# RECOLLECTIONS OF THE TRANSITION TO GEOMATICS

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**ABSTRACT**

In mid 1993, the then Department of Surveying and Land Information at The University of Melbourne initiated the process of changing its name to the Department of Geomatics. The hope offered by a name change was that "geomatics" would be seen as a discipline encompassing much more than measurement science. Indeed, the aim was that geomatics would indicate to prospective students and associated professions the science of acquisition, management, modelling, analysis and presentation of spatial data over a range of activities focussed on land and environmental management. In this the 50th year of operation of the Department, we look back upon a successful transition to geomatics over the past half decade and reflect upon both the compelling reasons for the transition and the impact of the rapidly evolving spatial information industry.

## 1. INTRODUCTION

In mid 1993, the then Department of Surveying and Land Information at The University of Melbourne initiated the process of changing its name to the Department of Geomatics. The reasons for the change have been well documented by the present author and others (e.g. Gagnon & Coleman, 1990; Trinder & Fraser, 1994). Basically, they hinged upon the fact that the academic program in "surveying" was offering much more than the traditional measurement science focus of surveying education. Thus, while the degree programs had broadened to embrace emerging new fields such as GIS, environmental planning, land and resource management, and other elements of spatial information technology, there was limited recognition of this by either potential students or associated professions.

The hope offered by a name change was that "geomatics" would be seen as a discipline encompassing much more than measurement science. To quote from Gruen (1998): "*the task of the geomatic engineer consists of recording, managing, designing, developing and securing the structures inherent in our living space and economic environment*". One could go further and say that geomatics is about "*designing, building and managing the spatial dimension of our natural and built environment*" (Williamson, 1999).

This year The Department of Geomatics celebrates its 50th anniversary as a stand-alone program in 'surveying' education at the University of Melbourne. In the 44 years prior to the name change to Geomatics, the Department changed its name only once, in the mid 1980s, when it became the Department of Surveying and Land Information. This name change attracted little attention, whereas the change to geomatics initially met with a reasonable measure of resistance from within both the traditional surveying profession and in quarters of academia.

Indeed, in Australia a debate over the transition to geomatics raged via the pages of *The Australian Surveyor* for almost two years following program name changes at the Universities of Melbourne (Geomatics) and New South Wales (Geomatic Engineering). Now that the acrimony of this debate is but a memory, and there has been half a decade or so for the transition to geomatics to come to full fruition, it is useful to reflect. In this paper we both look back upon the process to assess whether the explicit and implicit aims of this transition have been realised, and we also touch upon the future.

A number of measures, both internal to the university, and external within the professions, can be called upon to quantify the success or otherwise of the transition to geomatics. For example, we could look at changes in student numbers and quality, changes in curricula, changes in employment trends and prospects for graduates, and also possible changes in the overall professional standing of recent graduates. It is never easy to bring forth compelling quantitative evidence to back up assertions that are in large part qualitative. Yet we are in an era in education where such quantitative data is being increasingly replied upon as an essential component in the determination of both the resources given to academic programs, and their prospects for longevity.

At the University of Melbourne the transition to geomatics was couched in long-term goals of building a better academic program in spatial information science and management, but it also had the very real imperatives of boosting student quality and numbers in order to arrest talk of possible future program closure.

Given this background, it is useful to look at the state of the Department of Surveying and Land Information in 1993 and compare it to the current state of the Department of Geomatics. This exercise, it will be shown, need not be exhaustive in order to demonstrate that the goals of the transition have in large part been realised. In presenting this recollection the author contrasts the current healthy state of the Department of Geomatics with the somewhat precarious position of the surveying program at the time of the name change.

It is noteworthy, as well, that not only a name change was involved. The transition to geomatics included a complete curriculum redesign to better reflect the broader base of the geomatics program. Accompanying the transition was the powerful onus to educate the general public and associated professions so that the perception was instilled that geomatics was not just another name for surveying, but essentially a new discipline concerned with spatial information measurement and management, of which surveying was simply one of a number of components. The purpose was never at any time to diminish surveying, but more to better encapsulate the broader scope of activities associated with geomatics.

## 2. THE DEPARTMENT OF SURVEYING AND LAND INFORMATION, CIRCA 1993

After a reasonable period of growth in the late 80s and early 90s, the Department had the equivalent of nine full-time staff, about 180 undergraduate and 30 postgraduate students. In addition, it attracted grant and industry research funding to the level of $300,000 per annum. Although there was evidence that fewer graduates were entering the mainstream surveying profession, eligibility to become a Licensed Land Surveyor remained the only formal professional recognition for the degree in surveying. The degree was accredited by The Institution of Surveyors, Australia and by The Reciprocating Boards of Surveyors for Australia and New Zealand.

Undergraduate students undertook one of three degree programs, a four-year degree in surveying (B.Surv), or one of two five-year combined degrees with science (B.Surv/B.Sc) or arts (B.Surv/B.Arts). The combined degrees, although requiring both an 'overload' in terms of subjects taken and an extra year of study, were proving to be extremely popular. But, there was a problem: to undertake a combined degree the student's entry score had to be very high (in the top 10% of incoming students). Surveying, however, was not drawing a sufficient number of such students. Hence the majority (approximately 70%) were only able to undertake the B.Surv.

In order to rectify this situation, better student quality was a must. High university-wide entry standards also meant that many potential surveying students could not gain entry to the program. Surveying was in the unfortunate position of not being able to fill its quota with students having high enough entry scores. Poorer than expected progression rates and low course completion rates are a natural consequence of having a cohort of students who, when based on average entry scores, were at the lower end of the performance spectrum.

Whatever the reason, such factors were drawing a good deal of concerned attention from within the University. The lingering question, which was fortunately not overtly expressed too frequently, was "if you cannot attract sufficient students of a quality demanded by the University of Melbourne, why should the University continue to offer the program?" Of course there were many good reasons to continue the program, yet these were increasingly losing their clout in the face of unfavourable statistics which influenced the program's funding. The bottom line was clear: student quality had to improve, along with an increase in demand which would lead to higher student intakes.

Although ongoing curriculum reviews had led to formal coverage of subjects such as GIS, spatial analysis, remote sensing and land management in the surveying degree program, it is fair to say that at the time it still had a dominant focus towards measurement science. Such a focus persisted even though developments in technology were changing the face of surveying at an ever increasing rate, and opportunities for graduates were emerging within the spatial IT sector.

These factors were having a considerable impact on employment patterns for 'surveying' graduates. According to a survey conducted at the 1995 AURISA Annual Conference (Trinder & Li, 1997), close to 50% of graduates employed in the broader spatial information industry had received their formal education in 'surveying'. The growth in the spatial information industry was fortuitous given that productivity improvements associated with new technologies were decreasing the need for surveyors, at the same time as a leveling off was occurring in the land development associated with the continued urban sprawl of major Australian cities.

The combination of these and other factors meant that overall demand for traditional cadastral surveyors was diminishing, while at the same time new opportunities were opening up for graduates with skills in spatial information measurement and management. In a course promotions context the problem persisted that the general public (especially prospective students and their parents) associated 'surveying' with the diminishing opportunities of traditional surveying and not with the emergence of a whole new range of professional career possibilities in the spatial information industry.

## 3. THE GEOMATICS PROGRAM IN 1999

The picture in 1999 is certainly more positive in most respects than that of half a decade ago. The transition to Geomatics has produced immediate improvements in regard to student quality, and consequently numbers. The department now has the equivalent of 11 academic staff members, 9 full time research associates, between 190 undergraduate students (limited by quota) and 60 postgraduates. Moreover, the annual research budget is now close to $ 1.1 million. One of the features of the postgraduate student body is that the majority of students have a first degree other than geomatics. This is a reasonable indicator that the Department's efforts to broaden its research focus to embrace new developments in spatial information are paying off.

Within the undergraduate student cohort, the formally worrying characteristic that geomatics students had lower entry scores than engineering students (The Department is one of six in the Faculty of Engineering) has now largely disappeared. One interesting side effect of this improvement in student quality is that the majority of undergraduate students, 60-70%, are now enrolled in combined degrees (typically with computer science, information systems, environmental science or geography), which has the pronounced indirect benefit of further broadening the scope of geomatics graduates and therefore of the discipline. These undergraduate students no longer face a curriculum which is top-heavy in measurement science. Instead, as shown in Figure 1, the structure of the geomatics program now includes much more significant components of information systems and management, along with an 'engineering focus' (photogrammetry courses are categorised here as measurement science). The adoption in spirit, though not in name, of geomatic engineering has led to full professional accreditation of the geomatics degree by the Institution of Engineers, Australia. Thus, students can, upon graduation, pursue registration as a Chartered Professional Engineer, as well as being able to avail themselves of registration as a Licensed Land Surveyor.

## 4. PROGNOSIS FOR THE FUTURE

From an academic standpoint, The Department of Geomatics is now well placed to provide the essential professional education that will equip graduates for a career in the spatial information industry – indeed, we would say in the *Geomatics* industry. The degree programs, both single and combined degrees, offer necessary coverage of the following core components of Geomatics:

- fundamental sciences, with a focus on mathematics
- computer science and information systems
- spatial information science, planning and management
- measurement science
- communications technologies
- land and environmental management
- professional skills and engineering management

Our aim is to continue to produce graduates who will be well equipped to meet the responsibilities of building and managing spatial data infrastructures for the future, and of developing the associated spatial business systems.

In regard to research, current trends to smaller government, and the outsourcing of many functions previously associated exclusively with government, present new opportunities for The Department of Geomatics. It could well be argued that at the same time as there is a growing economic importance and national interest concern regarding comprehensive and integrated spatial databases (topographic, cadastral, land use, environmental assessment, etc.), so there is a fragmentation in the coordination of resources committed to this area by governments. Moreover, much of the necessary research work required to accompany advances in measurement science, geo-informatics, spatial planning and land and environmental management, has been removed from the umbrella of government service due to factors such as economic rationalisation and general downsizing. Yet this essential work must continue if we are to realise the promise of new advances in spatial information technology. Universities should be well placed to take up the consequent research opportunities which will surely present themselves.

## 5. REFERENCES


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Figure 1: Curriculum structure for the Bachelor of Geomatics Degree.