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REGIONAL CENTRE FOR SERVICES IN SURVEYING MAPPING AND REMOTE SENSING

21919

REPORT OF THE TRAINING COURSE ON REMOTE SENSING TECHNIQUES FOR THE DEVELOPMENT OF MONITORING NETWORKS IN INDUSTRIAL URBAN AREAS

17 - 26 MARCH, 1997
NAIROBI - KENYA



COUNTRIES SERVED BY THE CENTRE

LECTURED DURING THE COURSE IN REMOTE SENSING TECHNIQUES
DEVELOPMENT OF MONITORING NETWORKS IN INDUSTRIAL URBAN AREAS

17-26 MARCH, 1997

NAIROBI-KENYA

1. Sampling Techniques
by Dr. G.C. Mulaku, Dept. of Surveying, University of Nairobi, Box 30197, Nairobi.
2. GIS and Spatial Data Analysis
by Dr. G.C. Mulaku, Dept. of Surveying, University of Nairobi, Box 30197, Nairobi.
3. Pollution in Industrialized Urban Areas - Overview
by Dr. D. Ben Sari, ICS-UNIDO.
4. Introduction to the Course in Remote Sensing
Techniques for the Development of Monitoring
Networks in Industrial Urban Areas
by Dr. D. Ben Sari, ICS-UNIDO, Earth, Environmental and
Marine Sciences and Technologies Secretariat, Via
Grignano 9, 34014, Trieste, Italy.
5. Monitoring Systems - Overview
by Dr. D. Ben Sari, ICS-UNIDO, Earth, Environmental and
Marine Sciences and Technologies Secretariat, Via
Grignano 9, 34014 Trieste, Italy.
6. Image Processing
by Mr. Nicholas Ochanda, University of Nairobi-CEES,
Box 30197, Nairobi.
7. Industrial Development in Nairobi and Environs
by Mr. Nicholas Ochanda, University of Nairobi-CEES,
Box 30197, Nairobi and Mr. Luka A. Isavwa, RCSSMRS,
Box 18118, Nairobi.
8. Industrial Processes and Pollution in Developing
Countries by H.W. Namai, University of Nairobi,
Box 30197, Nairobi.

8. **Spatial Resolution Measurements**
by Mr. Nicholas Ochanda, University of Nairobi-CEES,
Box 30197, Nairobi.

10. **Analysis of Temporal Sequences**
by Mr. Nicholas Ochanda, University of Nairobi-CEES,
Box 30197, Nairobi.

11. **Exercise on Temporal Analysis**
by Mr. Nicholas Ochanda, University of Nairobi - CEES,
Box 30197, Nairobi.

12. **Industrial Ecology - A Branch of Ecology Studying the Interactions between Industry and Basic Environmental Variables** by Prof. Enrico Feoli, ICS-UNIDO, Earth, Environmental and Marine Sciences and Technologies Secretariat, Via Grignano 9, 34014, Trieste, Italy.

13. **Atmospheric Emission Inventory Guidebook**
First Edition, A Joint EMEP/CORIVAIR production.
Prepared by the EMEP Task Force on Emission Inventories
Edited by Gordon McInnes, European Environ Agency,
Feb.1996.

**REPORT OF THE
TRAINING COURSE ON REMOTE SENSING
TECHNIQUES FOR THE DEVELOPMENT OF
MONITORING NETWORKS IN INDUSTRIAL
URBAN AREAS**

17-26 March, 1997

NAIROBI-KENYA

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INTERNATIONAL CENTRE FOR SCIENCE AND HIGH TECHNOLOGY (ICS)
AND
REGIONAL CENTRE FOR SERVICES IN SURVEYING, MAPPING
AND REMOTE SENSING (RCSSMRS)

REPORT

Title : Training Course on Remote Sensing Techniques
for the Development of Monitoring Networks in
Industrial Urban Areas

Dates : 17-26 March, 1997

Venue : Nairobi, Kenya

Organizers/
Directors : Prof. Simon Ndyetabula, Director General
RCSSMRS, Nairobi, Kenya and Mr. Luka Isavwa,
Director Remote Sensing, RCSSMRS, Nairobi,
Kenya

Prof. Enrico Feoli, ICS-UNIDO, Trieste, Italy
Prof. Driss Ben Sari, ICS-UNIDO, Trieste, Italy

Purpose : The purpose of the training course is to
provide adequate information for the
development of monitoring networks using remote
sensing techniques in industrialized urban
areas in developing countries.

AIMS OF THE TRAINING COURSE

The aims of the training course were:

- . To offer training and support in some specific areas such as remote sensing and monitoring instrumentation
- . To introduce participants, who had been identified to have close contacts with decision making parties in their countries in supporting planning and management, to the use of remote sensing techniques for the detection and monitoring of industrial activities in urban areas;

- . To provide adequate information for the development of monitoring networks in industrialized urban areas in developing countries;
- . To apply remote sensing techniques for landscape assessment and optimal setting of in-situ monitoring instrumentation;
- . To find the optimal sites for new industrial development areas;
- . To establish in the already settled areas, monitoring networks suitable to control the state of the environment in order to assess the risks and eventually plan remedial or recovering actions in case of disasters.

For details of the course, see the Aid-Memoire of the meeting in Annex I

THE TRAINING PROGRAM

Opening Ceremony

Address by Director General, RCSSMRS, Nairobi, Kenya

A welcome address on behalf of the Governing Council and the staff of the Centre to the participants and distinguished guests was given by Prof. Simon Ndyetabula, the Director General, RCSSMRS, Nairobi, Kenya. In his address, the Director General presented an overview of the Centre highlighting its objectives and activities.

He reiterated the importance of such course which was being held in Sub-Saharan Africa for the first time. He welcomed the collaboration with ICS and UNIDO in protection of the environment and this collaboration would provide the opportunity for the two institutions to be acquainted with the activities of the Centre. The unique benefits that will accrue to the Centre from this cooperation will flow to its Member States.

The Director General emphasized that the technical cooperation between the International Centre for Science and High Technology of Trieste, Italy and the Centre was a significant milestone in the history of the Centre.

Opening Address by Guest of Honour, Prof. Ugo Leone, ICS Managing Director, Trieste, Italy

The opening address of the training course was given by Prof. Ugo Leone, the ICS Project Leader and Assistant Secretary General of

the United Nations. He outlined the activities of the ICS and emphasized the role it played in the field of industrial development which requires a knowledge-based management of natural resources and environment.

He also cited the recent national and international legislation both related to Environmental Impact Assessment (EIA) and to the adoption of Agenda 21 which proposes actions that have to be taken continuously, in real time and at different scale levels: within the industrial plants, within the industrial areas and within the landscape.

He emphasized that ICS has taken up seriously the implications of Agenda 21 for industrial policy and industrialization patterns in developing countries and together with UNIDO it has started to address the problems in its activities.

He noted that the present course is the first one to be mounted by ICS in Sub-Saharan Africa and hoped that the awareness created will be useful for the developing countries.

The cooperation with the Regional Centre for Services in Surveying, Mapping and Remote Sensing is to develop and strengthen a new awareness of technological transfer through the Centre. ICS will do its best to strengthen the capabilities of the RCSSMRS to meet the challenges of environmental assessment in industrial development in urban areas.

Address by Mr. Ugo Astuto, First Secretary, Italian Embassy

Mr. Ugo Astuto delivered an address on behalf of the Ambassador Di Leo of the Italian Embassy in Nairobi. In his address, he underscored the importance of monitoring urban areas through remote sensing and Geographic Information Systems which have been recognized as useful tools for policy makers and planners. He cited the ever growing urban population and commended ICS Trieste, for spear heading efforts in the application of such systems in the developing world as a significant contribution towards the goal of sustainable development of urban areas as stated in the Habitat II Conference in Istanbul in 1996.

For details of the opening addresses see Annex IIA and IIB

The Training Timetable

The training timetable of the course (see Annex III) was followed closely with very minimal adjustments.

The timetable of the course was grouped into four themes namely; pollution in industrialized urban areas, introduction to remote sensing, sampling techniques and data analysis and developing monitoring networks for in-situ measurements.

The topics that were covered encouraged the interaction of ideas by the participants through comments and questions.

Most of the participants found the scientific program very useful. The use of small working groups and case studies were found to be particularly useful. The time spent by lecturers after classes on specific problems was balanced. The rest of the class lectures were balanced scientifically.

An evaluation of the lecturers indicated that they were qualified and executed their respective assignments adequately. The course materials were adequate (see the evaluation report in Annex IV).

A presentation was given by Mr. Giovanni Carnizaro, the Project Manager and Chief Technical Advisor of the Land Cover Mapping of East Africa (AFRICOVER) project. The presentation was intended to increase the participants' knowledge in what can be done through remote sensing applications. (see Annex IV).

The details of the course program and the names of lecturers is given in Annex III.

PARTICIPANTS

Nineteen (19) experts attended the course. Eight (8) countries were represented as follows:

Ethiopia	-	1
Kenya	-	4
Malawi	-	2
Sudan	-	2
Swaziland	-	1
Tanzania	-	2
Uganda	-	3
Zambia	-	2
RCSSMRS	-	2

19

The final list of participants is attached (see Annex IVA). A list of distinguished guests who attended the opening ceremony is given in Annex IVB.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The duration of the course was found to be too short while the length of the working day was adequate.

Participants found the training facilities and hotel accommodation satisfactory.

The organizers responded very well to the participants' needs and the overall program was very good.

All the participants undertook the responsibility to recommend to their national colleagues to attend such training course in future.

For detailed conclusions see evaluation report Annex V

Recommendations:

Recommendations have been suggested at different levels:

At National Level

1. Create a comprehensive understanding and appreciation of industrial development problems.
2. Encourage city planners to participate in future courses
3. Devise methods of scientifically mitigating industrial development problems.
4. Develop methods for treating industrial pollution through understanding of industrial development
5. Develop good understanding of the use of remote sensing techniques for siting and management of industrial development in urban areas.

At Regional Level

1. Enhance and strengthen the Regional Centre for Services in Surveying, Mapping and Remote Sensing as a focal point for

research, advisory services and training of environmental assessment of industrial development of urban areas.

2. Develop techniques to be used for detection of pollution for planners and decision makers.
3. Conduct follow up workshops at the Regional Centre for Services in Surveying, Mapping and Remote Sensing.
4. Devise ways and means of increasing regional capacity expertise for environmental industrial development through training and research and pilot projects.
5. Develop a regional data base of environmental information systems concerning networks of industrial development in urban areas.
6. Conduct follow up courses in the member States of the RCSSMRS.

At International Institutional Level

1. Intensify training to create an impact of awareness of environmental issues during the development of industries in urban areas.
2. Establish networks of focal points for industrial development.
3. Develop and encourage more workshops in developing countries.
4. Encourage publication and dissemination of environmental issues in the development of industries in urban areas.
5. Encourage and provide necessary facilities for study tours.
6. ICS to encourage the use of remote sensing based techniques.

Specific Actions to be carried out by ICS-UNIDO

1. Create a data-base at regional level of environmental issues
2. Encourage research in equipment and technology in the use of remote sensing.
3. Conduct regular training courses for enhancing human resources capacities in developing countries.

4. Strengthen the Regional Centre for Services in Surveying, Mapping and Remote Sensing as a focal point for research, training and advisory services for the East and Southern Africa region.
5. Conduct a follow up course for participants of the course after 2 years.

FUNDING

The total budget for the training course amounted to a total of US\$50,000 (Fifty thousand). However, a total of US\$52,708.00 (Fifty two thousand seven hundred and eight) was reflecting an overexpenditure of US\$2,708.00.

The over expenditure is reflected in perdiem, boarding and lodging, satellite imagery, transport expenses, administrative support and miscellaneous.

The funds on miscellaneous was used for field work expenses in Nairobi and the surrounding areas. It was also used to hire extra utilities for training materials as well as extra satellite imagery which proved to be useful for the course.

The Regional Centre for Services in Surveying, Mapping and Remote Sensing is grateful for the financial assistance by UNIDO for the successful accomplishment of the training course.

During the course, many issues were discussed especially during the field trip in Nairobi as well as the surrounding areas. The issues relating to data bank development and maintaining an ICS-UNIDO activity at the Centre was emphasized.

The financial assistance given was adequate and we hope that the recommendation that the Centre runs similar courses in future will likewise be supported by UNIDO.

For details see Annex VI.

ANNEX I

ICS

*International Centre for Science
and High Technology*

Regional Centre for Services in Surveying Mapping and Remote Sensing
(RCSSMRS)

AIDE-MEMOIRE

**Remote Sensing Techniques for the Development of Monitoring
Networks in Industrial Urban Areas**

Nairobi, Kenya
17-26 March, 1997

*International Centre for Science and High Technology (ICS)
Via Grignario 9, P.O. Box 586, 34014 Trieste, Italy
Via
Tel.: 39-40-224572 Fax: 39-40-224575*

**Regional Centre for Services in Surveying, Mapping and Remote Sensing
P.O. Box 18118, Nairobi, Kenya
Tel: 254-2-803320-9
Fax: 254-2-802767**

BACKGROUND AND JUSTIFICATION

Industrial pollution reaches water and soil by direct deposits or emissions, or by indirect deposit through the emission in the air. Monitoring air, water and soil could be done on a regular basis through networks of in-situ techniques or at an irregular basis when required.

Industrial development requires a knowledge-based management of natural resources and environment. It is urgent to develop monitoring systems capable to offer data and knowledge on the state of environment and on the level of its degradation. The Environmental Impact Assessment (EIA) and the Agenda 21, require controls at different scale levels within the industrial plants, industrial areas and within the landscape.

The development of monitoring systems is particularly needed in developing countries. Field observations and other direct measurements of the earth's surface have to be integrated with the results of proper interpretations or remotely sensed data that will be of guidance in subsequent image processing for image enhancement and information extraction. Particularly important for efficient monitoring is the development of a network system of monitoring stations suitable for registering atmospheric and aquatic pollution. Monitoring is essential to establish protocols for risk assessment and plans for response to emergency. The complementary nature of remotely sensed data and of ancillary data gathered from data acquisition with suitable monitoring instrumentation, ground verification and other maps, is the key to computer modeling for environmental control.

AIMS OF THE TRAINING

The aims of the training course are:

- to introduce participants who have close contacts with decision making parties in their country in supporting planning and management, to the use of remote sensing techniques for the detection of industrial activities in urban areas and devise methods of their detection and monitoring.
 - to provide adequate information for the development of monitoring networks in industrialized urban areas in developing countries;
 - to apply remote sensing techniques for landscape assessment and optimal sitting of in-situ monitoring instrumentation;
 - to find the optimal sites for industrial development of new areas;
- to establish in the already settled areas, monitoring networks suitable to control the state of the environment in order to assess the risks and eventually plan remediation or recovering actions in case of disasters.

STRUCTURE OF THE TRAINING COURSE

The structure of the training course includes several lectures, demonstrations and exercises by specialists on the following subjects: monitoring industrial areas by remote sensing; industrial ecology; industrial processes and pollution; introduction to remote sensing (satellite and data acquisition instrumentation, image processing, correction techniques, spatial resolution measurements, analysis of temporal sequences); sampling techniques and data analysis (successive approximations, multivariate data analysis, GIS and spatial data analysis); monitoring systems (development of monitoring networks for in-situ measurements, landscape assessment and scale problems).

PARTICIPATION

The training course will bring together technologists and researchers dealing with remote sensing and monitoring in industrial urban areas. Participation is by invitation. A maximum of 15 participants, of which 4 from Kenya will be admitted to the training course coming from Ethiopia, Malawi, Sudan, Tanzania, Uganda and Zambia. About eight lecturers will be invited to speak on specific topics.

EXPECTED OUTPUTS

The training course is structured in a way to improved both the individual skills and the capacity building of the institutions from which participants are coming.

The contents of the course should be framed in the regulatory context and special emphasis given to access information.

The output of this activity will be the training of the invited participants by transferring the acquired knowledge through the decision making process in their own countries. It is expected that through this activity the capacity building of the institutions from which the participants are coming will be improved.

The results of the course should be used for efficient planning and management of the natural resources and the environment.

PROGRAMME

The training course will offer the participants the opportunity to be exposed to topics, giving them clear indication on the basic methodology to be applied and on the access to the information and material for learning. Tools such as Image Processing Systems (IPS), GIS, statistics, data analysis methods, etc. will be presented with examples (case studies) and practical experiences.

This activity will also take into consideration the local industrial development issues with connection to the Environmental Management System programme as far as the problem of eco-audit and eco-labeling is concerned.

DOCUMENTATION

The documents available for the training course will be:

1. Aide-memoire of the training course.
2. Programme and list of participants.
3. Lecture notes, bibliography and copies of manual exercises (for internal use only).
4. A list of selected bibliography on remote sensing techniques for the development of monitoring networks in industrial urban areas.

LANGUAGE

The training course will be conducted in English and no translation facilities will be available. It is expected that the participants have a good command of English.

TIME AND VENUE

The training course will be held at the Regional Centre for Services in Surveying, Mapping and Remote Sensing, P.O. Box 18118, Nairobi, Kenya, from 17 to 26 March, 1997.

FINANCIAL ADMINISTRATIVE ARRANGEMENTS FOR UNIDO-ICS FINANCED PARTICIPANTS

For those who will be invited by UNIDO-ICS to participate in the training course, round-trip air-economy transportation from the airport of departure will be arranged and prepaid tickets issued where necessary.

Room and board at the training course venue plus a daily allowance and terminal expenses will be provided upon arrival to Nairobi. Reservation will be made for all participants at the (Tel.: +, Fax: +).

The participants will be required to bear the following costs:

All expenses in their home country incidental to travel abroad, including expenditures for passport, visa and any other miscellaneous items. UNIDO-ICS will not assume responsibility for any of the following costs which may be incurred by the participant while attending the meeting.

1. Compensation for salary or related allowances during the period of the workshop;
2. any costs incurred with respect to insurance, medical bills and hospitalization fees;

3. compensation in the event of death, disability or illness;
4. loss or damage to personal property of participants while attending the workshop.

VISA ARRANGEMENTS

Participants are requested to arrange for their visa as early as possible at the Embassy of Kenya in their home country. In case of difficulties, please advise the contact person mentioned below.

CONTACT PERSON

For additional information, please contact Prof. Simon Ndyetabula. Further details about the training course and travel instructions will be provided upon request.

Prof. Simon Ndyetabula
Regional Centre for Services in Surveying Mapping and Remote Sensing
P.O. Box 18118
NAIROBI, Kenya
Tel: 254 2 803320-9
Fax: 254 2 802767

ANNEX IIA

ICS COURSE: OPENING STATEMENT BY DIRECTOR GENERAL OF RCSSMRS

Your Excellency

Heads of International Organizations

Representatives of the Kenya Government

Participants of the Subject Training Course

Colleagues

Ladies and Gentlemen

It gives me great pleasure to take this opportunity to welcome you to the Regional Centre for Services in Surveying, Mapping and Remote Sensing, here in Kasarani, Nairobi.

As some of us are aware, this Centre was established 22 years ago with the following objectives:

- (i) To provide natural resource and environmental data through the use of specialized techniques such as: mapping, remote sensing, GIS and other related approaches;
- (ii) To provide training for nationals of member States in the fields mentioned above;
- (iii) To carry out studies and research in surveying, mapping, remote sensing and GIS, and make available to member States the results of the researches and studies;
- (iv) To provide advisory services to member States, upon request on problems relating to natural resources and environmental information.

The topic of the course, which is to be opened today, is 'Remote Sensing Techniques for the Development of Monitoring Networks in Industrial Urban Areas'. Among other issues that will be dealt with by the course are:

- pollution in industrialized urban areas
- pollution monitoring systems using remote sensing techniques
- acquisition and processing of the monitoring data etc.

Such areas are those which this Centre, in collaboration with other institutions, is competently placed to be able to address; and as such, the Centre is participating fully in the running of this course. In the light of its mandate, the Centre, notes with satisfaction that the introduction of this course to the activities of the Centre, is a unique addition to the benefits that accrue to its member States.

Let me add with gratitude that the running of this course at the RCSSMRS marks a significant milestone in the technical cooperation between the International Centre for Science and High Technology of Trieste, Italy and our Centre. For this reason, I take this opportunity, on behalf of the Centre's Governing Council and the entire community of the Centre to sincerely thank UNIDO for sponsoring this course and to thank the Managing Director of ICS, Prof. Ugo Leone, for facilitating all the possibilities of the course.

Ladies and Gentlemen

Let me once again, on behalf of the Centre, extend to you all our warmest welcome to the Centre to participate in the opening of this course.

Welcome and Thank You.

ANNEX IIB

ADDRESS BY MR. UGO ASTUTO, FIRST SECRETARY, ITALIAN EMBASSY,
NAIROBI, KENYA

"Mr. Chairman, Ladies and Gentlemen,

Thank you very much for your invitation at this opening ceremony. Ambassador Di Leo would have liked to join us today, unfortunately, he could not, due to other previous engagements. He has asked me to

convey to you his best wishes for a successful and fruitful discussion. The monitoring of urban areas through remote sensing has been recognized as a particularly useful tool for policy-makers. Geographical Information Systems (GIS) are widely acknowledged as an effective method for the collection of data, for planning purposes. Italy has been supporting several projects in this field, for instance through the U.N. Centre for Human Settlements (UNCHS-Habitat), based in Nairobi. The application of such systems in the developing world is a significant contribution towards the goal of sustainable development for urban areas, as stated in the Habitat II Conference, in Istanbul, last year.

Urbanization is growing worldwide and will be a difficult challenge to be met by developing countries, where urban population will increase dramatically, in the next few years. We, therefore, welcome the present initiative, undertaken in the framework of activities implemented by the Trieste Centre for Science and High Technology. We fully subscribe and support the objectives of the Trieste Centre, i.e., the promotion of North/South partnership through the exchange of ideas and scientific knowledge, and we are glad to acknowledge the results achieved by the Centre, such as today's seminar.

Again, best wishes for a fruitful debate.

Thank you."

ANNEX III

PROGRAMME OF COURSE

Saturday/Sunday-	-	Arrival of participants and speakers	
Day One	-	Monday 17th March, 1997	
<hr/>			
0830-1000	-	Registration and logistics	- RCSSMRS
1000-1030	-	Tea/coffee break	
1030-1130	-	Opening ceremony	- ICS/RCSSMRS
1130-1230	-	Introduction to course	- D.Ben Sari
1230-1400	-	Lunch break	
1400-1500	-	Overview of pollution in industrialized urban areas	- D. Ben Sari
1500-1630	-	Presentation by participants	
Day Two	-	Tuesday 18th March	
<hr/>			
0900-1000	-	Industrial processes and pollution	- H.Namai
1000-1030	-	Tea/coffee break	
1030-1230	-	Overview of monitoring systems	- D. Ben Sari
1230-1400	-	Lunch break	
1430-1530	-	Introduction to remote sensing Satellite and data acquisition instrumentation	- J. Agatsiva
1530-1600	-	Tea/coffee break	
1600-1700	-	Continuation	
Day Three	-	Wednesday 19th March	
<hr/>			
0900-1000	-	Image processing	-J. Agatsiva/ N. Ochanda
1000-1030	-	Tea/Coffee Break	
1030-1130	-	Continuation of Image processing	
1130-1230	-	Exercises	-H. Namai/ J. Agatsiva
1230-1400	-	Lunch Break	
1400-1700	-	Exercises	-H.Namai/ J. Agatsiva

Day Four - Thursday 20th March

0900-1000 - Correction techniques -J.Agatsiva
1000-1030 - Tea/coffee break
1030-1230 - Spatial resolution measurement-N. Ochanda
1230-1400 - Lunch break
1400-1700 - Exercises -N. Ochanda

Day Five - Friday 21th March

0900-1000 - Analysis of temporal sequences-N. Ochanda
1000-1030 - Tea/Coffee Break
1030-1230 - Sampling Techniques and data analysis
Successive approximation -G.Mulaku/E.Feoli
1230-1400 - Lunch break
1400-1700 - Exercises -N. Ochanda

Day Six Saturday 22nd March

- Tour of Nairobi Industrial Development and Environment -N. Ochanda
L. Isavwa

Day Seven - Sunday 23rd March

F r e e

Day Eight - Monday 24th March

0900-1000 - Introduction to Industrial Ecology - E.Feoli
1000-1030 - Coffee break
1030-1230 - Multivariate data analysis - E. Feoli
1230-1400 - Lunch break
1400-1700 - GIS and spatial data analysis - G. Mulaku

Day Nine

Tuesday 25 March

- 0900-1000 - GIS and spatial data analysis - G. Mulaku
(continuation)
- 1000-1030 - Coffee break
- 1030-1230 - Remote Sensing, monitoring,
landscape assessment and
scale problems - H. Namai
- 1230-1400 - Lunch break
- 1400-1700 - Case studies and monitoring network

Day Ten

Wednesday 26 March

- 0900-1000 - Presentation of AFRICOVER
project -G. Carnizzaro
 - 1000-1030 - Coffee break
 - 1030-1230 - Presentation and Evaluation
by participants
 - 1230-1400 - Lunch break
 - 1400-1500 - Closing of the meeting
- Departure of participants/lecturers

ANNEX IVA

ICS COURSE IN REMOTE SENSING
17TH - 26TH MARCH, 1997

PARTICIPANTS

NAME	PRESENT POSITION	ADDRESS
(1) MRS.ABU HARAZ SALWA	Senior Inspector- Development Budget	Ministry of Finance & National Economy P.O. Box 298 KHARTOUM Sudan Tel: (249) (11) 771626/770772 Fax: 775630
(2) MISS SOUAD YOUSIF AHMED	Senior Inspector	National Ministry of Industry P.O. Box 2184 KHARTOUM Sudan Tel: (249) (11) 778940/777770 Fax: 777603/775243
(3) MR.MUTAMBI JOSHUA	Pupil Engineer	Ministry of Trade & Industry Technology Department P.O. Box 7103 KAMPALA Uganda Tel: (041) 254091 Fax: (041) 251578
(4) MR.KIMANI MICHAEL MATTHEW MUIGAI	Industrial Develop- ment Officer	Ministry of Commerce & Industry P.O. Box 30418 NAIROBI Kenya Tel: 340010 Fax: 217916

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Professor
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ANNEX IVB

ICS - RCSSMRS COURSE IN REMOTE SENSING
17-26 MARCH, 1997

OPENING CEREMONY

Attendance

The following invited guests attended the opening ceremony:

1. Prof. Ugo Leone
Managing Director of ICS and
Assistant Secretary General of UN
International Centre for Science and
High Technology
Via Grignano 9
TRIESTE
Italy

Tel: 39 40 224572
Fax: 39 40 224575

2. Prof. Driss Ben Sari
Area Coordinator
International Centre for Science and
High Technology
Via Grignano 9
TRIESTE
Italy

Tel: 39 40 224572
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3. Prof. Thomas R. Odhiambo
Managing Trustee
RANDFORUM
P.O. Box 49849
NAIROBI
Kenya

Tel: 564257

4. Mr. Ugo Astuto
First Secretary
Embassy of Italy
International House
9th Floor, Mama Ngina Street
P.O. Box 30107
NAIROBI
Kenya

Tel: 254-2-337356/7
Fax: 254-2-337056

5. Mr. Peter L.B. Kubebea
Deputy Permanent Secretary
Ministry of Environment and Natural Resources
P.O. Box 30126
NAIROBI
Kenya

Tel: 254-2-229261
Fax: 254-2-216951

6. Prof. Simon Ndyetabula
Director General
Regional Centre for Services in Surveying,
Mapping and Remote Sensing
P.O. Box 18118
NAIROBI
Kenya

Tel: 254-2-803320-9
Fax: 254-2-802767

7. Mr. Luka A. Isavwa
Director, Remote Sensing
Regional Centre for Services in Surveying,
Mapping and Remote Sensing
P.O. Box 18118
NAIROBI
Kenya

Tel: 254-2-803320-9
Fax: 254-2-802767

8. Mrs. Leone
International Centre for Science and High Technology
Via Grignano 9
TRIESTE
Italy

Tel: 39 40 224572
Fax: 39 40 224575

9. Mr. Martin Chodota
Senior Surveyor
Regional Centre for Services in Surveying,
Mapping and Remote Sensing
P.O. Box 18118
NAIROBI
Kenya

Tel: 254-2-803320-9
Fax: 254-2-802767

10. Mr. Giovanni Canizzaro
Chief Technical Advisor
AGFRICOVER PROJECT
P.O. Box 18118
NAIROBI
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Tel: 254-2-803320-9
Fax: 254-2-802767

11. Mr. Zein Sharif
Chief Cartographer
Regional Centre for Services in Surveying,
Mapping and Remote Sensing
P.O. Box 18118
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12. Mr. Jaspat Agatsiva
Remote Sensing Officer
Regional Centre for Services in Surveying,
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P.O. Box 18118
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13. Mr. Haggai Namai
Senior Lecturer
Department of Geography
University of Nairobi (CEES)
P.O. Box 30197
NAIROBI
Kenya

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Fax: 254-2-336885

14. Mr. G.C. Mulaku
Senior Lecturer
Department of Surveying
University of Nairobi
P.O. Box 30197
NAIROBI
Kenya

Tel: 254-2-334244
Fax: 254-2-336885

15. Mr. Nicholas Ochanda
Lecturer
Department of Architecture and Urban Planning
University of Nairobi
P.O. Box 30197
NAIROBI
Kenya

Tel: 254-2-334244
Fax: 254-2-336885

16. Prof. Enrico Feoli
International Centre for Science and High Technology
Via Grignano 9
TRIESTE
Italy

Tel: 39 40 224572
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ANNEX V

ICS WORKSHOP/TRAINING COURSE
EVALUATION QUESTIONNAIRE

The course was attended by nineteen (19) participants. Only fourteen (14) participants returned the evaluation forms. The following is a summary of the reactions from the participants.

Course Title

The course was titled ICS course in Remote Sensing Techniques for the Development of Monitoring Networks in Industrial Urban Areas.

A. Organisation

1. Most of the participants got the information about the course through four main channels as follows:

Employer	21.43%
Training Officers	21.43%
Head of Department	21.43%
Invited by RCSSMRS	35.71%

		<u>Excellent</u>	<u>V. Good</u>	<u>Good</u>	<u>Fair</u>
2. Information process was	35.72%		50%	7.14%	7.14%
3. The announcement and pre-course was	14.28%		35.72%	21.43%	7.14%
4. The Scientific programme was found to be	21.43%		64.285%	14.285%	-
4.1 Applied lectures	14.285%		64.285%	14.285%	7.15%
4.2 Use of small working groups	28.57%		35.72%	35.72%	-
4.3 Case Studies	28.57%		28.57%	28.57%	14.29%
4.4 Time spent by lecturers and after class	28.57%		35.72%	35.72%	-

		<u>Balanced</u>	<u>Unbalanced</u>
4.5 Student scientific knowledge	78.57%		21.43%

B. Duration of programme

		<u>Just Right</u>	<u>Too Long</u>	<u>Too Short</u>
1. Number of days	35.72%		-	64.28%
2. Length of working days	71.43%		7.14%	21.43%

C.	Training Facilities/Hotel	<u>Excellent</u>	<u>V. Good</u>	<u>Good</u>	<u>Fair</u>
1.	Lecture/Training Rooms	21.43 %	28.57 %	28.57 %	7.14 %
2.	Breaks/Refreshments	28.57 %	21.43 %	28.57 %	7.14 %
3.	Hotel Accommodation	35.72 %	21.43 %	7.14 %	-
4.	Meals at Hotel	35.72 %	42.86 %	14.29 %	-
D.	Organiser's response to participants' needs	42.85 %	35.72 %	14.29 %	7.14 %
E.	Overall programme organisation	28.57 %	57.15 %	7.14 %	7.14 %
F.	Would you recommend to others from your institution/country to attend similar activity in future	<u>Yes</u> 100%	<u>Maybe</u>	<u>No</u>	
G.	Evaluation of Lecturers & Speakers				
1.	Course materials	28.58 %	35.72 %	35.72 %	-
2.	Lecture presentation	21.43 %	50.0 %	28.57 %	-
3.	Ability of lecturers to answer specific questions	35.71 %	42.86 %	21.43 %	-

Other responses are as follows:

1. Main benefit for participants and or their institution and countries.
 - Created a comprehensive understanding and appreciation of industrial development problems.
 - Methods of scientifically mitigating industrial development problems was adequately shown.
 - Methods of data collection and analysis of raw data into acceptable products was clearly demonstrated.
 - How to treat industrial pollution and industrial ecology was demonstrated.
 - Use of remote sensing for mapping and monitoring pollution was demonstrated.
 - The knowledge gathered will enhance industrial decision making process.
 - Remote sensing and in-situ instrumentation can be used for monitoring environmental changes and monitoring.
 - Pleased to learn industrial landscape and industrial ecology.
 - Understanding of the GIS and information management was very useful.

- Application of remote sensing techniques have been demonstrated for landscape assessment, monitoring as well as planning.

2. Activities found to be most useful by participants:

- Information through GIS as integration of electronic data.
- GIS and Spatial analysis and image interpretation.
- Multivariate data analysis and the detection of pollution.
- Use of remote sensing and aerial photography for urban monitoring and planning.
- The field trip was excellent and opened adequate discussions on site.
- Industrial ecology, land scape and GIS and spatial analysis.

3. Part of the activities to be expanded

- GIS and its application
- Spatial data analysis
- Image process and computer demonstration
- Gaseous emissions to the ozone layer
- Monitoring and assessment of the Centre
- Scale problems and sampling
- Industrial ecology to be expanded

4. No activity to be dropped

5. Future improvement of the programme

- Introduce humanities
- Policy development
- Have more practical
- Increase more case studies
- Lecture notes to be given before class for easier reference

6. Whether or not topics studied can be introduced to industries in participants' home/country

- Topics can assist in developing monitoring techniques for assessing industrial process.
- Device techniques to be used for the detection of pollution for planned and decision makers.
- Can use some of the topics to advise on the development of industrialization in their countries.
- The use of remote sensing for locating and siting industries and the management of environmental depreciation.
- Development of systematic methods of collecting waste, its dumping and its management.
- How to deal with environmental issues affecting industries in a clear methodical manner.
- Making the Regional Centre for Services in Surveying, Mapping and Remote Sensing the focal point so as to utilize their extensive remote sensing facilities and satellite imageries.
- Report in other countries what was done in Nairobi.

7. Suggestion of Programmes and Future Activities which ICS could pursue in order to help with the technological and scientific advancement of countries.

- Dissemination of information on available cost-effective means of cleaning the industrial environment.
- Development of equipment and technology and the use of remote sensing
- Training and creation of awareness for the development of instrumentation for assessing pollution in urban industrial area.
- Establish a network of focal points for developing strategies for monitoring urban landuse data inventory and development and environmental degradation in industrial urban areas.
- Development methods for mapping industrial urban areas using remote sensing.

- Develop and encourage more workshops for indepth consideration of environment of industrial urban areas.
- Encourage and provide for study tours.

8. Further Comments

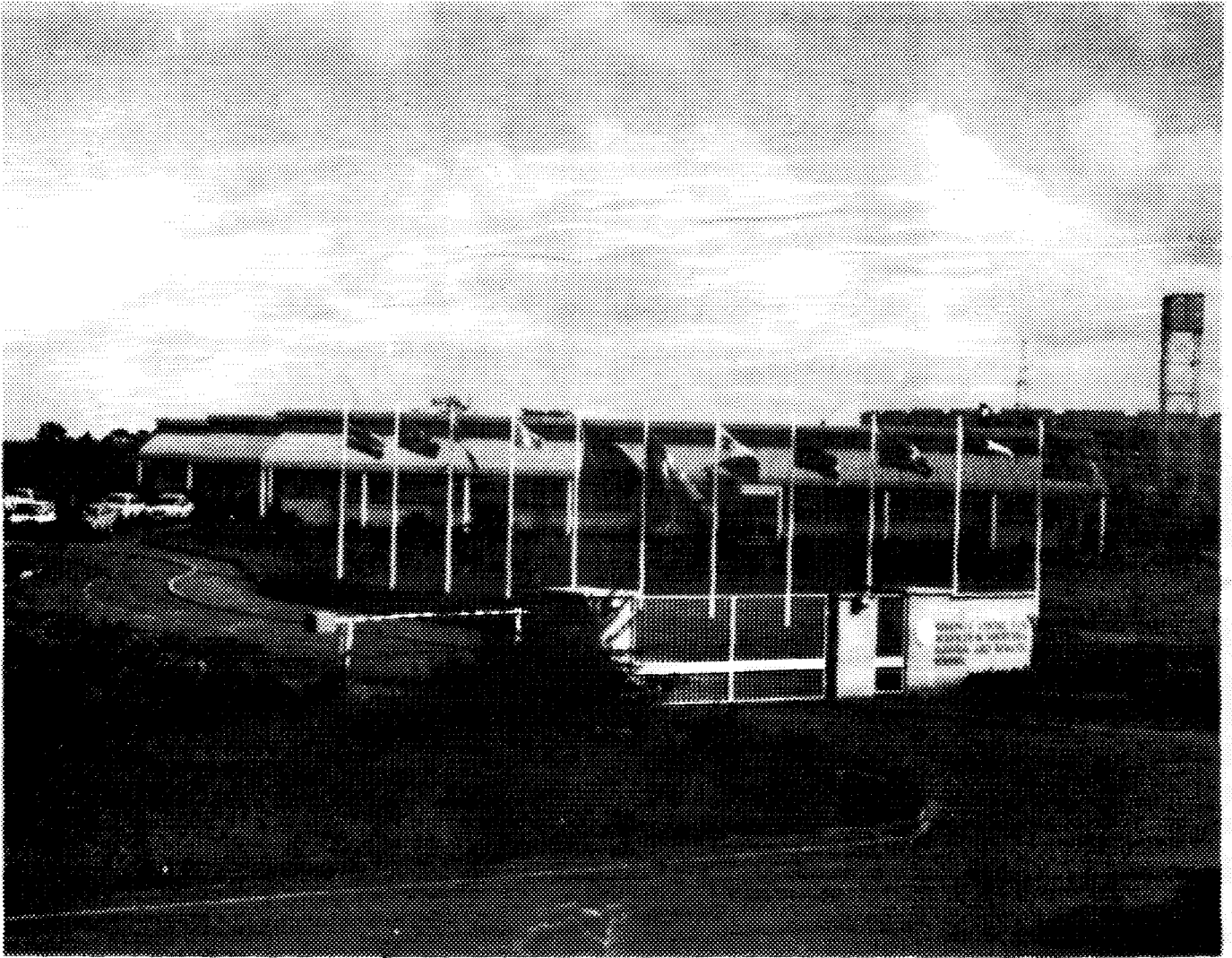
- Participant were pleased by the kind of courses conducted at the Centre for developing countries.
- ICS to introduce remote sensing to accelerate base maps revision for faster development.
- A course should be mounted to assess processing and pollution in urban industrial areas.
- Thanked the Centre's staff for the excellent organisation of the course making it pleasant to attend and participate.
- City participants should be encouraged to attend future courses.
- Needs for GIS technology to be developed and a course be mounted in the future.
- Participants should be kept informed through follow-up workshops and organised study tours. dissemination of journals, publication with the aim of assessing feed back and planning for ICS.
- Encourage research for faster demonstration of remote sensing technology.
- Provide financial assistance for research projects.
- Strengthen the RCSSMRS as a focal for ICS activities in the region.

ANNEX V1

ICS/UNIDO

EXPENDITURE FOR THE COURSE HELD FROM 17TH - 26TH MARCH 1997

ITEM	ALLOCATION	ACTUAL AMOUNT
	US\$	US\$
1. Air Tickets	13100.00	12749.00
2. Per Diems	3240.00	3300.00
3. Board and Lodging	12000.00	12125.00
4. Fees for Speakers	2500.00	2925.00
5. Satellite Imagery	5000.00	6920.00
6. Transport Expenses	2000.00	2245.00
7. Utilities	3000.00	3220.00
8. Administration Support	3500.00	3800.00
9. Contingencies	1660.00	1350.00
10. Miscellaneous	<u>4000.00</u>	<u>4074.00</u>
TOTAL	<u>50000.00</u>	<u>52708.00</u>



THE CENTRE'S HEADQUARTERS

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