

Geodesy Education at RCMRD: From Frame to Parcel

PRESENTER

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DATE & VENUE

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Senegal & Uganda, 2025

Trained to run their new national CORS networks.

Solar Panel

Infra red
Camera

GNSS Receiver,
IoT, electricals

FIELD • 2017–2025

Who Trains the Operators?

After the project ends — the next technician, and the one after that.

Senegal, 2025

Technicians from **ANAT** + **PROCASEF** trained on SEN-CORS architecture, supervision, alert tools, preventive and corrective maintenance. Training by IGN FI consortium.

Uganda, 2017–2025

UGRF — 40+ station network. Local teams trained in network management, data processing and maintenance as part of IGN FI technical assistance.

“ International partners are doing excellent work. The knowledge must also stay in Africa.

The Need — and the Hunger to Learn

A 2013 gap, and a 2025 response.

WORLD BANK, 2013

<10 land surveyors
per million people

In Ghana, Kenya and Uganda — against 197 in
Malaysia.

Kenya • Ghana • Uganda **<10**



Malaysia **197**



➤ A 20× gap in human capacity for land
administration.

UN-GGCE, NAIROBI, MAY 2025

~63 geodesists from
29 African countries

Came to Nairobi for the UN Global Geodetic Centre of
Excellence capacity-development workshop on modern
geospatial reference frames.

The hunger to learn is there. What we need is a
programme that meets it every year, not once.

Founded on Surveying. Built for the Region.

RCMRD — Regional Centre for Mapping of Resources for Development.

1975

Founded under auspices
UNECA

20

Member States across
Eastern & Southern
Africa.

50+

Years of service in 2025.

4

CORS stations co-
operated

Core Mandate

Original name: *Regional Centre for Services in Surveying,
Mapping and Remote Sensing.*



Training



Projects



Advisory



Calibration
&
Servicing



Research



Data
Dissemination

*Geodesy is not an add-on for us. It's where we started —
fifty years ago.*

Member States: Botswana · Burundi · Comoros · Eswatini · Ethiopia · Kenya · Lesotho · Malawi · Mauritius · Namibia · Rwanda · Seychelles · Somalia · South Africa · South Sudan · Sudan · Tanzania · Uganda · Zambia · Zimbabwe.

From Technician to Specialist

A CORS network needs the technician who climbs the roof when a station goes down, as much as the geodesist who computes the frame.

01 FOUNDATION

Certificate

Certificate in Land Surveying at our training institute.

Survey fundamentals, instruments, control, basic GNSS.

02 DIPLOMAS

Diplomas

Land Surveying; Cartography & GIS; Photogrammetry & Remote Sensing.

Control surveys, coordinate systems, GNSS field methods, adjustment, datums.

03 SHORT COURSES

Professional short courses

GNSS Technologies, Modern Survey Instruments, GNSS & RTK, Land Administration, LIS, LiDAR, SAR.

RTK/CORS workflows, processing, transformations, land administration.

04 FLAGSHIP

Regional flagship

AFREF & GNSS workshop (to 2025) → LIMS 2026 → Frame to Parcel Africa (from 2027, proposed).

AFREF, CORS, real-time networks, open-source processing, LIMS.

 **Beside the ladder:** attachments, internships, mentorship — and CPD with the Institution of Surveyors of Kenya

A Continental Channel That Already Exists

AFREF & GNSS workshop — sponsored nominee from every member State, every year.



“ GGOS Africa doesn't need to invent a training channel. **One already exists.** ”

Central Tanzania

USAID Feed the Future Land Tenure
Assistance

What a Coordinate Means for a Family

Real people — named, documented — from 41 villages in Iringa District

Joti Kihongo — shopkeeper

When his land was mapped with a GNSS tablet and satellite imagery and registered, he took the certificate to the bank, borrowed to buy stock in bulk, and raised his profits by about 30%.

✦ Martha Paulo Mwilongo — farmer

Resolved a long boundary dispute with a neighbour once her parcel was surveyed and recorded. She said: "I'm so happy because I have freedom."

~63,000

parcels demarcated &
mapped

<US\$10

per certificate

41

villages across Iringa
District

Now count the professionals behind Martha's freedom: the geodesist, the GNSS technician, the surveyor, the land-information manager, the registrar. Every one of them needs training. That is our job.

LIMS 2026 in Numbers

14–18 September 2026 • RCMRD, Nairobi • with solutions exhibition

55

participants

21

African countries
represented

4

solution providers
exhibiting

5

days of training

"Three lessons stood out — and they shape what we do next."

01



Hunger for systems-level training

Land agencies are not asking for theory — they want practical, systems-level training on LIMS design, digital cadastre, costing and procurement.

02



Geodesy questions from land officers

Land officers kept asking about datums, epochs and CORS. The two halves have to talk to each other.

03



Geodesists and land admins in one room

The two communities need to be in the same room — which is exactly what we are going to do next.

Frame to Parcel Africa — One Flagship, Three Tracks

TRACK A



Frame

AFREF, reference frames, epochs and velocities. Dynamic datums, deformation models, geoid basics (with GGOS modules).

TRACK B



Position

CORS design and operation, RTK, NRTK, PPP, the new free services from space (Galileo HAS, ANGA). Open-source processing.

TRACK C



Parcel

LIMS, cadastre, fit-for-purpose land administration, digital registries. Spatial data integration and costing.

SHARED ACROSS ALL THREE TRACKS

🌟 Open invitation: let GGOS Africa co-own the Frame track.

The Geodesist of 2035

Half engineer, half data scientist — fully African



GNSS & CORS Engineering

Dense networks; integrity monitoring of space services.



Dynamic Reference Frames

Coordinates with epochs on a deforming continent.



Data Science & AI

Automated QC, anomaly detection, ML on monitoring streams.



Cloud & Real Time

Continental real-time products, streaming corrections to tractors, drones, phones.



InSAR & Sensor Fusion

Deformation and subsidence monitoring; GNSS + radar fusion.



Land Information

Coordinates into secure tenure; can explain to a land minister how coordinates end up in a title deed.

"Half engineer, half data scientist — fully African. That is who we must train."

Where We Are Strong — and Where We Need Partners

Top 5 training priorities from the WP2 assessment — and RCMRD's current capability against each.

■ Strong
 ■ Partly there
 ■ Weak

PRIORITY 1

CORS installation, maintenance & operation



STRONG

Our flagship. RCMRD CORS station + calibration lab. Strongest area.

PRIORITY 2

GNSS network design & data processing



STRONG

AFREF workshop track record. Open-source processing. Strong.

PRIORITY 3

Geodetic reference systems

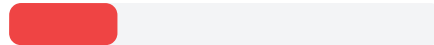


MEDIUM

Partly there. Dynamic datums module needs deepening with GGOS Africa.

PRIORITY 4

Geoid modelling

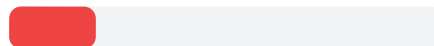


WEAK

Not where we need to be. Partnership opportunity with universities.

PRIORITY 5

Space geodesy (VLBI, SLR, LLR, DORIS)



WEAK

Africa has one VLBI station (HartRAO). Summer school proposal with SARA0 and Manchester.

Three Offers

A concrete partnership — ready to sign this week

01

Co-own the Frame Track

Co-own the Frame track of Frame to Parcel Africa from 2027 — with GGOS Africa modules, trainers and certificates. AFREF, reference frames, dynamic datums, deformation models.



From 2027

02

Three Regional Hubs, One Programme

RCMRD for Eastern and Southern Africa, AFRIGIST for West and Central Africa and CRTEAN for North Africa— sharing one core curriculum. Continental reach with regional ownership.



Continent-wide

03

One Modular Geodesy Curriculum

From running a CORS, to modelling the geoid, to registering a parcel — with shared AFREF datasets and joint certificates. Stackable, transferable, recognised.



Modular & stackable

Three offers. One continental programme. Ready when you are.



Trained in Africa. For Africa.

The next time an African country switches on a national CORS network, let its technicians, geodesists and land officers have been trained in Africa — at regional hubs like AFRIGIST, CRTEAN and RCMRD, with GGOS  beside us.

“A reference frame that never reaches a title deed is a beautiful piece of science. A reference frame that does is development.”

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You are all invited to Nairobi in 2027.