GIS STANDARDS FOR TURKEY DISASTER INFORMATION SYSTEM

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ABSTRACT

Within the context of TABIS project, a standard database structure for geographic information systems is developed in both local and national levels. All responsible units in both levels have to form their own systems within these standards. This will enable the central government to monitor the whole operational structure and provide synergy and harmony between the operational units by defining information and management system standards. With the ongoing project, a major contribution to Turkey's disaster and emergency plans is aimed.

The initial project for defining these standards started in 2000 and finished in 2002. Since, the standards have been applied in various projects thus, was improved, updated and modified according to the further experience gained from them. The standards can be accessed via an object catalogue called TABIS-OC defining the objects, attributes and relations within the data. It is the first standard on a large scaled disaster in the world and ongoing studies in order to copyright and patent these standards are present. The current version of the object catalogue is TABIS-2007 v2.

This study is about the basic steps on the design process of the TABIS-OC, organization and grouping of the standards, their contents.

Introduction

As all countries, Turkey meets with natural or man-made disasters like earthquake, flood, fire, landslide or terrorizm attacs. These disasters cause many loses in various levels. All kind of damages are being increasing when population and industry increase in the regions disasters occur.

In this project it is aimed constitute a Disaster Information System for generating a base model for Turkey. Main clients in this system are:

- Civilian defence units
- State corporations (governments, municipalities)
- Service industry (banks, insurance companies, engineering companies),
- Research companies,
- NGOs

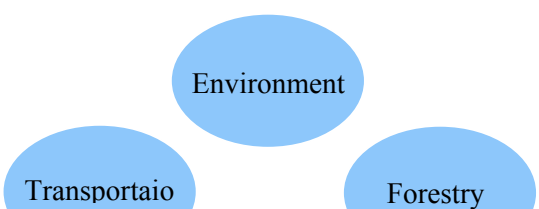

Fig.1. Some Basic Fields for TABİS

The main objective in this project is developing standards for a geographic information system which is designed to support decision makers in means of disaster management and administrations of state units.

Today, technologies designed to obtain data systematically are started to be used in many countries. Data gathered from such a technology "remote sensing" can be updated efficiently and geographic information systems are used to evaluate and analyse these data.

Method

As the project began in the early August of 2001 3 main steps were foreseen to get desired results.

- Preperation of the standards draft
- Evaluation of the draft by the specialists
- Legalisation process

In details, the project is designed as seen in Fig.2.

Step 1a

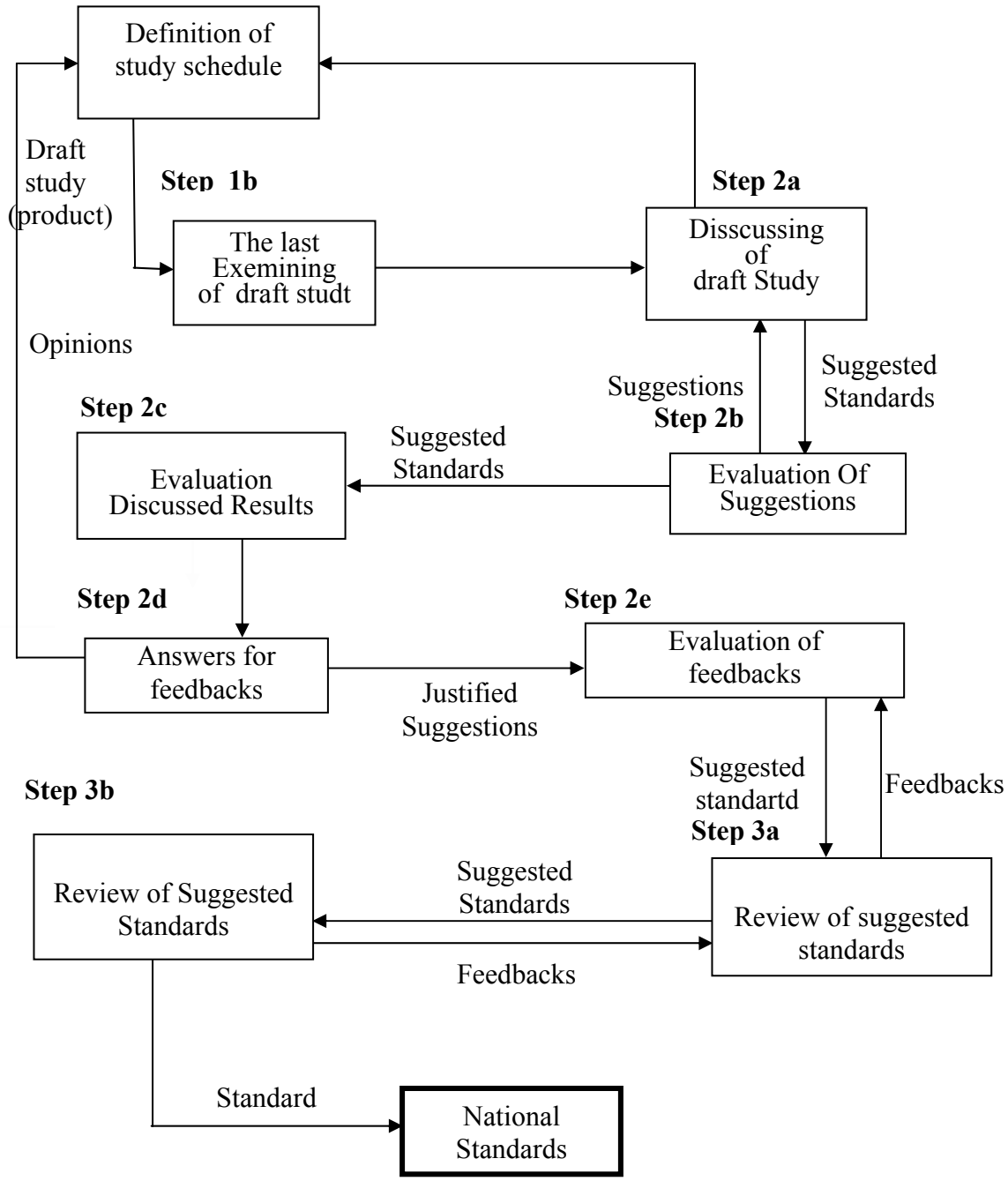

Fig.2. Executive chart of Project

The components of standards for disaster is given as follows:

- Personnel
- Hardware
- Software
- Data exchange standard
- Data collection and updating
- Meta data standard

- General data standad (geometric, semantic and thopological modelling)

Personnel

In this part, the personnel that would work in the disaster management oriented GIS (TABIS – Turkey Disaster Information System) centre are categorised. The duty and the responsibility of the employee are defined and job specifications are explained.

Hardware

Because of the fast improvement in the technology, the hardware equipments for a geographic information system should not be determined with strict rules but instead a more flexible method would be better in means of suiting the changes that can be faced during the project. It must be considered that the technology will improve quite fast.

Software

The software in such a project provides functions like storing and analysing of spatial data, preparation of the end-user products and visualisation. There are lots of various GIS programs to be used. The right product must be selected considering the objective of the project. The most efficient programs include spatial data recording, analysing, visualisation, inquiry, interface and a database management module.

Data Exchange Standards

Data exchange standard is a prerequisite for transferring the data into Geographic Information Systems. There is no special data exchange standard that can be used among countries in the World today. Countries have their own standards for dealing with data exchange.

Spatial data exchange requires the joint agreements in data contents that are to be determined from the parties and it requires using a joint information channel. With this goal, systems should be identified, structured, systematized clearly.

Data Collection and Updating

The base provision of the information systems being succesful is the data updating about spatial and nonspatial data. The data, and data about space are changing everytime and data updating is a continual process and it should be done systematically. In this context, every province has to prepare the specific updating plan for using the data effectively. Cities, for example districts in the cities, can update the spatial and nonspatial data in yearly basis and special attention can be given specific parts of the districts. In this respect, updating period must not exceed for the five years in any district. Simultaneous updating should be done for critical data and it is a obligation to deal with disasters effecitively.

Metadata Standards

The data managed in geographic information systems in any country should be featured and evaluated from the parties who requires these data.

General Data standard

The data which is the basement for the multi purpose disaster management and standards about these data are taken into consideration. Project team recommends the component of the project as “Turkish Disaster Information System-(TABIS)”.

TABIS is a outcome of comprehensive studies in Turkey that have not been done before. TABIS model serves a data model to be used for geographic information systems nationwide.

The first part of the project is the base spatial database for all area of specialization. This product is going to be served for public and private bodies as a common property.

The reference model of the TABiS system constitutes of two vector components.

These components are named as;

- Digital Spatial Model (SMM), and
- Digital Disaster Model (SAFM).

Both digital models form the space by separating it to its components based on object oriented basis. This process is called as atomizing of the space in the database modeling. The atomized data of the both digital models prepared as an object catalog. These catalogs are;

- TABiS-Basic Topographic-Spatial Object Domains Catalog (TABiS-TOK)
- TABiS-Disaster Management Object Domains Catalog (TABiS-AOK)

The aim of the TABiS-TOK is the modeling of the concrete objects which are the characteristic parts of the topography of the region where the system will be constructed. Parallel to this aim, the components of the TABiS-TOK are named as “Basic Topographic-Spatial Object Domains”. TABiS-TOK is also has the quality of being a data standard for the countrywide public and private institutions who want to set up a detailed spatial information system for their own purposes. Because of the object modeling, object definitions, attribute definitions, data types for the attributes and attribute values can be matched with analog topographic map contents, a disaster management based GIS which is constituted convenient to the TABiS-TOK model can work totally harmoniously with the other GISs of the same region. Even if the aims of the systems are different.

Conclusion

Consequently, a geographic information system that set up as TABIS-TOK modeling in any district can be used from the other systems easily. In this context, it is clear that exchange standards and copyrights should be determined and implemented. With TABIS-TOK, the big

gap in spatial modeling will almost be closed. On the other hand, with these standards, the big issues for the instutions who require the proper data and are trying to set up an information system will be solved. Thus, homogenity between systems is going to be done by this nonhomogenity (geometrical and semantic accuracy, currency, and consistency) removed.

Especially after 1999 Marmara earthquake and then Düzce earthquake, design of a new disaster management system that will cover the needs of the social, economic and administrative structure which is currently used in Turkey has come up as a mandatory situation.

In this aspect there is a great need of the constitution of GIS and administration standards which will be used as a base system for reducing the damages of the disasters and planning, organisation and control of disaster management.

ITU has been a pioneer in Turkey with its experienced scientists and young researchers in means of creating policies and actions against disasters. An important step in this role has been the cooperation of ITU and FEMA (Federal Emergency Management Agency (U.S)) including the subjects like emergency education, disaster management and disaster response plans.

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He was born in Malatya in 1964. He is graduated from ITU-Geodesy and Photogrammetry Engineering Department, then took his MsC degree in 1992, and took PhD degree in 1998. He has been an assistant professor in Surveying Tecniques Division since 2000. He is interested in GPS, GIS, Mobile GIS, Emergency Planning, and software development.