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A Future Business Model for Cadastral Surveying and Mapping to Support Property Registration

EGYPT FINANCIAL SERVICES PROJECT
TECHNICAL REPORT #80

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Submitted by: Raymond Struyk, Chief of Party
Egypt Financial Services (EFS) Project
4 Hayet El Tadrees Square
Dokki, Cairo, Egypt
Tel: (20) 2 762-6140 Fax: (20) 2 762-6150
www.egyptfs.com
Contract No. 263-C-00-05-00003-00

Submitted to: EFS CTO: Paul Bruning
EFS DCTO: Ingi Lotfi
Private Sector Programs
Office of Policy and Private Sector
USAID Mission to Egypt

Task: Task 2: Improve operation of the registration system
for urban properties in the Ministry of Justice

KRA: KRA 2.6: Deregulation and Privatization of Property
Registration Related Services

Activity: KRA 2.6.1: Identify long-term strategy to create and
establish private sector capacity and role in the
provision of cadastral survey and mapping services

Author: Robert Cross – Senior Cadastral Systems Adviser

Work with ESA in formulating short- and long-term
strategies for the role of private sector in the
provision of cadastral surveying and mapping
services. Assist formulate appropriate
accreditation/licensing mechanisms, both long and
short term, and identify appropriate standards and
specifications for cadastral activities and data
products.

Managed by: R. Dougal Menelaws, Task 2 Team Leader

Reviewed by: R. Dougal Menelaws, Team Leader; Eng. Mosaad
Ibrahim, Senior Management Specialist
Outsourcing/Privatization

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ACRONYMS

EFS	Egyptian Financial Services Project
ESA	Egyptian Survey Authority
REPD	Real Estate Publicity Department
LE	Egyptian Pound
MOH	Ministry of Housing, Utilities and Urban Development
MSAD	State Ministry for Administrative Development
MOF	Ministry of Finance
MOJ	Ministry of Justice
PID	Property Identifier Number
PIM	Property Index Map
RO	Registry Office
<i>SIGUEL EI-SHAKSI</i>	Personal Deed Registration System – Law 114/1946
<i>SIGUEL EL-AINEE</i>	Title Registration System – Law 142/1964
USAID	United States Agency for International Development

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Future Business Model for Cadastral Surveying and Mapping to support Property Registration

1. Introduction

This paper is intended as a discussion paper aimed at raising and addressing issues which are of major concern to the Egyptian Survey Authority (ESA), in providing sufficient resources for the spatial definition of property (cadastral surveying and mapping), in the context of the development of a parcel-based registration system.

Currently ESA is facing pressure from a number of external factors:

- 1.1. ESA's Economic status, which means it must operate at minimum on a cost recovery basis
- 1.2. Government's Privatization Policy
- 1.3. Competition from the private sector
- 1.4. Divided responsibilities for both the *Siguel El-Shaksi* and *Siguel El-Ainee* Registration systems with Ministry of Justice
- 1.5. User needs both private and public sector for spatial data

Within this environment there is a number of contributing internal pressures:

- 1.6. Workload with a number of programs, particularly within the cadastral area
- 1.7. Large workforce, but many are not skilled or lack appropriate skills
- 1.8. Equipment – keeping up-to-date with technology
- 1.9. Lack of trained staff on QA/QC
- 1.10. Need to generate revenue

It is inevitable that the private sector will become involved in cadastral surveying and mapping, both in the short and long term. The impacts of the use of the private sector will be multi-layered. A well developed private sector should offer efficiencies of operation, providing the consumer with choice and professional services in a timely manner and at competitive prices.

The privatization of the ESA operational role, as a consequence of GOE policy, will mean it must downsize, in order to control costs and be competitive. The introduction of the private sector will however create work opportunities for ESA staff, which may mean that ESA loses their more qualified personnel to more attractive salaries and careers.

In the short-term, the private sector can become involved in the mass formalization of property rights or first registration by supplementing ESA resources and assisting with the preparation of property index maps. EFS is designing a training course which will be a pre-requisite for private contractor personnel to enable them to participate in the preparation and production of property index maps.

In the longer-term, the licensing of Survey Engineers, controlled by ESA as the regulatory authority, will allow the private sector to participate in subsequent

transactions. As part of this strategy, there is a need for a separation of the regulatory and approval functions from the operational functions of ESA.

2. Context

There are two stages of involvement in the Property Registration process, which will require surveying and mapping, including the preparation of a Property Index Map (PIM), whether it is for parcel-based Deeds System (*Siguel El-Shaks*) or for Title System (*Siguel El-Ainee*). Important principles that should be adhered to by ESA are:

- At the mass formalization or first registration stage, the emphasis should be more on completeness, speed and cost rather than on the survey accuracy of individual parcels.
- At the subsequent registration or transaction stage, more emphasis can be placed on the survey accuracy of individual parcels, so the spatial cadastral data can be continually upgraded (see Annex D – Property Index Mapping Methodology).

3. ESA Monopoly and Expanding Workload

Currently all cadastral surveying and mapping for registration purposes is conducted by ESA. It has a monopoly on the provision of cadastral survey and mapping services. Several factors will impact on this situation in the future. Firstly new workload will be imposed to support the two national programs for registration, rural (MCIT) and urban (MSAD), in addition to servicing ongoing subsequent transactions for both deed and title systems. The national programs impose workloads and compete for ESA resources. The second factor is designation in the 2000/01 Prime Ministerial Decree of ESA as an autonomous economic agency. The third contributing factor is the general Government policy for privatization of Government services.

4. Current Institutional Framework

Egypt has a multi agency institutional model for the delivery of registration services to the public. Responsibility for the cadastral survey and mapping component is assigned to the Egyptian Survey Authority (ESA) whilst responsibility for the registration of legal rights is assigned to the Real Estate Publicity Department (REPD). Moreover, it should be noted that there are not two but three separate entities - the cadastre (ESA), the justice ministry and the courts (MOJ), the registry offices (REPD) with each having some degree of self-interest. Moreover, although legal principles are an important foundation of any registration system, the operation of registry offices is essentially an administrative function. Currently, REPD has virtually no autonomy in establishing technical procedures that administer the operations of registry offices, despite the fact that the real expertise on the operational side resides with senior REPD personnel. Based on World Bank experience on registration projects such multi agency models have been characterized as the most difficult to deal with in creating modern cadastre and registration systems. They often exhibit management inefficiency and lack of cooperation. Separate bureaucratic entities tend toward competitiveness rather than cooperation. In the absence of a common management body assuring cooperation, policies may need to be reconciled through time-consuming negotiations in which no entity has sufficient incentive to compromise.

Therefore, an efficient system requires close coordination of policy and procedures between the cadastre and registry. Recognition of this lead to Government assigning the role of integrating and automating the business processes to MSAD.

Public response to registration has been poor. The benefits of registration are not understood and the prevailing perception by the public is that registration does not convey benefits and is costly and time consuming.

The longer-term solution is for one agency to be responsible for the whole process of initial registration and subsequent transactions. In any such proposed unified model there needs to be recognition of the role of government and the private sector.

This paper focuses on the parcel description side, as this represents 80% of the work for initial registration, and is the largest single task facing both national registration projects. It also introduces a role for the private sector, in supporting initial registration and the provision of private sector survey services to the public for subsequent transactions.

The introduction of private sector licensed to carry out cadastral survey work will require a separation between the examination and approval for cadastral surveys and the operational responsibilities for conducting such surveys, which currently is all conducted within ESA. The examination and approval responsibilities are considered a government function. The establishment of a regulatory body, by law, is seen as achieving this role, as well as establishing policy, advising government, setting standards and licensing Survey Engineers (see Annex A – A Future Business Model for Cadastral Surveying and Mapping for Land Registration).

As the volume of subsequent transactions increases, more work will be created for the private sector.

5. Defining the Parcel for Registration Purposes

While Law No. 142/1964 requires the placing of marks, to indicate the parcel boundaries, there is no direction provided in relation to the survey accuracy or methodology to be adopted. Nor is this detail found in any executive regulations. ESA has issued instructions as “A Guide for Engineering Offices in Survey Directorates”, circa 1997. These instructions provide some detail, but do not explicitly define the methodology, nor do they provide any spatial accuracy criteria, except with the mention of cadastral maps at a scale of 1:1000. While there is much talk in relation to the requirements of ESA for accurate survey data, in reality it appears this is not being achieved.

In considering the overall situation in trying to achieve a large exercise such as the first registration in urban areas, many lessons can be learned from the activities undertaken by ESA in rural areas for the title system.

A vision for the future needs to be considered as the first step. We maintain that a survey accurate cadastre, in the form of a coordinated cadastre is not required to support registration of properties. The preparation of cadastral maps with detailed survey is too costly and is not necessary to support registration. Rather, ESA should focus on

the preparation of property index maps to low level accuracy but sufficient to identify the property that is to be registered using a unique property identifier.

Types of products that might be considered are:

1. Property Index Map (PIM) – provides the location and shape of the parcel with respect to other parcels and contains links to individual building units and attribute data.
2. Cadastral Database (coordinated cadastre) – provides the co-ordinate location of all parcel corners and a topological parcel structure.
3. Block Survey Plan - provides the location and shape of the parcel with respect to other parcels, to a particular scale and accuracy, for a particular Block.
4. Parcel plan – plan of an individual parcel, to a particular scale.
5. Apartment plan – plan of an individual apartment, to a particular scale.
6. Apartment textual description – giving the Apartment number and other particulars about the apartment to allow it to be uniquely identified.

There are several choices for defining the parcel in terms of methodology and resources. These will be discussed briefly in relation to the criteria established for first registration or mass formalization.

To define land parcel and produce a Property Index Map (PIM) several steps are involved (see Annex B – Property Index Map Methodologies). The criteria for providing first registration or mass formalization data are i) completeness (including the currency (accuracy) of the data); ii) speed; iii) cost; and iv) spatial accuracy (within certain limits).

The production of a PIM is required to move the Deeds Registration system from an owner-based to a parcel-based registration system. The PIM will therefore be common to both Deed and Title Registration Systems, and assist in the eventual conversion from the Deeds to Title.

Depending on the methodology, one or more of the other products such as, Cadastral Database; Block Survey Plan; Parcel plan; Apartment plan; Apartment textual descriptions will be used.

6. Mass Formalization and First Registration

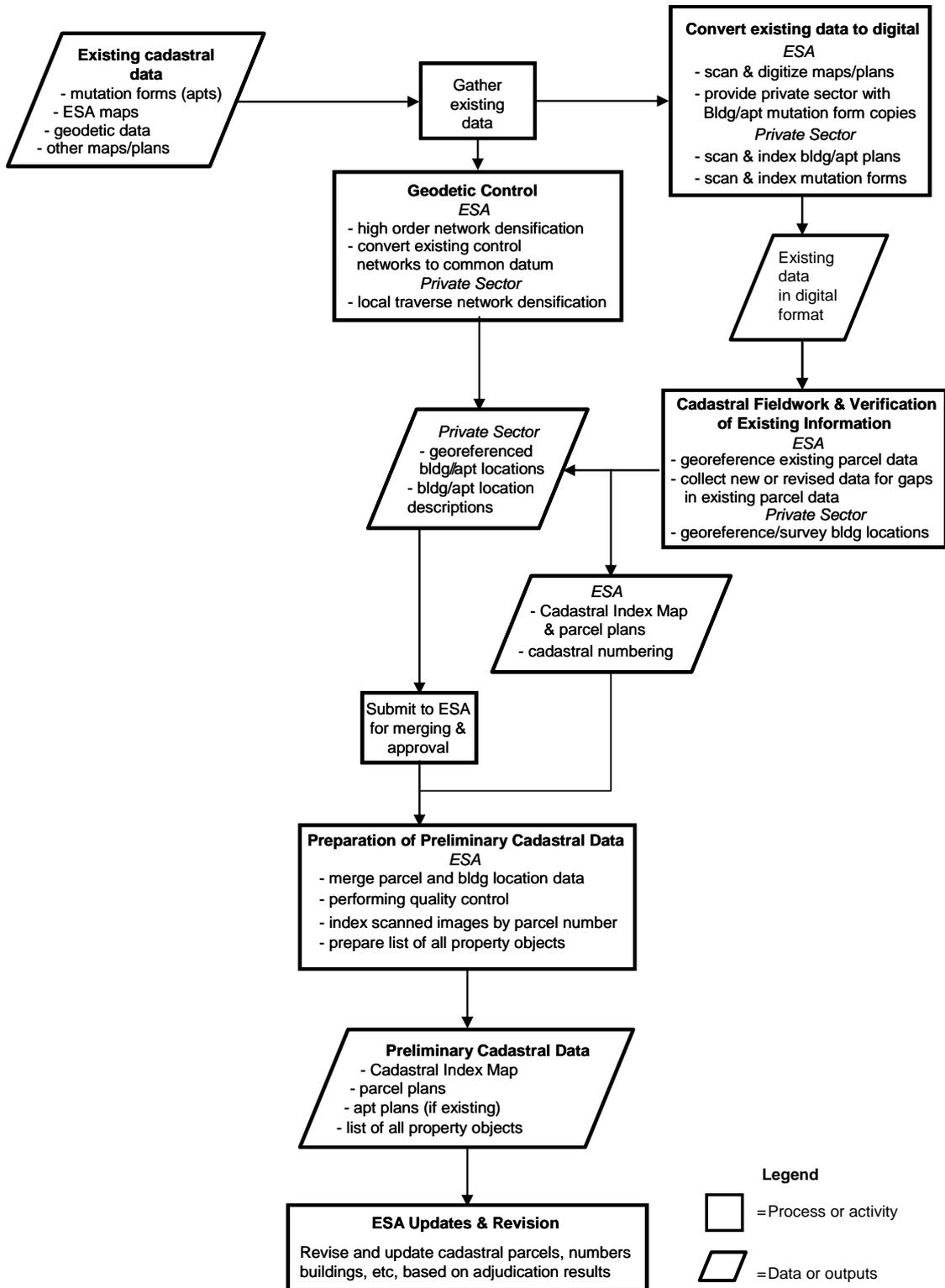
EFS developed a methodology (see Figure 1¹) aimed at providing a starting point. This methodology sets out the steps that are seen as being carried out by ESA and those steps which could be carried out by the private sector. Some steps have not been designated either way, indicating further details will be required in order to make this decision. This methodology has not yet been accepted by ESA.

¹ Summary of EFS Concepts and Proposals for Egyptian Cadastral System, EFS Project, Technical Report No. 40, December 2005

After further analysis, and to achieve the above criteria, it was decided that further clarification and other options for the methodology will be considered for the preparation of the PIM. These are discussed in Annex B. These include the use of readily obtainable high resolution satellite imagery (IKONOS), or the acquisition of large scale aerial photography; and using existing plans from a number of sources, including developer subdivision plans, building plans, mutation forms. Most parcels are defined by physical features, and such imagery would allow this to be plotted. This process would provide 'as-built' detail, as to buildings, fences and walls, overlaid with geo-referenced parcel data. In this form, no easements would be shown.

If there is a requirement for a higher degree of spatial accuracy, requirements can be placed on subsequent transactions, thus allowing the progressive upgrade of this data.

Figure 1: Potential Division of Work - ESA and Private Sector



7. Short-term Strategy - Private Sector Training

Due to ESA's monopoly on cadastral survey and mapping no formally trained private licensed surveyors exist in Egypt. It is therefore proposed that the private sector Survey Engineers be trained and licensed in cadastral surveying and mapping.

7.1 Training

Once the methodology or methodologies have been decided ESA staff will require training in the new methodology. EFS has agreed to prepare a training course that will be used to train both ESA and private sector personnel. Given that this course will be delivered possibly several times, it would be appropriate for EFS to support a train-the-trainer program for ESA trainers, in the specifics of the methodology, as the initial step. This course can then be delivered by ESA Trainers to both ESA staff and the private sector, on a fee per participant basis.

7.2 Type and Selection of Private Sector Resources

The type of resources required will have skills in survey, CAD/GIS, management and administration. There are two approaches which could be adopted for the recruitment of these skills from the private sector. The first approach involves the contracting of individuals to fill individual roles within a team. The second approach involves inviting companies to tender for the supply of staff or for producing a specific product or service. This could be on the basis of tendering for a particular type of work or task; or providing skilled resources to an ESA-led field or office team.

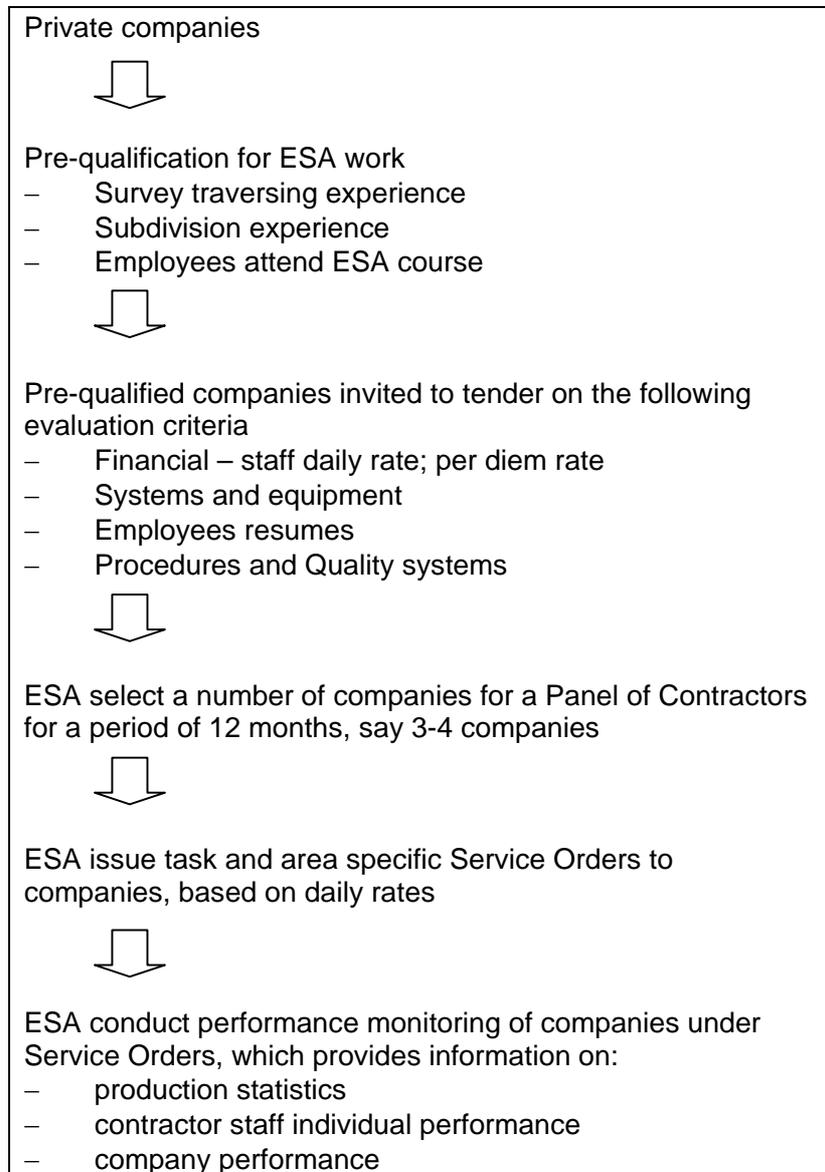
The contracting of individuals will involve a recruitment process, which could be costly and time consuming for ESA, due to the potentially large number of applicants. Once selected and appointed ESA must then monitor individual performance and deal with each individual, as if they were staff members. On the other hand, contracting companies means that the company is responsible for the performance, and ESA will monitor overall performance.

It is proposed that ESA tender work to companies, rather than on an individual basis. The methodology, once decided, will, to a large extent, determine the way work is contracted.

The contracting process suggested is to choose a contracting panel (see Figure 2)². This approach would provide ESA with a great degree of flexibility, as well as providing a mechanism to use the best performing contractors for most of their work, while having other contractors available to cover periods of peak workload.

² This should be checked with the Egyptian Tendering Act

Figure 2: Contracting Process



8. Subsequent Transactions

The survey requirements for Subsequent Transactions for urban areas will initially be carried out by ESA. However, currently there is a requirement imposed on ESA by the Title Registration Fund Board, which means that ESA must conduct a re-establishment of any parcel, where a transaction occurs, even if survey is not required for that particular transaction. This does apply to the deed system. This requirement has several negative effects. Firstly, it absorbs ESA skilled resources, which will be stretched to complete first registration activities. Secondly, it adds more expense to the seller and purchaser to conduct a transaction, which discourages formal registration.

8.1 Use of Licensed Survey Engineers

A recent EFS report³ set out a number of alternatives for involvement of the private sector in the subsequent transaction process:

Alternative 1 – Hybrid Public-Private Cadastral Survey Services

Under this model ESA provides cadastral survey services and acts as the regulator and QA/QC body for services provided by private surveyors. The property owner/applicant is free to choose between ESA and private licensed surveyors for surveying services.

Alternative 2 – Private Cadastral Survey Services

Under this model ESA plays a regulatory and QA/QC monitoring role, as well as custodian and seller of cadastral data, geodetic data, map products, etc. This model is extremely common around the world, for surveying related to both first and subsequent registration activities.

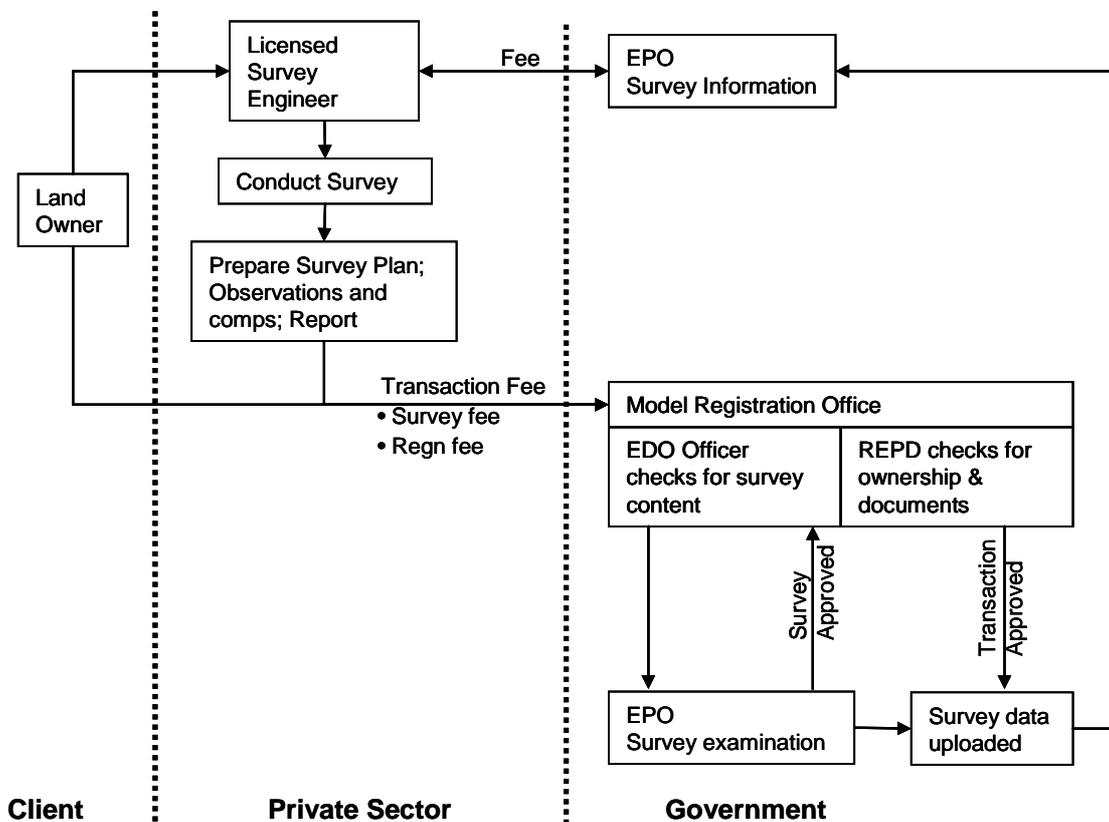


Figure 3: Interaction between Licensed Survey Engineer and ESA

³ Summary of EFS Concepts and Proposals for the Egyptian Cadastral System, EFS, December 2005

Alternative 3 – Public Contracting of Private Surveyors

This model is similar to Alternative 1, except that private surveyors would be contracted by ESA to perform the services on behalf of ESA for the customer. There are no direct contractual obligations between the private surveyor and the customer.

Alternative 4 – Combination of Alternatives 1 & 3

The customer would have three choices when it comes to field work, contract private surveyors, contract EPO for ESA surveyors, or contract EPO for private surveyors. It also provides ESA with the ability to analyze private sector involvement through different models, which could help assist in refining or refining its strategy for private sector involvement.

It should be noted that discussions with ESA have evolved and there is now more acceptance of a model which involves a split between the regulatory examination and approvals, and the field survey work undertaken for a transaction. This is depicted in Figure 3 and described more fully in Annex A.

9. Long-term Strategy

The basis of the long-term strategy is the licensing of Survey Engineers, i.e. the licensing of individual private sector Survey Engineers to undertake cadastral surveys, essentially for subsequent transactions, on behalf of Government, but paid for by applicants. This concept and its implementation strategy are discussed in detail in Annex C.

With licensing as the basis, the long-term strategy must involve capacity building of the private sector in cadastral systems. There will be several arms to this strategy in the following aspects:

- Institutional arrangements
- Legal
- Licensing
- Education and Training
- Public Awareness
- Work Processes and Equipment

9.1 Institutional Arrangements

The separation of functions between REPD and ESA has adverse efficiency implications. Poor communication often is the result. The issue is further complicated by external and internal pressures on ESA. Discussions between EFS and ESA on these issues, including the ESA economic status; funding and revenue generation; the structure of regulatory and operational units; and the ESA business model are on-going (see Annex A). However, ESA would be better advised to present and discuss proposed business rules to include equitable fee payments for ESA services with the Ministry of Justice.

The separation of functions has also been a long standing complaint by applicants who are required to make several visits (as many as 16) to ESA and REPD offices. To overcome this complaint, EFS has proposed the establishment of an integrated model one stop shop for applicants.

9.2 Legal Reform

EFS reviews of *Siguel el-Shaksi* Law No. 114/1946 and *Siguel el-Ainee* Law No. 142 / 1964 have indicated that the legal base provides a workable framework for real estate ownership and transactions. However, problems arise in the subsidiary regulations and instructions and their implementation.⁴

In order to support and give legal authority to set standards for surveys and private practice of surveying, we recommend that a Surveying Act be enacted by Parliament. (see Annex B).

9.3 Licensing

The licensing of Survey Engineers will require legislative backing and it is proposed that this should be through a broad Surveying Act. The Surveying Act should provide authority to the Licensing process, as well as define the licensing of Survey Engineers, and establish a mechanism such as the Survey Engineers Licensing Board to undertake this role.

The Survey Engineers Licensing Board, which should act under the auspices of a Government Regulatory Authority, should have representation from Government, private sector, academia and the public consumer. This is described in Annex B.

9.4 Education and Training

There are 2 levels of involvement - firstly with the tertiary institutes, in terms of introducing Cadastral Systems into undergraduate Engineering courses; developing post graduate courses; and possibly bridging courses. The second level relates to the provision of training to both public and private sector, which could be an ESA initiative. An initial course would focus on first registration, with a second course focusing on subsequent transactions. Further details are given in Annex B.

9.5 Public Awareness

A public awareness campaign on the existence and role of Licensed Survey Engineers should be prepared and rolled out. In addition the formation of a vibrant professional body is a key element of promotion, as well as maintaining professional standards (see Annex B).

9.6 Work Processes and Equipment

EFS analysis and re-engineering of work processes has been undertaken for both the Deeds Registration and Title Registration systems. Further analysis is planned for identifying the needs and process for the cadastral survey and index mapping processes (as discussed in Annex D), as well as the requirements for equipment to support the re-engineered processes.

In addition, EFS prepared system requirement specifications and detailed re-engineered work flows for the title system and these were presented to both MDAS and MCIT in March 2006.

⁴ The Legal Framework for Property Registration in Egypt, Richard Gaynor, ILS, EFS, April 2005

Annex A: Future Business Model

1. Introduction

This analysis draws heavily on previous reports prepared by EFS as indicated in the footnotes and references. Recommendations are based on the results derived from several meetings with Chairman Hisham Nasr, ESA through an iterative process, to reach the final model. However, it should be noted that only general figures related to revenue or costs have been seen, and none relating to staff attrition rates, so the model would need to be analyzed with more complete and updated data to test its feasibility.

2. Current Role

Following on from a comprehensive study in 1995, which culminated in the development of a Strategic Plan⁵, which called for “greater organizational autonomy and more management flexibility”, the Egyptian Survey Authority (ESA) was granted economic status by the Government of Egypt (GOE) in 2001. But while the Strategic Plan also recognized that “many of the Authority’s products and services are too expensive to allow for full cost recovery”, it also stated that both a “national series of topographic maps” and the “development and maintenance of a national cadastre” are a “legitimate function of government”. It further stated that such programs “are necessary to national development” and therefore “it is unlikely that the Authority will ever be able to operate without some level of government subsidy”. However, in effect, the current economic status of ESA means that it receives no direct funding from GOE.

So while ESA receives no GOE funding, it is understood that it is mandated⁶ by GOE to perform the following tasks:

- Provide cadastral survey and mapping services for the registration of land, in support of the national cadastre.
- Provide national topographic mapping coverage at various scales.
- Provide a geodetic control network as a spatial reference framework for Egypt.

On the cadastral side, Blakemore and Aikas⁷ state that:

1. Land can only be brought into registered title using ESA mapping service.
2. Mutations of the registration maps, due to subdivision or amalgamation, or, in theory creation of easements and leases, also require ESA’s mapping services.

While this gives ESA a monopoly for conducting the surveys and mapping required for property registration, which is paid for by applicants, for both Deed and Title systems, the future push by GOE for privatization will see this monopoly disappear in 5 to 7 years time.

⁵ The General Survey Authority’s Strategic Plan, Ministry of Public Works and Water Resources, June 1995

⁶ No documentation has been sighted for these mandates

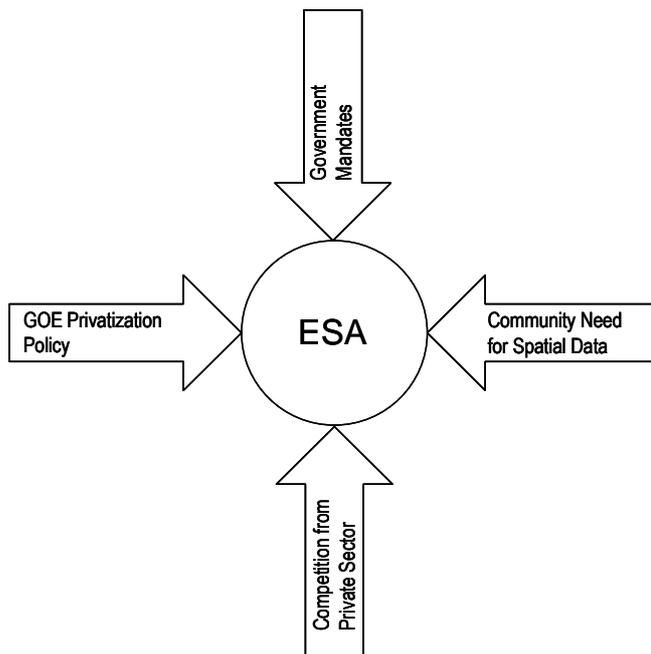
⁷ Michael Blakemore and Unto Aikas, Report of the ECIM/ ESA Consultancy, February 2006

The focus of the work by the EFS Project is from the cadastral perspective; however ESA carries out other activities which are of major benefit to Egypt, which must be considered as part of the consideration of the future overall shape of ESA.

3. Towards A Future Model

While the Government push is for privatization, this is a difficult task for ESA. The pressures on ESA come from many quarters, and are both external (Figure 1) and internal (Figure 2).

Figure 1: External Pressure on ESA



The external pressures which come from Government are two-edged. On the one hand ESA is expected to fulfill its mandated services by Government and generate revenue; but at the same time to downsize and privatize in an increasingly competitive environment. There is also an increasing need/demand for digital spatial data from the external users for many purposes, due to the revolution in Geographic Information Systems (GIS). If ESA does not satisfy this need, it is likely that the private sector will fill this gap. However, ESA should retain the function of establishing regulatory standards for the survey industry and core data sets.

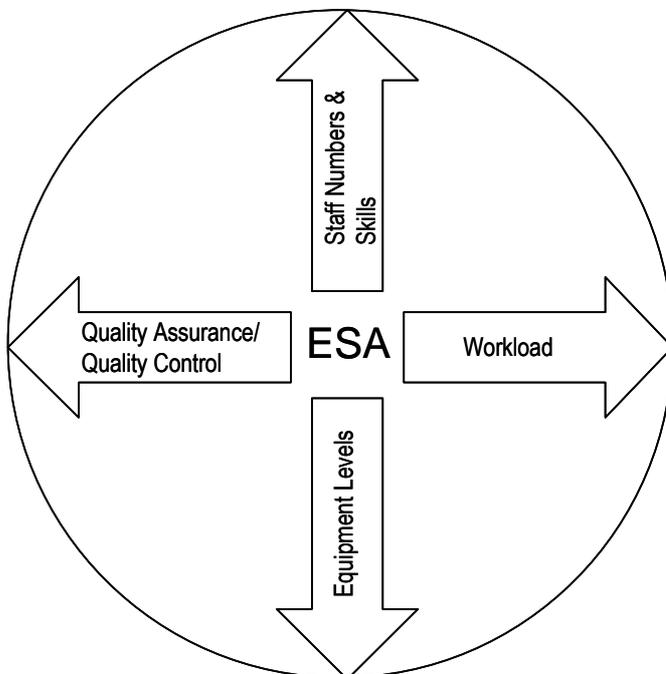
The internal pressures facing ESA are significant. They relate to the cost of operating in a digital environment, where there are large data conversion tasks; maintaining the level of technology to be able to service clients' needs; bringing staff up to competent skill levels to efficiently utilize new technology; and providing a level of Quality Control to ensure that the clients receive what they ordered.

ESA has a large staff compliment, some 9534 staff members, of which 50% are lower level administrative staff. While ESA senior management feels a loyalty to staff, it must

be recognized that in the emerging competitive environment this staff level cannot be justified and constitutes a very large overhead.

The current workload of ESA is significant, and from competing interests. The completion of Title Registration in rural areas is continuing, and is currently 80% complete. Assuming current production rates survey related work to support title registration in rural areas will be completed in another seven years. To complement rural title registration, the Ministry of Communications and Information Technology (MCIT) is coordinating a program of conversion of paper maps and ownership records to digital format. Moreover, the National Urban Title Registration Project, coordinated by the Ministry of State Administrative Development (MSAD) is about to commence and will place further demands on ESA. Both these projects place pressure on ESA resources, and are in addition to its normal workload.

Figure 2: Internal Pressures on ESA



Unlike the private sector, ESA, under its current economic status, must generate revenue, but has limited opportunity to do so. ESA's biggest problem is that it is mandated to provide certain services and products, but does not control the pricing of these products and services. This places ESA at a disadvantage.

We therefore need to be realistic in developing a future model for ESA, considering all elements and setting a transition path and period which enable the achievement of Government objectives, whilst at the same time ameliorating downsizing staff pressure, and at the same time producing quality products and services.

4. A Future Model

A future model is presented in Figure 3. The model has two components - splitting the functions of policy, regulation, approval, spatial data custodianship and the production aspects, which should be privatized. We propose that a National Regulatory Authority for Surveying and Land Information (NRASLI) be created by legislative act. A regulatory authority is defined as a Government agency or authority established under legislation with the power to make legally enforceable decisions and regulations, but which can retain generated revenues. Given the legal mandate that the regulatory authority would be legislated to undertake, it is expected that the Government would initially fund such an agency. However the agency would be revenue generating, and it could be expected over time to become financially self sustaining, depending on a number of factors as outlined in Section 8 of this report.

There are numerous examples around the world of regulatory authorities being created for this purpose. In the area of Land Registration and Cadastral Systems, most countries operate a system which is administered and managed by a Ministry or Department. Some examples follow (also see www.cadastraltemplate.org).

In the Netherlands, in 1994, the Council of Ministers decided to transfer the Cadastre and Land Registry Department into a so-called independent public body, recognizing land registration and cadastre as a public task but to be executed in a business like way. The Agency was constituted by special law, the 'Cadastre Organization Act', precisely prescribing the mandate, and the division of tasks and competencies of the Agency, the Minister, a Supervisory Council, and a User Board. Today, the Agency comprises a head office and 15 regional offices. In these offices the registers are kept, the boundaries surveyed, maps maintained and information disseminated.⁸

In Tanzania the National Council of Professional Surveyors (NCPS), which is a statutory government agency established under the provisions of the Professional Surveyors (Registration) Act No. 2 of 1977, registers individuals and regulates the profession of Cadastral Surveyors.⁴

In the United Kingdom the Ordnance Survey is another example. While a civilian organization, *"it is still part of the UK Government, but it covers its operating costs by selling its products and services or licensing others to use its copyright material. Since 1999 Ordnance Survey has had government 'Trading Fund' status, giving it more responsibility for its own finances and planning and more freedom to develop new initiatives"*. At the same time, a National Interest Mapping Services Agreement (NIMSA) was put in place – a government contract to help fund specific mapping activities that are vital to the national interest but which cannot be justified on purely commercial grounds. They include such tasks as keeping the most detailed mapping of remote areas up-to-

⁸ Cadastral Template, A Worldwide Comparison of Cadastral Systems, Cadastral country reports based on a jointly developed PCGIAP/FIG template. Established under UN mandate by Resolution 4 of the 16th UNRCC-AP in Okinawa, Japan in July 2003. UN endorsement for cooperation with UN-ECE WPLA, UN-ECA CODI, and PCIDEA. FIG Commission 7 – Cadastre and Land Management, PCGIAP-Working Group 3 "Cadastre", The University of Melbourne, Department of Geomatics.

date – areas where such mapping is vital for public administration but where there is little other demand. This work is carried out on a not-for-profit basis.⁹

We propose that NRASLI be responsible for the following functions:

- Policy – formulate policy on survey, mapping and land information for recommendation to the Minister and Government.
- Standards – set standards for surveying mapping and land information.
- Legislative advice – provide specialist legislative advice to the Minister and Government, in relation to surveying mapping and land information.
- Survey Engineers Licensing Board – maintain the integrity of the land registration system by:
 - Setting standards for the licensing of Survey Engineers;
 - Examining and licensing Survey Engineers;
 - Advising on standards and the regulation of cadastral surveys;
 - Maintaining standards of Survey Engineers and surveys (including conducting random audits (field checks) and instigating disciplinary action, where necessary);
 - Determining penalties for non compliance with the law and its regulations; and advising ESA on the law relating to Survey Engineers and surveys.
- Survey examination and approval – this function would operate in a decentralized mode to maintain the integrity of the land registration system by:
 - examining surveys from Licensed Survey Engineers for approval; and
 - approving the updating of Cadastral Data.
- Custodian of Geodetic, Cadastral & Topographic NSDI Core Data – the core data is essential for the organized and systematic development communities and cities, as well as a factor in facilitating the economic development of Egypt.
- Manage expropriations
- Production specifications and pricing – develop and set specifications and pricing for outsourcing of updates and licensing of NSDI data.
- Fair competition – with the privatization of parts of ESA, there is a need to ensure that this privatization process does not disadvantage private sector companies already in the market, or the privatized ESA Company.

Each of these functions is proposed to be undertaken by a separate unit or division within NRASLI.

It is argued by some observers, such as the World Bank, that the private sector is more efficient at the production role. Therefore, and in line with GOE policy, the production aspects of the current ESA mandates, are proposed for privatization, and would interact

⁹ From www.ordnancesurvey.co.uk

with NRASLI, as per Figure 3 (this is explained more fully in Section 5: Interaction between the NRASLI and the Private Sector).

Privatization of functions is proposed to occur in the following manner:

- Licensing of private sector Survey Engineers to carry out subsequent transactions for private clients.
- Outsourcing of the cadastral spatial data updates from subsequent transactions, under a period contract.
- Outsourcing of topographic data acquisition, either on a project or program basis, under a project or program specific contract.
- Public Private Partnership to operate a Continuously Operating Reference System (CORS) for the real-time positioning.

For each function NRASLI will set the standards; specify the product; and monitor the quality. The last three items NRASLI would let the contracts and monitor the performance, as well, under the differing contract arrangements.

The production side of ESA would operate in a privatized form, and compete for this work with other private sector companies. Firstly the Cadastral Services (represented in the current structure by the Land Registration and the Governorate Survey Affairs Departments) would in part be privatized in order to provide a resource for subsequent transactions. It would mean that staff and equipment would be transferred to a financially autonomous unit within ESA, or as a private company 100% owned by ESA, in the initial stages. This approach would need to occur in a decentralized manner, so that the services were available close to the potential clients – land owners.

The extent to which the loss of these technical staff, will need to be supplemented by private sector survey staff (see Figure 4), for first registration, has yet to be determined, as production figures and the breakdown of staff numbers have not yet been released by ESA.

Secondly a similar split of functions and privatization needs to occur on the spatial data side. This could occur over a longer timeframe, depending on current programs being undertaken, and also the larger amount of equipment and staff from the Mapping Affairs and Information Systems Departments.

Figure 3: A Future Model

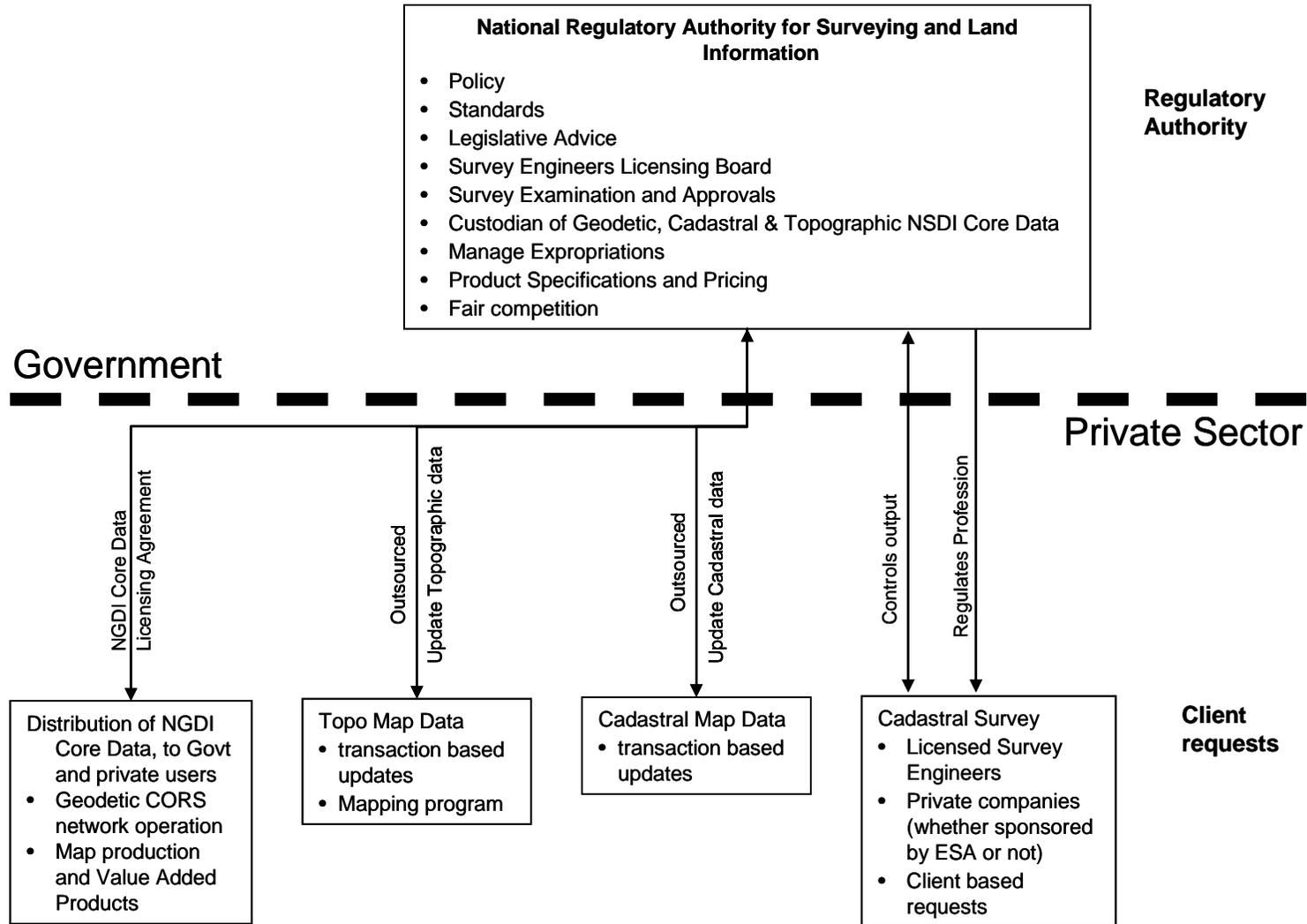
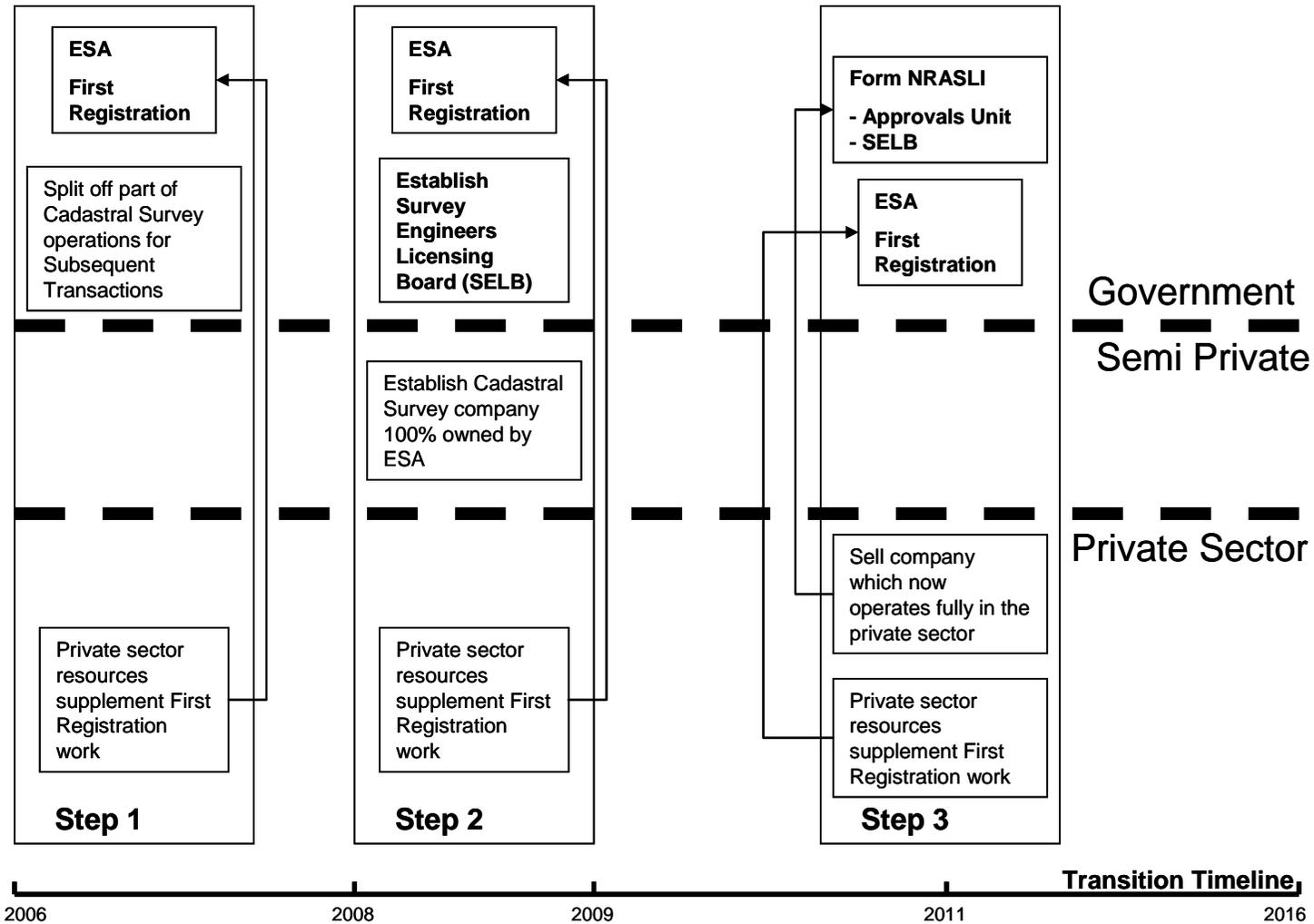


Figure 4: Private Sector Support to First Registration



5. Interaction Between the NRASLI and the Private Sector

The two components of Figure 3, i.e. Government and Private Sector will operate in different ways with various levels of interaction between the NRASLI and private sector companies. The NRASLI will not conduct any production work, but will be responsible for the availability and quality of the spatial data. The NRASLI will therefore outsource the production work to the private sector, specifying the product and its standards; contracting its production; and monitoring the performance (time and budget) and the quality of the product.

In terms of maintaining the geodetic data, it is accepted that a primary network has been established, and it is envisaged that a CORS network will be operational, after a possible re-observation of the primary network. The operation of the CORS network is proposed to be conducted by a private company, or by an association of private companies, in a Private Public Partnership with the NRASLI. Within the large cities, such as Cairo and Alexandria, the use of Global Positioning System (GPS) technology, on which CORS is based, will not be as effective. It may therefore be necessary to maintain a denser pattern of coordinated ground marks. It is suggested that this be done by NRASLI, in partnership with the local municipalities, which would benefit from the availability of such marks.

For cadastral surveys the interaction between NRASLI and the private sector is more complex. Using the Licensed Survey Engineers model, the licensing of individuals to conduct cadastral surveys will operate as described in Annex B.

The client is free to choose a private sector Licensed Survey Engineer (LSE) to carry out this work. The LSE would be responsible to the client and the Government for the following actions:

- Obtaining the appropriate survey information, including previous surveys within the area and the control point descriptions and coordinates obtained from NRASLI
- Selecting the survey methodology
- Conducting the survey
- Computations and preparation of the Plan of Survey
- Preparation of a Survey Report
- Submission of the observations, Plan of Survey and Survey Report to the NRASLI

It should be noted here that the survey would occur prior to any transaction being submitted to NRASLI. And in this regard the flat fee structure will not work, since the LSE should be paid by the client for work he has performed, even if the client does not proceed with the transaction through no fault of the LSE (see Section 8: Funding the Transition and Future Model).

On the regulatory authority (NRASLI) side, the following actions would be taken to quality control the product, in order to maintain the integrity of the cadastre:

- Setting of output specifications and standards (usually in Regulations, Instructions or Guidelines)
- Supply of survey information

- Office examination of surveys
- Conduct random field checks

On the spatial data side, the interaction will again differ. Various forms of contracts will be used. The outsourcing of the cadastral spatial data updates from subsequent transactions will be under a period contract. This contract will be for a period of 12 months or more and updates will be sent to the contractor, in batches, on probably a daily basis. The data will come from the approved survey data from a subsequent transaction, and the contractor will undertake the update within 24 hours, returning it to the NRASLI. NRASLI will check only those updates that did not fall within the tolerances allowed, before uploading it to the database. There may be one or several contractors performing this role, depending on update volumes and decentralization policies.

The acquisition of topographic data would be outsourced, either on a project or program basis. Where a GOE agency or group of agencies requires data, then a project specific contract would be let, generally to one contractor. However, where a nationwide program was involved, there may be several contracts let, each covering a specific area or a specific task. In both these cases, technical capability within NRASLI would be required.

The establishment of a CORS system would complement the existing network of survey control points at various levels. It is envisaged that NRASLI would need to retain the technical capacity to analyze and quality check observations and undertake national adjustments. The establishment of a CORS system would be as a joint venture, a Public Private Partnership, to operate, maintain and distribute co-ordinate and location information for control points.

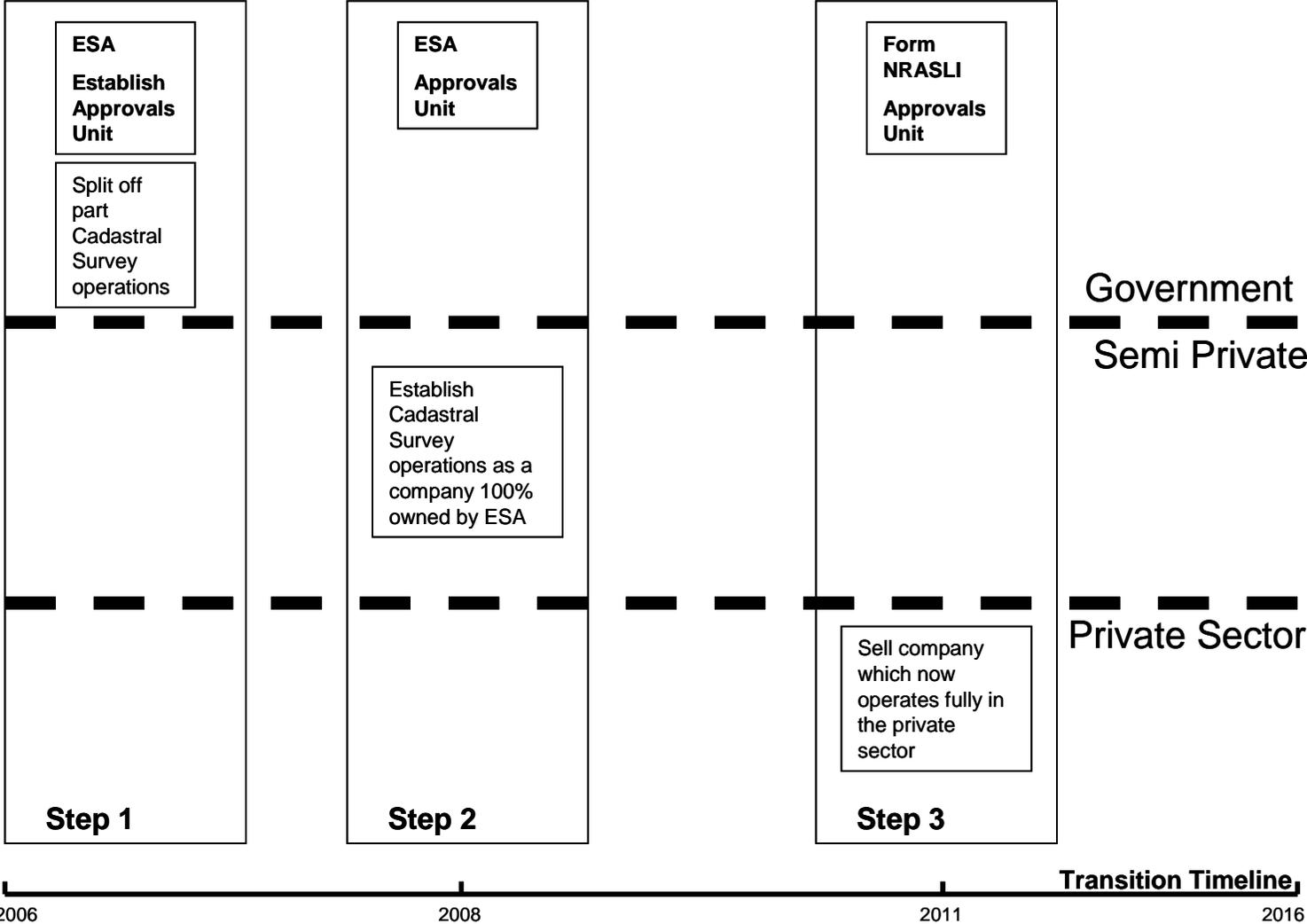
6. Transition to the Future Model

6.1. Assumptions

The future model and its transition path are based on a series of assumptions, which are set out below:

1. Government will fund the first registration process.
2. The natural attrition rate of staff at ESA is 6% per year.
3. The land market will increasingly develop generating increasing volumes of subsequent transactions.
4. Subsequent transactions will be an ESA monopoly for the next 5 years, until the Licensed Survey Engineers are qualified to operate.
5. ESA will receive a level of income from the subsequent transaction flat fee, to cover costs, overheads and profit margin, and consequently revenue will stay at the current level or increase.
6. A CORS network will be accepted and established.

Figure 5: Split off Cadastral Operations Area



6.2. Transition Timeframe

Government has stated that nationwide First Registration will take some 7 years to complete. However, in our view this is an ambitious timeframe, and will require extensive budget support that has yet to be quantified or confirmed. We think 15 to 20 years is a more realistic timeframe based on comparable initiatives undertaken in countries such as Thailand and Malaysia. A realistic timeframe impacts the transition period for the establishment of NRASLI.

The privatization of functions, i.e. the Licensing of private sector Survey Engineers will take a minimum of 5 years. The outsourcing of the cadastral survey process can happen in a partial manner within 12 months. The outsourcing of the cadastral map update from subsequent transactions can be implemented within 12 months.

The acquisition of spatial topographic data, through an outsourcing arrangement will take a minimum of 2 years. And finally the development of a joint venture Public Private Partnership to operate a Continuously Operating Reference System (CORS) could occur within 3 years.

It is proposed that a transition period of 10 years is adopted for the full implementation of the Future Model. A schedule of proposed activities is provided in Appendix 1.

6.3. Establishing a Private Sector Capacity

Figure 5 shows the transition from ESA to the NRASLI and a private company for cadastral surveys.

ESA already has experience in establishing a private company. The Al-Tameer company is a semi private company (shares are owned only by GOE entities), with the following shareholders:

ESA	40%
New Urban Communities Authority (NUCA)	30%
Al-Tameer Bank (under MOH)	20%
Maraqia Company (Northern coast development body)	10%

It is understood that the Al-Tameer company facilitates the registration of property, but has no production capacity. However ESA can learn from this experience, but the privatization will involve expensive equipment and an increase in staff.

There are a couple of alternatives; the first is to establish a new company, as per the Al-Tameer model. The second alternative is to sell the capability, equipment and staff by tender.

6.4. Stages of Transition

The establishment of the NRASLI, i.e. the transformation from ESA, will occur in stages. The initial stage will involve the licensing of Survey Engineers - see Annex B.

Once property is registered, a mechanism will immediately be required for subsequent transactions. For the first 5 years of the transition period, ESA will carry out the cadastral survey work, through a separate Cadastral Survey Unit, that should be separated from the survey examination and approval task. This provides an opportunity to create a split between these two functions, thus creating the second element of NRASLI, and commencing the process of privatizing the cadastral survey task (see Figure 6).

After 2 years, it is proposed that this unit be established as a company, with ESA owning 100% of the shares. A Board of Directors will be required to be established, which should have representation from the private sector.

After 5 years, a number of Survey Engineers should be licensed to carry out subsequent transactions. At this point in time, the ESA Private Company needs to operate in a fully commercial environment. In this scenario, ESA Private Company work will taper off slowly to stabilize at a level, which will be determined by the service level and fees it charges, both of which will be under the control of the company itself.

At this stage, a decision would be required as to the future path. Options are to sell the company to the private sector or retain the company under ESA ownership, so that the income could maintain ESA in its transition.

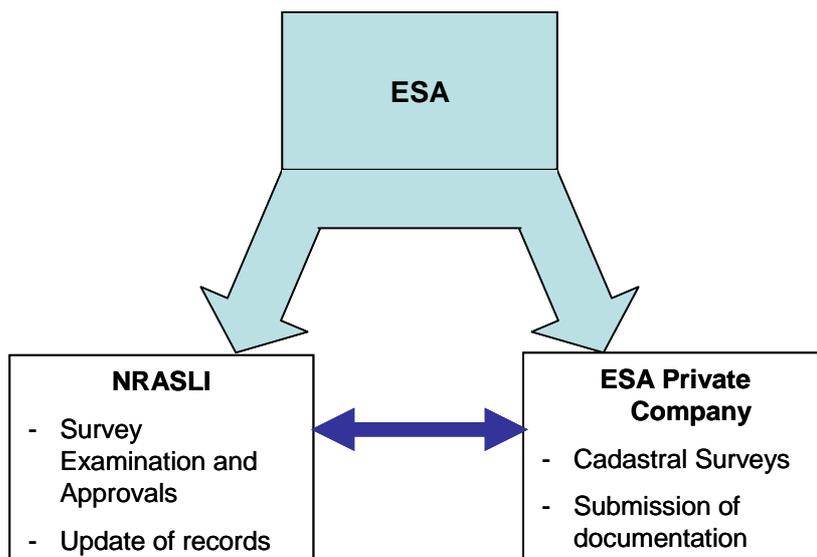


Figure 6: Stage 2 of the Transition – Handling Cadastral Survey and Approvals

Stage 3 of the Transition will focus on the custodianship of spatial data. The 3 elements to this are the core spatial data sets, for which GOE has given ESA a mandate, i.e.-

- Geodetic
- Cadastral
- Topographic

NRASLI is proposed to become the custodian for these three data sets. However both production and distribution will occur via the private sector. Production will be contracted to the private sector in two ways. Firstly, on the basis of an individual project required by a GOE agency or group of agencies. This may involve the update or production of topographic spatial data for a particular area. The client agency would approach NRASLI, which would then tender the work and contract a company to carry out this work. Payment for work is made by the GOE agency to NRASLI, and NRASLI would pay the contractor, after acceptance of the product.

Secondly, it involves the requirement to undertake a mapping program. This would generally be required by a number of GOE agencies, and therefore funded by a strategic alliance of agencies. This type of program could be over a number of years and may therefore require a different contracting approach. One approach could involve the tendering for acceptance on a panel of contractors, with individual companies to be engaged by service orders, at an agreed daily rate for staff or teams, with the service agreement specifying the task and the expected level of input for the task.

The Cadastral data set is far simpler, as updates occur by virtue of subsequent transactions. The application and examination fees would pay for the update of the spatial data. The updates would be batched and sent to the private sector company on regular basis. The company awarded the contract for the update would be for a period of 12 months or longer. Such contracts would have performance standards. Whether this would be done centrally or on a Regional or Provincial basis will depend on a number of factors, including the transaction and update volume; and the availability of suitably qualified and experienced companies in the location.

The Geodetic data set is the least recognized, yet it is the one on which all spatial relationships, via co-ordinates, for both the Cadastral and Topographic data sets rely. With the adoption of the primary network; the conversion to NED95; and the establishment of a CORS network, Egypt will have a world class service, through a Public Private Partnership.

7. Implications on Staffing for the Transition and Future Model

Currently ESA has a large staff compliment, some 9534 staff members, of which 50% are lower level administrative staff. Using a rate of natural attrition of 6%, this figure would reduce to 5135 at the end of the 10 year transition period.

While all of the functions to be privatized could be handled by existing companies currently operating in the private sector, the question then remains as to what happens to the capability, equipment and staff currently carrying out production functions within ESA.

Recent statements have been reported on privatization by President Mubarak¹⁰:

- “We [GOE] structure companies before selling them with a view to making profits”.
- “One of the basic conditions for the sale of a [state-owned] company is not to infringe on employees’ rights”.

¹⁰ As reported in “The Egyptian Gazette”, Monday 24th April 2006

In the case of ESA, these requirements seem to be conflict. In order to make ESA profitable, the Strategic Plan set out as one of its concepts that ESA had to “minimize operating costs”. The large staff numbers at ESA, even with, say 1500 staff employed by NRASLI, and a staff attrition rate of 6%, will still leave, after the transition period of 10 years, some 4000 staff to be reallocated to the privatization of the production side. Compare this to the largest survey and mapping company currently operating in Egypt, which has a permanent staff complement of less than 100.

8. Funding the Transition and Future Model

Referring to the documentation of subdivision and ownership as the basis for a land registration system as legislated for in 1923, the 1995 Strategic Plan¹¹ states that “to date 53 percent of the agricultural land and 20 percent of the urban land have been incorporated in that system.” In the rural areas this figure is now 80%. These figures will become significant when we consider the future income for ESA, during the transition to the NRASLI; since it will be 5 years before any private sector Licensed Survey Engineers will be available. So, in the next 5 years, ESA will continue to do all the cadastral survey work for both the Deeds system (both rural and urban) and an increasing volume of subsequent transactions for Title Registration in urban areas.

We should consider this aspect in more depth. A change in the sequence of tasks undertaken for subsequent transaction will mean that cadastral surveys would be undertaken prior to any transaction being submitted. Therefore, the introduction of a flat fee structure will not work, since the Licensed Survey Engineer should be paid by the client for work he has performed, even if the client does not proceed with the transaction, through no fault of the Licensed Survey Engineer.

Let’s look at some overall figures.

1. For 2004, it is understood that the annual costs were around LE 86 mill.
2. It is also understood that for 2005 fiscal year the income balanced the costs¹².
3. No income is received from GOE from the budget side, any GOE income is payment for services rendered.
4. It is also understood that 85% of income is generated from cadastral services. The fees for this work are for the performance of surveys for registration purposes.
5. The future fee structure for cadastral work will need to recognize the split in this function, between conducting the survey and the examination of the survey for approval. So part of the fee will go to the survey side (Licensed Survey Engineer) and the other portion will go to NRASLI.

If the figures for 2005 are truly representative, i.e. there are no unusual circumstances for that year, either in terms of extraordinary income or costs, then for the next 5 years, or half of the transition period, ESA does not have a problem, given that they have a monopoly on surveys for registration purposes, and this makes up 85% of their income.

¹¹ The General Survey Authority’s Strategic Plan, Ministry of Public Works and Water Resources, June 1995

¹² However, the sum total is unknown and there is no breakdown by various functions.

In fact ESA will lose around 2,500 staff in this period through natural attrition, which will reduce its costs.

In the following 5 years, i.e. the second half of the period, the introduction of the Licensed Survey Engineer will take time to settle in and for the public to be aware that this option exists. Therefore it is reasonable to assume that while ESA's share of this work will diminish, they will still have a significant share by the end of the transition. It may also be reasonable to assume that as the land market activity increases, that the volume of work will also increase.

The Government funding of NRASLI, as a Regulatory Authority is proposed. However this could be salaries only, as depending on what happens with future fee structures, it is anticipated that NRASLI will generate income, and in time this will cover or exceed its costs, if examples from other countries can be used, e.g. Malaysia, New Zealand.

Appendix 1: Schedule of Actions and Timeframe

Actions*	Timeframe
Prepare an overall plan of activities, through a consultative process with stakeholders.	Months 1-3
Create a Survey Examination and Approvals for Title Section and Cadastral Survey for Subsequent Transactions Section.	Months 4-10
Establishment of Cadastral Survey for Subsequent Transactions Company – 100% owned by ESA	Month 24-36
Establish the first elements of NRASLI, being some basic policy and planning functions; the Survey Examination and Approvals for Title Section; and the NSDI Data Custodianship Unit.	Month 48 – 60
Decision on sale or retention of Cadastral Survey for Subsequent Transactions Company	Month 60
NRASLI to include all areas for full implementation	Month 108 – 120
Sale of Cadastral Survey for Subsequent Transactions Company	Month 117 – 120
A component of ESA will still exist to finalize First Registration if it is not complete.	Month 120

Note * Only major activities are covered

Annex B: Licensing of Survey Engineers

Introduction

The introduction of the private sector to the Cadastral System is a new approach to the participation of the private sector in survey and mapping in Egypt. This paper is divided into 2 parts:

Part 1 – describes the concept of licensing Survey Engineers to conduct cadastral surveys and the mechanisms which would support its implementation.

Part 2 – proposes a strategy for implementation of such a licensing system.

Part 1: Concept and Mechanisms

1. The Importance and Role of Cadastral Surveys in Land Registration

Land is an essential element in not only the basic survival of man, but also in endeavors to improve livelihood and lifestyle. The registration of land is fundamental to the well being of society, particularly with respect to:

- law and order (avoidance of boundary disputes);
- social cohesion;
- promotion of economic growth; and
- managing the land resource.

There are two basic elements to land registration, spatial - what is owned (property object); and textual - ownership (owner, type and extent of right). Cadastral surveys and mapping undertake the role of defining the property object.

2. Concept of Licensing

The role of defining the property object is essentially seen as a process which should have Government oversight. In most jurisdictions, the government is guaranteeing the ownership, under a title registration system, and therefore by extension should also ensure that the definition of the property object is well conducted, if not explicitly guaranteed. Cadastral surveys and mapping are undertaken in most countries either by Government Survey Engineers or by private sector Survey Engineers, licensed by Government. It is also the case that most jurisdictions apply the concept of licensing to anyone who undertakes a cadastral survey, whether they be government or private sector.

The licensing of Survey Engineers is a mechanism to allow the involvement of the private sector in the cadastral survey process. This can be seen as ESA “exploring new business models for collaboration with other public and private institutions”¹³. Licensed Survey Engineers act as agents of the Government and therefore have two clients:

- the Government with respect to maintaining the integrity of the land registration system and its laws and regulations;

¹³ Nasr, M Hisham, Radwan, M Mostafa, Lemmen, Christian, The Egyptian Survey Authority Business Model to Strengthen Public Private Partnership in the Real Estate Industry, FIG Working Week, Cairo, April 2005.

- the person/organization who engages the Licensed Survey Engineer to undertake the survey, including the responsibility of payment of their fees.

3. Role of the Licensed Survey Engineer

It is more appropriate to discuss the role of the Licensed Survey Engineer, in the context of subsequent transactions. This is not to say however, that Licensed Survey Engineers cannot be involved in first registration, but rather that the requirement for a license to carry out this work should not be mandatory. The Licensed Survey Engineer will undertake all types of subsequent transactions which involve a change in parcel boundaries, e.g. amendment to an existing parcel or creation of a new parcel. Examples from other countries provide a useful guide in this regard. In introducing private licensed professional surveyors in Norway, they considered that the person should be a specialist in legal and planning matters related to the creation of new parcels.¹⁴ In countries such as Australia, where all land is now registered (so no first registration is required), the private sector Licensed Survey Engineers conduct all subsequent transactions on behalf of private clients. In Australia, while each State Government operates their own system, Figure 1 gives a generalized view of the interaction between the Licensed Professional Surveyor (Survey Engineer) and Land Victoria (includes Surveyor General's Office and Land Registry).

4. Legislation and Regulatory Mechanisms for Cadastral Surveying

A "Surveying Act" should provide authority to the Licensing process. As well as defining the licensing of Survey Engineers, and establishing a mechanism such as the Survey Engineers Licensing Board to undertake this role, the legislation must also give legal authority to set standards for surveys and the practice of surveying.

The Survey Engineers Licensing Board, which should act under the auspices of a Government Regulatory Authority, should have representation from Government, private sector, academia and the public consumer. The "Surveying Act" should also establish a mechanism and process for the handling of complaints; allow for the auditing of work carried out by Licensed Survey Engineers; and impose penalties for breaches of the Act.

5. Benefits of Licensing

As previously mentioned licensing is a mechanism to involve the private sector, as agents of the government in the spatial definition of land parcels. The volume of subsequent transactions generally has a direct relationship to the land market, which is subject to peaks and troughs. Therefore the resource requirements will also vary. Such variations are more appropriately handled by the private sector, which is not hamstrung by the bureaucracy of government employment requirements.

The creation of private sector Survey Engineers will also mean that ESA employees may choose to leave ESA to start up their own private business, which will assist ESA in reducing its staffing levels to a more cost effective level.

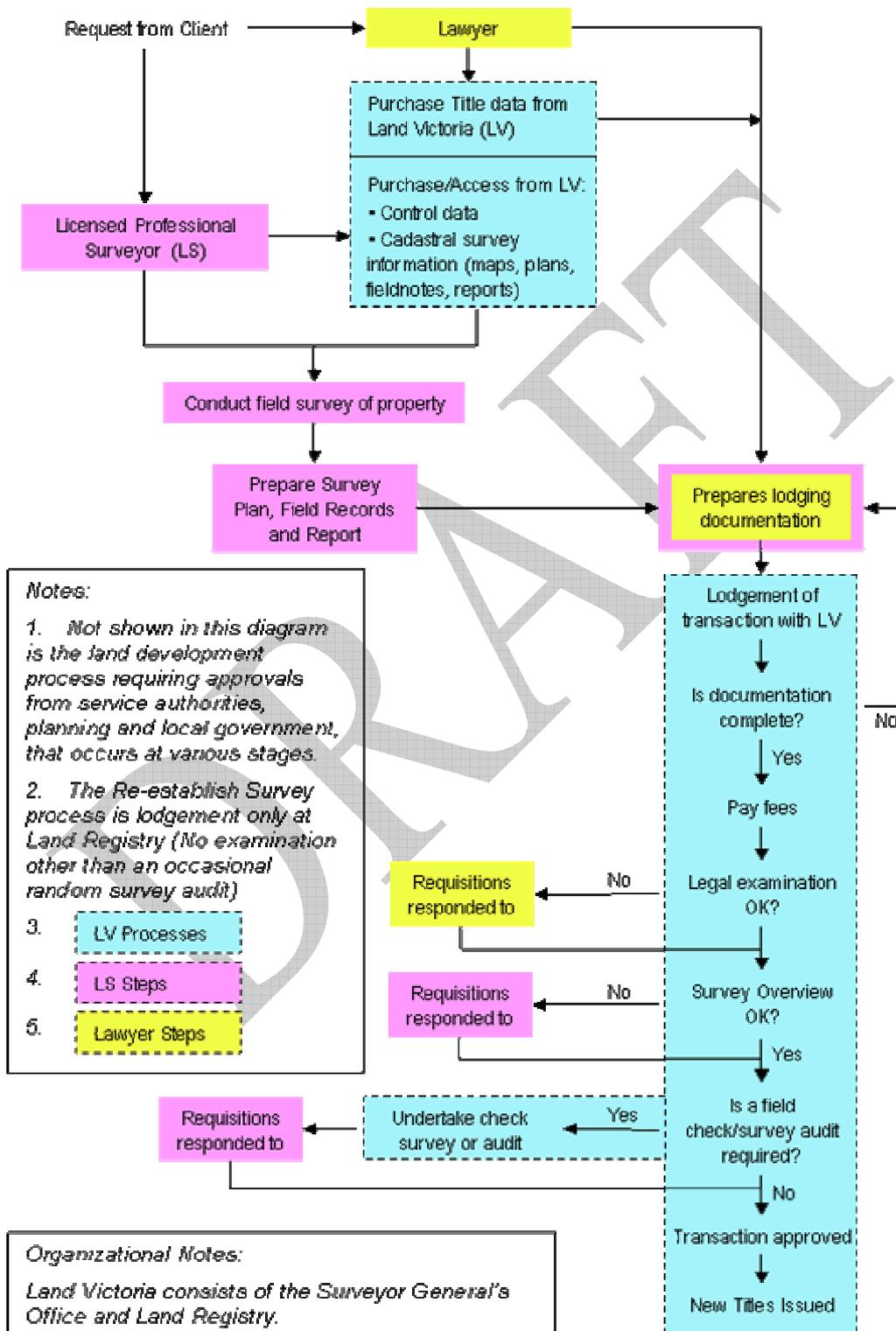
This will create a resource pool for ESA to draw on to supplement its resources for conducting surveys for first registration. This could be seen as part of ESAs strategy for future outsourcing of activities (see footnote 1).

¹⁴ Onsrud, Helge, Privatizing Cadastral Surveying in Norway, FIG XXII International Congress, Washington, DC, USA, April 2002

Consumer choice is also a benefit which can result from use of the private sector. Consumers are able to choose between using ESA; or using ESA to sub-contract the private sector; or using a number of Licensed Survey Engineers directly.

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Figure 1 – Subsequent Transaction – Interaction Between Land Victoria and Licensed Professional Surveyor and Private Lawyer – Generalized Model



Part 2: Strategy for the Implementation of a Licensing System

1. Development and Acceptance of the Concept of a Licensed Survey Engineer

This step needs to start with workshops to explain the concept with key stakeholders to get them on board, eg ESA, REPD, Committee for Survey and Mapping, Engineers Syndicate, Academia. A political champion will need to be identified and consultation will play a key role in the ready acceptance of the concept as part of the Government's land and privatization policies.

2. Giving Legislative Authority to the Concept

Establish a working group, with the support and inclusion of stakeholders, to develop a proposed Surveying Act. The basic coverage of the Act is suggested as follows:

PART 1 — PRELIMINARY

- Purposes
- Commencement
- Definitions

PART 2 — CONDUCT OF CADASTRAL SURVEYS

- General Responsibilities
- Regulations for Conducting a Survey
- Correction of Errors
- Entry onto Property

PART 3 — LICENSING OF SURVEY ENGINEERS

- 1 - Registration as Licensed Survey Engineer
 - Procedures for Obtaining a License
 - The Register of Licensed Surveyors
- 2 - Investigations into Licensed Survey Engineer
 - Complaints about professional conduct
 - Conduct of a formal hearing
- 3 - Offences
 - Offences by unlicensed persons, fraud, forgery
- 4 - Survey Engineers Licensing Board
 - Establishment
 - Functions and Powers
 - Membership
 - Meetings

3. Education and Training

There are 3 areas of involvement with the tertiary institutes:

- Development and include cadastral material for inclusion in their Engineering undergraduate courses.
- Establish a post-graduate course in cadastral systems.
- Develop a bridging course from the 2-year Higher Institute Surveying Course to a 5 year degree level.

Establish an Industry Advisory Committee to advise the tertiary institutes on the needs of the profession.

On the training side there are two courses being considered to assist both ESA staff and the private sector to participate in first registration initially, and then later a second course in subsequent transactions.

- A preliminary training course ESA Certificate in Cadastral Surveying I (3 months), which aims at providing material for conducting cadastral surveys and mapping for first registration. This course would allow participants to survey cadastral parcels and prepare a Cadastral Index Map, a Cadastral Map, and the Survey Book.
- A second course ESA Certificate in Cadastral Surveying II (probably 4-5 months) which will focus on cadastral surveying and plan preparation for subsequent transactions under the Title Registration System.

Each of these courses will be supplemented by around 12 month's practical experience, under the supervision of ESA.

The tertiary and training courses should be submitted to the Survey Engineers Licensing Board for approval.

4. Survey Engineers Licensing Board

Once the legislation is promulgated, the Survey Engineers Licensing Board should be established. The legislation will define the composition of the Board, chaired by the ESA Chairman, which should include representation from Government, the private sector, academia and the public consumer. Board members should be trained in their role and responsibilities.

The Survey Engineers Licensing Board acts as an agent of the Government for the purpose of maintaining the integrity of the land registration system by:

- setting standards for the licensing of Survey Engineers;
- examining and licensing Survey Engineers;
- advising on standards and the regulation of cadastral surveys;
- maintaining the standards of Survey Engineers and surveys (including instigating disciplinary action where necessary);
- determining penalties for non compliance with the law and its regulations;
- advising ESA on the law relating to Survey Engineers and surveys.

5. A Strong Profession

In addition to the establishment of the regulatory mechanism, the Survey Engineers Licensing Board, the formation of a vibrant professional body is a key element of maintaining professional standards, both technical and ethical, and supporting growth to continually improve its service to the public and the government. Some options are available for the development a professional body i) as an arm of the Engineers Syndicate; ii) strengthen the Committee for Surveying and Mapping; or iii) form a new professional body.

6. Public Awareness

A public awareness campaign on the existence and role of Licensed Survey Engineers should be prepared and rolled out. This campaign should demonstrate the choice consumers have between the Government and private sector and fee for services.

7. Regular Renewal of License

Consideration should be given to the renewal of the license on a regular basis, either annually or for a longer period. Renewal could be on the basis of satisfying certain requirements, for example participating in continuing professional development, through the attendance at relevant courses, seminars, conferences and the like. Initially a renewal period of 12 months is suggested, which could then be extended to 2 or 3 years, once the licensing system was gaining maturity.

8. Qualifying for a License

Three paths are suggested for gaining a license, as follows:

1. Survey Engineers Licensing Board approved 5 year degree course in Surveying and Cadastral Systems, plus 1 year of practical experience, under ESA or a Licensed Survey Engineer, plus and interview.
2. A Civil Engineering/Surveying or equivalent 4 or 5 year degree course, plus a post graduate course in Cadastral Systems, as approved by the Board, plus 1 year of practical experience, under ESA or a Licensed Survey Engineer, plus and interview.
3. A 2 year degree course in surveying, plus a bridging course in Cadastral Systems to 5 year degree status, as approved by the Board, plus 1 year of practical experience, under ESA or a Licensed Survey Engineer, plus and interview.

The following types of Survey Engineers are currently performing roles in the cadastral system:

- ESA Survey Engineers – first registration (acquiring spatial parcel and legal data)
- Registered Survey Engineers (Registered by the Engineers Syndicate) – plans of subdivision and building and apartment plans:
 - Registered Survey Engineer
 - Land Surveying Consultant
 - Aerial Surveying Consultant

A transition path for any of these current Survey Engineers should be considered, if they don't match any of the above paths. Some of the requirements approved by the Board may include, all or any combination of the following

- ESA Certificate in Cadastral Surveying I
- ESA Certificate in Cadastral Surveying II
- Practical experience
- Examination

- Interview

9. Timeframe

The timeframe for the first Survey Engineers to be licensed would be around 5 years. The longest period will be concerned with the legislation and the process involved in having it developed, passed and promulgated. This timeframe provides an opportunity for surveyors to attend courses and be involved in practice (under the supervision of ESA). It is anticipated that the first Licensed Survey Engineers will be staff members of ESA.

The steps are set out in the following table:

Action	Timeframe
Consultation and acceptance of the concept and need for licensing of private survey engineers by ESA and stakeholders, including the Committee for Surveying and Mapping, Engineers Syndicate.	Months 1-2
Consultation on the mechanisms and requirements for licensing by working group established with members, including Academia, Government, Private Sector by Committee chaired by ESA Chairman or Head of Cadastral Section.	Months 3-6
Endorsement of Licensing mechanisms and requirements by Minister.	Months 7-8
Preparation of Legislative "Surveying Act" requirements and drafting instructions, by working group.	Month 9-11
Memorandum with attached proposal and drafting instructions submitted to the Prime Minister.	Month 12
Sent to Ministry of Justice for drafting of the legislation.	Month 13 – 15
Ministry of Justice sends proposed legislation to the President for submission to Parliament for debate.	Month 16
Parliamentary consideration and debate.	Months 17 – 19
Promulgation of Legislation by President.	Months 20-21
Preparation of Regulations.	Month 22 – 24
Establishment of Survey Engineers Licensing Board.	Month 25 – 27
Preliminary meeting to discuss how the Board will function and develop implementation plan	Month 28 – 29
Development of procedures and operational manual	Month 30 – 32
Train Board Members in their roles and responsibilities	Month 33 – 34
Inaugural meeting of Survey Engineers Licensing Board	Month 35
Assess and accredit University courses as pre-requisites for licensing	Month 36 – 38
Publicize the role Licensed Survey Engineers, and the way in which they can assist the public	Months 36 – 42

Annex C: ESA's Role in Overseeing the QA/QC of Private and Public Sector Cadastral Activities and Data Acquisition

1. Introduction

The role of the private sector will supplement on the one hand and compete on the other, with ESA, depending on the future structure of ESA or any of its derivatives. Within this context, attention needs to be paid to the quality of the product, particularly as the data and products that are being dealt relate to the ownership of property, and are critical to peoples' survival and level of security and living conditions.

The impacts of the use of the private sector will be multi-layered. A well developed private sector should offer efficiencies of operation, providing the consumer with a choice of companies providing a professional output in a timely manner and at a competitive price. The privatization of the ESA operational role will mean it must shed staff, in order to control costs and be competitive with other companies. The introduction of the private sector will create opportunities for ESA staff, which may mean that loose their more qualified people. The need for a separation of the regulatory and approval functions from the operational functions of ESA.

2. Quality Assurance/Quality Control

The use of both Quality Assurance and Quality Control philosophies and methodologies is appropriate to the work of ESA. Quality Assurance is applicable as a strategy for internal systems, processes and staff, whereas, Quality Control is most applicable to determining if the product meets the specifications and standards set for it, as well as the management of contracts by ESA with the private sector.

2.1. Quality Assurance of Processes

The introduction of a Quality Assurance (QA) approach provides a rigorous framework within which to review current systems and processes, against the required outcomes, and satisfying these through the outputs which are produced in the most efficient manner, and then documenting procedures and operational manuals. An extension of this approach would be to have the ESA certified under the International Standard ISO 9000 series, providing international recognition as a Quality Organization. The introduction of Quality Assurance should include the training of staff at all levels of the agency in the concepts of QA – doing things right the first time and continuous improvement – and being able to apply this to their individual roles, including assisting in the preparation of procedures and manuals.

The introduction of documented procedures, serves a number of purposes:

- It establishes the process as an official and formal process.
- It provides a consistency of approach and therefore results.
- It provides transparency.
- It protects staff from accusations of favouritism or misconduct.
- It provides new staff with a learning resource and existing staff with a point of reference.

2.2. Quality Control of Output and Products

The procedures documented under the Quality Assurance process will define the steps required to control the quality of the output or product. Quality Control mechanisms will generally be based on ensuring that the output or product meets the specifications and standards set for that output or product. Such specifications and standards will generally be set out in the procedures, Instructions or Guidelines, or in the case of external contractors, may be contained in the contract.

In the context of contract management, Quality Control (QC) is a mechanism to assist in ensuring that the performance and output of contract meets the specifications and requirements of the contract deliverables and provides 'value for money' for ESA. The contractor should also be made aware of the types of quality control measures which will be employed, so that he is no doubt of the quality required for the work.

Until the specific methodology for the preparation of a CIM is decided, specific Quality Control measures cannot be determined. However the type of measures that could be considered includes:

Survey:

- The contract should state that "Good survey practice" should be employed at all times, e.g.
 - Redundant measurements should be observed where-ever possible.
 - All traverses should be closed onto themselves or onto points of known co-ordinate.
 - Radiations should be checked by offsets or double measurements.
 - All polygons should be plotted out to make sure they close.
- The point numbering system should be simple and unambiguous.

Mapping:

- Geo-referencing of maps to required accuracy
- Structure of vector data (e.g. closed polygons)
- Recording of parcel numbers
- Coding of map features

Data Collection:

- Cross check using different sources.
- Conduct field check to ensure that no properties have been missed.
- Publication of potential ownership.

Contracting the private sector:

1. Contracting certain tasks, e.g. pick-up of building footprints.
2. Contracting the supply of personnel to work within a survey team, led by an ESA employee.

If aerial survey is used then the plotting of the Draft Cadastral Index Map, i.e. all the physical features prior to any ground activity.

Strengthening the Role of Contract Management:

There is a need raise the skill level of ESA staff in terms of the following areas related to contract management.

- Contract management
- Performance monitoring
- Financial management

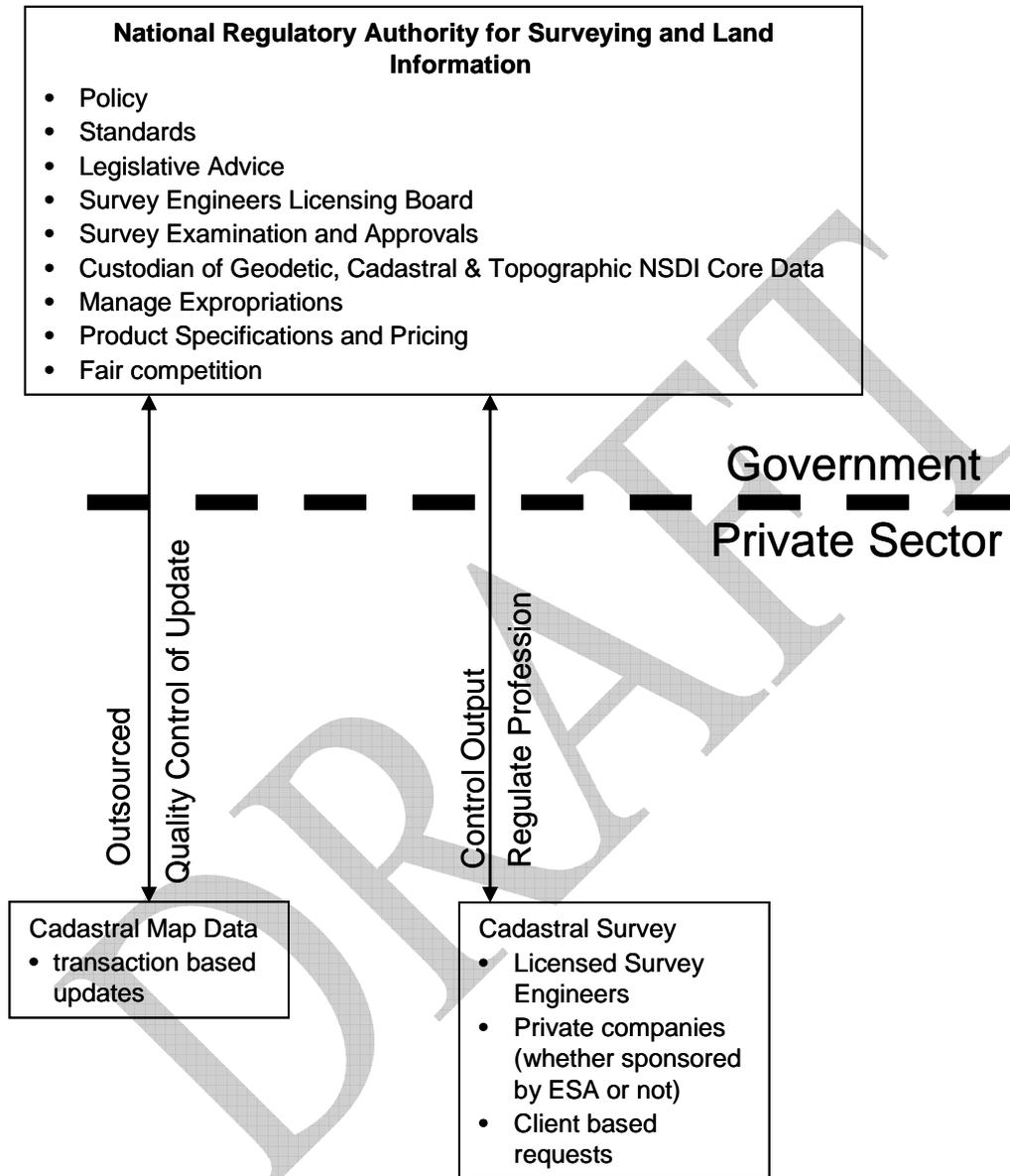
3. Institutional Arrangements

The type of Quality Assurance (QA) and Quality Control (QC) measures introduced will, in part, depend on the institutional arrangements and mechanisms in place. It is envisaged that the role of the private sector will increase over time, to a stage where private sector Survey Engineers will be licensed by the Government to conduct cadastral surveys, on behalf of clients.

In this scenario, Figure 1 sets out a possible institutional structure and the interaction with the private sector and the Quality Control required.

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Figure 1: Institutional Structure



Annex D: Property Index Mapping Methodology

1. Introduction

A Property Index Map (PIM) provides an index to the parcel structure.

There are several options for producing a PIM which are discussed below. However in the first instance a decision needs to be taken regarding the basis and role of the PIM in defining the parcel. First registration includes the initial process of cadastral survey and mapping, and while ESA would like to ensure that parcels are well defined spatially, there are other imperatives which will impact on this issue.

The first of these is that a registration system will not work well unless it covers all parcels and apartments (property units). The first priority for a registration system must be **completeness**.

A registration system will not work well and be complete unless it has the confidence of the property owners. To achieve this, the introduction of the registration system must achieve registration for individual property owners as quickly as possible. With such a large project this is not easy to achieve, however **speed** is the second priority.

The registration of all properties in Egypt is an expensive exercise. To achieve completeness property owners must be encouraged to use the system and no fee or low fee policy would assist in this regard. However this would mean that the Government would need to pay for the entire program. So the third priority must be **cost**.

To spatially define parcels, then some level of accuracy must be achieved to provide a basic spatial relationship between parcels. So the last priority should be **accuracy**.

2. Types of Areas to be Mapped

There are two main types of areas to be mapped

1. New Urban Communities
2. Older Densely-populated Areas

3. Methodology

The options are:

1. Ground Survey – traversing and pick-up of parcel boundaries and buildings and other features representing physical boundaries. This option consists of a full ground survey, using control points to accurately control the survey. All parcel boundaries and building footprints would be measured, as well as apartment dimensions. Cadastral maps at applicable scales could then be produced.

The next 3 options involve the use of imagery, whether it is aerial photography or satellite imagery to plot all physical features such as buildings, fences walls, which may

constitute cadastral information. The process, timeframes and costing for type of imagery should be determined first and then options 2, 3, and 4, added on.

2. Aerial Survey, supplemented by ground survey of parcel dimensions – using the aerial survey plots as a base, parcel boundaries are measured by tape with a cross check on diagonals, if possible. Building footprints would also be measured by tape. Apartments would be identified uniquely, but would not be measured.
3. Aerial Survey, supplemented by ground-truthing of physical features – using the aerial survey plots, check building footprints, measuring, where necessary. Also check that physical features do form parcel boundaries. Apartments would be identified uniquely, but would not be measured.
4. Aerial Survey, supplemented by ground survey to define blocks– using the aerial survey plots as a base, accurately survey, using ground control, the boundaries all each block, but not the individual parcels. Check building footprints, measuring by tape, where necessary. Also check that physical features do form parcel boundaries. Apartments would be identified uniquely, but would not be measured.

The options for a methodology should address the following:

- basic steps involved, including:
 - time for each step;
 - resources required; and
 - equipment required.
- products produced
- advantages and disadvantages
- cost of the overall process
- timeframe for the overall process

In this manner a comparison can be made of the methodologies and their applicability in each of the area types. It may well be that there is need to use more than one methodology, since one particular methodology is suited to a particular area type.

In addition other factors may need to be considered in the overall planning and development context of Egypt. The use of aerial photography would provide a valuable resource for other uses apart from the primary use of mapping for land registration purposes.