

**THE NATIONAL REPORT OF TURKEY
FOR
PHOTOGRAMMETRY AND REMOTE SENSING
1992-1996**

Prepared by Turkish Society for
Photogrammetry and Remote Sensing

ABSTRACT

The National Report of Turkey outlines routine activities and developments in photogrammetry and remote sensing during the period 1992-1996. Subjects such as employment, equipment and education are described in terms of governmental organizations, private sector and universities. Important activities in Turkey related to photogrammetry and remote sensing are also mentioned in this report.

COMPILATION OF THE REPORT

In order to prepare the report, an effort was made to obtain knowledge from all organizations interested in photogrammetry and remote sensing. In this way, information was asked from 24 organizations (11 governmental, 6 private companies, 7 universities) and the report was compiled by using information sent by 18 organizations (7 governmental, 4 private companies, 7 universities).

KEY WORDS : Turkey, National Report, Application, Organization.

1. INSTITUTIONS AND PUBLICATION

The Turkish National Society for (TNSP) was established in 1974 and converted to The Turkish National Society for Photogrammetry and Remote Sensing (TNSPRS) in 1984. TNSPRS carries out its activities in parallel with the aims and statutes of the ISPRS. Commissions of the TNSPRS are the followings :

Commission I : Sensors, Platforms and Imagery.

Commission II : Systems for Data Processing, Analysis and Representation.

Commission III : Theory and Algorithms.

Commission IV : Mapping and Geographic Information Systems.

Commission V : Close Range Techniques and Machine Vision.

Commission VI : Economics, Professional Matters and Education.

Commission VII : Resource and Environmental Monitoring.

Meetings of the commissions of TNSPRS are held annually.

A majority of the researches in reports and articles in the field of photogrammetry and remote sensing are published in the below periodicals :

- Harita Dergisi : Issued semiannually by the General Command of Mapping.

-Surveying and Cadastral Engineering : Issued in 4 editions annually by the Chamber of Surveying and Cadastral Engineers.

- Tapu ve Kadastro Dergisi : Issued in 3 editions annually by the Directorate of Land Registry and Cadastre of Turkey.

Also, results of research applications and various books related to photogrammetry and remote sensing were published in this period.

2. PHOTOGRAMMETRY

Photogrammetric activities were carried out only by two official organizations (General Command of Mapping (GCM), General Directorate of Land Registry and Cadastre (LRC)) up to last ISPRS meeting, KYOTO-1988 where Turkey participated in. An official organization (General Directorate of Forestry) and four private companies (MNG, Belbim, S.T.F.A., Yalcin Teknik) were initiated their photogrammetric activities, after that point.

GCM implements primarily the production and revision of 1/25000 scale topographic mapping and 1/50000 scale map production by using satellite images. LRC implements the standard topographic mapping by using analog instruments at the scale 1/5000, pertain to rural area.

General Directorate of Forestry has been implementing various activities on forestry (mapping of forest types, etc.) by using analytical and digital instruments.

General Directorate of Electrical Affairs, General Directorate of Highway, State Water Organization and General Directorate of Mineral Research and Exploration of Turkey can be taken into account as the other official organizations which interest with photogrammetric

activities and have instruments for that purpose, besides the three big organizations mentioned above.

Activities of private companies related to photogrammetry have been increasing day by day. They especially interest with the large scale (1/1000 and 1/500) urban mapping, orthophoto and DEM production and establishment Land Information System for the requirements of majorities.

Besides the four big private companies, Air Silver also can be considered as photogrammetric company. Employment in photogrammetry including all big official organizations and universities is about 200. That is about 100 in private sector.

2.1. EMPLOYMENT

The situation of private and official sector in photogrammetry, according to employment is given in Table 1.

Table 1. Number of organizations according to employment

Employment	Number of Organizations
1 - 5	11
6 - 25	4
More than 25	4

Recently, numbers of person employed in photogrammetry have been decreasing in official organizations while increasing in private sector.

2.2. TYPES OF ORGANIZATIONS

Number of private and official organizations providing photogrammetric production and number of employment can be shown sequentially in table 2. and table 3. .

Table 2. Number of private and official organizations providing photogrammetric production.

	Official organization	Private company	Non-profit Institutions and Universities
Number of Organization	7	6	10
Percentage	30%	26%	44%

Table 3. Number of employment in private and official sector.

	Public sector	Private sector	Non-profit Institutions and Universities
Numbers employed	130	96	51
Percentage	47%	35%	18%

2.3. APPLICATIONS

Activities of official organizations in photogrammetry can be summarized as follows :

- Topographical mapping and revision at 1/25000 scale.
- Topographical map production by using stereo satellite images at 1/25000 scale.
- Forestry mapping.
- Digital mapping of motorways.
- 1/5000 scale standard topographical map production pertain to rural area cadastre.
- Point determination with aerial triangulation.
- Terrestrial photogrammetric applications in architectural, engineering and other fields.
- GIS applications

Activities of private companies in photogrammetry :

- Digital mapping and city plans of urban area in large scales (1/1000, 1/2000 and 1/5000).
- The production of orthophotos and photomosaics in large scales.
- Digital production of various types of carriageway mapping (i.e. water, road, railroad, drainage and power transmission lines).
- Establishment of city information system with digital data.
- Revision of city maps produced in various scales.

Activities of universities and researching institutions in photogrammetry :

- Personnel training and education in photogrammetry,
- Scientific researches in photogrammetry,
- Technical consultancy for activities of official and private sector, in photogrammetry,
- Organizing of various symposiums in photogrammetric fields.

Primary application field of photogrammetry in Turkey is topographical and project mapping.

Training and education have the big share in spent time for photogrammetric activities.

Application of close range photogrammetry is in limited level and in the fields such as, protection of environment, hydrography, architecture and industrial engineering, some special applications occur time to time. Photogrammetry is not used yet in medicine and archaeology.

Official organizations use mostly analog and analytical instruments, on the other hand , private companies prefer analytical and especially digital instruments.

Photogrammetric application types in Turkey are shown in Table 4.

Table 4. Photogrammetric application types in Turkey.

APPLICATION	PURPOSE-ACTIVITY		
	Main >%50	Major %10-50	Minor <% 10
Education/ training	5	2	2
Research	-	3	3
Consultancy	-	7	2
National mapping	2	-	3
Project mapping	3	1	1
Close range photogrammetry			
Architectural	-	1	3
Industrial/engineering	-	-	1

2.4. EDUCATION

In Turkey, postgraduate and undergraduate education in the domain of geodesy and photogrammetry are given by 5 universities (Y.T.U., K.T.U., Konya Selcuk U., I.T.U., Zonguldak Karaelmas U.). Excluding these universities the courses related to geodesy and photogrammetry are given by Hacettepe U., Bosphorus U., M.E.T.U., Faculty of Architecture Cukurova U., Istanbul U.-Faculty of Forestry.

In addition to the education given by the universities, the elementary education in the domain of photogrammetry is also given by the high schools and the school of vocational and the technical personnel are trained in these schools as photogrammetrists.

2.5. PHOTOGRAMMETRIC INSTRUMENTS , TOOLS AND EQUIPMENT

The hardware and software requirements related to photogrammetric instruments and systems are imported and any company that manufactures photogrammetric instruments in public and private sector doesn't exist. Institutions and universities improves the additional user software which they need.

Quantity and presence of existing instruments and equipment are listed in table 5.

Table 5. Quantity and presence of existing instruments and equipment.

The type of instrument	Quantity
Aircraft	8
Aerial camera	15
Terrestrial camera	10
Photolaboratory	2
Analoque instruments	60
Analytical instrument	22
Digital instrument	26
Scanner	6
Stereoscope	Many

2.6. PROJECTS, RESEARCH AND DEVELOPMENTS

The project to produce the large scale digital map and to establish GIS with data coming from the first project launched by three metropolitan municipality (Ankara, Istanbul, Bursa) are going on. These projects have been carried out by two big private companies.

In GCM the test project related to usage of relative kinematic GPS data in aerial triangulation resulted in success.

In the Directorate of Land Registry and Cadastre, the project to determination of ground control points with aerial triangulation method has been started and it is planned to produce 7000 ground control points in that project.

Digital cross-section production in the Directorate of Highway and digital forest map production in the Directorate of Forestry, are continued.

Excluding these efforts in the domain of photogrammetry various projects, works, investigations and publications in the other public and private organizations and universities also exist.

2.7. IMPORTANT CHANGES IN THE PERIOD 1992-1996.

In the domain of photogrammetry, the extensive use of computer and computer aided systems made the photogrammetry superior in Turkey, similar to the other countries. Private sector's advancement in the domain of photogrammetry starts in this period . When we evaluate existing systems and present conditions we come to these following conditions :

- In public facilities, analoque instruments are still used efficiently. Also the works about the conversion of some of them to the semi-analytical will be just completed.

- Analytical instruments are used in both private sector and public facilities. Especially for the measurement of aerial triangulation, analytical instruments are still used more efficiently, and in the recent years so the digital instruments.

- Digital photogrammetric systems have been implemented for the last few months. Data which are obtained from aerial photographs by means of precise scanners are used in these systems. In this period which the digital orthophoto production has just begun (using satellite images), orthophoto and anaglyph map production have the primary role.

3. REMOTE SENSING

As a natural extension of "Information age" in which we

are living, remote sensing activities carried out by employing satellite images acquired from sensor systems established on the satellite platform specially designed for this aim and aerial photos in the manner of supporting satellite images are getting increased and its application fields are getting supplemented in Turkey as being in the world perspective.

Considering satellite image improvements that will take place in the near future, the satellite images are still inefficient in respect of their application capabilities. These inefficiencies are; difficulties in procuring images in the desired time and the desired area, to take much time for getting existing images, to be affected too much by the meteorological conditions, having poor resolution for some applications, dependence on the other countries.

From the Turkey's point of view, to eliminate some inefficiencies of satellite images above mentioned and to decrease the other ones to the minimum level we are aiming at establishing a technology. For this purpose Airborne Remote Sensing system project was launched under the structure of TNSPRS.

By implementing the project, data acquisition will be accelerated and the actual data requirements of our country will be fulfilled more rapidly with the help of Airborne Remote Sensing system. Remote sensing activities which have been currently carried out by using satellite images and aerial photos will gain the big acceleration and these works will be integrated with data acquired from the project.

3.1. APPLICATIONS

In Turkey, remote sensing is used successfully in the fields of conservation of environment, defense, forestry, agriculture, geology, mining, geophysics, region and city planning, rearrangement of lands, water resource management, municipality services, coast surveying, metropolitan area analysis, digital map production and understructure sewage management.

By using satellite image, topographical map production in 1/50000 and the smaller scale are carried out successfully in GCM which is the most important map production organization in public sector. Also, digital orthophoto and anaglyph map production are carried out by using satellite images in the same organization.

In the big and important projects, universities and private sector benefit from remote sensing techniques. The projects realized in this field; Lake-basin of ATATURK dam project, Powerline distribution systems in Gaziantep and Bursa cities, rearrangement of SanliUrfa Harran plain, agricultural crop forecast, conservation of environment project.

Landsat satellite image archive which covers the Turkish territory was established in the institute of statistics.

3.2. EDUCATION AND INSTRUCTION

Remote sensing education has been given in 8 universities (Istanbul Tech. U., Bosphorus U., Tech. School on Geodesy & Photogrammetry, Bilkent U., Gazi U., Hacettepe U.) in our country.

Engineer graduated from these universities are educated to undertake efficient tasks in the worldwide project and in the national development.

Engineers are specialized in the domain of remote sensing by attending the postgraduate and undergraduate program in the same universities.

3.3. RESEARCH AND DEVELOPMENT

Research and development studies in the domain of remote sensing in Turkey are generally carried out in the universities and public sector. Especially research demands and a lot of interest in the domain of remote sensing are observed.

4. IMPORTANT EVENTS

* The scientific and steering committee meetings of OEEPE were held between 25-27 OCTOBER 1994 in Ankara.

* 2nd remote sensing symposium organized by GCM and Hacettepe University were held in MAY 1994 in Bursa.

* 1st National Geographical Information System symposium was organized by the Karadeniz Technical University in 1994.

* The 5th Mapping Assembly was organized by The chamber of Surveying and Cadastral Engineers in JANUARY 1995.

* 100th anniversary of Turkish Mapping was celebrated in MAY 1995. During this meetings different activities were carried out and international mapping symposium was held.