

METADATA PORTAL FOR MAPS IN TURKEY

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ABSTRACT:

“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 use used as database. ESRI GIS Portal Toolkit provides technology and service solution for National Spatial Data Infrastructure in Turkey.

1. INTRODUCTION

While knowledge and information has very important roles nowadays spatial data have taken much more valuable part in life. To follow map production and map information in whole country has come into our daily and business life as “portal” which is called as “catalog services. Catalog services are to collect spatial or nonspatial data in different standards and to present them as a service (Akinci ve Cömert, 2007). As Batuk and Emem (2007) say in their paper many country have studied and developed projects to collect metadata in countrywide and to manage them. The aim is to make metadata ready, available and usable. Map Production Monitoring Center (MPMC) Project is the first catalog system, an information system, and geographic information system in Turkey to hold definition information of the maps that are produced by map_related institutions and organizations.

This project is a subproject of Information System for Land Registry and Cadastre (TAKBIS) which started in 2001 and called as a Geographic Information System (GIS).

1.1 Legal Infrastructure of the Project

In fact the foundations of this project have been based on Regulation to Provide and Use Maps and Map Information in 1994. Article 3 of this regulation mentions to provide coordination in production and reproduction of maps and map information and to prevent from unnecessary duplications and expenditures (URL 1). This had been discussed in many different professional conventions and meetings. However because of the lack of legal infrastructure, technical infrastructure and the organization among the institutions this could not be put into practice.

General Directorate of Land Registry and Cadastre (GDLRC) which observes all these problems put on the agenda this

subject to Inter-Ministries Committee on Coordination and Planning about Maps and Map Information and offered as regulation articles. Consequently stronger legal infrastructure is formed with this regulation, Regulation of Production of Large Scale Maps and Map Information (RPLSMMI). RPLSMMI is executed on 15.07.2005. The articles of 103, 104 and 105 have constituted the bases of Map Production Monitoring Center (MPMC) Project.

The last regulation commissions GDLRC to follow large scale maps and map information and to provide coordination among map related institutions. Ministries, public institutions, municipalities have to apply for their projects (completed, continued, planned...) and to register their completed projects by a project number (URL 2).

1.2 Technical Infrastructure of the Project

To be holded, managed and searched the metadata are realized by MPMC Portal. MPMC Portal is a subproject of Information System for Land Registry and Cadastre and it is a GIS portal project.

Metadata services are built on the functionality of ESRI products – ArcGIS ArcCatalog, ArcIMS and ArcSDE. ArcCatalog creates and authorizes metadata and sends to metadata service. ArcIMS hosts the metadata service. ArcSDE is the interface to the relational database that stores metadata document (ESRI, 2002). ArcSDE/SQL Server as GIS database, Arc/IMS as geographic data publisher are used. Metadata publishers document and register dataset and web services in MPMC Metadata Catalog (GIS PORTAL TOOLKIT). Users are connected to this Portal Catalog Services directly. When being realized these functions, the components of Portal Catalog Services, Map Viewer, Tool for Collecting Metadata, Canal Publication are used. Internet Map Publisher is the base

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of the metadata services at the step of software (Şahin ve Bakıcı and Mataracı, 2007).

GIS Portal Toolkit includes better metadata management and access control and integration with ArcGIS Desktop. It organizes services and content by using metadata. Furthermore it is a technology and service solution for Spatial Data Infrastructure (SDI) portals (ESRI Press Release, 2006).

The project is designed within ISO/TC 211 standards. The goal of ISO/TC 211 is to develop a family of international standards that increases the availability, access, integration, and sharing of geographic information. The standardization enables interoperability of geospatially enabled computer systems and ease the establishment of geospatial infrastructures on local, regional and global level. (Radfar, 2007).

1.3 Capacity Building

In terms of capacity building activities, nearly 50 people from 20 institutions and nearly 50 people from 22 Region Directorate of Land Registry and Cadastre all over the country have been trained on MPMC Project Test Studies about online metadata registration and searched since February 2006. Because this is the first, great an important application in Turkey these probable participants were invited to GDLRC meetings to get feedbacks and comments while the application and interface were been developing.

During the test studies and meetings among related institutions and organizations many considerable questions come out. All these questions with their answers are put into place on webpage.

Besides Usage Guideline as a training material is compiled on test application interface both digital and hardcopy format.

2. EXPECTED UTILITIES OF THE METADATA PROJECT FOR MAPS

The number of GIS and metadata users increases because of the technical advancements, web technology, Spatial Data Infrastructure (SDI) initiatives and interoperability. Interoperability is one of the most important principles in metadata implementation. The interoperability is the compatibility two or more systems such that they can exchange information and data. By means of the operability the exchanged information and data can be used without any spatial process (Chan and Zeng, 2006).

An approach to interoperability is through standardization. Standardization contributes to the sustainable development (Radfar, 2007). It goes to full interoperability with Catalog Services by integration of data and metadata.

GIS Portal Toolkit is a technology and service solution for Spatial Data Infrastructure (SDI) portals (ESRI Press Release, 2006). As the initiative of SDI the aim of the metadata project is to encapsulate the technologies, policies, institutional arrangements, financial and human resources that facilitate the availability, access and effective usage of geographic data. The project helps to get spatial information for policy-makers, decision supports, planners and managers, citizens and their organizations.

The project of metadata portal for maps provides effectively access, retrieve and applies data without considerable effort to search map storages. Only by visiting web sites time and cost can be saved to make many different queries, download files, and reconcile different vendor formats. It helps to minimise the duplication and fragmentation of data.

The metadata help in many thematic map areas. Some of these can be considered as the following: Socio-economic sciences, environment, agriculture, food, health, energy, settlement, land reform, land policy. This logic underlines the sustainable development with economic, social and environmental bases (Mengi and Algan, 2003). The linkage between sustainability and information society development is provided with technology tools.

The triangle of economic, social and environmental bases goes to good governance. Good governance with in each country and at the international level is essential for sustainable development (Magel, 2006). To develop updated metadata provides infrastructure to decision-makers and planners for risk maps. It facilitates to decide risk area and accelerate to find risk related map data.

3. FUNCTIONS OF THE PROJECT

To register, to query and to access to the spatial information Metadata User Interface is created for users. It can be said that this national level GIS portal application has two type of functions on Metadata User Interface: Administration functions and online metadata functions. In addition to these Ground Control Points (GCP) Function is developed.

3.1 Administration Functions

Because each institution and each user is responsible for their own metadata to register into GIS portal the rights and responsibilities to register them have exceptional importance.

Institutions' Management Function is to control the institutions and organizations that have the responsibility and rights to register the map related metadata to the portal. On this interface both a new institution can be registered and an institution is searched. When adding a new institution, name short name, telephone number and address are registered.

Users' Management Function is to control the rights of the users who work in their map_related institution. On this interface both a new user can be added and a user is searched. Each user has the authority to register its own institution's metadata. When adding a new user, user name and surname, user id, user password, institution name, address, telephone number, fax number, authority type are filled.

3.2 Metadata Functions

Function for Online Metadata Registration: After user reaches the webpage with his user name and password metadata online form is filled. This form contains Metadata Contents Type, Spatial Boundaries, Metadata Information, Metadata Owner Information, Metadata Distribution Information and Last Step to attach any information file (Figure1). All these steps are mandatory to pass each one. Spatial boundaries are determined by sheet index, coordinate list, choosing on map or selecting on map. Metadata Information that is created according to TC 211

ISO 19115 standards has metadata subject, title, production method, version, published date, process summary, aim to produce, key words, spatial (place) words, projection, scale, data type, data usage limitations ...etc.

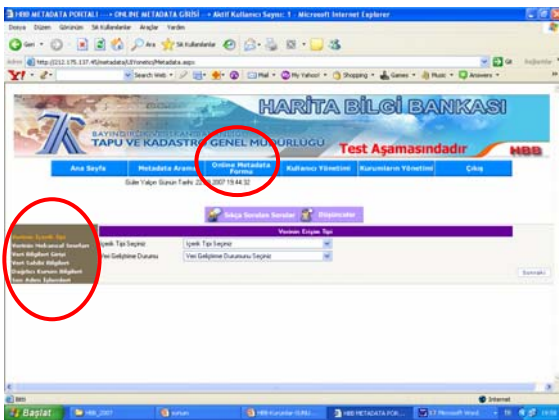


Figure1. Online Metadata Registration.

From Technical Archive to Map Production Monitoring Center: In General Directorate of Land Registry and Cadastre a different interface is designed to register data and to send metadata to MPMC Portal. This Technical Archive Part has cadastral maps, aerial photos, satellite images, orthophotos divisions. Until now nearly 900 “1/5000 scale photogrammetric map production project areas” are registered and have been searched on web. For aerial photos four different pilot areas (Sakarya, Samsun-Sinop, Urfa, İzmir) are selected and the metadata of the photos and their areas are registered on Technical Archive collectively (Figure2) and can be searched by the aim of the test (Figure3).

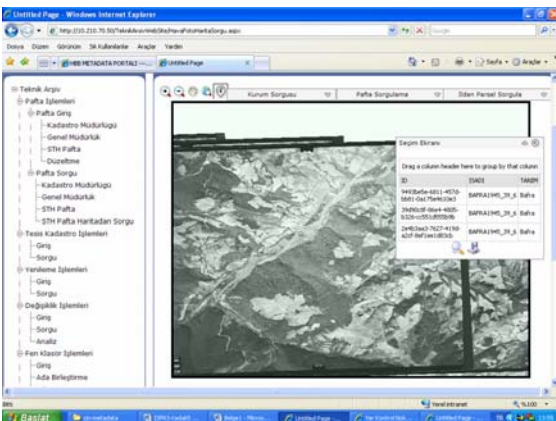


Figure2. Technical Archive.

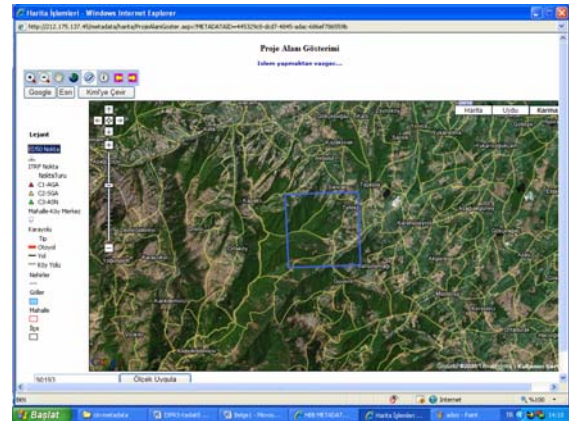


Figure3. To search aerial photos' metadata on MPMC.

Function for Online Metadata Search: This function can be used without any user id and user password. The Simple Search is possible with “What” and “Where” key words. In addition to this The Detailed Search can be done by type of metadata, institution, continuity of the project, project number, and subject with different combinations. The result can be viewed as summary of metadata and project area. The view is integrated with GoogleMap. If the user is a system administrator or institution administrator, the metadata can be deleted, updated, approved or rejected by their functions (Figure4).

In this part one of the most important services is “Search 1/5000 Scale Photogrammetric Maps”. Also 1/5000 scale maps can be searched on MPMC Portal by their producer organization, General Command of Mapping or General Directorate of Land Registry and Cadastre, by the function of “Search 1/5000 Scale Photogrammetric Map production Project Areas”. Therefore photogrammetric sheets can be searched before planning any project.

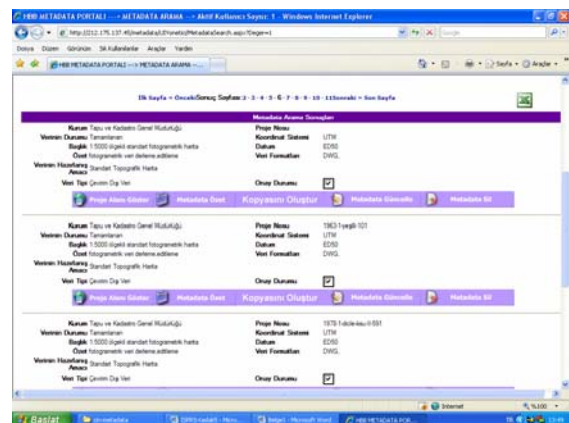


Figure4. The result of Online Metadata Search.

3.3 Ground Control Points (GCP) Function

For this function three steps are formed: Searching GCP Number, Searching Approximate Coordinate, and Approximate Point Analyse. These functions can be used without any password, also with GoogleMaps Integration (Figure5)

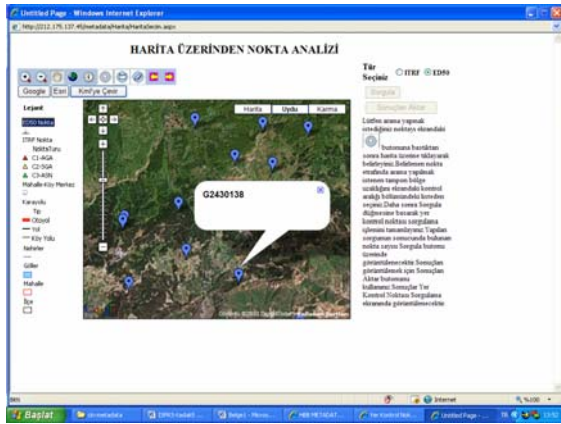


Figure5. GCP Analyzes with GoogleMap Integration.

Searching GCP Number: The aim is to follow the numbers of ground control points with their degrees as C1, C2 and C3 in 1/100 000 scale in the scope of Large Scale Maps and Map Information Production Regulation. It shows the last point number in 1/100 000 scale and it is notified that the last updated time of this information, generally in 24 hours.

Searching Approximate Coordinate: In this part the approximate coordinates of the points which are delivered to the GDLRC Arhieve Department, can be searched by European Datum 1950, ITRF Datum 1996, political boundaries, selecting on map and drawing on map. The results can be provided on view, also with the format .txt, .xls or .doc. (Figure6)

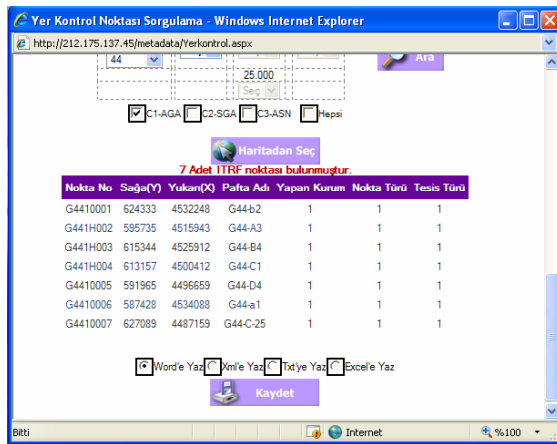


Figure6. Searching Approximate Coordinates, also saving.

Approximate Point Analyse: It is useful for surveying. Before going to the survey land, planned area is investigated in the view of GCP. The regulation determines the distances among C1-C2-C3. Using this function the duplicate GCP within limited area is prevented.

4. CONCLUSION

Geographic Information is increasingly part of the commerce, government and academia world. Administrative and economic decisions are based on spatial information. In recent years GIS development takes metadata into account to save time and money because data expense has the largest part of most GIS

budgets. Metadata supplies a summary for data set and describe thematic content, spatial reference system, quality, type, scale, projection system, etc. It is stored in Extensible Markup Language (XML) format.

Metadata Portal for Maps in Turkey is a opportunity project for different users to have different level of access such as browsing, publishing, administrating.

This project is a key tool for Sustainable Development and a base for Spatial Data Infrastructure.

The metadata project is a fundametal for security issue such as risk management.

This project provides Quality Policies to the customer with good, fast, sound, proper and correct service. It takes care of environmental values (GDLRC, 2007).

In MPMC Project Analyze Report it is considered that country sheet classification indexes, ground control points that are produced by GDLRC or other related institutions, attributes for maps and index information, coordinates on digital maps that are produced by GDLRC or on maps that are subject to the registration, description information for raster data, 1/5000 scale standard topographic maps, in case it is needed the other data about maps (GDLRC, 2005).

- Some of the aims of MPMC Project are;
- To follow map related metadata in different institutions in one-center,
 - To prevent from duplicate map production,
 - To collect large scale spatial data in the concept of Spatial Data Infrastructure,
 - To provide metadata standardization by using TC 211 ISO 19115 standards,
 - To reach true and reliable data on time,
 - To avoid waste of time to search any data in a huge amount of data,
 - To provide necessary information to Decision Support Systems,
 - To provide coordination among different map related institutions,
 - To create an infrastructure for Turkish National Geographic Information System.

The project is still going on the test studies through the mission on Large Scale Maps and Map Information Production Regulation.

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