Policies and Standards for Building Turkey National GIS Infrastructure

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The problem…

- Uncoordinated geo-data management causes time and effort losses in Turkey...

- Geo-data produced by different public institutions should be interoperable for effective use and sharing of geographical data...

- Standard, policy, and technology components are required to manage geo-data sets effectively on electronic communications networks…

- Turkey National GIS action triggered in 2004 aims to build Turkey's National Spatial Data Infrastructure...

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Development process…1

- Public institutions in Turkey started investment for Information and Communication Technologies in the **1990s** especially. They recognized the necessity of GIS in these years.

- Analog maps were commonly converted to digital format and used in some thematic projects. The General Command of Mapping (GCM) pioneered digital map production process. Standard Topographic Maps, smaller than 1:5.000, are digitized by the GCM.

- **In 1999**, Commission for Coordination and Planning Map Services Between Ministries (BHİKPK in Turkish) produced "Turkey National GIS politics and strategy draft" pioneered...

- **In 2000**, National Information System was triggered by the prime ministry. It is aimed that the data within authority and responsibility of public institutions and organizations should be reachable and usable by distributed systems.

1990

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Development process…2

- **In 2003**, a five-years National Development Plan was prepared by the State Planning Organization. In this report, "Map, Land Registry and Cadastre, Geographic Information and Remote Sensing Systems Specialization Commission" determined some aims and visions about Turkish National GIS process.

- **In 2003**, eTurkey initiative, identical to eEurope+, increased efforts to transform the country into an information society. The "e-Transformation Turkey Project" aims to foster the evolution and coordination of information society actions. As an action plan of this initiative, building Turkish National GIS was initiated…

- **In 2004** with the National Action Plan No. 47 the current situation in relation to building Turkey National GIS (TUCBS in Turkish) was examined. However, it has yet to be determined which institutions produce which data and to which standard or scale.

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Development process…3

- **In 2005**, With the National Action Plan No. 36, TUCBS concept and implementation models were determined... It was emphasized that it is necessary to build a National SDI (TUCBS) to efficiently share the geo-data produced by participating public institutions, organizations, companies, and universities...

- **In 2009**, Guide for Interoperability Principles was published, and updated in 2012 within the scope of E-Turkey Project. This aims the interoperability between all institutions to serve geo-data sets in electronic environment to the community. This guide suggests international accepted OGC standards about web services etc…

- **In 2011**, According to Modernization in Public Administration Action Plan No.75, under responsibility of the General Directorate of Land Registry and Cadastre (TKGM); current status, responsible establishments of geo-portal, examples of international projects, and standards were analyzed with feasibility study for TUCBS.

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TRGIS

TURKISH NATIONAL GEOGRAPHICAL INFORMATION SYSTEM

In 2011, the General Directorate of GIS was established within Ministry of Environment and Urbanization. With its power, the general directorate aims to coordinate GIS activities, to produce standards, and to determine main policies and strategies in Turkey.

- General Directorate of GIS started the projects about "Developing Turkey National GIS (TUCBS or TRGIS in English) Standards" and "Developing Turkey Urban GIS standards" (TRKBISS in Turkish) in 2011. These projects carried out by the Istanbul Technical University as a sub-contractor of the TURKSAT Inc.

- TRGIS project's aim is to determine TUCBS framework law and related legislation and to determine geo-data standards for TUCBS geo-portal.

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TRGIS Project working packages…

- **WP.1 TRGIS Portal Analysis:** site selection analysis was done. Cloud computing architectures are analyzed …

- **WP.2 TRGIS Management Model:** National and international SDI initiatives were examined. After examining legal and administrative structure in Turkey; vision, mission and expectations were determined in the context of TRGIS. The steps were defined for implementation strategy..

- **WP.3 TRGIS Data Requirements Analysis:** TRGIS data forms were prepared for data requirement analysis. By visiting stakeholder institutions and workshops, information forms were completed and evaluations were made..

- **WP.4 TRGIS Conceptual Data Model Components:** The general structure of the conceptual data model was examined on the level use of ISO and OGC standards. TRGIS principles, terminology, reference model, the application scheme rules, metadata, and quality components were determined…

- **WP.5 TRGIS Data Standards:** According to the TRGIS Conceptual Model, application schemas and data catalogues of geo-data themes were developed. Feature classes for each data theme were defined. UML/GML application schemas were prepared for 10 base geo-data themes..

- **WP.6 TRGIS Legislation Requirement:** Legislation and implementation rules were examined to manage TRGIS portal, data specification, responsibility of data providers.

- **WP.7 Portal Implementation Rules:** INSPIRE, ISO and OGC criteria, web services, personnel criteria, software / hardware details were examined to build TRGIS portal for the institutions. The portal implementation rules were defined..

- **WP.8 TRGIS Training and Dissemination:** Papers, slides, and case applications were prepared for training experts and developing educational strategies in public institutions.

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TRGIS Geo-data **Themes…**

To develop geo-data standards, use case and requirement analysis were utilized to all stakeholders of National GIS including 15 ministries, 86 general directorates, 88 departments, and 118 branches. As a result of fieldworks, 254 information products as map, application, and product were analyzed..

Requirements and Feature Types were identified, depending on use cases specialized in Data/Function Matrix. In As-is analysis, the existing specifications were determined and used as basis and potential data specification for the relevant data themes…

"TRGIS Annex-I", The Primary Base Geo-Data Themes for Turkey...

- **Address, Building, Cadastre, Administrative Unit, Transportation, Hydrography, Orthophoto, Land Cover, Geodetic Infrastructure, Topography.**

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Slide 1

TRGIS Geo-data **Themes…**

1- TRGIS.AD Address: This theme defines any land or building in terms of geo-location and function. It includes geographic place names. Address identification is expressed with address components and numeric information at local level.

2- TRGIS.BI Building: This theme includes structures on land and water, permanent or temporary, official and private, underground and over ground with their construction. The building within the scope of this theme is the structures for living, housing, working, and other use. And, this theme includes contents required by the users.

3- TRGIS.TK Land Registry & Cadastre: This theme includes land ownership parcels with cadastre and immovable property that is the smallest homogeneous unit refers as spatial. This real estate title deed, registered for goods contains the information for the property and other rights.

4- TRGIS.ID Administrative Unit: Administrative Unit defines administrative boundary areas of management units including central and local administrative units and institutional units. The hierarchy of administrative units is defined compatible to Turkey's administrative structure and regional statistics definitions.

5- TRGIS.UL Transportation: Transportation theme includes road, rail, sea, and air transport networks. This structure provides integrated solutions for the management of transportation data, other transport networks, intersections and network-related data.

6- TRGIS.HI Hydrography: The lake, river, watershed, coastal regions, and features related to hydrography are defined in this theme. Hydrographical data is organized to facilitate interoperability and sharing.

7- TRGIS.AO Land Cover: This theme includes built-up areas, agricultural areas, forests and semi-natural areas, wetlands and water bodies formed in the surface of the wet areas and cover the physical and biological surface.

8- TRGIS.OF Ortophoto: Images taken from satellites and aircraft and other air tools are used as corrected map after eliminating defects.

9- TRGIS.TO Topography: Land, coastal edge and water bodies are defined with heights in digital elevation model. Earth's three-dimensional express is represented with the topography.
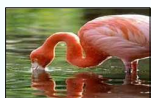
10- TRGIS.JD Geodetic Infrastructure: Reference coordinates and geographical grid systems are covered in geodetic infrastructure data theme..

TRGIS ANNEX - I: "BASE" Geo-Data Themes...

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Slide 2

TRGIS Geo-data **Themes…**

TRGIS ANNEX - II: "THEMATIC" Geo-Data Themes...

TRGIS:YA Restricted / Protected Regions

History / Natural Protected Regions, Specially Protected Environment Area, Military Forbidden Zones, Urban Conservation Areas
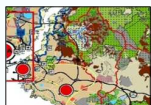
TRGIS:PL Plan Zones

Regional Plan, Environment Plan, the Provincial Environment Plan, Reconstruction Plan

TRGIS:SO Social / Culture

Urban and Rural Settlement, Population Distribution and Demography, Heritage Tourism, Cultural Heritage, Human Health and safety

TRGIS:AL Infrastructure

Drinking water, Sewer System, Communications, Natural Gas, Petroleum Pipeline, Power, Geothermal

TRGIS:DO Natural Resources

Ecosystem Resources, Water Resources, Agriculture and Land Resources, Forest Resources, Fishery Resources, Geological Resources, Renewable Energy Sources

TRGIS:BI Biodiversity

Flora, Biogeographic Regions, Habitat Areas, Animal / plant species distribution

TRGIS:HA Weather / Climate

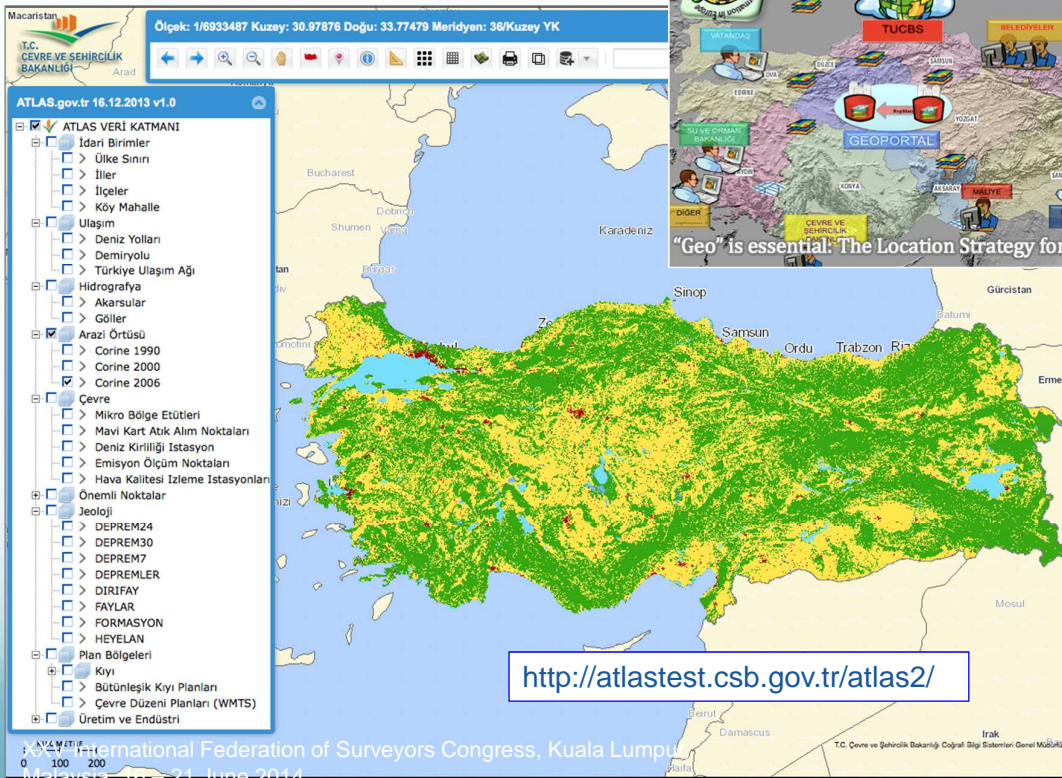Meteorological, air and atmospheric situation, climate zones

TRGIS:JF Geology / Environmental

Geology, Geomorphology, Soil

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TRGIS technical infrastructure…

http://atlastest.csb.gov.tr/atlas2/

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Fundamental Principles of **TRGIS…**

1. Geographic data should be fit for multi-purpose uses - Geographic data might be used in different application areas and industries**.** To produce and use of geographic data standards and production methods should be determined.

2. Metadata data that identifies the geographic data - Geographic data sets with standard Metadata should be defined as the identity, characteristics, location, quality, usage rights, and so on. Many users may reach information.

3. Access to data via Geo-portal becomes available – geo-data can be used in different application areas when needed. Geo-Portal infrastructure and service-based server architecture designed with the SDI must be accessible by users..

4. Presentation of geo-data - The Internet-based interfaces are used out of the traditional presentation of geographical data mapping approaches. Data from different sources should be possible to present the user with various Internet application tools.

5. Geographic distribution services and open access to data - Web services within the authority can be accessible to data and applications. Data distribution and sharing of interoperability can be achieved with a service-oriented architecture**.**

6. Institutional capacity building - The users in different administrative levels should be aware of on the establishment, sustainability, and institutional and legal re-arrangements about Spatial Data Infrastructure (SDI).

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TRGIS Project Legislation Phases...

TRGIS draft legislation was prepared and is about to put into practice. This legislation includes contents like INSPIRE legislation accepted in European countries. Other legislation requirements were also examined. The sections of this legislation include…

- TRGIS vision, aim, scope, and definitions,

- TRGIS administrative structure with units, principles, and duties to coordinate TRGIS activities in Turkey,

- TRGIS base and thematic geo-data themes with definitions,

- Responsibilities of stakeholder institutions,

- TRGIS metadata,

- TRGIS network services with properties and pricing policy,

- TRGIS interoperability principle for sharing geo-data sets and services,

- TRGIS calendar.

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Conclusions...

- …the effective use and sharing of geographical data, which provides various administrative levels, policies, standards and technologies, identification and effective management of electronic communications networks and geo-portal that provide Turkey's National Spatial Data Infrastructure (TRGIS - SDI) is aimed to build.

- …current situation was analyzed and vision, mission, and working steps were determined to build TRGIS. Expectations were indicated about legal, standard, and technical infrastructure of TRGIS initiatives.

- …but no concrete steps had been taken. Since 2011, General Directorate of GIS with its legal force gets a significant role to build and implement TRGIS.

- ..non-coordinated bureaucracy and authorization changes constantly hamper the sustainability of TRGIS progress. Beside capacity building activities, TRGIS require process-based approach in the long term instead of product-based approach in short term.

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Hope to see you in FIG XXVI'2018 Congress in Istanbul, Turkey

Thank you for listening…

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