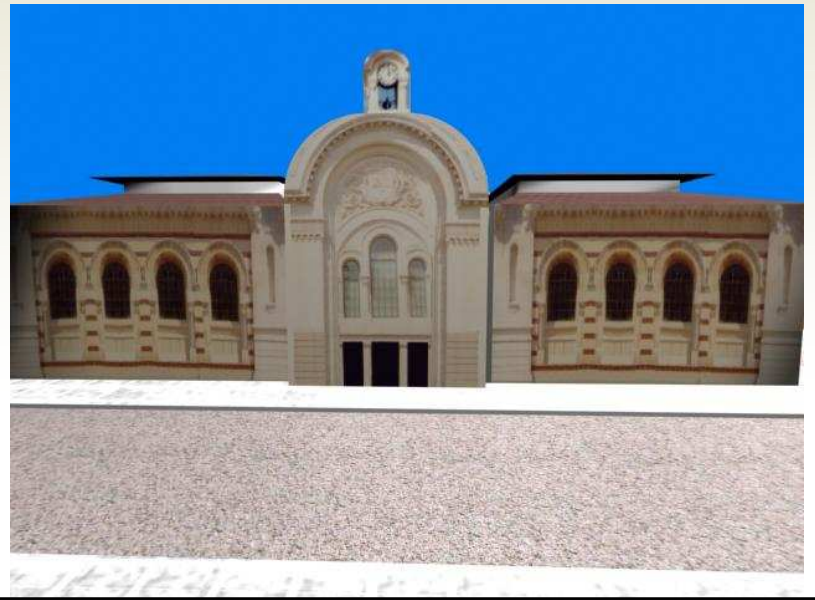
3D maps – created for different usage



- Telecommunications
- Design and advertisement

3D maps – created for different usage

- Tourist offices
- Archives of City Architecture



3D maps – created for different usage

- Transport services

3D maps – created for different usage

9-11 Damage Report - Lower Manhattan

- **Crises management**

3D model of New York (http://www.metroblocks.com)

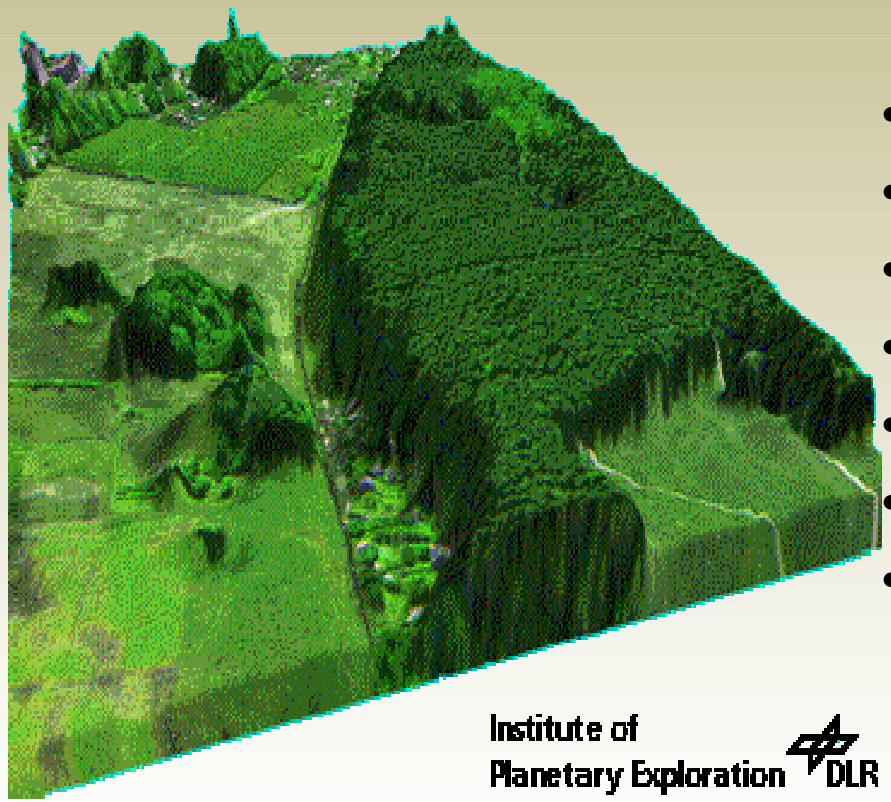
3D maps – created for different usage

- Police
- Military
- fire management

3D maps – created for different usage

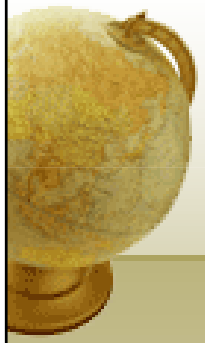
- **Meteorology**

3D maps – created for different usage



- Environment pollution
- Water resources
- Flood mapping
- Crises management
- Risks Prevention Plans
- Long-term Monitoring
- Flood early warning

3D model created by Institute of Planetary Exploration, DLR



Contents of 3D maps

- **Main content**
- **Secondary content**
- **Additional content**

Main content

- large topographic or landscape objects – relief bodies
- roads
- buildings

3D model of New York (http://www.metroblocks.com)

Secondary content

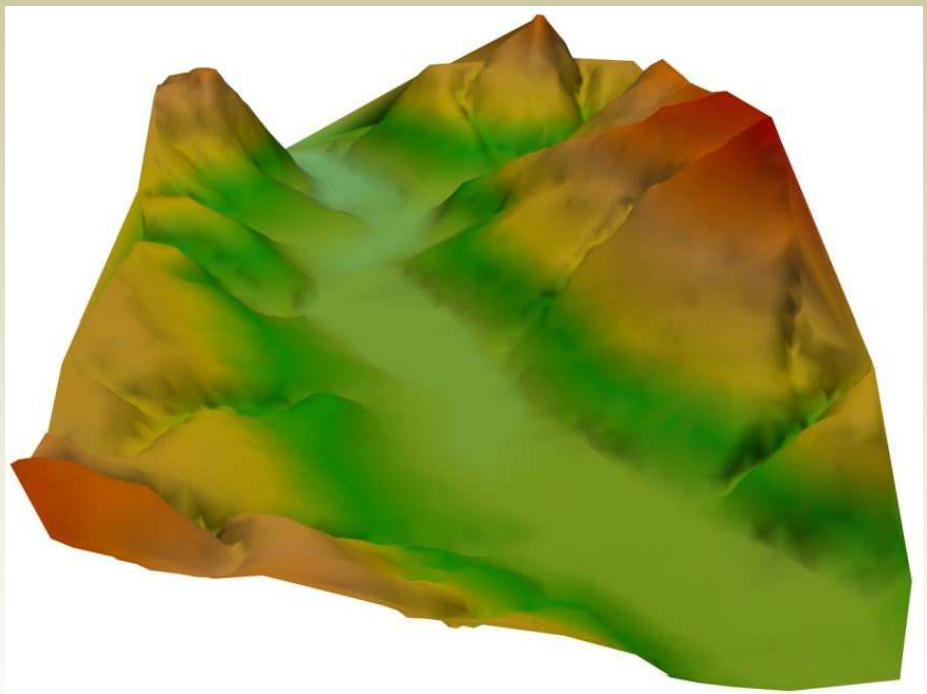
- traffic signs
- facilities
- transport elements
- information signs
- trees
- geodetic points

3D map “a street in Vienna”, created by ICG, TUGraz and 3D symbols created by T. Bandrova

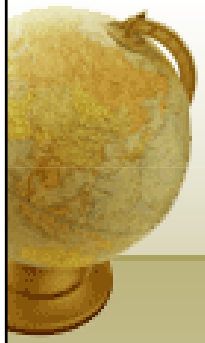
Additional content

- quality and quantity information about objects – fence, roof, street, parcel
- created as a textural database

Sources for 3D map

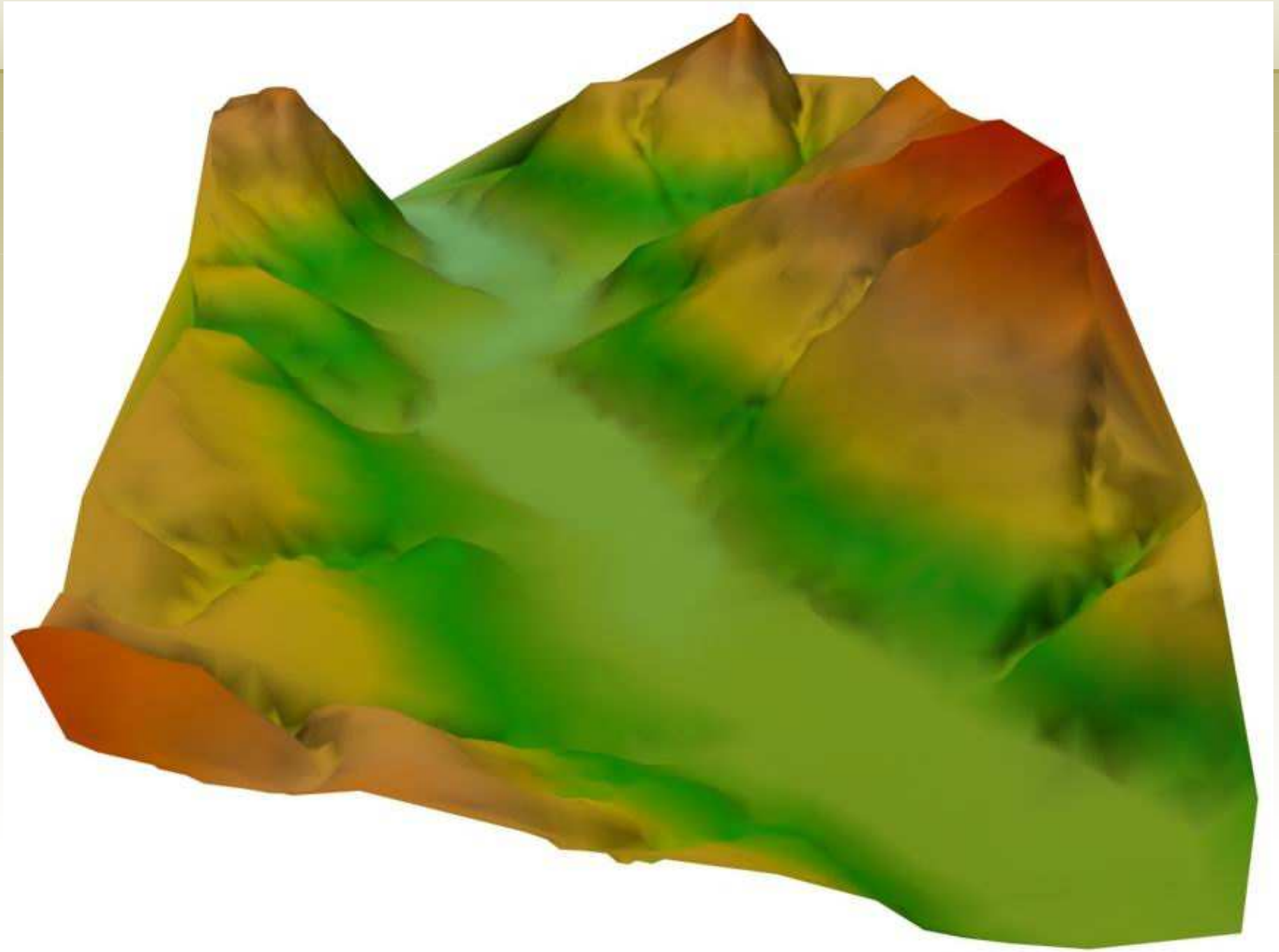


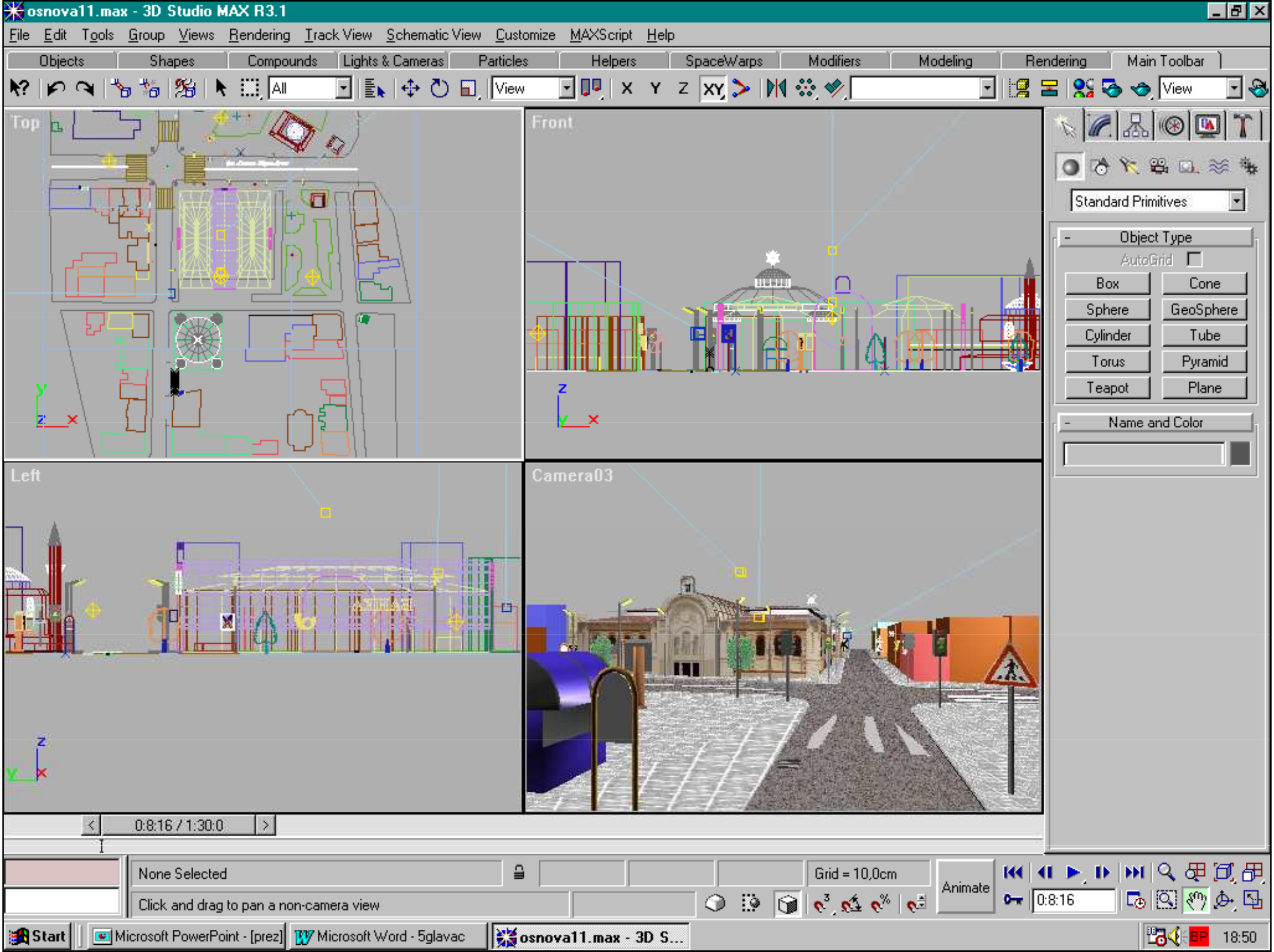
- paper topographic or cadastral maps
- photogrammetric or surveying data
- digital 2D map
- topographic information, measurements, architecture drawings etc.
- digital or paper photos
- 3D symbol system

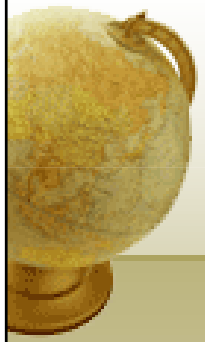


3D Digital Terrain Model

- Vectorizing topographic map (1: 5 000) + third coordinate, Z is inputted for every contour line. The frame of relief model was generated.
- The surface is generated automatically after processing of contour lines with the third coordinate.
- Outskirts of the surface are generated to model for design a completed view of DTM




osnova11.max - 3D Studio MAX R3.1
File Edit Tools Group Views Rendering Track View Schematic View Customize MAXScript Help
Objects Shapes Compounds Lights & Cameras Particles Helpers SpaceWarps Modifiers Modeling Rendering Main Toolbar
All
View
X Y Z XY
View
Top
Front
Left
Camera03
Standard Primitives
Object Type
AutoGrid
Box Cone
Sphere GeoSphere
Cylinder Tube
Torus Pyramid
Teapot Plane
Name and Color
0:8:16 / 1:30:0
None Selected
Click and drag to pan a non-camera view
Grid = 10,0cm
Animate
0:8:16
Start
Microsoft PowerPoint - [prez]
Microsoft Word - 5glavac
osnova11.max - 3D S...
18:50

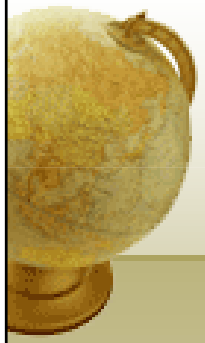


Generalization

Automatic – formal selection, smooth and filtration, according formal criteria

Dynamic – for animation presentation and track out the development of the phenomena in the space and time

Interactive – complex of the traditional, automatic and time generalization



Accuracy in objects representation

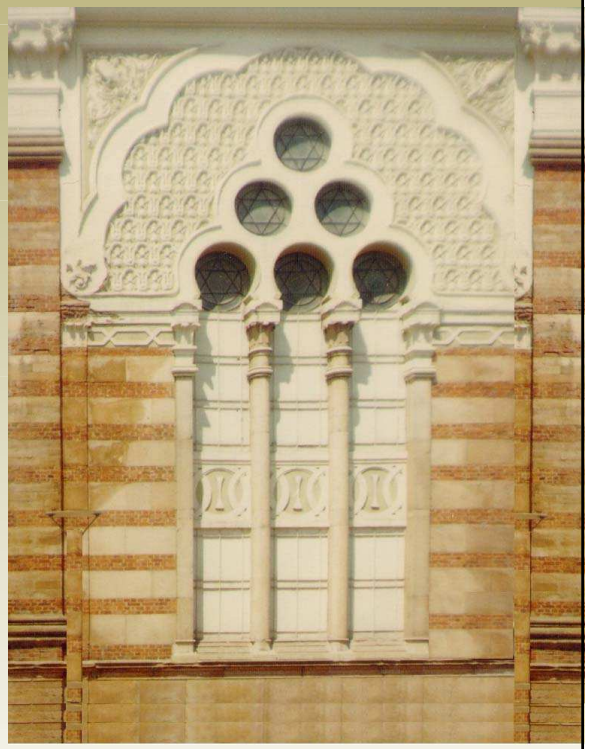
- Accuracy in reference (location)
- Thematic accuracy
- Semantic accuracy

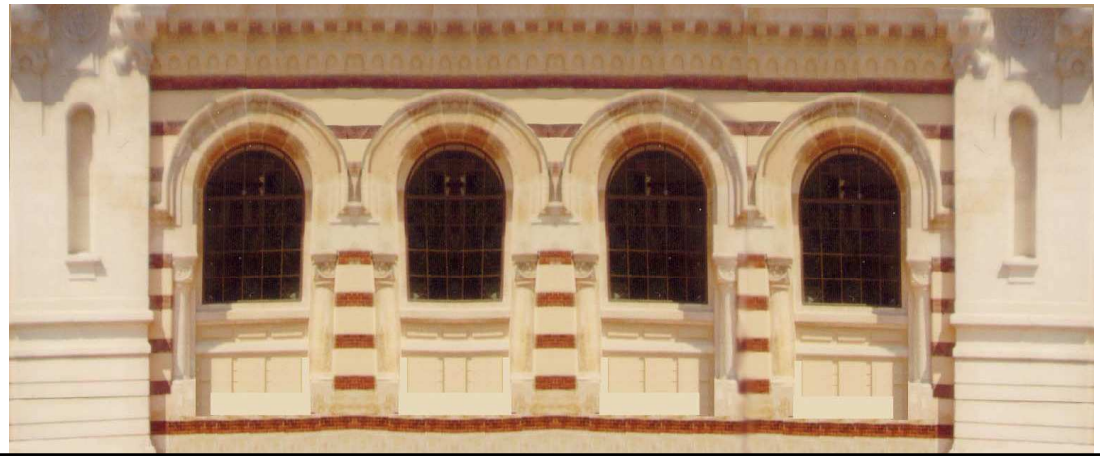
Photo-texturing

Photos from street level – for buildings facades

Photo-texturing

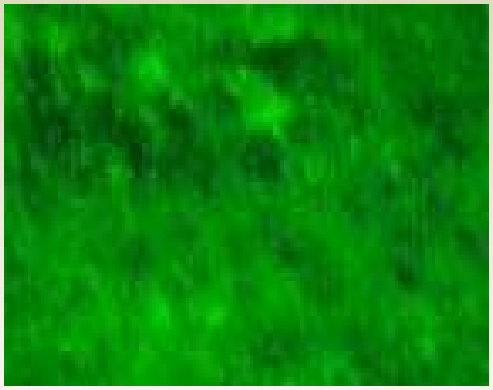
textures after image processing



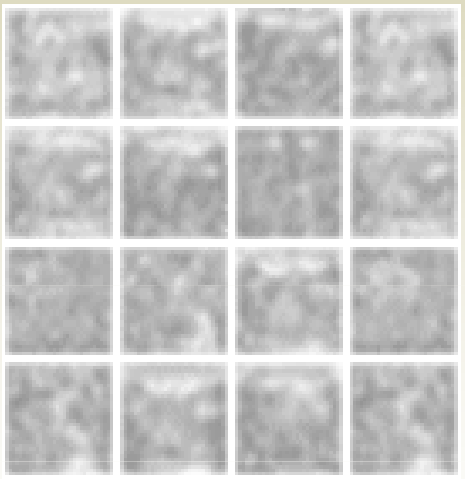


Texturing

Software library texturing - areas symbols



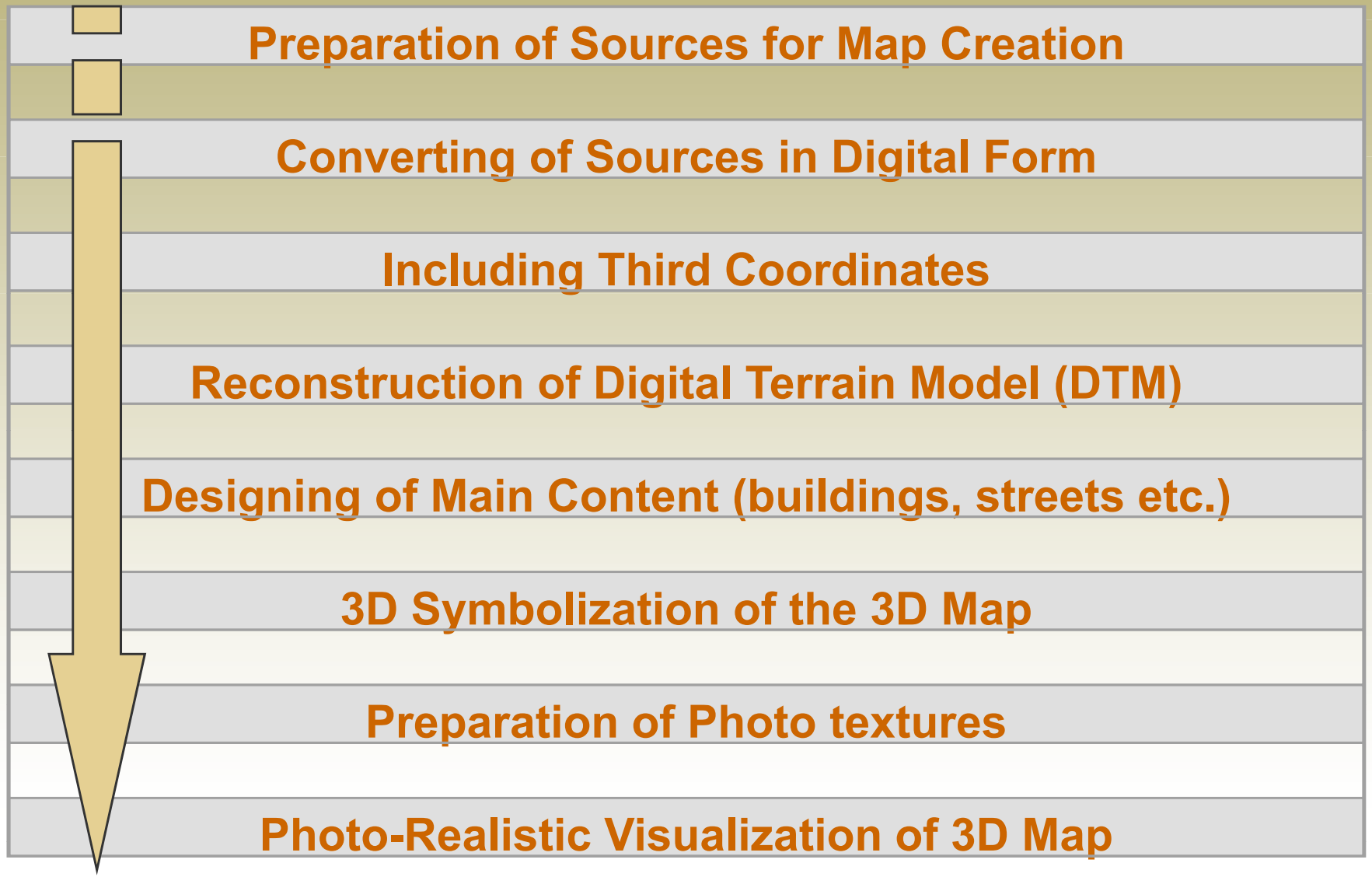
Grass



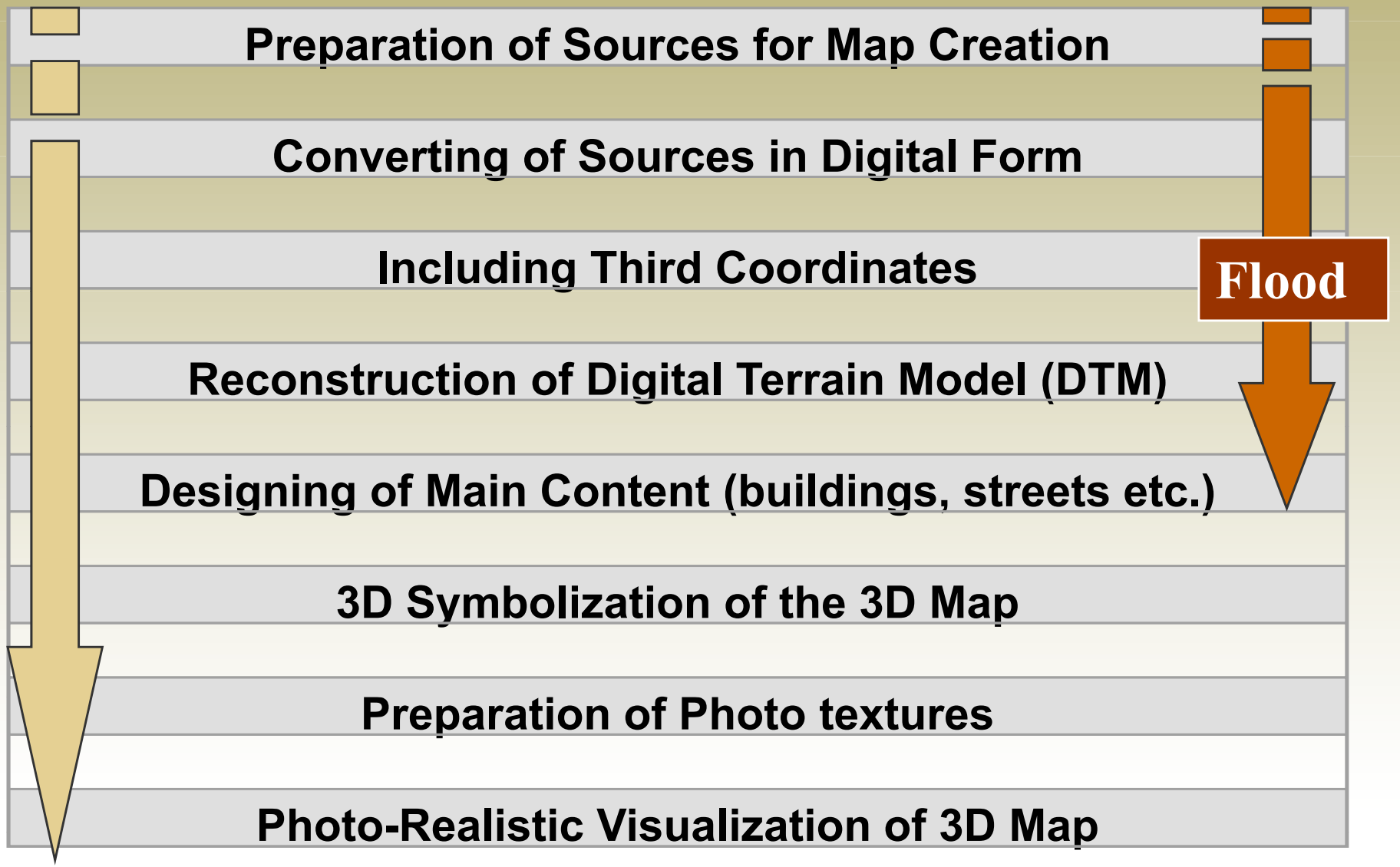
Pavements

Roads

A technology for designing of 3D maps



A technology for designing of 3D maps



3D City Maps – Flood mapping

Topography	→	3D statistical sources
DTM	→	Database for animation
3D buildings	→	Crises management
Streets, Bridges	→	Early warning
Rivers	→	1D Hydraulics Model
Land use	→	2D surface water model

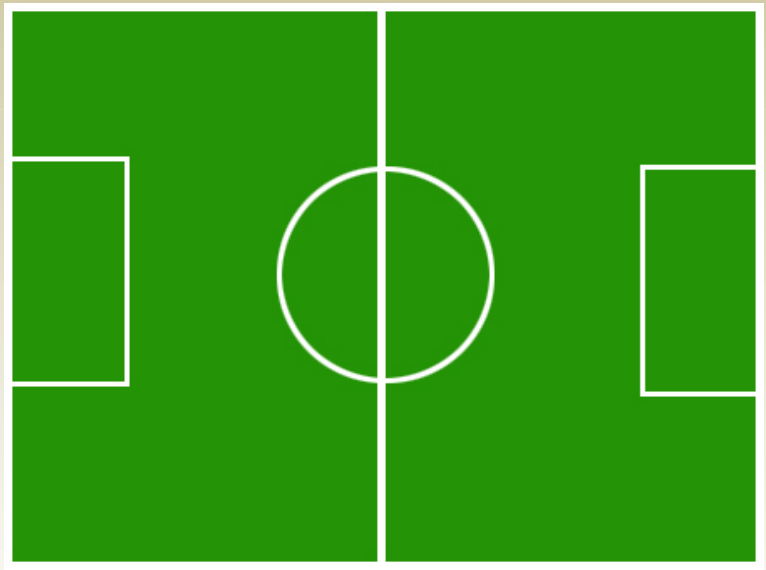
For users – providing a highly efficient system as the benefits

Steps for symbol creation

(1st developed theory of 3D cartographic symbol system in the world - 1996)

1. gathering information for an object;
2. analyzing information and collecting data for each object;
3. designing symbols by visual and metric analysis applying computer graphics techniques;
4. visualizing symbols in virtual environment;
5. obtaining synthesized information for an object.

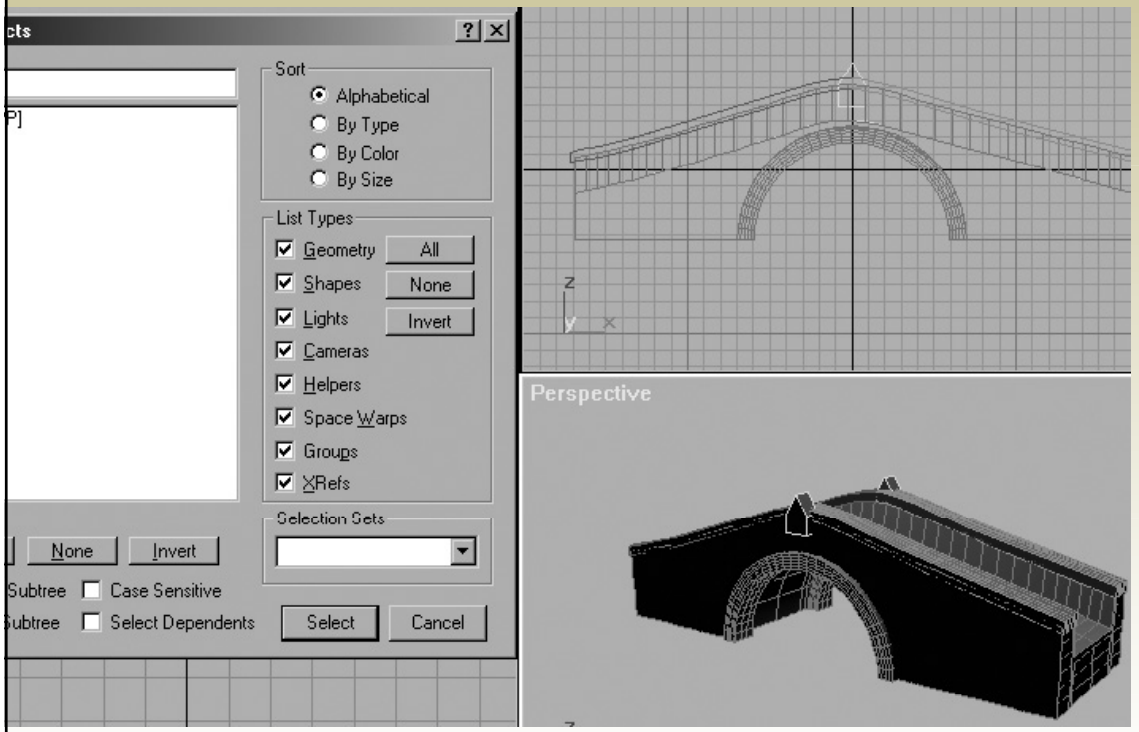
2D objects in 3D maps – a step in virtual mapping



geometry of area symbol + texture = 2D object for using in a 3D map

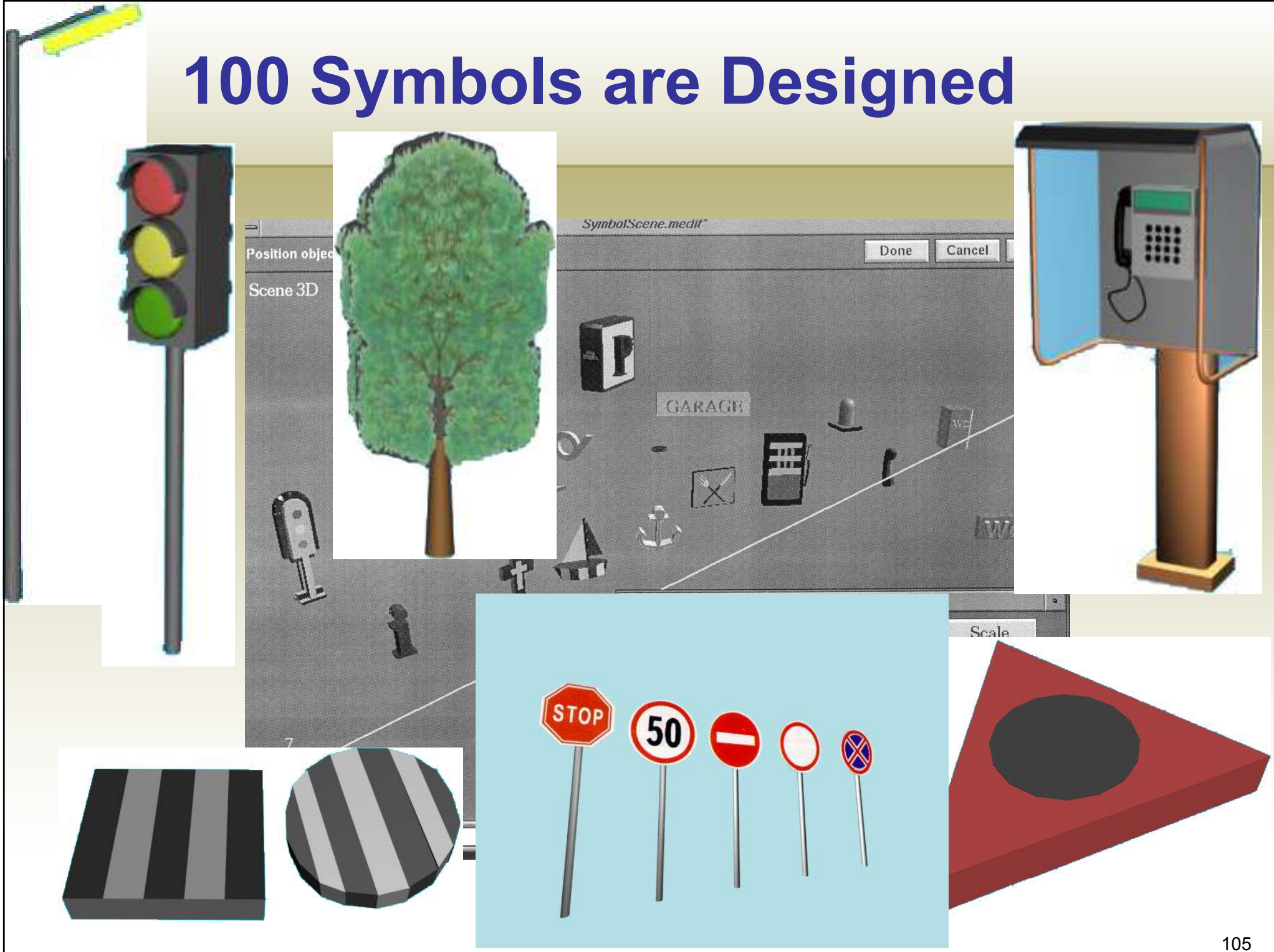
- disadvantage
- advantage - high realism, quick and cheap way for object creating in a 3D map.

Creating of sub-objects

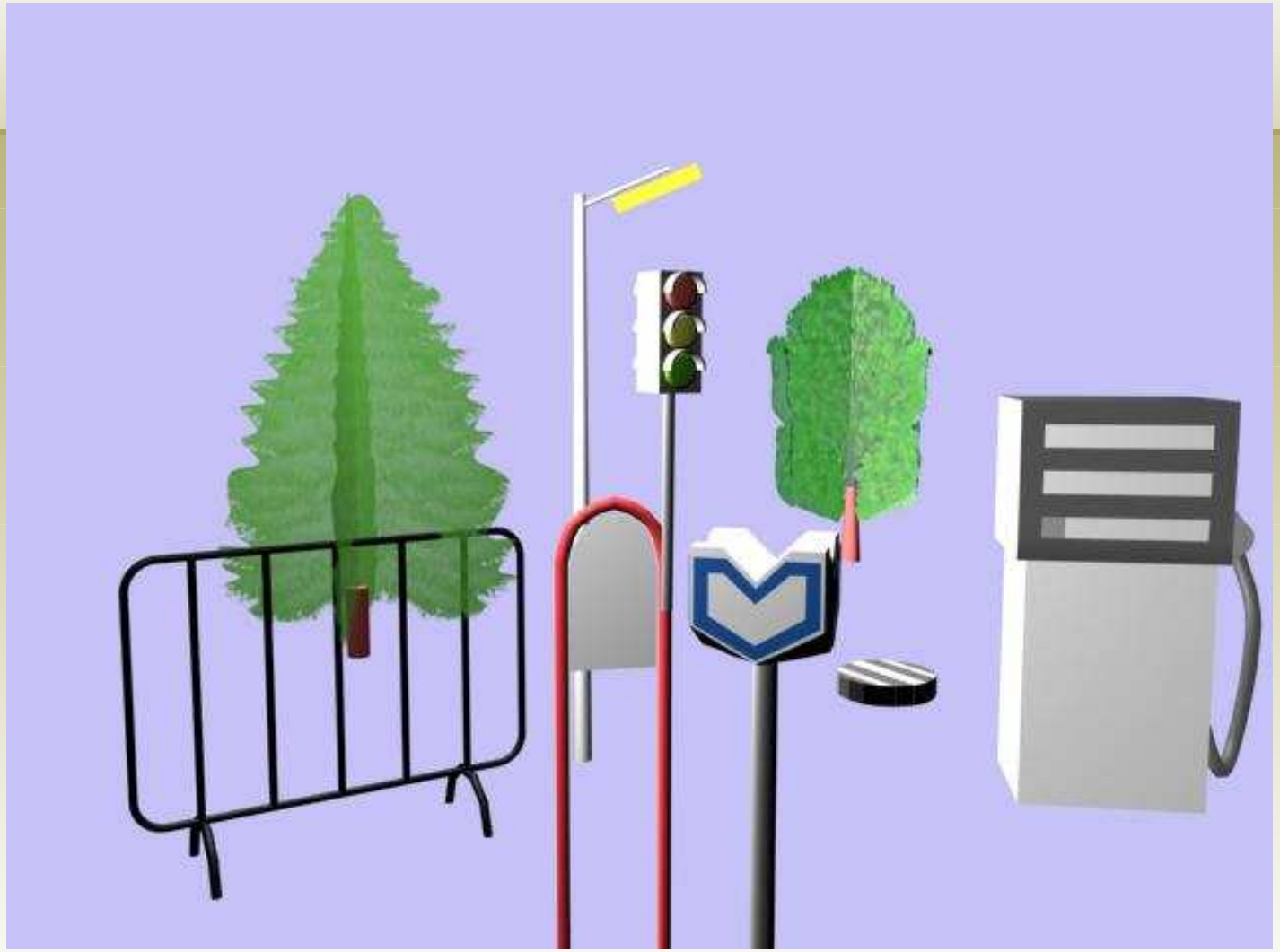


The symbol, represented a bridge contains seven sub-objects. Very often the sub-objects are created as 2D geometrical shapes. For some of objects is not important one of three dimensions (it is multiple smaller then others two dimensions in reality). They are presented as 2D shapes.

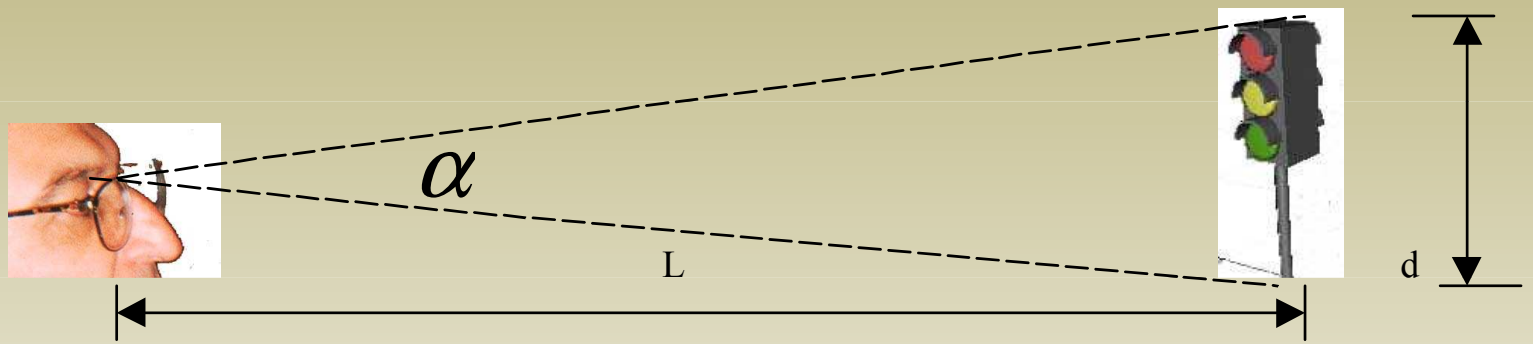
100 Symbols are Designed



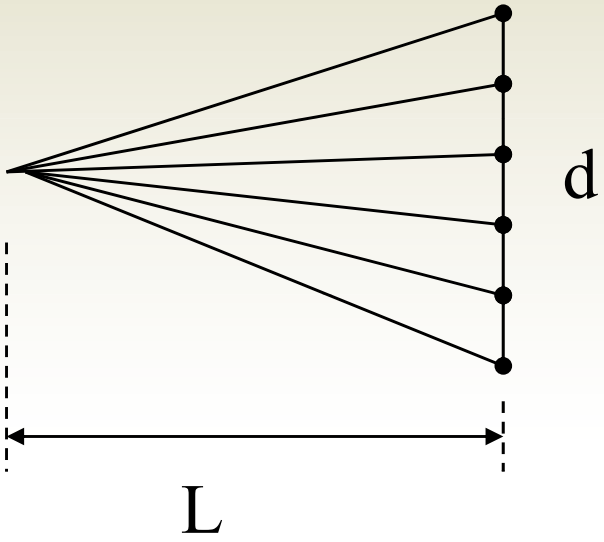
Symbols for objects in settlements and geodetic base



Symbols for industry, transport and plants



$$d = 2L.tg\frac{\alpha}{2}$$

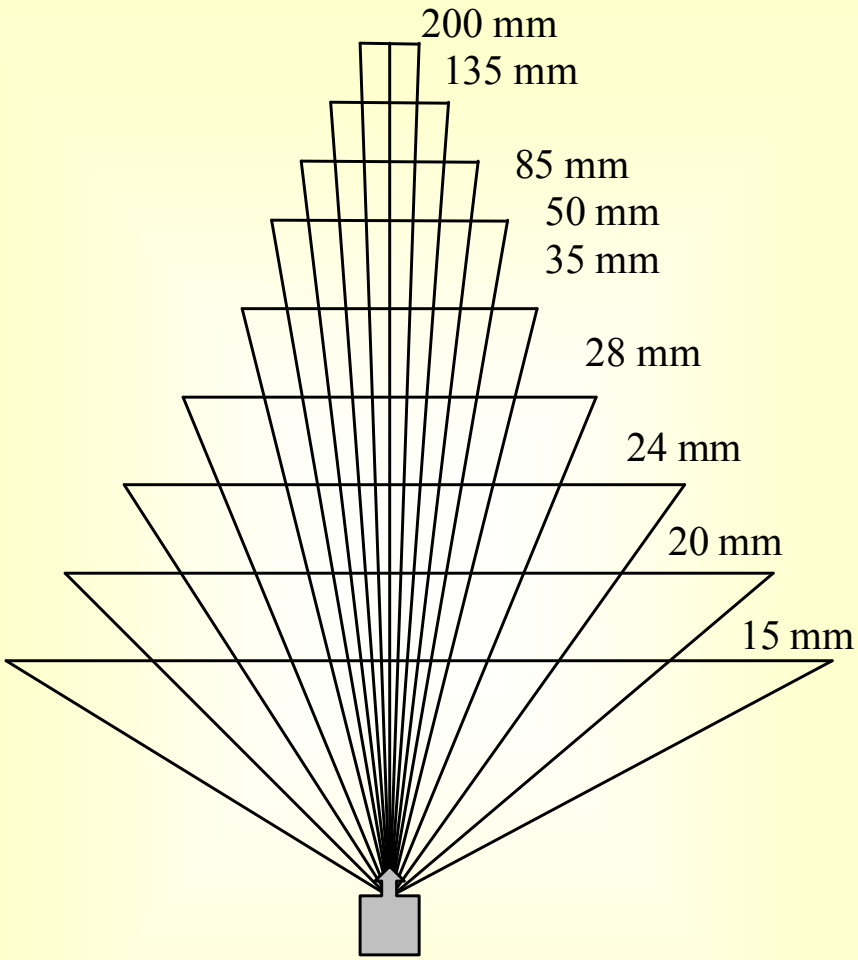


Levels of Details

Symbol	Dimensions (m)	Level of details	Distance of appearing (m)
Gas-station	2,0 / 1,3 / 0,4	Near Middle Far	50 100 600
Traffic lights	3,0 / 0,9 / 0,6	Near Middle Far	75 200 500
Electric lamp	8,0 / 2,2 / 0,5	Near Far	300 600
Bank	2,0 / 0,8 / 0,1	Near Far	100 200
Road sign	3,5 / 0,9 / 0,1	Near Far	75 200
Shaft	0,5 / 0,5 / 0,05	Far	75
Tree	3,0 / 3,0 / 0,0	Far	600

Virtual Camera - an element of 3D map

Focal distance F, mm	*Visual angle, degree*
200	10,286
135	15,189
85	23,913
50	39,598
35	54,432
28	65,470
24	73,740
20	83,974
15	100,385
9, 867	175,000



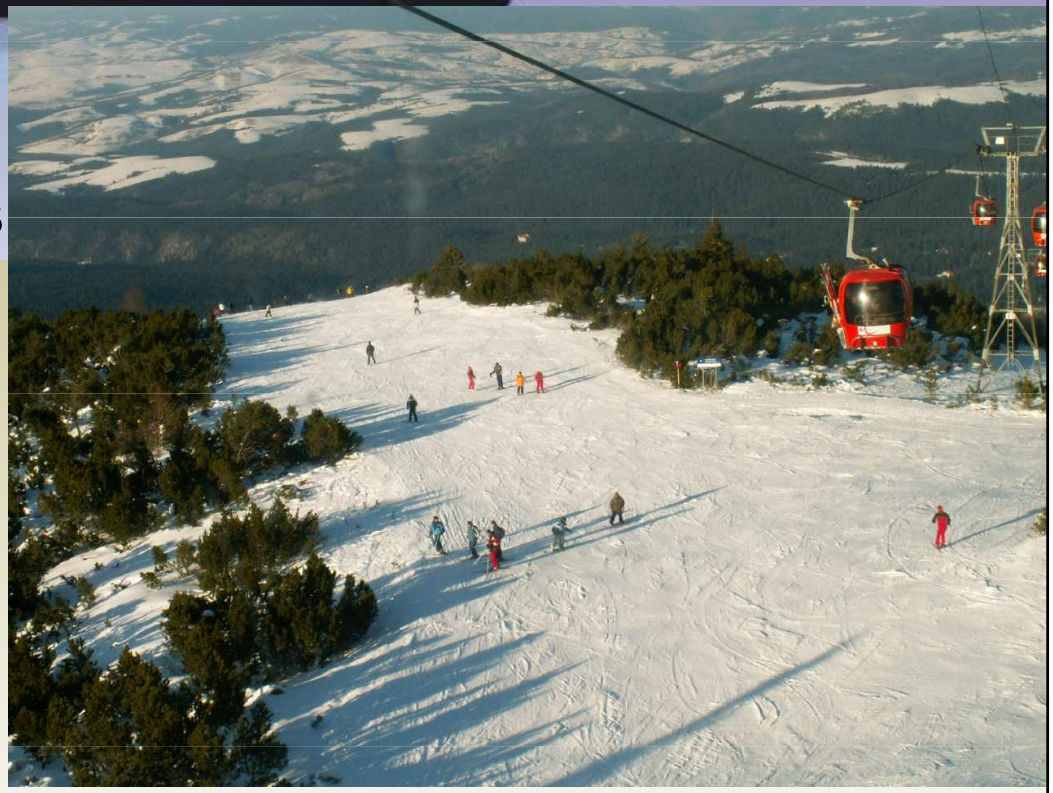
Virtual cameras with typical focus distances

Borovets, Bulgaria

INTERNATIONAL CONFERENCE ON CARTOGRAPHY AND GIS

January, 21-24, 2008

Rila is the highest mountain in Bulgaria and Balkan Peninsula (Moussala peak – 2925 m). With its forests, mountain peaks, lakes, valleys and rivers, Rila is an ideal place for hiking, mountain climbing and skiing.



Only 70 km from Sofia is a beautiful mountain ski resort – Borovets, situated at 1350 m above sea level on the northern slopes of Rila Mountain.

www.datamap-bg.com/conference2008

Borovets, Bulgaria

INTERNATIONAL CONFERENCE ON CARTOGRAPHY AND GIS

January, 21-24, 2008

INVITATION

Under the auspices of the rector of
the University of Architecture,
Civil Engineering and Geodesy, Sofia
Prof. Dr. Penio Penev

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Planetary cartography
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Fax: +359 2 886 22 01
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e-mail: cartography@abv.bg

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