

GNSS training At Kenya Institute of Surveying and Mapping



Presented by
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Order of presentation

- Who are we?
- Training at KISM
- GNSS Third Country training.
- Recommendations

Who are we ?

- ☀ **K**enya **I**nstitute of **S**urveying & **M**apping
- ☀ Government mid-level technical training institute in the Survey Dept – Ministry of Lands
- ☀ Registered under the Education Act (Cap 211 Laws of Kenya) since 1994
- ☀ Registered as an Examination Centre by the **K**enya **N**ational **E**xamination **C**ouncil for Diploma and Higher Diploma Courses

Who are we ? (2)

- The construction of the current structures was done with assistance of Government of Japan through Japan International Corporation Agency (JICA) in 1997
- Student population of 300 and 45 academic staff

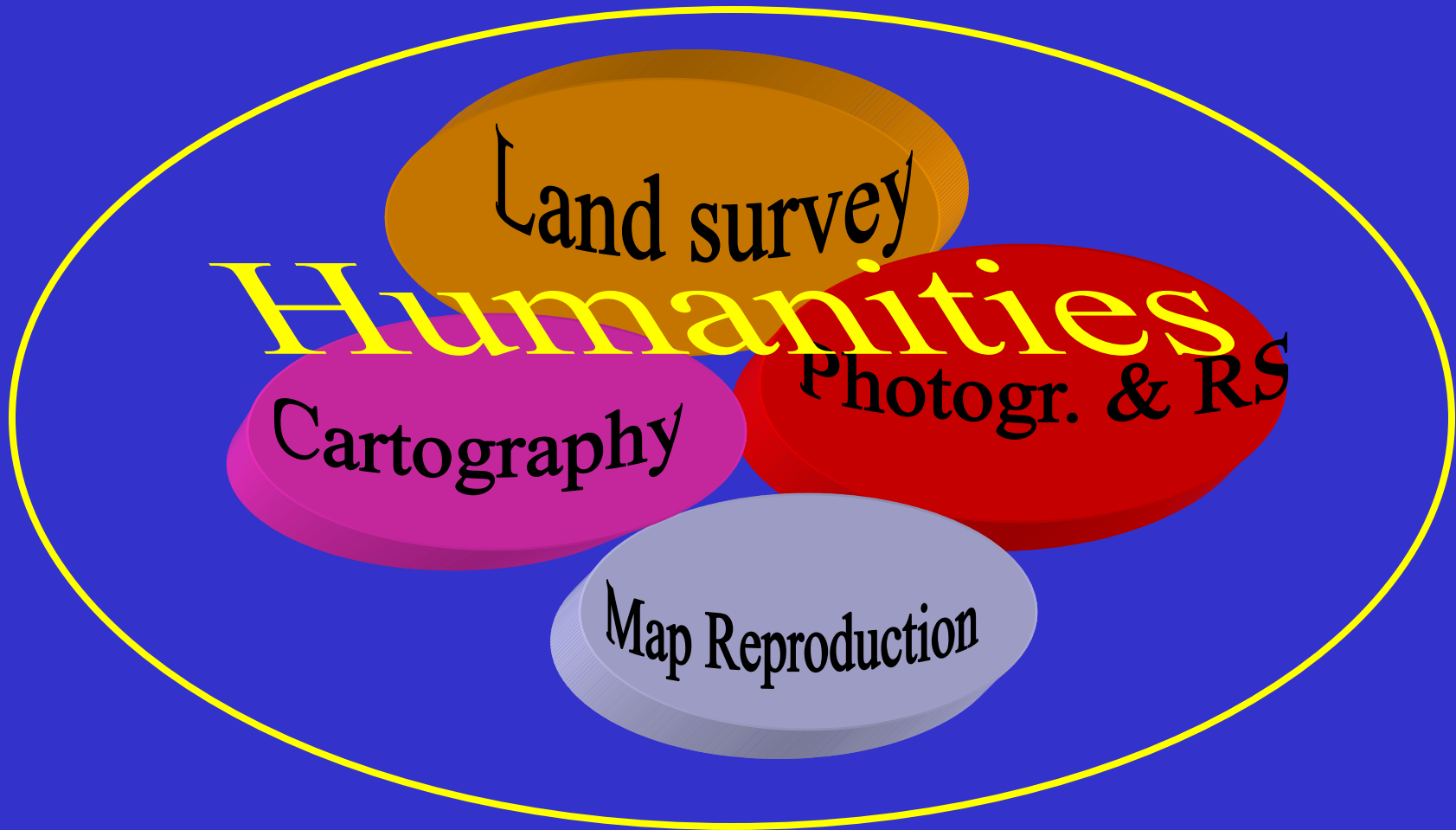
Mission statement

- To provide training for fostering qualified personnel in the fields of Surveying, Mapping and Printing and to carry out research in those areas

Our vision

- To become a centre of excellence in the training and research in the fields of Surveying, Mapping and printing

Departments



TRAINING ACTIVITIES

- a) Regular Courses
- b) Short Term Courses
- c) Third Country Group Training Courses

A: REGULAR COURSES

DIPLOMA

- ✚ Land Surveying
- ✚ Cartography
- ✚ Map
Reproduction
(Printing)
- ✚ Photogrammetry
and Remote
Sensing

HIGHER DIPLOMA

- ✚ Land Surveying
- ✚ Cartography
- ✚ Photogrammetry
and Remote
Sensing

DIPLOMA COURSE CONTENT

COURSE	MAJOR TOPICS
Land survey	Land Law, Surveying Instruments, Topographical Surveying, Cadastral Surveying, Engineering Surveying, Survey Control
Cartography	Applied Cartography, Cartographic Reproduction, Topographic and Cadastral Cartography
Photogrammetry and Remote Sensing	Photogrammetry, Photogrammetric Instruments, Aerial Triangulation, Basics of Remote Sensing
Map Reproduction	General Printing Studies, Printing Science, Print Origination, Photomechanical Processes, Machine Printing, Print finishing
Common courses	Social Studies, Entrepreneurship Education, Communication, Mathematics, Physics, Geography, Computer Sciences, Industrial Attachment, Project Work

HIGHER DIPLOMA COURSE CONTENT

Course	Major Topics
Land survey	Geodesy, Field Astronomy, Survey Adjustment, Environmental and Physical Planning
Cartography	Environmental and Physical Planning, Cartography, Topographic Mapping
Photogrammetry and Remote Sensing	Analytical Photogrammetry, Digital Photogrammetry, Remote Sensing Data Processing, Image Classification
Common for all courses	Entrepreneurship Education, Information Technology / Computer Studies, Development Studies, Resource Management, Industrial Attachment, Project Work

ENTRY QUALIFICATIONS

DIPLOMA

- ✚ Mean Grade C- (Div II) in Kenya Certificate of Secondary Education *and C- (Credit) in:*
 - Mathematics
 - English
 - Geography, and
 - Physical Science or Physics or Chemistry

HIGHER DIPLOMA

- ✚ A Diploma in the relevant discipline

Short term courses

- Modern technology
 - GIS and Remote Sensing
 - AutoCad
 - GPS and Total Stations
 - Desktop Publishing
 - Information Technology
- Tailor made to suit clients needs

THIRD COUNTRY TRAINING PROGRAMMES

AIMS:

- ✦ To share knowledge acquired or otherwise developed at the Institute.
- ✦ Transfer of modern surveying & mapping technology
- ✦ Enhancing capacity of KISM
- ✦ Contribute to the development of African Reference Framework (AFREF)



THIRD COUNTRY TRAINING PROGRAMMES (2)

- # Duration of about one month in August each year
- # Course Participants initially from 16 African Countries now extended to 19
- # Four courses have been run since 1998 with each course module running for 5 years
- # GPS Surveying course run from 1998 to 2002. Renewed as the GNSS course in 2003 to end in 2007
- # GIS course started in 2001 and ended in 2005. Proposal for a new course has been made
- # Remote Sensing for mapping (RSM) course began in 2004 and will end in 2008

GNSS training

- Participating countries
- Objectives
- Selection criteria
- Collaboration
- Examples of GNSS use
- Recommendations on future collaborations

3rd Country GNSS course participating countries



GPS/GNSS training per country (1998-2005)

NO	Country	GPS 1998- 2002	GNSS 2003- 2005	Total
1	Botswana	5	3	8
2	Ethiopia	4	4	8
3	Kenya	16	9	25
4	Lesotho	3	1	4
5	Malawi	6	1	7
6	Mauritius	3	1	4
7	Mozambique	0	1	1
8	Namibia	5	0	5
9	Rwanda	0	1	1
10	Seychelles	4	2	6

NO	Country	GPS 1998- 2002	GNSS 2003- 2005	Total
11	Swaziland	5	2	7
12	Tanzania	9	6	15
13	Uganda	9	6	15
14	Zambia	6	4	10
15	Zanzibar	0	3	3
16	Zimbabwe	0	2	2
17	Burundi	0	0	0
18	Eritrea	0	0	0
19	Sudan	0	0	0
TOTAL		75	46	121

GPS/GNSS Participants by year and course

Year/ Country	'98	'99	'00	'01	'02	'03	'04	'05	Total
Botswana	1	1	1	1	1	1	1	1	8
Ethiopia	1	1	-	1	1	2	1	1	8
Kenya	3	3	4	3	3	3	3	3	25
Lesotho	1	-	-	1	1	1	-	-	4
Malawi	1	1	2	1	1	-	-	1	7
Mauritius	1	1	-	-	1	-	-	1	4
Mozambique	-	-	-	-		-	1	-	1

GPS/GNSS Participants by year and course (...Cont'd)

Year/ Country	'98	'99	'00	'01	'02	'03	'04	'05	Total
Namibia	1	1	1	1	1	-	-	0	5
Rwanda	-	-	-	-	-	-	1	-	1
Seychelles	1	1	-	1	1	-	1	1	6
Swaziland	1	1	1	1	1	-	1	1	7
Tanzania	1	2	2	2	2	3	2	1	15
Uganda	2	2	2	2	1	3	2	1	15
Zambia	1	1	2	1	1	3	1	-	10
Zanzibar	-	-	-	-	-	1	1	1	3
Zimbabwe	-	-	-	-	-	-	1	1	2
Total	15	15	15	15	15	17	16	13	121

Objectives of the course

- To understand the fundamental theory of GNSS.
- To understand various applications of GNSS.
- To understand applications of GNSS to development of Geodetic Reference Frame.
- To carry out GPS surveys applying the various GPS positioning techniques.
- To be able to apply GNSS technologies in the participant's respective countries in development of national geodetic reference frame.
- Content is 40% theory and 60% practical with field trip to the Kenya Rift Valley

Selection criteria

- Nominated by their respective countries
- Level of education of Higher Diploma, university graduate or equivalent academic background
- Be engaged in surveying, mapping or related work & have practical field experience of preferably 5 years in the field
- Be 40 years of age in principle
- Have a good command of spoken and written English
- Be citizens of the applying countries
- Be of good health to be able to complete the course
- Computer literacy desirable

Collaboration by Kenya & Japan

Kenya (20%)

- Management of Local transportation and accommodations
- Transportation for field study tours,
- Sending out General Information (GI) and Certification
- Processing of applications and provision of training personnel, equipment and venues

Japan (80%)

- Provide short term experts
- Expenses for travel, accommodation, Health Insurance and daily allowances for foreign participants
- Payment of honoraria for resource persons external to KISM
- Expenses for textbook development, meetings and consumables

.....Collaboration

- Trainers drawn from KISM lecturers, local universities in Kenya, and Japanese short term experts
- Administration and management done at KISM by KISM staff
- Foreign Participants fully sponsored by Government of Japan, through JICA, while Kenyan Participants by Kenya Government through the Ministry of lands

Uses of GNSS

- ✚ Monitoring of Crustal Movement in the Rift Valley in Kenya
- ✚ Determination of Transformation parameters from WGS 84 to local datum
- ✚ Airports positioning to WGS 84

Monitoring of Crustal Movement in the Rift Valley in Kenya

- Joint venture with 3 universities in Japan including Hokkaido Hirosaki and Tohoku. JICA recently renewed 2 GPS receivers.
- 5 continuous operating stations around the Kenya rift valley
- Japanese provide funding and equipment while Kenya provides Personnel
- Analysis done in Japan, but plans are now under way to do it in Kenya
- Lately project was experiencing some problems, but has been revived in April this year.
- Participants extended to include Regional Centre for Mapping of Resources for Development (RCMRD), Jomo Kenyatta university of agriculture and Technology (JKUAT)

Recommendations on future collaborations

- Expand the rift valley monitoring project to other Countries by establishing collaboration with the participating countries and encouraging them to establish GPS continuous tracking stations for processing during the GNSS training.
- All participating countries should be enabled to take part in the development of AFREF by facilitating them to purchase the required equipment. The 121 participants so far trained across these 19 countries form a critical mass of GPS/GNSS experts needed for the project in the region.

.....recommendations

- Based on the experience so far gained, KISM should be supported to organize Tailor made GNSS courses to meet objective of actualization of the millennium development goals (MDGs)
 - Physical planning.
 - Disaster management.
 - Resource exploration & exploitation.
 - Social-economic issues including health.
 - Infrastructure development.
 - Utility management.
 - Mapping especially updating of topographical maps.
 - Routing for urban transport and goods movement.
 - Environmental monitoring and management.



•Our contacts

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