

# ASPECTS ON PHOTOGRAMMETRY AND REMOTE SENSING EDUCATION AT THE FACULTY OF CIVIL ENGINEERING IN A.U.TH

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### ABSTRACT:

This paper includes aspects relatively to the following: Subjects of organizing courses and education on photogrammetry and remote sensing and facing rapid advances and the continuously increasing volume of knowledge. Professional and economic subjects in the framework of modern requirements and particularities of the market in a scheme of interaction of education and market. Satisfaction of the requirement the resulting from education of photogrammetry and remote sensing knowledge to be integrated, that is, to be followed by terrain information (geomorphologic, geologic, hydrologic, geotechnical subjects), in order to give the potential of direct professional “action”. Analysis and presentation of an education example (road design-construction).

## 1. INTRODUCTION

Photogrammetry and Remote Sensing contribute essentially to the study of subjects of different scientific areas.

The contribution of photogrammetry and remote sensing to the study of subjects of civil engineering ( Structural Engineering, Hydraulics and Environmental Engineering, Geotechnical Engineering, Transport, Infrastructure, Management and Regional Planning ) is of particular importance (Patmios E. et al, 1997).

The education on photogrammetry and remote sensing in a Civil Engineering Department presents particularities, caused mainly from the difference in the content of these subjects when it is compared with the one of the “usual” subjects of the Dept.

At first, the education must efficiently cover these subjects in combination with all the basic considerations that must be taken in mind, because of the continuous advances and the enormous volume of knowledge on these.

However, it must also include concise but inclusive knowledge from other education subjects of Civil Engineering (Structural Engineering, Hydraulics and Environmental Engineering etc. ). This is the necessary base for the direct, clear and “fertile” perception of the possibilities to apply photogrammetric and remote sensing methods on these (Lazaridou M., 1998, 1999).

This paper presents relevant considerations and subjects.

## 1. FUNDAMENTALS FOR THE EDUCATION ON PHOTOGRAMMETRY AND REMOTE SENSING

On the base of our education experience on photogrammetry and remote sensing in the Dept. of Civil Engineering in A.U.Th, the advances at these subjects and the continuously increasing volume of knowledge, we have organized a scheme of subjects (Patmios E. et al , 2000) – syllabus, that is characterized from the following principles:

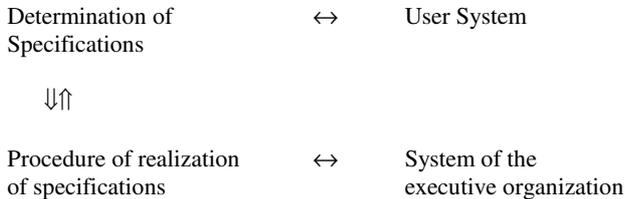
- Grouping of subjects to reasonable and functional entities.
- Presentation of principles and methods (correspondences, differences).
- Presentation of selective examples from every category of instrumentation.
- The volume of knowledge must not prevent from profound understanding of principles and methods.
- Evaluation and introduction of new knowledge.
- Overall aspects for Photogrammetry Remote Sensing and GIS.

## 2. PHOTOGRAMMETRY AND REMOTE SENSING AS A SYSTEM

The education on photogrammetry and remote sensing in the Dept. of Civil Engineering presents particular interesting, because these subjects are closely connected with applications in the four Divisions of the Department.

Professional and economical subjects in the framework of modern requirements and particularities of the market, work in a scheme of interaction of education and market.

From this aspect, it is very useful to consider the following system:



This system suitably formed, according to the case, is a base of reference and organization for all photogrammetric and remote sensing applications on civil engineering subjects.

### 3. EDUCATION FRAMEWORK TO FACE ROAD DESIGN – CONSTRUCTION WITH PHOTOGRAMMETRY AND REMOTE SENSING

A general framework of aspects relatively to the education of photogrammetry and remote sensing that is in harmony with the modern status and the advances is included in section 2.

Particularly, to face subjects of design – construction of roads, we consider the following education scheme as an effective one.

- Takings from terrain, aeroplane, satellite – Global Positioning System.
- Image acquisition (photographic and other imaging systems).
- Image interpretation- study (visual interpretation, digital analysis).
- Methods: analytical, digital, rectification, orthophotography, aerotriangulation, Digital Terrain Models.
- Adjustment, software packages.
- Subjects relatively to geomorphology, geology, soils, hydrology, geography, urban areas, archaeology.

### 4. STAGES OF DESIGN – CONSTRUCTION OF ROADS WITH PHOTOGRAMMETRY AND REMOTE SENSING

The study and planning of road networks – systems is done on the base of long – term plans of landuses and development.

Photogrammetry and remote sensing contribute to the acquisition and processing of data for technologic and technoeconomical analysis and decision making in all the phases,

that is road design – study, construction, management and maintenance.

In the following, we refer to this contribution at the various stages of road study (Patmios E., et al, 1995).

- Recognition study

General concise information (geographic, geologic, geotechnical, land uses ) are acquired for the wide area, with the study of suitable images.

Stereoscopic study, map production and preliminary measurements at sections are being done.

The above, result in setting boundaries of ground corridors (passages).

- Preliminary study

It includes the following:

- Detailed study of ground corridors in 1-2 km width.
- Aerotriangulation
- Photogrammetric restitution
- Appointing of possible routes
- Choice of the most suitable route

- Final study

Maps in large scales are produced in order to study the relevant technical works.

Digital measurements at sections are done and Digital Terrain Models are produced.

### CONCLUSIONS – DISCUSSION

Teaching a subject in a audience is influenced by various relevant parameters-factors, among which, the kind of use-application of the offered knowledge proves to be basic-important.

This is particularly important in the case of education on Photogrammetry and Remote Sensing in the Civil Engineering Department.

The presentations on the above – photogrammetric and remote sensing methods, instrumentation, products – must be comprehensive and vital without long analyses. They must also be “flexible” and characterized by gradual withdrawing of the “old” and introduction of the “new”.

The other subjects of civil engineering, in the study of which photogrammetry and remote sensing are “called” to contribute to, must be formulated clearly and with adequate details, so that the combination should be unhindered and “fertile”.

Realization of the above principles is described in this paper, concerning the Lab. of Photogrammetry-Remote Sensing in the Dept. of Civil Engineering in Aristotle University of Thessaloniki.

The application of photogrammetry and remote sensing in road design – construction was chosen and presented as an example.

#### REFERENCES

Lazaridou M., 1998. The Art of Photointerpretation. *The Magazine of Leica Geosystems (Reporter 40)*, p.11.

Lazaridou M., 1999. The Photointerpretation on the Study of the Surrounding Area of a Road. Example. *Bulletin of the Central Public Works Laboratory, Greece 1997-1999*, pp. 61-64.

Patmios E., Lazaridou M., 1995. Photointerpretation and Photogrammetry on Road Construction. In : *The Archives of First Hellenic Congress of Road Construction*, Larissa, Greece, pp. 180-184.

Patmios E., Lazaridou M., 1997. Contribution of “Photogrammetry-GIS” and “Photointerpretation-Remote Sensing” to subjects of Civil Engineer. In: *The Archives of Hellenic Congress of Civil Engineering Faculties*, Thessaloniki, Greece, pp. 121-125.

Patmios E., Lazaridou M., 2000. Education on Photogrammetry Remote Sensing and GIS. Experiences, Criticism, Revisions. In: *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, Amsterdam, The Netherlands, Vol. XXXIII, Part B6, pp. 231-233.