

NATIONAL SPATIAL DATA INFRASTRUCTURE RELATED PROJECTS IN TURKEY

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Land and Land Administration System have an important role for societies in every area, especially for sustainable development. Land related information such as land registry and cadastre has a great importance in human life, while it's known that land is a scarce source too.

A modern Land Administration System is concerned with providing detailed information at the individual land parcel level. It should service the needs of both the individual and the community at large. Benefits arise through its application in guaranteeing of ownership, security of tenure and credit; facilitating efficient land transfers and land markets; supporting management of assets; and providing basic information in processes of physical planning, land development and environmental control. The system, this way, acts as a backbone for society.

General Directorate of Land Registry and Cadastre (GDLRC) is the leader organizations in Turkey on the field of mapping-land registry-cadastre. GDLRC has executed spatial based projects on the way National Spatial Data Infrastructure especially from the beginnings of 2000s. such as; Continuously Operating GPS Reference Stations (TUSAGA-Aktif/CORS_TR), Geo-Metadata Portal (HBB), Orthophoto-Base Map Production and web services (TUCGAP), Completion of Initial Cadastre, Cadastral Renovation Project(TKMP), Land Registry and Cadastre Information System (TAKBIS), Turkish National Spatial Data Infrastructure Project (TNSDI), Ottoman Land Registry Archive Information System (TARBIS).

Directive 2007/2/EC for establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) entered into force on the 15th May 2007. Turkey has taken the important steps in Pre-Accession Term to European Union (EU) although it is not a member state and followed the INSPIRE initiative in its geo-data related projects. This paper presents National Spatial Data Infra Structure (NSDI) related projects in Turkey.

Key words: Cadastre, e-governance, metadata, Orthophoto, CORS, NSDI.

1. INTRODUCTION

The organisational structures for land management differ widely between countries and regions throughout the world, and reflect local cultural and judicial settings. The institutional arrangements may change over time to better support the implementation of land policies and good governance. Within this country context, the land management activities may be described by the three components: Land Policies, Land Information Infrastructures, and Land Administration Infrastructures in support of Sustainable Development.

The need of spatial data as a tool of Land Administration Infrastructures has also been increasing in Turkey as in the world. The spatial data is the basic of Geographic Information Systems (GIS). GIS is a kind of data processing in every field in societies and a component for national data processing policies. Spatial Data Infrastructure (SDI) is the infrastructure for GIS and also its aim is to facilitate the exchange and the share of spatial data and to provide coordination among users. At administration level it is to reach the best results on economical, social and environmental decisions. Its role is to supply active and effective environment on organizational goals for producers and users. SDI accepts the technological support.

Spatial data has an important role on sustainable development and is a required component of e-government. Daily more people want to reach spatial data via Internet . The studies on e-government projects have been going on since 2000's. To benefit from information technologies at national and sustainable development it is needed to create SDI. Cadastre Law (2005) says to create the infrastructure of spatial data. On 16.12.2009 Agreement for Service on Feasibility Research to Establish Turkish National Spatial Data Infrastructure (TNSDI) is signed by TURKSAT A.Ş.

National Spatial Data Infra Structure (NSDI) related projects in Turkey is presented below as a tool for Sustainable Land Administration Infrastructures.

2. BACKGROUND OF THE PROJECT OF NATIONAL SPATIAL DATA INFRASTRUCTURE

In the concept of The Prime Minister's Office Notice dated as 04.12.2003 and numbered as 2003/48, e-government Transformation Turkey Project Short Term Act Plan had came into force. Act47 as "Initial Study for Turkish National Geographic Information System (TNGIS)" had been executed by General Directorate of Land Registry and Cadastre with participation of the different institutions, organizations, universities, private sector, municipalities and presented to T.R. Prime Ministry State Planning Organization after application term. At the end of the study of Act47 a report had been prepared. In this report the geographic information system studies in our country and abroad had been investigated, the detailed analysis for existing situation had been made, the problems and the expectations had been determined, The Application Plan for 2005 had been suggested.

The Application Plan for 2005 had been prepared in the coordination of State Planning Organization (SPO) to avoid waste of time during transition to information society in

our country. And also the aim is to economize the time during the period to prepare the information society strategy document. Thus “e-Transformation Project in Turkey, Act Plan for 2005” came into force on 1st April, 2005 as appendix to High Planning Committee Decision dated on 24th March, 2005. The Act36 is another action article for Act Plan for 2005. It is for “Initial Infrastructure Studies for National Geographic Information Systems in Turkey”. In Act36 the goals are:

- to determine standards for classification data, metadata, production data, storing data, quality and sharing data,
- to prepare National GIS Infrastructure Policy/Strategy Document containing descriptions of communication infrastructure, institutional organization duty and responsibilities.
- To determine legal arrangement requirements.

In the scope of Act36, three commissions were constituted as Table1. The commissions' reports were evaluated on Act36 Intermediate Meeting on 12th October 2005. Immediately following it, Act36 Policy and Strategy (Draft) Document had been prepared. On Act36 Main Meeting dated 28th February 2006 this draft document had been discussed and resulted.

In Act36 Policy and Strategy Document, the following road map (application plan) is determined:

Step1: To make legal arrangements to determine responsible people for TNGIS policies, concept and data.

Step2: To make studies to adapt National Data Exchange Format (NDEF) to ISO 19136 standards using TNGIS Policy and Strategy Document by General Directorate of Land Registry and Cadastre (GDLRC).

Step3: To get ready metadata related to TNGIS by their institutions that they are responsible and to present institutional GIS portals.

Step4: To determine and to determine common standards for geographic data that will be used for TNGIS Administrative Infrastructure.

Step5: To prepare TNGIS data by all related institutions.

Step6: To present TNGIS data on related institutions' portals in the scope of TNGIS legal arrangements.

Commission No	Commission Name	Tasks
1	Standards Commission	To determine TNGIS Pocerure Scope To determine TNGIS Data Scope To determine TNGIS Standards
2	Technical Infrastrucure Commission	To determine TNGIS Comunication Infrastrucure
3	Administrative/Legal Infrastructure Commission	To determine TNGIS Institutional Organization Principles To determine TNGIS Institutional Duty and Responsibility Principles To determine TNGIS Legal Arrangement Requirements

Table1: The commissions under Act36 Studies.

After Act36, National Information Society Strategy and its appendix Act Plan for 2006-2010 came into force on 28th July 2006 to determine policies and steps for information society. In “Act Plan for 2006-2010” there has been an important title “Modernization in Public Management” that aims to develop cooperation and interoperability among public institutions, to decrease resorce waste, to increase productivity during work processes, to develop policy and decision processes based on information and communication technology. In the same Act Plan, Act75 had planned under title MPM. Act75 has projected “Establishing Geographic Information Infrastructure”. In the scope of the action, it is aimed to determine the concept of the geographic data and the standards of data exchange and to create portal that provides sharing the geographic information (<http://www.bilgitoplumu.gov.tr>). Act75 has been replaced in GDLRC budget as RESEARCH PROJECT.

Until today contact units in each institution, execution committee, technical committee and project execution office have been constituted related to Act75 that is under responsibility of GDLRC. On 17-18/12/2008 the procurement document for consultancy services was completed by Technical Committee and presented to Execution Committee. In the Execution Committe the required corrections were made and completed on procurement document in accodance with decisions of Execution Committee. The members of Technical Committee began to sign the last procurement documents on 28/01/2008. The final document was sent to SPO. The directive that determines the contact units and the study principles was accepted by Execution Committee and the directive came into force by publishing on website www.tkgm.gov.tr.

3. TURKISH NATIONAL SPATIAL DATA INFRASTRUCTURE (TNSDI) AND INSPIRE

TNSDI Project aims to reach true and actual geographic information in national standards online incase geographic information users need to made decisions (GDLRC,

2006). In this project INSPIRE (The Infrastructure for Spatial Information in Europe) that will be executed by member countries of European Union is the basic document. INSPIRE Project is formed by 4 (four) phases. The first phase is to create metadata for the spatial datasets and services and to access and to use these. The second phase is to harmonize the spatial data sets and services. The third phase is to develop common geographic data models and to integrate these data sets. The fourth, the last phase is to service seamless geographic datasets which have the different scales and sources in different national and local levels (GDLRC, 2005).

INSPIRE Directive is published on Official Journal dated 25.04.2007 and put into practice. 2009-2013 is the Implementation Period of INSPIRE Directive. The first requirement in directive is metadata, the second one is geodata sets in Annex1, Annex2 and Annex3 and services. Member countries have to create and update metadata geodata sets and services. In Turkey Metadata Portal serves on <http://hbb.tkgm.gov.tr/metadata/> web site to publish and update metadata. Furthermore CORS-TR Project as the first theme “coordinate reference system” in Annex1 and Orthophoto

In Turkey TNGIS infrastructure studies have been going on for along time under responsibility of GDLRC. Now Consultancy Service Procurement on Geographic Information Systems Infrastructure is ready. The qualifications in the consultancy service procurement announcement are listed as following:

1. Investigate and report of Institutional Roles, policies, funding, relations, GIS based objectives and activities of organizations in TR due to preparation of implementation tender documents,
2. Investigate and report of current used software/hardware, network infrastructure, services and securities of relevant institutions,
3. Investigate and report of International works, International Geographic Information Infrastructure and data contents and data standards at sample countries due to develop Geographic Information System Infrastructure at national level,
4. Purchase ISO 191XX standards from TSE and deliver to TKGM in digital form and prepare of a national draft standard in Turkish Language based ISO 191XX (translated standards as a Turkish or original standards as a current situation) and OGC standards, deliver national standards to TKGM after discussion and revision in the workshop,
5. Purpose alternative NSDI Strategies and models to develop CBS-A at national level
6. Prepare feasibility report,
7. Organize first workshop,

8. Prepare tender documents for implementation of NSDI,
9. Consultancy on controlling and acceptance stage during establishment of NSDI,
10. Organize second workshop,
11. Prepare a report which includes legal requirements of institutional geographic data production, data sharing, development and management of NSDI at national level.

After accepting of feasibility report and providing budget by State Planning Organization Implementation stage will be started.

4. THE PROJECTS THAT ARE RELATED TO NATIONAL SPATIAL DATA INFRASTRUCTURE

4.1 Metadata in Implementation Rules in INSPIRE as The First Step

“Metadata Portal for Maps” that is named as “Map Information Bank” is intended to be established by General Directorate of Land Registry and Cadastre (GDLRC). The aim is to Monitor Map Production in Turkey in one way and to prevent duplicate mapping activities. Metadata Portal in Map Production Monitoring Center (MPMC) is based on Articles 103, 104 and 105 in Large Scale Maps and Map Information Production Regulation (LSMMIPR) legally and the duty to establish this metadata portal is referred to GDLRC. Technically MPMC is embedded in Information System for Land Registry and Cadastre (TAKBIS). In this scope a web_based prototype has been developed. All institutions that are related with map production in Turkey are members of this study.

Web interface is designed accordance to the ISO 19115/TC 211 Digital Geographic Information System Standards. MPMC data sets and web services are saved in GIS PORTAL TOOLKIT of ESRI. Users can directly connect ArcIMS Web Service to present geographic data and ArcSDE/SQL Server is used as database. ESRI GIS Portal Toolkit provides technology and service solution for National Spatial Data Infrastructure in Turkey.

In Metadata Portal Project, Metadata User Interface is created for users to register, publish, query and access to the spatial information. It can be said that this national level GIS portal application has many type of functions on Metadata User Interface: Administration functions, online metadata registration functions, query metadata functions. In addition to these Ground Control Points (GCP) Function is developed to search information related to GCP. Metadata and GCPS are integrated with GoogleEarth to provide broad visual capabilities.

4.2 Continuously Operating Reference Stations Project (Coordinate Reference Systems in Annex1)

Within the scope of this project: stationary GPS stations will be established to serve the whole country, operating with Real-Time Kinematic (RTK) functionality, based on the

network concept, and the capability to transform from ED50 datum to ITRFyy datum will be provided. Thus;

- Real-time usage of the system will be possible;
- All users will be able to get service from the centers to be established;
- Service will be provided nation-wide;
- Basis of all geo-information technologies will be constituted; and
- The relationships between ED50 and ITRFyy datums will be provided.

In brief, CORS-TR Project will remove the necessity of ground construction in the field of mapping in our country to great extent; will provide the users with high-tech's convenience and products.

Currently, there exist more than 2000 GPS receivers in the entire country. These GPS users, benefiting from static or RTK (real-time) techniques, are forming their own base stations, and then computing coordinates with the use of rover receivers. In static measurements, depending on the baseline length and applied method, rovers are required to collect data for periods extending from 15 minutes to multiple hours. When using RTK, on the other hand, solution can be acquired up to 5-10 km from the base station. This project will provide the existing and new GPS receivers with the capability to determine coordinates faster, more economical and more accurate than before, thus increasing their efficiency largely. The CORS-TR Network approach will provide the capability to determine static and RTK positions with 1-2 minute intervals, if not down to mere seconds. When using RTK, solution will be provided up to 75 km away from the base station. Points determined with such easy and economical approach can be marked in the field with practical and cheap materials.

The target here is to establish one station in each province, in order to provide a system that will cover the whole country, functioning 24 hours / day, and able to provide the capability of accurate position determination. Thus, with the assistance of this system:

- It will not be necessary to search for leveling benchmarks nor polygons for geodetic measurements or activities of mapping and cadastre;
- For GPS measurements, the necessity for further reference/base stations will be removed, and instead of the current status of having 1-2 bases and few rovers, we will have 1 reference station and tens even hundreds of rovers usable simultaneously; and coordinates will be produced with a single national format and standard.

CORS-TR system will be used in projects of planning, infrastructure, municipality, vehicle tracking, agriculture, forestry, GIS/LIS...etc. This system will be highly beneficial for measuring Ground Control Points necessary for the operations of photogrammetric map production, ortho-rectification, ortho-photo production...etc.

CORS-TR Project has significant implications for GDLRC:

- GDLRC will guarantee great savings in time and cost regarding its geodetic activities. For instance, the budget allocated for the year 2005 for such activities was around 20 millions US Dollars, the majority of which would have been saved had this system been ready.

- GDLRC will be able to conduct its cadastral works in a much better fashion, with higher quality, less cost and faster execution speeds.

GDLRC will be able to acquire the necessary information for TAKBIS to conduct coordinate transformation, and to gather new data.

4.3 Turkish Land Registry And Cadastre Information System-TAKBIS (Cadastral parcels- Annex1)

In our time in which people have great expectations in accomplishing such services, they need correct, reliable, easy and quick accessible land register and cadastral survey information. The importance of the LR&CIS (Land Registry and Cadastre Information System) project is arisen from such a reason.

The project aims to form the basic data of all kinds of projects prepared based on positional map data in the standards of the Geographic Information System ;

- to provide accurate, valid and reliable land information required for land and land related activities and decision markers,
- to transform land register and cadastral survey works and information into a multi purpose land information system to plan, manage and activate the services by the organization in a better, quicker, more reliable and more effective way to ensure that the data given to other institutions and organizations are used more broadly.

The LR&CIS is a parcel-based Land Information System. It contains geometric cadastral information and property information with respect to ownership. It covers all activities carried out in the General Directorate of Land Registry and Cadastre, in Regional Directorates (25),in Land Registry (1003) and Cadastral (325) Offices.

The main objective of TAKBIS is to form the property/ non-property rights and cadastre data on the basis of locality dimensional information. Today, for these kind of services; correct, reliable, easy&fast-to-access land registry and cadastre data are needed. The importance of TAKBIS project for the development of the country originates from this reason. In this wise, it is possible to share the data generated in standard and electronic media to local authorities, about 50 fields and sectors such as transportation, forestry, agriculture, energy, justice, finance in a reliable and updated way.

Turkey has been started to develop and put into applications very large e-government projects. Turkish Land Registry and Cadastre Information system is one of most important part of Turkey.s e-government structure that servers to another state informations systems that has been developing or deploying by other state offices. In near future, system will be deployed to whole Turkey step by step.

There are two main projects which are support TAKBIS. These project are “Agricultural Reform Implementation Project” and “Land Registry And Cadastre Modernization Project”. Detailed information is given below.

4.3.1 Agricultural Reform Implementation Project (ARIP)

The primary development objective of the Agricultural Reform Implementation Project (ARIP) is to help implement the Government's agricultural reform program, which is aimed at dramatically reducing artificial incentives and government subsidies, and substituting a support system that will give agricultural producers and agro-industry incentives to increase productivity in response to real comparative advantage. At the same time, the project is designed to mitigate potential short-term adverse impacts of subsidy removal, and facilitate the transition to efficient production patterns. Aside from promoting allocative efficiency, the reforms to be implemented are necessary for fiscal stabilization. The agricultural policy reforms are supported in part financially by the Bank under the Economic Reform Loan (ERL).

Component A of ARIP is Direct Income Support. This supported the Ministry of Agriculture and Rural Affairs (MARA) to create the National Registry of Farmers (NRF) throughout Turkey, and the General Directorate of Land Registry and Cadastre (TKGM) to try to accelerate completion of the Turkish cadastre (on which the NRF was largely based) through provision of computers, software, and labor services (canvassers, surveyors, etc.). The main areas of focus were the poorer and more remote provinces of eastern Turkey, where land registration activities had always lagged.

Expansion of Land Registration Activities. At the start of the project both the degree of reliable cadastral map/land registration coverage, and the ease of completion of this coverage, were optimistically overestimated. National territorial coverage was estimated at 83%, which was later reduced to 70%, and even much of this proved to be inaccurate. In part, the yawning magnitude of the task paralyzed TKGM, which had to regroup and consider how to tackle the initial systematic cadastral survey of 13,000 villages, when the agency's capacity was only 350-400 villages per year. TKGM faced a 35-year work program if they continued to rely on in-house teams using traditional manual methods. The project has made two important contributions here by pushing reliance on private sector contractors - which was at first time-consuming since the private cadastral surveying industry had to be largely generated from scratch by the tendering process. The project also paved the way for increased reliance on rectified orthophoto mapping - using as a basis maps consisting of amalgamated aerial photographs with distortions removed, a proven technique internationally. Thanks largely to these two breakthroughs, four years later (i.e. since the restructuring of the project) 12,400 of those villages have their cadastral survey and land registration completed, representing an acceleration of initial cadastre and registration work by at least 10 times.

A second factor which made this achievement possible was the decision by the government and TKGM to throw part of the huge revenues from the land administration process into the campaign, thus financing with their own funds about three times the volume of work financed by the loan, but with the same technical specifications, contracting procedures, and approaches. Thus in 19 provinces of eastern Turkey, the large south-central province of Konya, and four provinces in the rest of Turkey (Antalya, Kayseri, Trabzon, and Canakkale), ARIP has financed the survey and registration of 2.9 million parcels of land in 2,300 villages or other units. TKGM has itself funded (with a minor government contribution of US\$ 20 million) 8.5 million

parcels in 8,100 villages, through 392 million Turkish Lira worth of contracts, some of which are still being finished. Remaining villages typically presented security or access problems, or complex cases of villagers farming (sometimes for generations) one-time forest land, still registered officially as such. The total area of land titled was 100,000 km², or 10 million ha, which is larger than many small countries.

This was a remarkable catalytic effect, even considering that US\$ 109 million of loan funds were finally invested. Equally gratifying were the independent survey reports (see section 2.3) showing general satisfaction of beneficiaries, and their strong respect for the professionalism and integrity of TKGM staff. The actual cost of cadastre and registration work was about US\$ 30 per parcel, against an initial estimate of US\$ 44. TKGM has been generating revenues (fees and taxes) of some TL 1.35 billion per annum, of which it was allowed to retain TL 180 million per annum for this effort. Finally, beneficiaries of the ARIP-funded program alone numbered over 400,000 families (2.7 million people), with three times more covered by the self-financed program. A follow-up stand-alone project (Land Registry and Cadastre Modernization Project), aimed largely at technological enhancement, is now underway. This subcomponent was thus both highly successful and sustainable.

4.3.2 Land Registry and Cadastre Modernization Project (TKMP)

Turkey has a long history of protection of property rights. More than 95% of land in Turkey is mapped and registered, and the Turkish Land Registry and Cadastre Agency (TKGM) plans to complete the registration by 2008. Nevertheless, significant improvements are needed to fully modernize the TKGM and bring it to European standards.

While the Turkish Cadastre and Registration system is considered one of the most effective in the region as registration of property transaction is done within one day in many offices, there are still many shortcomings that require to be addressed to ensure that the system modernizes to reach the same service level as in the European countries.

Still, many of the Cadastre and Land Registry offices rely on manual systems, with old documents, some of them dating back to the Ottoman times. The TAKBIS system (the computerized Cadastre and Land Registry Software) runs in only 140 out of the 1000 offices. There are plans to expand the computerization to other offices in the coming years.

The most challenging aspect is that cadastral maps continue to be in a paper format, vary in accuracy and consistency, and are not linked to the national network. This makes it difficult to support E-government applications as cadastre maps serve as a base mapping for many government applications. Furthermore, in many localities maps are out of date and do not correspond with the ground locations and areas, differing sometimes by up to 10 meters. This situation resulted from the varying quality of surveying technologies used in the last 100 years and the lack of required resources and regulatory means to keep the cadastre up to date and to be truly representative of the realities on the ground. Over time, several different geographical coordinate systems for the cadastre have been used in Turkey, ranging from graphical systems 100 years ago,

then local systems, and finally, in the last 20 years, to a national coordinate system. Coordinates are central to digital spatial information systems, and at present, there is no standard system in use for the country's cadastre. This lack of a consistent coordinate system is a critical shortcoming for both developers, spatial analysts and users, and it will take several years to rectify.

The Government of Turkey is aware of the outstanding needs and decided to modernize the cadastre in order to realize the economic and social benefits of up-to-date information for future development. The E-government initiative, of which the cadastre and registration is a central part, is one of key government priorities. The transition from the paper-based to the computerbased land registry and cadastre is aimed at improving customer services, supporting Egovernment initiatives, and making information available to other government and private users.

The digital cadastre information provides the base maps and related information for many Egovernment functions such as municipal services, emergency management, land use planning and development control, postal services, real estate monitoring, utilities management and property taxation. Most countries in Europe, including many of the transition economies, have moved from paper-based to computer-based land registry and cadastre systems. The success of the Turkish transition to a uniform digital environment will require significant efforts to deal with data renovation and updating, building the IT and communications infrastructure in the TKGM central and field offices, and significant human resources development program to upgrade the skills of TKGM staff to operate effectively in the new environment.

The overall goal of the project is to contribute to government agenda to improve quality and effectiveness of public services through spreading and making effective e-government applications. The specific objective of the proposed project is to improve the effectiveness and efficiency of the land registry and cadastre services. This objective will be achieved through:

- renovating and updating cadastre maps to support digital cadastre and land registry information;
- making the digital land registry and cadastre information available to public and private entities
- improving customer services in land registry and cadastre offices
- improving human resources in the TKGM
- developing policies and capacity to introduce in Turkey best international practices in property valuation.

4.4 Orthophoto (Orthoimagery) in Annex2

One of the methods to produce spatial data and spatial data set is Photogrammetry. It is a method to collect true and reliable data fastly. Furthermore it provides visual information wealth after integration of real maps and image of earth surface (Çelik et al, 2005). Because of the huge importance of Digital Orthophotos, studies of National Orthophoto Information System began. Commission of Scientific Research and Coordination under Council of Coordination and Planning of Inter-ministerial Map Works aims to determine production and usage capacities of the institutions and to

determine requirements and cost analysis for Orthophoto Information System (OIS) through existing possibilities. In the view of the commission report the ratio of usage of aerial photos is %17 and the ratio of usage of both aerial photo and satellite image is %52. The ratio of wish to set up OIS is %96.

Digital Camera is purchased by GDLRC for OIS. Furthermore two adjudications, named 1/ 5000 Scale Digital Colour Orthophoto Production Work that contain Adana and Izmir but include Adana, Izmir, Mersin and Manisa were realized on 29.06.2009. These two work area are search and find on metadata portal web site. Orthophotos are one of the requirements in Annex2 in INSPIRE and the metadata of these should be created.

TKGM has already been executed Orthophoto web map service by publishing <http://212.156.70.86/ortofoto> web site. End of this year approximately 250.000 km² orthophoto of Turkey will be available as a web map service. This web map service will be used by the rural offices for the legal infrastructure before cadastral renovation and quality control during the cadastral renovation.

5. CONCLUSION

GDLRC is the fundamental institution especially big scale maps and ownership rights. It has initiated big projects recent years. One of these projects is Map Production Following Center Project (MPFCP) named as Metadata Portal under Land Registry and Cadastre Information System. The other project is CORS-TR Project. They are highly relevant to all public and private establishments and individuals who deal with geographic data. That is why, and since the starting point of the projects, relevant info, idea, and recommendations of our colleagues are highly appreciated.

All these projects for National Spatial Data Infrastructure named as TNGIS Infrastructure project. Turkey has taken the important steps in Pre-Accession Term to European Union (EU) although it is not a member state. General Directorate of Land Registry and Cadastre, one of the leader organizations in Turkey on maps-land registry-cadastre, has executed spatial_based projects on the way Accession to EU. Project for National Geographic Information System Infrastructure (NGISI) is one of the main projects and INSPIRE Directive has been taken as fundamental tool. Many inter_organizations (institutions) meetings had been realized in 2008 as initial studies for NGISI. After counseling adjudication in January 2009 technical studies will start for National Spatial Data Infrastructure (NSDI).

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