The European Union's Tacis programme for Ukraine

SUSTAINABLE LOCAL DEVELOPMENT

Deliverable A4

Elements of the strategic approach for

GIS in small & medium cities

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Warning

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SUMMARY

1. Objectives of a GIS-Service

1.1. Definitions

Tacis SLD proposed to create in the pilot cities a "GIS-Service". This report will develop the content and the feasibility of such a service inside the city administration. But first some points must be clarified.

GIS: Geographical Information System covers a whole of techniques aiming at a management of data linked to geographical positions. It's a large and fuzzy notion. Within this concept a large numbers of applications have been developed all over the world for administrations, for businesses, and for sciences. Our pilot cities will not implement all these applications. First a choice must be done and then priorities must be given.

The choice and the priority obey 2 criteria: strategy and cost efficiency. Such a service must be cost efficient for the community because it's paid with public money. But unfortunately, applications depend on the availability of information and some tasks must be considered as strategic investments as they are the condition of the development of future applications.

It's especially the case of the topography. When we say "data linked to geographical positions", the common point to all the applications is to be able to define the said geographical positions. So a preliminary common work is to dress the topography of the territory that will be managed with the help of the GIS.

1.2. Situation

We start with a situation that can be resumed as follows:

- There are no maps;
- There are no reliable data as:
    - Each one manages his own files about given data, with only the items for the job he is concerned with; and
    - There's no systematic management of the events modifying the data.

About topography, often the cities do not know the land of their property and they have no drawings of the buildings on and of their property.

When we say "development" the question is: how within 10 years can Ukraine reach a level of development comparable to EU? In our case, the question is limited to local development: the city and the surrounding Rayon. Moreover we work with the local administration and our target is therefore the development of the said administration; and the objective will be to reach the level where the European cities will be within 10 years, or about such.

1.2.1. Maps

1.2.1.1. Efficiency of municipal services and companies

Municipal services and companies are in charge of big networks: water supply, district heating, sewages, and even possibly in the future energy networks.

SLD will provide equipments for the implementation of a SCADA (Supervisory Control And Data Acquisition). The purpose is to get a real time monitoring of the networks, in aim to:

- Detect in real time and repair any failure;
- Realise a model to work extension, modification, renovation, of the networks;
- Use the same model to avoid incidents and hazardous works on or near existing networks..

However the preliminary task is to dress the maps of these networks.

Other services need to chart their equipments such as platforms for waste collection, roads and sidewalks construction and repairs, municipal parks and gardens, cemeteries, street lighting, and many others,

activities which fall under the third case above mentioned, as it is the case also for external companies having to chart their networks and facilities such as electricity, gas, telephone, cable TV, and so on.

For networks, 3D maps are necessary, reporting the altitude of the ground and the depth or altitude of the pipes.

1.2.1.2. Local level of State Administration: the Cadastre

Land property must be registered but it also must be possible to identify it on the field. The role of the maps of the cadastre is to give the information necessary for the location and the limits of any particular property. It usually included physical land marks as fences, peculiar trees, stones. Nowadays, it's easier to use absolute coordinates (longitude and latitude). Cadastre maps are 2D and the surface is always the vertical projection of the land.

1.2.1.3. Municipal property

Enterprises need land for their implementation and development. Today, the almost only one resource of land is municipal property. The use, the availability and the options taken by individuals should be charted and published in a transparent way.

1.2.1.4. Management of environment and natural middles

The sustainability of the development supposes to respect and to improve the state of the environment and the natural middles. But usually the knowledge of the behaviour of the natural middles can only be understood with the help of maps.

1.2.1.5. Housing

A lot of applications in municipal administration are linked to housing.

1.2.2. Databases

GIS is the association of data with geographical information. So we have now the issue of choosing which databases. The key points for the development of a database are:

- Structure of the data
- Uniqueness of the information
- Procedures of creation, update and deletion of the data
- Procedures of access to the data
- Procedures of safety
- Procedures of backup and archives

The question of databases will also be treated for the implementation of the documents management and the modernisation of the municipal administration.

1.2.2.1. Basic databases

Almost everybody in the municipal administration and the municipal services use data about the inhabitants and the housing. The usual practice is that a lot of people have to use a "software of the vertical". At a given moment, the state level or the regional level have obliged services to use specific software for the management of a task or for the preparation of statistics for the upper level. So these "software of the vertical" contain a file of the necessary data (the more often inhabitants or housing). It leads to the fact that each of these several services creates and maintains for instance its own particular file on inhabitants. And of course, after several years these files are not anymore coherent: actual inhabitants can exist in a file and not in another one. Let's add that the calculations made by the "software

of the vertical" are usually extraordinary simple and could be developed in about two hours with any database management software!

The necessary progress is to implement 2 basic databases to be used by everyone:

- Inhabitants
- Housing

A service must be in charge of the management of these databases. For part of information (often confidential), the relevant services should be in charge only of the management of this information inside the common databases. For instance the incomes of the inhabitants are information necessary for subsidies of low income people: it's confidential and it must be managed only by the service in charge of the subsidies, but it's a part of the database of the inhabitants.

1.2.2.2. Technical databases

The management of a network with a GIS supposes to link the geographical location of each component of the network with the description of this component. For instance a piece of pipe can be described by its material, its diameter, its thickness, its insulation, how it is buried, the date it has been put into service, the failures and repairs, etc. All this information must be standardised all over Ukraine: for instance it must be decided if the diameter is the outside, medium or inside diameter. Furthermore, additional links would provide the location (in the database) of the previous and following elements of the network (information "connected with").

So technical databases must be created for each municipal service or company and it would be more efficient if these databases have a unique structure whatever the city.

Currently all existing pieces of such information are seldom written; they may exist only in the memory of some oldest employees. Hence this task will not be so easy.

1.3. National Policy

1.3.1. International objectives

"*The international co-operation is poorly developed.*" as it is said by the Head of the State Service of Geodesy, Cartography and Cadastre in his report on 2005 activities (Bibliog. 2). For 2005, the international activities of this service have been:

In May 2005 within the framework of international activities in Kiev there was organized the 6th meeting of the Eastern Europe, Northern and Central Asia Department of the UN Expert's Group on Geographic Names and the 5th meeting of the Working Group on Geographic Names of the Inter-state Council of CIS-countries on Geodesy, Cartography, Cadastre and Distant Probing of the Earth.

In December Ukrgeodejkartographia signed the Agreement between the Ministry of Environment Protection of Ukraine and the National Cosmic, Geodesic and Cartographic Agency at the government of the Republic of Tajikistan "Tochikkoinot" about co-operation in the field of geodesy, cartography, cadastre and distant probing of the Earth.

The representatives of Ukrgeodejkartographia have taken part in:

- *22nd session of the Inter-state Council of CIS-countries on Geodesy, Cartography, Cadastre and Distant Probing of the Earth (March 2005, Moscow, Russian Federation);*
- *22nd International cartographic conference (July 2005, La-Coronya, Spain);*
- *23d session of the Inter-state Council of CIS-countries on Geodesy, Cartography, Cadastre and Distant Probing of the Earth (October 2005, Minsk, Republic of Belarus);*
- *9th meeting of the Baltic Department of the UN Expert's Group on geographic names (October 2005, Yurmala, Republic of Latvia).*

In accordance with the results of the implemented activities and materials delivered at the 29th session of the World Heritage Committee (15th of July, 2005, Durban, South Africa) the trans-border facility Geodesic Arch Struve (Belarus, Estonia, Finland, Latvia, Lithuania, Norway, Republic of Moldova, Russian Federation, Sweden, Ukraine) has been included into the World Heritage of UNESCO as a cultural facility of "an exceptional universal value". At the territory of Ukraine 4 places of the Struve Arch

have been included into the list of monuments of the world significance (Katerinivka, Felshtin, Baranivka, Staraya Nekrasovka).

And the forecast activities for 2006 were:

International cooperation in the sector of geodesy and cartography:

- *take efforts so that Ukraine joins the International organization – European Association of Official Cartography (Eurogeographics);*
- *participate in the meeting of the UN expert's group on geographic names (Vienna);*
- *organize implementation of the 7th meeting of the Department of Eastern Europe, North and Central Asia of the UN expert's group on geographic names in Ukraine (Lviv city);*
- *organize celebrations on occasion of inclusion of the Struve Geodetic Arc into the UNESCO world heritage list;*
- *fulfil the work on preparation of cooperation Agreements in the sphere of geodesy, cartography, cadastre and remote probing of the Earth with countries of Eastern and Western Europe;*
- *elaborate the possibilities for implementation of topographic, geodesic and cartographic activities within international projects and grants.*

Nevertheless, Ukraine participates in several international programmes of GIS.

1.3.1.1. Joint Ukrainian-Swedish Project Capacity Building for the implementation of a National Spatial Data Infrastructure (NSDI) in Ukraine

The Project is the continuation of the tight cooperation between State Service of Geodesy, Cartography and Cadastre at the Ministry of Ecology and Natural Resources of Ukraine, Swedish International Development Agency (SIDA) and Swedesurvey company. This cooperation started back in 1994 with promoting the introduction of title registration system in Ukraine. In autumn 2000 a new stage of the Ukrainian-Swedish Project was initiated.

The main aim of the Project is to study the existing situation and to promote the formation and creation of national spatial data infrastructure (NSDI), which is a needed element for:

- efficient functioning of real property market,
- power authorities (state, local),
- other organizations and authorities.

Project tasks:

- Capacity building for NSDI legislation in Ukraine;
- Capacity building for introducing international standards for spatial data in Ukraine;
- Preparation of the concept of cadastre index map and other sets of geospatial data;
- Elaboration of technical implementation of NSDI elements;
- Improvement of public awareness in Ukraine about the possibilities of using geospatial data, for instance, via internet.

1.3.1.2. NATO Programme ASDE (Air Situation Data Exchange)

Ukraine has asked to participate in the Air Situation Data Exchange (ASDE) programme, which NATO has offered to Partner countries since 2001.

The ASDE programme is a means for a reciprocal exchange of air situation filtered information between NATO and a Partner country. The programme is designed to enhance mutual situational awareness, enhance transparency and minimize possible cross-border air incidents. In addition, the programme also provides Partner countries with insight into NATO procedures and offers valuable training experience. The exchange of data takes place in accordance with provisions negotiated in a bilateral Memorandum of Understanding between NATO and individual Partner countries.

1.3.2. National objectives

The Law of 06/02/07 (Bibliog. 1) says:

The Basic Principles shall identify strategic goals for the development of an information-oriented society in Ukraine. Such goals shall include, in particular:

- *accelerating the development and the institution of cutting-edge competitive information and communication technologies into all areas of the country's life, in particular into the economy of Ukraine and **into the activity of** government bodies and **bodies of local government**;*
- *developing the national information infrastructure and integrating it with the global infrastructure;*
- *creating national information systems, primarily in the areas of **healthcare**, education, science, culture, and **environmental protection**;*
- *preserving cultural heritage of Ukraine by way of its electronic documentation;*
- *using information and communication technologies **to improve public administration**, the relations between the state and Ukrainian citizens, establishing electronic forms for the interaction between government bodies and **bodies of local government**, on the one hand, and private individuals and legal entities, on the other hand;*
- *achieving effective participation of all regions in the process of establishing an information-oriented society by way of decentralizing and supporting regional and local initiatives;*
- *protecting information rights of citizens, primarily those related to the accessibility of information, the protection of information about an individual, the support for democratic institutions, and the minimization of the risk of "information inequality";*
- *improving the legislation on the regulation of information relations;*
- *improving the state of information security in the environment of using cutting-edge information and communication technologies.*

According to the Basic Principles, the national policy for information development shall provide for the transition to the priority-driven scientific, technical and innovative development that shall envisage, in particular:

- *instituting information and communication technologies into all areas of activity of the society and the state;*
- *improving the coordination of activities of government bodies and **bodies of local government** with respect to developing elements of information infrastructure, in particular at the time of **building corporate information and analytical systems**.*

The situation is hard if not desperate!

The existing state geodesic and gravimetric networks and the reference system neither meet the demands of economy, science, defence and security of the state nor correspond to the due world level. The topographic cartography of the territory is in a rather poor state. Almost from 1998 no new topographic maps have been issued, the information on the old ones has never been updated. The situation is slightly better as far as thematic and special cartography is concerned. Meanwhile, there are enough problems in this field as well. The work on creation of the National Atlas of Ukraine has not been completed so far, higher education establishments are not supplied with cartographic materials, the same concerns secondary schools for children with weak eyesight, there is a number of problems referring for standardization of geographic names. Planning, analysis and decision-taking at the state level do not have a geo-information support… No decisions have been taken as regards creation of the infrastructure of the national system of geo-spatial data and information banks in accordance with the world experience. So far the State does not have new co-ordinates of the state border and networks of administrative and territorial division. There is no single approach to the creation of the State Cadastre. (Bibliog. 2)

This report says also that in 2005 *the enterprises of the branch have made a topographic survey of the area of almost 1.1 thous. km^2 in different scales* although the surface of Ukraine is 600 thous. km^2!

A big obstacle for the development of this Information Society, and then GIS, is the question of security. On 22/12/2000 Deputy Chief of Ukraine's Security Service - SBU - General Hryhory Lazarev has called the attention of all authorities of Ukraine about the security of the information (Bibliog. 3). By lack of means, no attention has been paid to the question and of course it resulted in scandals, defaults, and so on. Thus the attitude of the authorities in charge of the security in Ukraine, first of them the SBU, is to forbid such activities dealing with government information at a maximum. And now anyone can notice that this seriously hampers the development of the modernisation and of the economy. A realistic solution would be to give to state (and subordinate) structures the means to manage the said security rather than to block all development because without security it might be hazardous.

1.3.3. Objective at the international level

For us, it seems clear that the will of Ukraine to adhere to WTO, NATO and EU, supposes efforts toward the implementation of the relevant regulations and "fair game" rules.

1.3.3.1. Directive INSPIRE

The EU Directive INSPIRE (Bibliog. 4) gives a framework for implementation of GIS in EU.

Article 1

1. The purpose of this Directive is to lay down general rules aimed at the establishment of the Infrastructure for Spatial Information in the European Community (hereinafter referred to as Inspire), for the purposes of Community environmental policies and policies or activities which may have an impact on the environment.

Article 7

1. Implementing rules laying down technical arrangements for the interoperability and, where practicable, harmonisation of spatial data sets and services, designed to amend non-essential elements of this Directive by supplementing it, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 22(3). Relevant user requirements, existing initiatives and international standards for the harmonisation of spatial data sets, as well as feasibility and cost-benefit considerations shall be taken into account in the development of the implementing rules. Where organisations established under international law have adopted relevant standards to ensure interoperability or harmonisation of spatial data sets and services, these standards shall be integrated, and the existing technical means shall be referred to, if appropriate, in the implementing rules mentioned in this paragraph.

The key-concept of the Directive is to ensure the interoperability of spatial information developed all over the territory of EU.

Article 17

1. Each Member State shall adopt measures for the sharing of spatial data sets and services between its public authorities referred to in point (9)(a) and (b) of Article 3. Those measures shall enable those public authorities to gain access to spatial data sets and services, and to exchange and use those sets and services, for the purposes of public tasks that may have an impact on the environment.

7. By way of derogation from this Article, Member States may limit sharing when this would compromise the course of justice, public security, national defence or international relations.

But even if it's defined about environmental policies, the list of data is large:

Annex I

1. Coordinate reference systems

Systems for uniquely referencing spatial information in space as a set of coordinates (x, y, z) and/or latitude and longitude and height, based on a geodetic horizontal and vertical datum.

2. Geographical grid systems

Harmonised multi-resolution grid with a common point of origin and standardised location and size of grid cells.

3. Geographical names

Names of areas, regions, localities, cities, suburbs, towns or settlements, or any geographical or topographical feature of public or historical interest.

4. Administrative units

Units of administration, dividing areas where Member States have and/or exercise jurisdictional rights, for local, regional and national governance, separated by administrative boundaries.

5. Addresses

Location of properties based on address identifiers, usually by road name, house number, postal code.

6. Cadastral parcels

Areas defined by cadastral registers or equivalent.

7. Transport networks

Road, rail, air and water transport networks and related infrastructure. Includes links between different networks. Also includes the trans-European transport network as defined in Decision No 1692/96/EC of the European Parliament and of the Council of 23 July 1996 on Community Guidelines for the development of the trans-European transport network and future revisions of that Decision.

8. Hydrography

Hydrographic elements, including marine areas and all other water bodies and items related to them, including river basins and sub-basins. Where appropriate, according to the definitions set out in Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy and in the form of networks.

9. Protected sites

Area designated or managed within a framework of international, Community and Member States' legislation to achieve specific conservation objectives.

Annex II

1. Elevation

Digital elevation models for land, ice and ocean surface. Includes terrestrial elevation, bathymetry and shoreline.

2. Land cover

Physical and biological cover of the earth's surface including artificial surfaces, agricultural areas, forests, (semi-)natural areas, wetlands, water bodies.

3. Orthoimagery

Geo-referenced image data of the Earth's surface, from either satellite or airborne sensors.

4. Geology

Geology characterised according to composition and structure. Includes bedrock, aquifers and geomorphology.

Annex III

1. Statistical units

Units for dissemination or use of statistical information.

2. Buildings

Geographical location of buildings.

3. Soil

Soils and subsoil characterised according to depth, texture, structure and content of particles and organic material, stoniness, erosion, where appropriate mean slope and anticipated water storage capacity.

4. Land use

Territory characterised according to its current and future planned functional dimension or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational).

5. Human health and safety

Geographical distribution of dominance of pathologies (allergies, cancers, respiratory diseases, etc.), information indicating the effect on health (biomarkers, decline of fertility, epidemics) or well-being of humans (fatigue, stress, etc.) linked directly (air pollution, chemicals, depletion of the ozone layer, noise, etc.) or indirectly (food, genetically modified organisms, etc.) to the quality of the environment.

6. Utility and governmental services

Includes utility facilities such as sewage, waste management, energy supply and water supply, administrative and social governmental services such as public administrations, civil protection sites, schools and hospitals.

7. Environmental monitoring facilities

Location and operation of environmental monitoring facilities includes observation and measurement of emissions, of the state of environmental media and of other ecosystem parameters (biodiversity, ecological conditions of vegetation, etc.) by or on behalf of public authorities.

8. Production and industrial facilities

Industrial production sites, including installations covered by Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control and water abstraction facilities, mining, storage sites.

9. Agricultural and aquaculture facilities

Farming equipment and production facilities (including irrigation systems, greenhouses and stables).

10. Population distribution - demography

Geographical distribution of people, including population characteristics and activity levels, aggregated by grid, region, administrative unit or other analytical unit.

11. Area management/restriction/regulation zones and reporting units

Areas managed, regulated or used for reporting at international, European, national, regional and local levels. Includes dumping sites, restricted areas around drinking water sources, nitrate-vulnerable zones, regulated fairways at sea or large inland waters, areas for the dumping of waste, noise restriction zones, prospecting and mining permit areas, river basin districts, relevant reporting units and coastal zone management areas.

12. Natural risk zones

Vulnerable areas characterised according to natural hazards (all atmospheric, hydrologic, seismic, volcanic and wildfire phenomena that, because of their location, severity, and frequency, have the potential to seriously affect society), e.g. floods, landslides and subsidence, avalanches, forest fires, earthquakes, volcanic eruptions.

13. Atmospheric conditions

Physical conditions in the atmosphere. Includes spatial data based on measurements, on models or on a combination thereof and includes measurement locations.

14. Meteorological geographical features

Weather conditions and their measurements; precipitation, temperature, evapotranspiration, wind speed and direction.

15. Oceanographic geographical features

Physical conditions of oceans (currents, salinity, wave heights, etc.).

16. Sea regions

Physical conditions of seas and saline water bodies divided into regions and sub-regions with common characteristics.

17. Bio-geographical regions

Areas of relatively homogeneous ecological conditions with common characteristics.

18. Habitats and biotopes

Geographical areas characterised by specific ecological conditions, processes, structure, and (life support) functions that physically support the organisms that live there. Includes terrestrial and aquatic areas distinguished by geographical, abiotic and biotic features, whether entirely natural or semi-natural.

19. Species distribution

Geographical distribution of occurrence of animal and plant species aggregated by grid, region, administrative unit or other analytical unit.

20. Energy resources

Energy resources including hydrocarbons, hydropower, bio-energy, solar, wind, etc., where relevant including depth/height information on the extent of the resource.

21. Mineral resources

Mineral resources including metal ores, industrial minerals, etc., where relevant including depth/height information on the extent of the resource.

As a conclusion, Ukrainian authorities in charge of the spatial data development cannot ignore this directive for the decisions they have to take.

1.3.3.2. Standards ISO

ISO has already established numerous norms about geospatial information:

- ISO 19103 - Geographic information - Conceptual schema language
- ISO 19106:2004 - Geographic information - Profiles
- ISO 19107:2003 - Geographic information – Spatial Schema
- ISO 19108:2002 - Geographic information – Temporal Schema
- ISO 19109 - Geographic information - Rules for application schema
- ISO 19110 - Geographic information - Methodology for feature cataloguing
- ISO 19111:2003 - Geographic information - Spatial referencing by coordinates
- ISO 19112:2003 - Geographic information - Spatial referencing by geographic identifiers
- EN ISO 19115:2003 - Geographic information - Metadata
- ISO 19117 - Geographic information - Presentation
- ISO DTS 19139 - Geographic information - Metadata - Implementation XML
- prENV 12657 - Geographic information - Description of data - Metadata

The adhesion to WTO supposes to apply ISO norms as condition for fair competition.

2. Key applications of a GIS-Service

2.1. Topography and GIS

Priority must be given to the information necessary to the municipal services. Their modernisation and improvement suppose to have a good knowledge of the facilities and equipments they are in charge of. The typical case is networks (water supply, sewage, heating). As previously said SCADA can only be implemented on mapped networks. It was also said that the relevant services need geo-databases and for the moment, it's not clear how it will be managed. For instance Vodokanal's employees know where the networks are and what their components are. A GIS-Service knows how to create the relevant geographical information: it is the task of topography. But then there are several solutions for the creation and management of the geo-database: Vodokanal can develop it with the topographical elements provided by GIS-Service or GIS-Service can develop it with the technical elements provided by Vodokanal, or a lot of other solutions. In any case it will be a cooperative job.

It remains that GIS-Service will have to establish all the topographical information for all the applications.

The more often the information delivered to the recipients is under the form of drawings with measurements. But it must be clear that there are 2 different tasks:

- Topography is a work (a) on the field to take the measurements and (b) in office to transform the said measurements and create topographical data;
- Drawings are "on-demand" tasks using the topographical data for the production of documents that are needed by somebody or –bodies at a given moment.

GIS-Service will also be equipped with CAD software for civil survey and architecture. It will also be able to measure buildings and constructions and to make drawings of them.

2.2. Geographical Information Systems

Numerous services and administrations can improve their performance with a GIS. But it may be considered that each one will have his GIS, and it's why we wrote "Systems". Still it will always rely on topographical data and geo-databases managed by the GIS-Service and it will be a cooperative job between the GIS-Service and the relevant beneficiaries. We can introduce some typical applications.

2.2.1. Water networks

It's similar for water supply, sewage and district heating. A GIS will facilitate:

- Alert: complemented by a SCADA, the company can get a "real time" sight of the functioning of the network and detect malfunctions and disorders.
- Maintenance:
  - Curative maintenance: the repair service will be more efficient if, before to leave for an operation, they can get all the information about the pipe or the equipments they will find on site.
  - Preventive maintenance: a history of the components of the network allows implementing a policy of preventive replacement of the oldest components.
- Design: any extension or development of a network cannot be designed without a good knowledge of the existing network, and the parallel networks of the "colleagues" (it's better to avoid putting water in the gas!).
- Budget: the previous applications give greatly more accurate information for the preparation of budget and tariffs.

2.2.2. Gas networks

It is similar to the water networks but in the case of a non-municipal company, and often aerial.

2.2.3. Wire networks

Public lighting (municipal), electricity, telephone and cable TV (non municipal) have also to manage networks. The problems and the applications are almost the same as for water networks.

2.2.4. Housing

A lot of tasks of the municipalities are linked to the housing. ZHEK have to maintain the buildings. But also it exists taxes based on the housing (surface, number of inhabitants in the flat or the house, etc.). So it's necessary to develop a common primary geo-database of housing. Then each service will find there the data it needs for its applications. The main interest is to have a unique geo-database with unique good procedures for updating.

2.2.5. Waste management

On the basis of the housing it's possible to determine the theoretical production of SHW building by building. It helps to optimize the rounds of collection. It allows detecting abnormal situations as when a platform stores much more waste than theoretically, indicating by the way that there are organisations or people from outside the city disposing of their waste there.

2.2.6. Emergency situations

In case of disaster, catastrophe, huge accident, the service of emergency situation must have immediate access to all the above mentioned geo-databases.

2.2.7. Cadastre

Cadastre is a typical GIS application with the association of pieces of land (geography) and owners and eventually mortgages, history of property, etc. (databases).

2.2.8. Sanitary Epidemiological Service

The ultimate objective of the improvement of water supply and of sewage is to improve the health of the inhabitants. The works will be spread on several years and will be done district by district, street by street, and even building by building. The monitoring of this policy is done by developing a geo-database of public health linking detailed housing and some diseases representative of the problem of water such as gastroenteritis and so on. Thus the concrete impact of the works on water would be checked by concrete results on health.

2.3. Thematic maps

2.3.1. Tourist maps

All cities dream to develop tourism. The minimum is to publish maps in several languages: Ukrainian, Russian, English: maps of the City, map of remarkable sites, trekking maps, ...

2.3.2. Communication maps

Maps are a very good mean of communication for the implementation of specific strategies. It may concern:

- Environment: state of the natural middles, quality of surface waters;
- Public services: new territorial schemes of health facilities, of schools, etc.
- Transports: new schemes of transport

2.3.3. Study maps

Maps are a good way to:

- Follow up the long time evolution of a situation or a problem, for instance quality of air;
- Evaluate problems such as impact of floods;
- Imagine solution to complex problems in the way that complex data can appear linked together when they are reported on a map.

3. Content and organisation of a GIS-Service

3.1. Task 1: measures on the field

3.1.1. Measurement of land and civil works

Tacis SLD provided topographic GPS equipment. It's made of 2 beacons. For the measurement, one is installed on a tripod and the second one is mobile. The beacons receive the signals of the GPS satellites. So they cannot measure if they are not in a free horizon (no building, no trees, no physical obstacles in the vicinity for the reception of the signals). The accuracy of the measurement improves with the duration of the reception at a position. The one on the tripod is installed for all the duration of the work, so after several hours, its accuracy is decimetric. The two beacons are communicating and the fixed one transmits corrections to the mobile one so its accuracy is also decimetric.

Back to the office, the beacons are downloaded in the computer. The measures are coordinates (longitude, latitude, altitude). These are data. But it's insufficient for their use. The minimum is to define which object they are related to. With time passing, it becomes necessary to remember who measured, when, etc. These are metadata. So all along the measurements, the operator has to note information about what he is doing.

When there are obstacles, it's necessary to use classical methods from 2 points located with the GPS such as decametres, theodolites, etc.

As campaigns of measurement can be done by phases at different periods, it's useful to implement or to define landmarks that will be used as starting point for new undertakings.

3.1.2. Measures of buildings

The measures should be more efficient with light equipment: a laser distance meter and a laser level.

3.1.3. Qualification of the personnel

There are 2 main methods for the establishment of topography. The first one is to define a square net and to measure points by 20 x 20 m, or 50 x 50 m each or other. It is a very long process. The second one is to determine the characteristic points of the relief and measure only these points, according to which the software will determine by mathematics methods all the other points. For this second method (much more efficient, often 5 times faster) the operator must have the skill of comprehension of the terrain. So he must be an experienced topographer (land surveyor).

For a lot of measurements, the topographer needs an assistant without any either peculiar or particular qualification.

3.1.4. Other means

Computer for the downloading of the data and for the recording of the metadata

Car (all terrain such as Lada Niva) to carry the equipment and go on the field

3.2. Task 2: management of topographical data

With time, there will be an accumulation of topographical data.

Some topographical data may be used for several different applications.

So it's necessary to manage the topographical data in aim to:

- easily retrieve data for new questions;
- reuse existing data for new questions;
- update the existing data.

A good solution at the beginning would be to entrust the management of the topographical data to the topographer.

3.3. Task 3: development of geo-databases

A geo-database:

- Is specialized: it describes a topic such as the water supply network, the housing, etc.
- Has a defined structure: each data has a definition, a number of characters (alphabetical or figures), a method of creation (for instance how it is calculated, or for a pipe if the diameter is external, medium, internal)
- Has to be created and updated
- Is used to provide "on-demand" information, meaning that information can be extracted, treated and formalized for particular demands (including routine demands as periodic statistics)
- Is used to provide "on-demand" information under the form of maps
- Is used for "real time" application as administrative tasks (for instance the service of passport can use the geo-database of inhabitants when people come for a new passport)

All these tasks must be managed by somebody. Let's add that in western countries it's more and more usual to give a free access (for agreed people) to geo-databases in view that they request themselves "on demand" information and get directly the result on their own computer, either by internal network or by public network (internet). For Ukrainian cities, it can only be envisaged at a later step.

3.3.1. Creation of geo-databases

Any creation of geo-database will result of the cooperation between the GIS-Service and the involved municipal service or company. Reality may be known only by the people involved. The role of the GIS-Service is to transform the information about the said Reality in data and store them in a geo-database.

The preliminary task is to decide how will be described the reality. For that SLD proposes to define a common description method that can be later generalized all over Ukraine. So the relevant central bodies (State) should be involved in this process of definition.

As everything has to be done, a work programme must be established. SLD proposes that priority should be given to the water networks as: i) it's a preliminary task for the implementation of the SCADA; ii) it avoids the question of the secret of the maps.

3.3.2. Real time applications

In parallel the municipalities will implement databases for the municipal administration within the programme of documents management with the equipments provided by SLD. For the moment we don't know how will be linked the developments of these databases and the geo-databases. Several solutions are possible and they must be assessed. Anyway GIS-Service will be involved and will have a role to play in this process of modernisation.

3.3.3. On-demand information and maps

SLD provided a A0 plotter and a A3/A4 laser Colour printer. But there are not "push button" applications.

Any demand must be accurately defined, and so there has to be a step of dialogue with the user. Then the pertinent information is treated. For maps, a map is the construction of a drawing from selected pertinent data. It's a relatively long task so it's usual to store ready made "map backgrounds" that can be re-used for several applications, for instance by preparing map backgrounds of the city and districts at different scales.

3.3.4. Qualification of the personnel

It's better to recruit somebody educated in architecture, civil works, or construction with skills in computers than a specialist of computers but without skills in land and buildings. It's easy to learn software of databases and the like. It's more difficult to understand what the real problems of the users are.

3.4. Task 4: production of documents

There are "on-demand" documents and publications. The equipments provided by SLD are sized for "on-demand" documents, even if it's 20 or 30 copies of a report for the municipal council. But from time to time it's needed to publish booklets, leaflets, and newspapers, for public awareness. For that, files must be transmitted to the publishers, usually in Adobe (pdf) or Quark X-Press format.

Production of documents is a specific task. It's complementary to the task of production of "on-demand" information. With the development of the service, it will be the task of a specialized employee.

The most convenient is to systematized reports in A3 landscape format. The drawings in A3 show general views and the interesting details. A0 and A0+ are essentially useful for work meetings.

3.4.1. Qualification of the personnel

Ideally when the number of documents will increase, a publication designer must be recruited. Aesthetic of the printed documents is an important added value: it develops some positive attitude of the reader, it costs next to nothing and it should not be neglected.

3.4.2. Other means

It will be useful to arrange for a space in the premises for the production of documents. Out of the plotter and the printer, the minimum is to have a large table where to put and fold A0 drawings, and buy a binder machine.

3.5. Task 5: archiving

This task is too often neglected. First the GIS-Service will have to work on former old maps and drawings. Then, the production of the GIS-Service must be stored but must stay easy to access for some time. So it's necessary to organise the storage of the documents. Physical means are cupboards for A4, A3 formats and for rolls of A0 formats.

3.6. Task 6: management of a website

It can be expected that in the future some elements of the geo-databases will be put at the disposition of the public through internet. It's too early to envisage that. But it's useful to already keep that in mind and to consider during the development of the geo-databases which parts of the information could be shared on public website later on.

4. Cost of a GIS-Service

All amounts are in UAH.

4.1. Investments

Equipment	Task	Provided by SLD	Bought by the City	Total
Office computer	Topography	5 483		5 483
Uninterruptible Power Supply	Topography	252		252
Topographical GPS	Topography	50 185		50 185
Car	Topography		80 000	80 000
Theodolite	Topography		10 000	10 000
Laser level	Topography		3 000	3 000
Small metering equipments	Topography		1 000	1 000
Desk furniture	Topography		2 000	2 000
CAD Station	Geo-databases	41 945		41 945
Uninterruptible Power Supply	Geo-databases	252		252
GIS software	Geo-databases	14 654		14 654
CAD software	Geo-databases	41 945		41 945
Desk furniture	Geo-databases		2 000	2 000
Plotter	Documents	40 231		40 231
Laser Colour Printer	Documents	33 452		33 452
Binder, guillotine	Documents		2 000	2 000
Cupboard for supplies	Documents		2 000	2 000
Table for maps	Documents		3 000	3 000
Cupboards for archives	Archives		10 000	10 000
ADSL Switch	Common	253		253
TOTAL		228 652	115 000	343 652

Electronic equipments have a life length of more than 7 years but progress in that sphere is so fast that they are often obsolete within the 4 first years. So it's realistic to amortize them on 5 years. For furniture, it's usual to amortize them on 10 years.

4.2. Operation

Charges	
Wages	
Topographer	36 000
Assistant	18 000
GIS engineer	36 000
Social funds and taxes on wages	30 000
Total workforce	*120 000*
Consumables and supplies	
Car gas	18 000
Office supplies	12 000
Printer consumables	6 000
Total consumables and supplies	*36 000*
Services	
Office rent	12 000
Phone	12 000
Car maintenance	4 000
Printers maintenance	3 000
Total Services	*31 000*

Taxes	*5 000*
TOTAL	**192 000**

4.3. Incomes

GIS-Service provides services to the municipality and municipal services and companies. It can also provide services to private companies. For private companies, a tariff should be calculated.

For the municipal sphere, there are 2 different principles. One would be to consider that GIS-Service will improve all municipal activities and its functioning cost to be covered by the municipal budget. The other one is to consider that a true service must be bought, meaning that the municipal services and companies should pay when they ask something from the GIS-Service. In that second case a tariff must be calculated.

4.4. Budget

Incomes	**260 700**
Result	0
Operation Charges	**187 000**
Wages	120 000
Consumables and supplies	36 000
Services	31 000
Taxes	**5 000**
Amortization	**68 700**

5. Programme of implementation

5.1. Context

The Administration of the City is in charge of many duties, among them: administration of the population, social services, health, education, housing, conveniences (water, sewage, domestic waste, heating), services (transport, markets, funerals), city frame (lighting, parks), and so on. As a local self-government body, the city has the ambition to favour the economical development.

Everybody can notice that the conjunction of a lack of means and the heritage of an archaic organisation provokes:

- A gap of more than 20 years with Western cities;
- Very long procedures for the each administrative act needed by the inhabitants, and for the economical actors;
- A very big number of employees but with a poor global efficiency.

Today, the modernisation process of a lot of services, and moreover the economical development, are hampered by the lack of drawings, maps, topographical information. It's largely due to 2 factors:

- During the soviet period, if drawings and dossiers of projects were "wishes", the works done were the "availabilities": when comparing today the permitting dossiers and the existing buildings, nothing has been done as it was scheduled.
- During the soviet period, nobody paid attention to the land property, and since independence, there were a lot of other priorities than the delimitation and the registration of the land properties.

Let's add that a lot of topographical materials disappeared with the independence, as they were managed, for some oblasts, by institutes located in Russian cities.

5.2. Stakes

For instance, are already identified:

- Housing and administration of the population: it's necessary to develop a database of the housing, and further a geodatabase;
- Water, sewage, heating: the revamping, and further the extension, of the networks require to develop maps and drawings of the networks, and then to develop a geodatabase of the components of these networks;
- Public lighting: the revamping, and further the extension, of the networks require to develop maps and drawings of the networks, and then to develop a geodatabase of the components of these networks;
- Health: the improvement of the quality of the water consumed by the inhabitants should appear in statistics about diseases linked to water, but the understanding of the situation is only possible on maps and geostatistics;
- Transport and circulation: the rationale of the improvement of the road network should be based on maps and geostatistics;
- Adaptation of the networks of health and education: it can be foreseen only on the base of geostatistics of the population;
- Real estate market: people need delimitation of their land parcel and certification of their property;
- Economical development: entrepreneurs need land and premises for their activity;
- Tourism: circulation maps, thematic maps;
- Municipal property: the city should know what it possesses and what can be sold;
- Tax on land and construction: if such a tax appears, it can only be based on a cadastre;
- Projects of infrastructures: all projects of infrastructures (roads, networks, settlements, industries) should be based on drawings of the existing.

5.3. Objectives

The objectives of the City are:

- To draw detailed cartography and topography of the territory of the City as the basement of any further works;
- To develop a geodatabase of the networks that are the property of the City and that must be modernized for a better service to the population;
- To implement an exhaustive cadastre of the territory of the City;
- To improve the knowledge of the municipal properties;
- To provide to the municipal staff and to the municipal companies staff an easy access to all documents, drawings and maps;
- To develop a GIS allowing each one to analyse particular problems or questions with a geographical approach;
- To publish geostatistics about any question of a common interest.

5.4. Priorities

The detailed cartography and topography of the territory of the City is a relative and not an absolute notion. The level of "detail" is ambiguous as, on one hand, who can decide of this accuracy, and, on the other hand, the accuracy should be fitted with the purpose of the drawn object. At least, it could take several years before to get the detailed topography.

Another approach is to consider that the detailed cartography and topography of the territory of the City is:

- Progressive: it's the synthesis of all other works of topography and cartography;
- Continuous: it is continuously updated and improved;
- Side effect: it doesn't cost anything to take additional points during a task of measure of a particular object, for instance, during the survey of a network, it's possible to take the survey of the road, of the sidewalk, and so on.

It must be paid attention to the fact that the creation of the GIS service supposes training, organisation, development of methods, and so on.

So the priorities are defined as:

- Drawing of the pipes networks (water, sewage, heating) and development of a geodatabase of the networks;
- Management of drawn documents: collection of existing, codification, description, storage, database of contents (on line for the staff), digitalisation, rasterisation, copy and printing;
- Progressive development of a cadastre led in parallel on the survey of municipal properties, on "on demand" surveys for inhabitants and entrepreneurs, and a yearly programme of systematic surveys;
- Development of geostatistics, in particular for yearly reports about municipal services, health, environment, etc.

5.5. Tasks

- Preliminary phase: topography and geodatabase

The GIS service must get acquainted with the tools provided by Tacis SLD and must develop a preliminary organisation of the works.

The staff must learn the functionalities of the software. The concrete support for this apprenticeship is the survey of the networks, including the collection of all existing documents about them.

The GIS service develops its organisation and its methods for these tasks, in particular the joint work with the municipal companies and the other municipal services.

- Second phase: drawn documents management

The expected result is to implement a database of contents on the server of the City Administration.

The tasks are:

- To locate existing documents;
- To negotiate and to agree about the physical storage of the documents, either in GIS with a copy in the service of origin (meaning the service that possesses today the document, or in the service of origin with a copy in GIS.
- To define a codification of the content (key-words);
- To define and to implement the physical storage of the documents;
- To create the structure of the database;
- To collect, sort, identify, describe, store, the documents.

- Third phase: cadastre

Cadastre is a particular application of the two previous phases.

5.6. Logical framework

N°	Tasks	Who	Tools	Key-points
1	**To take points**	Geodesist	Trimble GPS Trimble software Desk computer Laser printer Car	• Preparation of the mission: administrative order, check of the equipment, organisation of the mission, definition of the objects to survey • Implementation of the measures: development of the equipments on the field, registration of the attributes of each point • Withdrawal: tidying and cleaning of equipments • Downloading: transfer of the files, data processing, assembling of points to objects, storage in graphic files, printing, report
2	**Management of graphic files and data**	Geodatabase manager	ArcView CAD station Plotter	• General: definition of topographic layers, procedures of update, archive and backup • Networks databases: definition with the relevant municipal companies of the structure of the databases, procedure of joint work, access to the databases throughout the municipal network • On demand printing: agreement on standard scales, filtering of graphic data and smoothening rules
3	**Map of the City**	Geodatabase	ArcView	• Purchase of land photos (aerial

	(optional)	manager	CAD station Plotter	or satellite) or existing maps • Drawing or graphic file transfer
4	**Inventory of existing documents**	Municipal Administration		• Inquiry in all services, on site visits, rough assessment of the quality of existing documents, physical state of existing documents
5	**Methodology for documents management**	Geodatabase manager		• Procedures of transfer (temporary or definitive) of the documents, organisation of the waiting storage • Structure of the database of content: identification data, key-words, description, summary • Means and organisation: database software, computer, scanner, etc., dedicated staff • Procedure of publication on the municipal network: transfer of data on line or batch, access rights • Procedure of labelling and archiving of the documents • Organisation of "on demand" recovery of drawings: tools (rasterisation software + scanner, graphic software), dedicated staff, format of files
6	**Cadastre**	Geodesist		• Licensing of the geodesist • Tools and equipments for the demarcation (boundary stones or pegs or buried marks) • Links with state regulation • Tariff • Format of delivered official documents

Bibliography

Bibliog. 1 The Law of Ukraine On the Basic Principles for the Development of an Information-Oriented Society in Ukraine for 2007–2015, 06/02/2007

Bibliog. 2 Results of Topographic, Geodesic and Cartographic Activities Carried out in 2005 and the Main Tasks for 2006 (Report of the Head of the State Service of Geodesy, Cartography and Cadastre Mr. Sossi P.I. at the joint meeting of the management and directors of enterprises as of February 21, 2006)

Bibliog. 3 COMPUTER DANGER, press release of CACDS of 22/01/2001

Bibliog. 4 DIRECTIVE 2007/2/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)

Appendices

Appendix 1 List of legal acts about e-government development

(in chronological order)

Date of passing	Registration number	Type	Title
26.03.2008	N° 272	Resolution of the Cabinet of Ministers of Ukraine	"On creating of State Committee on Informatization of Ukraine"
19.03.2008	N° 451-p	Regulation of the Cabinet of Ministers of Ukraine	"On Approving the Action Plan for 2008 Concerning Realization of the Strategy of State Statistics Development for the Period through 2008"
26.09.2007	N° 805-p	Regulation of the Cabinet of Ministers of Ukraine	"On Approving the List of Tasks (Projects) of the National Informatization Program for 2007, Their State Customers and Volume of Financing"
15.08.2007	N° 653-p	Regulation of the Cabinet of Ministers of Ukraine	"On Approving the Action Plan on Implementing the Tasks Envisaged by the Law of Ukraine "On Main Principles of the Development of Information Society in Ukraine for 2007-2015"
09.01.2007	N° 537-V	Law of Ukraine	"On Main Principles of the Development of Information Society in Ukraine for 2007-2015"
08.11.2006	N° 552	Regulation of the Cabinet of Ministers of Ukraine	"On Approving the List of Tasks (Projects) of National Program of Informatization for 2006, their State Customers and Financing Volume"
29.03.2006	N° 373	Resolution of the Cabinet of Ministers of Ukraine	RULES of Information Safety in Information, Telecommunication and Information-Telecommunication Systems
20.10.2005	N° 1497	Decree of the President of Ukraine	"On Top Priority Tasks for Introducing Innovation Information Technologies"
09.08.2005	N° 720	Resolution of the Cabinet of Ministers of Ukraine	"On Approving Rules of Providing and Obtaining Telecommunication Services"
28.10.2004	N° 1454	Resolution of the Cabinet of Ministers of Ukraine	"On Approving the Procedure for Compulsory Transmission of Documentation Information"
28.10.2004	N° 1453	Resolution of the Cabinet of Ministers of Ukraine	"On Approving the Standard Procedure for Electronic Documents Circulation in Executive Authorities"
28.10.2004	N° 1452	Resolution of the Cabinet of Ministers of Ukraine	"On Approving the Procedure of Electronic Digital Signature by Governmental Authorities, Local Authorities, Enterprises, Institutions and Organizations of State Form of Ownership"
28.10.2004	N° 1451	Resolution of the Cabinet of Ministers of Ukraine	"On Approving the Resolution on Central Certifying Body"
13.07.2004	N° 930	Resolution of the Cabinet of Ministers of Ukraine	"On Approving the Procedure for Accreditation of the Key Certification Centre"
26.05.2004	N° 680	Resolution of the Cabinet of Ministers of Ukraine	"On Approving the Procedure for Certification of Availability of the Electronic Document (Electronic Data) on a Fixed Period of Time"
14.04.2004	N° 499	Resolution of the Cabinet of Ministers of Ukraine	"On Amendments to Measures to Implement Tasks, Ensuring from President's Address to Verkhovna Rada of Ukraine "European Choice. Conceptual Grounds of the Strategy of Economic and Social Development of Ukraine for 2002-2011" and "On Internal and External State of Ukraine in 2001"
17.03.2004	N° 326	Resolution of the Cabinet of Ministers of Ukraine	"On Approving the Regulation on the National Register of Electronic Information Recourses"

04.03.2004	N° 253	Resolution of the Cabinet of Ministers of Ukraine	“On Approving the Procedure for Legalization of Computer Programs in Executive Authorities”
31.12.2003	N° 828	Regulation of the Cabinet of Ministers of Ukraine	“On Approving the Conception of Formation of the System of National Electronic Informational Resources”
10.09.2003	N° 1433	Resolution of the Cabinet of Ministers of Ukraine	“On Ratification of the Order of Computer Programs Use in Executive Bodies"
27.03.2003	N° 1347	Resolution of the Cabinet of Ministers of Ukraine	“On Creation of National Preparation Committee on Ukrainian Participation in World Summit on the Information Society”
22.07.2003	N° 447	Resolution of the Cabinet of Ministers of Ukraine	"On Administration of the Domain UA”
17.07.2003	N° 414	Resolution of the Cabinet of Ministers of Ukraine	On Approving the List of Tasks (Projects) of National Program of Informatization, their State Customers and Financing Volume”
17.07.2003	N° 415	Resolution of the Cabinet of Ministers of Ukraine	“On Approving the Plan of Measures to Create Ukrainian Linguistic System in the Internet”
06.06.2003	N° 97	Decree of the State Committee of Connection	“On Approving the Methodology to Define Availability of Budget Programs in Informatization Sphere”
22.05.2003	N° 851	Law of Ukraine	“On Electronic Documents and Electronic Document Circulation”
22.05.2003	N° 852	Law of Ukraine	“On Electronic Digital Signature”
18.05.2003	N° 325	Decree of the President of Ukraine	“On Preparation of Propositions about Providing Publicity and Openness of Activity of Governmental Bodies”
05.05.2003	N° 259	Regulation of the Cabinet of Ministers of Ukraine	“On Approving the Conception of Forming the System of National Electronic Information Resources”
26.04.2003	N° 608	Resolution of the Cabinet of Ministers of Ukraine	“On Procedure for Paying Taxes, Stipulated by the Law of Ukraine “On State Budget of Ukraine on 2003” and Fulfilment of the Tasks (Projects) of the National Program of Informatization, Including Projects of Informatization of Governmental Bodies”
17.03.2003	N° 151-p	Regulation of the Cabinet of Ministers of Ukraine	“On Measures as for Financial and Material-Technical Supply for the State Enterprise “Ukrainian Special Systems”
24.02.2003	N° 208	Resolution of the Cabinet of Ministers of Ukraine	“On Measures as for Creation the Electronic Information System “Electronic Government” Creation”
25.11.2002	N° 327/225	Joint Decree of the State Committee of Connection and Information of Ukraine	“On Approving the Procedure for Information Filling and Technical Supply of a Unified Web-Portal of Executive Authorities and the Procedure for Functioning of Web-Sites of Executive Authorities”
16.11.2002	N° 1772	Resolution of the Cabinet of Ministers of Ukraine	“On Approving the Procedure for Cooperation of Executive Authorities on State Information Recourses Protection in Information and Telecommunication Systems”
11.10.2002	N° 1520	Resolution of the Cabinet of Ministers of Ukraine	“On Approving the State Program for Creation, Development and Provision of Functioning of National System of Confidential Connection”
29.08.2002	N° 1302	Resolution of the Cabinet of Ministers of Ukraine	“On Measures to Ensure Further Openness of the Activity of Executive Power Bodies”
01.08.2002	N° 683	Decree of the President of Ukraine	“On Additional Measures to Ensure Openness in the Activity of State Power Bodies”

25.07.2002	N° 1048	Resolution of the Cabinet of Ministers of Ukraine	"On Approving the Procedure for Examination of the National Program of Informatization and its Certain Tasks (Projects)"
15.05.2002	N° 247	Regulation of the Cabinet of Ministers of Ukraine	"On Approving the Conception of Legalization of Software and Struggle Against its Illegal Use"
12.04.2002	N° 522	Resolution of the Cabinet of Ministers of Ukraine	"On Approving the Procedure for Connection to Global Datacom"
13.03.2002	N° 281	Resolution of the Cabinet of Ministers of Ukraine	"On Some Issues of Information Protection, Provided by the State"
04.01.2002	N° 3	Resolution of the Cabinet of Ministers of Ukraine	"On Procedure for Promulgation in Internet the Information on Executive Bodies Activity"
18.12.2001	N° 1702	Resolution of the Cabinet of Ministers of Ukraine	"On Approving the Procedure for Forming and Implementation of the Branch Program and Informatization Project"
21.02.2001	N° 54	Regulation of the Cabinet of Ministers of Ukraine	"On Approving the State Customers of Regional Programs and Informatization Projects"
31.07.2000	N° 928	Decree of the President of Ukraine	"On Measures as for Development of the National Component of the Global Information Internet and Provision of the Wide Access to this Net in Ukraine"
14.07.2000	N° 887	Decree of the President of Ukraine	"On Improving the Information-Analytical Provision for the President of Ukraine and Executive Authorities"
12.04.2000	N° 644	Resolution of the Cabinet of Ministers of Ukraine	"On Approving the Procedure to Form and Implement Regional Programs and Informatization Project"
26.06.1999	N° 1354	Resolution of the Cabinet of Ministers of Ukraine	"On Ratification the Resolution on the Procedure of Transmission by the Residents of Certain Tasks (Projects) of National Program of Informatization in the Sphere of National Security and Defence of the State"
16.11.1998	N° 1815	Resolution of the Cabinet of Ministers of Ukraine	"On Approving the Procedure for Ratification of Program Products (Software Environment) to Implement National Program of Informatization"
31.08.1998	N° 1352	Resolution of the Cabinet of Ministers of Ukraine	"On Approval the Regulation of Forming and Implementation of the National Program of Informatization "
16.02.1998	N° 160	Resolution of the Cabinet of Ministers of Ukraine	"On Measures to Strengthen Control over Projects Validity of Informatization Activity in Central Executive Authorities"
04.02.1998	N° 76	Law of Ukraine	"On Conception of the National Program of Informatization"
04.02.1998	N° 74	Law of Ukraine	"On National Program of Informatization"

Appendix 2 Law on the Development of an Information-Oriented Society

The Law of Ukraine

On the Basic Principles for the Development of an Information-Oriented Society in Ukraine for 2007–2015

Date of entry into force:

February 6, 2007

The present Law approved the Basic Principles for the Development of an Information-Oriented Society in Ukraine for 2007–2015.

According to the Basic Principles, one of the main priorities for the country shall be the aspiration to build an information-oriented society that is open for everybody and aims at the development where everybody could generate and accumulate information and knowledge, have free access to them, use and exchange them in order to provide a possibility for each individual to fully realize their potential, contributing to social and personal development and raising the quality of life.

The development and the creation of various information and communication technologies (hereinafter referred to as the ICTs) and the general state information and analytical systems give grounds to think that the domestic market of information and communication technologies is at the stage of active formation.

However, this does not comply with the capacities and potential of Ukraine, as the level and the development of the regulatory and legislative basis for the information area is insufficient, while the level of government support for the production of means of computerization, software and applications and the institution of information and communication technologies is low, which does not meet all needs of the country’s economy and the country’s life.

Thus, according to the Basic Principles, the objective for the development of an information-oriented society in Ukraine shall be to contribute to providing each individual with a possibility to create information and knowledge, to use and exchange them, to produce goods and to provide services, fully realizing their potential, raising the quality of their lives and facilitating sustainable development of the country.

The Basic Principles shall be the basis for developing objectives related to the development of an information-oriented society in Ukraine.

The Basic Principles shall identify strategic goals for the development of an information-oriented society in Ukraine. Such goals shall include, in particular:

- accelerating the development and the institution of cutting-edge competitive information and communication technologies into all areas of the country's life, in particular into the economy of Ukraine and into the activity of government bodies and bodies of local government;

- providing for computer and information literacy of the population, primarily by way of creating a system of education oriented towards using cutting-edge information and communication technologies in the formation of a comprehensively developed individual;

- developing the national information infrastructure and integrating it with the global infrastructure;

- providing government support for new "electronic" sectors of the country's economy (trade, the provision of financial and banking services and so on);

- creating national information systems, primarily in the areas of healthcare, education, science, culture, and environmental protection;

- preserving cultural heritage of Ukraine by way of its electronic documentation;

- providing government support for the use of cutting-edge information and communication technologies by the mass media;

- using information and communication technologies to improve public administration, the relations between the state and Ukrainian citizens, establishing electronic forms for the interaction between government bodies and bodies of local government, on the one hand, and private individuals and legal entities, on the other hand;

- achieving effective participation of all regions in the process of establishing an information-oriented society by way of decentralizing and supporting regional and local initiatives;

- protecting information rights of citizens, primarily those related to the accessibility of information, the protection of information about an individual, the support for democratic institutions, and the minimization of the risk of "information inequality";

- improving the legislation on the regulation of information relations;

- improving the state of information security in the environment of using cutting-edge information and communication technologies.

The achievement of the above-mentioned goals shall make it possible:

- to raise the national competitiveness by way of developing the human potential, primarily in highly intellectual areas of labour and also to expand the export potential of Ukraine's industry of information and communication technologies;

- to improve the living standards for the population thanks to economic growth, the support for human rights and freedoms, the provision of equal quality access to information, education, services of healthcare facilities, and administrative services of government bodies and bodies of local government, the creation of new jobs, and the expansion of the employment opportunities for the population, the provision of social protection to vulnerable categories of the population, in particular individuals that need social assistance and social rehabilitation;

- to contribute to the formation of an open democratic society that will guarantee the observance of the constitutional rights of citizens regarding their participation in the country's life, the adoption of the relevant decisions by government bodies and bodies of local government.

According to the Basic Principles, the national policy for information development shall provide for the transition to the priority-driven scientific, technical and innovative development that shall envisage, in particular:

- instituting information and communication technologies into all areas of activity of the society and the state;

- improving the coordination of activities of government bodies and bodies of local government with respect to developing elements of information infrastructure, in particular at the time of building corporate information and analytical systems.

In order to raise the effectiveness of the development of an information-oriented society, it shall be necessary to set up an integral legislation system. The legislation drafted shall be harmonized with the provisions of the international law with respect to the issues of the development of an information-oriented society. Draft laws shall be prepared along with the organization of public debates on such draft laws.

To develop an information-oriented society, it shall be necessary to form a favourable economic environment, namely:

- to raise the competitiveness of the national economy;

- to facilitate business activity in the area of information and communication technologies.

One of the national policy areas in the field of information and communication technologies shall be to provide universal access to telecommunication services and information resources and to increase the number of electronic services.

Special attention in the process of building an information-oriented society shall be paid to advanced development of fundamental and applied research, the development of the domestic programming industry and the infrastructure for the production of information and communication technologies.

The Basic Principles shall identify the organizational and legal foundation for the development of an information-oriented society in Ukraine.

The fulfillment of the main objective of building an information-oriented society shall require:

- providing the maximum support for an increase in public activity and productive utilization of the potential of each individual;
- ensuring ongoing improvement of the system of the organizational and legal support for the development of an information-oriented society;
- concentrating resources of the state on priority objectives of the development of an information-oriented society;
- providing the organizational and legal support for the development of an information-oriented society that is financed and that is not financed by the state;
- creating a favorable regulatory environment for the development of information and communication technologies, including for the development of software, with due consideration for international experience.

To support the implementation of the Basic Principles, the determining importance shall be given to the policy of Ukraine's international cooperation and Ukraine's participation in the development of the global information-oriented society. This cooperation shall be carried out with the aim to coordinate strategies for the development of an information-oriented society and to reduce digital and information inequality.

The implementation of the Basic Principles for the Development of an Information-Oriented Society in Ukraine for 2007–2015 shall make it possible to support positive changes in the activity of the society and an individual.