

**Sheila Holland**  
**Swedesurvey AB**



[sheila.holland@swedesurvey.se](mailto:sheila.holland@swedesurvey.se)  
[www.swedesurvey.se](http://www.swedesurvey.se)

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006

TS 14: Innovations in Land Administration Processes  
TS14:5 Botswana – Department of Surveys and  
Mapping (DSM) Cadastral Information System

**Mr Bryson B. H. Morebodi**  
**Director**



[bmorebodi@gov.bw](mailto:bmorebodi@gov.bw)

**Department of Surveys & Mapping**  
**Botswana**

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006

TS 14: Innovations in Land Administration Processes  
TS14:5 Botswana – Department of Surveys and  
Mapping (DSM) Cadastral Information System

**Cadastral Information  
System**

**Botswana – Department of Surveys  
& Mapping**




5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006

TS 14: Innovations in Land Administration Processes  
TS14:5 Botswana – Department of Surveys and  
Mapping (DSM) Cadastral Information System

**Agenda**

- About DSM Botswana
- The route to a fully fledged CIS
- Drawbacks with the current system
- Agency Needs
- IGIS – II Project
- CIS Project Overview
- Project Benefits
- Conclusion

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006

TS 14: Innovations in Land Administration Processes  
TS14:5 Botswana – Department of Surveys and  
Mapping (DSM) Cadastral Information System

**About DSM Botswana**

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006

TS 14: Innovations in Land Administration Processes  
TS14:5 Botswana – Department of Surveys and  
Mapping (DSM) Cadastral Information System

**DSM is a Government Agency within the  
Ministry of Lands responsible for:-**

- Carrying out Cadastral, engineering and geodetic surveys, produce topographic and thematic mapping.
- Providing basic attribute and Geo-spatial data and information to Government, private and public users.
- Providing GIS derived products for several non-Technical departments within Government of Botswana (GOB).

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006

TS 14: Innovations in Land Administration Processes  
TS14:5 Botswana – Department of Surveys and  
Mapping (DSM) Cadastral Information System

## DSM Responsibilities, cont/d...

- Advising on National and International boundaries.
- Responsible for delimitation, survey, demarcation and maintenance of the above boundaries.
- Responsible for reviewing and verifying that the survey has been done in accordance with the survey act and regulations
- Responsible for the examination, approval and archiving of all cadastral surveys

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006



TS 14: Innovations in Land Administration Processes  
TS14.5 Botswana – Department of Surveys and Mapping (DSM) Cadastral Information System

## Cadastral Surveys

The Botswana cadastral survey is regulated by the law to take place by approved professional land surveyors. The surveyors can be private licensed surveyors or local and central government surveyors

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006



TS 14: Innovations in Land Administration Processes  
TS14.5 Botswana – Department of Surveys and Mapping (DSM) Cadastral Information System



## The Route

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006



TS 14: Innovations in Land Administration Processes  
TS14.5 Botswana – Department of Surveys and Mapping (DSM) Cadastral Information System

## Integrated GIS Initiative – Phase I 1997 - 2004

### Components:-

- BNGRS – Botswana National Geodetic Reference System WGS84 – est. 2002
- Cadastral, Geodetic & Topographic Databases in MS Access
- Aerial Photography and Orthophoto Mapping
- Staff Training
- NSDI – National Spatial Data Infrastructure for Botswana
- Upgrading of the IT Infrastructure

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006



TS 14: Innovations in Land Administration Processes  
TS14.5 Botswana – Department of Surveys and Mapping (DSM) Cadastral Information System

## Drawbacks of the Current System

- The current processing of the survey records takes up to several months
- The delay in the process is a result of the manual examination process
- Lack of adequate progress and performance reporting
- Databases today are in MS Access – proving insufficient to cater to the needs of the agency
- System not capable of analytical capabilities of a GIS or topologically structured geo-spatial database systems

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006



TS 14: Innovations in Land Administration Processes  
TS14.5 Botswana – Department of Surveys and Mapping (DSM) Cadastral Information System

## Agency Needs

A precise image for the required system covering the agency needs was reached after Swedesurvey and QSIT carried out a comprehensive analysis of the current resources and legacy system, the set objectives and the current business needs of DSM.

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006



TS 14: Innovations in Land Administration Processes  
TS14.5 Botswana – Department of Surveys and Mapping (DSM) Cadastral Information System

## Agency Needs

- Upgrading DSM technological capabilities by establishing a GIS based enterprise cadastral information system.
- Employ state-of-the-art technologies to allow for richer, faster and more accurate operations for handling the national cadastre survey and parcel management.
- Providing an integrated cadastral, geodetic and topographic database to facilitate the provision of geographic information for cost-effective use in society.

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006



TS 14: Innovations in Land Administration Processes  
TS14:5 Botswana – Department of Surveys and Mapping (DSM) Cadastral Information System

## Agency Needs

- Providing the latest technology for interfacing to survey instruments and processing of surveying computations.
- Providing land information in various ways using modern GIS tools and delivering them to different organizational levels for the purpose of municipal planning, and land reform for supporting decision-making.
- Training and qualifying DSM personnel from all sections through a comprehensive capacity building plan.

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006



TS 14: Innovations in Land Administration Processes  
TS14:5 Botswana – Department of Surveys and Mapping (DSM) Cadastral Information System

## Integrated GIS Project – Phase II

- The development and implementation of a fully fledged digital cadastral information system comes as part of the IGIS-II project.
- The IGIS-II project started in November 2004.
- The overall IGIS project goal is the integration of cadastral, geodetic, and topographic databases to facilitate the provision of geographic information for cost-effective use in society.

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006



TS 14: Innovations in Land Administration Processes  
TS14:5 Botswana – Department of Surveys and Mapping (DSM) Cadastral Information System

## Cadastral Information System Project Overview

- Development of cadastre Handling System
  - Streamlined field and office workflow for all cadastral survey and Land records processes within the Department.
- Development of Cadastral Geodatabase Storage
  - Spatial and non-spatial data storage within a Geodatabase System. This will be a dynamic system that allows for the creation of new products.
- Development of the Digital Archive System
  - This system will archive scanned and/or digitized data. This will handle mainly legal documents but also reports for ease of storage and retrieval.

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006



TS 14: Innovations in Land Administration Processes  
TS14:5 Botswana – Department of Surveys and Mapping (DSM) Cadastral Information System

## Project Overview cont/d...

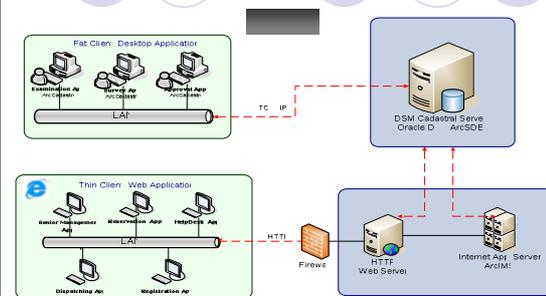
- Development of the Cadastre Dissemination System
  - This system will publish all data and information processed through the other systems.
  - It will also provide the linkage between the Topographic and Geodetic Geodatabases.
  - Will enable dissemination to other Government organisations and private users.
  - Access to the system for regional offices in the future.

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006



TS 14: Innovations in Land Administration Processes  
TS14:5 Botswana – Department of Surveys and Mapping (DSM) Cadastral Information System

## Cadastral System Architecture



5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006



TS 14: Innovations in Land Administration Processes  
TS14:5 Botswana – Department of Surveys and Mapping (DSM) Cadastral Information System

## Project Benefits

### ○ Profits

- "Cost saving by catering to client specific needs"
- "Generation of income through new products derived from the geodatabase"
- "Cost saving through data sharing amongst users of GI"

### ○ Customer Satisfaction

- "The new system will be capable of speeding up data processing, data analysis and data output to increase the quality of the products"
- "Delivery of data in the appropriate format"
- "Short delivery periods"

### ○ Transparency

- "Good governance "
- "To facilitate decision-making processes within the government "

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006



TS 14: Innovations in Land Administration Processes  
TS14:5 Botswana – Department of Surveys and  
Mapping (DSM) Cadastral Information System

## Conclusion

- A Digital Cadastral Information Enterprise System that will interface with other systems in the country to optimise information that enhances security of title, equity in land distribution, appropriate land use to alleviate poverty and improve sustainable economic development consistent with the Nations Vision.
- Established standards and the design for all spatial databases and elaborated efficient systems for data dissemination and data capture.

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006



TS 14: Innovations in Land Administration Processes  
TS14:5 Botswana – Department of Surveys and  
Mapping (DSM) Cadastral Information System

Thank you

5th FIG Regional Conference  
Promoting Land Administration and Good Governance  
Accra, Ghana, March 8-11/2006



TS 14: Innovations in Land Administration Processes  
TS14:5 Botswana – Department of Surveys and  
Mapping (DSM) Cadastral Information System