



The Unmapped Twin

Spatial Computing for addressing and navigation in kampala's informal settlements

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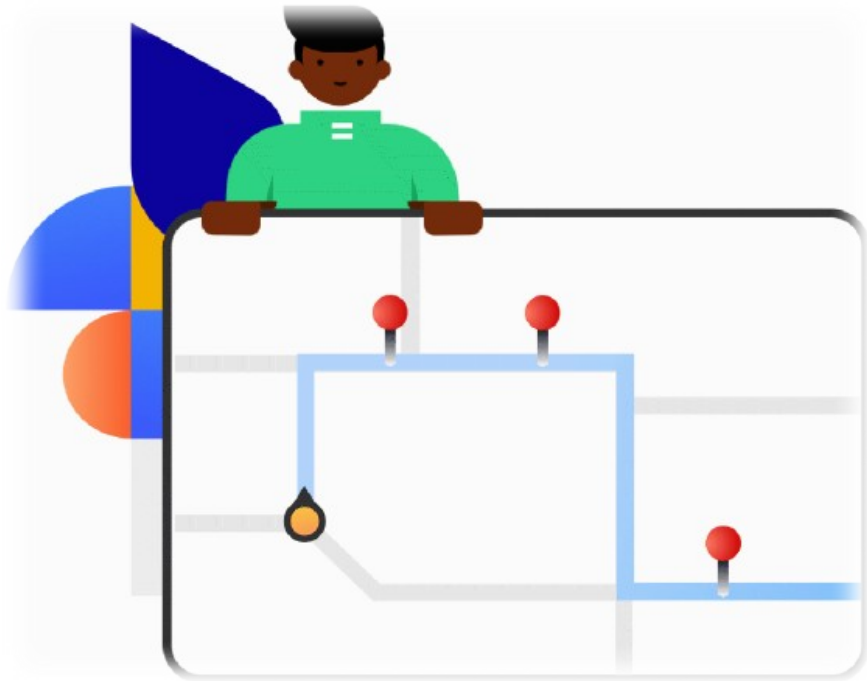
BSc.Surv | MSc. GIST | MBA (PPM) | M.A ILM(c) | Ph.D (Geomatics)



The Addressing Gap- Before the D-twin

- **4 Billion People:** It is widely estimated by organizations like the [United Nations](#) that roughly 4 billion people worldwide live without a formal address.
- More than [440 million people in Africa](#) lack a physical address.
- As of 2018, approximately 35 million people in East Africa lived in slums or informal settlements where formal addresses are rare.
- As of 2026, it is estimated that roughly 8.3 million to 10.5 million people live in slums or informal settlements in Uganda.

Digital addressing in Formal setting- The easy



Towards digital twins in the Informal Setting- The Unmapped



Not Chaos — Hidden Order

Informal settlements have structure via paths, clusters, landmarks



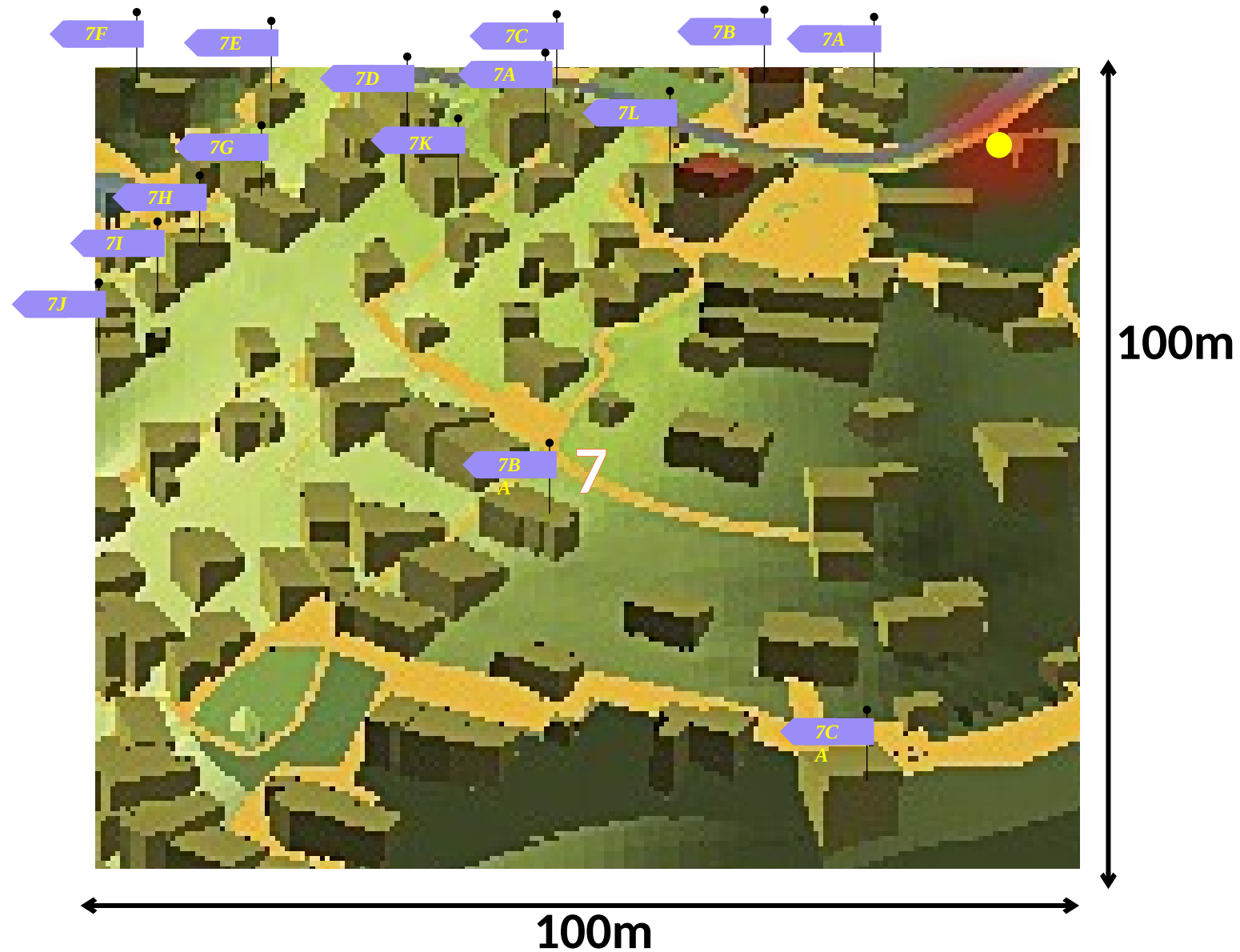
- **100 m Grid Network**
- **Plot Nos.**
- **Road layer**
- **Satellite Image/ Drone Mapping**
- **Administrative Units – Village level**
- **AI Work flows**

D-Addressing System-Informal Area

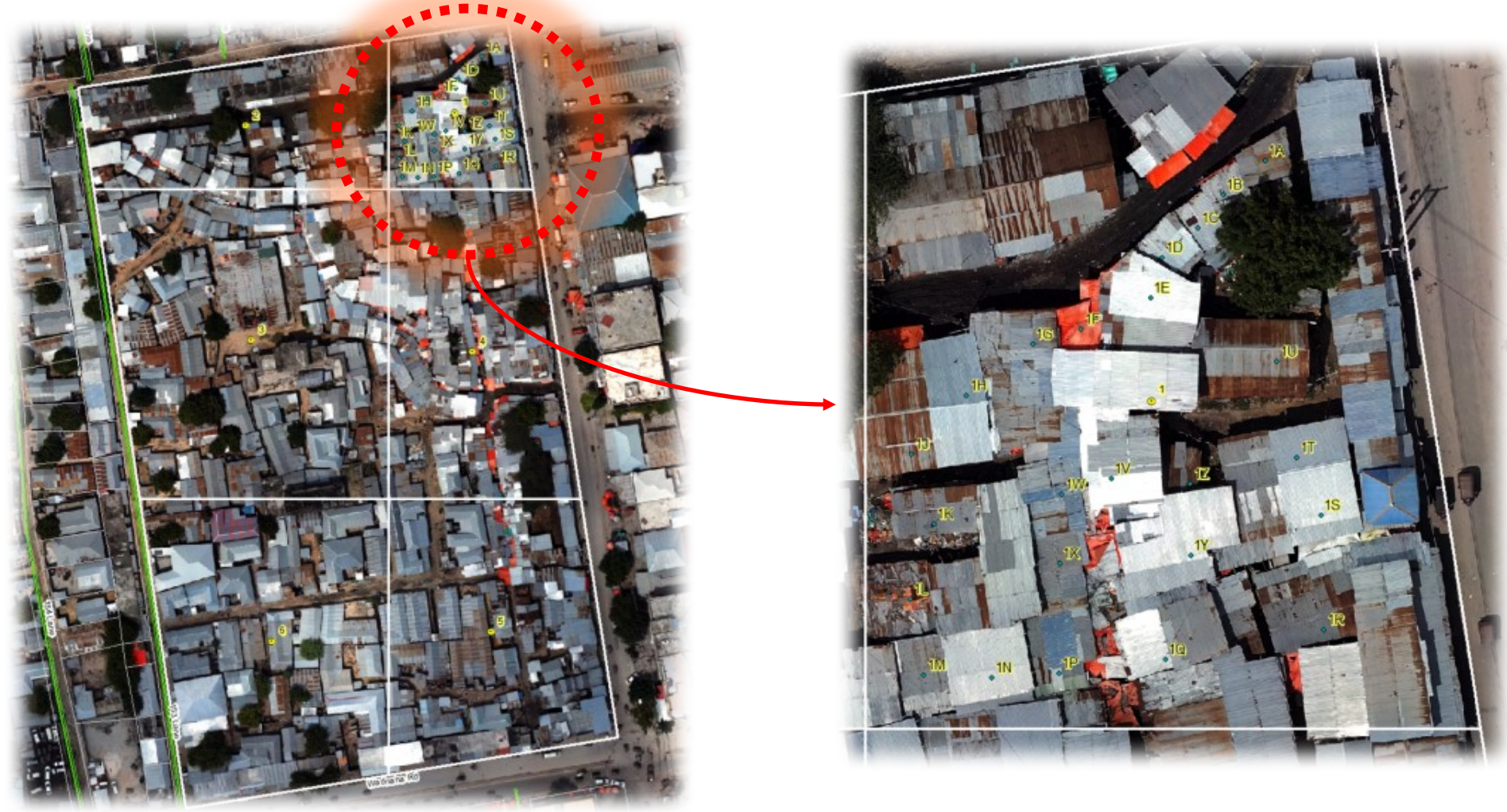


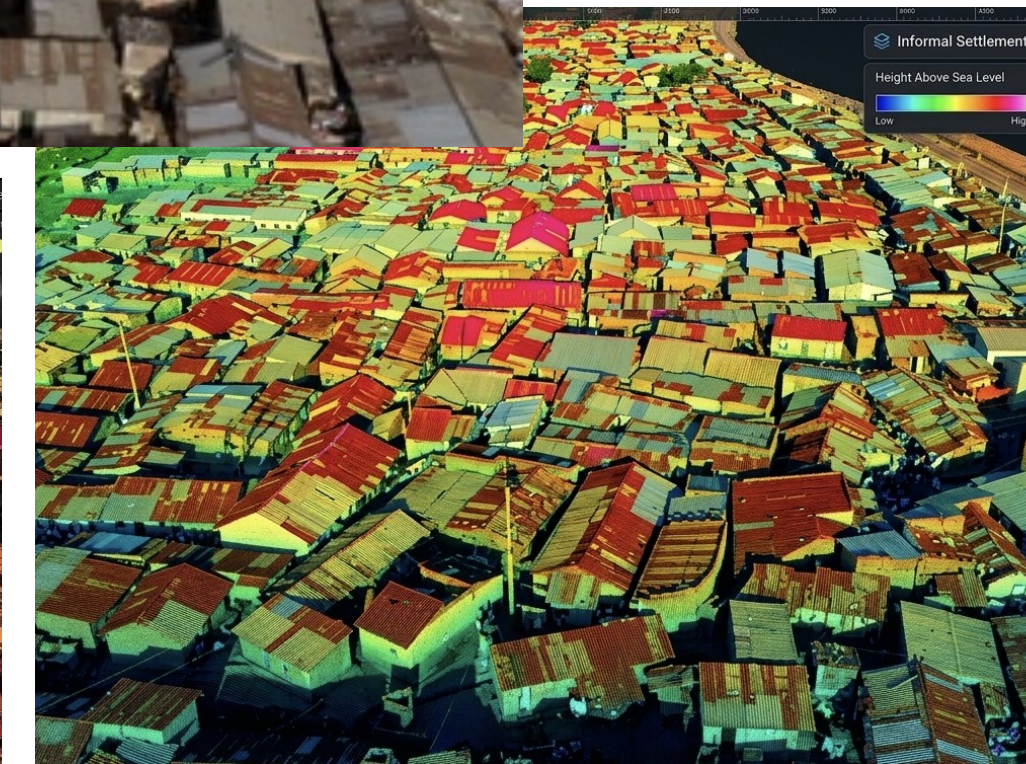
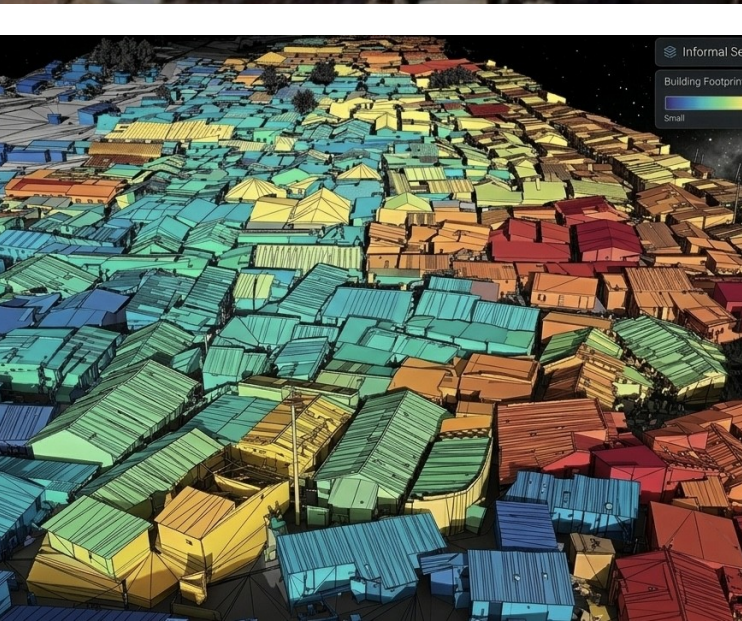
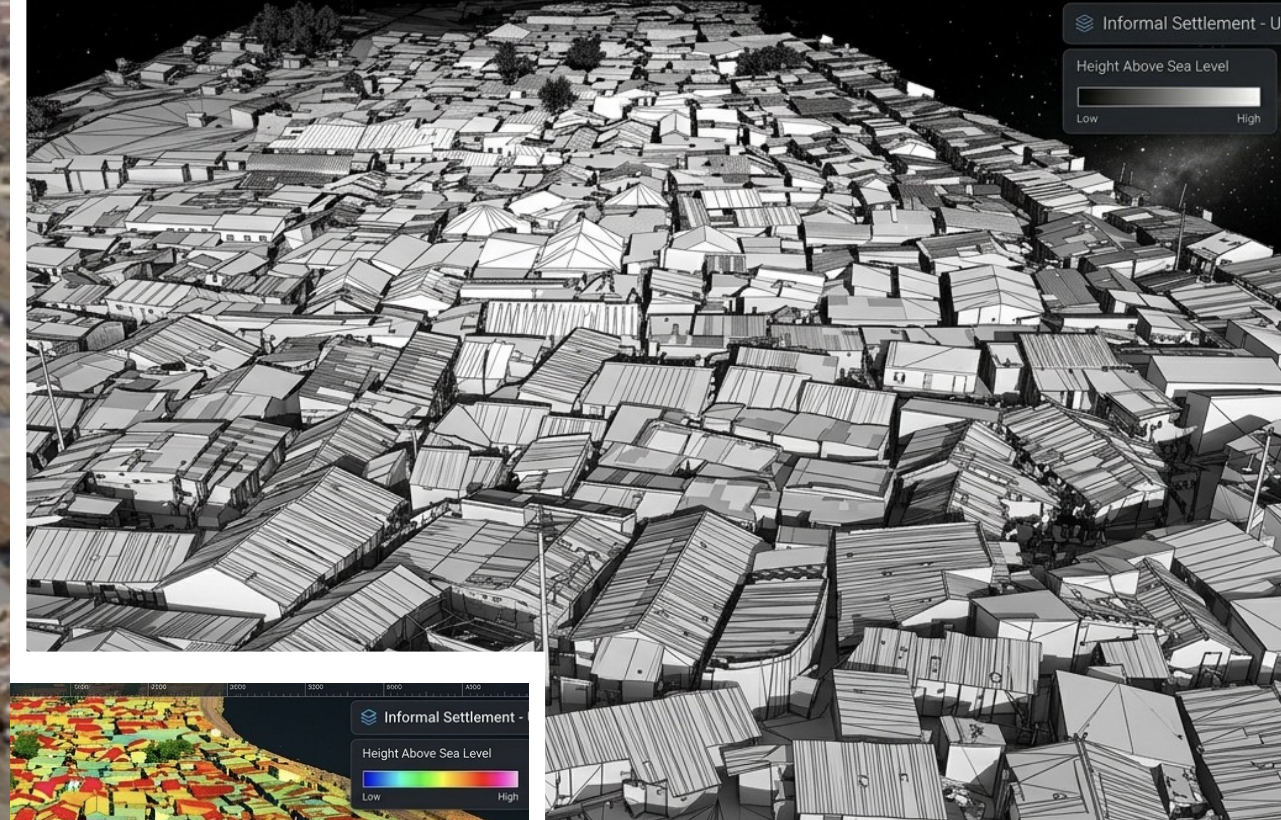


Toward D-Address in informal settings (Grid system)



AN ADDRESSED INFORMAL SECTOR





BEFORE vs AFTER: TRANSFORMING INFORMAL SETTLEMENTS INTO ADDRESSABLE SPACES

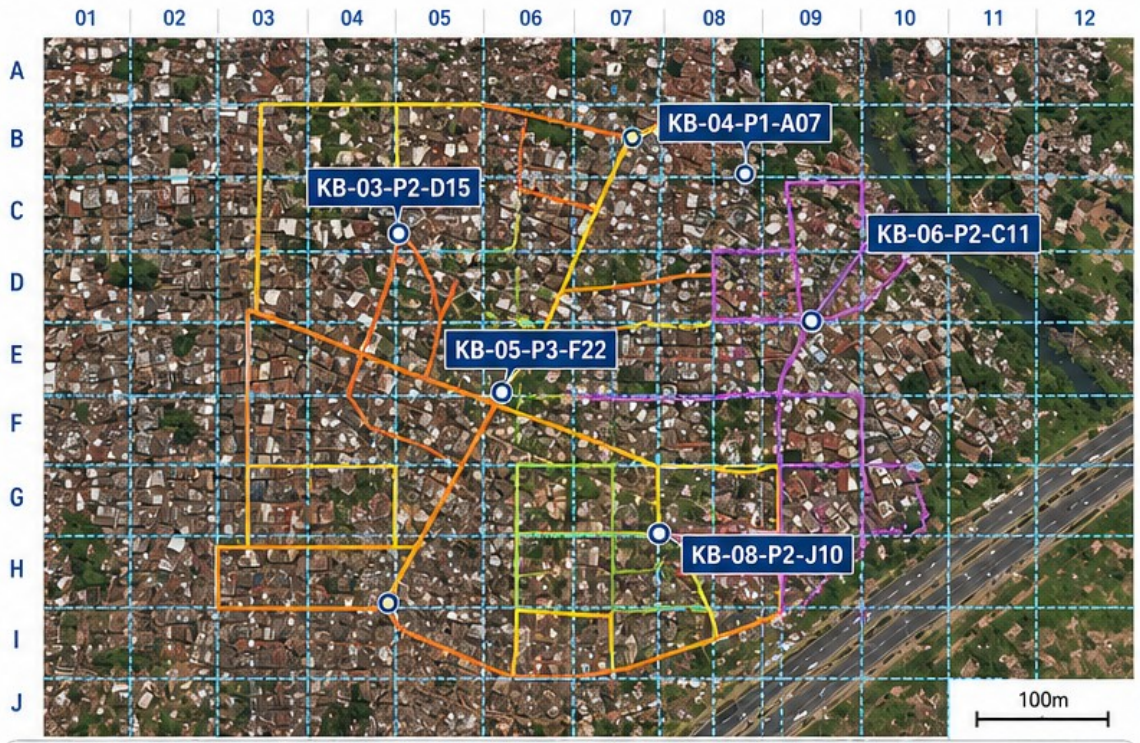
📍 KATANGA SETTLEMENT, KAMPALA, UGANDA

BEFORE: UNMAPPED & UNADDRESSABLE



- 
 No Formal Roads
- 
 Unmapped Paths
- 
 Unplanned Structures
- 
 Hard to Find Locations
- 
 Delayed Services

AFTER: SPATIALLY STRUCTURED & ADDRESSABLE



--- 100m Grid
 --- Primary Path
 --- Secondary Path
 KB-05-P3-F22 Address Code

IMPACT






- 
 Faster Emergency Response
- 
 Efficient Delivery & Logistics
- 
 Better Utility Planning
- 
 Data for Urban Transformation
- 
 Inclusion & Recognition



KAMPALA CONTEXT



ABOUT KATANGA

-  Population: ~ 50,000+
-  Area: ~ 0.65 km²
-  Settlement Type: Informal
-  Challenge: No formal addresses
-  Solution: Spatial Addressing System

WHY SPATIAL ADDRESS IN SLUMS MATTERS

AN ADDRESS IS MORE THAN A LOCATION—IT IS ACCESS, DIGNITY AND OPPORTUNITY.

WITHOUT SPATIAL ADDRESS

INVISIBILITY. EXCLUSION. MISSED OPPORTUNITIES.



EMERGENCY DELAYS

Ambulances and fire services can't find you in time.



NO DELIVERY ACCESS

Goods, services and opportunities can't reach you.



FINANCIAL EXCLUSION

No formal address, no bank account or loans.



POOR SERVICE PLANNING

Hard to plan and deliver water, waste, electricity and roads.



INVISIBILITY

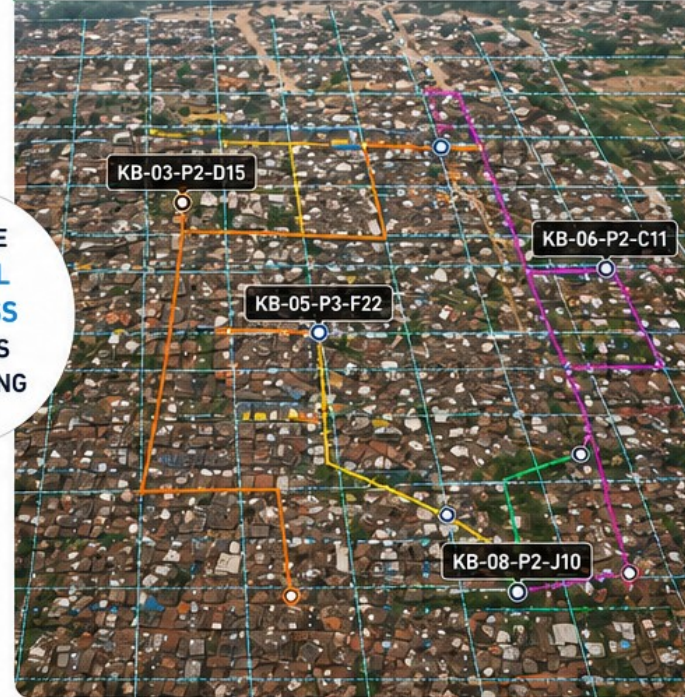
You don't exist on maps, you don't exist in systems.



A SIMPLE SPATIAL ADDRESS CHANGES EVERYTHING

WITH SPATIAL ADDRESS

VISIBILITY. ACCESS. BETTER LIVES.



FASTER EMERGENCY RESPONSE

Teams find you quickly. Lives are saved.



DELIVERY & SERVICES REACH YOU

Goods, e-commerce, health, and more come to your door.



FINANCIAL INCLUSION

Open bank accounts, access loans and grow your business.



BETTER PLANNING & INFRASTRUCTURE

Data-driven decisions improve services and living conditions.



RECOGNITION & RIGHTS

You are visible. You belong. You have a voice.

REAL IMPACT ACROSS SECTORS



HEALTH

Vaccines, clinics and health workers can find everyone.



EDUCATION

Every child can be reached and no one is left behind.



WATER & SANITATION

Plan pipes, toilets and collection services effectively.



ENERGY

Extend electricity and manage connections efficiently.



ECONOMIC GROWTH

Businesses thrive when they are discoverable and accessible.



GOVERNANCE

Inclusive cities start with mapped, addressed and engaged communities.



AN ADDRESS IS THE FIRST STEP TO AN INCLUSIVE, RESILIENT AND PROSPEROUS CITY.



Thank you

If you are not addressable, you are invisible