

MINISTRY OF MINES AND MINERALS DEVELOPMENT

REGIONAL WORKSHOP ON THE APPLICATIONS OF GLOBAL
NAVIGATION SATELLITE SYSTEM (GNSS) TECHNOLOGIES IN SUB-
SAHARAN AFRICA

PRESENTATION BY

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APPLICATION OF GNSS IN MINERAL EXPLORATION IN ZAMBIA

INTRODUCTION

ZAMBIA'S USE OF GLOBAL NAVIGATION SATELITE SYSTEM (GNSS) IS IN THE CONTEXT OF THE MINES AND MINERALS ACT (1995) – CAP 213 OF THE LAWS OF ZAMBIA IN WHICH THE MINISTRY OF MINES AND MINERALS DEVELOPMENT IS MANDATED TO ADMINISTER THE ACT THROUGH THE THREE TECHNICAL DEPARTMENT:

1. GEOLOGICAL SURVEY DEPARTMENT
2. MINES DEVELOPMENT DEPARTMENT AND
3. MINES SAFETY DEPARTMENT



GEOLOGICAL SURVEY DEPARTMENT (GSD)

APPLICATIONN OF GNSS IN MINERAL EXPLORATION

GSD IS MANDATED TO CARRY OUT GEOLOGICAL MAPPING AND MINERAL EXPLORATION IN ZAMBIA . USE OF GNSS IS AN INTEGRAL PART OF ITS OPERATIONS

CURRENT SCENARIO

A. GEOLOGICAL, GEOCHEMICAL AND GEOPHYSICAL MAPPING:

1. GNSS IS APPLIED FOR POINT LOCATION AND NAVIGATION BY USE OF GPS DEVICES
2. POINT LOCATIONS (X,Y COORDINATES)
 - FOR OBSERVED MINERAL OCCURRENCES IN THE FIELD
 - FOR MINERAL INDICATORS etc....
1. GPS IS USED TO LOCATE CERTAIN AREAS OF KNOWN MINERAL OCCURRENCE USING THE X,Y COORDINATE DATA BY NAVIGATION
2. ULTIMATELY USE OF GNSS LEADS TO ACQUISITION OF DATA WHICH IS ANALISED AND PLOTTED ON VARIOUS TYPES OF MAPS.



GEOLOGICAL SURVEY DEPARTMENT (GSD)

B. USE OF SATELITE IMAGERY

CURRENTLY THE DEPARTMENT IS UNABLE TO MAKE FULL USE OF SATELITE IMAGERY DUE TO NON AVAILABILITY OF REMOTE SENSING SOFT/HARDWARE. HOWEVER, THE DEPT GIVEN THE MENTIONED CAN USE GNSS EFFECTIVELY IN MINERAL EXPLORATION AS FOLLOWS:



GEOLOGICAL SURVEY DEPARTMENT (GSD)

CURRENT SCENARIO

FROM IMAGES

1. WE CAN IDENTIFY DIFFERENT ROCK TYPES BECAUSE ROCKS HAVE DIFFERENT SIGNATURES AND CHARACTERISTICS UNDER DIFFERENT BAND COMBINATIONS
2. WE CAN GET STRUCTURES
 - LINEAMENTS (FAULTS AND LINEATIONS etc....LINKED TO MINERALISATION)
 - FOLDS
 - ALTERATION HALOS
3. DESKTOP MAPPING (TARGET GENERATION FOR POSSIBLE MINERALISATION, FIELD WORK AND FIELD SAMPLING PLANNING)



MINES DEVELOPMENT DEPARTMENT (MDD)

APPLICATIONN OF GNSS IN PROCESSING OF MINING RIGHTS

MDD IS MANDATED TO PROCESS MINING RIGHTS FOR ALL APPLICANTS INTERESTED IN MINES DEVELOPMENT IN ZAMBIA

- APPLICANTS ARE REQUIRED TO PROVIDE COORDINATES OF AREAS OF INTEREST
- GPS IS ALSO USED FOR RECONNAISSANCE FOR THOSE APPLICANTS WHO MAY NOT BE ABLE TO IDENTIFY THE AREAS OF INTEREST
- WHEN APPLICATIONS ARE APPROVED , AREAS ARE BEACONED
- GPS IS USED FOR NAVIGATION TO MINE PIT SITES BY OFFICERS IN ALL DEPARTMENTS
- IN THE MODERNISED MINING CADSTRE SYSTEM CURRENTLY BEING IMPLEMENTED IT WILL BE COMPULSORY FOR APPLICANTS TO SUBMIT GNSS COORDINATES WHICH WILL BE TRANSFORMED USING APPROPRIATE TRANSFORMATION PARAMETERS



GSD/MDD

ADVANTAGES OF GNSS USE

GSD

1. IT IS A POWERFUL TOOL IN IDENTIFYING POTENTIAL AREAS FOR MINERAL EXPLORATION
2. IT IS COST EFFECTIVE, WE REDUCE LARGE AREAS BY MAPPING AND DELINEATING POTENTIAL ZONES USING REMOTELY SENSED DATA
3. IMAGES PROVIDE INFORMATION ABOUT INACCESSIBLE REGIONS
4. SATELITE IMAGES PROVIDE A SYNOPTIC VIEW OF AN AREA

MDD - MINING CADASTRE UNIT

1. PROVIDES COORDINATES FOR MINING RIGHTS POLYGONS
2. ENABLES QUICK VERIFICATIONS OF APPLIED FOR AREAS
3. BEACONING IS QUICKER BECAUSE NO LINE OF SIGHT REQUIRED
4. DATA CAPTURE IS QUICKER AND EASIER



MINISTRY OF MINES AND MINERALS DEVELOPMENT

CONCLUSION / FUTURE SCENARIO

WHAT THE MINISTRY ENVISAGE IS THAT GIVEN THE NECESSARY SOFTWARE VIS-A-VIS ERDASS IMAGING,ILWIS, ARCGIS AND ARCINFO,TOGETHER WITH THE NECESSARY HARDWARE THE MINISTRY WILL BE ABLE TO CARRYOUT MINIERAL EXPLORATION AND MINERAL DEVELOPMENT EFFECTVELLY AND EFFICIENTLY WITH APPLICATION OF GNSS TECHNOLOGIES



MINISTRY OF MINES AND MINERALS DEVELOPMENT

THANK YOU ALL

