# GEOMATICS IN PAKISTAN

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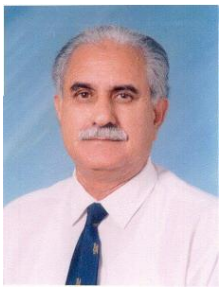

Geomatics is the art and science of measurements on the surface of earth including what is below the earth and in the oceans. This is the simplest form of definition; more exact and elaborate definition has been produced by FIG[1]. In other simple words Geomatics is the new terminology for the centuries old profession of Surveying and Mapping. There is far more demand interlinked with other allied professions and disciplines from the surveying profession and as such need for new name / definition. The developed nations plus others have adopted the change and now train their engineers and technicians to be geomaticians whereas we are very reluctant to change on our own. We are waiting for someone to give us a push in the direction of change. One institution on writer's suggestion have adopted the name geomatics in their courses of study e.g. Government College. University and University of Engineering & Technology (UET) Lahore do tell their engineers what geomatics stands for.

In the recorded history early Egyptians practiced the profession of surveying (modern day geomatics) for cadastral and construction works. Other civilizations have built massive structures and planning well organized cities like Ghandara (Sind), and Harapa (Punjab) in Pakistan and similar ones in India, South America, (Maya civilization for one). All of this was not possible without the knowledge of surveying profession.

The British introduced the modern surveying technology and practices to the Indian sub-continent when they wanted to consolidate their grip on the territory for collection of land revenue and for military purposes. The Surveying and mapping data was classified information and only very trusted Indians were trained in this profession. British established very large triangulation and leveling networks which were a great scientific achievement of the time. We do salute them as well as the Indians (of undivided India) who carried out major share of the field survey work when traveling was on foot or horse back through malaria

and other deceases infected Jungles / swamps etc. Those brave men produced mapping through pain staking process of Plane Tabling in some of the most difficult terrain in the world. We are using that triangulation data more than a century later although it is high time to critically review and update it. But once again limited financial resources hinder our desire to achieve the goal in the near future.

Geomatics is basic to all civil engineering projects and quality of survey data has direct bearing on the design and quantities of the project. Our country constructed very large water related works in the sixties as a part of the Indus Basin Water Treaty. We know that for all major projects at the time both the foreign consultants and the contractors brought in their own expatriate Chief Surveyor for the projects and in some cases even senior surveyors were also expatriates. The reason being we were not producing senior level surveyors at any of our technical institutes. We were producing at best technician level personnel. Khewra Mining School and Rasul Technical College were the only two instituions which imparted surveying training in the form of survey diploma courses. No effort was ever made to upgrade them to graduate level in the form of B.Sc. Engineering in Surveying like it was done in Europe, North America and elsewhere in the world including in Iran and India. The only change that has come about is that Polytechnics all over the country now undertake generally one year surveying diploma course. The standard of students output by these institutions is not as good as one would desire. They learn very elementary theory of surveying at Polytechnics and then get on job training once they are in service with Public or Private sector. The root cause of poor standard is the shortage of trained and experienced teaching staff and absence of modern surveying instruments to train the students on.

University of Engineering and Technology (UET) Lahore, the prime engineering university of the country does teach civil, mining and architectural engineering undergraduates surveying during their degree programme and include a 10 day or two weeks field camp to carry out field surveying activities in the hills around Abbottabad but nothing further at post graduate level. They could have taken lead in introducing degree programme in geomatics. This did not happen.

This stems from short sightedness of our education policy makers. Part of the blame for this neglect also falls on Survey of Pakistan (SOP) who did little towards the development of the profession. This department continues to live in cloud of secrecy inherited from the British Policy of 18$^{th}$ and 19$^{th}$ century. The British gradually slackened and eventually abandoned the policy of secrecy about survey data in their own country but we continue to live with it even in this age of satellite imagery and GPS when nothing is hidden or secret from rest of the world. SOP does have their own training institute but the quality of teaching at an institute is directly related to the teaching faculty of the institute.

Geomatics is also very basic and important activity in cadastre. An important government activity for all nation states is building and maintaining a land administration system (LAS) with the primary objective of supporting an efficient and effective land market. This usually includes cadastral surveys to identify and subdivide land, land registry systems to support simple land trading (buying, selling, mortgaging and leasing land) and land information systems (LIS) to facilitate access to the relevant information, increasingly through an Internet enabled e-government environment[2].

In Pakistan unfortunately cadastre is in the hands of poorly qualified revenue department's famous or should we say infamous personnel called *Patwaris.* Their performance in land related surveying work is full of opportunities for cheats to flourish unchecked and innocent citizens to suffer. Computerization of land record is in progress at district level and one would hope that *Patwari* culture may end soon.

In our country courts are loaded with land related civil cases and other disputes including very many murder cases stemming from land disputes. Geomatics can be instrumental to put an end to all this. No LAS or LIS can function without credible basic land related data and only geomatics will provide this. It is a very important technology of this age and we have neglected it for too long.

GIS culture is also spreading like wild fire everyone talks about it and wants to acquire it but majority are unaware that for quality GIS basic requirement is quality geomatics data. Quality geomatics data will be produced by non other than qualified and trained surveyors (*geomaticians*). Our institutions and universities which are to say the least poorly staffed and inadequately equipped for this purpose. It may take a while for the situation to improve for the simple reason shortage of resources and lack of determination to excel.

As we look further deep down we notice that fewer of our young persons go for this profession when they go abroad at undergraduate level and in our own country no university offers degree course in geomatics. In this age of internet we only need to key in the word geomatics and see for ourselves the places and the countries offering degree courses in this technology. Pakistani technical universities are lagging behind others in this discipline.

In the private sector surveying companies, and there are plenty here, are run by technicians in general with the exception of a couple headed by civil engineers and there is only one which is in the hands of a professional survey engineer. This situation is the direct result of the absence of any licensing system for surveyors or surveying companies. Any one who can run line leveling and operate a total station, and has resources to buy a total station; sets up his surveying company. The price competition between a technician run survey company and that of an engineer / professional survey engineer goes in favor of

the former. The public sector departments, major source of surveying contracts and even bulk of the private sector companies go for the cheapest quotation with complete disregard for quality of end product. The amazing thing is that it will be a multibillion dollar project and the owner would be trying to make savings and compromise quality of survey data on which the project design and earth work quantities are to be based.

There is a need for controlling authority through an act of parliament on the same lines as Pakistan Engineering Council. In the last parliament we had a surveyor turned politician as deputy speaker and he could have done something on these lines. As a politician his priorities were different and the opportunity is lost until another surveyor gets into the parliament. We can only hope that it happens soon.

References:

1. FIG – *Federation Internationale des Geometres* (International Federation of Surveyors).
2. Using Cadastres to Support Sustainable Development - Professor Ian WILLIAMSON, Centre for Spatial Data Infrastructures and Land Administration, The University of Melbourne, Australia