UNITAC HAMBURG
United Nations
Innovation Technology
Accelerator for Cities

Digital Tools for Sustainable Urban Futures

UN-HABITAT

United Nations
Office of Information and
Communications Technology

HafenCity
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About UNITAC

The United Nations Innovation and Technology Accelerator for Cities (UNITAC) is an innovation lab in Hamburg, Germany, established in March 2021 by the The United Nations Human Settlements Programme (UN-Habitat) in collaboration with the UN Office of Information and Communications Technology (OICT) and HafenCity University (HCU).

The Accelerator promotes **open and participatory data governance** and **digital platforms, innovations related to mapping, spatial analysis, data visualization, and people-centred smart cities** for a sustainable urban future. UNITAC was financed by the government of Germany.

We work with local governments and stakeholders to identify and co-create data and digital solutions to real world problems. Some solutions benefit from well-tested and simple technological approaches. In other cases, we utilize scenario planning methods, Artificial Intelligence (AI) or other advanced technology. In every case we aim to support projects that are **need driven.** The projects must respond to an actual demand or need identified by local leadership and the local community, addressing the most pressing or emerging urban challenges. In this way, we are advancing the approach of **People-centred Smart Cities,** where the primary purpose of digital technologies for urban development is to improve the quality of life of residents inclusively, promoting equitable access to digital tools and urban services aligned to the goals of the **New Urban Agenda**.

We develop data platforms and geospatial applications that are compliant with Open Geospatial Consortium (OGC) standards, utilizing open-source modules. Starting with user needs assessments and the problem statements of our stakeholders, we design technical infrastructure with scalability, portability and sustainability in mind.

Another objective of UNITAC is to co-create data and digital solutions that have potential to be expanded to other geographic areas within a city or country, or to new places to benefit ever more people. For this reason, we work to develop and package tangible tools and products that can be handed over and scaled to other regions and / or contexts.

IMPLEMENTING THE NEW URBAN AGENDA

11 SUSTAINABLE CITIES AND COMMUNITIES

UNITAC is guided by the **New Urban Agenda** and aligns closely with the **2030 Agenda for Sustainable Development**, with a particular focus on **Goal 11: making cities and human settlements inclusive, safe, resilient, and sustainable.**

HCU team

Our multi-disciplinary UNITAC team include **data scientists, developers, sociologists and urban planners.**

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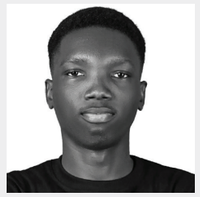


Michael Olanrewaju
UI/UX Designer

Rahul Bhat
Machine Learning Engineer

Roman Okhrimchuk
Data Scientist

Our Offer

STRATEGY

We analyse and provide technical expertise on urban digital transformation, data strategies and digital governance frameworks.

TOOLS

We provide innovative approaches and digital tools on public participation, spatial analysis, mapping, data simulation and visualization.

CAPACITY

We provide practical training, knowledge exchange and technical advice.

Our services are delivered through the following modalities:

- Digital transformation readiness assessment
- Strategic advice on urban digital transformation
- Development of smart city, data and digital transformation strategies, frameworks and policies
- Urban data visualization, analysis and scenario planning platform
- Citizen science, crowdsourcing and participatory data collection
- Digital public participation toolbox
- Digitally-enhanced service provision
- Training for city leaders on people-centred smart cities
- Technical advice service on digital platforms, tools and approaches

- Innovative digital strategies and tools for **adequate housing, land and basic services**
- **Informality mapping** using AI and geospatial techniques
- Data analytics and spatial intelligence to support **equitable urban planning**
- Digital capacity-building and knowledge exchange for **sustainable urban development**

Using Artificial Intelligence for better city planning, Central America and South Africa

Ground truthing maps of Informal settlements in eThekwini Municipality

> *BEAM changed our workflows and accelerated detection processes… we are able to get a turnaround time now of 72 hours across the whole of eThekwini. BEAM has been a great help.*
>
> **Snobani Dweku**
> **Corporate GIS, eThekwini Municipality**

In South Africa, **eThekwini Municipality** has the largest number of informal settlements in the country, with over a quarter of the city's 4.2 million residents living in informal areas. Continued urbanization and a dwindling supply of well-located serviced land has resulted in a multitude of vulnerabilities experienced by its population.

In 2022, the Human Settlements Unit of eThekwini Municipality applied for **UNITAC's open call for projects, funded by the German Ministry of Foreign Affairs,** to receive technical support to develop the **Building and Establishment Automated Mapper (BEAM).**

The objective of the BEAM tool was to develop an innovative and scalable approach to help the city improve its land monitoring process. The tool leverages machine learning to identify buildings in aerial imagery, with a particular focus on informal areas. eThekwini Municipality has used BEAM to map buildings throughout the whole city, providing accurate and up-to-date information to its officials.

The BEAM tool was also being upgraded to work on satellite imagery in eight cities in Central America (Belize City, Guatemala City, San Salvador, Tegucigalpa, Managua, San José, Panama City, and Santo Domingo.). It is also being applied to high resolution aerial imagery in the City of Cape Town, South Africa, with a specific focus on informal structures in the backyards of formal residences.

Innovation component

Prior to the introduction of the BEAM tool, informal structures in eThekwini were identified by on the ground land monitors, with 15 Land Monitors servicing 587 informal settlements, and through manual marking of structures on aerial photography. This workflow greatly limited the city's capacity to respond to residents' needs in an efficient and effective way. The BEAM tool enhanced the efficiency of this process, allowing officials to map the entire city in 72 hours.

This means that the city can have up-to-date records of the location and extent of structures in its informal settlements, as well as keep track of changes in the built-up area or density.

BEAM provides a simple and easy-to-use tool that allows the user to quickly detect and visualise the rooftops of buildings in a specific area by simply uploading aerial images of a given location. Through four easy steps, it predicts which buildings are present in an image by identifying and geo-referencing the pixels that are likely rooftops.

The version used by eThekwini and the City of Cape Town is designed to be run and hosted locally by the city, with the developments in the Central America project optimized for running on the cloud.

Project Results

The following results have been achieved with the tool

- Fast, accurate mapping of buildings, allowing the city of eThekwini to extract building footprints for the whole municipality in 72 hours (1,530,546 building footprints)
- Pixel level accuracy on high resolution aerial imagery: Over 90%
- Pixel level accuracy on high resolution satellite imagery: Over 84%
- BEAM mapped 6324 informal areas and detected 550,776 buildings across the eight Central American cities

Bridging water access for the urban poor in Hargeisa

Water Vendor in Hargeisa

> *This innovative solution is a game-changer for women, eliminating the need for long walks to fetch water, saving time, and significantly improving overall well-being."*
>
> **Hargeisa Water Agency**

Read the impact story

In early 2024, UNITAC launched its second **open call** for innovative projects to promote people-centred smart cities where technology is applied carefully and strategically to leave no one behind. We believe in the power of well-managed and inclusive digital transformation to achieve urban sustainability.

Through our demand-driven innovation approach, we identify projects that work on improving the quality of life in cities, especially for marginalized communities.

For this open call, **funded by the German Ministry of Foreign Affairs,** UNITAC invited organizations to submit project ideas that address the most pressing urban challenges with data or technology solutions. **Hargeisa Water Agency** submitted one of the winning proposals.

Basic Urban Services

Innovation component

Hargeisa, the largest city in Somaliland only 35% of the residents have access to piped water through household connections or water kiosks. For the remaining 65%—approximately 780,000 people— fetching water means a daily struggle. These residents, traditionally women or older girls, must walk long distances to fetch water from water kiosks.

This project with Hargeisa Water Agency introduces a **digital water platform** in Hargeisa, connecting users in disadvantaged settlements - who do not have a piped water connection - with certified water vendors through a mobile application.

By eliminating middlemen, the platform **ensures affordability** and **enhances transparency in pricing** and **quality in the water** supply chain.
This innovative solution will be valuable for disadvantaged communities, especially for women, significantly improving access to safe drinking water.

Focus group with female residents in Hargeisa

Project Results

The following technical and non-technical requirements have been gathered as the key features of the application and the process of rapid prototyping has begun.

- User-friendly registration for water vendors and consumers (including vendor certification & user registration)
- Place water orders through mobile app
- Real-time tracking of vendor locations and delivery
- Send real-time notifications, updates, and alerts via SMS
- Secure payment (automated payment and e-receipts)
- Reports for monitoring of prices, transactions and vendors

The application will deliver the following value to users:

- Connects users without piped water to certified water vendors via mobile-based orders
- Monitors pricing for affordability and enhances transparency
- Enhances public health and gender equality by reducing time and effort spent on fetching water
- Improves water access to vulnerable populations

Digital solutions for more climate resilient informal settlements in Namibia

Read the impact story

Today, more than 40% of Namibia's overall population – and around 80% of its urban population – live in informal dwellings. At a national level, **upgrading informal settlements** is a priority for the Ministry of Urban and Rural Development.

The project "*Just Transitions in Vulnerable Places – Digital Solutions for More Climate Resilient Informal Areas in Namibia*" funded by the **Ministry of Economic Cooperation and Development (BMZ)** aims to build digital and data capacity of the national and local governments to support urban decision making and planning.

Together with national and local stakeholders we are exploring ways to improve their digital and data capacity, enabling them to extract greater value from their data.

Additionally, we are working to co-develop digital solutions and processes, enabling them to make better decisions, plan better, and ultimately deliver better services to the community.

Inspecting water infrastructure in informal settlements in Namibia

Basic Urban Services

Innovation component

In Namibia, a just transition for people living in informal settlements includes receiving access to basic services and tenure security. We have applied a design thinking approach to understand user needs and the priorities of local governments in planning for and delivering basic services such as water, sanitation and waste management.

We have hosted ideation workshops with four of our partner towns, namely: Rehoboth, Rundu, Opuwo and Helao Nafidi. A common requirement is to very simply digitalise basic business processes such as job cards, which are used by technical staff to report to managers on various issues (e.g. water leakages, building inspections etc.). In doing so, data about performance, resource needs and service requests can be captured immediately, and decision makers can have real-time information to enable data-driven decision making. One example is the standardized management and advanced analysis of data to reduce non-revenue water losses in Rundu.

At the same time there is an opportunity to incorporate citizen-driven data collection into business processes and foster greater inclusivity, transparency and accountability.

In small towns, like Opuwo and Rehoboth, digital and data readiness is vastly different. In some cases, we can pilot and test innovative technology and tools, and in other cases we can be innovative in how we apply tried and tested digital tools to solve immediate needs.

While we are committed to meeting the basic digital and data needs of local authorities, the task of UNITAC is also to tackle more complex challenges and inspire innovative solutions for resilient people-centred smart cities. With the City of Windhoek, we are co-developing the Windhoek Smart City Strategy.

> *On the weekend, they are using a paper job card. The community also signs off on the job card – what was done. It's approved that they were there... Yes, my reporting will be much easier. Now I don't need to go and physically count how many call outs there were.*
>
> **Willie Jansen, Head of Water and Sewerage Division, Rehoboth Town Council**

Digital tools and capacity for inclusive, smart and resilient recovery in Ukraine

Crisis Response & Resilience

Since February 2022, UNHCR reports that more than 6.7 million people fled the country, while an estimated **3.7 million** became **displaced within Ukraine** itself. In the municipality of **Drohobych** located in the Western part of Ukraine, the arrival of internally displaced persons (IDPs) has been especially visible. Drohobych is now home to around 16,000 IDPs which make about 13.3% of its 120,404 residents.

This rapid population change is happening against the backdrop of a widespread housing crisis. By 2024, more than **10% of Ukraine's housing stock** —impacting nearly 2 million households— had been damaged or destroyed. Around 250,000 housing units, or 8.6% of the country's total residential area, require repair or reconstruction.

User testing workshop in Hamburg.

The project ***"Just Transitions: Digital Tools and Capacity for Inclusive, Smart, and Resilient Urban Recovery in Ukraine"*** funded by the **Ministry of Economic Cooperation and Development (BMZ)** supports Ukrainian local governments with digital and data tools to facilitate smart, inclusive, and democratic recovery and development towards people-centered smart cities. For this, UNITAC developed the spatial decision support system URPS (Urban Recovery Planning System), enabling hromadas to visualize and analyse sectoral data, without the need of extensive technical knowledge in GIS.

The project collaborates with various levels of the Ukrainian government, including the Ministry for Communities, Territories and Infrastructure Development of Ukraine, and local governments of Makariv, Drohobych and Irpin. The UNITAC project works closely with the UN-Habitat Country Office in Ukraine, especially in collaboration with the Urban Lab team in the country. Additionally, the project engages with international and local stakeholders such as UN agencies, civil society organizations, and academia.

Innovation component

UNITAC's Just Transitions project in Ukraine tackles urban recovery through a multifaceted digital innovation strategy.

First, it co-creates the platform and its use cases with the partner governments and local stakeholders. Secondly, it leverages technical expertise in GIS, data science, software development and urban profile and recovery methodologies to design an integrated tool that facilitates data collection, processing, and harmonization across government levels enabling more efficient resource allocation and coordinated planning for urban recovery. By working with UN-Habitat's Urban Lab and its implementing partners, UNITAC contributes to diagnostics that guide the urban recovery process.

However, the project recognizes that technological solutions alone are not enough. UNITAC prioritizes capacity-building through a dedicated program offering training sessions, workshops, and knowledge exchange events. This program fosters digital literacy and equips local leaders and stakeholders with the skills needed to actively participate in building back better.

By empowering communities to make data-driven decisions, UNITAC bridges the emergency response and development nexus to foster a more inclusive and sustainable urban future for Ukraine.

Credit: UNDP Ukraine, Oleksandr Ratushniak

Project Results

Ukrainian local governments have a robust e-government system but lack capacities and strategic direction in recovery and digital transition. The project aims to support hromadas recovery efforts by enhancing data governance procedures, developing strong local capacity, and introducing innovative digital tools.

Digital tools are being co-created and developed with Ukrainian municipalities, through co-creation workshops and user testing sessions. Drawing from UN-Habitat's urban profiling methodology, UNITAC has integrated the same data architecture employed to produce urban recovery strategies, making it easier for hromadas to develop capacity in geospatial data and planning analysis.

The Urban Recovery Planning System includes an interface for national government access and open datasets. Through a user-friendly Content Management System (CMS), users can add more urban profiles and configure access to additional users. URPS will be **handed over to Ukrainian stakeholders** for further independent application to recovery and spatial planning.

Participatory Multilevel Governance

Supporting Brazil's vision for 2050 with digital participation

AOVI as part of the Brazil 2050 strategy process

AOVI is an open-source tool for public participation developed by UNITAC through an agile process to produce a tool that could support inclusive dialogue in the Regional Dialogues for the Development of the Brazil Strategy 2050, organized by the Ministry of Planning and Budget.

The objective was to complement participatory planning dialogues, providing additional qualitative data and a channel for multilevel stakeholder inclusion, with the objective to define long-term goals around economic development, social inclusion, and sustainability

The digital tool AOVI represents both an enabler of inclusive and strategic planning as well as an entry point to a wider strategy to build capacity on innovation and digital transformation, exploring with data storytelling, urban data governance, and stakeholder engagement through participatory methodologies that also tailor to specific groups, such as youth, women and girls.

With the support of the UN-Habitat country office in Brazil, the cooperation strengthened the federal government planning process, leveraging innovation, digital tools, data and stakeholders' engagement. The project also built capacity within the Ministry—designing the tool alongside planning staff strengthened their skills in participatory digital engagement

Adopted in 26 workshops during the Brazil 2050 national strategy process, it organizes discussion around key questions. Participants also were able to use the tool to share their vision for Brazil 2050.

Over 3000 participants in 12 regional workshops engaged with AOVI, contributing their perspectives and voicing concerns.

UNITAC projects

UNITAC is collaborating with local partners and local governments on various projects in the following countries:

UNITAC training at Devolution Conference in Kenya, 2025

UNITAC works across Africa, Latin America, Asia-Pacific and Europe to tackle challenges from informal settlement mapping to water access, crisis recovery, and citizen participation.

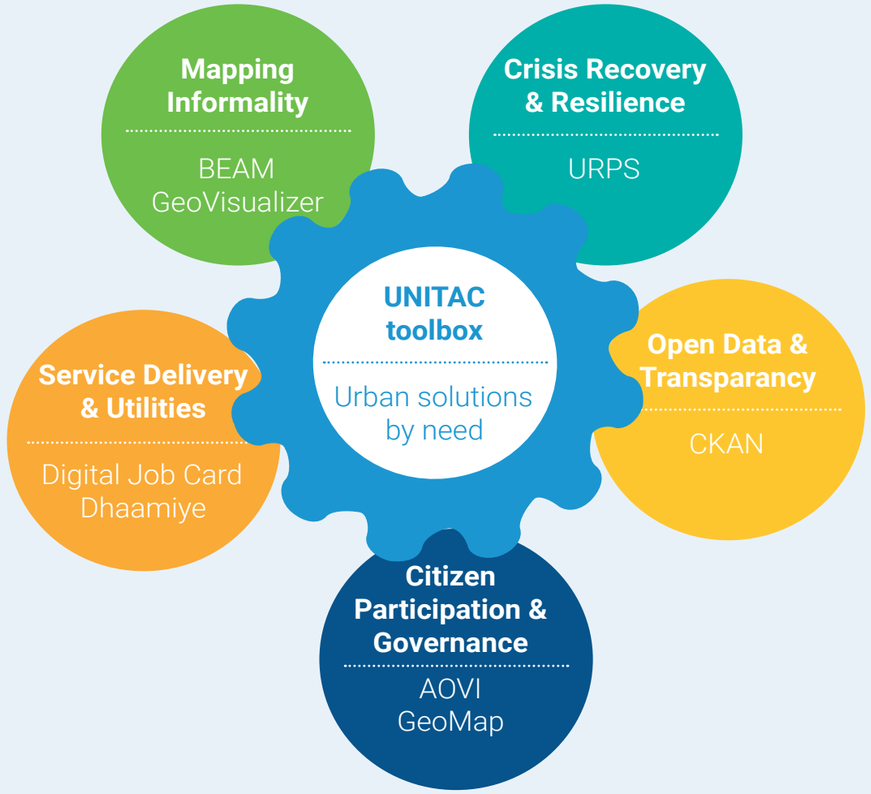
We deploy people-centred technologies such as AI mapping, mobile and USSD apps, participatory platforms, geospatial visualizers, and open data tools to deliver inclusive and scalable urban solutions.

Contact unitac@un.org for more information about how to use the tools in your region.

UNITAC toolbox

UNITAC develops, tests, and applies a wide variety of innovative tools and technologies to address urban needs and support the implementation of global agendas at the local level.

These tools combine data, technology and participatory approaches to strengthen evidence-based decision-making and foster inclusive urban development. By providing practical resources for spatial analysis, visualization and co-creation, the toolbox enables governments and partners to work together towards more sustainable, resilient and people-centered cities.



Building Establishment Automated Mapper (BEAM)

BEAM is an AI tool developed to automatically map rooftops of buildings in informal settlements for a variety of benefits. In South Africa, eThekwini Municipality and the City of Cape Town are using the tool to count the number of informal dwellings in informal settlements and backyards to improve service delivery and infrastructure capacity. UN-Habitat Mexico has used BEAM to gain an understanding of the morphological characteristics of informal settlements in Central American cities, such as Guatemala City, Tegucigalpa, Belize City, San Salvador, Santo Domingo, San José, Managua, Panama City.

A second pilot project with eThekwini Municipality is underway, with the objective of utilizing BEAM to distinguish formal from informal structures. Additionally, the tool is part of an ongoing collaboration aimed at supporting the UN-Habitat Data and Analytics Unit in efforts to monitor SDG 11.1, with partners including ETH Zurich and the University of Twente.

Buildings mapped using BEAM in Guatemala and Santo Domingo

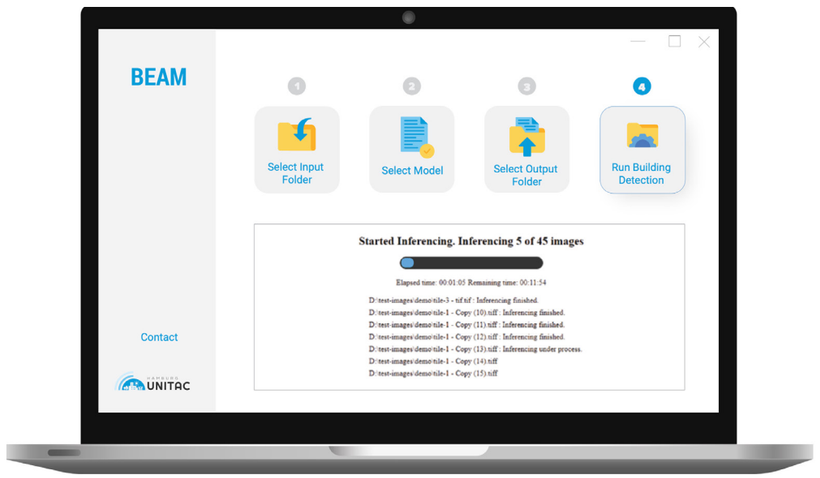
> *BEAM is one of the tools which will enable us to better understand the trends in urban development in the city. It will also create better efficiencies and create a platform for sharing of data so that we can improve our delivery of basic services… to those excluded from the formal areas of the city.*
>
> **Sarah Watson, Human Settlements Unit, eThekwini Municipality**

Partners
Human Settlements Department, eThekwini Municipality, South Africa; City of Cape Town Geomatics Branch, South Africa and UN-Habitat Mexico

Impact
BEAM quickly generates shapefiles of rooftops to help municipalities to

- maintain up-to-date records and maps
- better prioritize upgrading interventions
- improve basic service delivery

Scalability
BEAM is already proven to be scalable across the world, with applications in South Africa and Central America. Access to training data (imagery of the area of interest) is required.



Desktop view of BEAM tool processing aerial images

More info

Geo Visualizer

Geo visualizer is a tool that enables anyone without GIS software or expertise to open and explore geo-spatial data files such as GeoJSON, Shapefile, csv.

Based on our work with different stakeholders, we have observed that some local authorities face challenges in accessing digital infrastructure. In certain cases, urban planners do not have the necessary server capacity or software to open and explore their own spatial data. This can limit opportunities for collaboration.

To address this, we developed a tool designed to function without a server and without being constrained by fixed data table structures, supporting quicker access to insights and analysis.

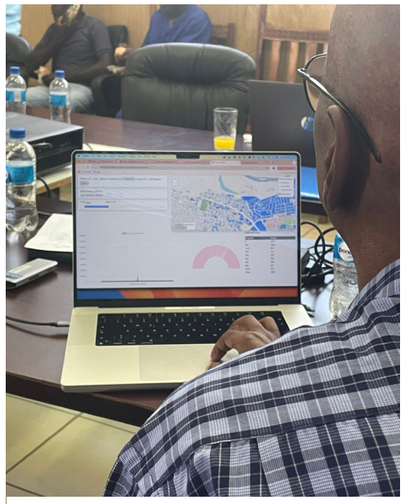
The workflow is completely offline. Users can start using the tool by simply double clicking the html file. This will open the tool in their browser, and then the user can click upload, and select their geospatial files to visualize the data on a map as well as get a sense of data distribution of various attributes and metadata. We have also adapted the tool to support explorations of surveys data to easily obtain insights about the data in support of informal settlements upgrading. The tool deploys simple web technologies.

Using Geo Visualizer to open and explore spatial data from Rundu, Namibia

Partners
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Inclusive and Sustainable Urban Development (ISUD) Namibia

Impact
- Removes the barrier of entry for working with geospatial data, making the tool useful for people with limited technical background.
- Helps users see the benefits of collecting location information.
- Supports analysis at different stages of data management. For instance, during data collection, it can highlight progress or any challenges with data that should be fixed as the data collection progresses.

Scalability
Geo Visualizer has been used by the UNITAC team in several projects and prototypes especially in Namibia to work with different stakeholders such as GIZ, NHAG and the town council staff of different partner towns in Namibia. As the tool is not based on a fixed data table structure, it can easily be scaled to support several projects and activities.



Stakeholders viewing spatial data from Rundu during a workshop

More info

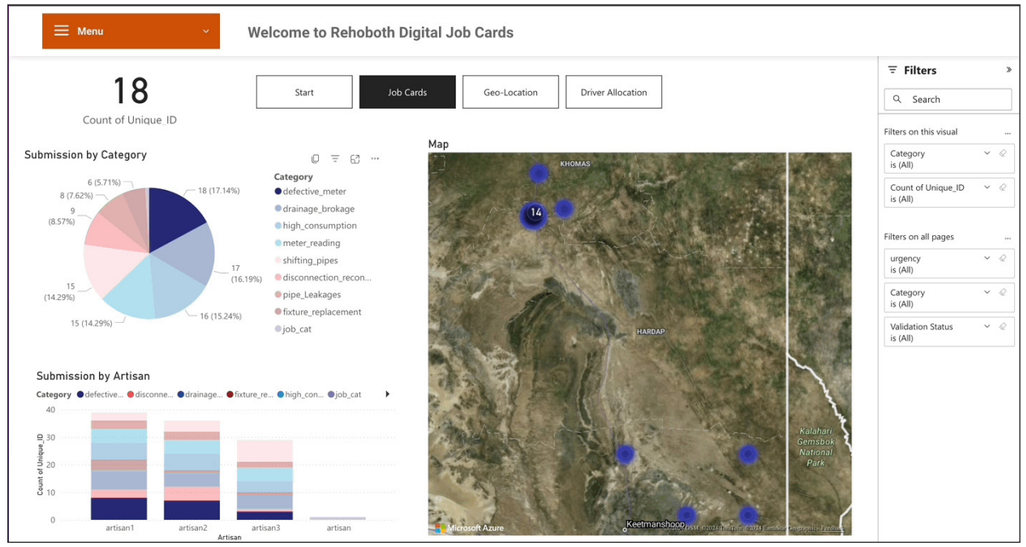
Digital Job Card

More info

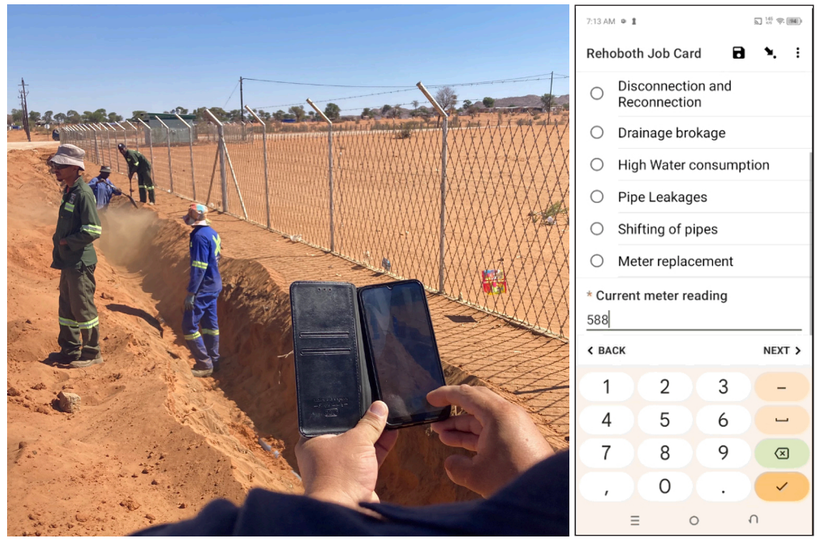
The Digital Job Card is a web and mobile application designed to work both online and offline. The app digitalizes the process of creating and tracking job cards for different urban services or issues such as water meter readings, electricity fault reporting, or building inspection for local authorities in Namibia.

With this system, technical staff and clerks can track and report on the completion of their tasks or the status of the issue, allowing supervisors and managers to have sight of the data in near real time. The collected information can be used for monitoring processes, data management, analysis and visualization, thereby improving information accessibility and evidence-based decision-making, planning and service delivery. The prototype was developed in collaboration with Rehoboth Town Council, who participated in user needs and ideation workshops, as well as Rundu Town Council who have also participated in user testing sessions.

The application leverages KoboToolBox and other open-source modules to trigger various communication requirements, such as informing citizens, customers and town council staff on the progress of a job or the status of an application. The tool also makes use of a Content Management System (CMS) in the form of Apache Superset to easily monitor KPIs, as well as detect operational bottlenecks, hence contribute to efficient resource management.



Digital Job Card showing data entry on mobile app and dashboard for Rehoboth, Namibia



User testing with the Water and Sewerage Division in Rehoboth,reporting the laying of new water pipes.

Partners

Rehoboth Town Council, Rundu Town Council, Helao Nafidi Town Council, Opuwo Town Council, Namibia

Impact

The Digital Job Card is:

- Easily customizable in a no code/low code environment
- Communicates real-time service-related requests and status updates within the local authority and with customers, assists in improving basic service delivery
- Creates access to information and service performance data which informs better urban planning and sustainable infrastructure planning

Scalability

The Digital Job Card is designed to be easily scalable within the local authority across multiple business processes, as well as with new local authorities. Helao Nafidi Town Council and Opuwo Town Council in Namibia have already requested to adopt the tool. It allows local authorities (especially secondary towns unable to implement city scale solutions) to take one step at a time in the direction of digital tools and services.

Dhaamiye

More info

Dhaamiye is a **mobile-first water access platform** that **connects households without piped supply in Hargeisa to certified water vendors**, improving affordability, transparency and service quality across an often fragmented market. It targets underserved settlements and IDP communities where only around 30–37% of residents have direct access to the public network and many depend on costly private vendors.

The system comprises three products: **a customer app, a vendor app, and an administrator dashboard** managed by Hargeisa Water Agency (HWA). Customers can discover nearby vendors via map/list views, see ratings and vehicle/tank capacity, place immediate or scheduled orders, track deliveries in real time, receive notifications, pay by cash or mobile wallet, and rate or report issues. Vendors manage availability, service areas and minimums, accept/decline orders, navigate with routing support, and receive payments. The admin dashboard enables HWA to onboard and certify vendors, monitor orders, prices and transactions, handle complaints, and place phone-in orders from a call center. Low-tech access (USSD) supports users and vendors with limited smartphones or mobile data.

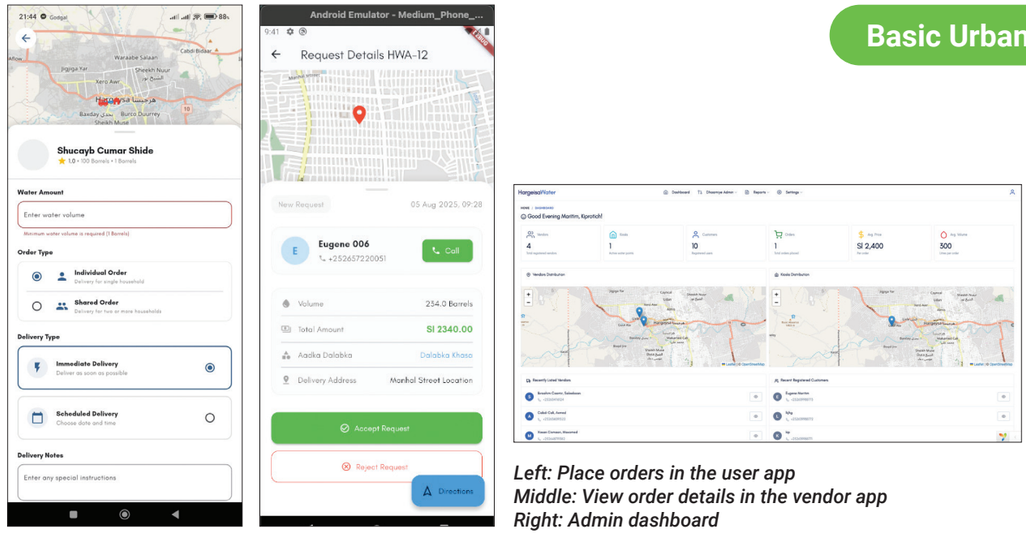
Focus group with Hargeisa water vendors

Technically, Dhaamiye follows a modular architecture with back-end/server services and mobile/front-end clients, integrating external services for mobile payments, SMS/USSD, notifications, and routing. The delivery plan covers UI/UX, iterative user testing, performance testing, CI/CD, and thorough handover. Hosting and long-term maintenance are planned on HWA server infrastructure with capacity building for local teams.

Ultimately, Dhaamiye removes middlemen, surfaces fair pricing, and shortens delivery times – particularly benefiting women who shoulder water collection – while providing HWA with valuable data to steer the city's pro-poor water services.

UNITAC Hamburg has led the design and development of Dhaamiye for the Hargeisa Water Agency (HWA). HWA will host and operate the platform. Field delivery is supported by a local consultant and developer, alongside structured engagement with vendor groups, telecom providers, and end users. UNITAC has also been working with UN-Habitat's Global Water Operators' Partnerships Alliance (GWOPA) to enable operator-to-operator learning and peer support.

Basic Urban Services



Left: Place orders in the user app
Middle: View order details in the vendor app
Right: Admin dashboard

Partners

Hargeisa Water Agency (HWA), Global Water Operators' Partnerships Alliance (GWOPA)

Impact

The tool addresses underserved settlements where only 30–37% of residents have piped connections by removing intermediaries, surfacing transparent prices, and improving delivery reliability. Expected outcomes include greater affordability, transparency and service quality, with specific benefits for women who disproportionately shoulder water collection. Community research highlights long waits, price volatility, and safety concerns. Residents in pilot areas often spend a significant amount of their income on water. These are issues the app tackles via transparent and stable pricing, ratings, and low-tech access (USSD).

For water vendors, this digitalization represents an opportunity to improve operational efficiency, streamline service delivery, and gain formal recognition, thereby addressing long-standing informality in their work.

Scalability

In the app development, many customization options have already been built in, which can facilitate upscaling, such as language and currency settings, the list of common vendor types, and different payment options.

Urban Recovery Planning System (URPS)

The Urban Recovery Planning System (URPS) is a web-based open-source digital platform supporting crisis response and reconstruction efforts towards building back better. URPS is a spatial decision support system (SDSS) for users who may not have expertise using available proprietary GIS software.

URPS provides visualization and analysis of datasets on various sectors. Planning functionalities include reachability analysis and simulation of facilities.

Based on the visualization of data, an analysis of the urban profiles helps to pinpoint critical areas for intervention, setting the stage for strategic planning and resource allocation.

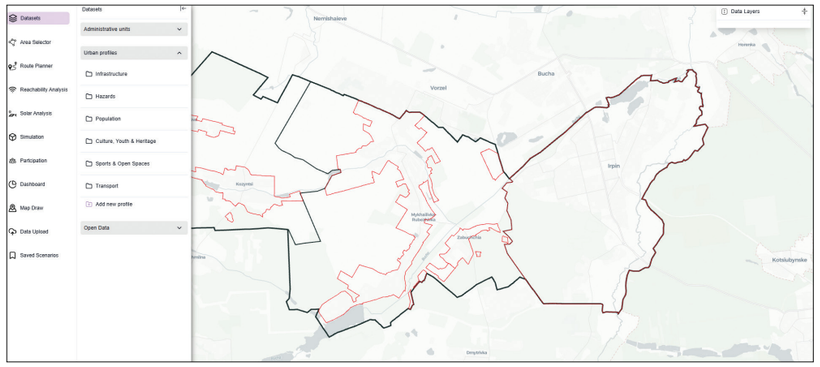
Users can use the tool to **assess damage and repair levels,** as well as the availability and **provision of shelter and emergency facilities** according to population distribution.

The design of the digital tool responds to specific needs and use cases identified in crisis-affected areas, and which contribute to preparedness, response, recovery and reconstruction.

The tool can also support **participatory process,** by allowing consultation, location-based feedback and ranking of priorities on any recovery project.

URPS is designed for scale, with the capacity to support other hromadas throughout Ukraine, and its modular architecture, with core functions, makes URPS customizable to other crisis-affected places worldwide.

UNITAC collaborates closely with the UN-Habitat Ukraine Country Office and the Ukraine Urban Lab, as well as with Ukrainian governments, to understand user needs and how best the digital platform contribute to the sustainable recovery of Ukraine and help build back better.



Urban profiling with URPS

Crisis Response & Resilience

Partners

Hromadas: Makariv, Irpin, Drohobych and Kamianets, Ministry for Communities, Territories and Infrastructure Development of Ukraine, UN-Habitat Ukraine Urban Lab

Impact

URPS contributes to:

- Responding to legal frameworks and human rights and inclusion principles, the tool provides mechanisms that allow people to participate in urban recovery processes, by providing location-based feedback and ranking projects according to proximity to services, facilities, and other public goods.
- Consolidate statistical, geospatial and non-spatial data for accurate analysis and planning.
- Highlighting the social and economic value of land, to identify context and relationship between data on basic services and facilities, area and target groups.

Scalability

URPS can be scaled to other hromadas and in other crisis affected areas.

Stakeholders interacting with a spatial decision support system on a smart table at HafenCity Lab, Hamburg

More info

GioMap

GioMap is a web-based open-source application designed for the visualization and collection of geospatial data. It allows multiple (non-technical) users to collaboratively draw and edit points, lines, and polygons directly on an interactive map in real time. These features are automatically converted into GeoJSON files for any spatial analysis process.

The tool has been used in workshops with participants in various locations across Central America and customized for Makariv hromada, in Ukraine, to capture geospatial information that can then be used further in planning and analysis tools, demonstrating its value in diverse geographical and socio-political contexts. It is a quick fix in data scarce environments and can facilitate rapid response in crisis zones or areas of rapid change.

You can also upload existing GeoJSON files to add or edit layers.

Locations of waste containers and waste collection routes plotted by data contributors during workshop with Makariv Hromada, Ukraine.

Crisis Response & Resilience

Partners
UN-Habitat Mexico, Makariv Hromada, Ukraine

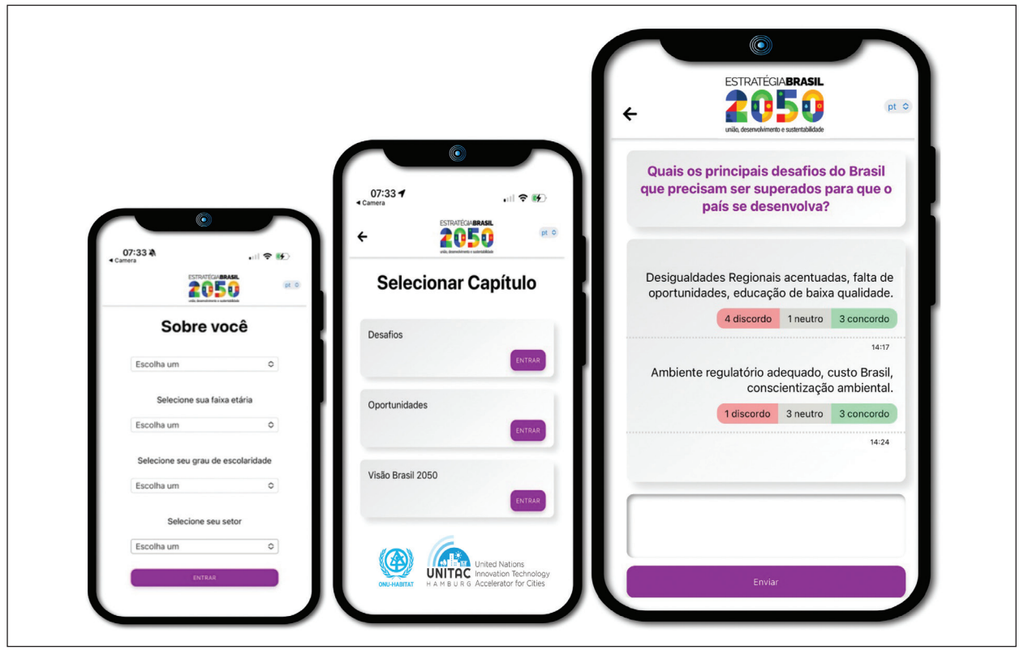
Impact
- fosters real-time, multi-user collaboration, allowing teams to draw and edit geospatial data simultaneously, improving efficiency in data collection and decision-making
- provides non-technical users with the ability to contribute to data collection
- automatically converts drawn features into GeoJSON files, ensuring seamless integration of data into planning, analysis, and decision-making processes
- allows the users to upload and edit existing datasets, for data validation

Scalability
GioMap is designed for easy scalability and adaptability, with successful implementations in Central America and Ukraine, making it an ideal solution wherever geospatial data is required.

More info

AOVI – Real-Time Digital Participation

Participatory Multilevel Governance



AOVI interface preview

More info

AOVI is a digital tool developed in collaboration with **Brazil's Ministry of Planning and Budget** to foster inclusive dialogue at live events.

Adopted in 12 workshops during the **Brazil 2050 national strategy process**, it organizes discussion around key questions. Participants submit their own responses and can click to agree or disagree with others' contributions.

The prototype includes moderators' access to advanced real-time data visualization: a live animated timeline of submissions that can be projected in the room, demographic filters to break down input by age, location or gender, and network visualizations to identify politically aligned subgroups. These capabilities allow for dynamic, responsive facilitation.

Partners

Launched in partnership with the **Ministry of Planning and Budget** (Ministério do Planejamento e Orçamento), AOVI was integrated into the process of developing the Brazil 2050 strategy — a collaborative national planning initiative led by state governments to define long-term goals around economic development, social inclusion, and sustainability.

Impact

The consultations included over **3000 participants in 12 regional workshops**. The project also built capacity within the Ministry—designing the tool alongside planning staff strengthened their skills in participatory digital engagement.

Scalability

AOVI has already been rolled out nationwide across Brazil, and plans are underway to adapt it for other national participatory initiatives.

In addition, the tool will be adapted to support challenge-driven innovation processes, specifically in collaboration with **GIZ Bangladesh** in the initiative INCLUDE – **Innovations for Climate-Smart Urban Development.** Partner municipalities and stakeholders participating in the innovation project will be able to use AOVI to share ideas and comment on proposed solutions that aim to tackle urban challenges identified by the local community.

AOVI as part of the Brazil 2050 strategy process

Customized/ Integrated Tool

Comprehensive Knowledge Archive Network (CKAN)

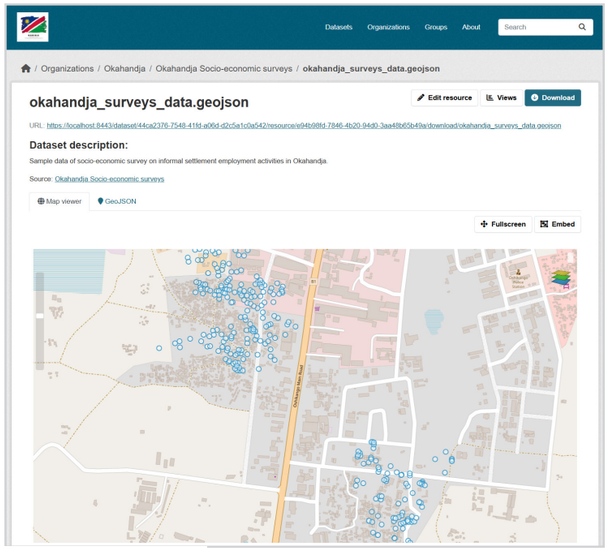
More info

The Comprehensive Knowledge Archive Network (CKAN) is an open-source data portal technology. We adopted and extended CKAN's core functionalities under our spatial data portal to support data cataloging, orchestration and general management of informal settlement data collected by partner organizations working across different towns in Namibia.

This tool provides various level of access and authorization for different categories of users. With this system, organizations working in the partner towns of Namibia can store their data in a central repository, organize, preview and securely share data as desired. It also enables the partner organizations to transfer each town's data and access privileges to town authorities, ensuring full ownership of each town's data by the town authority.

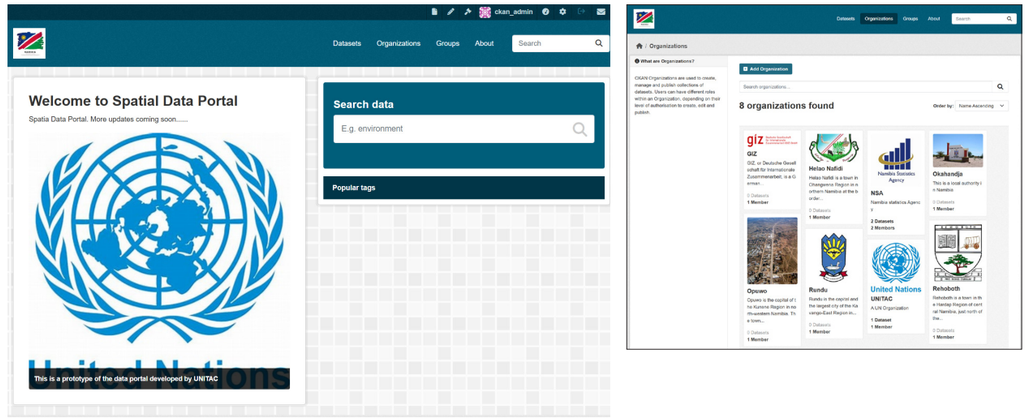
This system further allows the towns to update their own data once there are new updates, allow different organizations and the public to request or contribute data to the town councils thereby ensuring up to date data availability for town council operations. Overall, we have integrated the tool with a data orchestration service to automate the process of data uploaded to CKAN into a central database where the other applications can securely connect and create dashboards for data visualizations. The tool processes various spatial and attribute data formats including xls, csv, shp, GeoJSON, gpk, JSON, etc, allowing the previewing of the data and their metadata information in maps and tables and allows users with the right access to download the data or be shared as APIs.

This tool was built mainly on CKAN extended functionalities with the integration of Apache-Airflow for speedy data orchestration and PostgreSQL database for a centralized storage. We defined python modules used for managing data processing. In this way, authorized users can login into the system, upload their data into their organization, choose accessibility level, and the data will be automatically processed and stored in a central database and made available for previewing.



CKAN interface preview

Participatory Multilevel Governance



CKAN interface preview

Partners

National, sub-national, and local level stakeholders.

Impact

The CKAN for Data Management

- centralized and standardized data storage
- ensures secure, multi-organization and multi-level data management with spatial capabilities
- fully open-source tech stacks
- can be scaled easily to any type of use-case/project
- completely Dockerized set-up for ease of deployment across different environments

Scalability

The CKAN for Data Management has been designed to be fully scalable, adaptable in most projects and data management use cases. The system is fully open-source and completely dockerized allowing developers to extend its functionalities or utilize its individual modules for other data management, automation or orchestration processes.

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