

## Republic of Croatia State Geodetic Administration

# COUNTRY REPORT:

# GEOSPATIAL INFORMATION MANAGEMENT IN CROATIA

2019

Document submitted by: State Geodetic Administration Prepared by: Iva Gašparović

#### ABSTRACT

The National Report on Geospatial Information Management in the Republic of Croatia describes the establishment and implementation of the National Spatial Data Infrastructure as well as availability of geospatial information in state institutions which manage geospatial information.

It can be stated that the most important activities related to Geospatial Information Management in the Republic of Croatia, are done under the auspices of the State Geodetic Administration who is also the National Contact Point for INSPIRE in the Republic of Croatia and is responsible for leading the National Spatial Data Infrastructure establishment and INSPIRE implementation.

The main mission of the Croatian National Spatial Data Infrastructure is to develop the infrastructure which provides geospatial information through standardized network services to public authorities, businesses, organizations and citizens. From the establishment of National Spatial Data Infrastructure in Croatia many positive outcomes in relation to development and managing of geospatial information have emerged.

The Report briefly describes the availability of geospatial information the Republic of Croatia through the development of geoportals, network services and many other geospatial applications that are developed to facilitate the use of spatial data to public authorities, citizens and other stakeholders.

The Report also covers the data sharing policies in the Republic of Croatia between public authorities and re-using of data for different purposes.

### SAŽETAK

Nacionalno izvješće o upravljanju prostornim informacijama u Republici Hrvatskoj opisuje uspostavu i provedbu Nacionalne infrastrukture prostornih podataka te dostupnost prostornih informacija u državnim institucijama koje upravljaju prostornim informacijama.

Može se reći da se najvažnije aktivnosti vezane uz upravljanje prostornim informacijama u Republici Hrvatskoj obavljaju pod okriljem Državne geodetske uprave koja je ujedno i Nacionalna kontaktna točka za INSPIRE u Republici Hrvatskoj i odgovorna je za vođenje, uspostavu i provedbu Nacionalne infrastrukture prostornih podataka i implementaciju Direktive INSPIRE.

Glavna misija Nacionalne infrastrukture prostornih podataka u Hrvatskoj je razvoj infrastrukture koja pruža prostorne informacije putem standardiziranih mrežnih usluga javnim tijelima, poduzećima, organizacijama i građanima. Od uspostave Nacionalne infrastrukture prostornih podataka u Hrvatskoj, mnogi pozitivni rezultati u vezi s razvojem i upravljanjem prostornim informacijama pojavili su se ne samo u Državnoj geodetskoj upravi, već i u mnogim drugim državnim institucijama.

Izvješće ukratko opisuje dostupnost prostornih informacija u Republici Hrvatskoj kroz razvoj geoportala, mrežnih usluga i mnogih drugih proizvoda temeljenih na prostornim podacima koji su razvijeni kako bi se tijelima javne vlasti, građanima i drugim subjektima olakšalo korištenje prostornih podataka.

Izvješće također obuhvaća politike dijeljenja podataka u Republici Hrvatskoj između javnih tijela i ponovno korištenje podataka za različite namjene.

## Contents

1	Iı	Introduction1			
2	Т	The N	ational Spatial Data Infrastructure in Croatia	2	
	2.1	Le	gal Framework	2	
	2.2	In	stitutional Framework	3	
	2.3	Na	ational contact point of NSDI; State Geodetic Administration	5	
3	C	Geosp	atial Information availability in Croatia	7	
3.1 Development of geoportals in Croatia			7		
	3	.1.1	NSDI Geoportal	7	
	3	.1.2	SGA Geoportal	9	
	3	.1.3	ENVI geoportal	9	
	3	.1.4	ISPU Geoportal	. 10	
	3	.1.5	ZG Geoportal	. 11	
	3	.1.6	Open Data Portal	. 11	
	3.2	De	evelopment of spatial data applications and services	. 12	
	3	.2.1	Register of Geographical Names	. 12	
	3	.2.2	Land Parcel Identification System	. 13	
	3	.2.3	GeoSTAT <sup>HR</sup> portal	. 13	
	3	.2.4	MIS portal	. 13	
	3	.2.5	One-Stop-Shop (OSS)	. 14	
	3	.2.6	Croatian Positioning System	. 14	
	3	.2.7	System for creating digital geodetic reports (SDGE)	. 15	
	3	.2.8	Katastar.hr	. 15	
	3.3	Da	ata sharing	. 15	
4	References				

## 1 Introduction

Geospatial information have core value in almost all economic and scientific disciplines thus representing the foundation for society's development. By using spatial data there is also growing the awareness on data standardization which will make them easier to use, and ensure that economy can develop faster and more efficiently while the financial savings they make will bring new demands on spatial data.

State administration system often has issues related to availability, quality, organization, availability and sharing of spatial data. Solving these problems requires measures that address standardization, sharing, and spatial data usage. To accelerate spatial data development, Europe has launched Directive 2007/2/EC of the European Parliament and the EU Council from March 14, 2007, establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) that links national spatial data infrastructures. To transpose the directive into Croatian legislation the Law on National Spatial Data Infrastructure (Official Gazette 56/13, 52/18) was adopted by the Croatian Parliament. The Law on National Spatial Data Infrastructure (NSDI) aligns the Croatian legislation with EU legislation regarding NSDI implementation and forms a legislative basis for developing the legal, organizational, technical and other aspects related to NSDI implementation.

The most important activities related to Geospatial Information Management (GIM) in the Republic of Croatia, are done under the auspices of the State Geodetic Administration (SGA). SGA is also the National Contact Point (NCP) for INSPIRE in the Republic of Croatia and is responsible for establishing the National Spatial Data Infrastructure as well as implementation of INSPIRE Directive and the coordination of the NSDI Subject activities.

The past few years in the Republic of Croatia, many geoportals, spatial network services, and different e-service related to spatial data have been developed. The spatial data market has evolved through the establishment and implementation of NSDI.

The Geospatial Information Management in Croatia is reported through the development of NSDI in Croatia, availability of geospatial information and spatial data sharing between state institutions.

## 2 The National Spatial Data Infrastructure in Croatia

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) was implemented on 15 May 2007. It establishes the legal framework for the establishment and operation of a European spatial data infrastructure, which represents a collection of interoperable infrastructures for spatial information of all Member States including Croatia.

NSDI vision in Croatia is: "Everybody can find, understand and use spatial data."

The main mission of NSDI stakeholders is to develop the infrastructure which provides geospatial information through standardized network services to public authorities, businesses, organizations and citizens.

NSDI gives the basis for discovery, viewing and use of spatial data within government bodies, in the economic, non-commercial and public sectors, the academic community and citizens in general. The implementation of the INSPIRE Directive and NSDI is a collection of layered processes in society, which are sometimes not all easily considered; but some of them are: construction of the public sector information, new possibilities for development of services/products and markets, change of administrative-management relations and other.

The development of NSDI has a direct and indirect influence on a number of social relationships; from economic and legal relations to educational relations, influence on social relations and other.

The Croatian NSDI has to be harmonized with the development of European spatial data infrastructure (INSPIRE) and global spatial data infrastructure (GSDI, UN-GGIM), but beside the development at national levels, it has to influence the development of spatial data infrastructures at a local level (URL 1).

### 2.1 Legal Framework

The first legislation concerning the NSDI in Croatia came into force in February 2007. A separate chapter (Chapter V) of the Law on State Survey and Real Estate Cadastre (Official Gazette 16/2007) referred to NSDI and its implementation. The Law provided a definition of the NSDI and referred to obligations related to metadata, data, services and subjects of NSDI. Moreover, it set the institutional framework including the roles and responsibilities of NSDI

bodies. But, the content addressed only a part of the topics introduced in the INSPIRE Directive and did not formally represent the transposition of the INSPIRE Directive.

The Law on National Spatial Data Infrastructure (Official Gazette 56/13) was adopted by the Croatian Parliament in May 2013 and amended it with the Law on Amendments to the Law on National Spatial Data Infrastructure (Official Gazette 52/18) in May 2018. The Law aligns the Croatian legislation with EU legislation regarding NSDI implementation and forms a legislative basis for developing the legal, organizational, technical and other aspects related to NSDI implementation.

Pursuant to the Law on NSDI, the NSDI is defined as 'a set of technologies, measures, standards, implementation rules, services, human resources and other factors necessary for improving the management and sharing of relevant spatial data with the purpose to satisfy the needs at both national and European levels'. In addition, the NSDI includes spatial data resources; metadata system(s); network services and technologies; implementation rules and agreements on spatial data sharing, exchange, access and use; conditions of use; coordination and monitoring mechanisms; processes and procedures; NSDI Geoportal; and human resources. One of the differences between the Law on NSDI and INSPIRE Directive is that the Law on NSDI covers 35 data themes, meanwhile INSPIRE covers 34 data themes. The additional spatial data theme in Croatia is Mine suspected areas.

In September 2017 the government of the Republic of Croatia adopted the Decision on the adoption of the National Spatial Data Infrastructure Strategy 2020 and the Strategic Plan of the National Spatial Data Infrastructure for the period 2017-2020 (Official Gazette 96/17). The adoption of the NSDI Strategy will help all stakeholders, primarily NSDI subjects, to achieve compliance with the INSPIRE Directive. It will further emphasize the centralized access to spatial data of the public bodies through the NSDI geoportal, which will result in greater efficiency of state administration in areas directly or indirectly linked to spatial data. Fulfilment of the strategic goals will increase the number of spatial data present, primarily at the regional and local level, where the largest number of new NSDI subjects are expected.

#### 2.2 Institutional Framework

The Law on NSDI set the institutional framework ensuring that appropriate coordination structures and mechanisms are designated for coordinating, across the different levels of government (Figure 1).

Main bodies of NSDI in Croatia are:

- NSDI Council
- NSDI Board
- NSDI Working Groups.



Figure 1. NSDI coordination structure in Croatia

NSDI Council is the main governing body of NSDI in the Republic of Croatia. It is a body which implements the NSDI within the Republic of Croatia and coordinates the activities of NSDI subjects within the scope and with rights and obligations determined by the Law on NSDI (Official Gazette 56/13, 52/18). Governmental authorities at the level of ministries mainly join this NSDI Council, but also relevant (branch) associations as well as National Contact Point. The Croatian Government appointed first NSDI Council in 2008 and at its 26<sup>th</sup> session on 16 March 2017 adopted a Decision on the appointment of members and the president of the 5<sup>th</sup> NSDI Council assembly. Due to personnel changes, on 23<sup>rd</sup> November 2017 as well as 28<sup>th</sup> March 2019 the Croatian Government has resolved some of the members of the NSDI Council and has appointed new members of the 5<sup>th</sup> NSDI Council assembly.

NSDI Board is a permanent body for NSDI implementing which serves as the coordination link between the NSDI Council and NSDI working groups. The NSDI Board is appointed by the NSDI Council and consists of three representatives from the NSDI Council, three from the NCP, and the heads of NSDI working groups. The NSDI Board is firstly appointed by the Council in 2008. At the operational level, there are NSDI working groups established for the purpose of elaborating certain tasks and obligations within the scope of the NSDI implementation. Heads of workgroups are appointed by the NSDI Council. Members of the workgroups are civil servants, regional, local or public officials, scientists and representatives of professional associations and experts from the private sector. Currently, there are three workgroups, dealing with specialized tasks:

- Workgroup for NSDI technical standards
- Workgroup for NSDI capacity building
- Workgroup for NSDI spatial data.

### 2.3 National contact point of NSDI; State Geodetic Administration

The NSDI Service in the SGA's Central office, acts as the Secretariat of the NSDI Council, coordinates all NSDI bodies and provides technical support. It is also the National Contact Point for INSPIRE in the Republic of Croatia. It is responsible for leading the NSDI implementation and the coordination of the NSDI subject activities within the scope and with rights and obligations determined by the Law on NSDI.

State Geodetic Administration is Croatian national mapping and cadastre agency that deals with administrative and professional tasks in the field of geodesy, cartography, cadastre and photogrammetry. As part of its activity, the SGA also comprises the tasks of the cadastre digitalization, geodetic and spatial systems, official state cartography, geodetic and technical documentation, statistics about the real estate cadastre and administrative units, addresses, utility cadastre, register of buildings, register of geographical names and the state border (URL 2). The SGA is also the National Contact Point of NSDI, the coordination body for the Croatian Spatial Data Infrastructure, and it acts as the Secretariat of the NSDI Council, coordinates all NSDI bodies and provides technical support.

The activities of SGA are regulated by the Law on State Survey and Real Estate Cadastre (Official Gazette 112/18). The objectives of the Law on State Survey and Real Estate Cadastre are to improve the procedures within the administrative areas of real estate cadastre and state surveying, improve the preservation and use of state survey data and real estate cadastre, improve cadastre of infrastructure, establishment of buildings register, improvement of registry of spatial units, ensuring the quality of SGA's spatial data, as well as ensuring more effective planning and implementation of the improvement of the land administration system (cadastre and land registers).

The SGA consists of the Head Office in Zagreb, 20 Regional Cadastral Offices and 92 cadastral branch offices. The total number of employees in the State Geodetic Administration is 1068 (June 2019). The Head Office is divided into Director General Office, Stand-alone Department for Internal Audit and seven sectors:

- Sector for State Survey
- Sector for Real Estate Cadastre
- Sector for Cadastre Programs and Special Registers
- Sector for Spatial Data Infrastructure
- Sector for Financial Operations, Strategic Planning, Procurement and General Affairs
- Sector for Legal Affairs and Human Resources Management
- Sector for Information Communication and Geoinformation System.

## 3 Geospatial Information availability in Croatia

Today, the main focus of public authorities is to develop e-services that help citizens to solve their everyday problems faster, easier and more efficient. Which corresponds to the NSDI vision: 'Help users find, understand and use spatial data.' The vision is realized by developing the infrastructure which provides geospatial information through standardized network services and interoperable data.

## 3.1 Development of geoportals in Croatia

Croatia has evolved to digital society, and many geoportals exist in the public institutions allowing the users to search for spatial data, view and download them.

## 3.1.1 NSDI Geoportal

Based on the Law on NSDI, the NSDI Geoportal (Figure 2) serves as a main point for accessing spatial data sources that are a part of National Spatial Data Infrastructure. The NSDI Geoportal has been developed as the part of the ILAS project and has been published in 2014 by National Contact Point. It is accessible on the following website: http://geoportal.nipp.hr/.



## Figure 2. NSDI Geoportal (URL 3)

Using NSDI Geoportal metadata can be edited and maintained, searched, analysed, viewed and downloaded. An integral part of the geoportal is metadata catalogue as well as the viewer of the spatial data that are accessible through network services. It is based on the open source technology. The main guiding principle in the NSDI Geoportal development was user-friendly

interface for end-users. Metadata are mainly input manually through metadata catalogue but with several institutions which also have metadata catalogues harvesting process is established. In June 2019 NSDI Geoportal had 359 metadata records from which 155 network services that are described from 40 NSDI Subjects (Table 1).

Resource types	Number
Datasets	167
Series	37
View services	95
Download services	54
Discovery services	3
Other services	3

Table 1. Spatial data resources in NSDI Geoportal

NSDI Geoportal consists out of INSPIRE relevant datasets that can be described through one of the INSPIRE spatial data themes and national datasets that are relevant for national purposes and goals. All of the relevant data that can be described through one of the INSPIRE spatial data themes are harvested from the NSDI Geoportal into the INSPIRE geoportal using discovery service. INSPIRE Geoportal shows all INSPIRE related datasets and their network services from Croatian NSDI Geoportal.

SGA annually submits report on monitoring the establishment, maintenance and development of the NSDI to the European Commission. The report consists of a spatial data source whose data are defined by INSPIRE spatial data themes and the corresponding network services. A total of 216 spatial data sources are submitted in the Report for 2018 (88 datasets, 28 series and 100 services) which can be classified into at least one INSPIRE theme. Existence and compliance of metadata is 100% as well as accessibility through national discovery service. The compatibility of datasets/series with INSPIRE specifications for a particular INSPIRE theme is still low, 8.4%. Out of a total of 216 datasets/series, 93 are available through view services (41%) and only 36 through download services (16%). The Report for 2018 included 100 network services (2 discovery services, 64 view services and 34 download services). Out of the total number of services, 4 view services and 14 download services).

#### 3.1.2 SGA Geoportal

The SGA manages the Geoportal (Figure 3) that provides spatial datasets from its jurisdiction, available through discovery and view network services at http://www.geoportal.dgu.hr. The SGA Geoportal became operational in May 2009 and from then it had several redesigns. SGA Geoportal is designed as geospatial portal according to reference architecture of geospatial portals defined by Open GIS consortium (OGC), built on Service Oriented Architecture (SOA) principles and in-line with ISO/OGC standards and INSPIRE directive. The Geoportal offers a metadata-driven catalogue-service for publish-and-find functionality. The catalogue contains metadata descriptions of all resources and allows users and other applications/portals to query and find these resources. The SGA Geoportal provides 'Register of Spatial Units', 'Gazetteer of Geographical Names', 'Digital cadastral plan', 'Digital orthophoto', 'Topographic maps', 'Digital terrain model' and 'Croatian Base Map'. The most used network services are Digital orthophoto, Topographic Map 1: 25 000 and Cadastral parcels and Cadastral municipalities. The view services of the State Geodetic Administration are annually requested more than 10.000.000 times through its Geoportal.



Figure 3. SGA Geoportal (URL 4)

#### 3.1.3 ENVI geoportal

The Ministry of Environmental Protection and Energy maintains the ENVI portal (Figure 4) which includes metadata catalogue. The Ministry manages many environmental data, mostly from Annex III of INSPIRE spatial data themes. The most important datasets are: 'An

ecological network NATURA 2000 RH (NATURA2000)', 'Protected areas of Croatia', 'CORINE land cover', 'Register of dangerous installations', 'Register of reported major disasters', 'Exploitation and exploration fields of mineral resources in Croatia', 'Sea bathing water quality in Croatia' etc. Most of the datasets of Ministry of Environmental Protection and Energy are available through view and download service and are harmonised with INSPIRE implementing rules and specifications. In May 2019 the portal had 67 datasets and 105 network services (URL 5). ENVI portal is automatically connected to NSDI Geoportal and all records are harvested into the NSDI Geoportal.



Figure 4. ENVI portal

## 3.1.4 ISPU Geoportal

The physical planning information system (ISPU) is a geoportal of the Ministry of Construction and Physical Planning which enables citizens with an easy access to information on land use (Figure 5). ISPU is established with the aim of gathering spatial plans of all levels and information on spatial interventions in one place, presenting and making available to all interested parties, including the general public wherever possible. It allows view of spatial data from other sources relevant to spatial planning and land use monitoring as well as facilitating the information obtaining on possibilities of using space and to accelerate the process of issuing building permits (URL 6). The ISPU geoportal is accessible on the following website: https://ispu.mgipu.hr.



Figure 5. ISPU Geoportal

## 3.1.5 ZG Geoportal

The City of Zagreb manages the ZG Geoportal (URL 7) with the following datasets and corresponding view services: 'Digital orthophoto 2012', 'Digital elevation model', 'Digital surface model', Strategic noise map', 'Cadastre of greenery' and many other, providing information on Land cover, Species distribution and Land use. The ZG Geoportal is accessible on the following website: https://geoportal.zagreb.hr. All available datasets and network services from ZG geoportal are also available through NSDI Geoportal.

### 3.1.6 Open Data Portal

The Open Data Portal of the Republic of Croatia is a data node that serves to collect, categorize and distribute open public sector data. It is launched at https://data.gov.hr and implemented by the Ministry of Administration. The Portal consist of spatial datasets as well as all other open public sector data. The goal is to improve the spread of public and open data across a single and central site and to enable the creation of innovative non-commercial and commercial applications that would use this data. It also intends to encourage more intensive cooperation with the private sector, especially in the area of information technology, and stimulate the improvement of electronic public services as well as increase the transparency of public administration (URL 8).

## 3.2 Development of spatial data applications and services

Today, not only public authorities, but also common citizens, require spatial data for their everyday use. Hence, the main focus is on developing e-services and applications that help citizens' accesses spatial datasets faster, easier and more efficient.

#### 3.2.1 Register of Geographical Names

State Geodetic Administration is responsible for establishing and maintaining Register of Geographical Names according to the Law on State Survey and the Real Estate Cadastre (Official Gazette, 112/18).

Currently there are more than 120.000 toponyms of geographic objects in the Register of Geographical Names. The main source of geographical names are official topographic maps issued by the State Geodetic Administration. Topographic maps used as basic input data for the Register are of scales 1: 300 000, 1: 200 000, 1: 25 000 and they cover the entire territory of the Republic of Croatia. Geometry and official names of administrative units are taken from the Register of Spatial Units which is also maintained by the State Geodetic Administration. Other official sources for entering the features names in the register include official documents of various public and other state institutions from their jurisdiction.

Data model of the Register of Geographical Names is fully compliant with the INSPIRE data model for the theme Geographical Names. Data is maintained in geodatabase PostgreSQL with PostGIS extension and published through the OGC WFS service which is open to use with no limitations on public access.

SGA has developed the application for Register of Geographical Names which enables access to database, discovery and view of data (URL 9). There is also option for crowdsourcing, allowing unregistered users to make proposals for new geographical name or changing the existing one through an online user interface of the application.

Dataset Register of Geographic Names is available for viewing and downloading through WMS (Web Map Service) and WFS (Web Feature Service) network services that are INSPIRE compliant and comply to Technical guidelines on Network Services issued by INSPIRE. INSPIRE view and download services are available as open data without any authorization. All information about Register of Geographical Names is available on the following website: http://rgi.dgu.hr/home/.

#### 3.2.2 Land Parcel Identification System

The Land Parcel Identification System in the Republic of Croatia was published under the acronym of "ARKOD" in 2009. ARKOD is a national system of identification of land parcels, or parcels in agricultural use in Croatia and is developed as well as maintained by the Agency for Payments in Agriculture, Fisheries and Rural Development. ARKOD's goal is to provide farmers easier and simpler way of applying for incentives as well as their transparent use (URL 10).

The ARKOD browser is a web application that allows users to easily identify and view ARKOD parcels across the entire territory of the Republic of Croatia. Web application offers the possibility of complex search because apart from the ARKOD parcels, contains spatial data from the State Geodetic Administration: digital orthophoto, digital cadastral plan, and topology map (URL 10). The application can be accessed on the following link: http://www.arkod.hr/.

## 3.2.3 GeoSTAT<sup>HR</sup> portal

GeoSTAT<sup>RH</sup> portal is developed by Croatian Bureau of Statistics (DZS) in 2019 and enables the combination of selected spatial units with the selected statistics, while an interactive approach makes the search and retrieval of data even more user-friendly (URL 11). The GeoSTAT<sup>RH</sup> portal (URL 12) has also a metadata catalogue whose functionality is to find, analyse, and use spatial data sources. The DZS metadata catalogue is supported by the discovery service which serves to find spatial data sets and services. One of the goals of the DZS metadata catalogue is to easily locate, analyse, and share spatial data and increase interoperability between the provider and the spatial data user and its services. DZS metadata catalogue is automatically harvested into the NSDI Geoportal by its discovery service.

#### 3.2.4 MIS portal

The borders of Mines Suspected Area (MSA) are defined at the Croatian Mine Action Centre (CROMAC), Ministry of the Interior using prescribed professional methods. Appropriate markings, mine threats, marked by MSA are used as a basis for all other mining actions with the ultimate objective to secure areas. The CROMAC informs stakeholders about mine suspected areas (URL 13). The MIS portal provides to the public insight into the MSAs in a fast and easy way and can be accessed on https://misportal.hcr.hr.

#### 3.2.5 One-Stop-Shop (OSS)

The Croatian real estate registration and ownership system has multiple tasks, most important of which is the establishment of secure real estate transactions and the protection of the registered ownership rights. The system of real estate registration in the Republic of Croatia is based on two registers – real estate cadastre from State Geodetic Administration and land registers of the Ministry of Justice.

Through the State Geodetic Administration and the Ministry of Justice, the Government of the Republic of Croatia initiated the National Land Registry and Cadastre Planning Program in 2003, within which the Common Land Registry and Cadastre Information System (ZIS) was developed.

The establishment of the ZIS created a unique register of cadastre and land registers in which systems are interconnected and exchange property-related data. Simplified, a unique database and application for managing and maintaining cadastre and land registry data has been established that brings numerous benefits for users. The time needed to access the data and registration is shortened. The citizens can now see in one place the ownership structure of the property and its accommodation in the space as well as numerous other functionalities.

One part of the ZIS is the One-Stop-Shop (OSS) - a unique place to access cadastre and land registry data. The OSS consists of two components: public and private. The public OSS is available to all users and allows searching and view of basic land registry data and basic cadastre analogue and graphical data. The private OSS is only available to registered users and allows more functionalities such as view of data, submitting claims for issuance of public documents, receiving official documents (URL 14).

#### 3.2.6 Croatian Positioning System

Croatian Positioning System (CROPOS) was established in 2008. During more than ten years of operation, it has more than 950 registered companies. CROPOS enables simpler, more efficient and reliable use of GNSS (Global Navigation Satellite System) measurements. The CROPOS system consists of 33 reference GNSS stations at a distance of 70 km to ensure coverage of the entire territory of the Republic of Croatia for the purpose of collecting satellite measurements and calculation of correction parameters. Correction parameters are available to users via mobile Internet (GPRS/GSM).

Main features of CROPOS system are collecting data from 33 reference GNSS stations, exchange of data on reference GNSS stations with neighbouring countries in real time, networking and calculation of real-time correction parameters, distribution of measurement data and correction parameters to users in real time, data distribution to users for post-processing, system monitoring and customer support and 24/7 availability of the system.

From 2013, five permanent GNSS stations CAKO (Čakovec), DUB2 (Dubrovnik), PORE (Poreč), POZE (Požega) and ZADA (Zadar) are included in the EUREF permanent network – EPN. At EPN centres, the quality of the received GNSS observations, availability and consistency of data is controlled on a daily basis (URL 15).

#### 3.2.7 System for creating digital geodetic reports (SDGE)

System for creating digital geodetic reports is an application that provides chartered engineers of geodesy with full support for the preparation of the digital geodetic reports, following the entire process of downloading digital data of the initial state in the GML format, preparation, and production of the geodetic report to its submission for review and validation (URL 16).

#### 3.2.8 Katastar.hr

Portal Katastar.hr – 'Cadastre on the move' has been developed with the aim of further digitization and transparency of public administration and its main goal is to bring the spatial data closer to the citizens and make them accessible in a simple and user friendly way. The portal provides insight into various spatial information based on the current location of the user using the available network services developed by the SGA. The portal is customized for display on mobile devices, and uses user location or address to show information that is of interest to the user such as the cadastral information, closest cadastral office or nearby offices of charted engineers (URL 17).

#### 3.3 Data sharing

The goal of the Republic of Croatia is to share the data between public authorities and to re-use it for different purposes. Although, Croatia hasn't got the open data policy, many datasets can be accessed free of charge with respecting their terms of use.

Data sharing agreements are common among public authorities and they define the terms of use for data that is being shared, therefore reducing the obstacles in data sharing. Geospatial information, as well as other information, is being shared between state authorities without fees or additional charges in order to reduce costs and re-use the collected data and developed products. State Geodetic Administration has 33 active data sharing agreements with 29 different public authorities.

There is also a practice of co-financing major data acquisition projects between two or more institutions that also leads to data sharing and cost reduction. The best example is the creation of Digital orthophoto in Croatia, which is co-financed by two institutions, State Geodetic Administration and Agency for Payments in Agriculture, Fisheries and Rural Development.

Data exchange and sharing are also common among many Croatian public authorities and European Community institutions and bodies.

## 4 References

Official Gazette (2018): Law on State Survey and Real Estate Cadastre, 112/18, Narodne novine d.d., Zagreb.

Official Gazette (2017): National Spatial Data Infrastructure Strategy 2020 and the Strategic Plan of the National Spatial Data Infrastructure for the period 2017-2020, 96/17, Narodne novine d.d., Zagreb.

Official Gazette (2013): Law on National Spatial Data Infrastructure, 56/13, 52/18, Narodne novine d.d., Zagreb.

Websites:

URL 1: National Spatial Data Infrastructure, http://www.nipp.hr/?id=30, 20.5.2019

URL 2: State Geodetic Administration, https://dgu.gov.hr/o-nama/9, 24.5.2019

URL 3: NSDI Geoportal, http://geoportal.nipp.hr/, 3.6.2019

URL 4: SGA Geoportal, http://www.geoportal.dgu.hr, 3.6.2019

URL 5: ENVI portal, http://envi-portal.azo.hr/, 5.6.2019

URL 6: ISPU geoportal, <u>https://ispu.mgipu.hr/</u>, 5.6.2019

URL 7: ZG Geoportal, https://geoportal.zagreb.hr, 3.6.2019

URL 8: Open Data Portal, https://data.gov.hr/, 7.6.2019

URL 9: Register of Geographical Names, http://rgi.dgu.hr/home/, 5.6.2019

URL 10: ARKOD, http://www.arkod.hr/, 24.5.2019

URL 11: Croatian Bureau of Statistics, https://www.dzs.hr/default\_e.htm, 5.6.2019

URL 12: GeoSTAT<sup>RH</sup> portal, https://geostat.dzs.hr/, 5.6.2019

URL 13: CROMAC MIS portal, https://misportal.hcr.hr, 6.6.2019

URL 14: One-Stop-Shop, https://oss.uredjenazemlja.hr/public/index.jsp, 6.6.2019

URL 15: CROPOS, http://www.cropos.hr/, 6.6.2019

URL 16: System for creating digital geodetic reports, https://sdge.dgu.hr/, 7.6.2019

URL 17: Portal Katastar, <u>https://www.katastar.hr/</u>, 7.6.2019