

NATIONAL REPORT OF TURKEY ON PHOTOGRAMMETRY AND REMOTE SENSING 1996-2000

Turkish National Society for Photogrammetry and Remote Sensing

KEY WORDS: Photogrammetry, Production, Education

ABSTRACT

National Report comprises activities and organizations related to the photogrammetry and remote sensing in the period of 1996-2000. To prepare that report, a questionnaire was sent to the all relating organizations and universities. Also, meetings and symposiums are included in that report.

1. INTRODUCTION

Nowadays, some of the most important duties of governments are to keep inventory of natural sources, to find out new sources and to protect the environment. Various scales maps and geographic information play an important role as background for every kind of investment relating to land. Parallel to the increasing investments in infrastructure, the requirements for updated and reliable geographic information in our country also grow. Data acquisition methods of photogrammetry and remote sensing for geographic information systems and for revision are assumed to be highly eligible methods concerning their productivity, reliability and velocity.

Rapid developments in the field of photogrammetry and remote sensing have also been applied in practical applications and many projects comprising new technology have been carried out by the private and public sector in Turkey.

2. TECHNICAL ACTIVITIES

Turkey is a country which has applications in photogrammetry since many years. The photogrammetric works initiated for the first time with terrestrial methods in 1927 have later been transferred into aerial photogrammetry which at first started in an experimental way and then in 1937 adapted and put in to application as the official production method.

Map required areas at 1/5000 scale determined by State Planning Organization is 500.000 km². 1/5000 scale maps were carried out in approximately 455.000 square kilometer area by photogrammetric methods.

In 1987, some articles of the related regulations were changed. By the force of new regulation photogrammetric map production by private sector became possible. After that time numbers of photogrammetric companies established and one of them is almost one of the the biggest in Europe and Middle East.

Large scale mapping activities are undertaken by using aerial photographs. High accuracy and efficiency can be obtained using analytical or digital photogrammetric methods. Terrestrial works have to be done only surveying the ground control points. Using the global positioning system

(GPS) for navigation of the airplane can minimize the costs for ground survey drastically. In urban areas for production of 1/1000 scale maps, aerial photographs are taken at 1/4000, in rural areas for production of 1/5000 scale maps, 1/16000 scale aerial photographs are used. Because of the flexibility, low cost and enough accuracy, digital photogrammetric orthophoto production has become most popular map production technique, and nowadays large scale orthophotos (1/1000-1/5000) of some of the big provinces in Turkey have already been completed. Applications of photogrammetric works are generally carried out by the private companies and by some public organizations.

General Command of Mapping is in charge of 1/25000 and smaller scale map production. Production of 1/25.000 scale maps of Turkey consisting of 5558 sheets were completed by means of photogrammetric methods in 1972. The first revision of the 1/25.000 scale maps have been completed in 1999. In more populated, intensive and important industrial areas, second and third revisions have also been carried out with an additional objective to create digital topographic database by General Command of Mapping. These topographic products are used by numerous civil organizations as a multi-purpose source of information.

Over the last two decades, new capabilities for data collection and processing, together with the expanding requirements of users, have directed attention to need for improved land information strategies. Such strategies are concerned with the effective organization of resources in order to achieve a set of objectives. These objectives may include improvements.

In this concept, establishment of land registration and cadastre information system in Turkey (TAKBİS Project) has been presented in October 1990. The project has been included in the 6th five year development plan of Turkey.

In June 1994, General Command of Mapping has commenced the Turkish National Geographic Information System (TUNGIS) Project. This project has almost been completed.

Ankara, Istanbul, izmir, Bursa, Aydın, Diyarbakır, Alanya municipalities have an urban information projects. As a first step, digital mapping have already been completed and all they are now in implementation phase of LIS.

Some state organizations, namely, General Directorate of Forestry, State Property Organization, South-East Anatolia Investment Organization (GAP) has their own LIS project for their own purposes.

After the 17th August and 12th November 1999 earthquakes, new map production is required on the Marmara Earthquake Region as a tool for reconstruction and development. For this reason, 800 sheets of 1/5000 scaled digital orthophoto and hundreds of 1/1000 scale digital maps have been produced. All those maps are going to be used in MERLIS (Marmara Earthquake Region Land Information System) Project which also includes Cadastre Renovation and Land Management Component. Also, another study which was carried out by the department of photogrammetry division of Istanbul Technical University was about earthquakes revealed problems in the process of documenting and analyzing the building damage, as they demanded much effort in terms of time and manpower. The aim of this study is to make an improvement using the combination of GIS as a management and data analysis tool and Photogrammetry as a documentation method. Photogrammetric data acquisition has achieved using a CCD-Camera. A digital photogrammetric software package (PICTRAN by Technet) and a GIS software package (Arc View by ESRI) have

been used. This is a common Project with the Stuttgart University and supported by the Volkswagen Foundation.

3. EVALUATION OF THE PHOTOGRAMMETRY AND REMOTE SENSING ACTIVITIES

Evaluations are summarized in the following tables:

1. group: represents the public sector and municipalities
2. group: represents the universities
3. group: represents the private sector.

Table-1: Activities in the field of photogrammetry and remote sensing

IMPLEMENTED ACTIVITIES	1.GROUP	2.GROUP	3.GROUP	TOTAL
POINT TRANSFER	4	2	0	6
POINT MEASUREMENT	5	2	3	10
BLOCK ADJUSTMENT	5	2	3	10
DTM PRODUCTION	7	6	4	17
ANALOG MAPPING	7	7	4	18
DIGITAL MAPPING	9	8	4	21
GIS LAYER DATA PRODUCTION	9	7	4	20
ENHANCED SATELLITE IMAGERY	5	5	2	12
ORTHOPHOTO PRODUCTION	3	2	3	8
ANAGLYPH MAPPING	1	0	0	1
AERIAL PHOTOGRAPHY	2	3	2	7
TERRESTRIAL PHOTOGRAMMETRY	3	2	1	6
(*) Number of organisations	60	46	30	136

Table-2: Source material used in photogrammetrical activities

TYPE OF SOURCE MATERIAL	1.GROUP	2.GROUP	3.GROUP	TOTAL
SATELLITE IMAGES SPOT	5	4	2	11
LANDSAT	4	8	2	14
ERS	1	0	0	1
IRS	0	1	1	2
KFA 1000	0	0	1	1
METEOSAT	0	0	0	0
JERS	1	0	0	1
RADARSAT	0	0	2	2
NOAA	0	2	0	2
SIR	0	0	0	0
KVR 1000	1	0	2	3
RESURS	0	0	0	0
TOPEX POSEIDON	0	1	0	1
AERIAL PHOTOGRAPHS BLACK-WHITE	8	4	3	15
COLOUR	1	2	1	4
(**) Number of organisations uses those materials	21	22	14	57

As it is presented in table-2, black and white aerial photographs, Landsat and Spot images are used as source material in production and evaluation by means of photogrammetry and remote sensing.

It can be realised that there are some limitations to accessing the data produced by universities and private sector, on the contrary to the expected limitations of the public sector, in the table 3.

Table-3: Accessibility to the produced data by other users

			1.GROUP	2.GROUP	3.GROUP	TOTAL
ACCESS	POSSIBLE	For only public sector	3	3	0	6
		For everybody	3	0	2	5
	NOT POSSIBLE		7	5	2	14

The hardware situation has been presented in table-4. The public sector have many instruments, including analogue and semi-analytical instruments, but most of the analogue instruments are not used in production. On the other hand, the private sector have analytical instruments and generally digital photogrammetric workstations. Most probably due to cheaper costs, universities have a tendency to PC's, although workstations have been preferred for editing etc. by the public sector.

Table-4: Hardware situation

HARDWARE	1.GROUP	2.GROUP	3.GROUP	TOTAL
ANALOG INSTRUMENTS	28	13	0	41
SEMI-ANALYTICAL INSTRUMENTS	8	2	0	10
ANALYTICAL STEREO PLOTTER	11	1	8	20
POINT TRANSFER DEVICE	2	0	0	2
DIGITAL PHOTOGRAMMETRIC WORKSTATIONS	9	0	39	48
WORKSTATIONS FOR EDITING	30	1	19	50
IMAGE PROCESSING SYSTEM	17	7	7	31
FILM SCANNER	2	0	4	6
PC	96	119	42	257
PRINTER	43	33	14	90
PEN PLOTTER	10	10	3	23
INKJET PLOTTER	20	3	10	33
AIRCRAFT	6	0	2	8
AERIAL CAMERA	10	0	2	11

Table-5: Software situation

SOFTWARE	1.GROUP	2.GROUP	3.GROUP	TOTAL
KINEMATICS GPS DATA PROCESSING	2	1	0	3
BLOCK ADJUSTMENT	4	0	7	11
DIGITIZING	7	5	8	20
PHOTOGRAMMETRIC PROJECT MANAGEMENT	3	0	8	11
ORIENTATION	4	0	7	11
DIGITAL DATA ACQUISITION	4	3	8	15
MAP SHEET PREPERATION	5	3	7	15
EDITING	8	4	6	18
IMAGE PROCESSING	6	6	4	16
ORTHO RECTIFICATION	3	2	6	11
GIS APPLICATIONS	12	7	5	24

DTM PRODUCTION	7	4	9	20
(****) Number of organisations have those software	63	34	75	172

Table-6: Profession situation

GRADUATION	1.GROUP	2.GROUP	3.GROUP	TOTAL
TECHNICIAN	72	0	68	140
SURVEYING ENGINEER	84	0	43	127
AGRICULTURE ENGINEER	6	0	2	8
GEOLOGIST	9	1	1	11
FORESTRY ENGINEER	24	0	0	24
COMPUTER ENGINEER	1	0	7	8
CIVIL ENGINEER	9	0	1	10
MECHANICAL ENGINEER	3	0	8	11
ARCHITECT	1	0	1	2
CITY PLANNER	8	0	8	16
ELECTRONICS ENGINEER	0	0	4	4
GEOPHYSICS ENGINEER	1	0	0	1
GEOMORPHOLOGIST	1	0	0	1
ECOLOGIST	0	0	1	1
Msc.	32	20	0	38
Dr.	7	47	0	54
TOTAL	258 (54%)	68 (15%)	144 (31%)	457

The number of the people working in photogrammetry and remote sensing is 457. Distribution of them according to the sectors as a percentage is; 54 % public, 31 % private and 15 % universities.

4. EDUCATION

There are 12 Geodesy and Photogrammetry Engineering Department of the totally 50 universities in Turkey. Three of them have just established and two of them have only master of science education. There are also 29 vocational school (2 years) and some technical collages. In general, training on surveying and mapping is under effect of German system.

Education in universities is given as 8 semesters. A semester consists of 14 weeks. Four major components of education may be distinguished:

1. Basic studies (semester 1-4; mathematics, mechanics, computer science, basics of surveying)
2. Specialized studies (semester 5-7; physical and satellite geodesy, photogrammetry, remote sensing, land planning and consolidation, engineering surveying, GIS)
3. External practical work (60 days at governmental institutions and private sector)
4. Seminar study and diploma thesis (semester 8)

Table 7 shows that a percentages and contact hours of basic and specialized studies and their ratios.

University	Y.T.U	K.T.U	□.T.U	S.U	Z.K.U
Basic studies	62 % 31	61 % 30	86 %41	69 %32	53 %28
Specialized	138	145	123	149	134

Studies	%69	%70	%59	%68	%72
Total hours	200	206	209	218	187

As an example, 9 MSc and 5 Ph.D. thesis dealing with digital aerial triangulation and digital orthophoto have been completed only at Istanbul Technical University in the period of 1996-2000.

5. IMPORTANT EVENTS

Turkey has decided to bid for hosting ISPRS Congress to be held in 2004, at the meeting of Turkish National Society for Photogrammetry and Remote Sensing which was held at the end of 1998. Other seminars or symposiums relating to the photogrammetry and remote sensing are as follows:

- Second Turkish-German Geodetic Days, May 27-29, 1997, Berlin
- Symposium on Digital Photogrammetry, May 21-22, 1998, Istanbul
- Third Turkish-German Geodetic Days, June 1-4, 1999, Istanbul
- International Symposium and Field Seminar on Present State and Future Trends of Karst Studies, September 17-26, 2000, Marmaris
- ICGESA International Conference on GIS for Earth Science Applications, September 11-14, 2000, İzmir/Menemen
- Second International Symposium on New Technologies for Environmental Monitoring and Agro-Applications, October 18-20, 2000, Tekirdag