

УДК: 9.91

*Matchanov Muzaffar, PhD in Geographical Sciences, Associate Professor
e-mail : mmuzaffar@yandex.ru Urgench State University, Urgench, Uzbekistan*

SPATIAL DATA INFRASTRUCTURE IN UZBEKISTAN

ЎЗБЕКСТАНДАГЫ МЕЙКИНДИК МААЛЫМАТТАРДЫН ИНФРАСТРУКТУРАСИ

ИНФРАСТРУКТУРА ПРОСТРАНСТВЕННЫХ ДАННЫХ В УЗБЕКИСТАНЕ

***Abstract:** General overview of spatial data infrastructure (SDI), brief history of SDI or its elements in Uzbekistan, initial period of SDI, National Geographic Information System, creating State Cadaster Unique System (SCUS) of Uzbekistan and its management procedure, main principles of SCUS were described in this article.*

***Key words:** infrastructure, spatial data, National Geographic Information System, State Cadastral System.*

***Аннотация:** Мақалада мейкиндик маалыматтарынын инфраструктурасынын (ММИ) жалпы обзори, ММИнинг же анын Ўзбекистандагы элементтеринин қысқача тарыхы, ММИнинг башталгыч мезгили, Улуттук географиялык маалыматтык системанын иши, Ўзбекистанда Мамлекеттик кадастрдык уникалдуу системаны түзүү жана аны башкаруу процедурасы, Мамлекеттик кадастрдык уникалдуу системанын негизги принциптери каралат.*

***Түйүндүү сөздөр:** инфраструктура, мейкиндик маалыматтар, Улуттук географиялык маалыматтык система, Мамлекеттик кадастрдык система.*

***Аннотация:** В статье рассмотрены обций обзор инфраструктуры пространственных данных (ИПД), краткая история ИПД или ее элементов в Узбекистане, начальный период ИПД, работа Национальной географической информационной системы, создание Государственной кадастровой уникальной системы Узбекистана и процедуры ее управления, основные принципы Государственной кадастровой уникальной системы.*

***Ключевые слова:** инфраструктура, пространственные данные, Национальная географическая информационная система, Государственная кадастровая система.*

1. Introduction

There are several concepts about SDI and almost all of them have same meaning that gathers common principles; standards for developing information, agreements for sharing with each other, policies to use of geospatial data [1]. Spatial data of infrastructure can be determined as an internet based facility that used to search, find, access, and share location specific information and data [2].

SDI is widely used in developed countries as it has more benefit in economic, political and environmental points of view. It has been used under different names but with almost same purposes. Canadian Geospatial Data Infrastructure, The Lithuanian Geographic Information Infrastructure, GIS-based Land Information Network can be shown as examples [3]. Some countries apply joint opportunities to use a common SDI – building issues such as INSPIRE.

Developing countries have not/widely applied SDI due to following reasons:

- Lack of technical resources such as computers, scanners, digitizers etc.
- Low usage level of information communication technologies.
- Insufficient knowledge on using GIS and RS, etc.

Additionally, some political and military reasons have also been influenced wide application of sharing geo-spatial data.

Brief history of SDI or its elements in Uzbekistan

Entire territory of Uzbekistan scientifically was investigated during the Soviet time for resources, and especially agricultural points of view. Topographic/military and other maps with

different scales, and some other geographical atlases were prepared to optimal use of the country resources [4].

Responsible governmental organizations such as the State Geodesy Committee, Land Resources and Cadaster organizations, Tashkent Cartographic factory, designing and architectural organizations and the others shared their geospatial information with official permissions and in paper versions in Soviet time. The scientific, constructional projects and other geospatial information prepared with a high geodetic accuracy, and with unique standards such as accepted coordinating systems, required map scales, common and unique map legend elements, and text, table forms. Only little elements of today's SDI used and their importance were clear, but considered as secure data in that period. Readers can find lots of bibliographic, citation and documentary information related to this section.

Initial period of SDI in Uzbekistan

After independence all spheres of economy in the country faced difficulties of management with following possible reasons:

- Lack of management skills;

- Lack of geo/information related resource and infrastructure for Uzbek citizens.

Therefore, lots of governmental managerial orders, rules and regulations have been accepted since 20 years periods and some of them changed their meaning within a year, when some others were not suitable for real situation. More than 20 years hard experience of the country has shown the importance of geospatial information for controlling the government. Thus, an order of the first president of independent Uzbekistan were developed on 25.09.2013 with number of #PO-2045 about "On measures to implement the investment project "Creating a national geographic information system". There are the other rules and regulations have also been developed to create and use geospatial data since today. According to them Uzbekistan has built close cooperation with South Korea on development a National SDI and the achievements were discussed annual conferences. One of the last conferences Eurasia SDI took place in Tashkent on 12.09.2018 years and National Geographic information System, Joint Platform for SDI and others were discussed [5].

There were some difficulties of National SDI implications such as no data sharing between agencies via network, not any act in National SDI, lack of human resources, lack of standards including metadata, not digitized paper maps before 2010. Saidov (2005) listed a low level of communication channels, difficulties on policy, culture, and some other legal aspects of SDI implementation in Uzbekistan. He recommends establishing a Committee for SDI in the country [6]. Later, National SDI Master Plan in Uzbekistan developed in order to improve SDI in the country and its temporal scope covered 2013-2017 years. This plan proposes two main stages [7]. The first stage included Enactment of Act on National SDI, Creation of Metadata, Securing data sharing within public organizations, Development of standards, Strengthening of Human resources. Expansion of data sharing between governmental organizations, enlargement of human resources, development of spatial data application, fostering spatial data services were involved in the second stage of development.

1. National Geographic Information System (NGIS)

There are 12 complex communication systems and 6 central data base were planned to create in the aim of preparing "E-government" that based on the president order on 27.06.2013 years about "Deep development of National Information and Communication System of the Republic of Uzbekistan". Two of those data base have geospatial characters and so they have prepared by the State Committee of Land Geodesy Cadaster of Uzbekistan. The first central database is NGIS of Uzbekistan.

The objectives of NGIS are:

- Making ready of geospatial data for users on optimal use of natural and economical resources;

- Managing economy and territories of the country;

- using as the main base for improving social life style.

Total cost of NGIS project was estimated about 30 million US dollars and half of this amount would be covered by credit of Korean Eksim bank YeDSF found. The project lifetime was 2013-2017 years. The government has been working with open coordinating systems to share the data and to make it available for public use [8].

2. Creating State Cadaster Unique System of Uzbekistan and its management procedure

State Cadaster Unique System (SCUS) of Uzbekistan is the second central geospatial data base and the cost of this project was estimated about 25 million US dollars. 20 million dollars of that amount was expected to cover by World Bank and this project life time is 2017-2020 years [9]. Nowadays, State Tax Committee has started using geospatial information from SCUS database. The Notarial offices of the country have been testing SCUS data base for issuing ownership rights of person for objects since July 2017 in Tashkent, and all the others regions from 2018 [10].

The State Committee of Land Geodesy Cadaster of Uzbekistan, together with relevant ministries and organizations that manage SCUS data base, controls a presence of objects, creates geospatial information of them, digitize and make digital maps with scales of 1:2000, 1:10000, and 1:25000, develop legend elements, recommendations to use. Until today, more than 1 million 770 thousand parcels and 2 million 715 thousand buildings information inserted to the data base.

According to the rules of SCUS, data base focused to provide with immediate information about territories and rights of properties, and related legal documentations required by juridical and physical persons and state and management organizations [11]. The followings are considered as **the objects of SCUS**:

- Natural resources (Land, water, forest, fossil fuels and etc.).
- Buildings and constructions, transport and engineering communication.
- Geodetic points and the other relevant elements.

The SCUS objects information must be created by unique **standards** and have to be prepared by following organizations as indicated:

-State Land Cadaster information has to be prepared by responsible organizations: regional governmental organization, Land Resources State Committee, The Main Geodesy, cartography and state cadaster department under Ministry Union.

-Water Cadaster information by Hydrometeorology Service Center, State Geology Department, Ministry of Water and Melioration.

-State Forest Cadaster information by State Forest Department.

-Mineral Resources State Cadaster information by State Geology Committee.

-Protected areas Cadaster information by Ecology and environmental protection committee of the republic, and Academy of Science.

-Animals, vegetation and fish Cadaster information by Academy of Science.

-Buildings and construction Cadaster by regional governmental organizations, the main department of UzGeodesCadaster.

-State City Cadaster information by regional governmental organizations, and State Architecture and Construction committee.

Main principles of SCUS

Followings are considered as the main principles of SCUS:

- Covering all territories of the country.
- Accepting central management system.
- Unique technology for preparing and delivering cadaster information.
- Applying unique coordinating system.
- All cadaster information has to be prepared on the base of Land cadaster.
- Applying GIS technologies.
- Quality, integrity, accuracy, completeness, and correctness of information and basements.
- Continuance of updating and filling geospatial information.
- Security of geospatial data and confidentiality for exact purposes.

The Land Resources, Geodesy, Cartography and State Cadaster Committee of the republic accepted the decree about the Information content and their preparation rules for SCUS in

12.09.2014 years. According to this regulation all thematic layer have to be prepared by ArcGIS in *.shp, *.gdb, *.mdb formats. Periodicity of geospatial information for different areas has their agreed and standard time and attributive content [12]. For example, techno-gen disastrous information have to be updated every year in March, animal species information in May, natural disastrous zone information every December. Satellite and all updated areal images, secret topographic maps with different scales and the entire original map have been used to develop base maps of SCUS.

Conclusions

The government of the country began creating geospatial data base for better governance. It is the considerable step for developing national economy and governmental management. However, there are still some difficulties that have not foreseen. They may be followings:

- less qualified specialists on GIS, RS and SDI;
- Not involving resources of relevant universities and Volunteered Geographic Information.

However, there is a blended and innovative course “Spatial Data Infrastructures for environmental protection and disaster risk management” have been preparing by Erasmus+ EPCA project which mainly adopted to build capacity of higher educational systems in Central Asia.

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