CONTENTS

EXECUTIVE SUMMARY

We set out a brief Executive Summary of the strengths and weaknesses identified from our market research and from the discussions held over the period of the Costing and Pricing Study with the senior management and staff of SMO. We then state the recommended mission and aims of SMO over the next five years and the actions to be taken to achieve these aims.

SMO's Strengths

- recognised as the central authority for land surveys and all types of mapping in Hong Kong;
- a good reputation for high technical competence;
- risks underwritten by Government in the national interest;
- almost a monopolistic position in the Hong Kong market place, which is believed to be too small to attract serious competition;
- well established links and relationships with key users;
- current product and service range meets the great majority of customer needs;
- SMO's databases represent a valuable national intellectual property asset.

SMO's Weaknesses

- low profile and identity in the market place, with poor awareness of SMO's activities, products and services;
- perceived as bureaucratic, commercially immature, inflexible and a high priced supplier;
- limited marketing, sales and commercial skills, knowledge and experience, and no pro-active selling;
- does not operate as a single, coherent corporate entity and has a fragmented approach to product and market development;
- lacks co-ordination of management data to provide information on costs, sales and key performance indicators (except at strategic and DSO levels), leading to ineffective control;
- multi-layered management structure, over-manned and inefficient in some areas, and no cost control;
- poor customer support services and communications, and seen as giving poor delivery service to customers;
- digital products considered not to be up-to-date and of inadequate quality;
- as Office within Lands Department not able to determine own policies or retain revenue for investment and development;
- has a rationale for pricing both digital data and paper products which is no longer understood by SMO or the market.

The following statements of 'mission' and 'key business development aims' arise from the above analysis of strengths and weaknesses. Under each of the 'aims' set out in italics below, we have indicated the recommended actions to be taken.

The overall purpose or 'mission' of the Survey and Mapping Office (SMO) is perceived as being:

To meet the land surveying and mapping needs of all sections of the Hong Kong SAR community in a cost-effective, high quality and timely manner.

More specifically, SMO's key business development aims over the five year time-span of the business strategy are set out below:

- *To achieve recognition throughout the community and the Government that it is the authority, centre of excellence and prime source of supply for, land boundary survey, mapping and geospatial information within the SAR.*

- *To promote the development of the GIS (Geographic Information Systems) market in Hong Kong and so increase the penetration and utilisation of its digital mapping products.*

To achieve these first two aims we have recommended a Promotion Strategy designed to raise SMO's profile and to educate, inform and persuade its customers to buy. The strategy calls for a centralised professional function which will be responsible for the production of promotional literature, press releases, catalogues, CD-ROM etc., and dissemination of its messages via its sales outlets, seminars, media events, the Internet, exhibitions and conferences. In addition we recommend partnership arrangements with Value-Added-Resellers (VARs) and other intermediaries.

- *To improve the quality, variety, up-to-dateness and utility of digital data, graphical maps and plans available to the Hong Kong community, in accordance with customer requirements.*

- *To take the lead in the development, management and exploitation of an integrated Hong Kong Geographic Information System, incorporating data from both the public and the private sectors.*

To address the above two aims we have proposed a product development strategy which includes: updating of SMO's ArcInfo system to ensure Year 2000 compliance; enhanced facilities to improve data quality, delivery and content; consideration of the introduction of on-line links to VARs and major customers; establishment of common data exchange standards as an initial step to achieving an integrated SAR geographic information system; resolution of non-technical issues for GIS development; use of client server architecture; and formation of joint ventures/partnerships to supplement internal resources.

- *To introduce more effective sales, distribution, promotion and customer support arrangements, which will improve delivery and buying convenience and will encourage increased customer take-up of SMO's products and services.*

This aim is addressed in the Sales and Distribution strategy for which we propose the development of a mixed direct and indirect (external to SMO) sales and distribution network. This includes a VAR network to attack the non-technical business market; booksellers to exploit the demand from the general public; and more convenient and effective ordering, buying, delivery and customer support arrangements. A key recommendation is to appoint professionally trained and experienced marketing and sales personnel.

- *To introduce simpler, more rational pricing and copyright policies, structures and levels, which will support the range of business development aims and targets*.

This aim is addressed in the Pricing and Licencing strategy which recommends "charging" all customers, with full copyright enforcement. However, we recognise that SMO cannot unilaterally adopt a hard charging policy with government customers. If use of an Operating Services Account is not possible, then SMO must at least inform all its customers of the value of the products and services being provided via 'dummy' invoicing. Real and notional sales values should then be combined to show notional cost recoveries against costs.

We have recommended more rationally structured market-based pricing based on sound market intelligence and regular review.

As a tool to support pricing and product mix decisions, we have developed a comprehensive cost model of SMO's cost centres, databases, product families and product costs.

- *To re-position SMO within Government so as to demonstrate accountability and to facilitate realisation of its key business aims*.

Following a wide consideration of options we have recommended that SMO should be separated from Lands Department and set up as a Stand-Alone Department. This move recognises both that it is a fundamentally different type of business from Lands and that it is itself of strategic importance to the SAR. It will also provide SMO with a higher market profile and greater autonomy and accountability. We have rejected a trading fund option on the basis that this would require significantly greater culture change within SMO, whose management and staff are not in any way prepared for such a status change at this time. We, nevertheless, believe that the trading fund option should be considered as a long term objective.

- *To identify and implement efficiency improvements on a continuing basis, in order both to meet cost targets and to release additional resources for business development*.

Using a task force approach and critical examination techniques we have identified a wide range of efficiency improvements in all sections of the SMO, including Headquarters, District Survey and Project Offices, and in the Land Information Centre. We have recommended that SMO should continue to operate these task forces, which are now equipped with the methodology to examine any area of activity and identify other development opportunities for improving, efficiency, effectiveness and economy. These teams should be headed by senior managers to demonstrate full commitment. We have recommended the setting of targets to reduce costs after a 2 year period of consolidation by say 5% per annum in real terms for the remaining period of the Business Plan. This 5% however is not based on any finite calculation but an agreed target to aim for. Demonstration of the ability to control costs, improve efficiency and fund investment from internal savings will put SMO in a much stronger position to bid for capital expenditure, and ultimately move to trading fund status.

- *To introduce management information systems which will enable business performance to be monitored and controlled effectively against the targets and objectives set*.

SMO staff collect a lot of data, but there is no central co-ordination to convert this data into information to help managers make effective business decisions. This co-ordination should be the responsibility of a management accountant/information manager. A new post should be created within SMO. Building on the performance measures at strategic level, and the performance indicators at DSO level, key performance indicators should be developed at all levels within SMO. A structure and examples have been provided, together with an implementation development programme.

- *To develop an organisation and introduce human resource development programmes which will support the achievement of business aims, facilitate change and foster a customer and employee caring organisation*.

The recommendations on staffing in other strategies have been brought together to provide a complete view of the human resource implications. We have also discussed the human resource issues which need to be addressed, including: staff rotation policy, training, culture change and change management, and improved staff communications to address the serious labour relations issues.

All the above elements have been brought together to form a coherent market-led business strategy.

1. INTRODUCTION

This final report is the fourth in a series of reports on the SMO Costing and Pricing Study which began on 3 March 1997. Previous reports have included the Inception Report (17 March 1997); the First Interim Report (25 April 1997) following preliminary investigations; and the Second Interim Report (20 June 1997) after secondary investigations.

This final report culminates in the production of a Business Plan for SMO (Volume 1) for the next 5 financial years 1998/99 to 2002/2003, beginning in April 1998. In this report we bring together the results from all the different components of the study, namely the Marketing and Market Research, Cost Analysis and Development, Study Tours, Efficiency Reviews, and SMO's Status within Government, as planned in the Inception Report. We envisage that SMO senior management will assimilate the plan in late 1997, and then take steps to begin to introduce the recommendations from April next year. Some of the more urgent actions which we have identified should, of course be taken as soon as possible.

In this last Stage 4 of the study we have developed detailed strategies and actions and set these out in a series of Position Papers (See Annex 'A'), which were discussed at a Management Workshop held in Aberdeen and attended by the PGLS, his senior managers and the STA from Lands Department. At this workshop overall consensus was reached on the recommended strategies.

This Business Plan gives an overview of SMO; provides a strengths, weaknesses, opportunities and threats (SWOT) analysis; and then sets out the mission and aims for SMO, and details the strategies to meet each of these aims over the five year period of the plan, and the time-frame in which these should be completed. The implementation plan should be used by SMO as a basis for more detailed planning each year, in order to be able to monitor the progress of achievement against the agreed aims throughout the five year period. Within the framework which we have set, SMO will need to review progress each quarter and complete the detailed work required to meet the stated objectives.

As part of the study we have completed the development of a comprehensive Cost Model as a decision support tool for pricing. In Volume 2 we provide separate reports as follows:

- Volume 2A Costing Model - Concepts;
- Volume 2B Costing Model - Operation Manual
- Volume 2C DFMSXTRA.

We have also provided to SMO under separate cover the technical working papers provided by our three specialists consultants on:

- Copyright
- Promotion, and
- Computer and Related Technical Issues.

In addition the final version of the Asset Manual, developed during the project has been provided to SMO and the TA (MA) in Lands Department.

An SMO report on the North American study tour is included as Annex 'D'.

2. OVERVIEW OF SMO

The Survey and Mapping Office (SMO) is responsible for: the establishment and maintenance of a geodetic network; the provision of land boundary (cadastral) surveys and photogrammetric surveys as well as cartographic and reprographic services; and the production and revision of maps and plans at different scales for different purposes.

The SMO establishes and maintains an accurate and rigid network of horizontal and vertical control points covering the whole territory, for accurate position and height reference in land and engineering surveys. New technological applications, such as the Global Positioning System, are being used to establish the location of reference points.

Land boundary survey is a major area of SMO work. It is the process of defining (i.e. measuring, recording and marking) boundaries of land parcels for the alienation of government land to private owners and non-government bodies, the allocation of land to various government departments, and the survey of road and lane limits.

The SMO produces and updates maps at various scales. Basic mapping in Hong Kong is carried out at 1:1,000 scale. These 3,100 basic survey sheets require continuous updating. All maps and plans are bilingual with the exception of the 1:1,000 basic survey sheets.

The expertise of the Reprographic Section of the Office is used by many government departments to meet their requirements. The Photogrammetric and Air Survey Section supplies large scale mapping and provides much of the information for updating the basic maps of the territory.

A computerised Land Information System (LIS) under the control of the Land Information Centre has been installed in all the District Survey Offices (DSOs). The system contains comprehensive and up-to-date land data. It has a unique geographic framework and standard upon which other users may build their own sub-systems, enabling the integration of a network of land and land-related information systems in future.

The SMO Training School, established in 1965, provides training in land survey and cartography. It provides in-house training for Survey Officers and Technical Officers of the Department and courses for officers of other government departments.

During the course of the Costing and Pricing Study we have had the opportunity to discuss the various aspects of the SMO's work with senior and middle management, and with their customers. We set out below our assessment of the strengths, weaknesses, threats and opportunities in relation to SMO at this point in time.

Strengths

- recognised as the central authority for land surveys and all types mapping in Hong Kong;
- a good reputation for technical competence;
- risks underwritten by Government in the national interest;
- almost a monopolistic position in the Hong Kong market place, which is believed to be too small to attract serious competition;
- well established links and relationships with key users;
- current product and service range meets the great majority of customer needs;
- SMO's databases represent a valuable national intellectual property asset.

Weaknesses

- low profile and identity in the market place, with poor awareness of SMO's activities, products and services;
- perceived as bureaucratic, commercially immature, inflexible and a high priced supplier;
- very limited marketing, sales and commercial skills, knowledge and experience, and no pro-active selling;
- does not operate as a single, coherent corporate entity and has a fragmented approach to product and market development;
- lacks co-ordination of management data to provide information on costs, sales and key performance indicators (except at strategic and DSO levels), leading to ineffective control;
- multi-layered management structure, over-manned and inefficient in some areas, and no cost control;
- poor customer support services and communications, and seen as giving poor delivery service to customers;
- digital products considered not to be up-to-date and of inadequate quality;
- as Office within Lands Department not able to determine own policies or retain revenue for investment and development;
- has a rationale for pricing both digital data and paper products which is no longer understood in the market.

Opportunities

- fill the vacuum in GIS leadership in the SAR;
- take the lead in integrated database development across Government and in the Utilities;
- exploitation of the just developing Business Professional segment of the market, specifically in the Property Development, Real Estate and Retail sectors;
- extend the penetration in the Government and Technical professional segments of the market, particularly in the Architectural and Consultant sectors;
- take up VAR, agency, booksellers and academic institution partnerships, and offer full technical and marketing support;
- realise efficiency improvement potential to provide finance for product and market development, systems improvements and the training to close skill gaps;
- develop the cost model to provide information for cost management throughout SMO.

Threats

- uncertainty regarding future Government policy following the handover;
- in the marketing vacuum left by SMO there are signs of infiltrating competition. A 倰heery picking' approach from competitors could leave SMO with the high cost/low volume revenue rump;
- other Government departments and the Utilities are stepping into the GIS leadership vacuum. SMO are not pro-active, thus creating 'internal' competition and unco-ordinated GIS development in the SAR;
- ITSD threat to take over computer aspects of highly technical systems;
- developing use of satellite and ortho-photography technologies;
- failure to demonstrate 'value for money' from services and products could lead to declining future investment in SMO. There will be increasing pressure on SMO to account for its spending.

3. MISSION AND AIMS

The following statements of 'mission' and 'key business development aims' arise from the above analysis and discussions held with the senior management of SMO during the course of the Costing and Pricing Study.

The overall purpose or 'mission' of the Survey and Mapping Office (SMO) is perceived as being:

To meet the land surveying and mapping needs of all sections of the Hong Kong SAR community in a cost-effective, high quality and timely manner.

More specifically, SMO's key business development aims over the five year time-span of this Business Plan are:

1) *To achieve recognition throughout the community and the Government that it is the authority, centre of excellence and prime source of supply for, land boundary survey, mapping and geospatial information within the SAR.*

2) *To improve the quality, variety, up-to-dateness and utility of digital data, graphical maps and plans available to the Hong Kong community, in accordance with customer requirements.*

3) *To promote the development of the GIS (Geographic Information Systems) market in Hong Kong and so increase the penetration and utilisation of its digital mapping products.*

4) *To take the lead in the development, management and exploitation of an integrated Hong Kong Geographic Information System, incorporating data from both the public and the private sectors.*

5) *To introduce more effective sales, distribution, promotion and customer support arrangements, which will improve delivery and buying convenience and will encourage increased customer take-up of SMO's products and services.*

6) *To introduce simpler, more rational pricing and copyright policies, structures and levels, which will support the range of business development aims and targets.*

7) *To re-position SMO within Government so as to demonstrate accountability and to facilitate realisation of its key business aims.*

8) *To develop an organisation and introduce human resource development programmes which will support the achievement of business aims, facilitate change and foster a customer and employee caring organisation.*

9) *To identify and implement efficiency improvements on a continuing basis, in order both to meet cost targets and to release additional resources for business development.*

10) *To introduce management information systems which will enable business performance to be monitored and controlled effectively against the targets and objectives set.*

4. POSITIONING OF SMO WITHIN GOVERNMENT

We believe that SMO needs to develop a separate identity from Lands Department, which is commensurate with its role as the central authority for land survey, air survey and all types of mapping in Hong Kong. This will put SMO in a key position to take the lead in GIS developments. The user community will benefit most in the short to medium term by positioning SMO as an independent department, which maintains its present integration of activities, but adds to this business and marketing elements. This change should be consolidated over the five-year period of this Business Plan during which SMO acts independently of Lands Department. This status change should be accompanied by a policy of "charging" all customers and introducing steadily increasing cost recovery targets, so as to ensure that there is a continuing pressure to improve cost awareness, efficiency and customer focus. Within this new status we believe that SMO's business development aims can best be met:

- in an organisation in which SMO is held accountable for its own operations;
- where some form of external pressure is being brought to bear to encourage greater efficiency, effectiveness and economy, without impairing the high professional standards of the organisation;
- where SMO management becomes more business focused;
- where SMO has autonomy in managing its staff resources.

We recommend, therefore, that SMO should separate from Lands Department and become a stand-alone department in its own right. Ideally it should be positioned in a Government bureau which is not a user of its survey and mapping services i.e. a neutral bureau, not only without, but seen to be without vested interest in SMO. Such a positioning as a Stand-Alone Department will:

- recognise its importance in the Special Administrative Region;
- provide SMO with greater autonomy and accountability, and force it to justify the value for money from its expenditures:
- place SMO in a stronger position to manage customer priorities and able to resist demands that do not meet value for money criteria.
- Provide the independent ability to argue fund justification in: keeping abreast of new technologies in: mapping; marketing its products and services; and developing its own management information systems.
- put SMO in an independent position to take the initiative on issues such as the development, management and marketing of a multi-agency/multi-dataset geospatial database;
- assure SMO of a much higher profile in the market place – a major benefit in promoting its products and services;

We believe that this stand-alone status is in the best interests of SMO, the Hong Kong Government and the SAR as a whole as SMO seeks to:

- improve the efficiency and cost effectiveness with which its products and services are provided to customers;
- maintain, provide and administer sound and up-to-date land survey, mapping and land information systems for the territory;
- encourage the more widespread use of its products and services;
- set pricing policies which will attract customers and safeguard future product and service provision;
- act as lead co-ordinator for geo-spatial data systems within the SAR;

We recognise that SMO would come under increased Government scrutiny with a much higher profile as an exposed department rather than as an Office within a larger department. It will also need to add staff, e.g. finance staff, to meet the demands of departmental accounting, and possibly other staff to cover the services currently provided by DAO.

Lands Department must be convinced that such a separation would have no adverse effect on the substantial services being provided to them. We believe that such assurances could be provided through Service Level Agreements between SMO and LAO and LACO, which set out clearly the nature and range of the products and services to be provided, quantified where possible, and with agreed service targets, all within an agreed annual budget value. Under a key account concept, Lands Department would continue to be a key account and should be managed accordingly.

We believe that whatever the current climate is now, at some time there will be strong efficiency measures imposed on all aspects of the Hong Kong SAR Government activity, in accordance with the world-wide trends observed in the Study Tours. The sooner that SMO Management prepare for this the better. As a minimum, business management, marketing and management accountancy skills will be needed. There will also be a need to re-assess human resource strategies. By managing themselves as a business with clear targets and performance monitors, SMO will reduce its dependence on Government subsidies and hence will be well positioned and able to point to sustained improvement when efficiency pressures increase. In the meantime, such action will put SMO in a stronger position to argue for development funding.

The full arguments for the ‘Positioning of SMO within Government’ are set out in Position Paper N°2.

5. MARKETING STRATEGIES

5.1 Product mix and development

The Product Development Strategy is designed to correct the product weaknesses, and meet the customer needs, identified in the research programme and set out in Position paper N°5 "Product Mix and Development". The strategy will meet the Key Business Development Aims numbers 2 and 4 viz:

- *To improve the quality, variety, up-to-dateness and utility of digital data, graphical maps and plans available to the Hong Kong community, in accordance with customer requirements.*

- *To take the lead in the development of an integrated Hong Kong Geographic Information System, incorporating data from both the public and the private sectors.*

The key elements of our proposed development strategy are as follows:

1. **ArcInfo Version 6 should be upgraded to Version 7 as a matter of urgency**, to ensure the LIS is Year 2000 compliant. This upgrade will also provide the opportunity to restructure the data already held, so that it can accept proposed and as-built plans from developers, and other additional features, to enhance content and perceived currency.

2. **Enhanced hardware capacity, storage and processing** (over and above the already proposed data dissemination system) i.e. the 'customer supply set', **should be introduced into LIS**. This will not only speed delivery, but will also act as a hot/warm stand-by in the event that the central processor/storage fails. Further robustness would be added by locating this hardware in separate accommodation.

3. In the interests of assuring optimum currency, **checks should be run: to ensure that all DSO's are meeting the pledge 'to capture all significant topographic change within three months**' in a uniformly consistent manner, and; **to ensure that the procedures, which interrogate DSO map headers to determine whether an up-date has occurred or not, are functioning correctly**.

4. To manage customer expectations in respect of quality, currency and content, **SMO should publish and communicate to customers its data specifications and standards**.

5. **Better quality diskettes should be used**, when used as output media, both to improve customer data quality and to reduce internal rectification costs.

6. **A flow-line should be created, to enable 'sweeping' of the entire database**, in order to validate and 'eyeball' every sheet, and so confirm that the topological model has been maintained throughout. This will rectify historical errors in digitisation and will improve the internal consistency between DSO boundaries and sheet edges. The planning, development and execution of such a flow-line will, however, require a sizeable effort in manpower.

7. **A detailed user needs survey, aimed specifically at identifying and quantifying the need for additional features to enhance data content, should be carried out by SMO before embarking on such enhancement**. The upgrade to ArcInfo Version 7 will provide the opportunity to implement the findings (see above). Examples of enhancement already identified include, addition of bus routes (particularly important in the Hong Kong Guide - Streets and Places), traffic information, more frequent levels data, planned developments etc. Further requirements are included in the market research report. It will be important to maintain an on-going awareness of changing customer requirements and future development needs through the market intelligence approach proposed in Position Paper N^{o} 6.

8. **Consideration should be given to introducing an ORACLE Relational Database Management System and associated spatial data engine to the LIS following the upgrade to ArcInfo Version 7 and its associated hardware upgrade**. This could provide improved attribute data. For example, it would enable true 3D data to be offered, such as the height of a building and its height above sea level, as well as its planimetric position. Such data is already required by some users. However, provision of this increased functionality would first necessitate the collection of additional data.

9. **All layers of a map sheet should be supplied to customers, regardless of whether they contain data or not**. This will reassure customers that no data is missing from the supply.

10. **A data quality unit should be established within SMO**, to establish and enforce common standards (i.e. consistency of approach) of data capture, digitisation, depiction and all other matters concerned with spatial data throughout SMO. Such standardisation within the organisation is a pre-requisite to SMO taking the lead in the provision of spatial data on a wider basis. Part of the unit's role should also be to investigate, and take action on, all customer quality complaints. To the same end i.e. standardisation and quality, **membership of the Mapping Committee should be extended to include a wider range of technical interest and functions across SMO**. Consistency of approach across SMO also requires documentation of common standards and methodologies and training of all staff involved in them.

11. In view of the increasing use being made of **remote sensing techniques and data** in conjunction with conventional map data (for example, for pollution monitoring purposes), **SMO should maintain up-to-date awareness of developments and possible opportunities for exploitation in Hong Kong**, if only as a 'defence mechanism' against possible competition from this source.

12. In the longer term SMO should create and maintain digital, ortho-photography, photo-mosaic and remote sensing imagery databases to facilitate map, digital photo and digital terrain model production.

13. CD-ROM should be introduced as a data supply media option at the earliest opportunity. However, although a CD-ROM writer has already been purchased by LIC, **the possibility of customer demand overloading the existing data supply system should be examined before proceeding**. This in conjunction with plans to introduce the proposed 'data dissemination system' and our earlier proposal to speed delivery with a 'customer supply set'. A further means of overcoming any possible bottleneck would be to maintain a stock of pre-prepared CD-ROMs for sale, suitably encrypted for selected release of data to customers on demand and following receipt of appropriate payment. This approach has implications for data currency.

14. Direct on-line supply to the proposed VAR network (and perhaps selected major direct customers) should be considered in conjunction with the development of the network. For data distribution purposes (and updating value added data), VARs might hold a database locally with nightly on-line updates from the central SMO database. Whilst not difficult technically, this would require considerable investment in good communications links and in storage and output devices at each linked VAR.

15. Direct on-line access to SMO's database is a further possibility for major customers, as a means of easing data delivery and currency problems. Direct access to a variety of formats stored in the proposed 'customer supply set' would save on customer conversion costs and permit SMO to retain quality control over its base data. However, access to a seamless database (with feature rather than sheet identification) would require all such users to share a common 'data dictionary' (the same data structure). Since this is unlikely to be realisable in the medium term (see below), we see on-line access as a long-term prospect.

16. Access to data via the Internet/ Web is already under consideration by SMO. This does not become a serious possibility until Version 7 of ArcInfo has been implemented, and, for example, a web browser becomes feasible. There are also problems associated with data security, copyright etc. (see Position Paper N^{o} 4). **We therefore recommend that this delivery option be restricted to a catalogue, data select and data ordering aid in the short to medium term**.

17. **The standard data formats currently supplied by SMO should be extended to include popular GIS data formats, to facilitate the development of the business professional/PC based market**. Consideration could be given to providing other formats at a premium, but, at all events, the range of formats provided should be kept under continuous review. For reasons of quality assurance, liability and maintaining ownership/copyright of the data, it is preferable for SMO in general to maintain responsibility for conversion.

18. In the interests of SMO retaining the leadership of GIS developments in the SAR, extending to an integrated Hong Kong GIS, and also to improving the use and value of its data, **SMO should take the lead in establishing common data exchange standards and geospatial data model (data dictionary) across the SAR**. It should also aim to become the custodian of Meta-data for all Geographic Information Systems within Government Departments and provide a platform for the sharing of Geographic Information within the SAR Government.

19. **SMO should take the lead in the future establishment of an integrated Hong Kong GIS**, which would provide single point user access to a range of government and possibly private sector data sets. However, whilst this is largely technically feasible now, implementation will require resolution of a number of non-technical issues, such as: data ownership, copyright, security, common data exchange format etc. Realisation remains a long term prospect, but will never occur unless an initiative to begin is taken in the short term. As a first step SMO might become the custodian of all geographic information and maintain a centralised, integrated and dynamic land information database for the SAR Government.

20. **To improve efficiency in DSOs and increase the speed with which BMS and CIS are updated, SMO should move away from dedicated workstations and consider the adoption of client-server architecture throughout**. Workstations should be able to access and up-date the complete range of SMO geographic databases. Consideration should also be given to managing the databases centrally, with LIC holding the master copy and DSOs requiring write permission to update a specific map sheet.

21. The potential developments outlined will impose a heavy additional programme and project management burden upon existing resources. The programme will need to be planned carefully and realistically in the light of the management resources which can be made available. **Consideration should also be given to the possibility of forming joint ventures/partnerships with academic or other technically based organisations to supplement internal resources**.

Although nominally about products, it will be clear that the majority of the arguments above have centred on developments to database specification, management and update. The success of any national mapping organisation today is wholly dependent on the quality of its geographic databases. If the databases are right, any mapping or geographic information product can be designed and produced.

5.2 Sales, Distribution and Support

The Sales and Distribution strategy is designed to correct the weaknesses identified in the research programme and set out in Position Paper N°6 "Sales and Distribution." The strategy will meet the Key Business Development Aim number 5, viz:

- *To introduce more effective sales, distribution, promotion and customer support arrangements, which will improve delivery and buying convenience and will encourage increased customer take-up of SMO's products and services*.

The strategy will also contribute to meeting Key Business Development Aim number 3, viz:

- *To promote the development of the GIS market in Hong Kong and so increase the penetration and utilisation of SMO's digital mapping products*.

1. **First, we recommend that SMO should develop a mixed direct and indirect (external to SMO) sales and distribution network, on the grounds that it offers a faster, lower risk approach to market development and growth, at greatly reduced cost**. Given current financial constraints it seems unlikely that SMO could find the investment 'to go it alone'. Also, its resources would seem best employed in concentrating on database development and exploitation, for which it has the expertise and which we believe is its core Government task.

Within this framework, the key elements of the sales and distribution strategy should be as follows:

2. **Continue to market and deliver digital data products direct to both government and selected major technical professional customers. This should include pro-active marketing to develop latent opportunities such as with Education Department, the Fire Department etc.**

3. **Establish a VAR network sub-licenced**: to market and deliver basic and tailored digital data (and paper plots thereof) to other technical professional customers; to market, develop and deliver packaged solutions to the business professional market segment; and to develop, market and deliver tailored data and packaged solutions to Government customers, all within joint venture/partnership arrangements.

4. **Sub-licence major government customers**, such as Civil Engineering, Highways and Drainage Services Departments, as appropriate, **to distribute digital data to their contractors and sub-contractors on government contracts**.

5. **Market and deliver paper products and services direct via HQ to the selected major technical professional customers, as well as government customers.**

6. **Continue to supply paper products and services to the wider market via the Map Publication Centres (MPC), the Government Information Service (GIS) and the DSOs.**

7. **Establish a bookseller network to stock and sell printed maps and guides to the general public.**

8. **Develop faster, more convenient digital data ordering and delivery systems,** including: the already proposed 'data dissemination system'; a 'customer supply set' to pre-convert data into a range of the most popular formats; an Internet select and order system, perhaps extending to on-line supply; CD ROM supply media; dedicated on-line data supply for major direct customers and the VAR network. Sharing distribution between SMO and the VARs, and in particular restricting SMO to servicing only the largest customers, will of itself of course reduce delivery times.

9. **Introduce an 'express' delivery system at a premium, for direct customers for both digital and paper products.**

10. In addition to the faster digital data delivery systems referred to above, **improve the actual or perceived currency/up-to-dateness of digital map data** by: improved communication as to update availability; incorporating customer up-date requirements within the supply contract, as a means of triggering automatic supply of either a full or partial replacement data set; introducing an ordinance which obliges the public to inform SMO of building name changes (such an ordinance is already in place to notify SMO of road name changes).

11. **Introduce more convenient ordering, buying and delivery arrangements, for both digital and paper products**, including: telephone ordering and payment on account for regular, credit worthy customers; payment by credit card or cheque; Internet/telephone catalogue, product selection, ordering, payment facility; paper/electronic product, update, service catalogue at sales outlets; postal or courier delivery service; extended opening times in line with normal commercial practice. These in addition to the faster delivery systems referred to earlier.

12. **Provide a telephone 'help-line' for all customers and products/services as the single point entry to a range of personal and written, technical and commercial, customer pre- and post-sale enquiry/support services**. Written material should be to a consistently high standard and should include: full product/service catalogues and indexes, including dates of last up-date and next planned up-date; details of sales outlets, contact points/names, buying procedures, opening times etc; full pricing and copyright information; user manuals for loading and manipulation of digital data, and containing also the data dictionary and data standards employed and a clear exposition of up-date policy and standards. Such material should also be placed on SMO's Internet web page.

13. **Appoint professionally trained/experienced marketing/sales personnel** to manage, maintain close liaison with, provide commercial support to, and drive sales through, respectively: direct customers; the VAR network and business professional market; the bookseller/DSO/MPC/GIS network. **These should comprise: an internally recruited Key Account Manager at SLS level, for both digital data and paper direct sales; an externally recruited, experienced Business Development Manager at SLS level, to develop and manage the VAR network and business professional market and; an internally recruited Indirect Sales Manager at SLS level, to develop and manage the bookseller/DSO/MPC/GIS network**. The last should have direct responsibility for the DSO/MPC sales activities. All three should report to **an externally recruited, professional Marketing Manager at CLS level, who himself should report direct to the PGLS**. The Marketing Manager should have overall responsibility for all aspects of sales, marketing, distribution and supply, including pricing and copyright (see Position Paper Nº 4). The team should also include internally recruited administrative staff to provide support in all these functions.

Note: A precedent with Government has already been set for the appointment of specialist marketing posts. For example, both the Land Registry and Companies Registry Trading Funds have appointed Business Managers.

14. **Appoint a small technical support team**, with all-round expertise, to deal with technical enquiries from members of the networks and end-users, to provide training and support, to manage the production of technical literature and to provide feedback to the development team on customer technical problems and requirements. In the first instance the team should comprise no more than two to three members, and should be recruited from, and report into, the LIC. The need for future strengthening of the team will have to be kept under constant review.

15. **Produce annual sales plans and monthly sales statistics showing performance against plan, by main product and market segment, and by market sector and outlet, aggregated across all products/business centres, to facilitate effective sales and marketing management.**

Clearly, further detailed work will be required by SMO to implement these elements of the strategy, and prioritisation will be required in the light of the resources which are made available. However, in principle, the aim should be to implement all within the five year time-scale of the business plan. Further consideration to many of the elements is given in other strategies within this Business Plan i.e. Pricing and Licencing, Product Mix and Development, Management Information Systems, Promotion, and Organisation and Human Resources.

5.3 Promotion

The promotional strategy is designed to overcome the promotion weaknesses identified in the research programme and in our wider study of SMO operations, as set out in Position Paper N°8. The strategy will meet Key Business Development Aims 1 and 3, viz:

- *To achieve recognition throughout the (Hong Kong) community and the Government that it (SMO) is the authority, centre of excellence and prime source of supply for, land surveying, mapping and geospatial information within the SAR.*

- *To promote the development of the GIS (Geographic Information Systems) market in Hong Kong and so increase the penetration and utilisation of its digital mapping products.*

The promotional strategy proposed is designed to support the Positioning, Sales and Distribution, Pricing and Licencing and Product Development strategies put forward in other sections of the Business Plan.

5.3.1 Promotional objectives

SMO's market breaks down into three broad segments with identifiably different characteristics in respect of marketing, and, more specifically, promotional requirements. The segments are Government, technical professional and business professional customers.

The Government segment largely comprises existing customers, who know of SMO, but are not necessarily aware of its product range, particularly its digital products and their utility. Both paper and digital products are taken, generally free of charge, and there is a trend towards the replacement of paper with digital products. Mid - and large-scale maps and plans are the main area of interest. Current digital customers are largely 'buyers' of data, but there is a growing demand for 'packaged solutions'. 'Buying' decision makers are generally technically aware, although some, and particularly amongst the potential (as opposed to current) customers, are not. We have proposed that all current and potential customers should be supplied direct, as at present, although, where modified data or a packaged solution is needed, VAR involvement (at a price) may be apposite.

The Technical Professional segment comprises both existing and new potential customers, all of whom generally have a low awareness of SMO, its activities and its products. Both paper and digital products are taken, at the commercial price unless used for a Government contract, but the main area of potential is for digital products (at the expense of paper), since all are users of CAD systems. The great bulk of demand is for large scale maps and plans in base data form; there is little interest in packaged solutions. Buying decision makers are technically aware. We have proposed that selected major customers should be supplied direct (or via their sponsoring department if used for a Government contract) and other customers indirectly: for digital data via the VAR network, or for paper, via the MPC, DSO etc. network.

The Business Professional segment largely comprises potential new customers, the great majority of whom have a low awareness of SMO, its activities and its products. The main interest is in digital products, as the base mapping for GIS, at competitive prices. All scales of maps are likely to be used and a packaged solution approach is essential. Buying decision makers are usually senior business managers, who are technically unaware, and have to be 'sold' on the benefits of a business solution, not the features of a technical product. This is, therefore, a VAR market.

SMO's promotional objectives should be to:

- **Raise its profile, correct its adverse image and increase awareness of its activities and products in the market place**. This is a corporate promotional activity. It involves continuous communication with all of its target customers, not only via promotional activity as such but via every customer contact, whether this be a sales visit, dealing with a technical or commercial enquiry, submitting technical data, a letter or even an invoice. It requires that all these media, also its products and services, and its indirect, as well as its direct sales outlets, projects a consistently positive image of SMO. To ensure that every communication reinforces that image, all communications should be linked by a corporate logo. The image to be projected, and which over time should be brought to mind when the logo is seen, is that of *the* go-ahead, customer caring, commercially aware supplier of high quality maps and mapping data, which is at the forefront of mapping and GIS technology, and invariably delivers value for money. Of course, the image communicated must be delivered in practice by products and staff, as well as promotional materials.

- **Educate and persuade customers of the benefits to be realised in employing digital mapping data in new CAD and GIS applications**. This is particularly important in the Business Professional market segment, where solutions and business benefits, not products and features, have to be sold to achieve market penetration in this; probably the largest opportunity open to SMO. Case study material and referrals will be needed for the messages to carry conviction, and, since market development is dependent on VARs, so will close joint working with the VARs.

- **Inform customers: of the product and service range, new developments and releases/up-dates; of sales outlets and contacts, pricing/copyright, ordering and payment arrangements; and of technical back-up literature and support; etc**. Such information should be regularly provided/made readily accessible, should be to a consistently high standard (see above) and should be user friendly. It can be made available: verbally on a help-line or via sales contacts, in literature form by mailing or via sales contacts/point-of-sale locations, or via the Internet.

5.3.2 Promotional Strategy

The strategy is to direct promotional effort at, and use media suitable for, targeted audiences, rather than use mass media such as TV, radio or newspaper advertising. These are expensive and wasteful if a mass market is not being attacked. It is possible that the VARs may find such a market, but it is unlikely within the time-frame of this Business Plan. The key elements of the promotional strategy are outlined below. They are designed to meet the objectives set in the previous section and should be further detailed by SMO before implementation, in line with the qualifying remarks following each.

1. **All SMO's promotional activity should be centralised within the proposed new corporate Sales and Marketing team**. The Marketing Manager should take personal responsibility for the promotional function, using contracting agencies for design, production and media work.

2. **A corporate SMO logo, distinct from the Lands logo, should be designed and used on all internal and external communication material, including letterheads and commercial stationery**.

3. **Good quality, plain language, corporate, product, pricing/copyright and technical literature should be produced as the foundation for most other promotional activity**. It should be distributed widely, via regular mailshots to targeted actual or potential customers, personal contact with customers and point-of-sale displays/racks. It should also be made available for use by VARs, as part of SMO's support to them, but also to maintain SMO's profile with VAR customers. **Literature should include**:

   – **A corporate 'glossy' brochure**, which might set out for example: the SMO 'mission' and image to be conveyed; product and service range; applications and benefits of mapping information and GIS to what sectors; where and how to buy.

   – **Product leaflets**, setting out for example: product specification and features; map index; applications and benefits; case studies.

   – **Pricing and copyright leaflets** (for content see Position Paper N° 4).

   – **Technical Data Sheets** (for content see Position Paper N° 5).

4. **Current or potential customers should be regularly mailed with literature and newsletters, as appropriate**. The latter might contain: news of recent application case studies, price changes, developments in hand or planned, new releases/ updates etc.

5. **Press releases/advertorials should be issued/obtained in the SAR press/trade and institutional journals etc**. and should contain newsworthy items as described above. These offer a low cost access to the mass media. They are particularly appropriate, in combination with mailings, exhibition appearances and especially arranged press conferences, to announce a new product launch and so gain maximum publicity exposure for the launch.

6. **SMO should hold a full, regularly updated product, service, pricing, outlet etc. catalogue on a dedicated Internet web page**. Although a 'passive' promotional medium, it provides a further increasingly accessible source of information for customers.

7. **A more pro-active form of electronic communication would be to mail CD-ROMS to targeted customers**. This might contain not only the 'catalogue', but also case study examples. **This option should be considered**.

8. **Sales outlet addresses, opening times, locations, routing information and contacts should be publicised in all media**, also information access points. Outlets should be clearly signposted. They should contain readily accessible electronic and/or hard copy product etc. catalogues within, also full sets of literature for the entire product range.

9. **SMO initiated seminars, dealing with both 'leading edge' and sector specific topics should be held regularly**. Targeted sectors/customers should be invited – another mailing contact opportunity – and followed up after the event. Customer specific events might also be held on the premises of selected major actual or potential customers.

10. For purposes of such events, and direct sales calls, **audio visual presentations should be prepared, containing sample data and examples of applications**. These would preferably be 'notebook' computer/Powerpoint based.

11. **SMO should also attend, exhibit at, and present papers to, relevant exhibitions and conferences**.

12. **Other promotional tools which should be considered include, packaging, sales incentives, promotional gifts, sponsorship of sporting or other newsworthy events, and participation in other Government promotional activities** – potentially a low cost means of achieving coverage, but increasing SMO's profile.

13. **Finally, as part of its partnership arrangements with its VARs and other intermediaries, SMO should support and participate in their promotional activities**. This might include financial support, or might be limited to the provision of literature, the loan of demonstration equipment or joint manning of stands. Joint promotional initiatives would be a further option.

5.4 Pricing and Licencing

The Pricing and Licencing policy is designed to correct the weaknesses found during the study and set out in Position Paper N°4 "Pricing and Licencing". The strategy will meet the Key Business Development Aim number 6, viz:

> *To introduce simpler, more rational pricing and copyright policies, structures and levels, which will support the range of business development aims and targets*.

5.4.1 Charging Policy

Our arguments on charging policy are set out in Position Paper N° 4. **In normal business circumstances we would recommend the adoption of a charging policy, where all customers are charged, with full copyright ownership enforcement, as being the best route to maintaining the integrity of mapping within the SAR, and to SMO delivering value for money and ultimately achieving trading fund status.**

Subject to prices being set at 'market' levels we would anticipate no fall in usage, and the additional revenues generated should fund the investments in marketing, technical development, copyright enforcement and accountancy needed to drive market development and growth forward in a controlled manner.

However, we recognise the Government environment in which SMO is currently operating. We do not believe that SMO can unilaterally adopt a hard charging policy within the Public Sector Reform framework. This can happen if there is a Government policy in the future for all departments to charge each other for products and services supplied, as is the case in many other countries, or if SMO becomes a trading fund. However, we see no short-term prospect of the latter being possible, although it should remain a long-term aim (see Position Paper N°2). Another alternative, as a transitional measure, is for SMO to be given the clearance from the Finance Bureau to charge Government departments under an Operating Services Account, as previously used by EMSD.

If an Operating Services Account is not possible, **we nevertheless believe that SMO must be in a position to demonstrate the value of its work and it must, as a minimum, inform all its customers of the value of the products and services being provided**. We recommend, therefore, that all customers should be "charged", with commercial customers being charged as they are now, and with 'dummy invoices' being submitted to Government customers at the same commercial rates for the provision of the same products and services. Where services specific to Government are provided (e.g. projects such as West Rail, and all the work done for LAO and LACO), Service Level Agreements should be negotiated annually. These should set out the nature, quantity and level of the services to be provided and an agreed value for these services. SMO management will then be in a strong position to account fully for the services being provided both to commercial and government customers and to demonstrate a combination of real and notional cost recovery.

5.4.2 Pricing principles, structure and levels

Our policy recommendations are as follows:

General policy

1. **Price levels and structure, including the conditions of the licence should be simple, readily understood and defensible**. They should be documented and communicated to customers via appropriate media immediately following every review.

2. **Market-based pricing should be adopted**, since a key aim of SMO is to extend the use of its products, and particularly of digital data. Although prices can be cost or market-based, the former take no account of what customers are prepared to pay. Even though SMO is currently in a near monopoly position, customers will either not buy at all, will stay with paper or will try to circumvent copyright, if prices are above the perceived value of the product. Unrealistically high prices will also encourage the entry of competitors. For these reasons, we recommend the adoption of market-based pricing.

Digital products

3. **Prices for digital data overall (for initial supply, annual licence renewal and up-dates, at an appropriate volume of sales) should recover the full material, staffing and processing costs involved, in transferring, modifying, marketing, selling and distributing data from databases to customers, where these are additional to the core strategic requirements of Government**. In this context we classify database development, maintenance and management as a core strategic Government requirement. The difference between the market based selling price and these costs is the contribution to core costs. Where negative, a strategic decision must be made whether or not to withdraw the product (see also Position Paper N°5 – Product Mix and Development).

   (Note: The above refers to products. Services would normally be charged either, at an hourly rate, which includes an element of overhead recovery plus a profit margin, or, on a fixed price contract basis, where the contract specifies the work to be carried out.)

4. Published **digital data price structures for initial sales, should include**:

   - **a supply charge element** (inclusive of standard media costs and against which a quantity discount can apply related to the number of sheets purchased);
   - **a one year licence-to-use element** (inclusive of hard copies printed off, provided these are only for internal use,.and escalating according to the number of sheets and terminals in use, this latter represents **an "enhancement charge")**.

5. In principle, for digital data sales, apart from the initial supply charge, customers are paying a licence fee for permission to use, not own the data. Ownership remains with SMO. Thus, **the initial licencing charges should continue to be levied as long as a customer is using the data. The annual digital data licence renewal fees should, therefore, be set at the same level as the initial licence fee**, suitably modified as appropriate according to changes in usage.

6. **Data update charges should be levied at a proportion of the initial supply charge element, discounted in proportion to any initial quantity discount**. Initial and renewal licence fees should transfer from the sheets replaced, thus obviating any notion of charging twice for the same sheet. The changes levied should encourage updating and, therefore, the maintenance of common, up-to-date databases throughout the SAR.

7. **As an option, the initial data supply contract should include provision for an automatic update service**, the anticipated supply of which could count towards any quantity discount.

8. **Enhancement charges should be based on customer forecasts of terminal usage, backed by 'enforcement checks**'. Therefore, the practice of recording terminal serial numbers for data pricing purposes should be discontinued.

9. **In the longer term, consideration should be given to differentiated pricing related to sale of selected data for selected applications**, thus opening up new market opportunities without jeopardising existing business. Such data selection and differential pricing will best be implemented by the VAR network. (See intermediaries below).

10. **Digital data contracts should expressly permit the production of hard copy printouts under licence and the requirement for the correct acknowledgment and licence number to appear on each printout**. This will facilitate the detection of any infringing copies.

Paper products

11. **For paper products, the same approach to cost recovery should be adopted as proposed for digital products**. That is that prices for paper products should recover the full material, staffing and processing costs involved, in transferring and modifying data from databases and in marketing, selling and distributing the paper products to customers, where these are additional to the core strategic requirements of Government, as previously defined. In this case however, there is no requirement to break the price down into supply, licensing and royalty elements, although quantity discounts for large volume orders should still apply.

12. *With the adoption of market pricing for paper products across all market sectors, the need for pricing 'formulae' disappears*, although costs are still highly relevant as a means of establishing contributions, making decisions on product mix and in pricing decisions themselves.

13. **Permission should not be given to customers to digitise/scan paper maps where the resultant 'product' is a direct competitor to one of SMO's products**. Permission should only be given where it can be shown that an SMO product does not meet the particular requirement. In this case there should be a one-off digitise/scan copyright royalty equal to the price of the relevant SMO data and application of the normal data annual licencing arrangements. As a first step to enforcement it will be necessary to communicate this policy to customers.

14. **SMO should take steps to bring business copying of paper maps for internal use within its copyright control**. An annual licence could be introduced for registered users, whereby royalties are levied annually against forecasts of the number of copies to be made. This might be included in an all-up licence for digital data customers. The copyright requirement should be communicated to all customers via the variety of media available (see Position Paper N°8), and perhaps some incentive given for customers to register e.g. priority delivery service, advance notification of new releases, up-dates etc. Prices per copy should be set at a level which will not deter participation or encourage infringement and should include provision for quantity discounts.

15. **Customers wishing to publish SMO maps and photographs, or extracts thereof, should be charged a flat rate royalty per copy, related to the size of the extract to be copied, with discounts given for larger quantities and special customers, such as education and charities. No distinction need be made between black and white/colour.** This is in place of the present complex formula. Customers wishing **to** reproduce exact copies in publications competing with SMO's own products should be permitted only copying to a restricted size. In the case of maps, they should be encouraged to produce redrawn versions, which do not compete directly with SMO's products, via a discounted royalty, set at say 50% of the norm. Customer declarations of copies made, for royalty payment calculation purposes, should in future be backed by documentary evidence (e.g. printers invoices). To further discourage under-declaration, royalty refunds should be made against properly authenticated quantities of destroyed stock (via a copy of the destruction note for example).

Intermediaries

Our policy recommendations for dealing with intermediaries are as follows:

16. **Booksellers, who stock and sell printed maps and guides to the general public, should be afforded a discount on their purchases of stock**. This should be negotiated, but, in view of past history, the discount will probably have to be in the region of 30%. We anticipate that the bulk of their sales will be additional to, rather than competing with, those of SMO's own outlets.

17. **Government departments sub-licenced to distribute data to their contractors and sub-contractors on Government contracts, should inform SMO on a monthly basis of the data distributed to each contractor,** so that SMO can put a value on this data and administer and enforce its copyright ownership. Again, it should be noted, all notional revenue from this source will be additional revenue.

18. **VAR's sub-licenced to distribute data, modified data or to develop and market packaged solutions, should also receive a negotiated discount or other remuneration,** as appropriate, for so doing. As well as supplementing SMO's own data distribution resource, the VAR's will be opening up new applications and new markets for SMO's products, extending from high priced, business GIS applications to low priced, mass market applications. It will, therefore, be imperative for SMO to take an innovative and commercial approach to partnership, pricing and shared reward negotiations, which are likely to be unique for each VAR, according to their particular products, applications and markets.

19. **Recruitment of VARs should preferably be via advertisement requesting joint venture proposals. Following evaluation and negotiation, a contract should be drawn up formalising the agreed arrangements**. These might well include free supply of data for development purposes in exchange for an up-front predicted annual royalty return, as a measure of VAR commitment and seriousness. Royalties might be calculated as a percentage of the net sales return on the product, as a flat rate fee per unit of sale, or as a percentage of sales. The need for end-user copyright licences will depend on the application and target market. For example, for low price, high volume applications, the licence would generally be included in the price of the product, but, for high price, low volume applications, a licence is likely to be needed to maintain control over the use of data within the product. Professional legal advice should always be sought prior to entering into any contract.

The Internet

Our recommendations for the short term are as follows:

20. **SMO should only allow customers to make SMO sample data available on the Internet**, until the difficulties of security, identifying and charging for access have been overcome.

21. **Customers wishing to place only small amounts of data, say upto 100 sq. cm., on the Internet, World Wide Web or other on-line service should be permitted to do so. If the data is redrawn to the customer's own specification, then this might be extended to say 200 sq. cm. A flat rate licence fee, for a period not exceeding six months, should be charged**, since most web sites are changed on a regular basis to maintain browsers' interest. At the end of the licence period the site should be checked, and, if the data has not been deleted, the customer contacted to renew the licence.

5.4.3 Price review and revision

Our recommendations are as follows:

1. **With the adoption of market pricing, the current practice, of annual review and automatic uplift of prices by the rate of inflation or increases in material cost if greater, should be discontinued.**

2. **Prices should be kept under regular review, in relation to feedback from the market place and costs, and should be adjusted only when indicated as being desirable by the review, and at intervals which are sensible commercially. Price revisions more frequent than annually should be resisted in all but exceptional circumstances.**

3. **Feedback ("market intelligence") from the market place should be via the Sales, Marketing and Copyright staff proposed in our Sales and Distribution, and Organisation and Human Resources strategies, and in this strategy**. It should be collected on a continuous basis and analysed routinely by the Marketing Manager using procedures developed and documented for this purpose. It should include regular feedback from VARs and other intermediaries and be supplemented by periodic (say annual) surveys of samples of customers from each market sector. The data collected should include customer satisfaction and improvement suggestions relating to price levels and licencing arrangements. It should also include intelligence on competitor products, activity and prices. Customer samples for the survey should be structured not only by sector, but also by size and application. Feedback from VARs and other intermediaries will be a crucial input to the intelligence gathering operation.

4. **Price reviews should be conducted at say quarterly intervals**, to ensure that price levels, price structure and licencing arrangements remain competitive, meet market requirements, and take account of movements in costs and changing business circumstances and targets. The reviews should include sub-licencing and discount arrangements with intermediaries.

5.4.4 Copyright administration and enforcement

Since licencing fees and royalties represent a major potential revenue stream, continuing after the initial purchase, copyright administration and enforcement are an important function within the business. This quite apart from the fact that it is Government policy to protect its copyright ownership. Accordingly, we recommend that:

1. **The following copyright acknowledgment should be consistently used on all SMO products**: "© copyright (*date of publication*) the Government of the Hong Kong Special Administrative Region of the People's Republic of China."

2. **Formal delegation of responsibility to SMO for the administration of copyright licencing of its products should be sought, as a matter of urgency**, through the Director of Information, the Secretary to the Treasury and the Director of Intellectual Property. This is needed to secure SMO's legal status in the management of its copyright asset.

3. **Contractual agreements with third parties**, either supplying data for inclusion in SMO's database, or supplying plans which may be sold on by SMO, **should contain assignment of copyright clauses**.

4. **SMO should set up formal procedures for dealing with infringement investigations.** Detection of possible infringement will depend upon SMO resources, but closer ties with the Intellectual Property Investigation Bureau of the Customs and Excise (infringement for business gain) and the Civil Litigation Unit of the Secretary of Justice (individual infringement, not for business gain) should be developed for subsequent investigation and action.

5. **SMO should develop fingerprinting and encryption policies and techniques in order to deter and detect infringements**. When in place their introduction should be published.

6. **Requests for data at special discounted rates** e.g. from universities for educational or research purposes, **should be carefully vetted** to confirm that no commercial interest is involved.

7. **Copyright administration should be centralised within SMO, and staffed by specialists**. In addition to copyright management and administration as such, their role should be: to educate customers (and SMO staff) on copyright arrangements through personal contact and the written word; to identify infringement and initiate enforcement action, and; to obtain customer feedback to inform on-going policy development. The costs of the unit would be expected to be recovered by the additional revenue thereby obtained. In the first instance we would expect that **one copyright specialist will need to be recruited externally; remunerated at SLS level and supported by administrative staff recruited internally.**

6. PRICE STRUCTURES AND LEVELS

6.1 Introduction

Market based pricing involves making judgemental decisions as to:

- what the market will bear, determined via market intelligence;
- the levels needed to achieve target growth rates and sales volumes;
- and, the levels needed to achieve cost recovery targets, if set.

It is not an exact science, and the results cannot be precisely predicted. As previously stated in Position Paper N°4, it is therefore vitally important to obtain customer feed-back on prices, particularly on price changes, and to monitor and review their impact on sales, to ensure they are supporting the achievement of the business objectives set.

This document sets out our pricing proposals for SMO products. The levels set represent our judgement as to what is appropriate in support of SMO's business objectives, in the light of our market research findings and those of other strands of the study. They are designed primarily to support greater penetration of existing markets, to facilitate the development of new market opportunities and to achieve a reasonable level of cost recovery. Their reception by customers, and impact on sales, should be carefully monitored by SMO following implementation. Corrective action should then be taken, if necessary, following the Review guidelines indicated in Position Paper N°4.

Implementation, of at least some of our proposed price changes for existing customers, will have to be made in stages. For example, in the case of digital data products (where we have reduced the initial charges but increased the year-on-year licencing charges) new customers, who will perceive a significant reduction in prices, will receive an incentive to buy, and for them, the sooner the new prices are introduced the better. Conversely, large existing customers will experience a net increase in costs, which is likely to be received badly if implemented in one step.

However, the new pricing structure provides for contract customers an annual automatic update of all sheets at a much lower cost than previously, which should be seen as a benefit by most customers.

Even so, to encourage existing contract customers to transfer to the new scheme we believe it will be necessary to offer a reduction in the annual update charge for at least one year. What is acceptable to these customers will only be determined through experience, however, an initial start point of a 50% reduction of the proposed update price for one year only should be tried. If this does not have the desired result it might then be necessary either to increase the existing licence fee or offer graduated reductions for additional years.

In the sections that follow, we set out our proposed prices and price structures, together with methods of calculation and our reasoning behind the derivation where appropriate. We have also included examples of calculations, and comparisons with current pricing, where we believe this may be helpful. In Section 2 we deal with digital products, then successively in Sections 3, 4 and 5, with graphical maps and plans, aerial photographs and geodetic survey data. In Section 6 we deal with royalties and in Section 7 with special discounts. We have not included 'services', such as the survey work for LAO/LACO, special projects or training. The last has been dealt with separately in Position Paper N°10 (Training School Fees), and, as discussed in Position Paper N°4 (Pricing and Licencing), the first two should be dealt with either, via an annual 'service level agreement' (if an on-going activity) or, via a negotiated 'contract' (if a one-off activity).

Finally, it should be emphasised that pricing policy alone will not bring in the additional sales sought. Pricing is just one part of the 'marketing mix'. The improvements to product, promotion and sales/distribution recommended elsewhere must also be implemented.

6.2 Digital Data Products

6.2.1 BMS and CIS 1:1000 large scale maps

The price structure broadly follows the principles set out in Position Paper N°4. Market research indicates that the current price is not a significant deterrent to purchasing for small quantity orders but that it is as the number of sheets bought increases. For this reason, and in order to facilitate introduction of the new prices, we have retained the existing single sheet price level as the starting point.

Quantity discounts have then been introduced to encourage higher off-take. The discount reaches a maximum at 1,001 sheets, broadly corresponding to urban area coverage and the maximum likely coverage of the majority of customers.

The enhancement charge calculation which has been simplified, is more rational and should be more transparent to customers. It peaks at 101 terminals, well above the maximum for the vast majority of users.

Update charges have been reduced to a more acceptable level, to encourage both initial purchase and to encourage updating. It must be of benefit to the community to have all users working from a common, up-to-date database. However, since for practical reasons, updating can only be effected by replacing all the sheets held, this policy does have major cost recovery implications (not to mention data downloading capacity implications). For this reason we have been obliged to introduce a minimum updating charge, to try to ensure that at least direct media and downloading costs will be recovered. (As noted elsewhere, use of lower grade staff to download data and of more appropriate media to transfer it, would substantially reduce these costs.)

Prices are inclusive of standard media costs. The revenue returned from this source is very small and it is a source of irritation to customers.

The consultant originally proposed a sliding scale charging system as set out under Approach 1 (see also table 6-1) comprising 11 bands, covering sheet quantities from 0 to 1000+, providing a charge reduction from 0% to 50%. This was to apply to a supply cost element of HK$1,045 per sheet with a separate licence fee of HK$75 per sheet applied to bring the total initial price per sheet to the full HK$1,120 amount. This approach was proposed to:

a) Maintain consistency in licence fee application between the initial sheet purchase and for licence renewal.

b) Provide a simple sliding scale charge system, easily understood by customers, with what the consultants considered to be and acceptable overlap of prices at the band boundaries.

Approach 1 - Original proposed price structure

Initial single sheet price:	HK$ 1,120	
Of which the Supply charge element is:	HK$ 1,045	
And the Licence charge element is:	HK$ 75	
Supply charge sliding scale for quantities:		
	1-10 sheets:	100% of supply charge
	11-50 sheets:	95%
	51-100 sheets	90%
	101-200 sheets:	85%
	201-300 sheets:	80%
	301-400 sheets:	75%
	401-550 sheets:	70%
	551-700 sheets:	65%
	701-850 sheets:	60%
	851-1,000 sheets:	55%
	1,000+ sheets:	50%
Enhancement charge:	1-10 terminals:	0%of licence charge
(add to licence charge)	11-20 terminals:	5%
	21-30 terminals:	10%
	31-40 terminals:	15%
	41-50 terminals:	20%
	51-60 terminals:	25%
	61-70 terminals:	30%
	71-80 terminals:	35%
	81-90 terminals:	40%
	91-100 terminals:	45%
	101+ terminals:	50%

Charge for standard media:	Nil
Charge for non-standard media, or supplying on customer's own media:	Cost of media (if supplied) + labour used in downloading data + 20% overhead recovery.
Update charge (for replacement of all sheets held):	2% of the sliding scale supply charge. Minimum charge HK$ 209.
Annual licence renewal charge:	Initial (licence + enhancement) charge, modified as necessary according to any notified changes to the number of sheets or terminals in use.

In line with a request from SMO, we provide an alternative pricing structure as set out under Approach 2 (see also table 6-2) which seeks to address the following points:

- To apply the sliding scale charge reduction to the total sheet charge including the licence fee, on the basis that unnecessary explanation would be necessary to customers with regard to the licence fee charge.

- The number of bands was considered to be too many and the price overlap at the band boundaries was considered to be too great by SMO. We have therefore reduced the number of price bands from 11 to 5 and have used a cumulative sliding scale price calculation to overcome the price overlap problem.

Although we have tried to match our original pricing structure as nearly as possible, this does have a number of implications:

- By applying the sliding scale charge reduction to the total sheet charge including the licence fee i.e. HK$1,120, the discount offered to the customer becomes higher.

- By reducing the number of bands, the discount structure profile is modified throughout the ranges and the effect is difficult to quantify.

- Incorporating the licence charge into the sheet charge produces inconsistency in applying the licence charge between initial purchase and renewal.

Approach 2 - Proposed cumulative price structure

Initial single sheet price:	HK$ 1,120
Of which the Supply charge element is:	HK$ 1,045
And the Licence charge element is:	HK$ 75

Supply charge sliding scale for quantities:		
	1-10 sheets:	100% of supply charge
	11-100 sheets:	88%
	101-500 sheets:	64%
	501-1,000 sheets:	49%
	1,000 + sheets:	44%
Enhancement charge: (add to licence charge)	1-10 terminals:	0% of licence charge
	11-40 terminals:	10%
	41-70 terminals:	25%
	71-100 terminals:	40%
	101 + terminals:	50%
Charge for standard media:	Nil	
Charge for non-standard media, or supplying on customer's own media:	Cost of media (if supplied) + labour used in downloading data + 20% overhead recovery.	
Update charge (for replacement of all sheets held):	2% of the sliding scale supply charge. Minimum charge HK$ 224.	
Annual licence renewal charge:	Initial (licence + enhancement) charge, modified as necessary according to any notified changes to the number of sheets or terminals in use.	

Notes:

(1) The price structures and levels reduce initial purchase and update prices substantially but raise on-going licencing costs. This will have the effect of spreading buyers' costs over a period of years, rather than have them being concentrated 'up-front'. Overall, revenues per sheet (and hence the cost to the customer) will reduce over a five year period, but we expect this to be more than compensated by the resultant increase in sales volumes.

(2) We recognise that the proposed pricing structures particularly favours 'project' based customers (typically consultants and architects), who use mapping only for the duration of a project and do not require updates or licence renewal. This is deliberate. Many are currently deterred from buying by the high initial costs. Their purchases under the new price regime will represent additional sales.

Worked examples of pricing under the proposed structures are given below. We have provided further worked examples, compared with current pricing, in tables 6-1 and 6-2. These show, for a variety of purchase and customer installation sizes, how initial charges and five year revenues differ under the current and proposed new price regimes.

Examples

Given : Customer buys 500 sheets and declares that they will be used across 50 terminals.

Under Appropach 1 - Original proposed price structure

Supply charge = HK$ (500 x1,045) x Quantity sliding scale of 70%
= HK$ 365,750

Licencing charge = HK$ (500 x 75) + (Enhancement charge of 20% of 500 x 75)
= HK$ 45,000

Initial charge = HK$ 410,750

During the first year of use the customer updates his data holding once.

Up-date charge = 2% of HK$ 365,750
= HK$ 7,315

At the end of the first year of use, the customer decides to renew the licence for a further year. The customer declares that all sheets will remain in use, still across 50 terminals.

Licence renewal charge = HK$ 45,000

(If the customer had instead declared that only 400 sheets were to remain in use, across only 40 terminals, then the licence renewal charge would equal HK$(400 x 75) x 1015 or HK$34,500.)

Under Appropach 2 - Proposed cumulative price structure

Supply charge = HK$ (10 x 1,120 x Quantity sliding scale of 100%) + HK$ (90 x 1,120 x Quantity sliding scale of 88%) + HK$ (400 x 1,120 x Quantity sliding scale of 64%)
= HK$ 386,624

Licencing charge = HK$ (0) + (Enhancement charge of 25% of 500 x 75)
(for the 1st year) = HK$ 9,375

Initial charge = HK$ 395,999

During the first year of use the customer updates his data holding once.

Up-date charge = 2% of HK$ 386,624
= HK$ 7,732

At the end of the first year of use, the customer decides to renew the licence for a further year. The customer declares that all sheets will remain in use, still across 50 terminals.

Licence renewal charge = HK$ (500 x 75) + (Enhancement charge of 25% of 500 x 75)
= HK$ 46,875

6.2.2 BMS 1:5000 mid scale maps

The price structure proposed for this new product broadly follows that set out in Section 2.1, but recognises the fact that the database comprises 188 sheets rather than the 3,150 providing complete SAR coverage for the 1:1000 large scale. The 1:5000 scale is a generalised version of the 1:1000, and is generally acknowledged to be of great potential utility to many market sectors. There is the risk that it will compete with, and detract from the sales of the large scale maps. We have therefore proposed a single sheet price of four times that of the large scale maps. The structure recommended none-the-less would provide complete SAR coverage for around 30% of the cost of the large scale maps.

Proposed price structure

Initial single sheet price:	HK$ 4,480
Of which the Supply charge element is:	HK$ 4,180
And the Licence charge element is:	HK$ 300

Supply charge sliding scale for quantities:

1-5 sheets:	100% of supply charge
6-10 sheets:	95%
11-20 sheets:	90%
21- 30 sheets:	85%
31- 45 sheets:	80%
46- 60 sheets:	75%
60 + sheets:	70%

Enhancement charge: (add to licence charge)	As for 1:1000 large scale maps
Charge for standard media:	Nil
Charge for non-standard media, or supplying on customer's own media:	As for 1:1000 large scale maps
Update charge (for replacement of all sheets held):	2% of the sliding scale supply charge. Minimum charge HK$ 836.
Annual licence renewal charge:	As for 1:1000 large scale maps

6.2.3 Topographical 1:20000 small scale maps

The same remarks apply as for the 1:1000 large scale maps except that here, our proposed discount structure recognises that complete SAR coverage is afforded by just 17 sheets. Since the 1:20000 scale map contains too little detail to be considered as a serious threat to the large scale maps (unlike the 1:5000 scale) we have retained the current single sheet price as our starting point. Also, for this product, we have not provided other than nominal updating 'discounts'. This is because: type of application and reduced detail, relative to large- and mid-scale maps, generally place a much lower demand on currency (i.e. customers will only wish to update relatively infrequently), and; complete SAR coverage is in any case purchased at a relatively low cost.

Proposed price structure

Initial single sheet price:	HK$ 1,190
Of which the supply charge element is:	HK$ 1,110
And the licence charge element is:	HK$ 80

Supply charge sliding scale for quantities:

1-2 sheets:	100% of supply charge
3-5 sheets:	95%
6-9 sheets:	90%
10 + sheets:	85%

Enhancement charge: (add to licence charge)	As for 1:1000 large scale maps
Charge for standard media:	Nil
Charge for non-standard media, or supplying on customer own media:	As for 1:1000 large scale maps
Update charge (for replacement of All sheets held):	85% of the sliding scale supply charge.
Annual licence renewal charge:	As for 1:1000 large scale maps

6.2.4 GIRS (Geographic Information Retrieval System) Data

This data is supplied as an optional extra with the BMS 1:1000 scale map data. Currently, if map data is bought for 25% or more of a district, GIRS data is supplied free of charge against the sheets purchased. If map data for less than 25% of a district has been purchased, then the customer is charged at a rate of 20% of the price of a map sheet for each 'sheet' of GIRS data purchased. This policy is perceived as being irrational and unfair by customers.

In line with our general approach, we recommend that GIRS data be offered as an optional extra, against any BMS 1:1000 map sheet sold, at a 'single sheet' price equal to 20% of the BMS single sheet price, and subject to the discount, licencing etc. arrangements pertaining for the map sheets, as follows.

Proposed price structure

Initial 'single sheet' price:	HK$ 224
Of which the Supply charge element is:	HK$ 209
And the Licence charge element is:	HK$ 15
Supply charge sliding scale for quantities:	Apply the quantity discount pertaining to the relevant BMS 1:1000 map sheets purchased.
Enhancement charge:	Apply the enhancement rate pertaining to the relevant BMS 1:1000 map sheets purchased.

Media, update and annual licence renewal charge as for BMS 1:1000 large scale maps.

Example

A customer has purchased 150 sheets of BMS large scale maps and 30 'sheets' of GIRS data. The maps will be used on 25 terminals. Under the original proposed banded sliding scale, the charge for the GIRS data is calculated as follows:

Supply charge:	HK$ 30 x 209 x 85%	=	HK$ 5,330
Licence charge:	HK$ 30 x 15 plus 10%	=	HK$ 495
Initial charge:			HK$ 5,825
Update charge:			HK$ 209 (i.e. minimum supply charge applies)
Annual licence renewal charge:			HK$ 495

6.3 Graphical maps and plans

6.3.1 Approach

Products fall into three main categories:

- Up-to-date plots taken directly from the database (mainly large-scale black and white (B/W));

- Printed stock items, which by definition are out-of-date (including both B/W and coloured items; large-, mid-, small-scale and special maps and guides);

- Copied maps and plans ('reprographic items'), which again, by definition are not up-to-date (mainly large-scale B/W).

In view of the demand, in particular, for more up-to-date large-scale products, we recommend a pricing policy for these, which will encourage the market to move away from printed and copied maps and plans towards plots. This move has already been implemented in the case of Lot Index Plans. Implementation of the policy more widely requires substantial reductions in current plot prices and substantial increases in copying/print prices, to close the gap between the two. Whilst we believe the market will stand a substantial uplift in the latter, it would not stand closure of the gap in a single revision. We have therefore proposed gradual closure over a period of five years. The year-on-year rates of price escalation suggested in the price lists that follow, are indicative only. Actual rates should be determined in the price review process described in Position Paper N^{o}4.

Our approach to price differentials between the different reprographic processes has been to establish the base market price for the lowest cost process, then set differentials to reflect differences in process cost. Where current prices are above the resultant calculation, we have retained the higher price but suggested a lower rate of escalation thereafter to close the gap with plot prices. With respect to different reproduction sizes, we have sought to equalise prices, since there is little difference in cost (for example, between 760 x 900 mm and 760 x 300mm sheets) and current differentials perhaps merely perpetuate an unnecessary variant. It should be noted that Government is the major customer by far for reprographic services. In practical terms, therefore, our proposed changes will have little impact on actual revenue, they will however have a major impact on notional revenue and the perceived value of the products.

Apart from large scale maps, the printed stock items include mid- and small-scale topographical maps, the Countryside (leisure) series, geological maps, a variety of guides and thematic/special maps. Generally, our market research has indicated that there is scope for some increase in the prices of these and our recommendations reflect this. Substantial increases are possible in the case of guides and the Countryside series, with increased sales, particularly if the marketing recommendations made in our position papers are implemented and if the Street and Place Guidebook is enhanced, to include bus routes for example. In the case of the Countryside series we have also harmonised prices as we see no useful purpose being served in maintaining price differentials between different members of the series. Although we have only listed reprographics prices under large scale maps and plans, where relevant these same prices should apply equally to smaller scales.

In line with our approach for digital data, we recommend that quantity discounts be given for all products, at the rates listed below. For plots, the qualifying quantity should be the number of sheets per order per database, for printed stock items it should be the number of sheets/maps/books per order per product type, and for reprographics items the qualifying quantity should be the number of copies per order, per sheet size, per process type, per product type. Proposed sliding scale rates are as follows:

1 – 10	sheets/maps/books	100% of the supply charge
11 – 20	do	95%
21 – 40	do	90%
41 – 60	do	85%
61 – 80	do	80%
81 – 100	do	75%
100 +	do	70%

Throughout, in considering market price levels, we have referred to the near equivalent price levels of the Ordnance Survey in Great Britain, as well as market conditions and costs in Hong Kong.

6.3.2 Large scale maps and plans

	HK$ per copy
Computer electrostatic plotter (paper 760 x 900mm) (reduce price at rate of $200 p.a. down to $415)	1,015
Computer electrostatic plotter (film 760 x 900mm) (reduce price at rate of $200 p.a. down to $520)	1,120
Printed 1:1000 large scale B/W maps and plans (paper 750 x 850mm) (increase price at rate of $80 p.a. upto $340)	100
Xerox 2520/OCE' 7600 (paper 841 x 1000mm) (increase price at rate of $80 p.a. upto $340)	100
Xerox 2520/OCE' 7600 (tracing paper 841 x 1000mm) (increase price at rate of $80 p.a. upto $345)	105
Diazo (paper 760 x 900mm/760 x 300mm) (increase price at rate of $80 p.a. upto $345)	105
Diazo (film 760 x 900mm/760 x 300mm) (increase price at rate of $60 p.a. upto $360) (notional price, worked on consistent basis $120)	180
Contact process (Bromide paper 760 x 900mm/760 x 300mm) (increase price at rate of $40 p.a. upto $440) (notional price, worked on consistent basis $205)	320
Contact process (matt/clear film 760 x 900mm/760 x 300mm) (hold price at this level for foreseeable future) (notional price, worked on consistent basis $230)	705
Projection process (Bromide paper 760 x 900mm/760 x 300mm) (increase price at rate of $30 p.a. upto $460) (notional price, worked on consistent basis $220)	370
Projection process (matt/clear film 760 x 900mm/760 x 300mm) (hold price at this level for foreseeable future) (notional price, worked on consistent basis $235)	850

Projection process (documentary film 210 x 297mm), photocopy of documents, and Canon colour copier (A3&A4 size) prices to be retained at current levels.

Lot Index Plans ('supply of correlated lot boundary data in NT') (760x900mm)	As for Computer Electrostatic Plotter.
Survey record plans (very low sales volumes, no change)	200
Land boundary plans (A4 size) (should be moving to direct plot from the database, notional price for paper therefore should be $1,015 x (210 x 297/760 x 900) = $93)	105

6.3.3 Other maps and plans

	HK$ per copy
1:5000 scale computer electrostatic plotter (paper 760 x 900mm) (reduce price at rate of $200 p.a. down to $415)	1,015
1:5000 scale computer electrostatic plotter (film 760 x 900mm) (reduce price at rate of $200 p.a. down to $520)	1,120
Printed 1:5000 scale B/W maps (paper 750 x 850mm) (increase price at rate of $80 p.a. upto $340)	100
Printed 1:10000/1:15000 scale B/W street maps (paper 750 x 850/760 x 1100)	45
Printed 1:15000 scale coloured street maps (paper 655 x 980)	50
Printed 1:20000 scale coloured topo. (paper 680 x 975mm)	50
Printed 1:50000 scale coloured topo. (paper 1010 x 690mm)	55
Printed 1:50000 scale two colour topo. (paper 1020 x 760mm)	50
Printed 1:100000 scale coloured topo. (paper 625 x 800mm)	45
Printed 1:200000 scale coloured topo. (paper 235 x 343mm) (print plus selling costs = $15 across range)	45
Printed 1: 300000 scale coloured 'HK in its regional setting' map (paper 610 x 860mm)	45

Hong Kong Guide – Streets & Places (book 210 x 150 x 15mm)	90
Hong Kong Official Guide Map (610 x 880mm)	60
Countryside Series (approx. 610 x 880) – price per map	60
End maps for HK Annual Report	45
HK Geological Map (1:20000, 775 x 1000mm)	80
HK Geological Survey (1:5000, 760 x 1000mm)	100
Ordinance plans for HK Airport	25
Land utilisation in Kowloon & HK Island	50
HK Helicopter Flying Chart	50

6.4 General and aerial photographs

We have no evidence of significant price sensitivity for photographs. With the exception of the correction of some anomalies, we have therefore set the prices of standard photographs at current prices (around 7% up on those current during our research) then, consistent with our approach for maps and plans, have added additional processing costs to arrive at prices for enlargements. Where these prices do not fully recover manufacturing and selling costs we have also indicated a notional price, which would recover these costs, and suggested a rate of price increase to achieve full recovery. Where current prices exceed our calculated prices, we have retained the existing prices but, again, have indicated a notional manufacturing and selling cost recovery price.

We recommend adoption of the same quantity discount structure as for maps and plans, where the qualifying quantity should be the number of B/W photographs per order or the number of colour photographs per order.

Black and White	HK$ per item
Paper (200 x 250mm/250 x 250mm) (Notional price $120, suggested rate of price increase $10 p.a.)	80
Paper (400 x 500mm) (Notional price $130)	270
Paper (500 x 600mm) (Notional price $135)	370

Paper (760 x 760mm) (Notional price $210)	885
Paper (910 x 910mm) *(Notional price $220)*	1,050
Paper (300 x 1016mm) (Notional price $180)	350
Air photo contact, paper (250 x 250mm) (Notional price $70)	75
Air photo contact, film diapositive (250 x 250mm) (Notional price $90)	365

Colour

Paper (200 x 250mm/250 x 250mm) (Notional price $140)	150
Paper (280 x 350mm) (Notional price $145)	200
Paper (400 x 500mm) (Notional price $150)	325
Paper (500 x 600mm) (Notional price $220)	435
Paper (760 x 760mm) (Notional price $255)	1,080
Air photo contact, paper (250 x 250mm) (Notional price $140)	150
Air photo contact, duraclear transparency film (250 x 250mm) (Notional price $160)	640

6.5 Miscellaneous other products and services

	HK$
Certification of a true extract of map, aerial photograph etc. (per certificate)	140
Stereo plotting charges (hourly rate)	
Wild A10	291
Zeiss Planicart	248
Wild Aviomap	334
Intergraph IMA	677
Computer supported data acquisition system (Revised rates in line with latest cost information to achieve full cost recovery)	231
Land Survey (fees) Regulation	As current
Geodetic control data (per copied sheet)	100

6.6 Royalties

We are not aware of any market pressure to reduce royalties on copyright. We do believe the royalties scheme should encourage payment, by being fair and transparent, with royalties pitched at a level which people are prepared to pay. We are therefore proposing:

- to eliminate the current minimum 'Administrative' charge;
- to replace the current complex formula with a simpler, more comprehensible one, and a straightforward quantity discount;
- to eliminate the colour to B/W differential; and
- to broadly maintain current B/W charging levels.

Royalties should be payable for copying paper maps, plans or photographs, for publication or for internal use, whether derived from digital data or not.

The royalty fee payable should be equal to:

$$\text{(Number of copies) x (retail price of item) x } \frac{\text{(Area of extract)}}{\text{(Area of original)}} \text{ less Sliding Scale rate}$$

where the sliding scale rate is as follows:

No. of copies	Sliding Scale %
1 – 5	95
6 – 20	90
21 – 50	80
51 – 150	70
151 – 350	60
351 – 750	50
751 – 1,500	40
1,501 – 3,000	30
3,001 – 6,000	20
6,001 – 12,000	15
12,001 – 24,000	10
24,001 – 50,000	7
50,001 – 100,000	5
100,001 – 200,000	4
200,000 +	3

Further discounts may be given on the royalty fee rate, as calculated above, as follows:

- A 50% discount where publication is of redrawn maps or plans which are not exact copies of the original;
- A 100% discount for publications which are for academic study or for charitable purposes;
- A 70% discount for publications of non-profit making organisations;
- A 60 % discount for publications with a shelf-life of less than 7 days;
- A 40% discount for publications with a shelf-life of 7-15 days;
- A 20% discount for publications with a shelf-life of 16-31 days.

6.7 Other discounts

Apart from the sliding scale rates given for quantity and the special sliding scale rates given on royalties, discounts may be given on 'original' products or services (including digital data), in line with current practice. These should be clearly published. At a minimum we suggest the following:

- For educational or research use by schools or academic organisations. Supply at handling plus media/material cost only.
- For bona fide joint market or technical development work with 'contracted' partners. Supply at a negotiated price (see also Position Paper N^{o} 4).
- For charitable or other non-profit making activities with registered charities or other non-profit making organisations. Supply at handling plus media/material cost only.

6.8 Training School Fees

We set out in Position Paper N^{o}10 the arguments for the setting of fees for the SMO Training School. We recommend market pricing at a level of HK$800 per trainee day, with the exception of fees to the Civil Engineering Department at a reduced rate of HK$600 per day to take account of seconded staff. These fees cover both training and the use of training facilities.

SMO Costing & Pricing Study

BMS & CIS 1:1000 Large Scale Maps : Comparison of prices & revenues between current, proposed and graduated pricing structures

			PROPOSED			PROPOSED			PROPOSED			PROPOSED
	CURRENT		APPROACH 1	CURRENT		APPROACH 1	CURRENT		APPROACH 1	CURRENT		APPROACH 1
# of Terminal	1		1	10		10	50		50	101		101
# of Sheets	10		10	401		401	500		500	3,150		3,150
Supply Charge	11,200		10,450	449,120		419,045	560,000		522,500	3,528,000		3,291,750
(Quantity Sliding Scale)	0	%		0	%		0	%		0	%	
# of sheets 1-10		100%	10,450		100%			100%			100%	
11-50		95%			95%			95%			95%	
51-100		90%			90%			90%			90%	
101-200		85%			85%			85%			85%	
201-300		80%			80%			80%			80%	
301-400		75%			75%			75%			75%	
401-550		70%			70%	293,332		70%	365,750		70%	
551-700		65%			65%			65%			65%	
701-850		60%			60%			60%			60%	
851-1000		55%			55%			55%			55%	
1001+		50%			50%			50%			50%	1,645,875
Discounted Supply Charge	11,200		**10,450**	449,120		**293,332**	560,000		**365,750**	3,528,000		**1,645,875**
Licence Charge	0		**750**	0		**30,075**	0		**37,500**	0		**236,250**
Enhancement Charge	0		**0**	0		**0**	82,880		**7,500**	51,520		**118,125**
# of terminals 1-10		0%	0		0%	0		0%			0%	
11-20		5%			5%			5%			5%	
21-30		10%			10%			10%			10%	
31-40		15%			15%			15%			15%	
41-50		20%			20%			20%	7,500		20%	
51-60		25%			25%			25%			25%	
61-70		30%			30%			30%			30%	
71-80		35%			35%			35%			35%	
81-90		40%			40%			40%			40%	
91-100		45%			45%			45%			45%	
101+		50%			50%			50%			50%	118,125
Initial Data Charge	11,200		11,200	449,120		323,407	642,880		410,750	3,579,520		2,000,250
Standard Media Charge	197		0	591		0	788		0	3,940		0
Total Initial Charge	11,397		**11,200**	449,711		**323,407**	643,668		**410,750**	3,583,460		**2,000,250**
Annual Update Charge	280 *		209 +	11,228 *		5,867 +	14,000 *		7,315 +	88,200 *		32,918 +
Storage Media Charge	36		*incl.*	197		*incl.*	197		*incl.*	197		*incl.*
Annual Licence Renewal Charge (no change in use assumed)	105		750	105		30,075	105		45,000	105		354,375
Reduction in Initial Charge (%)			2%			28%			36%			44%
Revenue over 5 years												
Year 1 (no update)	11,397		11,200	449,711		323,407	643,668		410,750	3,583,460		2,000,250
Year 2	421		959	11,530		35,942	14,302		52,315	88,502		387,293
Year 3	421		959	11,530		35,942	14,302		52,315	88,502		387,293
Year 4	421		959	11,530		35,942	14,302		52,315	88,502		387,293
Year 5	421		959	11,530		35,942	14,302		52,315	88,502		387,293
Total	**13,081**		**15,036**	**495,831**		**467,173**	**700,876**		**620,010** 0	**3,937,468**		**3,549,420**
Reduction in revenue over 5 years (%)			(15%) Increase			6%			12%			10%

+ One-off replacement of all sheets held (automatic update of all sheets once per year)

* One-off replacement of 5% of the sheets held (average percentage for replacement as proposed by SMO)

SMO Costing & Pricing Study

BMS & CIS 1:1000 Large Scale Maps : Comparison of prices & revenues between current, proposed and graduated pricing structures

			PROPOSED			**PROPOSED**			**PROPOSED**			**PROPOSED**
		CURRENT	APPROACH 2		CURRENT	APPROACH 2		CURRENT	APPROACH 2		CURRENT	APPROACH 2	
	# of Terminal	1	1		10	10		50	50		101	101	
	# of Sheets	10	10		401	401		500	500		3,150	3,150	
Supply Charge *(1st year licence incl.)*		11,200		11,200	449,120		449,120	560,000		560,000	3,528,000		3,528,000
(Quantity Sliding Scale)		0	%		0	%		0	%		0	%	
# of sheets	1-10		100%	11,200		100%	11,200		100%	11,200		100%	11,200
	11-100		88%	0		88%	88,704		88%	88,704		88%	88,704
	101-500		64%			64%	215,757		64%	286,720		64%	286,720
	501-1000		49%			49%			49%			49%	274,400
	1001+		44%			44%			44%			44%	1,059,520
Discounted Supply Charge		11,200		**11,200**	449,120		**315,661**	560,000		**386,624**	3,528,000		**1,720,544**
Licence Charge		0		750	0		30,075	0		37,500	0		236,250
Enchancement Charge		0		**0**	0		**0**	82,880		**9,375**	51,520		**118,125**
# of terminals	0-10		0%	0		0%	0		0%			0%	
	11-40		10%			10%			10%			10%	
	41-70		25%			25%			25%	9,375		25%	
	71-100		40%			40%			40%			40%	
	101+		50%			50%			50%			50%	118,125
Initial Data Charge		11,200		**11,200**	449,120		**315,661**	642,880		**395,999**	3,579,520		**1,838,669**
Standard Media Charge		197		0	591		0	788		0	3,940		0
Total Initial Charge		11,397		**11,200**	449,711		**315,661**	643,668		**395,999**	3,583,460		**1,838,669**
Annual Update Charge		280 *		224 +	11,228 *		6,313 +	14,000 *		7,732 +	88,200 *		34,411 +
Storage Media Charge		36		*incl.*	197		*incl.*	197		*incl.*	197		*incl.*
Annual Licence Renewal Charge		105		750	105		30,075	105		46,875	105		354,375
(no change in use assumed)													
Reduction in Initial Charge (%)				2%			30%			38%			49%
Revenue over 5 years													
Year 1	(no update)	11,397		11,200	449,711		315,661	643,668		395,999	3,583,460		1,838,669
Year 2		421		974	11,530		36,388	14,302		54,607	88,502		388,786
Year 3		421		974	11,530		36,388	14,302		54,607	88,502		388,786
Year 4		421		974	11,530		36,388	14,302		54,607	88,502		388,786
Year 5		421		974	11,530		36,388	14,302		54,607	88,502		388,786
Total		**13,081**		**15,096** 0	**495,831**		**461,214** 0	**700,876**		**614,429** 0	**3,937,468**		**3,393,813**
Reduction in revenue over 5 years (%)				(15%) Increase			7%			12%			14%

+ One-off replacement of all sheets held (automatic update of all sheets once per year)

* One-off replacement of 5% of the sheets held (average percentage for replacement as proposed by SMO)

SMO Costing & Pricing Study

BMS & CIS 1:1000 Large Scale Maps : Comparison of prices & revenues between current, proposed and graduated pricing structures

			PROPOSED			**PROPOSED**			**PROPOSED**			**PROPOSED**
		CURRENT	APPROACH 2		CURRENT	APPROACH 2		CURRENT	APPROACH 2		CURRENT	APPROACH 2	
	# of Terminal	1	1		10	10		50	50		101	101	
	# of Sheets	10	10		401	401		500	500		3,150	3,150	
Supply Charge *(1st year licence incl.)*		11,200		11,200	449,120		449,120	560,000		560,000	3,528,000		3,528,000
(Quantity Sliding Scale)		0	%		0	%		0	%		0	%	
# of sheets	1-10		100%	11,200		100%	11,200		100%	11,200		100%	11,200
	11-100		88%	0		88%	88,704		88%	88,704		88%	88,704
	101-500		64%			64%	215,757		64%	286,720		64%	286,720
	501-1000		49%			49%			49%			49%	274,400
	1001+		44%			44%			44%			44%	1,059,520
Discounted Supply Charge		11,200		**11,200**	449,120		**315,661**	560,000		**386,624**	3,528,000		**1,720,544**
Licence Charge		0		750	0		30,075	0		37,500	0		236,250
Enchancement Charge		0		**0**	0		**0**	82,880		**9,375**	51,520		**118,125**
# of terminals	0-10		0%	0		0%	0		0%			0%	
	11-40		10%			10%			10%			10%	
	41-70		25%			25%			25%	9,375		25%	
	71-100		40%			40%			40%			40%	
	101+		50%			50%			50%			50%	118,125
Initial Data Charge		11,200		**11,200**	449,120		**315,661**	642,880		**395,999**	3,579,520		**1,838,669**
Standard Media Charge		197		0	591		0	788		0	3,940		0
Total Initial Charge		11,397		**11,200**	449,711		**315,661**	643,668		**395,999**	3,583,460		**1,838,669**
Annual Update Charge		280 *		224 +	11,228 *		6,313 +	14,000 *		7,732 +	88,200 *		34,411 +
Storage Media Charge		36		*incl.*	197		*incl.*	197		*incl.*	197		*incl.*
Annual Licence Renewal Charge		105		750	105		30,075	105		46,875	105		354,375
(no change in use assumed)													
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Year 4		421		974	11,530		36,388	14,302		54,607	88,502		388,786
Year 5		421		974	11,530		36,388	14,302		54,607	88,502		388,786
Total		**13,081**		**15,096** 0	**495,831**		**461,214** 0	**700,876**		**614,429** 0	**3,937,468**		**3,393,813**
Reduction in revenue over 5 years (%)				(15%) Increase			7%			12%			14%

+ One-off replacement of all sheets held (automatic update of all sheets once per year)

* One-off replacement of 5% of the sheets held (average percentage for replacement as proposed by SMO)

SMO COSTING & PRICING STUDY: STAGE 4

ACTION PLAN - PROPOSED TIME SCALES FOR IMPLEMENTING KEY STRATEGIES

	STRATEGY	REFERENCE TO TEXT - SECTION	YEAR 1: 1998/99				YEAR 2: 1999/00				YEAR 3: 2000/01				YEAR 4: 2001/02				YEAR 5: 2002/03			
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
C	Establish SMO as stand-alone Department	4, 10.2.1																				
TECHNICAL	Achieve Year 2000 compliance on LIS	5.1.1																				
	Enhance LIS currency and speed of delivery	5.1.2, 5.1.3, 5.1.20, 5.2.8																				
	Upgrade LIS data quality via d'base 'sweep'	5.1.6																				
	Upgrade LIS data content via RDBMS	5.1.7, 5.1.8																				
	Introduce short term LIS quality improvements	5.1.4, 5.1.5, 5.1.9																				
	Introduce CD ROM as LIS supply media (staged with 5.1.2)	5.1.13, 5.2.8																				
	Install limited internet data access for LIS	5.1.16, 5.2.8, 5.3.2.6																				
	Install on-line supply to VARs/key customers for LIS	5.1.14, 5.2.8																				
	Install direct on-line access to key customers for LIS	5.1.15, 5.2.8																				
	Extend the range of standard data supply formats	5.1.17																				
	On-going LIS developments	5.1.11, 5.1.18, 5.1.19, 5.1.21																				
SALES & DISTRIBUTION	Appoint sales & marketing team	5.2.13, 5.3.2.1, 5.4.4.7, 10.2.2																				
	Appoint technical support team	5.2.13, 10.2.3																				
	Establish VAR network	5.2.3, 5.4.2.19/20																				
	Establish a bookseller network	5.2.7, 5.4.2.17																				
	Sub-licence key government customer as data distributions	5.2.4, 5.4.2.18																				
	Enhance customer service and support	5.2.5, 5.2.9, 5.2.10, 5.2.11,																				
	On-going sales & distribution activities	5.2.2, 5.2.6, 5.2.14																				
PROMOTION	Centralise promotional activity	5.2.12, 5.3.2.1																				
	Introduce SMO logo	5.3.2.2																				
	Produce literature	5.3.2.3																				
	Develop Internet catalogue	5.3.2.6, 5.1.16, 5.2.8																				
	Prepare audio-visual presentation	5.3.2.10, 5.3.2.7																				
	Support VAR promotional activity	5.3.2.13																				
	On-going promotional activities	5.3.2.4/5/7/8/9/11/12																				
PRICING & COPYRIGHT	Introduce notional charging for all customers	5.4.1																				
	Introduce & publicise new pricing & copyright policy, structures &	5.4.2.1-5.4.2.22, 6																				
	Introduce new price review & revision procedures	5.4.3																				
	Centralise copyright administration in SMO	5.4.4.7																				
	Implement copyright administration & enforcement fees	5.4.4																				
SDM	Improve survey methods & standards to meet customer mapping	7.3.1/3/4/7/8/11/12/13																				
	Improve survey efficiency & utilisation of resources	7.3.2/3/4//9/11																				
E	Continue to operate the Efficiency Task Forces	8.1																				
	Set efficiency and effectiveness targets, monitor performance	8.2																				
MI	Conduct detailed investigation into management information needs	9.4																				
	Appoint Management Information Manager	9.2, 10.2.5																				
	Develop effective management information systems	9.3																				
HR	Address human resource issues	10.2.7																				
C	Establish SMO data quality unit on on-going basis	5.1.10, 10.2.4																				

C = Corporate
SDM = Survey & D'Base Management
E = Efficiency Reviews
MI = Management Information
HR = Human Resources

7. SURVEY AND DATABASE MANAGEMENT

7.1 Introduction

SMO should set itself targets for the next 5 years in the field of surveying to address specifically what is required to meet the following key business aim:

> Aim 2: *To improve the quality, up-to-dateness and utility of digital data, graphical maps and plans available the Hong Kong community, in accordance with customer requirements*.

The strategy set out below is designed to contribute also to the key business aims on efficiency, and recognition of SMO's authority as "*the centre of excellence and prime source of supply for, land surveying, mapping and geospatial information within the SAR*".

7.2 Background

The basic survey scale for Hong Kong is 1:1000. The SAR is completely surveyed at this scale. Mapping is produced on demand from the digital database and represents the ground position at the time of the most recent survey.

The current target of SMO is to survey urban change within 3 months of it occurring on the ground. The target is not yet being achieved on a regular basis.

The Geodetic sections are responsible for maintaining the correct density of survey control and ensuring the integrity of the control network. Geodetic connections across the SAR border are maintained.

7.3 Future strategy

1. **SMO should continue to work towards achieving the target of keeping the urban mapping up-to-date within 3 months**. To achieve this aim, research should be undertaken to ensure that SMO staff use the most effective survey methods and utilise the most cost effective equipment, including the following:

2. **The balance of work between photogrammetry and field survey should be optimised to ensure best use of scarce resources.**

3. **In conjunction with Land Information Centre staff, survey managers should develop best practice in the use of digital data for surveying**. The aim should be to speed up the download, survey and database updating procedures.

4. **A target for the up-to-dateness of rural mapping should be identified along with a clear definition of the distinction between Urban and Rural mapping, so that customers clearly understand the level of performance to be expected from SMO in any geographical area.**

5. **In the first two years of the Business Plan, SMO Topo Survey sections should aim to maintain the mapping with, at the very least, no more staff than are employed now. In the later years of the Plan, the target should be to deliver the up-to-dateness targets and reduce costs by 5% per annum in real terms over the remainder of the 5 year period of the Business Plan. This 5% however is not based on any finite calculation but an agreed target to aim for.**

6. **The total direct time spent on survey work should increase year-on-year. In particular, minor staff utilisation should increase.**

7. **The process of gathering and disseminating intelligence about topographic change should be reviewed and new procedures introduced where necessary.**

8. **New equipment and new survey methods should be tested on a regular basis to assess fitness for use in Hong Kong. Where possible, equipment that can be interchanged between Survey and Geodetic teams should be examined.**

9. **Building on the work of the Topographic Task Force efficiency team, developments in satellite navigation systems such as the Global Positioning System should be monitored with a view to adopting GPS techniques for standard topographic surveying when accuracies and equipment costs permit.**

10. SMO is currently a two dimensional organisation with respect to digital data. **A three dimensional approach should be adopted to respond to the level of sophistication now reached by users of the data sets**.

11. **Geodetic management should investigate ways of reducing the destruction rate for existing control points.**

12. **Staff at all levels within survey and geodetic teams should be trained to adapt to changing technical practice.**

13. As the use of digital data increases, there will be additional pressures on access to the Basic Mapping System Database. **Survey teams should work with LIC to develop effective access control methods to ensure continued integrity of the database**.

14. The Basic Mapping System should be developed in line with customer requirements. Where this has impact on survey procedures in terms of survey specifications for content, accuracy or up-to-dateness, **SMO should test and implement new survey and data management procedures to deliver customer needs in the most efficient and effective manner**.

8. EFFICIENCY REVIEWS

In Position Paper N°3 "Efficiency Reviews" we set the context for the efficiency reviews; reported on the work completed on efficiency reviews throughout SMO in the different stages of the study; and documented the present status of these reviews towards the end of Stage 4 of the Costing and Pricing Study.

Three of SMO's business development aims relate specifically to the subject of Efficiency Reviews, namely:

- *To improve the quality, variety, up-to-dateness and utility of digital data, graphical maps and plans available to the Hong Kong community, in accordance with customer requirements;*

- *To introduce more effective sales, distribution, promotion and customer support arrangements, which will improve delivery and buying convenience and will encourage increased customer take-up of SMO's products and services.*

- *To identify and implement efficiency improvements on a continuing basis, in order both to meet cost targets and to release additional resources for business development.*

The reviews have now reached a point where developments with significant benefits are being identified by the Task Force Teams. In Stage 4 of the study we have debated with the Task Force teams a number of excellent papers and reports prepared by team members on specific development issues.

The papers and reports produced by the Task Force Teams show that the personnel working in the operational areas are best equipped to take forward the development issues arising from the efficiency reviews and to accept or reject these issues.

1. We recommend that SMO should continue to operate its Efficiency Task Forces over the five year period of the Business Plan, and beyond.

These teams are now equipped with a critical examination methodology which will enable them to examine any area of activity and identify other development opportunities for improving efficiency, effectiveness and economy, in addition to those already identified to date.

SMO must decide if it wishes to retain separate Topographic, Land Boundary Survey and Cartographic Task Forces. In view of the investigations currently taking place to merge the Land Surveyor and Cartographer grades, it may be more appropriate to form a consolidated DSO Task Force Team. In the other areas the LIC and Headquarters Task Force Teams should certainly be retained.

We recommend that these teams should be headed by senior managers at current CLS level. If such teams are to function properly they must have the support and commitment of top management. They should meet on a quarterly basis to review progress on the implementation of their recommendations and to identify other areas for efficiency improvements, which will inevitably arise over the five year period.

The business development aims stated at the beginning of this paper call for the Task Force Teams to concentrate attention not only on quality, timeliness and the utility of SMO's products and services, but also the efficiency, effectiveness and economy with which these are produced and delivered. In other words the provision of value for money.

2. **It will be necessary to set targets for the above factors so that progress can be monitored on a continuing basis**. Our market research exercise has already defined the customer requirements in terms of quality, timeliness and the utility of products and services. Take-up of products and services can be measured on a continuous basis. Cost targets are given in the next paragraph. These, allied to the DSO Performance Indicators already in place will form the basis for continuing assessment. Over the period of the Business Plan, key performance indicators will need to be developed for other areas of SMO.

It is our firm conviction that, in accordance with world-wide trends, at some time in the future there will be both efficiency and economy measures imposed on all aspects of Hong Kong Government activity.

3. **We recommend, therefore, SMO should, after a reasonable period of consolidation (say 2 years from now), target to reduce costs by say 5% per annum in real terms (see P.53, section 7.3 - bullet point #5)**. This means that if the main measure of inflation the CPI (Consumer Price Index) goes up by 7%, SMO should keep its cost rise to 2%, a figure which it has already achieved between the years 1995/96 and 1996/97. At the same time SMO must set out to improve services to its customers through strengthening of personnel in sales & marketing team, the efficiency measures and technical developments identified in our study. Demonstration to the Government of the ability to control costs, improve efficiency and fund investment from internal savings will put SMO in a much stronger position when bidding for increased capital expenditure for development needs.

Over the period of the study we have worked with the Task Force teams to critically examine all areas of the SMO. In some areas action has already been taken to improve efficiency, or the Task Forces have decided that the proposed development was not worth pursuing further. The remaining **recommended areas for further investigation and development** may, therefore be summarised as follows:

DSOs

4. As recommended by the Task Force Team, introduce the GPS technique in topographic survey in Sai Kung, Islands, North and Yuen Long. Monitor the impact on costs compared with the traditional method.

5. SO/Title staff need the same skills as Topo staff in dealing with feature codings used in map revision work. Districts should rotate staff to their Topo section to gain experience in mapping and BMS updating. In addition, the program 'Survey CAD' should be updated to include the ability to transfer data from the PC to the LIS environment.

6. The option to subcontract survey vehicle provision should be kept under constant review. Vehicle utilisation should be continuously monitored by each DSO in relation to other DSOs in order to bring each to the level of the best.

7. As in the past year SMO has used private sector contractors to carry out cost effective land boundary survey work and the updating of map sheets on special projects, the potential for further subcontracting should be investigated.

8. The task force team have concluded that a pilot study should be conducted of field and office survey work. The objective of this study should be to shorten the time spent on survey work, both in the field and in the office, in order to increase productivity.

9. The possibility of subcontracting the support operations of the chainmen and workmen should be examined. The effect would be to transfer any utilisation problem out of SMO.

10. A review of data processing problems in the DSOs identified the need to link all PCs to workstations and other PCs, and to standardise equipment, without creating a monopoly supplier situation. These developments need to be monitored.

11. A list has been prepared by LIC of the system deficiencies identified by the DSOs and the corrective action to be taken. This action must be monitored.

12. Situation in Tai Po where computer method is claimed to take twice as long as manual method. Needs further investigation between LIC and Tai Po DSO.

13. Analysis of questionnaires sent to DSOs provides assessment of LIC courses and suggestions for future hardware and software developments. These developments should be pursued with LIC.

14. Frequent staff postings do not allow sufficient time to consolidate training. Need to re-examine this aspect in line with career development needs and ICAC requirements on anti-coruption measures.

LIC

15. The joint pilot study on use of the Internet to disseminate Mapping Information and Geodetic data is scheduled for completion in September. Monitor the progress of this development.

16. Technical tests are being carried out on a trial basis on use of the CD-ROM Writer. This issue cannot be fully addressed until the data dissemination system is in place. Monitor developments.

17. Other efficiency development issues being addressed in LIC include:

- the upgrading of ArchInfo to Version 7;
- need for enhanced hardware capacity, storage and processing;
- use of better quality diskettes both as output media for customers and in the DSOs;
- 'sweeping' of the entire database;
- consideration of introducing an ORACLE Relational Database to provide improved attribute data;
- direct on-line supply to VAR network and on-line access to SMO database for major customers;
- move away from dedicated workstations and consider adoption of client-server architecture.
- revision of system for contract renewal to twice a year;
- effective utilisation of the proposed new high resolution scanner;
- updating of Terms of Reference for Mapping Committees to address digital developments;
- integrated management of SMO's mapping databases, geo-data, mapping information and survey intelligence within LIC, especially road, place and building names;
- possibility of combining development functions in Themetic sections and LIC now that open systems permit conversion between Intergraph and ArchInfo systems;

Some of the above are linked to the technical issues set out in the Product Mix and Development Strategy. All issues need to be monitored.

Headquarters

In the Headquarter sections the recommended areas for further development are as follows:

18. the impact of the relocation of the Hong Kong Sales Office from Murray Building to North Point should be re-examined as a matter of urgency;

19. to make cost effective use of sales accommodation space, consideration should be given to extending the range of complementary products which can be sold in these outlets;

20. sales training needs should be identified both for existing staff and for all staff transferring to any selling operation;

21. there should be steady but continuous development of modern retail sales outlet systems such as POS;

22. the SMO Training School should reposition itself to include management training specific to SMO and develop courses in Human Resources Management, Marketing and Costing;

23. the School should also examine the potential for developing a course for the private sector on the Land Information System. This would have the dual benefit of providing revenue to the School and also help to address the lack of awareness of SMO developments in this area of the market.

24. training accommodation needs should be examined in the light of the changing nature of cartographic training, the need for access to the computer based LIS, and the option to expand the Training School by taking over the existing Government canteen in the same premises;

25. the introduction of the ITSD Survey Office Management System needs to be monitored by the Management Accountant to ensure that the resulting information fully meets SMO's developing requirements. Resource allocation tasks should be improved by the new systems to be introduced by ITSD;

26. in support of the Lands Department HRM Planning initiative, papers are being prepared by SMO on Training and Development, and Performance Management. These papers should incorporate the recommendations in our Organisation and Human Resources, and Management Information strategies;

27. in the Technical Information Section, effort should be put into updating the technical manuals in terms of content and presentation format;

28. in the Geodetic Section a special investigation should be completed to investigate the reasons for loss of survey marks to determine the steps to be taken to reduce the 10% loss per annum.

29. the introduction of more modern GPS equipment and computer systems and software should be pursued by the Geodetic Section, building on the Japanese experience quoted in the recent capital expenditure proposal.

30. to ease the workload of the Geodetic Section:

- the possibility of further sub-contracting of observation work should be examined. First order geodetic work has already been subcontracted.
- As workload and density standards are closely related, the current standards should be re-examined to determine if the most effective use is being made of resources;
- The surveying of aerial photo control points for mapping should be formally delegated to the DSOs and the Photogrammetric Unit, thus recognising the de facto situation;

9. MANAGEMENT INFORMATION

In Position Paper N°7 "Management Information" we examined the state of the art of management information in SMO and concluded that a strategy is required to develop management information reports that will enable SMO managers to manage a multi million dollar business effectively. We set out in the paper examples of the performance monitors which need to be developed. The provision of good quality management information specifically meets the following key business development aims:

> Aim 10: *To introduce management information systems which will enable business performance to be monitored and controlled effectively against the targets and objectives set.*

Management information will also aid effective decision making and contribute to meeting many other key business development aims.

9.1 Background

Currently SMO staff collect data about a wide range of their activities, but there is no central co-ordination of the data collected and little evidence that data is being converted into information that can help managers make effective business decisions.

Personnel and financial data is mainly managed by Lands Department and Treasury more than it is by SMO senior management. SMO organisational structures are drifting apart from the Cost Centre and organisational structure understood by Lands Department staff.

There will be increasing pressure on SMO to become more accountable for its actions. High quality management information such as production progress, costs, customer requirements, market pressures, sales figures, asset utilisation and human resource location and development are examples of vital ingredients of a successful and sustainable business.

9.2 Overview

Simple paper based management information systems are often just as effective as complex computer systems. There is no need for significant investment in hardware and software. The form of each component part of the system should be considered on its merits.

There is an over-riding need to co-ordinate the collection, analysis and dissemination of management information within SMO. This co-ordination should be managed within SMO HQ and should involve increased liaison with Lands Personnel and Treasury Accountancy staff (within both Lands and Treasury) if SMO remains as a unit within Lands. If SMO is positioned elsewhere within Government, the necessary liaison with central Departments will have to be managed effectively. Close liaison will need to be maintained with ITSD as they develop the Survey Office Management System.

The amount of work required to develop and analyse management information is such that a new post should be created within SMO HQ. The individual should have an understanding of management accountancy and have experience of the benefits that relevant, timely and accurate information can bring to a business.

9.3 Management Information Required

There is a need for data and information in the following areas:

- Time spent on specific production activities;
- Time spent on indirect activities - e.g. leave, training, administration;
- Cost of activities;
- Manpower movements;
- Cost allocation logic;
- Costs of accommodation;
- Direct Expenses and accurate allocation to activity;
- Costs of specific services provided to SMO by other Government Departments;
- Overhead costs at Central, Departmental and SMO level;
- Hourly rates for staff and machines;
- Sales volumes by product;
- Material costs;
- Customer information - basic data - name, address, credit worthiness;
- Customer information - product holdings, licences and other purchases;
- Customer requirements;
- Potential customers;
- Competitor information;
- Asset Register;
- Business intelligence;
- Market Research.

The management information area should also provide an advice and analysis service for managers within SMO. This advice and analysis should include

- Investment appraisal analysis;
- Cost Benefit analysis;
- Trends in costs and revenue by activity and product;
- Implications of changes in trends;
- Contingency planning;
- Manpower trends;
- Monthly reporting of key performance monitors and other business statistics for SMO;
- Product and Service costing advice;
- Development of improved costing models and decision support tools;
- Regular analysis of management information needs;
- Development of training programmes for using management information.

9.4 Implementation of Management Information Development Programme

There is a need for further research to assess and prioritise the work that has to be done. The exercise should not be seen as a means of increasing HQ administration staff. The investment and running costs required to sustain a new post of Management Information Manager needs to be justified in terms of return on investment in the future.

The first step is to identify exactly what management data is being collected now and assess:

- Is the data collection being duplicated elsewhere in SMO?
- Is the data necessary for effective business management?
- Is the data being collected and processed in the most efficient and cost-effective manner?
- Who is converting the data into information?
- Who is using the data/information?
- Who would find the data/information useful, but is not aware that it exists?
- What important data and information is missing?
- How and where can the missing data best be collected?
- To whom should management information be given?
- What information should managers get?
- How will the information be used?

This research phase is likely to take some 3 months, at least, as it will require a good deal of investigation to identify everything that is available. The **research and analysis** of the results **should be undertaken by individuals who understand the nature of SMO activities and also understand how information can be used to improve business performance**. This will require the creation of a two person team - one from within SMO and one external advisor (for example, from the Efficiency Unit, existing Hong Kong Trading Fund on secondment for a time, or from an external consultancy)

The findings of this work should determine the relevant priorities for building a comprehensive management information system and recommend an optimal organisation structure for achieving the implementation milestones.

The Business Plan should be reviewed each year to include specific management development targets that flow from the initial research. For the first year the target should be to identify the priority elements within a Management Information System, to appoint a programme co-ordinator, and start work on the first priorities.

Our own assessment of the **management information priorities** would place the following at the top of the list:

- Appointment of research team;
- Appointment of Management Information Manager (preferably equivalent to CLS, failing that, no less than SLS equivalent);
- Establishment of a Cost Centre structure that reflects the activities undertaken by SMO;
- Building of a central robust and comprehensive sales volume database incorporating all SMO products;
- Creation of a customer database across the whole of SMO;
- Establishment of customer satisfaction surveys;
- Identification of key performance indicators to be monitored at SMO and Cost Centre level in partnership with senior and middle mangers (See Position Paper N^{o}7);
- Training of managers in the use of management information;

These priorities are unlikely to be completed within the first year of the Business Plan.

9.5 Sales Performance

Under separate cover we have provided the report prepared by ICON Business Systems Limited "Feasibility Study on POS Management Computer System" as requested by SMO. You have also received under separate cover ICON's Cost Proposal for this system.

10. ORGANISATION AND HUMAN RESOURCES

10.1 Introduction

This section of the Business Plan brings together the recommendations on organisation and staff posts made in Position Paper N°9 and sets these within the context of a modified organisation structure for SMO as a Stand-Alone Department within Government. We also identify some of the major Human Resource issues which need to be addressed. The recommendations made will enable SMO to meet all its key business aims over the five-year period of the Business Plan, including the main relevant aim:

- *To develop an organisation and introduce human resource development programmes which will support the achievement of business aims, facilitate change and foster a customer and employee caring organisation*.

10.2 Organisation

10.2.1 Reposition within Government

In meeting the aim "*to reposition SMO within Government*" there will be a need to set up departmental administrative support similar to that currently provided by DAO from within the Lands Department. This could be achieved by transferring some staff from DAO. We would not envisage that the costs of these staff would exceed the current allocation of overhead costs from DAO to SMO. The staff transferred should be attached to the CLS/HQ and report directly to the SLS/HRM.

10.2.2 Marketing and Sales

There are key business aims to the addressed in this area, namely the aims:

- *To achieve recognition throughout the community and the Government that it is the authority, centre of excellence and prime source of supply for, land surveying, mapping and geospatial information within SAR*

- *To promote the development of the GIS market in Hong Kong and so increase the penetration and utilisation of SMO's digital mapping products*.

- *To introduce more effective sales, distribution, promotion and customer support arrangements, which will improve delivery and buying convenience and will encourage increased customer take-up of SMO's products and services: and*

- *To introduce simpler, more rational pricing and Copyright policies, structures and levels, which will support the range of business development aims and targets*

To meet these aims, we recommend the appointment of professionally trained and experienced marketing, copyright and sales personnel to manage, maintain close liaison with, provide commercial support to, and drive sales through respectively:

- direct customers:
- the VAR network and professional business market: and
- the booksellers/DSO/MPC/GIS network.

These personnel should include an externally recruited, professional Marketing Manager at equivalent to CLS level, who should report direct to the PGLS in his external facing role for SMO. The Marketing Manager should have overall responsibility for all aspects of marketing, sales, distribution and supply, including pricing and copyright (see Position Paper N°4: Pricing and Licencing, and Paper N°6; Sales and Distribution).

We recommend that the other members of the marketing/sales team, all reporting to the Marketing Manager should include:

- an *internally* recruited **Key Account Manager** at equivalent to SLS level, to take responsibility for direct sales of both digital and paper products to major customers;
- an *externally* recruited **Business Development Manager** at equivalent to SLS level, to develop and manage the VAR network and business professional market:
- an *internally* recruited **Indirect Sales Manager** at equivalent to SLS level, to develop and manage the bookseller/DSO/MPC/GIS network;
- an *externally* recruited **Copyright Specialist** at equivalent to SLS level, responsible for copyright management and administration.

The team should be centralised in SMO and supported by administrative staff recruited internally.

The Marketing and Sales function is so important to the whole future of SMO that it must be set up as a separate unit in SMO reporting to the PGLS.

10.2.3. Technical Support

We recommend (see Position Paper N°5) **the appointment of a small technical support team**, with all-round expertise to:

- deal with technical enquiries from members of the networks and end-users;
- provide training and support to members of the networks, end-users, and internal sales/ marketing and other staff, as necessary;
- manage the production of technical literature; and
- provide feedback to the development team on customer technical problems and requirements.

The team should comprise no more than two to three members and should be recruited from, and report into, LIC.

10.2.4 Quality Unit

We recommend (see Position Paper N°5) **that a data quality unit should be established within SMO HQ under the SLS/TI**, to set and enforce common standards (i.e. consistency of approach) of data capture, digitisation, depiction and all other matters concerned with spatial data, throughout SMO. Such standardisation within the organisation is a pre-requisite to SMO taking the lead in the provision of spatial data on a wider basis. Part of the unit's role should also be to investigate, and take action on, all customer quality complaints.

10.2.5. Management Accountant/Management Information Manager

We recommend (see Position Paper N°7) **the appointment of an externally recruited Management Accountant** to take responsibility for the production of monthly management accounts and other necessary management information. There is an overriding need to co-ordinate the collection, analysis and dissemination of management information within SMO. The amount of work required to develop and analyse management information, and educate management in its use is such that a new post should be created within SMO HQ. The individual appointed must have a full understanding of management accountancy and experience of the benefits that relevant, timely and accurate information can bring to a business. The appointment should ideally be made at equivalent to CLS level, failing that, no less than SLS equivalent grade. This appointment is vital if SMO is to operate as a business and a Stand-Alone Department within Government.

10.2.6 Overall Organisation

With the exception of the changes in organisation recommended above, we believe that the overall organisation should remain as it is at present. It is only recently that SMO changed its organisation structure to recognise the growing importance of digital mapping. The changes now needed to address its key business aims should, therefore, be kept to a minimum so that they can be more easily absorbed. The major new posts are shown in Appendix A'.

10.2.7 Human Resources Issues

Re-organisation and the development of technology will not by themselves bring greater market share or improved satisfaction to customers. The human resource issues surrounding motivation, continued development, deployment, recruitment and retention of personnel within SMO, all need to be addressed in parallel with organisation and technology changes. We have identified a number of human resource issues which will affect SMO's ability to achieve the key business aims.

SMO will need to address personnel issues such as the fact that some of its staff do not yet share the vision and purpose of digital data. One of the many challenges that will face SMO is communication to all of their staff of the "vision" of a market-driven enterprise heavily reliant on computer technology. Such reliance on technology will place new demands on staff, particularly those involved with the capture and update of data. To be of significant value to the customer, the data must be more than merely a digital version of the traditional topographic map. Staff will need to understand the requirements of digital data within a market-driven organisation. An education/retraining programme needs to be implemented to ensure that all members of staff are able to grasp the concepts of digital data and the requirements with respect to the capture of attribute "meta" data.

We have questioned in previous reports the validity of the staff rotation policy, where staff are rotated as a deliberate policy on a regular basis. There are many good reasons for such a policy, but equally there are disadvantages, which are now manifesting themselves and threaten, in particular, to upset the long term stability of LIC. With the increasing acceleration and growth of computer technology, the time frames within which proficiency is gained will be longer and thus the period for constructive input lessened. **We recommend that, in technical areas in particular, the rotation policy should be revised**.

With the introduction of a Marketing and Sales function, and a market-led/customer focused approach, staff development training needs to be increased. It should include components such as:

- Customer care and focus;
- Business management and understanding;
- Financial/Commercial awareness and understanding;
- Forecasting and planning ;
- Market appreciation;
- Sales administration;
- Copyright management and administration;

Given the technical programme advocated (see Position Paper N°5), we also believe that LIC staff may find development of Programme and Project Planning of benefit.

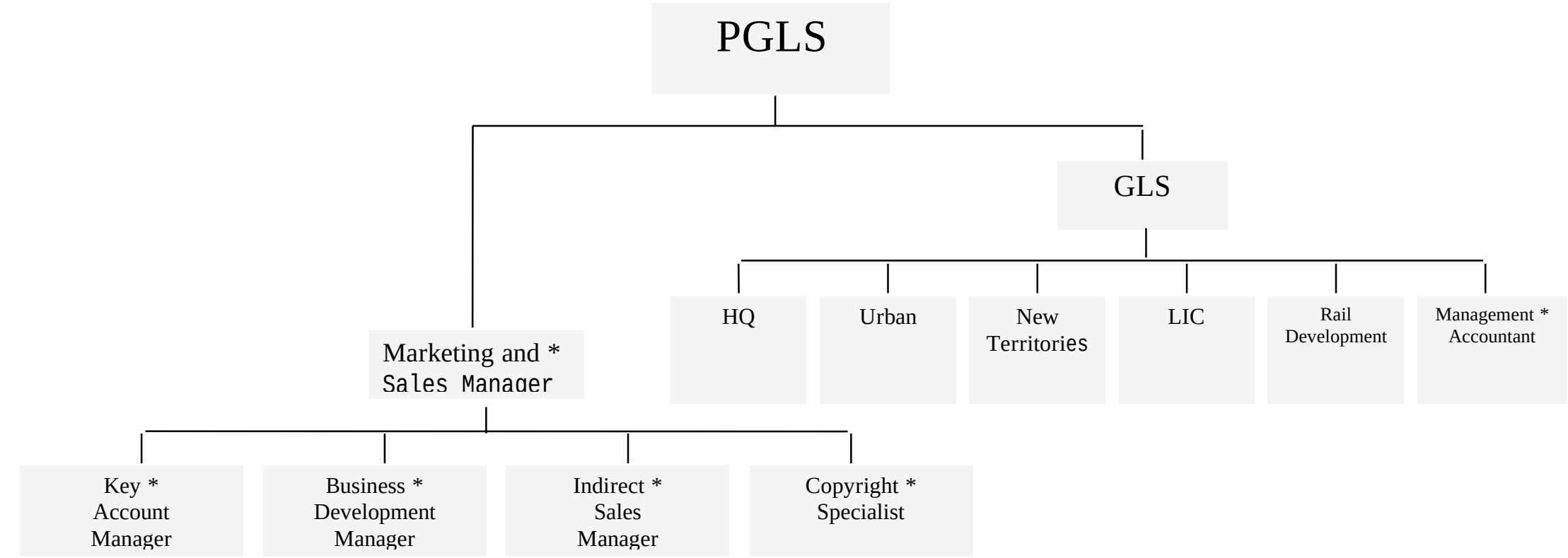
Courses on these and other related topics should be developed over the next year between the Training School, in its recommended extended role into middle management training, and the new members of the Marketing and Sales team. Some of the more general topics listed above should be made available to staff throughout SMO.

We recognise that all these proposals call for a significant culture change within SMO. This has human resource implications over and above training needs. It requires a change in management style and approach. A more communicative style of management will be needed to convey the message that SMO is running a business, and to allay the quite understandable concerns over job security, changes in job content etc. SMO in pursuit of its aim to be seen as a caring employer may need to take more overt action to demonstrate this. Similarly, a more participative management style, using cross-disciplinary problem solving workshops, such as used in the efficiency reviews, would be advantageous.

APPENDIX A

SMO ORGANISATION (REVISED)

(showing new posts only)



* New

11. TARGET REVENUES AND COSTS

In this section we bring together the Sales and Cost Targets for SMO over the five year period of the Business Plan.

We have assumed that the increases in sales targets over the five years will be met by adding a Marketing Manager and his team plus administrative support. In addition, technical, quality, promotion and development support costs have been added. The growth in Services to government, rising at approximately 8% per annum has been addressed by adding survey officers and senior staff.

All target costs have been expressed at constant 1998/99 prices to eliminate the effect of inflation.

SALES TARGETS

1998/99 to 2002/2003
in HK$ Ms

PRODUCT GROUP and MARKET SEGMENT	1998/99	1999/00	2000/01	2001/02	2002/03
	Year 1	Year 2	Year 3	Year 4	Year 5
Digital Data Products					
- Government	7	7	7	7	7
- Private sector technical professional	11	12	14	15	16
- Private sector business professional	1	10	19	28	37
Total	**19**	**29**	**40**	**50**	**60**
Graphical Maps (incl. of repro)					
- Government	8	10	12	12	10
- Private Sector	10	13	16	18	19
Total	**18**	**23**	**28**	**30**	**29**
Survey Plans (incl. of repro)					
- Government (excl. LAO/LACO)	7	7	6	6	6
- Private Sector	12	12	10	8	9
Total	**19**	**19**	**16**	**14**	**15**
Photographs					
- Government	4.0	4.0	4.0	4.0	4.0
- Private Sector	0.8	0.9	0.9	1.0	1.0
Total	**4.8**	**4.9**	**4.9**	**5.0**	**5.0**
Geodetic Survey Data					
- Government	0.6	0.6	0.6	0.6	0.6
- Private sector	2.1	2.3	2.5	2.8	3.1
Total	**2.7**	**2.9**	**3.1**	**3.4**	**3.7**
Services					
- Government	227.0	245.0	265.0	286.0	301.0
- Private sector	6.3	6.9	7.6	8.4	9.2
Total	**233.3**	**251.9**	**272.6**	**294.4**	**310.2**
GRAND TOTAL TARGET SALES REVENUE in HK $ millions	**297**	**331**	**365**	**397**	**423**

Notes:

1. The sales revenue targets (See Annex 'B' for calculations) are not forecasts. They are what SMO should aim to achieve following the recommendations set out in the foregoing sections of the Business Plan. They have been derived systematically using historical sales volumes and growth rates and the potential demand estimates derived in our market research. All values are at the recommended new prices, modified only for the year-on-year adjustments recommended in our report. No allowance has been made for inflation.

2. Values have been derived from volumes judgmentally, using notional sales mix and average pricing estimates. The revenues accorded to Government (and Government contractors in the Private Sector Technical Professional Segment) are likewise notional, based on the assumption that 'dummy' invoices will be issued to these customers, so that a value can be put on their business.

3. The historical sales volume figures used in the estimates were obtained from the SMO in August 1997. These have been adjusted as necessary in the light of additional figures obtained separately.

4. Digital data products include BMS and CIS large scale, 1:5,000 and 1:20,000 scale and GIRS products. Value estimates are inclusive of licence fees. Updates have been included, on the assumption that the complete holdings will be updated at a frequency dependent on the particular segment. The proportion of customers purchasing updates also varies according to segment.

5. Graphical Maps includes large-, mid- and small-scale plots/prints/repro products, leisure maps, guides, geological and other special maps. Nominally they include royalties. They anticipate a fall-off in repro and printed maps as these are increasingly replaced by digital data and plots of higher value. They also anticipate growth in leisure maps and guides as a result of our sales and distribution recommendations.

6. Survey plans include Land Boundary, Lot Index and, to a much smaller extent, Survey Record plans. Output for LAO/LACO has been excluded. This is included under services and will be covered by a Service Level Agreement, following our recommendations to that effect. The figures anticipate significant growth in (Volume) demand, but accompanied by the proposed reduction in (plotted) Lot Index Plan prices. We would expect price reductions to help sustain demand above the level it would otherwise have seem.

7. Photographs include both Black and White, and coloured. Some growth has been assumed in the private sector

8. Services includes all the land survey output for LAO/LACO, Land Boundary Ordinance work, computation folder searches and all the special project groups. Substantial growth is anticipated in work for LAO/LACO and for special projects – both to be handled under Service Level Agreements or contracts. The values have, therefore, been calculated using man-days input and a notional daily labour rate of HK$ 307 x 8. This rate has been derived pro-rata to Survey and Technical Officer labour costs and an average DSO overhead.

9. Finally, it must be emphasised, the targets are notional, based on many assumptions about product mix and the rate of implementation of our recommendations. They should be revised as soon as actual values for a significant period become available, following the implementation of our Management Information recommendations (See Position Paper N^{o}7).

Cost Targets

The following cost targets have been based on the analysis from the 1996/97 Cost Model and the 1997/98 overall budget for SMO (See Annex 'C' for calculations). We set out below the targets for the five years of the Business Plan from 1998/99 to 2002/03. The items asterisked are indicative grades only.

HK$ Ms

COSTS HK$ M	**1998/99**	**1999/00**	**2000/01**	**2001/02**	**2002/03**
	Target	Target	Target	Target	Target
Cash Costs					
- Personal Emoluments P/E	332.0	332.0	332.0	332.0	332.0
- Extra Staff	8.2	16.1	23.6	30.8	37.8
-Marketing Manager	1.1	1.1	1.1	1.1	1.1
- Key Account Manager	0.9	0.9	0.9	0.9	0.9
- Business Development. Manager	0.9	0.9	0.9	0.9	0.9
- Indirect Sales Manager	0.9	0.9	0.9	0.9	0.9
- Copyright Manager	0.9	0.9	0.9	0.9	0.9
Extra Marketing Admin.					
- EOs (2)	0.9	0.9	0.9	0.9	0.9
- Cos (2)	0.5	0.5	0.5	0.5	0.5
- CA (1)	0.1	0.1	0.1	0.1	0.1
- OA (1)	0.1	0.1	0.1	0.1	0.1
- Management Accountant	1.1	1.1	1.1	1.1	1.1
Technical Support					
- STO (3) *	1.1	1.1	1.1	1.1	1.1
Quality Unit					
- LS (1) *	0.6	0.6	0.6	0.6	0.6
- STO (2) *	0.8	0.8	0.8	0.8	0.8
- TO (2) *	0.5	0.5	0.5	0.5	0.5
Total P/E	350.6	358.5	366.0	373.2	380.2
- Departmental Exps. D/E	39.0	39.0	39.0	39.0	39.0
- Development Costs	2.0	2.0	2.0	2.0	2.0
- Promotional Costs	-	1.0	1.0	1.0	1.0
Total LAFIS Cash Costs	391.6	400.5	408.0	415.2	422.2

Non-Cash Costs – basic	280.6	287.0	292.3	297.5	302.5
Add Extra Depreciation					
Data Disseminate System	1.0	1.0	1.0	1.0	1.0
Customer Supply Set	1.0	1.0	1.0	1.0	1.0
On-line/Internet			1.0	1.0	1.0
Sub-Total	674.2	689.5	703.3	715.7	727.7
Less Efficiency Reduction 5% p.a.			(35.2)	(71.0)	(107.4)
SMO TOTAL COSTS	**674.2**	**689.5**	**668.1**	**644.7**	**620.3**

Notes:

1. Personal Emoluments and Departmental Expenses for 1998/99 are calculated at 7% above the budget for 1997/98 and then held at constant costs, ignoring inflation.

2. Extra staff to cover the 8% p.a. increase in Services to Government have been calculated at 31 staff added year-on year (see Annex 'C'), but with a 5% reduction in additional numbers each year to take account of productivity improvements after implementation of the business plan, to strengthen personnel in the above table. Staff Ready Reckoner costs for personal emoluments have then been used to evaluate the extra staff costs.

3. A Marketing Manager has been added at CLS level and evaluated at ready reckoner cost.

4. Four marketing staff at SLS level have been added in accordance with our recommendations at ready reckoner costs.

5. Marketing Administration Support staff have been added as shown at ready reckoner costs.

6. A Management Accountant has been added, again at CLS level, and evaluated accordingly.

7. Technical Support and Quality Unit staff have been added as shown and evaluated at ready reckoner costs.

8. Development Costs have been added at HK$ 2M per annum to cover the Data Dissemination System and the Customer Supply Set developments.

9. Promotion Costs of a rounded figure of HK$ 1M have been added for each year of the plan after year 1. Some expenditure of around HK$ 250K will be incurred in the first year.

10. Non-Cash Costs-basic have been calculated as a fixed percentage of the total LAFIS Cash Costs in the 1997/98 budget.

11. Extra depreciation has been calculated at HK$ 1M per annum in years one to five for the Data Dissemination System and the Customer Supply Set, and at the same rate for the Full-on-line and Internet Access System, but only for years three to five, to take account of later installation.

12. Efficiency Savings have been calculated at a cumulative 5% of total costs from year three of the Business Plan after a two year period of consolidation. The savings can result from the developments in efficiency identified in Position Paper N^{o} 3, Efficiency Reviews and in Chapter 8 of this plan.

    As SMO is a technology based organisation we would also envisage savings arising from the procurement of up-to-date technology.

Notional Cost Recovery

Comparison of the Sales Targets and the Cost Targets for the five years of the Business Plan enables an indicative notional cost recovery to be calculated, as follows:

HK$ Ms	**1998/99**	**1999/00**	**2000/01**	**2001/02**	**2002/03**
Target Costs	674	689	668	644	620
Target Sales Revenue	297	331	365	397	423
Indicative Notional Cost Recovery %	44	48	55	62	68

12. ACTION PLAN

The Action Plan provided overleaf identifies the key strategies included in Sections 4 to 10 and proposes broad time scales for implementation.

This is our view of the priorities for SMO in developing its business, bearing in mind interdependencies and probable resource limitations.

SMO will, of course, need to carry out more detailed planning in implementing the strategies, once decisions have been made on our recommendations, SMO priorities and the resources available.

ANNEX A

POSITION PAPERS

1. Mission and Aims
2. Positioning of SMO within Government
3. Efficiency Reviews
4. Pricing and Licensing
5. Product Mix and Development
6. Sales and Distribution
7. Management Information
8. Promotion
9. Organisation and Human Resources
10. SMO Training School Fees

POSITION PAPER N° 1
MISSION AND AIMS

The overall purpose or 'mission' of the Survey and Mapping Office (SMO) is:

To meet the land surveying and mapping needs of all sections of the Hong Kong SAR community in a cost-effective, high quality and timely manner.

More specifically, SMO's key business development aims over the five year time-span of this Business Plan are:

1) *To achieve recognition throughout the community and the Government that it is the authority, centre of excellence and prime source of supply for, land boundary survey, mapping and geospatial information within the SAR.*
2) *To improve the quality, variety, up-to-dateness and utility of digital data, graphical maps and plans available to the Hong Kong community, in accordance with customer requirements.*
3) *To promote the development of the GIS (Geographic Information Systems) market in Hong Kong and so increase the penetration and utilisation of its digital mapping products.*
4) *To take the lead in the development, management and exploitation of an integrated Hong Kong Geographic Information System, incorporating data from both the public and the private sectors.*
5) *To introduce more effective sales, distribution, promotion and customer support arrangements, which will improve delivery and buying convenience and will encourage increased customer take-up of SMO's products and services.*
6) *To introduce simpler, more rational pricing and copyright policies, structures and levels, which will support the range of business development aims and targets.*
7) *To re-position SMO within Government so as to demonstrate accountability and to facilitate realisation of its key business aims.*
8) *To develop an organisation and introduce human resource development programmes which will support the achievement of business aims, facilitate change and foster a customer and employee caring organisation.*
9) *To identify and implement efficiency improvements on a continuing basis, in order both to meet cost targets and to release additional resources for business development.*
10) *To introduce management information systems which will enable business performance to be monitored and controlled effectively against the targets and objectives set.*

P-E/OS Consultant Team
1 September 1997

POSITION PAPER N°2
POSITIONING OF SMO WITHIN GOVERNMENT

Purpose of this paper

This paper is presented as a stand alone document which can be discussed with the senior management of SMO and with other interested parties, if required. We have, therefore, restated our recommended business development aims for SMO and summarised some of the earlier options considered before proceeding to develop the key issues relating to our short list of status options.

The purpose of the paper is to document the consultants' views on the viable options for the future status of SMO, to evaluate these options and to draw conclusions and make recommendations on any status change required to meet SMO's business development aims over the five year time-span of the Business Plan, which may be stated as follows:

- To achieve recognition throughout the community and the government that it is the authority, centre of excellence and prime source of supply for, land boundary surveying, mapping and geospatial information within the SAR.

- To improve the quality, variety, up-to-dateness and utility of digital data, graphical maps and plans available to the Hong Kong community, in accordance with customer requirements.

- To promote the development of the GIS (Geographic Information Systems) market in Hong Kong and so increase the penetration and utilisation of its digital mapping products.

- To take the lead in the development, management and exploitation of an integrated Hong Kong Geographic Information System, incorporating data from both the public and private sectors.

- To introduce more effective sales, distribution, promotion and customer support arrangements, which will improve delivery and buying convenience and will encourage increased customer take-up of SMO's products and services.

- To introduce simpler, more rational pricing and copyright policies, structures and levels, which will support the range of business development aims and targets.

- To re-position SMO within Government so as to demonstrate accountability and to facilitate realisation of its key business aims.

- To develop an organisation and introduce human resource development programmes which will support the achievement of business aims, facilitate change and foster a customer and employee caring organisation.

- To identify and implement efficiency improvements on a continuing basis, in order both to meet cost targets and to release additional resources for business development.
- To introduce management information systems which will enable business performance to be monitored and controlled effectively against the targets and objectives set.

The critical question to be addressed is what is in the best interest of SMO, the Hong Kong Government and the SAR as a whole as SMO seeks to:

- improve the efficiency and cost effectiveness with which its products and services are provided to customers;
- maintain, provide and administer sound and up-to-date land survey, mapping and land information systems for the territory;
- encourage the more widespread use of its products and services;
- set pricing policies which will attract customers and safeguard future product and service provision;
- act as lead co-ordinator for geo-spatial data systems within the SAR;

Options

In our Second Interim Report dated 20 June 1997 we considered a wide range of future status options and set out the advantages and disadvantages of each option. The options were:

The Status Quo - with SMO remaining as one of three functional offices within the Lands Department, supported by the Departmental Administration Office (DAO). In this option there would be no change whatsoever in the present position.

Existing Status (1) within Lands Department, but with:

- introduction of steadily increasing cost recovery targets and/or
- use of an Operating Services Account with charges to Government Departments; and
- setting up of separate marketing and management accounting support, and
- increased use of sub-contractors, where appropriate.

Existing Status (2) within Lands Department, but with:

- all products and services provided free to everyone, public and private sector.

Stand-Alone SMO, with similar optional changes as for the Existing Status options above. In this option, the whole of SMO would separate from Lands Department and become an autonomous department in its own right.

Stand-Alone LIC and Marketing Organisation, with similar option changes as for the Existing Status options above. In this variation of the Stand-Alone SMO option, LIC and the marketing activities would be split off from the survey activities, leaving survey with the Lands Department.

Trading Fund within Government - the option already followed under Hong Kong's Public Sector Reform Programme by Land Registry, Companies Registry, the Office of the Telecommunications Authority, Drainage Department and by the Electrical and Mechanical Services Department.

A Public Company within Government - this option would follow the French model examined in the Study Tour, where IGN in Paris is a public company managed within the Ministry of Public Works with a management board comprised of members from key stakeholder departments within government. IGN is also able to become a partner in private enterprise ventures.

Part Privatisation of SMO - this option is based on the New Zealand model considered in the Study tour, where the former mapping organisation DOSLI split into two components in July 1996. Land Information New Zealand (LINZ) manages the national interest and is responsible for policy, survey regulations and standards. TERRALINK is responsible for commercial exploitation.

Full Privatisation of SMO - in this option the SMO could be packaged for privatisation as a single entity and sold to a single buyer, or split in a number of ways and sold to different purchasers.

Following full consideration of the advantages of each option, as set out in our Second Interim Report, we have concluded that the business objectives of SMO can best be achieved within an organisation status in which SMO is held fully accountable for its own operations, and where there is some kind of external pressure being brought to bear to encourage greater efficiency, effectiveness and economy, without impairing the high professional standards of the organisation.

As a result of this conclusion, we do not believe that the **Status Quo** option is a viable option because:

- it provides no incentives to increase efficiency, effectiveness and economy;
- lack of commercial awareness will continue in the organisation;
- customer service issues will not be adequately addressed;
- there would no drive provided for market growth, especially into developing or potential markets;
- the current lack of control on the use of data would be likely to worsen;
- priority given to Lands Department will continue to undermine other activities.

The **Public Company within Government** option (The French Model) is considered to be more appropriate to larger organisations than SMO. In addition, there does not appear to be a precedent for this type of organisation within the Hong Kong Public Sector Reform Programme. It was, therefore, rejected as an option.

Either **Part Privatisation** on the scale of the New Zealand model, or **Full Privatisation** are not seen as practical options at this point in time as they would:

- call for a dramatic shift in culture and a significant human resources management programme against a current background of industrial unrest within SMO;
- conflict with the need for security in the national interest in the wake of the handover to the PRC, who treat these issues very seriously;
- make the Government reliant on external private sector services for the updating and maintenance of the databases.

In addition, there is no apparent political policy that favours these options. It is also unlikely that the private sector in Hong Kong has, as yet, the capacity and capability in this wide range of activities. There may, however, be scope for the sub-contract of specific activities. Lands Department have indicated that they are themselves considering the sub-contracting of more work. We have in our efficiency studies of the whole SMO organisation identified a number of areas where this should be considered.

At the end of Stage 3 of the study, therefore, we recommended that the two Existing Status options, the Stand-Alone SMO option, the Stand-Alone LIC and Marketing option, and the Trading Fund option should be carried forward for further consideration in this Stage 4 of the study. The remainder of this paper sets out an evaluation of this short list of options and documents our final conclusions and recommendations.

Evaluation of options

Existing Status (1)

Under this option cost recovery targets would be steadily introduced for both private and public sector sales. As a transitional measure, charges could be made to Government departments under an Operating Services Account. This technique was used by EMSD in their transition towards trading fund status with the objective of making the departments aware of the costs of the services provided, and preparing them for the hard charging regime required under trading fund rules. Charging in this way might enable SMO to reach realistic cost recovery objectives over the next five years. The precise target to be set would need to be determined and agreed. The study tour findings indicated a wide range of cost recovery regimes.

This option would need to be supported by marketing and management accounting, but would not require many additional staff. It would probably also be accompanied by the increased use of contractors in appropriate circumstances. This trend is already apparent in SMO for short term contracts or in circumstances where there are staff problems. A sizeable budget is already being considered for sub-contract work in the future, although there is no general policy that activities should be subcontracted.

Advantages

- efficient and effective operations would be encouraged;
- Government departments would be aware of the cost of their demands;
- a new commercial awareness would be brought to the business;

- clear marketing strategies would be introduced for the first time;
- the whole organisation would become customer focused;
- costs and prices would come under close scrutiny and need to be rationalised and justified;
- this option would meet the national interest for a sharper survey and mapping service able to meet future demands;
- introduction of a more rational pricing and licensing approach across all customers will reduce current data 'leakage'.
- would send a clear message to private sector customers that the 'inequity' of the current dual pricing system was being addressed.

Disadvantages

- calls for a significant change in the culture of SMO;
- steadily increasing cost recovery targets might prove difficult to achieve in a limited market, especially if the constraints on hard charging to Government remain;
- would highlight the anomaly of a dual price structure for public and private sectors;
- price adjustments to meet recovery targets may, if these are set too high, prove counter-productive with the known adverse price elasticity and continued leakages of potential income in the market;
- the market research indicates that the introduction of commercial pricing to Government customers would certainly reduce their off-take of SMO's products and services substantially;
- cost recovery targets may call for significant cost economies to be introduced - with salaries and payroll on-cost accounting for over 75% of costs, this would be a sensitive issue;

Existing Status (2)

Under this option, all products and services would be provided free to everyone in both the public and private sectors. Current thinking in the United States is to provide data free of charge. SMO products and services are currently provided free to Government departments (except for material costs) and via them to a number of consultants in the private sector. As the market research indicates that the potential market, especially for digital data is not as large as it was thought to be, then this becomes a logical option for consideration, since significant recovery levels might not be attainable anyway. However, SMO might still need to charge for material, handling and 'added value' cost to Government departments.

Even if this option was adopted, there would, we believe, still be the need for marketing and management accounting support.

Advantages

- wider use of SMO data would be encouraged and it is in the national interest for standard data to be used throughout Hong Kong;
- this would appeal to the predominantly professional, as opposed to commercial culture in SMO;

Disadvantages

- there would be no cost pressures to improve products and services or any incentive to increase efficiency and effectiveness;
- it is difficult to maintain data for the customers' benefit if it is provided free. This is already evidenced by the way that data is currently being passed around the market;
- once introduced it would be extremely difficult to reverse and would probably eliminate the possibility of SMO ever becoming a trading fund.

Stand-Alone SMO

One option is for the whole of SMO to separate from Lands Department and become an autonomous department in its own right. Ideally such a Department would need to be positioned in a Government Branch which was not a user of its survey and mapping services i.e. a neutral Branch, namely a branch or bureau not only without, but seen to be without vested interest in SMO. Within Lands Department, SMO is currently competing for funds against the other divisions of the department, so its voice tends to be weak. It is also perceived to be aligned with Lands Department in any issues involving cross-departmental co-operation or the surrender of data ownership in the interests of the greater good.

Advantages

- greater autonomy and accountability, able to argue its own fund justification, make quicker and better decisions, and forced to justify subsequent expenditure;
- would be perceived as independent of Lands Department and thus in a better position to take the initiative on issues such as the development, management and marketing of a multi-agency/multi-dataset geo-spatial database;
- positioning as a Stand-Alone department would recognise its importance in the Special Administrative Region and emphasise the need for value for money for the services provided by SMO;
- assurance of a higher profile in the market place – a major benefit in promoting its products and services;
- would be in a stronger position to manage customer priorities and able to resist demands that do not meet value for money criteria;
- Relationship with Lands governed by contract, less prone to Lands urgent priorities interfering with planned mapping business;
- Strengthens Lands position in requesting additional survey resources for SMO to meet Lands requirements;
- where SMO has autonomy in managing its staff resources.

Disadvantages

- might be perceived as a small department competing for funds with the large departments - possible not advantageous;
- would come under increased Government scrutiny with a much higher profile as an exposed department rather than as an Office within a larger department;
- would need to add staff, e.g. finance staff, to meet the demands of departmental accounting, and possibly other staff to cover the services currently provided by DAO;
- as a small department more vulnerable to interference/takeover by a larger department.

Stand-Alone LIC and Marketing Organisation

A variation on the SMO Stand-Alone option would be the splitting off of the LIC and marketing activities from the survey activities, leaving survey within Lands Department. This would allow LIC to concentrate on the technical and marketing aspects of mapping, both for paper maps and for digital data. In this option, the Government would retain the development, maintenance, ownership and copyright of the databases; would continue to develop and produce paper maps, and continue to control survey and mapping policy, set specifications and standards, and would market all mapping products.

Advantages

- Since a high proportion of the work of the locational DSOs is performed for Lands Department, there is a rationale in leaving survey activities with this department;
- LIC could then be focused on expanding the use of SMO data for both paper and digital map products, but with the emphasis on the continuing development and marketing of the use of digital data;
- greater freedom to sub-contract work to the private sector, if this proved to be more cost effective.

Disadvantages

- LIC would become reliant on other units outside its own department for updating its databases, but sound specifications, standards and service agreements could negate this problem;
- a major culture change would be needed to address the marketing issues inherent in such an approach - the technical skills are not in doubt;

Trading Fund within Government

The nature of trading funds were described in Appendix 4.2 to our First Interim Report. In brief:

- a trading fund operates more like a business, whilst remaining part of government;
- assets remain government assets and the staff remain as civil servants;
- it pays its suppliers and is paid by users of its products and services ;
- a trading fund has powers to borrow and create reserves;
- it fixes its fees and charges within the framework of a key financial target, normally an average rate of return on net fixed assets, but must take account of market forces;
- charges unless otherwise agreed are for full costs of services provided.

Advantages

- greater autonomy in decision making and improved flexibility in the use of resources;
- freedom from the constraints of vote accounting;
- greater flexibility to plan ahead, since a trading fund will normally only be required to meet its financial objectives over a period of years;
- the ability to borrow long and short term to meet financing needs;
- greater pricing flexibility for products and services, but statutory approval still applies;

- scope for negotiation for deviation from Civil Service Branch personnel policies, and exemption from some of the procurement and supplies regulations;
- accountability for its business with the associated commercial pressures to continuously improve its performance.

Disadvantages

- need for really special skills in management, marketing and finance in addition to the professional skills needed;
- requires the political will to implement and, most essentially, full support at high government levels;
- needs a champion who will drive the transition to a successful conclusion and who can then adapt quickly to a highly commercial environment;
- calls for a dramatic change in the culture of SMO.
- would demand a quantum leap in the financial revenues of SMO in order to meet agreed returns on invested capital.
- as was the case for some of the other Trading Funds, would require intensive study and financial appraisal to determine the true costs and benefits of moving to this status option.

Conclusion and Recommendation

We confirm the conclusion made at the previous stage of our study that the business development aims of SMO can best be met:

- within an organisation status in which SMO is held accountable for its own operations, and
- where some form of external pressure is being brought to bear to encourage greater efficiency, effectiveness and economy.
- where SMO management becomes more business focused.

We believe that whatever the current climate is now, at some time there will be strong efficiency measures imposed on all aspects of Hong Kong Government activity, in accordance with the world-wide trends observed in the Study Tours. The sooner that SMO Management prepare for this the better. As a minimum, business management, marketing and management accountancy skills will be needed. There will also be a need to re-assess human resource strategies. By managing themselves as a business with clear targets and performance monitors, SMO will reduce its dependence on Government subsidies and hence will be well positioned and able to point to sustained improvement when efficiency pressures increase. In the meantime, such action will put SMO in a stronger position to argue for development funding.

Following a reconsideration of the advantages and disadvantages of the short-listed options we conclude that;

- SMO needs to develop a separate identity from Lands Department, which is commensurate with its role as the central authority for land survey, air survey and all type of mapping in Hong Kong;

- such a separation would provide greater autonomy and the ability to argue fund justification in: keeping abreast of new technologies in mapping; marketing its products and services; and developing its own management information systems.

- SMO would then be perceived as independent and this would improve its prospects of leading major development initiatives in multi-agency databases;

Lands Department must, however, be convinced that such a separation would have no adverse effect on the substantial services being provided to them. We believe that such assurances could be provided through Service Level Agreements between SMO and LAO and LACO, which set out clearly the nature and range of the products and services to be provided, quantified where possible, and with agreed service targets, all within an agreed annual budget value. Under a key account concept, Lands Department would continue to be a key account and should be managed accordingly.

The two **Existing Status** options do not meet the independence criterion within our conclusions and perpetuate inefficiency. No business can develop by standing still. There is no doubt that under the existing status options SMO would retain its technical excellence, but today any national mapping agency needs both business and technical excellence if it is to prosper.

We believe that the **Trading Fund** option, although it meets the independence criterion, is not viable at this point in time. It would require major culture change within SMO, which we believe would necessitate several years of planning and preparation, even if the prerequisite study and appraisal demonstrated financial viability. In short, the management and staff of SMO are not prepared, and no agents of change have emerged to drive such a change, even if there was a commitment from higher government levels. We nevertheless believe that the trading fund option should be considered as a long term objective, but outside the timeframe of the five year Business Plan.

This leaves the two Stand-Alone options, either a Stand-Alone SMO or a Stand-Alone LIC and Marketing organisation.

Both of these options meet the independence criterion. The **Stand-Alone SMO** option in which the whole of SMO is transferred to a neutral Branch within government is a clear cut option. The **Stand-Alone LIC and Marketing** option is less clear cut and would mean splitting up the existing SMO organisation and leaving the survey operations within Lands Department. This would have a knock on effect upon Headquarters. SMO has only recently settled into a new organisation structure and a further revision would pose human resource problems and cause additional disruption with little obvious benefit at this time. There is still a great deal of technical development to be done in LIC and at present it would be more efficient to maintain close links within a single organisation. This would enable SMO to build on the existing organisational bond and loyalty, which might be destroyed if such a major split was made at this time. In addition, we have observed that a major culture change would be needed to address the marketing issues inherent in this option. We do not believe that in the short to medium term such a major culture shift is a practical possibility. Certainly LIC, in conjunction with all other units in SMO, needs to adopt a much more commercial approach, but a change to a separate market driven organisation is a change of a different magnitude. It also has the major disadvantage that LIC would be reliant on external units (the DSOs within Lands Department) for the update and maintenance of its databases, although as already stated sound specifications and service level agreements could negate this problem.

On balance, therefore, we believe that a strong case can be made for an organisation independent of Lands Department, and we would recommend this as an evolutionary rather than a more revolutionary approach. This will put SMO in a key position to take the lead in GIS developments. We also believe that the user community would benefit most in the short to medium term by positioning SMO as an independent department, which maintains its present integration of activities, but adds to this business and marketing elements. This change should be consolidated over a five year period in which a SMO acts independently of Lands Department. We recommend the SMO Stand-Alone option. The stand-alone option we prefer is one in which **all** customers are charged; with the introduction of steadily increasing cost recovery targets, so as to ensure that there is continuing pressure to improve cost awareness, efficiency and customer focus.

P-E/OS Consultant Team
1 September 1997

POSITION PAPER N°3
EFFICIENCY REVIEWS

Purpose of this paper

The purpose of this paper is: to set the context for the efficiency reviews; to report on the work completed on efficiency reviews throughout SMO in the different stages of the study; to document the present status of these reviews, and to set out the action to be taken over the period of the five year Business Plan, as a basis for agreement by the senior management team.

Context for the Efficiency Reviews

Three of SMO's business development aims relate specifically to the subject of Efficiency Reviews, namely:

- *To improve the quality, variety, up-to-dateness and utility of digital data, graphical maps and plans available to the Hong Kong community, in accordance with customer requirements;*

- *To introduce more effective sales, distribution, promotion and customer support arrangements, which will improve delivery and buying convenience and will encourage increased customer take-up of SMO's products and services.*

- *To identify and implement efficiency improvements on a continuing basis, in order both to meet cost targets and to release additional resources for business development.*

Work Completed

Within the overall framework of these aims, we have completed efficiency reviews in all parts of the SMO organisation.

In Stage 2 of the study we completed efficiency reviews of the DSO and LIC operations with review teams selected for each of the operations in consultation with the Chief Land Surveyors, Urban, New Territories and the Land Information Centre.

The first DSO Review on 9 April 1997 concentrated on examining the activities of the location-based DSOs. The technique of critical examination was outlined to the participants and then Outline Process Charts were used as the basis for critical examination.

The second DSO Review held on 10 April 1997 concentrated on project and special activities. The review team first critically examined the process of subcontracting and then adopted a problem solving/brainstorming approach, within the critical examination framework, to examine the project and special activities.

For the review of the LIC, three separate reviews were held in mid-April 1997 to critically examine first the administrative activities, then the technical and finally the photogrammetric and air survey activities. The Proposed Role of the Land Information Centre chart (dated October 1996) and the detailed activity listings thereon were used as the basis for examination.

The development issues arising from the two DSO Reviews and the LIC Reviews were fully documented in our First Interim Report. We then discussed the way forward on these development issues with the relevant CLSs and the participants at further review meetings. All participants bought in to the recommendation that task forces should be set up to develop the options during Stages 3 and 4 of the study. This had the dual advantage of involving those people most concerned with the relevant activities in the development process, and providing continuity beyond the end of the current consultancy study.

Task Force Teams were established in Stage 3 to follow up on Topographic, Land Boundary and Cartographic development issues in the DSOs and similar issues in LIC. On balance it was decided not to form any task forces to address the other project and special activity issues, but to leave these for consideration by the respective SLSs.

In addition in Stage 3 we completed efficiency reviews of the Headquarters operations of HQ Administration, Technical Information, Map Sales, Reprographics, Training School and the Geodetic Sections.

The results of the Stage 3 actions on follow-ups to the original reviews in the DSOs and LIC, and the new reviews of Headquarters are fully documented in the Second Interim Report.

In Stage 4 we have conducted further follow-up reviews on the Topographic, Land Boundary Survey, Cartographic and LIC development issues, and agreed the setting up of a Task Force to examine the development issues in the Headquarters review conducted in Stage 3.

Status of the Reviews

The reviews have now reached a point where developments with significant benefits are being identified by the Task Force Teams. In Stage 4 of the study we have debated with the Task Force teams a number of excellent papers and reports prepared by team members on specific development issues. These include:

1. Application of GPS for topographic Survey Work

Recommends the introduction of the GPS technique in topographic survey in Sai Kung, Islands, North and Yuen Long and states that compared with the traditional method, where four to five personnel are engaged, the operating cost of GPS survey is approximately 40% lower. It is recognised that this technique would not be appropriate in urban areas.

2. Use of Private Survey Contractors for Surveying

Identifies that SMO has in the past 12 months used private survey contractors to carry out cost effective land boundary survey work and the updating map sheets on special projects.

3. Study of field and office survey work

The task force team have concluded that a pilot study should be conducted of field and office survey work. The objective of this study should be to shorten the time spent on survey work, both in the field and in the office, in order to increase productivity.

4. Minor Revision Work carried out by the Title Survey Section

Problem identified is that SO/Title staff need the same skills as Topo staff in dealing with feature codings used in map revision work. A few districts have started rotating SO/Title staff to their Topo section to gain experience in mapping and BMS updating. Recommended that other districts should also rotate staff and that the program 'Survey CAD' should be improved to include the ability to transfer data from the PC to the LIS environment.

5. Transport Management and Vehicle Utilisation in Hong Kong DSO

Transport Management seen as a challenging task which requires a good deal of knowledge of HK traffic regulations and conditions. Report includes a comprehensive Summary of Vehicle Utilisation of the eight vehicles and drivers involved. Considered at present that the rate of vehicle utilisation achieved is satisfactory, but needs to be kept under continuous review. Vehicle utilisation can be increased by the planned and carefully controlled use of chainmen to undertake minor revision and site inspection activities in the afternoon session.

6. Search of Land Records

Paper on the developments taking place in the computerisation of lands records in Land Registry and its implications for DSOs concludes that even if the Direct Access Service was available in all District Lands Offices (DLOs) the savings would be marginal.

7. Review of Data Processing Problems in DSOs

Identifies the need to link all PCs to workstations and other PCs. Also the need to standardise equipment, where possible, without creating a monopoly supplier situation. Problem of floppy disk failures (claimed to be as high as 40% in each box) due to cheapest cost procurement policy – a false economy. Policy on PC entitlement in DSOs needs to be re-examined.

8. System Deficiencies identified by DSOs

A list prepared by LIC of deficiencies and corrective action to be taken under three main headings: Resolving the Hardware Deficiencies; Resolving the Software Deficiencies, and Bridging the Skill Gap. Action being taken which needs to be monitored.

9. Computer System Training Needs Survey

Analysis of questionnaires sent to four DSOs in July/August 1997 provides assessments of LIC computer courses and suggestions for future hardware and software developments. There is a need to examine the training needs of trainees.

10. Preparation of Building Licence Plans – manual v computer

Situation in Tai Po where computer method is claimed to take twice as long as manual method. Needs further investigation between LIC and the Tai Po DSO.

11. Use of the Internet

The Home Page which introduces the whole of Lands Department to the general public will soon be available to Internet users. The joint pilot study on the use of the Internet to disseminate Mapping Information and Geodetic data is scheduled for completion in mid-September.

12. Provision of data on CD-ROM

Technical tests are being carried out on a trial basis on use of the CD-ROM Writer. To fully address this issue requires the implementation of the data dissemination system.

13. Miscellaneous issues in LIC

Development issues being addressed in LIC include:

- ArchInfo data being provided in multiple formats;
- System for contract renewal being revised to once a year, but administered twice a year;
- Effective utilisation of the proposed new high resolution colour scanner;
- Updating of Terms of Reference for Mapping Committees to address digital developments;
- Integrated management of SMO's mapping databases, geo-data, mapping information and survey intelligence within LIC, especially road, place and building names;
- Possibility of combining development functions in Thematic sections and LIC now that open systems permit conversion between Intergraph and ArchInfo systems.

The above papers and reports produced by the Task Force Teams show that the personnel working in the operational areas are best equipped to take forward the development issues arising from the efficiency reviews and to accept or reject these issues.

Action over the Business Plan period

We recommend that SMO should continue to operate its Efficiency Task Forces over the five year period of the Business Plan, and beyond.

These teams are now equipped with a critical examination methodology which will enable them to examine any area of activity and identify other development opportunities for improving efficiency, effectiveness and economy, in addition to those already identified to date. A full list of our recommendations of areas for development will be given in the Business Plan.

SMO must decide if it wishes to retain separate Topographic, Land Boundary Survey and Cartographic Task Forces. In view of the investigations currently taking place to merge the Land Surveyor and Cartographic grades, it may be more appropriate to form a consolidated DSO Task Force Team. In the other areas the LIC and Headquarters Task Force Teams should certainly be retained.

We recommend that these teams should be headed by senior managers at current CLS level. If such teams are to function properly they must have the support and commitment of top management. They should meet on a quarterly basis to review progress on the implementation of their recommendations and to identify other areas for efficiency improvements, which will inevitably arise over the five year period.

The business development aims stated at the beginning of this paper call for the Task Force Teams to concentrate attention not only on quality, timeliness and the utility of SMO's products and services, but also the efficiency, effectiveness and economy with which these are produced and delivered. In other words the provision of value for money.

It will be necessary to set targets for the above factors so that progress can be monitored on a continuing basis. Our market research exercise has already defined the customer requirements in terms of quality, timeliness and the utility of products and services. Take-up of products and services can be measured on a continuous basis. Cost targets will be set in the five-year Business Plan. These, allied to the DSO Performance Indicators already in place will form the basis for continuing assessment. Over the period of the Business Plan, key performance indicators will need to be developed for other areas of SMO.

It is our firm conviction that, in accordance with world-wide trends, at some time in the future there will be both efficiency and economy measures imposed on all aspects of Hong Kong Government activity. We recommend, therefore, SMO should, after a reasonable period of consolidation implementing the business plan (say 2 years from now), target to reduce costs by say 5% per annum in real terms for the remaining years of the business plan. This 5% however is not based on any finite calculation but an agreed target to aim for. This target is easier to achieve if SMO becomes a Stand-Alone Department. This means that if the main measure of inflation the CPI (Consumer Price Index) goes up by 7%, SMO should keep its cost rise to 2%, a figure which it has already achieved between the years 1995/96 and 1996/97. At the same time SMO must set out to improve services to its customers through strengthening of personnel in sales & marketing team, the efficiency measures and technical developments identified in our study. Demonstration to the Government of the ability to control costs, improve efficiency and fund investment from internal savings will put SMO in a much stronger position when bidding for increased capital expenditure for development needs.

P-E/OS Consultant Team
8 September 1997

POSITION PAPER Nº4
PRICING AND LICENCING

1. Introduction

The purpose of this paper is to put forward a pricing and licencing policy which will correct the weaknesses found during the study and meet Key Business Development Aim number 6, viz:

> *To introduce simpler, more rational pricing and copyright policies, structures and levels, which will support the range of business development aims and targets.*

It does not, at this point, detail pricing structures or levels, since it is important first to establish the principles to be adopted.

In the sections that follow, we first briefly recap on the relevant study findings, then put forward our policy proposals.

2. Findings

The key research findings relevant to pricing and licencing are as follows:

- Present pricing and competition policies of:

  - free issuing digital data to most government customers, who in turn free issue data to their private sector contractors, who in turn free issue it to their sub-contractors etc.;
  - acquiescing in the potential establishment of rival databases (JUPG initiative);
  - SMO not receiving credit or revenue from these 'sales' nor from the commercial CD ROM development with Census and Statistics;

  are leading to uncontrolled use of digital data ('leakage') and potentially, a serious under-statement of the extent of usage and of the value of it, and of SMO, to the community.

- Digital data sales volumes are price sensitive, for both initial and up-date purchases. Current price levels are seen as being a major deterrent to market growth and development. Significant actual or potential customers would like to see:

  - the introduction of quantity sliding scale rates;
  - a more flexible pricing structure which varies according to nature of use (period, frequency etc);
  - a more flexible product offering (selected layers/features) associated with differential pricing;
  - the adoption of all-inclusive corporate licences.

- The perceived complexity and unenforcibly restrictive nature of current licencing arrangements are again seen as a major deterrent to market growth and development, and as an incentive to self-digitisation, unauthorised use of data, and data 'piracy'.

- Government customers are likely to become more selective in their purchases of digital data if charged, buying only the data needed when needed, rather than the whole database.

- Paper products appear to be relatively insensitive to price. For the majority of these SMO is a monopoly supplier. For 'guides' , marketing considerations other than price are responsible for SMO's weak competitive position.

In addition to the research findings, in our other investigations we have also found that:

- The present inconsistent charging policy i.e. free to Government customers and their contractors, but charging commercial customers, weakens SMO's legal position in defending its copyright ownership. In the case of contractors, who may receive free data for Government contracts, but at the same time may be charged for data on commercial contracts, it also encourages illicit use of data.

- The rationale for current pricing levels or formulae, for both digital data and paper products, appears to be no longer understood. The basis for pricing can appear unnecessarily complex, out-of-step with modern technology and not readily transparent to customers.

- Prices are reviewed annually and increased in line with inflation or material cost rises, whichever is the greater, and irrespective of market acceptability or cost decreases.

- The annual licence renewal fee for digital data is set at a flat rate HK$105 administrative charge, irrespective of the number of sheets or terminals in use. This places a low tangible copyright value on the licenced use of data and could undermine enforcement of legal ownership.

- The relatively long currency period of most mapping data – in comparison to versions of computer software for example – means that a policy of frequent up-dating is not an effective alternative to copyright as a method of protecting against illicit use.

- Elements of copyright ownership are not at present fully resolved, these include:

  - a variety of copyright acknowledgment statements are currently used on products rather than the consistent use of a single statement;
  - although claimed by SMO, no formal delegation of responsibility for copyright administration of its works has been accorded to SMO by the HK Government;
  - copyright ownership in respect of data supplied by developers, authorised surveyors etc. appears not to be formally assigned to SMO before acceptance onto the database or on-sale, thus opening up possible claims for infringement and risking loss of copyright ownership of the whole database.

- Largely for reasons of lack of resources, clear policies and procedures, copyright is not at present enforced effectively. Infringement actions can only be brought for cases occurring in the previous six years. Failure to take action can set precedents which lead to inadmissible cases at a later date.

- SMO do not at present appear to have a clear policy on permissions, or royalties payable, for customer self-scanning or digitising paper maps. Potentially this could undermine SMO sales.

- Current arrangements with VARs do not include sub-licencing, discount, royalty or other sales incentive agreements.

- Existing digital data contracts do not make clear whether hard copies can be produced under the licence or not. Some customers at least are under the impression that they cannot although SMO believe they are included.

- The fact that no permissions have been granted for copying paper products for internal business use suggests infringement of copyright is occurring in this area, despite the copyright acknowledgment on all such products forbidding copying without permission. Some loss of royalties is consequently almost certainly occurring.

- At present, permission is normally given to all customers who wish to reproduce maps or photographs in publications, irrespective of whether these may compete with SMO's own products and hence damage SMO's commercial interests. There is no royalty differential either, between exact copies and customer redrawn versions, to encourage use of the latter and so avoid direct competition.

- Royalty payments are currently based on customer declarations of copies made without supporting evidence, a possible source of underpayment. Conversely, royalty refunds are not made against destroyed stock, again a possible incentive to under declaration.

- Permission for customers to place SMO data on the Internet is currently being refused on the grounds of the lack of secure access and fear of losing control of the data. Although SMO copyright would still apply, the current absence of a clear policy and conditions under which this might be permitted, may be hampering market development.

- Copyright management and administration is currently a split and part-time function. It has totally inadequate resources to develop the innovative, customer friendly and well co-ordinated policies and activities needed to develop the market, deter infringement, effect enforcement or optimise licencing/royalty revenue.

3. Policy

3.1 Charging options

We have considered three basic charging options, which, together with their key advantages and disadvantages are as follows:

Option 1: The status quo, i.e. Free issue to Government customers and their Contractors, but charging commercial customers.

Key advantages:

- No change.
- Conforms with current Government policy.
- Encourages maximum use of SMO products by Government.
- Permits some recovery of costs.

Key disadvantages:

- Weakens SMO's legal position in defending copyright ownership.
- Encourages uncontrolled use and 'leakage'.
- Limits cost recovery.
- Encourages undervaluing and misuse of products.

Option 2: Charge all customers.

Key advantages:

- Optimises SMO's legal position in defending copyright ownership.
- Maximises cost recovery and prospects of eventually achieving trading fund status.
- Encourages more economic use of products and a higher value being placed upon them.
- Removes an incentive for misuse and 'leakage' of products, and increases customer accountability.
- Increases SMO accountability and pressure to improve efficiency and deliver value for money.
- Will demonstrate true value of SMO and its work to the community and facilitate acquisition of necessary investment.

Key disadvantages:

- Will require change in Government policy.
- Will lead to some fall-off in Government use.
- Achievement of benefits will require full enforcement of copyright.
- Administration costs will increase.

Option 3: Free issue to all customers.

Key advantages:

- Encourages the widest possible use of SMO products.
- Minimises administrative costs.

Key disadvantages:

- Removes basis for copyright ownership and enforcement (based on damages: no value, no damages).
- Hence, will lead to uncontrolled use and misuse of products and loss of common mapping in the SAR i.e. to potential anarchy!
- Nil cost recovery and prospect of moving to trading fund status.
- Will place low value on SMO and its products, and will discourage needed investment.
- Removes incentive for SMO to become more cost-accountable.
- VARs etc. would be free to profit from the exploitation of SMO products without contributing to SMO costs

After careful consideration of the three options we conclude that:

For the 'free issue to all customers' option, the disadvantages far outweigh the advantages and would not meet the business aims in terms of recognition of the excellence of SMO; penetration and utilisation of its digital mapping products in a controlled way; ability to take the lead in GIS developments; or encouragement of greater accountability within SMO. It would also discourage investment and leave an open market for the VARs to exploit. We therefore reject this option.

The 'status quo' option, in which products and services are issued free to Government, but charged to commercial customers, has, in addition to the disadvantages listed, the problem that until Government customers begin to recognise the value of the work done on their behalf, SMO will never be in a position to fully justify their overall expenditure. If SMO is to meet the aim of achieving recognition of its authority and excellence throughout the SAR, then placing a value on its work is an important step in this direction. The fact that this option also weakens SMO's copyright position is an additional major factor in leading us to reject the 'status quo' option, however comfortable this might appear to be.

Therefore, in normal business circumstances we would recommend the adoption of Option 2: Charge all customers, with full copyright ownership enforcement, as being the best route to maintaining the integrity of mapping within the SAR, and to SMO delivering value for money and ultimately achieving trading fund status.

Subject to prices being set at 'market' levels we would anticipate no fall in usage, and the additional revenues generated should fund the investments in marketing, technical development, copyright enforcement and accountancy needed to drive market development and growth forward in a controlled manner.

However, we recognise the Government environment in which SMO is currently operating. We do not believe that SMO can unilaterally adopt a hard charging policy within the Public Sector Reform framework. This can happen if there is a Government policy in the future for all departments to charge each other for products and services supplied, as is the case in many other countries, or if SMO becomes a trading fund. However, we see no short-term prospect of the latter being possible, although it should remain a long-term aim (see Position Paper N° 2). Another alternative, as a transitional measure, is for SMO to be given the clearance from the Finance Bureau to charge Government departments under an Operating Services Account, as previously used by EMSD.

If an Operating Services Account is not possible, we nevertheless believe that SMO must be in a position to demonstrate the value of its work and it must, as a minimum, inform all its customers of the value of the products and services being provided. We recommend, therefore, that Option 2 should be adopted as it stands with commercial customers being charged as they are now and with 'dummy invoices' being submitted to Government customers at the same commercial rates for the provision of the same products and services. Where services specific to Government are provided (e.g. projects such as West Rail, and all the work done for LAO and LACO), Service Level Agreements should be negotiated annually. These should set out the nature, quantity and level of the services to be provided and an agreed value for these services. SMO management will then be in a strong position to account fully for the services being provided both to commercial and government customers and to demonstrate a combination of real and notional cost recovery.

3.2 Pricing principles, structure and levels

Our policy recommendations are as follows:

General policy

- *Price levels and structure, including the conditions of the licence should be simple, readily understood and defensible*. They should be documented and communicated to customers via appropriate media immediately following every review.

- *Market-based pricing should be adopted,* since a key aim of SMO is to extend the use of its products, and particularly of digital data. Although prices can be cost or market-based, the former take no account of what customers are prepared to pay. Even though SMO is currently in a near monopoly position, customers will either not buy at all, will stay with paper or will try to circumvent copyright, if prices are above the perceived value of the product. Unrealistically high prices will also encourage the entry of competitors. For these reasons, we recommend the adoption of market-based pricing.

Digital products

- *Prices for digital data overall (for initial supply, annual licence renewal and up-dates, at an appropriate volume of sales) should recover the full material, staffing and processing costs involved, in transferring, modifying, marketing, selling and distributing data from databases to customers, where these are additional to the core strategic requirements of Government*. In this context we classify database development, maintenance and management as a core strategic Government requirement. The difference between the market based selling price and these costs is the contribution to core costs. Where negative, a strategic decision must be made whether or not to withdraw the product (see also Position Paper N° 5 – Product Mix and Development).

  (Note: The above refers to products. Services would normally be charged either, at an hourly rate, which includes an element of overhead recovery plus a profit margin, or, on a fixed price contract basis, where the contract specifies the work to be carried out.)

- Published *digital data price structures for initial sales, should include*:

  - *a supply charge element* (inclusive of standard media costs and against which a quantity sliding scale reduction can apply related to the number of sheets purchased);
  - *a one year licence-to-use element* (inclusive of hard copies printed off, provided these are only for internal use, and escalating according to the number of sheets and terminals in use).The latter represents an *"enhancement charge"*.

- In principle, for digital data sales, apart from the initial supply charge, customers are paying a licence fee for permission to use, not own the data. Ownership remains with SMO. Thus, *the initial licencing charges should continue to be levied as long as a customer is using the data*. *The annual digital data licence renewal fees should therefore be set at the same level as the initial licence fee,* suitably modified as appropriate according to changes in usage.

- *Data update charges should be levied at a proportion of the initial supply charge element, discounted in proportion to any initial quantity sliding scale reduction*. Initial and renewal licence fees should transfer from the sheets replaced, thus obviating any notion of charging twice for the same sheet. The charges levied should encourage updating and, therefore, the maintenance of common, up-to-date databases throughout the SAR.

- *As an option, the initial data supply contract should include provision for an automatic update service*, the anticipated supply of which could count towards any quantity discount.

- *Enhancement charges should be based on customer forecasts of terminal usage, backed by*

'enforcement checks'. Therefore, the practice of recording terminal serial numbers for data pricing purposes should be discontinued..

- *In the longer term, consideration should be given to differentiated pricing related to sale of selected data for selected applications*, thus opening up new market opportunities without jeopardising existing business. Such data selection and differential pricing will best be implemented by the VAR network. (See intermediaries below).

- *Digital data contracts should expressly permit the production of hard copy printouts under licence and the requirement for the correct acknowledgment and licence number to appear on each printout*. This will facilitate the detection of any infringing copies.

Paper products

- *For paper products, the same approach to cost recovery should be adopted as proposed for digital products*. That is that prices for paper products should recover the full material, staffing and processing costs involved, in transferring and modifying data from databases and in marketing, selling and distributing the paper products to customers, where these are additional to the core strategic requirements of Government, as previously defined. In this case however, there is no requirement to break the price down into supply, licensing and royalty elements, although quantity discounts for large volume orders should still apply.

- *With the adoption of market pricing for paper products across all market sectors, the need for pricing 'formulae' disappears*, although costs are still highly relevant as a means of establishing contributions, making decisions on product mix and in pricing decisions themselves.

- *Permission should not be given to customers to digitise/scan paper maps where the resultant 'product' is a direct competitor to one of SMO's products*. Permission should only be given where it can be shown that an SMO product does not meet the particular requirement. In this case there should be a one-off digitise/scan copyright royalty equal to the price of the relevant SMO data and application of the normal data annual licencing arrangements. As a first step to enforcement it will be necessary to communicate this policy to customers.

- *SMO should take steps to bring business copying of paper maps for internal use within its copyright control*. An annual licence could be introduced for registered users, whereby royalties are levied annually against forecasts of the number of copies to be made. This might be included in an all-up licence for digital data customers. The copyright requirement should be communicated to all customers via the variety of media available (see Position Paper 8), and perhaps some incentive given for customers to register e.g. priority delivery service, advance notification of new releases, up-dates etc. Prices per copy should be set at a level which will not deter participation or encourage infringement and should include provision for quantity discounts.

- *Customers wishing to publish SMO maps and photographs, or extracts thereof, should be charged a flat rate royalty per copy, related to the size of the extract to be copied, with discounts given for larger quantities and special customers, such as education and charities. No distinction need be made between black and white/colour*. This in place of the present complex formula. Customers wishing to reproduce exact copies in publications competing with SMO's own products should be permitted only copying to a restricted size. In the case of maps, they should be encouraged to produce redrawn versions, which do not compete directly with SMO's products, via a discounted royalty, set at say 50% of the norm. Customer declarations of copies made, for royalty payment calculation purposes, should in future be backed by documentary evidence (eg. printers invoices). To further discourage under-declaration, royalty refunds should be made against properly authenticated quantities of destroyed stock (via a copy of the destruction note for example).

3.3 Intermediaries

Our policy recommendations for dealing with intermediaries are as follows:

- *Booksellers, who stock and sell printed maps and guides to the general public, should be afforded a discount on their purchases of stock*. This should be negotiated, but, in view of past history, the discount will probably have to be in the region of 30%. We anticipate that the bulk of their sales will be additional to, rather than competing with, those of SMO's own outlets.

- *Government departments sub-licenced to distribute data to their contractors and sub-contractors on Government contracts, should inform SMO on a monthly basis of the data distributed to each contractor* so that SMO can put a value on this data and administer and enforce its copyright ownership. Again, it should be noted, all notional revenue from this source will be additional revenue.

- *VAR's sub-licenced to distribute data, modified data or to develop and market packaged solutions, should also receive a negotiated discount or other remuneration*, as appropriate, for so doing. As well as supplementing SMO's own data distribution resource, the VAR's will be opening up new applications and new markets for SMO's products, extending from high priced, business GIS applications to low priced, mass market applications. It will therefore be imperative for SMO to take an innovative and commercial approach to partnership, pricing and shared reward negotiations, which are likely to be unique for each VAR, according to their particular products, applications and markets.

- *Recruitment of VARs should preferably be via advertisement requesting joint venture proposals. Following evaluation and negotiation, a contract should be drawn up formalising the agreed arrangements*. These might well include free supply of data for development purposes in exchange for an up-front predicted annual royalty return, as a measure of VAR commitment and seriousness. Royalties might be calculated as a percentage of the net sales return on the product, as a flat rate fee per unit of sale, or as a percentage of sales. The need for end-user copyright licences will depend on the application and target market. For example, for low price, high volume applications, the licence would generally be included in the price of the product, but, for high price, low volume applications, a licence is likely to be needed to maintain control over the use of data within the product. Professional legal advice should always be sought prior to entering into any contract.

3.4 The Internet

Our recommendations for the short term are as follows:

- *SMO should only allow customers to make SMO sample data available on the Internet*, until the difficulties of security, identifying and charging for access have been overcome.

- *Customers wishing to place only small amounts of data, say upto 100 sq. cm., on the Internet, World Wide Web or other on-line service should be permitted to do so. If the data is redrawn to the customer's own specification, then this might be extended to say 200 sq. cm. A flat rate licence fee, for a period not exceeding six months, should be charged*, since most web sites are changed on a regular basis to maintain browsers interest. At the end of the licence period the site should be checked, and , if the data has not been deleted, the customer contacted to renew the licence.

3.5 Price review and revision

Our recommendations are as follows:

- *With the adoption of market pricing, the current practice, of annual review and automatic uplift of prices by the rate of inflation or increases in material cost if greater, should be discontinued*.

- *Prices should be kept under regular review, in relation to feedback from the market place and costs, and should be adjusted only when indicated as being desirable by the review, and at intervals which are sensible commercially. Price revisions more frequent than annually should be resisted in all but exceptional circumstances*.

- Feeedback ("market intelligence") from the market place should be via the Sales, Marketing and Copyright staff proposed in our Sales and Distribution, and Organisation and Human Resources papers and in this paper. It should be collected on a continuous basis and analysed routinely by the Marketing Manager using procedures developed and documented for this purpose. It should include regular feedback from VARs and other intermediaries and be supplemented by periodic (say annual) surveys of samples of customers from each market sector. The data collected should include customer satisfaction and improvement suggestions relating to price levels and licencing arrangements. It should also include intelligence on competitor products, activity and prices. Customer samples for the survey should be structured not only by sector, but also

by size and application. Feedback from VARs and other intermediaries will be a crucial input to the intelligence gathering operation.

- Price reviews should be conducted at say quarterly intervals, to ensure that price levels, price structure and licencing arrangements remain competitive, meet market requirements, and take account of movements in costs and changing business circumstances and targets. The reviews should include sub-licencing and discount arrangements with intermediaries.

3.6 Copyright administration and enforcement

Since licencing fees and royalties represent a major potential revenue stream, continuing after the initial purchase, copyright administration and enforcement are an important function within the business. This quite apart from the fact that it is Government policy to protect its copyright ownership. Accordingly, we recommend that:

- *The following copyright acknowledgment should be consistently used on all SMO products*: " © copyright (*date of publication*) the Government of the Hong Kong Special Administrative Region of the People's Republic of China."

- *Formal delegation of responsibility to SMO for the administration of copyright licencing of its products should be sought, as a matter of urgency*, through the Director of Information, the Secretary to the Treasury and the Director of Intellectual Property. This is needed to secure SMO's legal status in the management of its copyright asset.

- *Contractual agreements with third parties*, either supplying data for inclusion in SMO's database, or supplying plans which may be sold on by SMO, *should contain assignment of copyright clauses*.

- *SMO should set up formal procedures for dealing with infringement investigations*. Detection of possible infringement will depend upon SMO resources, but closer ties with the Intellectual Property Investigation Bureau of the Customs and Excise (infringement for business gain) and the Civil Litigation Unit of the Secretary of Justice (individual infringement, not for business gain) should be developed for subsequent investigation and action.

- *SMO should develop fingerprinting and encryption policies and techniques in order to deter and detect infringements*. When in place their introduction should be published.

- *Requests for data at special discounted rates* e.g. from universities for educational or research purposes, *should be carefully vetted* to confirm that no commercial interest is involved.

- *Copyright administration should be centralised within SMO, and staffed by specialists*. In addition to copyright management and administration as such, their role should be: to educate customers (and SMO staff) on copyright arrangements through personal contact and the written word; to identify infringement and initiate enforcement action, and; to obtain customer feedback to inform on-going policy development. The costs of the unit would be expected to be recovered by the additional revenue thereby obtained. In the first instance we would expect that one copyright specialist will need to be recruited externally; remunerated at SLS level and supported by administrative staff recruited internally.

P-E/OS Consultant Team
8 September 1997

POSITION PAPER Nº5
PRODUCT MIX AND DEVELOPMENT

1) Introduction

The purpose of this paper is to put forward a product development strategy which will correct the weaknesses, and meet the customer needs, identified in the research programme, thereby meeting Key Business Development Aims numbers 2 and 4 viz:

- *To improve the quality, variety, up-to-dateness and utility of digital data, graphical maps and plans available to the Hong Kong community, in accordance with customer requirements.*

- *To take the lead in the development, management and exploitation of an integrated Hong Kong Geographic Information System, incorporating data from both the public and the private sectors.*

Weaknesses amenable to a technical solution which relate to distribution, are dealt with in Position Paper Nº6.

In Section 2 we briefly recap on the main research findings of the study, and in Section 3 we list the main elements of our recommended strategy for SMO.

2) Findings

In summary, the main findings which are of relevance to this paper are as follows:

- The current product and service range, with the addition of the proposed 1:5000 scale digital data vector mapping (in replacement of the current raster product), meets the great majority of customer needs.

- With the exception of the Countryside series of leisure maps and the various street and place guides and maps, all products and services can be classed as being 'core'. That is, of strategic importance to Government, which SMO must provide, irrespective of wider market requirements. It can therefore be argued that the basic surveying, cartographic, and database development, maintenance and management costs involved in the production of core products, should largely be funded by Government, as the main 'customer', and only subsidised as possible, on a marginal contribution basis, by the wider commercial market. This factor is of key importance when determining market price levels (See Position Paper Nº4 – Pricing and Licencing).

- Inadequate currency (up-to-dateness), particularly of digital data, is a major customer complaint. This may now have been partly overcome with the introduction of direct electronic 'update links' between DSO's and the LIC central database. (Issues of customer 'perception' are dealt with in Position Paper Nº6).

- Poor data quality, in respect of incomplete objects, improperly closed objects, edge and boundary mismatches, excessive data loss in reformatting and transfer, inconsistency between sheets; etc. is a further main customer complaint. These problems may relate variously to: original poor quality contractor digitisation; a topographic rather than GIS approach being taken to digitisation; differing standards or different application of digitisation standards between DSO's; poor quality (diskette) transfer media, and; the conversion process from ArcInfo to other formats.

- Enhanced data content is required by customers. For example: inclusion of externally supplied as-built and planned development data (also improving currency); inclusion of a variety of additional features; improved attribute data.

- Improved, more modern data supply media, including CD ROM, the Internet and dedicated on-line supply is a further customer requirement (See also Position Paper Nº6).

- A wider range of commercial data formats would be preferred by customers, including perhaps a 'vanilla' HK Data Exchange Format that is universal throughout the SAR.

- There is a clear market requirement for single point access to additional data sets, including those from other Government departments and from utilities.

- Throughout the whole LIS there is no client-server hardware/software relationship, either within individual DSO's or between the DSO's and the LIC.

- SMO does not currently have any formal relationships established with academic or other technically based organisations, either to maintain up-to-date awareness of new and complementary technology,or with whom to undertake joint developments.

- ArcInfo Version 6, currently in use within the LIS, is not Year 2000 compliant. Failure to upgrade to Version 7, which is so compliant, will cause total system failure at the turn of the millenium.

3) Strategy

The key elements of our proposed development strategy are as follows:

- ArcInfo Version 6 should be upgraded to Version 7 as a matter of urgency, to ensure the LIS is Year 2000 compliant. This upgrade will also provide the opportunity to restructure the data already held, so that it can accept proposed and as-built plans from developers, and other additional features, to enhance content and perceived currency.

- Enhanced hardware capacity, storage and processing (over and above the already proposed data dissemination system) ie.the 'customer supply set' referred to in Position Paper N°6, should be introduced into LIS. This will not only speed delivery, but will also act as a hot/warm stand-by in the event that the central processor/storage fails. Further robustness would be added by locating this hardware in separate accomodation.

- In the interests of assuring optimum currency, checks should be run: to ensure that all DSO's are meeting the pledge 'to capture all significant topographic change within three months' in a uniformly consistent manner, and; to ensure that the procedures, which interrogate DSO map headers to determine whether an up-date has occurred or not, are functioning correctly.

- To manage customer expectations in respect of quality, currency and content, SMO should publish and communicate to customers its data specifications and standards (see also Position Paper N°6).

- Better quality diskettes should be used, when used as output media, both to improve customer data quality and to reduce internal rectification costs.

- A flowline should be created, to enable 'sweeping' of the entire database, in order to validate and 'eyeball' every sheet, and so confirm that the topological model has been maintained throughout. This will rectify historical errors in digitisation and will improve the internal consistency between DSO boundaries and sheet edges. The planning, development and execution of such a flowline will however require a sizeable effort in manpower.

- A detailed user needs survey, aimed specifically at identifying and quantifying the need for additional features to enhance data content, should be carried out by SMO before embarking on such enhancement. The upgrade to ArcInfo Version 7 will provide the opportunity to implement the findings (see above). Examples of enhancement already identified include, addition of bus routes (particularly important in the Hong Kong Guide – Streets and Places), traffic information, more frequent levels data, planned developments etc. Further requirements are included in the market research report. It will be important to maintain an on-going awareness of changing customer requirements and future development needs through the market intelligence approach proposed in Position Paper N°6.

- Consideration should be given to introducing an ORACLE Relational Database Management System and associated spatial data engine to the LIS following the upgrade to ArcInfo Version 7 and its associated hardware upgrade. This could provide improved attribute data. For example, it would enable true 3D data to be offered, such as the height of a building and its height above sea level, as well as its planimetric position. Such data is already required by some users. However, provision of this increased functionality would first necessitate the collection of additional data.

- All layers of a map sheet should be supplied to customers, regardless of whether they contain data or not. This will reassure customers that no data is missing from the supply.

- A data quality unit should be established within SMO, to establish and enforce common standards (ie, consistency of approach) of data capture, digitisation, depiction and all other matters concerned with spatial data throughout SMO. Such standardisation within the organisation is a pre-requisite to SMO taking the lead in the provision of spatial data on a wider basis. Part of the unit's role should also be to investigate, and take action on, all customer quality complaints. To the same end ie. standardisation and quality, membership of the Mapping Committee should be extended to include a wider range of technical interest and functions across SMO. Consistency of approach across SMO also requires documentation of common standards and methodologies and training of all staff involved in them (see Position Paper N^{o}9).

- In view of the increasing use being made of remote sensing techniques and data in conjunction with conventional map data (for example, for pollution monitoring purposes), SMO should maintain up-to-date awareness of developments and possible opportunities for exploitation in Hong Kong, if only as a 'defence mechanism' against possible competition from this source. In the longer term SMO should create and maintain digital ortho-photography, photo-mosaic and remote sensing imagery databases to facilitate map, digital photo and digital terrain model production.

- CD-ROM should be introduced as a data supply media option at the earliest opportunity. However, although a CD-ROM writer has already been purchased by LIC, the possibility of customer demand overloading the existing data supply system should be examined before proceeding. This in conjunction with plans to introduce the proposed 'data dissemination system' and our earlier proposal to speed delivery with a 'customer supply set'. A further means of overcoming any possible bottleneck would be to maintain a stock of pre-prepared CD-ROMs for sale, suitably encrypted for selected release of data to customers on demand and following receipt of appropriate payment. This approach has implications for data currency.

- Direct on-line supply to the proposed VAR network (and perhaps selected major direct customers) should be considered in conjunction with the development of the network (see Position Papers 4 and 6). For data distribution purposes (and updating value added data), VARs might hold a database locally with nightly on-line updates from the central SMO database. Whilst not difficult technically, this would require considerable investment in good communications links and in storage and output devices at each linked VAR.

- Direct on-line access to SMOs database is a further possibility for major customers, as a means of easing data delivery and currency problems. Direct access to a variety of formats stored in the proposed 'customer supply set' would save on customer conversion costs and permit SMO to retain quality control over its base data. However, access to a seamless database (with feature rather than sheet identification) would require all such users to share a common 'data dictionary' (the same data structure). Since this is unlikely to be realisable in the medium term (see below), we see on-line access as a long-term prospect.

- Access to data via the Internet/ Web is already under consideration by SMO. This does not become a serious possibility until Version 7 of ArcInfo has been implemented, and, for example, a web browser becomes feasible. There are also problems associated with data security, copyright etc. (see Position Paper N°4). We therefore recommend that this delivery option be restricted to a catalogue, data select and data ordering aid in the short to medium term (see also Position Papers N°4 and N°6).

- The standard data formats currently supplied by SMO should be extended to include popular GIS data formats, to facilitate the development of the business professional/PC based market. Consideration could be given to providing other formats at a premium, but, at all events, the range of formats provided should be kept under continuous review. For reasons of quality assurance, liability and maintaining ownership/copyright of the data, it is preferable for SMO in general to maintain responsibility for conversion.

- In the interests of SMO retaining the leadership of GIS developments in the SAR, extending to an integrated Hong Kong GIS, also to improving the use and value of its data, SMO should take the lead in establishing common data exchange standards and geospatial data model (data dictionary) across the SAR. It should also aim to become the custodian of Meta-data for all Geographic Information Systems within Government Departments and provide a platform for the sharing of Geographic Information within the SAR Government.

- SMO should take the lead in the future establishment of an integrated Hong Kong GIS, which would provide single point user access to a range of government and possibly private sector data sets. However, whilst this is largely technically feasible now, implementation will require resolution of a number of non-technical issues, such as: data ownership, copyright, security, common data exchange format etc. Realisation remains a long term prospect but will never occur unless an initiative to begin is taken in the short term. As a first step SMO might become the custodian of all geographic information and maintain a centralised, integrated and dynamic land information database for the SAR Government.

- To improve efficiency in DSO's and increase the speed with which BMS and CIS are updated, SMO should move away from dedicated workstations and consider the adoption of client-server architecture throughout. Workstations should be able to access and up-date the complete range of SMO geographic databases. Consideration should also be given to managing the databases centrally, with LIC holding the master copy and DSO's requiring write permission to update a specific map sheet.

- The potential developments outlined will impose a heavy additional programme and project management burden upon existing resources. The programme will need to be planned carefully and realistically in the light of the management resources which can be made available. Consideration should also be given to the possibility of forming joint ventures/partnerships with academic or other technically based organisations to supplement internal resources.

Although nominally about products, it will be clear that the majority of the arguments above have centred on developments to database specification, management and update. The success of any national mapping organisation today is wholly dependent on the quality of its geographic databases. If the databases are right, any mapping or geographic information product can be designed and produced.

P-E/OS Consultant Team
8 September 1997

POSITION PAPER Nº6
SALES AND DISTRIBUTION

1) Introduction

The purpose of this paper is to put forward a Sales and Distribution strategy which will correct the weaknesses identified in the research programme and so largely meet Key Business Development Aim number 5, viz:

- *To introduce more effective sales, distribution, promotion and customer support arrangements, which will improve delivery and buying convenience and will encourage increased customer take-up of SMO's products and services*.

The strategy will also contribute to meeting Key Business Development Aim number 3, viz:

- *To promote the development of the GIS market in Hong Kong and so increase the penetration and utilisation of SMO's digital mapping products*.

In the section that follows we briefly recap on the relevant main research findings. In Section 3 we consider the strategic options open to SMO and in Section 4 we outline the main elements of our recommended strategy for SMO.

2) Research Findings

In summary, the main findings in Stages 2 and 3 of the study which are of relevance to the subject of this paper are as follows:

- Excessive delivery times on both digital and non-stock paper products;
- Poor updating service and/or up-to-dateness of both digital mapping data and paper products;
- Out-of-date/inappropriate digital data supply media;
- Weak communications, especially in respect of product range, product developments, update availability and commercial arrangements;
- Cumbersome, inflexible and bureaucratic ordering, buying and delivery arrangements;
- Poor accessibility to commercial or technical advice or information;

- Absence of active co-operation with intermediaries for joint product and market development;

- Inaccessible and inconvenient sales outlets for paper products, especially relevant to the general public's purchases of street and place guides and the Countryside Series maps.

In addition to the weaknesses identified in the research we have observed that:

- The sales function is purely reactive, carried out by staff without professional sales expertise, on a part-time basis, and split between the various business centres without effective co-ordination between them, despite the fact that most digital customers are also customers for paper products.

- Distribution, with the exception of the passive participation of the Government Information Service, is almost exclusively carried out directly. The joint promotional arrangement with seven systems suppliers/VARs offers little incentive for them to actively promote, sell or distribute SMO's digital products. The loss of the booksellers as outlets for guides and the Countryside maps has largely left the way clear for competitors in the potentially lucrative 'general public' market for these products.

- Customer support is limited, fragmented and reactive in nature. Comprehensive technical and commercial literature is not available, regular communication is not maintained with customers and there is no single access point for dealing with customer technical or commercial enquiries.

- Sales statistics are not routinely aggregated across the various business centres to plan and monitor sales and marketing activity.

3) Options

We have considered two main options for rectifying the sales and distribution weaknesses identified and so for achieving the increased market penetration required. They are:

Option 1: Develop an effective direct sales and distribution function within SMO.

Key Advantages:

- Retain total control of the business.
- Maximise potential sales revenue.

Key Disadvantages:

- High investment in professional sales staff.
- High investment in promotional costs.

- High investment in digital data distribution system and associated commercial staffing costs.
- High investment in more accessible, 'high street' sales outlets for paper products.
- High investment in customer support staff and facilities.
- Downstream investment in development of 'packaged solutions' to enter the Business Professional market.

Option 2: Develop a mixed direct and indirect (external to SMO) sales and distribution network.

Key Advantages:

- Shared sales, distribution, promotional and customer support resources and costs.
- 'Free' access to professional sales and commercial expertise and resources.
- Allows SMO to concentrate its resources on key customers and not get diverted into servicing small customers;
- Access to more and more accessible sales outlets.
- Joint development of the Business Professional market and 'packaged solutions'.
- Makes available a wider range of products and of tailored products to customers.
- Faster rate of market penetration and development.
- Eliminates potential competitors.
- Shared market and technical development risks and costs.
- Maintains SMO's direct involvement in and knowledge of the market place whilst providing new and better informed sources of market intelligence.

Key Disadvantages:

- Some loss of control of the business.
- Shared sales revenue.

Our recommended option is Option 2, on the grounds that it offers a faster, lower risk approach to market development and growth, at greatly reduced cost. Given current financial constraints it seems unlikely that SMO could find the investment 'to go it alone'. Also, its resources would seem best employed in concentrating on database development and exploitation, for which it has the expertise and which we believe is its core Government task.

4) Recommended Strategy

Within Option 2, 'development of an indirect sales and distribution network in so far as this is practicable', the key elements of our proposed sales and distribution strategy are as follows:

- Continue to market and deliver digital data products direct to both government and selected major technical professional customers. This should include pro-active marketing to develop latent opportunities such as with Education Department, the Fire Services Department etc.

- Establish a VAR network sub-licenced: to market and deliver basic and tailored digital data (and paper plots thereof) to other technical professional customers; to market, develop and deliver packaged solutions to the business professional market segment; and to develop, market and deliver tailored data and packaged solutions to Government customers, all within joint venture/partnership arrangements.

- Sub-licence major government customers, such as Civil Engineering, Highways and Drainage Services Departments, as appropriate, to distribute digital data to their contractors and sub-contractors on government contracts.

- Market and deliver paper products and services direct via HQ to the selected major technical professional customers, as well as government customers.

- Continue to supply paper products and services to the wider market via the Map Publication Centres (MPC), the Government Information Service (GIS) and the DSO's.

- Establish a bookseller network to stock and sell printed maps and guides to the general public.

- Develop faster, more convenient digital data ordering and delivery systems, including: the already proposed 'data dissemination system'; a 'customer supply set' to pre-convert data into a range of the most popular formats; an Internet select and order system, perhaps extending to on-line supply; CD ROM supply media; dedicated on-line data supply for major direct customers and the VAR network. Sharing distribution between SMO and the VARs, and in particular restricting SMO to servicing only the largest customers, will of itself of course reduce delivery times.

- Introduce an 'express' delivery system at a premium, for direct customers for both digital and paper products.

- In addition to the faster digital data delivery systems referred to above, improve the actual or perceived currency/up-to-dateness of digital map data by: improved communication as to update availability; incorporating customer up-date requirements within the supply contract, as a means of triggering automatic supply of either a full or partial replacement data set; introducing an ordinance which obliges the public to inform SMO of building name changes (such an ordinance is already in place to notify SMO of road name changes).

- Introduce more convenient ordering, buying and delivery arrangements, for both digital and paper products, including: telephone ordering and payment on account for regular, credit worthy customers; payment by credit card or cheque; Internet/telephone catalogue, product selection, ordering, payment facility; paper/electronic product, update, service catalogue at sales outlets; postal or courier delivery service; extended opening times in line with normal commercial practice. These in addition to the faster delivery systems referred to earlier.

- Provide a telephone 'help-line' for all customers and products/services as the single point entry to a range of personal and written, technical and commercial, customer pre- and post-sale enquiry/support services. Written material should be to a consistently high standard and should include: full product/service catalogues and indexes, including dates of last up-date and next planned up-date; details of sales outlets, contact points/names, buying procedures, opening times etc; full pricing and copyright information; user manuals for loading and manipulation of digital data, and containing also the data dictionary and data standards employed and a clear exposition of up-date policy and standards. Such material should also be placed on SMO's Internet web page.

- Appoint professionally trained/experienced marketing/sales personnel to manage, maintain close liaison with, provide commercial support to, and drive sales through, respectively: direct customers; the VAR network and business professional market; the bookseller/DSO/MPC/GIS network. These should comprise: an internally recruited Key Account Manager at SLS level, for both digital data and paper direct sales; an externally recruited, experienced Business Development Manager at SLS level, to develop and manage the VAR network and business professional market and; an internally recruited Indirect Sales Manager at SLS level, to develop and manage the bookseller/DSO/MPC/GIS network. The last should have direct responsibility for the DSO/MPC sales activities. All three should report to an externally recruited, professional Marketing Manager at CLS level, who himself should report direct to the PGLS. The Marketing Manager should have overall responsibility for all aspects of sales, marketing, distribution and supply, including pricing and copyright (see Position Paper 4). The team should also include internally recruited administrative staff to provide support in all these functions.

Note: A precedent within Government has already been set for the appointment of specialist marketing posts. Foe example, both the Land Registry and Companies Registry Trading Funds have appointed Business Managers.

- Appoint a small technical support team, with all-round expertise, to deal with technical enquiries from members of the networks and end-users, to provide training and support, to manage the production of technical literature and to provide feedback to the development team on customer technical problems and requirements. In the first instance, the team should be of big enough size to support the VARs, comprise no more than two to three members, and should be recruited from, and report into, the LIC. The need for further strengthening of the team will need to be kept under constant review.

- Produce annual sales plans and monthly sales statistics showing performance against plan, by main product and market segment, and by market sector and outlet, aggregated across all products/business centres, to facilitate effective sales and marketing management.

Clearly, further detailed work will be required by SMO to implement these elements of the strategy, and prioritisation will be required in the light of the resources which are made available. However, in principle, the aim should be to implement all within the five year time-scale of the business plan. Further consideration to many of the elements outlined is given in other position papers ie. Pricing and Licencing, Product Mix and Development, Management Information Systems, Promotion, and Organisation and Human Resources.

P-E/OS Consultant Team
8 September 1997

POSITION PAPER Nº 7
MANAGEMENT INFORMATION

Purpose

This paper addresses the strategy required to develop management information reports that will enable SMO managers to manage a multi million dollar business effectively.

The provision of good quality management information specifically meets the following key business development aims:

> Aim 10: *To introduce management information systems which will enable business performance to be monitored and controlled effectively against the targets and objectives set.*

Management information will also aid effective decision making and contribute to meeting many other key business development aims.

Background

Currently SMO staff collect data about a wide range of their activities, but there is no central co-ordination of the data collected and little evidence that data is being converted into information that can help managers make effective business decisions.

Personnel and financial data is mainly managed by Lands Department and Treasury more than it is by SMO senior management. SMO organisational structures are drifting apart from the Cost Centre and organisational structure understood by Lands Department staff.

There will be increasing pressure on SMO to become more accountable for its actions. High quality management information such as production progress, costs, customer requirements, market pressures, sales figures, asset utilisation and human resource location and development are examples of vital ingredients of a successful and sustainable business.

Overview

Simple paper based management information systems are often just as effective as complex computer systems. There is no need for significant investment in hardware and software. The form of each component part of the system should be considered on its merits.

There is an over-riding need to co-ordinate the collection, analysis, dissemination of management information within SMO. This co-ordination should be managed within SMO HQ and should involve increased liaison with Lands Personnel and Treasury Accountancy staff (within both Lands and Treasury) if SMO remains as a unit within Lands. If SMO is positioned elsewhere within Government, the necessary liaison with central Departments will have to be managed effectively. Close liaison will need to be maintained with ITSD as they develop the Survey Office Management System (SOMS).

The amount of work required to develop and analyse management information is such that a new post should be created within SMO HQ. The individual should have an understanding of management accountancy and have experience of the benefits that relevant, timely and accurate information can bring to a business.

Management Information Required

There is a need for data and information in the following areas:

- Time spent on specific production activities;
- Time spent on indirect activities - e.g. leave, training, administration;
- Cost of activities;
- Manpower movements;
- Cost allocation logic;
- Costs of accommodation;
- Direct Expenses and accurate allocation to activity;
- Costs of specific services provided to SMO by other Government Departments;
- Overhead costs at Central, Departmental and SMO level;
- Hourly rates for staff and machines;
- Sales volumes by product;
- Material costs;
- Customer information - basic data - name, address, credit worthiness;
- Customer information - product holdings, licences and other purchases;
- Customer requirements;
- Potential customers;
- Competitor information;
- Asset Register;
- Business intelligence;
- Market Research

The management information area should also provide an advice and analysis service for managers within SMO. This advice and analysis should include

- Investment appraisal analysis;
- Cost Benefit analysis;
- Trends in costs and revenue by activity and product;
- Implications of changes in trends;
- Contingency planning;
- Manpower trends;
- Monthly reporting of key performance monitors and other business statistics for SMO;

- Product and Service costing advice;
- Development of improved costing models and decision support tools;
- Regular analysis of management information needs;
- Development of training programmes for using management information.;

Implementation of Management Information Development Programme

There is a need for further research to assess and prioritise the work that has to be done. The exercise should not be seen as a means of increasing HQ administration staff. The investment and running costs required to sustain a new post of Management Information Manager needs to be justified in terms of return on investment in the future.

The first step is to identify exactly what management data is being collected now and assess:

- Is the data collection being duplicated elsewhere in SMO?
- Is the data necessary for effective business management?
- Is the data being collected and processed in the most efficient and cost-effective manner?
- Who is converting the data into information?
- Who is using the data/information?
- Who would find the data/information useful, but is not aware that it exists?
- What important data and information is missing?
- How and where can the missing data best be collected?
- To whom should management information be given?
- What information should managers get?
- How will the information be used?

This research phase is likely to take some 3 months, at least, as it will require a good deal of investigation to identify everything that is available. The research and analysis of the results should be undertaken by individuals who understand the nature of SMO activities and also understand how information can be used to improve business performance. This will require the creation of a two person team - one from within SMO and one external advisor (for example, from the Efficiency Unit, existing Hong Kong Trading Fund on secondment for a time, or from an external consultancy)

The findings of this work should determine the relevant priorities for building a comprehensive management information system and recommend an optimal organisation structure for achieving the implementation milestones.

The Business Plan should be reviewed each year to include specific management development targets that flow from the initial research. For the first year the target should be to identify the priority elements within a Management Information System, to appoint a programme co-ordinator, and start work on the first priorities.

Our own assessment of the management information priorities would place the following at the top of the list:

- Appointment of research team;
- Appointment of Management Information co-ordinator (preferably equivalent to CLS, failing that, no less than SLS equivalent);
- Establishment of a Cost Centre structure that reflects the activities undertaken by SMO;
- Building of a central robust and comprehensive sales volume database incorporating all SMO products;
- Creation of a customer database across the whole of SMO;
- Establishment of customer satisfaction surveys;
- Identification of key performance indicators to be monitored at SMO and Cost Centre level in partnership with senior and middle mangers (A list of possible performance monitors is attached at Appendix 7-A);
- Training of managers in the use of management information;

These priorities are unlikely to be completed within the first year of the Business Plan.

P-E/OS Consultant Team
7th September 1997

Performance Monitors

It is acknowledged that there are already a number of performance indicators that are reported quarterly to SPEL. (See Appendix 7-B). Many of these remain relevant.

In addition, however, there should be some new indicators. All staff in SMO should, of course, be aiming to eliminate waste and increase productivity.

Possible monitors are:

Corporate SMO:

Notional Cost Recovery
Customer Satisfaction
Up-to-dateness of Survey
Direct Time percentages
Market penetration
Progress towards Superplan type products
Staff development monitors

CLS/HQ responsibilities

Admin costs as a percentage of total costs
Training school costs per training day
Geodetic costs, manpower utilisation and productivity
Number of training days 'sold' outside SMO
Cost of training days
Repro productivity
Improvement in management information and performance monitoring

Marketing Manager responsibilities

Increased revenue
VAR development
Copyright development
Speed of delivery

CLS/LIC responsibility

Improvements in data quality
Database sweep completion
Introduction of 1:5000 vector product
Development of improved download and editing procedures
Introduction of multi-user workstations and the integration of Land Information System (LIS), Automated Surveying System (Survey CAD) and digital mapping/cartographic systems
Faster, cheaper and more cost effective revision cycles for published map series

CLS/NT, CLS/Urban and CLS/RD responsibilities

Increasing productivity
Reducing overmanning
More effective work recording systems
Quicker survey
Better intelligence systems
Keeping projects within budget

APPENDIX 7-B

Appendix B to Position Paper No. 7 - Management Information								
							Target	
Activity	Existing record(s)	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	
Geodetic Survey - No. of control points fixed (surveyed)	Quarterly review for SPEL	345	236	240	459	455	450	
Geodetic Survey - No. of sales and enquiries				96	99	107	100	
Geodetic Survey - No. of constructed and maintained		285	441	299	685	529	500	
Topo Survey - Total area revised (Hectares)		9975	9390	3372	4813	5882	5000	
Topo Survey - Total area inspected (Hectares)				10157	3335	4031	4000	
Topo Survey - No. of mandays saved through good intelligence		84	138	185	149			
Map Production - No. of topo and thematic maps updated/produced			707	707	1787	605	600	
Map Production - No. answers to enquiries		68400	78000	84621	91479	117256	129000	
Map Production - No. of maps, charts revised and published			49	52	105	63	50	
Map Production - No. of printing and repro copies provided		647534	632920	552790	622805	569377	60000	
LIS - No. of survey sheets digitised		306	1099	976	320	480	Deleted	
LIS - No. of land record sheets digitised		150	260	476	1329		Complete	
LIS - No. DSOs with full implementation of LIS		1	1	2	4	3	Complete	
LIS - No. of days training * no. of trainees				618	784	796	800	
LIS - Supply of digital sheets to Government Departments		3820	3194	13394	34848	23894	25000	
LIS - Supply of digital sheets to non Government Departments		411	433	3136	1869	14762	12000	
LIS - Supply of digital land record data sheets to Government							10000	
LIS - Supply of digital land record data sheets to non Government							5000	
LIS - No. of base maps verified and uploaded to system							1000	
LIS - No. of record sheets verified and uploaded to system							2000	
Cadastral Survey - No. of lots and small houses defined/set out		2494	2804	3249	3643	3436	3300	
Cadastral Survey - No. of cadastral plans prepared		49800	43274	35223	31755	47577	30000	inc Land st
Cadastral Survey - No. of cadastral items recorded		24561	25816	29117	27572	30094	28000	
Cadastral Survey - No. of miscellaneous surveys undertaken		1350	2085	1570	3765	5807	5000	
Cadastral Survey - No. of land status plans prepared							15000	
Aerial Survey - Total area of photogrammetric survey conducted		1828	4177	3059	3624	6291	6000	
Aerial Survey - No. of earthwork cases processed			47	34	34	26	20	
Aerial Survey - No. of photographs taken for measurement record			9380	10364	8492	9499	10000	
Training - No. of days of training * no. of trainees				8612	9028	7689	5000	

POSITION PAPER Nº8
PROMOTION

1. Introduction

The purpose of this paper is to propose a Promotional strategy which will overcome the weaknesses identified in the research programme and in our wider study of SMO operations. Our strategy is designed to meet Key Business Development Aims 1 and 3, viz:

- *To achieve recognition throughout the (Hong Kong) community and the government that it (SMO) is the authority, centre of excellence and prime source of supply for, land surveying, mapping and geospatial information within the SAR.*

- *To promote the development of the GIS (Geographic Information Systems) market in Hong Kong and so increase the penetration and utilisation of its digital mapping products*.

In Section 2 we briefly recap on the main weaknesses found during the study, in Section 3 we discuss promotional objectives, and in Section 4 we indicate the main elements of our recommended strategy for SMO.

The promotional strategy proposed is designed to support the Positioning, Sales and Distribution, Pricing and Licencing and Product Development strategies put forward in our other position papers.

2. Study Findings

Our main findings relevant to the subject of this paper are as follows:

- There is no promotional/publicity function as such within SMO. What little promotional activity there is, is carried out on a piecemeal basis – without the benefit of a directional and co-ordinating 'corporate' strategy, plan or budget – and on a strictly part-time basis, by staff working independently in a variety of functions, sections and locations. In the circumstances their output is to be applauded.

- SMO has a low to non-existent profile with its customers, even within Government it is generally referred to as 'Lands' rather than as SMO, and awareness of its product and service range, where not of historical importance, is also very low. In contrast to this, the quality of its products, with some exceptions, is generally well regarded (although this certainly cannot be said of its supply and servicing arrangements).

- Communications with customers is a major weakness, extending from the provision of technical information, to details of the product and service range, applications and benefits, developments in progress, up-date availability etc. through to incomprehensible pricing and licencing arrangements and ignorance of sales outlet locations. Many customers, even within Government, were unaware of the existence of the otherwise excellent Map Catalogue. Customers want SMO to adopt a more pro-active communications stance.

- SMO staff are themselves aware of these shortcomings, and recognise that SMO is perceived (if at all) as being a technically orientated, bureaucratic, non-commercial, reactive public sector service, without customer focus. They also believe that currently, SMO lacks the policy framework, resources and skills to change this perception.

3. Promotional objectives

As referred to in our Research Report (Second Interim Report), SMO's market breaks down into three broad segments with identifiably different characteristics in respect of marketing, and, more specifically, promotional requirements. The segments are Government, technical professional and business professional customers.

The Government segment largely comprises existing customers, who know of SMO (although may think of it as Lands!) but are not necessarily aware of its product range, particularly its digital products and their utility. Both paper and digital products are taken, generally free of charge, and there is a trend towards the replacement of paper with digital products. Mid- and large-scale maps and plans are the main area of interest. Current digital customers are largely 'buyers' of data but there is a growing demand for 'packaged solutions'. 'Buying' decision makers are generally technically aware, although some, and particularly amongst the potential (as opposed to current) customers, are not. We have proposed, in Position Paper 6: Sales and Distribution, that all current and potential customers should be supplied direct, as at present, although, where modified data or a packaged solution is needed, VAR involvement (at a price) may be apposite.

The Technical Professional segment comprises both existing and new potential customers, all of whom generally have a low awareness of SMO, its activities and its products. Both paper and digital products are taken, at the commercial price unless used for a Government contract, but the main area of potential is for digital products (at the expense of paper), since all are users of CAD systems. The great bulk of demand is for large scale maps and plans in base data form; there is little interest in packaged solutions. Buying decision makers are technically aware. We have proposed in Position Paper 6 that selected major customers should be supplied direct (or via their sponsoring department if used for a Government contract) and other customers indirectly: for digital data via the VAR network, or for paper, via the MPC, DSO etc. network.

The Business Professional segment largely comprises potential new customers, the great majority of whom have a low awareness of SMO, its activities and its products. The main interest is in digital products,as the base mapping for GIS, at competitive prices. All scales of maps are likely to be used and a packaged solution approach is essential. Buying decision makers are usually senior business managers, who are technically unaware, and have to be 'sold' on the benefits of a business solution, not the features of a technical product. This is therefore a VAR market.

It is apparent from our study findings and the above analysis, that SMO's promotional objectives should be to:

- **Raise its profile, correct its adverse image and increase awareness of its activities and products in the market place**. This is a corporate promotional activity. It involves continuous communication with all of its target customers, not only via promotional activity as such but via every customer contact, whether this be a sales visit, dealing with a technical or commercial enquiry, submitting technical data, a letter or even an invoice. It requires that all these media, also its products and services, and its indirect, as well as its direct sales outlets, projects a consistently positive image of SMO. To ensure that every communication reinforces that image, all communications should be linked by a corporate logo. The image to be projected, and which over time should be brought to mind when the logo is seen, is that of *the* go-ahead, customer caring, commercially aware supplier of high quality maps and mapping data, which is at the forefront of mapping and GIS technology, and invariably delivers value for money. Of course, the image communicated must be delivered in practice by products and staff as well as promotional materials. Our recommendations in the other position papers, including those for staff training in Position Paper 9, are designed to achieve this.

- **Educate and persuade customers of the benefits to be realised in employing digital mapping data in new CAD and GIS applications**. This is particularly important in the Business Professional market segment, where solutions and business benefits, not products and features, have to be sold to achieve market penetration in this, probably the largest opportunity open to SMO. Case study material and referrals will be needed for the messages to carry conviction, and, since market development is dependent on VARs, so will close joint working with the VARs.

- **Inform customers: of the product and service range, new developments and releases/up-dates; of sales outlets and contacts, pricing/copyright, ordering and payment arrangements; and of technical back-up literature and support; etc**. Such information should be regularly provided/made readily accessible, should be to a consistently high standard (see above) and should be user friendly. It can be made available: verbally on a help-line (see Position Paper N°6) or via sales contacts, in literature form by mailing or via sales contacts/point-of-sale locations, or via the Internet (see Position Paper N°6).

4. Strategy

In general our proposed strategy is to direct promotional effort at, and use media suitable for, targetted audiences, rather than use mass media such as TV, radio or newspaper advertising. These are expensive and wasteful if a mass market is not being attacked. It is possible that the VARs may find such a market but it is unlikely within the time-frame of this business plan. The key elements of our proposed promotional strategy are outlined below. They are designed to meet the objectives set in the previous section and should be further detailed by SMO before implementation, in line with the qualifying remarks following each.

- All SMO's promotional activity should be centralised within the proposed new corporate Sales and Marketing team (see Position Papers N°6 and N°9). The Marketing Manager should take personal responsibility for the promotional function, using contracting agencies for design, production and media work.

- A corporate SMO logo, distinct from the Lands logo, should be designed and used on all internal and external communication material, including letterheads and commercial stationery.

- Good quality, plain language, corporate, product, pricing/copyright and technical literature should be produced as the foundation for most other promotional activity. It should be distributed widely, via regular mailshots to targeted actual or potential customers, personal contact with customers and point-of-sale displays/racks. It should also be made available for use by VARs, as part of SMO's support to them, but also to maintain SMO's profile with VAR customers. Literature should include:

    - A corporate 'glossy' brochure, which might set out for example: the SMO 'mission' and image to be conveyed; product and service range;applications and benefits of mapping information and GIS to what sectors; where and how to buy.

    - Product leaflets, setting out for example: product specification and features; map index; applications and benefits; case studies.

    - Pricing and copyright leaflets (for content see Position Paper N°4).

    - Technical Data Sheets (for content see Position Paper N°5).

- Current or potential customers should be regularly mailed with literature and newsletters, as appropriate. The latter might contain: news of recent application case studies, price changes, developments in hand or planned, new releases/ updates etc.

- Press releases/advertorials should be issued/obtained in the SAR press/trade and institutional journals etc. and should contain newsworthy items as described above. These offer a low cost access to the mass media. They are particularly appropriate, in combination with mailings, exhibition appearances and especially arranged press conferences, to announce a new product launch and so gain maximum publicity exposure for the launch.

- SMO should hold a full, regularly updated product, service, pricing, outlet etc. catalogue on a dedicated Internet web page (see Position Papers N°4,5 and 8). Although a 'passive' promotional medium, it provides a further increasingly accessible source of information for customers.

- A more pro-active form of electronic communication would be to mail CD-ROMS to targeted customers. This might contain not only the 'catalogue', but also case study examples. This option should be considered.

- Sales outlet addresses, opening times, locations, routing information and contacts should be publicised in all media, also information access points. Outlets should be clearly signposted. They should contain readily accessible electronic and/or hard copy product etc. catalogues within, also full sets of literature for the entire product range.

- SMO initiated seminars, dealing with both 'leading edge' and sector specific topics should be held regularly. Targeted sectors/customers should be invited – another mailing contact opportunity – and followed up after the event. Customer specific events might also be held on the premises of selected major actual or potential customers.

- For purposes of such events, and direct sales calls, audio visual presentations should be prepared, containing sample data and examples of applications. These would preferably be 'notebook' computer/Powerpoint based.

- SMO should also attend, exhibit at, and present papers to, relevant exhibitions and conferences.

- Other promotional tools which should be considered include, packaging, sales incentives, promotional gifts, sponsorship of sporting or other newsworthy events, and participation in other Government promotional activities – potentially a low cost means of achieving coverage, but diluting SMO's profile.

- Finally, as part of its partnership arrangements with its VARs and other intermediaries, SMO should support and participate in their promotional activities. This might include financial support, or might be limited to the provision of literature, the loan of demonstration equipment or joint manning of stands. Joint promotional initiatives would be a further option.

P-E/OS Consultant Team
10 September 1997

POSITION PAPER N°9
ORGANISATION AND HUMAN RESOURCES

1. Purpose of this paper

The purpose of this paper is to bring together the recommendations on organisation and staff posts made in other position papers; to set these within the context of a modified organisation structure for SMO as a Stand-Alone Department within Government (see Position Paper N°2), and to identify some of the major Human Resource issues which need to be addressed. We believe that the recommendations made will enable SMO to meet all its key business aims over the five-year period of the Business Plan, including the main relevant aim:

- *To develop an organisation and introduce human resource development programmes which will support the achievement of business aims, facilitate change and foster a customer and employee caring organisation*.

2. Organisation

2.1 Reposition within Government

In meeting the aim "*to reposition SMO within Government*" there will be a need to set up departmental administrative support similar to that currently provided by DAO from within the Lands Department. This could be achieved by transferring some staff from DAO. We would not envisage that the costs of these staff would exceed the current allocation of overhead costs from DAO to SMO. The staff transferred should be attached to the CLS/HQ and report directly to the SLS/HRM.

2.2 Marketing and Sales

There are key business aims to the addressed in this area, namely the aims:

- *To achieve recognition throughout the community and the government that it is the authority, centre of excellence and prime source of supply for, land surveying, mapping and geospatial information within SAR*

- *To promote the development of the GIS market in Hong Kong and so increase the penetration and utilisation of SMO's digital mapping products*.

- *To introduce more effective sales, distribution, promotion and customer support arrangements, which will improve delivery and buying convenience and will encourage increased customer take-up of SMO's products and services: and*

- *To introduce simpler, more rational pricing and Copyright policies, structures and levels, which will support the range of business development aims and targets*

To meet these aims, we recommend the appointment of professionally trained and experienced marketing, copyright and sales personnel to manage, maintain close liaison with, provide commercial support to, and drive sales through respectively:

- direct customers:
- the VAR network and professional business market: and
- the booksellers/DSO/MPC/GIS network.

These personnel should include an externally recruited, professional **Marketing Manager** at equivalent to CLS level, who should report direct to the PGLS in his external facing role for SMO. The Marketing Manager should have overall responsibility for all aspects of marketing, sales, distribution and supply, including pricing and copyright (see Position Paper N°4: Pricing and Licencing, and Paper N° 6: Sales and Distribution).

We recommend that the other members of the marketing/sales team, all reporting to the Marketing Manager should include:

- an *internally* recruited **Key Account Manager** at equivalent to SLS level, to take responsibility for direct sales of both digital and paper products to major customers;

- an *externally* recruited **Business Development Manager** at equivalent to SLS level, to develop and manage the VAR network and business professional market:

- an *internally* recruited **Indirect Sales Manager** at equivalent to SLS level, to develop and manage the bookseller/DSO/MPC/GIS network;

- an *externally* recruited **Copyright Specialist** at equivalent to SLS level, responsible for copyright management and administration.

The team should be centralised in SMO and supported by administrative staff recruited internally.

To determine the extent to which SMO is already moving in this direction, we have examined the 'Organisation Chart for the Proposed Re-engineering of Land Information Centre' dated 27 May 1997. We are encouraged to find that a number of our emerging recommendations for customer service, marketing, promotion, copyright, contract management/administration, pricing policy and financial control have been incorporated in the proposed structure.

However, we firmly believe that the Marketing and Sales function is so important to the whole future of SMO that it must be set up as a separate unit in SMO reporting to the PGLS, and should not just be a part of LIC.

This would mean that all the Customer Services and Administration activities in the proposed LIC structure should, in our view, be absorbed by the new Marketing and Sales function. This would leave LIC to concentrate logically on the prime functions of Data Management and Technical Services.

2.3. Technical Support

We recommend (see Position Paper N°6) the appointment of a small technical support team, with all-round expertise to:

- deal with technical enquiries from members of the networks and end-users;
- provide training and support to members of the networks, end-users, and internal sales/ marketing and other staff, as necessary;
- manage the production of technical literature; and
- provide feedback to the development team on customer technical problems and requirements.

In the first instance, the team should be of a big enough size to support the VARs, should comprise no more than two to three members and should be recruited from, and report into, LIC.

2.4 Quality Unit

We recommend (see Position Paper N°5) that a data quality unit should be established within SMO HQ under the SLS/TI, to set and enforce common standards (i.e. consistency of approach) of data capture, digitisation, depiction and all other matters concerned with spatial data, throughout SMO. Such standardisation within the organisation is a pre-requisite to SMO taking the lead in the provision of spatial data on a wider basis. Part of the unit's role should also be to investigate, and take action on, all customer quality complaints.

2.5. Management Accountant/Management Information Manager

We recommend (see Position Paper N°7) the appointment of an externally recruited Management Accountant to take responsibility for the production of monthly management accounts and other necessary management information. There is an overriding need to co-ordinate the collection, analysis and dissemination of management information within SMO. The amount of work required to develop and analyse management information, and educate management in its use is such that a new post should be created within SMO HQ. The individual appointed must have a full understanding of management accountancy and experience of the benefits that relevant, timely and accurate information can bring to a business. The appointment should ideally be made at equivalent to CLS level, failing that, no less than SLS equivalent grade. This appointment is vital if SMO is to operate as a business and a Stand-Alone Department within Government.

2.6 Overall Organisation

With the exception of the changes in organisation recommended above, we believe that the overall organisation should remain as it is at present. It is only recently that SMO changed its organisation structure to recognise the growing importance of digital mapping. The changes now needed to address its key business aims should, therefore, be kept to a minimum so that they can be more easily absorbed. The major new posts are shown in Appendix '9-A'.

3. Human Resource Issues

Re-organisation and the development of technology will not by themselves bring greater market share or improved satisfaction to customers. The human resource issues surrounding motivation, continued development, deployment, recruitment and retention of personnel within SMO, all need to be addressed in parallel with organisation and technology changes. We have identified a number of human resource issues which will affect SMO's ability to achieve the key business aims.

SMO will need to address personnel issues such as the fact that some of its staff do not yet share the vision and purpose of digital data. One of the many challenges that will face SMO is communication to all of their staff of the "vision" of a market-driven enterprise heavily reliant on computer technology. Such reliance on technology will place new demands on staff, particularly those involved with the capture and update of data. To be of significant value to the customer, the data must be more than merely a digital version of the traditional topographic map. Staff will need to understand the requirements of digital data within a market-driven organisation. An education/retraining programme needs to be implemented to ensure that all members of staff are able to grasp the concepts of digital data and the requirements with respect to the capture of attribute "meta" data.

We have questioned in previous reports the validity of the staff rotation policy, where staff are rotated as a deliberate policy on a regular basis. There are many good reasons for such a policy, but equally there are disadvantages, which are now manifesting themselves and threaten, in particular, to upset the long term stability of LIC. With the increasing acceleration and growth of computer technology, the time frames within which proficiency is gained will be longer and thus the period for constructive input lessened. We recommend that, in technical areas in particular, the rotation policy should be revised.

With the introduction of a Marketing and Sales function, and a market-led/customer focused approach, staff development training should include components such as:

- Customer care and focus;
- Business management and understanding;
- Financial/Commercial awareness and understanding;
- Forecasting and planning ;
- Market appreciation;
- Sales administration;
- Copyright management and administration;

Given the technical programme advocated (see Position Paper N°5), we also believe that LIC staff may find development of Programme and Project Planning of benefit.

Courses on these and other related topics should be developed over the next year between the

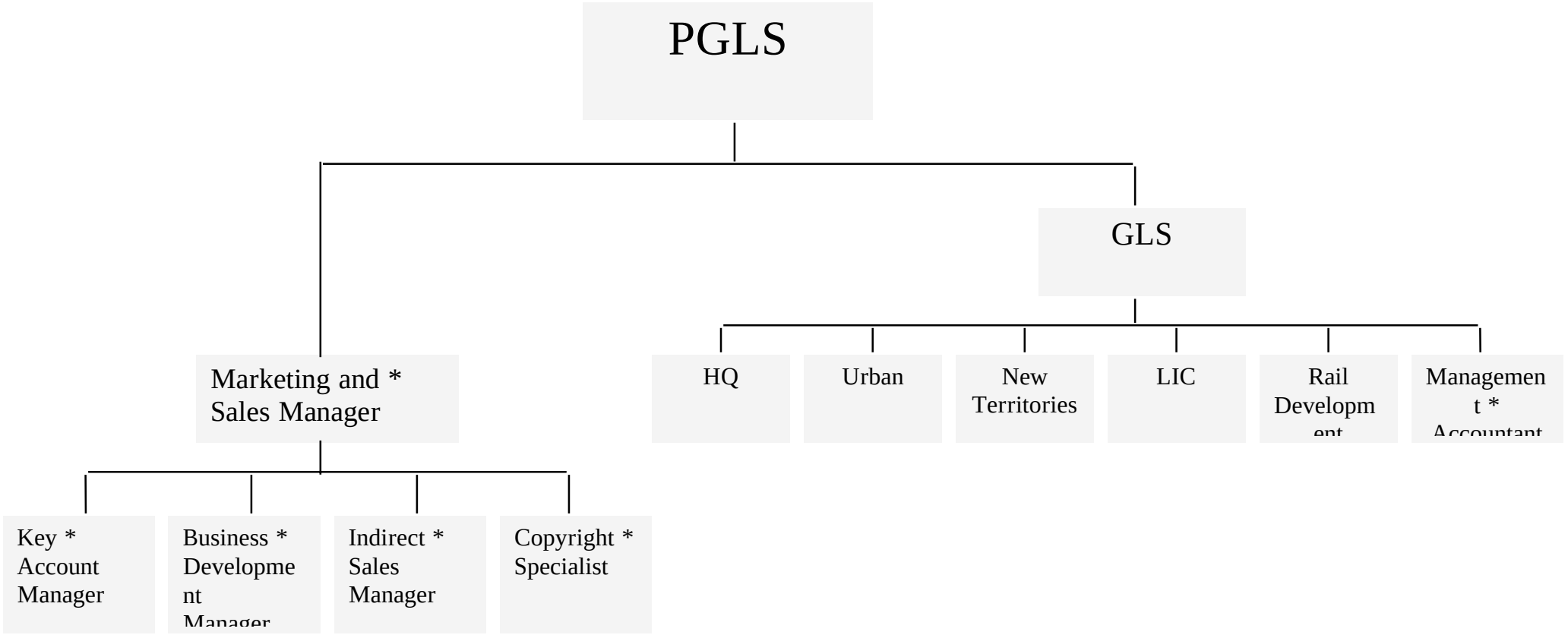
Training School, in its recommended extended role into middle management training, and the new members of the Marketing and Sales team. Some of the more general topics listed above should be made available to staff throughout SMO.

We recognise that all these proposals call for a significant culture change within SMO. This has human resource implications over and above training needs. It requires a change in management style and approach. A more communicative style of management will be needed to convey the message that SMO is running a business, and to allay the quite understandable concerns over job security, changes in job content etc. SMO in pursuit of its aim to be seen as a caring employer may need to take more overt action to demonstrate this. Similarly, a more participative management style, using cross-disciplinary problem solving workshops, such as used in the efficiency reviews, would be advantageous.

P-E Consultant Team
10 September 1997

APPENDIX 9-A

SMO ORGANISATION (REVISED)
(showing new posts only)



* New Posts

POSITION PAPER N°10
SMO TRAINING SCHOOL FEES

Purpose of this paper

The purpose of this paper is: to outline the key issues to be addressed in the determination of a future fee structure for the SMO Training School; to examine the cost base options for fees, and to recommend the price structure options which might be adopted.

Key Issues

The key issues to be addressed in the determination of a future fee structure for the Training School are:

- the reactive nature of course provision in response to the demand for basic survey and cartographic training. This is directly linked to the recruitment pattern for Land Surveyors, Cartographers and Survey Officers Land/Engineering Staff and causes wide fluctuations in demand ranging from 9,029 man-days of training in 1995/96 to an estimate of 5,000 man-days in 1997/98;

- the significant cost differences in providing the Training School facility ranging from actual costs of around HK$17.7M in 1995/96 to 21.0M in 1996/97. The 1996/97 costs include HK$6.469M of cost associated with managing long-term SMO trainees, including their salary costs.

- the changing nature of cartographic training requirements as old methods are being replaced by the developments in digital mapping;

- the resultant mix, therefore, of both course running costs and new course development costs in the overall costs of the Training School;

- the availability of course information on which to calculate cost rates per trainee day etc.;

- the need for a policy decision on whether SMO is seeking to recover the full costs of the Training School or only a contribution towards these costs;

- the fact that staff are on loan to the Training School from both the Civil Engineering Department (1 PSO and 2 SSOs) from the DSOs (3 Chainmen on a two month rotational basis). We understand that the Chainmen's costs are transferred to the Training School for the rotation period. Thus there is no problem in recharging fees which include their costs, if so required. As from April 1997 the Civil Engineering Department picks up the cost of their staff on loan. It would be logical, therefore, to exclude the costs of these staff from any fees levied on Engineering courses.

- Training School costs include Departmental Vocational Training Expenditure on external courses in Hong Kong and overseas. These costs should be excluded from man-day rate calculations for internal courses.

- the need to determine which of the three training groups under the PSO(L), PSO (Eng) and the Cgr provide which courses;

- the examination, in broad terms, of comparable market rates i.e. What the Hong Kong market will bear.

Cost Analysis

In order to provide a basis for pricing decisions on the future fee structure for the courses provided by the Training School, we have compiled an analysis of costs based on:

- the Interim Breakdown of Full Costs for 1996/97 analysed by nature of expense and as adjusted in our cost model to a total of HK$ 21.007M (see Appendix 1). This takes account of staffing levels in the Training School as at 1 May 1997.

- the Annual Report (1996/97) of Training Courses and Examinations run by the SMO Training School;

- the analysis provided by the Training School of technician training man-days for the years 1994/95 to 1996/97 and the estimate for 1997/98.

Training School costs for 1996/97 are only available at cost centre level for the whole facility. In future it will be necessary to set up sub-cost centres for Land Engineering Survey, Cartographic and Trainee sub-cost centres within the Training School cost centre. This exercise must be completed in March 1998. We are advised by the STA that it is not possible to create such sub-cost centres retrospectively for 1996/97 through the Treasury payroll system.

Departmental Vocational Training Costs of HK$ 1.216M covering courses provided outside of the Training School have then been eliminated from the 1996/97 adjusted figures. This gives us the following sub-cost centre costs. (See Appendix 2 for details).

	Land Survey/Eng.	**Cartography**	Total excluding.trainees
Total Net Cost	HK$ 7,635K	HK$ 2,838K	HK$ 10,473K
Trainee Days	6,078	1,152	7,230
Cost per Day	HK$ 1,256	HK$ 2,463	HK$ 1,449

The wide variation in costs per trainee day produced from these calculations illustrates the problem of basing fees for different sub-cost centres of the Training School on a cost basis. The figures calculated are volatile depending on the demand placed on the school for courses in each sub-cost centre each year. One solution would be to base the fee on the average cost rate for all trainee days provided by the school i.e. 1,449 HK$ per day in this case, if full cost recovery was required. As a policy decision, varying percentages of this rate could be used to recover contributions towards this cost per day.

However, one other problem is that cost rates will vary significantly from year to year as the demand fluctuates and Training School costs change. The number of trainee days produced vary from 7,230 in 1996/97 to an estimate of 5,000 per annum in 1997/98. Therefore, even if the cost rate of HK$ 1,449 was adopted based on 1996/97 figures, there would be an under recovery in 1997/98 of some HK$ 3.23M (i.e. 7,230 days minus 5,000 days times HK$ 1,449). If the net costs in 1996/97 were to be spread over the estimated 5,000 trainee days in 1997/98, then the resulting rate would be HK$2,095.

A solution would be to set fee levels at market rates for similar technician training in Hong Kong. We have conducted a brief market research of course rates in Hong Kong ranging from courses provided by the Hong Kong Management Association, Hong Kong Productivity Centre, the Hong Kong Polytechnic, the Hong Kong Technology Centre, CSTDI, and our own courses provided in Hong Kong by P-E Handley-Walker. The following selected range of indicative daily rates per trainee resulted from the research:

	Daily Rate HK$
Workshop on Strategic Business Decisions	3,045
Seminar on Project Evaluations and Feasibility studies	2,400
ISO9000 Lead Auditor Training	2,100
ISO9000 Internal Auditor Training	1,750
ISO9000 Documentation Presentation	1,250
Management Course for Shift Supervisors	700
Information Technology (CSTDI) *	730
Introduction to Plastic Materials Technology	600
Certificate Programme on Performance Management	270
Certificate Programme on Warehouse Management	275
Course in Building Services Design and Management	260

* This course is considered by the SMO Training School Manager to be the nearest equivalent to the technician courses run at the school.

Hong Kong Polytechnic University runs a part time day release and evening class course for the Certificate in Land Surveying and Cartography covering eight months of the academic year. Students spend one day and two evenings each week on their studies. The course cost was HK$ 9,240 in 1996/97 and is 10,420 in 1997/98. This gives a calculated daily rate per trainee day of between HK$ 272 and 306 per day, but is believed by the Training School staff not to represent full cost recovery. The course is also clearly not as intensive as the 65 day basic survey training courses provided by the Training School.

It is clear, therefore, that only high-level management subjects command a high premium in the Hong Kong market. We believe that the technician courses provided by the Training School would fit into the middle range of these course rates. If this is the case, then in market terms it appears that net daily trainee costs of HK$ 1,449 are relatively high for technician training and reflect the high fixed cost of running the Training School. We conclude, therefore, that it would be realistic for the school to recover a contribution to its operating cost at a level around HK$ 800 per day, a contribution of 55% of its net daily trainee cost, for courses provided to other Government Departments.

The Civil Engineering Department is a special case and it must be recognised that they are making a contribution already to salary and on-costs of their seconded staff. They should, however, be expected to cover other costs of the Training School. If salary and on-costs for the seconded officers of some HK$ 1.85M are excluded from the Survey/Engineering sub-cost centre in the Training School, then some 75% of the costs remain. A contribution of 75% of the HK% 800 daily fee rate, say HK$ 600 per trainee day would, therefore, be appropriate.

The Training School should not levy fees on its own internal cost centres for training its own staff. The question then arises what the contribution from other Government departments is worth in overall terms, assuming that charges can be levied. On the basis of the 1996/97 trainee days, we estimate that using the fee structure described above and charging other departments at HK$ 800 and the Civil Engineering Department at HK$ 600, some HK$ 2.75M would be recovered (see Table below) out of net costs (excl.trainees) of HK$ 10.5M, a 26.2% recovery.

Charge to:	**Trainee Days**	Charge Rate HK$	Recovery HK$
SMO	2766	**NIL**	**NIL**
Civil Engineering	4,098	600	2,458,800
LAO	225	800	180,000
Other Govt. Depts.	141	800	112,800
TOTAL	7,230		2,751,600

We recommend recovery of fees on the basis of what the market will bear. We believe that the analysis which we have provided faces the SMO Training School with two alternatives. Either it utilises facilities and staff by providing other training, as identified in our Efficiency Review, or SMO considers the subcontracting of all its training to outside training organisations who can provide the required training at more economic rates.

However, the SLS/Tr comments that:

- the training provided by outside organisations might not be to the same standard or quality as SMO require;
- most of the Technical Institutes in Hong Kong only provide relevant subjects in individual courses, but normally provide no special course in land surveying; and
- the Hong Kong Polytechnic University only emphasises academic work, with little practical training.

Survey Training School Costs - 20th September 1997

Discussions with SMO on 19th September established that SMO would like to create a separate Cost Centre to handle the costs associated with managing long term SMO trainees

An assessment of the split between Surevy & Engineering, Carto and Trainees was undertaken with SMO advice and the resulting split applied to 1996/97 adjusted DFMS costs. The DFMS costs as published have been adjusted to reflect the misallocation of staff to SMO/HQ and Map Production

Admin and Management have been spread

	Direct Personal Emoluments	Direct Expenses	Direct On-cost	Direct Accommodation	Direct Central Administration Overheads	Direct Depreciation	Direct Other Charges	Recharge Personal Emoluments	Recharge Expenses	Recharge On-cost	Recharge Accommodation	Recharge Central Administration Overheads	Recharge Depreciation	Recharge Other Costs	Total Costs		
Training School - Surveying & Engineering	**$3,719,270**	**$490,230**	**$1,899,384**	**$921,550**	**$165,610**	**$0**	**$0**	**$508,310**	**$129,503**	**$288,670**	**$134,112**	**$22,923**	**$32,693**	**$7,877**	**$8,320,133**		39.61%
Training School - Cartography	**$1,505,844**	**$198,482**	**$769,015**	**$373,113**	**$67,052**	**$0**	**$0**	**$205,803**	**$52,433**	**$116,876**	**$54,299**	**$9,281**	**$13,237**	**$3,189**	**$3,368,623**		16.04%
Training School - Trainees	**$4,165,442**	**$549,039**	**$2,127,239**	**$1,032,101**	**$185,477**	**$0**	**$0**	**$569,288**	**$145,039**	**$323,300**	**$150,201**	**$25,673**	**$36,615**	**$8,822**	**$9,318,235**		44.36%
Total	**$9,390,556**	**$1,237,751**	**$4,795,639**	**$2,326,764**	**$418,139**	**$0**	**$0**	**$1,283,401**	**$326,975**	**$728,845**	**$338,611**	**$57,878**	**$82,544**	**$19,887**	**$21,006,991**		

	PE	Expenses	Accom	CAO	Depn	Other Costs	On-costs	Total
Training School - Surveying & Engineering	**$4,227,580**	**$619,733**	**$1,055,662**	**$188,534**	**$32,693**	**$7,877**	**$2,188,054**	**$8,320,133**
Training School - Cartography	**$1,711,646**	**$250,915**	**$427,412**	**$76,333**	**$13,237**	**$3,189**	**$885,891**	**$3,368,623**
Training School - Trainees	**$4,734,730**	**$694,078**	**$1,182,301**	**$211,151**	**$36,615**	**$8,822**	**$2,450,539**	**$9,318,235**
								$21,006,991

APPENDIX 10-2

SMO Training School

Cost Analysis 1996/97

	Survey & Engineering **HK$ 000**	**Cartography** **HK$ 000**	**Trainees** **HK$ 000**	**Total** **HK$ 000**
Personal Emoluments	$4,228K	$1,712K	$4,735K	$10,674K
Departmental Expenses	$620K	$251K	$694K	$1,565K
Accommodation	$1,056K	$427K	$1,182K	$2,665K
Central Administration Overheads	$189K	$76K	$211K	$476K
Depreciation	$33K	$13K	$37K	$83K
Other costs	$8K	$3K	$9K	$20K
Payroll on-costs	$2,188K	$886K	$2,451K	$5,524K
Sub Total	**$8,320K**	**$3,369K**	**$9,318K**	**$21,007K**
Less Departmental Vocational Training	($685K)	($531K)	$0	($1,216K)
Total Cost	**$7,635K**	**$2,838K**	**$9,318K**	**$19,791K**
Less Trainee Cost				($9,318K)
Net Cost	**$7,635K**	**$2,838K**	**$0**	**$10,473K**
Trainee Days	**6,077.5 days**	**1,152 days**	**None**	**7,229.5 days**
Cost per day	**$1,256**	**$2,463**		**$1,449**

ANNEX 'B' - DERIVATION OF SALES TARGETS

1. DIGITAL DATA PRODUCTS

1.1 Historical Sales Volumes (sheets)

(Source: SMO August 1997)

	1994/95	1995/96	1996/97	1997/98 Est.*
Government (& contractors)	11,000	35,000	29,000	45,000
Private Sector	3,2000	1,600	18,000	8,000
TOTAL	14,200	36,600	47,000	53,000
Growth		164%	27%	13%

(*P-E estimates based on reported sales to end July 1997 and our expectations based on market research)

1.2 Target Sales Volumes (sheets)

From Table 7, Section 2 of Second Interim Report, total initial purchase potential of all products, over a 5-year period, is approximately as follows (sheets):

Government	36,000
Technical Professional (incl. of Government contractors)	85,000
Business Professional	195,000

Applying an update purchase potential to these figures, of the whole database, on average: 2 x p.a. for all Government customers; 2 x p.a. for 10% of Technical Professional customers; and 1 x pa for 50% of Business Professional customers (which is broadly consistent with our research findings); also, assuming a uniform year-on-year take-up of this potential, then the comparable additional update purchase potential is: 180,000 sheets, 43,000 sheets and 244,000 sheets respectively. These estimates ignore updates against previous initial sales. Given the very approximate nature of the estimates, this is appropriate for the technical professional market, which is project based and requires little updating, and for the business professional market, into which few sales have been made, but for the Government market an adjustment is needed to cover historical sales. We have estimated this adjustment at some 30,000 sheets p.a.. Thus, very approximately, we estimate total sales potential over a 5-year period as (sheets):

Government	366,000
Technical Professional	128,000
Business Professional	439,000

It is unrealistic to suppose that SMO could realise this full potential over 5 years. However, the figures do provide a comparator against which our proposed sales targets can be tested for realism and the Government/Technical Professional ratio also provides a broad indicator of the split between expected Government (excluding contractor) and Technical Professional (including Government contractor) sales.

Using this information, and:

- the historical sales data in 1.1;
- the assumed update frequency, customer proportions and historical adjustments set out above, except that, in the year of initial purchase, Government and Technical Professional customers will only take one update and Business Professional customers none;
- our research findings from the Second Interim Report as to short and longer term purchasing expectations, including the expectation that, in the Business Professional market, the Property Development sectors will not take off until 1999/00 and the Retail sector until 2000/01;
- the assumption that it will take time to implement our proposed key strategies (see Action Plan, Section 12);
- an iterative process;

we have arrived at the following sales volume targets, as being a sensible first attempt at target setting. They are targets i.e. what SMO should aim to achieve, and not forecasts. They should be updated in the light of better historical sales data, as soon as this becomes available following implementation of our management information recommendations.

		1998/99	1999/00	2000/01	2001/02	2002/03
Government	-updates previous sales	30,000	38,000	44,000	49,000	53,000
	-initial sales	4,000	3,000	2,500	2,000	2,000
	-new updates	4,000	3,000	2,500	2,000	2,000
	TOTAL SHEETS	38,000	44,000	49,000	53,000	57,000
Tech. Pro.	-updates previous sales	0	2,000	4,400	7,200	10,000
	-initial sales	11,000	12,000	14,000	14,000	15,500
	new updates	1,000	1,200	1,400	1,400	1,500
	TOTAL SHEETS	12,000	15,000	20,000	23,000	27,000
Bus. Pro.	-updates previous sales	0	500	5,000	14,000	27,000
	-initial sales	1,000	9,000	18,000	26,000	34,000
	TOTAL SHEETS	1,000	9,500	23,000	40,000	61,000
GRAND TOTAL SHEETS		51,000	68,500	92,000	116,000	145,000

1.3 Target Sales Values (HK$)

Volumes have been converted into sales values on the assumption that:

- the great majority of sales will be of large scales maps;
- the average customer will buy 100 sheets per order and has 10 terminals;
- the first approach of the proposed new price structure is in place viz. Initial purchase price per sheet is $1,015 inclusive of licence charge, and update charge is $93 per sheet inclusive of licence charge.

The resultant target sales values are accordingly as follows (HK$ millions):

	1998/99	1999/00	2000/01	2001/02	2002/03
Government	7.2	6.9	6.9	6.8	7.1
Technical Professional	11.3	12.5	14.7	15.0	16.3
Business Professional	1.0	9.2	18.7	27.7	37.0
SALES VALUES	19	29	40	50	60

2. GRAPHICAL MAPS (INCL. OF REPRO.)

2.1 Historical sales volumes (sheets)

Source: SMO August 1997; Private Sector figures adjusted in the light of other figures obtained earlier from SMO for costing purposes.

Figures show no clear trends, therefore historical figures taken as the mean for the three years 1994/95 to 1996/97:

Government	111,000 sheets
Private Sector	140,000 sheets

2.2 Target sales volumes (sheets, book etc.)

Based on our research findings set out in the Second Interim Report, we have assumed:

- substantial reductions in large-, mid-, and small scales map sales, in both Government and Private sectors, due to substitution by digital data; these reductions will lag some way behind digital purchases;
- in the private sector, these reductions will be partially off-set by increased sales of Countryside Series maps and Guides, achieved by improved marketing and distribution, following the implementation of our recommendations.

Accordingly, our proposed 'first shot' targets (which again, should be updated as soon as more reliable historical data becomes available) are:

	1998/99	1999/00	2000/01	2001/02	2002/03
Government	92,000	82,000	74,000	58,000	51,000
Private Sector	125,000	109,000	101,000	89,000	93,000
TOTAL SHEETS	217,000	191,000	175,000	147,000	144,000

2.3. Target sales values (HK$)

From the breakdown of historical sales:

- Approximately 50% of sales are for large/mid scales maps, with proposed new prices over the years of the plan as follows:-
- $100, 180, 260, 340, and 340 respectively for years 1,2,3,4 and 5.
- Approximately 20% of sales are for small scales maps, at $50 each across the board.
- Approximately 20% of sales are for Countryside maps and Guides at say $70 each on average across the board.
- Approximately 10% are other products, at say $80 each on average.

Assuming this breakdown holds across all the years of the plan, and assuming the above average prices, then, in Year 1, the average price across all products equals

5/10 x 100 + 2/10 x 50 + 2/10 x 70 + 1/10 x 80 = $82, and in Year 2 $122, in Year 3 $162, in Year 4 $202 and in Year 5 $202.

Applying these average prices to the target sales volumes, we arrive at target sales values as follows (HK$ millions):

	1998/99	1999/00	2000/01	2001/02	2002/03
Government	8	10	12	12	10
Private Sector	10	13	16	18	19
SALES VALUES	18	23	28	30	29

3. SURVEY PLANS (INCL. OF REPRO.)

3.1 Historical Sales Volumes (sheets)

Source: SMO August 1997

Excludes an estimated 90% of total sales to LAO/LACO, which are included under services (see below). Sales dominated by Land Boundary and Lot Index plans.

	1994/95	1995/96	1996/97	1997/98 EST.*
Government	18,200	18,000	20,300	22,500
Private Sector	6,000	6,000	11,000	13,000
TOTAL SHEETS	24,200	24,000	31,300	35,500

(*Estimate for Government from SMO looks realistic in light of trend and market research; estimate for Private Sector from SMO at 16,000 looks far too high in light of fact that main step increase due introduction of Land Survey Ordinance occured in 96/97. SMO estimate therefore modified downwards to 13,000 in line with research expectations.)

3.2 Target Sales Volumes (sheets)

Assumptions (based on research findings and historical sales):

- The recent Government growth rate of approx. 12% p.a. will decline at 1% p.a. over the period of the plan.
- A Private Sector growth rate of 15% will be maintained for the first 4 years of the plan, falling to 10% in the fifth year. The high growth will be encouraged by the proposed reductions in Lot Index Plan prices, see below.

Accordingly, our 'first shot' targets are:

	1998/99	1999/00	2000/01	2001/02	2002/03
Government	25,200	28,000	30,800	33,500	36,200
Private Sector	15,000	17,000	20,000	23,000	25,000
TOTAL SHEETS	40,200	45,000	50,800	56,500	61,200

3.3 Target Sales Values (HK$)

Historically, about 80% of Government off-take is for Land Boundary Plans and 20% for Lot Index Plans. In the Private Sector, Land Boundary Plans represent about 21.5% of sales and Lot Index Plans 78.5%. Over the period of the plan, the proposed price for Land Boundary Plans is $105 per sheet, and prices for Lot Index Plans are $1,015, 815, 615, 415 and 415 respectively for Years 1, 2, 3, 4 and 5.

Applying these proportions and prices to the target sales volumes, we arrive at target sales values as follows (HK$ millions):

	1998/99	1999/00	2000/01	2001/02	2002/03
Government	7	7	6	6	6
Private Sector	12	12	10	8	9
SALES VALUES	19	19	16	14	15

4. PHOTOGRAPHS

4.1 Historical Sales Volumes

(Source: SMO 1997)

No discernible trend in sales over the three years 1994/95 to 1996/97; if anything the trend is downward. Over this period, the mean p.a. sales are: 37,000 to the Government and 7,000 to the private sector.

4.2 Target Sales Volumes

From our research findings, we expect no growth in sales to Government but do believe there is some growth potential in the Private Sector, particularly in respect of settling land disputes and for other land development purposes. Our proposed target sales volumes (no. of photographs) are as follows:

	1998/99	1999/00	2000/01	2001/02	2002/03
Government	37,000	37,000	37,000	37,000	37,000
Private Sector	7,500	8,000	8,500	9,000	9,500
TOTAL SHEETS	44,500	45,000	44,500	46,000	46,500

4.3 Targets Sales Values (HK$)

In converting volumes to values we have assumed an average price per photograph of $110 i.e. mainly standard photographs with a slight preponderance of B/W. Target sales values are accordingly as follows (HK$ millions):

	1998/99	1999/00	2000/01	2001/02	2002/03
Government	4	4	4	4	4
Private Sector	0.8	0.9	0.9	1.0	1.0
SALES VALUES	4.8	4.9	4.9	5.0	5.0

5. GEODETIC SURVEY DATA

5.1 Historical Sales Volumes (sheets/items)

(Source: SMO August 1997)

There is no very clear trend in Government off-take, if anything it is downwards. The average annual off-take over the past three years is about 6,000. In the Private Sector, conversely, there has been steady growth, year-on-year growth being at a rate of 15%, 14% and 11% successively over the past four years, culminating in an estimated sales volume of 19,000 in 1997/98.

5.2 Target Sales Volumes (sheets/items)

Our research findings provided little guidance on future demand, although we would expect continued private sector growth, in line with the expected on-going land development and the increasing deployment of the private land surveying sector. We have accordingly assumed nil growth from Government demand and 10% growth p.a. from Private Sector demand in our targets, which are as follows:

	1998/99	1999/00	2000/01	2001/02	2002/03
Government	6,000	6,000	6,000	6,000	6,000
Private Sector	21,000	23,000	25,000	28,000	31,000
TOTAL SHEETS	27,000	29,000	31,000	34,000	37,000

5.3 Target Sales Values (HK$)

To convert volumes to values we have assumed a price per sheet of $100, as per our proposed pricing structure. Target sales values are therefore as follows (HK$ millions):

	1998/99	1999/00	2000/01	2001/02	2002/03
Government	0.6	0.6	0.6	0.6	0.6
Private Sector	2.1	2.3	2.5	2.8	3.1
SALES VALUES	2.7	2.9	3.1	3.4	3.7

6. SERVICES

6.1 Historical Sales Volumes (man days) (includes LAO/LACO work)

Sources: SMO August 1997. Government figures adjusted upwards by some 45% to achieve consistency with data separately obtained for costing purposes.

	1994/95	1995/96	1996/97	1997/98 EST.*
Government	66,000	71, 000	78,000	84,000
Private Sector	1,250	1,069	2,115	2,586
TOTAL SHEETS	67,250	72,069	80,115	86,586

6.2 Target Sales Volumes (man days)

Government sales have been growing at about 8% p.a., mainly due to special projects and increasing work for LAO/LACO. This growth is expected to continue in the medium term. In the Private Sector, land survey work is falling but computation folder search work and Land Survey Ordinance work is rising. We would not expect recent growth rates to be sustained, following the initial surge involved in the introduction of the Ordinance and continued fall-off in land survey work, but would expect growth rates of the order of 10% p.a. to be sustainable. This is in line with the projected growth for Survey Plans, when the impact of price reductions for these is discounted. We also consider the estimated figure for 1997/98 may be optimistic. Accordingly, we have set 'first shot' targets as follows:

	1998/99	1999/00	2000/01	2001/02	2002/03
Government	92,000	100,000	108,000	116,000	123,000
Private Sector	2,600	2,800	3,100	3,400	3,700
TOTAL SHEETS	94,600	102,800	111,100	119,400	126,700

6.3 Target Sales Values (HK$)

Values have been calculated from volumes using a notional daily labour rate of HK$307 per hour for a working day of eight hour i.e. a daily rate of HK$2,456. Target sales values are accordingly as follows (HK$ millions):

	1998/99	1999/00	2000/01	2001/02	2002/03
Government	226	246	265	285	302
Private Sector	6.4	6.9	7.6	8.4	9.1
SALES VALUES	232	253	273	293	311

ANNEX 'C'

COST TARGET CALCULATIONS

a) Personal Emoluments are based on HK$310M in 1997/98 plus 7% inflation = 332HK$M.

b) Extra staff calculated as follows:

Total salaried staff (SLS, LS, PSO, SSO, SO, Chainman, WMII, MD, PTO, STO, TO) in DSOs = 591

Then, 591 x 70% of time on Government work x 8% increase p.a. x 95% increase in productivity = 31 staff increase in 1998/99.

So,

	No. of Extra Staff Required		
Year	Yearly		Cumulative
1998/99	31	= 31	31
1999/00	31 x 95%	= 30	61
2000/01	30 x 95%	= 28	89
2001/02	28 x 95%	= 27	116
2002/03	27 x 95%	= 26	142

Table 1: Extra staff calculated pro rata based on 1996/97 Manpower spreadsheets in Cost Model).

		PE	1998/99		1999/00		2000/01	
Rank	No. of staff	(96/97) (HK$K)	Extra Staff	Cost (HK$M)	Extra Staff	Cost (HK$M)	Extra Staff	Cost (HK$M)
SLS	9	876	1	0.9	1	0.9	1	0.9
LS	19	587	1	0.6	1	0.6	1	0.6
PSO	12	497	1	0.5	1	0.5	1	0.5
SSO	57	383	3	1.1	3	1.1	3	1.1
SO	83	233	4	0.9	4	0.9	4	0.9
Chainman	211	141	11	1.6	11	1.6	10	1.4
WMII	27	108	1	0.1	1	0.1	1	0.1
MD	47	140	2	0.3	2	0.3	2	0.3
PTO	12	499	1	0.5	1	0.5	1	0.5
STO	38	376	2	0.8	2	0.8	2	0.8
TO	76	245	4	1.0	3	0.7	2	0.5
Total	**591**	**4,085**	**31**	**8.2**	**30**	**7.9**	**28**	**7.5**

(Continue from Table 1)

Rank	No. of staff	PE (96/97) (HK$K)	2001/02 Extra Staff	2001/02 Cost (HK$M)	2002/03 Extra Staff	2002/03 Cost (HK$M)
SLS	9	876	1	0.9	1	0.9
LS	19	587	1	0.6	1	0.6
PSO	12	497	1	0.5	1	0.5
SSO	57	383	2	0.7	2	0.7
SO	83	233	3	0.7	3	0.7
Chainman	211	141	10	1.4	9	1.3
WMII	27	108	1	0.1	1	0.1
MD	47	140	2	0.3	2	0.3
PTO	12	499	1	0.5	1	0.5
STO	38	376	2	0.8	2	0.8
TO	76	245	3	0.7	3	0.7
Total	**591**	**4,085**	**27**	**7.2**	**26**	**7.0**

Table 2: Total number of extra staff and cost required

Year	No. of Extra Staff Yearly	No. of Extra Staff Cumulative	Cost (HK$M) Yearly	Cost (HK$M) Cumulative
1998/99	31	31	8.2	8.2
1999/00	30	61	7.9	16.1
2000/01	28	89	7.5	23.6
2001/02	27	116	7.2	30.8
2002/03	26	142	7.0	37.8

Extra Marketing Admin.

			HK$M
EOs	2 x 442K	=	0.9
COs	2 x 268K	=	0.5
CAs	1 x 130K	=	0.1
OA	1 x 111	=	0.1

Technical Support

			HK$M
STO	3 x 376K	=	1.1

Quality Unit

			HK$M
LS	1 x 587K	=	0.6
STO	2 x 376K	=	0.8
TO	2 x 245K	=	0.5

Department Expenses 36M in 1997/98 plus 7% inflation = HK$39M.

Developmental Costs

	HK$
– Data Dissemination System	360K p. year
– Customer Supply Set	200K p. year
– Full on-line and internet	720K
	1.28 p. year say HK$2.0M

Promotion Costs - Estimated costs to cover range of promotional activities set out in Position Paper No 8.

Non Cash Costs - calculated at 71.657% of Cash Costs.

ANNEX 'D'

Report on North American Study Tour

(from 6.10.97 to 17.10.97)

1. Background

As part of the study to look into the costing and pricing of the SMO products, the consultant (OS & PE International) that was awarded the study contract arranged three senior staff from SMO management to visit survey and mapping organisations in the USA and Canada. The objective is to enable the staff to understand the business operation of these organisations and the costing and pricing strategies adopted by them, and the methods and policies used to protect intellectual properties.

2. Organisations Visited

OS & PE arranged the staff to visit seven organisations, namely

In USA
- Environmental Systems Research Institute, Inc. (ESRI)
- Thomas Brothers Maps
- The Library of Congress
- United States Geological Survey (USGS)

In Canada
- Geomatics Canada
- Teranet
- Ministry of the natural Resources, Province of Ontario

3. Delegates

The staff represented SMO were

Frank CHENG, CLS
Fred Wai Chiu So, CLS
Dominic Wai Ching SIU, SLS

4. Findings from Individual Organisation

4.1 ESRI, Redlands in California, USA

ESRI is a private company whose main business is software development particularly towards GIS application. The company is a leader in the GIS field and its software is adopted world-wide. SMO is amongst one of its software users.

ESRI's products are quite different from those of the SMO. The company has many strategies in marketing and copyright enforcement that could potentially be adopted by the SMO.

The company maintains a low pricing policy to encourage increased legal use of their products. It considers that affordable prices can discourage piracy and unauthorised usage. ESRI occasionally programs incorrect information onto inconspicuous map areas as a means of deterring illegal usage. These errors enable ESRI to identify persons attempting to pass off map data as their own.

As a private enterprise, ESRI enjoys the freedom to negotiate prices with its clients who order bulk purchases. It also offers discounts (on a sliding scale) on enhancement charges to licencees who wish to use its products on a large numbers of workstations.

As a long-established organisation, ESRI does not place heavy emphasis on the promotion of their products. Its users speak out for them. However, the company conducts user conferences, publishes newsletters, announces their products on the Internet and supports teaching institutes for research work as a means of enhancing its reputation.

4.2 Thomas Brothers Maps (TBM), Irvine in California

TBM is a private company publishing street maps of the states of California, Washington, Oregon and Washington, D. C.. It obtains most of its raw map data by purchasing the rights to use the data from the various counties which own the information. It came as a surprise to the Study Group that TBM sometimes has to pay a fairly high price for the rights of using the data.

TBM products include hard copy street maps and digital maps. For digital products the company does not sell its digital data. It offers licencees a right to use the data while it retains the intellectual ownership of the products.

To enable wider use of its digital products, the company sometimes supplied their products in two forms. One form is for the higher and users who are prepared to pay for a higher price. In this case the data will provided in graphics files where users can add publishing information and carry out analysis similar to GIS application. The cheaper version consists of data supplied in tabular files where manipulation is limited and users can only tabulate data.

It is interesting to note that TBM's products are more or less the same as the SMO's.

Unfortunately, the company indicated before our visit that it was not prepared to discuss their costing and pricing strategies.

As far as copyright protection is concerned, TBM adopts the same strategies as other map producers by adding false information into their products. This approach helps the company to identify whether their products have been copied illegally.

4.3 The Geography & Map Division of the Library of Congress in Washington, D.C.

During the stay in Washington, D.C., the Study Group also visited the Library of Congress. The main objective was to find out what is kept in the Library and whether the map information is available free of charge.

The Geography & Map Division of the Library of Congress occupies two acres of floor space. It has a collection of 5 million maps and 60,000 atlases. Amongst its collection are a wide variety of Hong Kong maps and plans some of which are dated as far back as the 1870s. These collections include maps prepared by the Japanese and British before the Second World War, old survey sheets ad cadastral plans in 1/600 and 1/1200. The SMO should approach the Library to acquire copies of those plans that have historic values.

Although the division mainly serves the Congress and federal departments and agencies, members of the public may use its Geography and Map Reading room through appointment. Maps and atlases are not for sale. However copies of such may be ordered through the Library Photoduplication Service, subject to copyright restriction. The Study Group also learned that as long as the order is of small quantity and they are on small sheets such as an A4 size, and are not for commercial use, the copies are generally supplied free. In the long term the Library may consider recovering some of the upkeeping and photcopying costs.

4.4 United States Geological Surveys (USGS) in Reston, Virginia

The USGS is a government department. It collects various kinds of information including hydrologic, biologic and geographic data and analyse such data for resources planning, environmental and hazard control. Of particular interest to the Study Group is its mapping information gathered by the department. USGS makes use of its mapping information to develop various digital and map products similar to those of SMO. The products include 1/24,000 topo maps covering the whole of US, county maps at 1/50,000 (20% of all counties are covered), state map series at 1/500,000 and national park map series at various scales.

Its digital products include digital elevation models data covering the whole country, digital line graph data consisting of land use data, transportation and hydrography information. Other products include aerial photographs in black and white or colour, orthophoto maps and satellite image maps. It is interesting to note that USGS did not register copyright on their mapping products.

USGS has numerous web sites to enable users to access information relating to its various services and products. The addresses of these sites are printed on fact sheets obtainable from their distributors or through their E-mail addresses. Clients may also obtain information through their toll free telephone line services.

As far as pricing policy in USGS is concerned, price for information products will be set "at a level that will recover reproduction and distribution cost". For services provided to federal and non-federal agencies, fees will be set to recover the full costs which include direct costs as well as indirect costs such as overhead and equipment depreciation. (Extract from USGS Pricing Policy approved in 1995.)

To serve its customers better, USGS carries out user evaluations on some of their products. Such evaluations are generally done by outside contractors. The Study Group was also given a copy of its evaluation report.

Unlike the practice in Hong Kong which has only a few sales outlets, USGS has two thousand distributions for its products. Promotion of products is done through public service announcement on TV and on scientific journals.

4.5 Geomatics Canada in Ottawa, Canada

Geomatics Canada is a government organisation providing mapping and geographic information covering the whole of Canada. Its function is more or less the same as SMO except that it provides comparatively less land boundary survey support for administration of government lands. Its paper products consists of 1/50,000 and 1/250,000 map sheets, aerial photographs, and aeronautical charts. Digital map data are also available at similar scales as paper maps.

The organisation also develops a few programs such as those used for EDM calibration, co-ordinate & datum transformation. These programs are somewhat similar to that developed by the SMO. They are sold for CDN$60 (Comparatively the same as charged by the SMO). However, Geomatics is not keen in selling these products as it had bitter experience before in defending itself from claims arising from damages.

Although Geomatics maintains a sales outlet at its HQ office, it is thinking of letting its distributors take up all the sales. On pricing policy, Geomatics does not provide free geographic information to the public. All the costs involved in reproduction, distribution, marketing and sales services are included in pricing their products.

As far as Royalty charges are concerned, Geomatics simply imposes a 10% profit to be collected from its distributors. However if its data required for educational use, a royalty charge will not be imposed.

4.6 Teranet in Ontario, Canada

Teranet is a private company offering land information services through parternship with Ontario based public and private sectors. It has developed and built a cadastral information system of Ontario and has enhanced the system by adding land registration information into it. Through the system, users can carry out land registry search for information related to properties within Ontario.

The company also maintains a database of all writs of execution in Ontario. It has developed a writ search system to enable users to determine if the debtor listed on a writ and the name searched represents the same person or company.

Teranet's line of products is completely different from that of the SMO. The only product that is similar is a land boundary plan. Such a plan can be viewed through their cadastral information system "Teraview".

The key customers for Teranet are developers, real estate agents, solicitors and financial institutions.

4.7 Ministry of Natural Resources (MNR), Ontario

As a mapping organisation, MNR has a wide range of mapping products similar to those produced by the SMO. MNR paper products include 1/10,000 and 1/20,000 map sheets, index plans, aerial photos, township maps, forest resource inventory maps. Its digital products include a topographic database obtained from aerial photography or from existing hard copy maps.

The Study Group noted from the list issued by MNR that the price of individual products is quite cheap. The price of a colour paper map is about HK$40 tax included, whereas licence fees for digital data per map is about HK$800. Paper prints for photographs are selling for HK$50 each. Customers may place their order through telephone/fax (which is currently not accepted by SMO) mail or by personal shopping at their Information Centre.

MNR has a return policy for the products sold. Except orders for photos and licence agreement for digital products, most of the orders for paper maps are refundable providing they are in reasonable conditions.

The Crown is the owner of the copyright in all the products of the MNR. As far as copyright charge is concerned, MNR takes 20% of the profit of the publishers/companies who take MNR data for commercial use.

MNR does not have a special team to monitor copyright. It will only take action when it suspects that its data have been illegally used by others, or when its licencees complain to MNR about other illegal users of its data.

5. General Points and Observations

The Study Group noted the following points which may be of interest to SMO management.

(a) In USA, the country has a policy that tax-payers have already funded government departments for their operation. The mapping organizations will therefore only charge map users for the costs of reproduction and distribution of their products. However, as some of these organizations are running into tight budgets and resource cuts, the policy may be changed in the long run to allow departments for more cost recovery. Currently some counties do license their digital data to mapping agencies at a cost recovery basis.

(b) Most of the organizations visited realize that students are their potential customers. In this respect they place heavy emphasis on educating students. Special rooms are set aside for teachers to bring their students in for geography lessons. Posters and CD Roms for map reading and GIS application are distributed free to teachers.

(c) Surveyors and cartographers are not professional programmers. Although they have developed some in-house software to meet their daily operation needs, these softwares should not be sold to outsiders. They may end up spending a lot of time in defending claims arising from bugs in the softwares.

(d) Legal support is very important as disclaimers have to be carefully written into contract documents. Licensing agreements have to be properly drawn to make sure they are enforceable.

(e) There is a tendency of reducing the number of staff within government departments. The majority of map revision work previously carried out by mapping organizations are now contracted out to private surveying companies.

(f) All government departments visited are focusing their attention on customer services. Evaluations of services are regularly carried out by research companies.

(g) All private companies add false information into their mapping products so as to deter people from illegal use. Licencees generally understand the companies' policies and they seldom complain about being annoyed by such information.

(h) All organizations agree that it is expensive to manage copyright. They all consider that if the price of a product is kept low enough, there will be more use of the product and there is less chance of its product being illegally used.

(i) Because of limited resources, government departments tend to cut down their sales teams to the minimum. Products are generally sold by distributors who get a discount of 30 - 50% from the departments.

(j) Many of the organizations put their products up on the Internet. MNR even provides a mini GIS on the Internet to enable students and teachers to get an overview of the system.

(k) More and more departments are developing joint ventures with business partners. Usually departments supply mapping data while their business partners put value added information

to create new products. In US, government departments does not charge their partners for using their data. Instead they negotiate with their partners for subsidies, for example, in the form of equipment to assist the departments in their daily operation. However in Canada, government departments work a profit-sharing basis with their business partners.

Frank Cheng
Study Group Leader
October 1997