

Digital Tools for Sustainable Urban Futures



Contents

04 | About UNITAC

07 | UNITAC Toolbox

- Building Establishment Automated Mapper (BEAM)
- Digital Participation System (DIPAS)
- Digital Job Card
- Cockpit for Social Infrastructure (COSI)
- EnerGIS
- Map Preview
- Map Draw
- Synthetic Data Generator

24 | UNITAC projects

- Participatory urban planning with DIPAS in Botswana
- Using Artificial Intelligence for better city planning, Central America and South Africa
- Bridging water access for the urban poor in Hargeisa
- Digital tools and capacity for inclusive, smart and resilient recovery in Ukraine
- Digital solutions for more climate resilient informal settlements in Namibia

About UNITAC

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

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 utilise 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.

HCU team

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



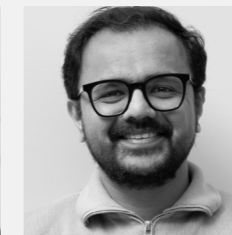
Gesa Ziemer
Academic Lead



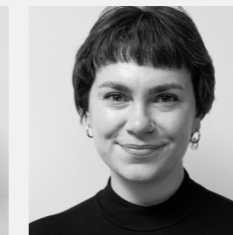
Sophie Naue
Urban Innovation Specialist



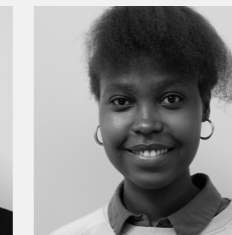
Abigail Kemper
Project Lead



Anand Gajaria
Data Scientist



Anja Berestetska
Urban Innovation Specialist



Carine Ingabire
Environmental Engineer



Dora Hegyi
Urban Innovation Specialist



Lisa Reudenbach
Urban Innovation Specialist



Martin Barner
Developer



Maryna Semenchenko
Project Co-ordinator



Mert Can Yilmaz
Urban Innovation Specialist



Michael Harthorn
Data Scientist



Nicola Stradtman
Financial Manager



Sarah Pieper
Lab Manager



Yuming Pan
Data Scientist

UN-Habitat team



Edlam Yemeru
Director External Relations, Strategy, Knowledge and Innovation



Aline Matta
Senior Programme Management Officer



Livia Schaefer-Nonose
Technology and Innovation Specialist



David Odiwuor
Administration



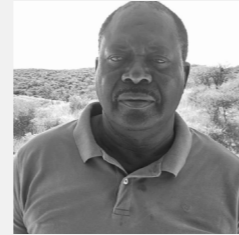
Elizabeth Okongo
Administration



Nathaneal Nabot
Data Scientist



Svitlana Timshyna
Project Advisor



Thomas Chiramba
Technical Advisory

OICT team



Michael Ibach
Chief of Service, ICT Policy and Compliance



Lambert Hogenhout
Chief of Data, Analytics and Innovation



Amanda Wang
Information Systems Officer



Anthony Twesigye
Developer



Emmanuel Adediji
Developer



Eugene Maritim
Developer



Ifeanyi (Frank) Ike
Data Scientist



Isaac Chann
Developer



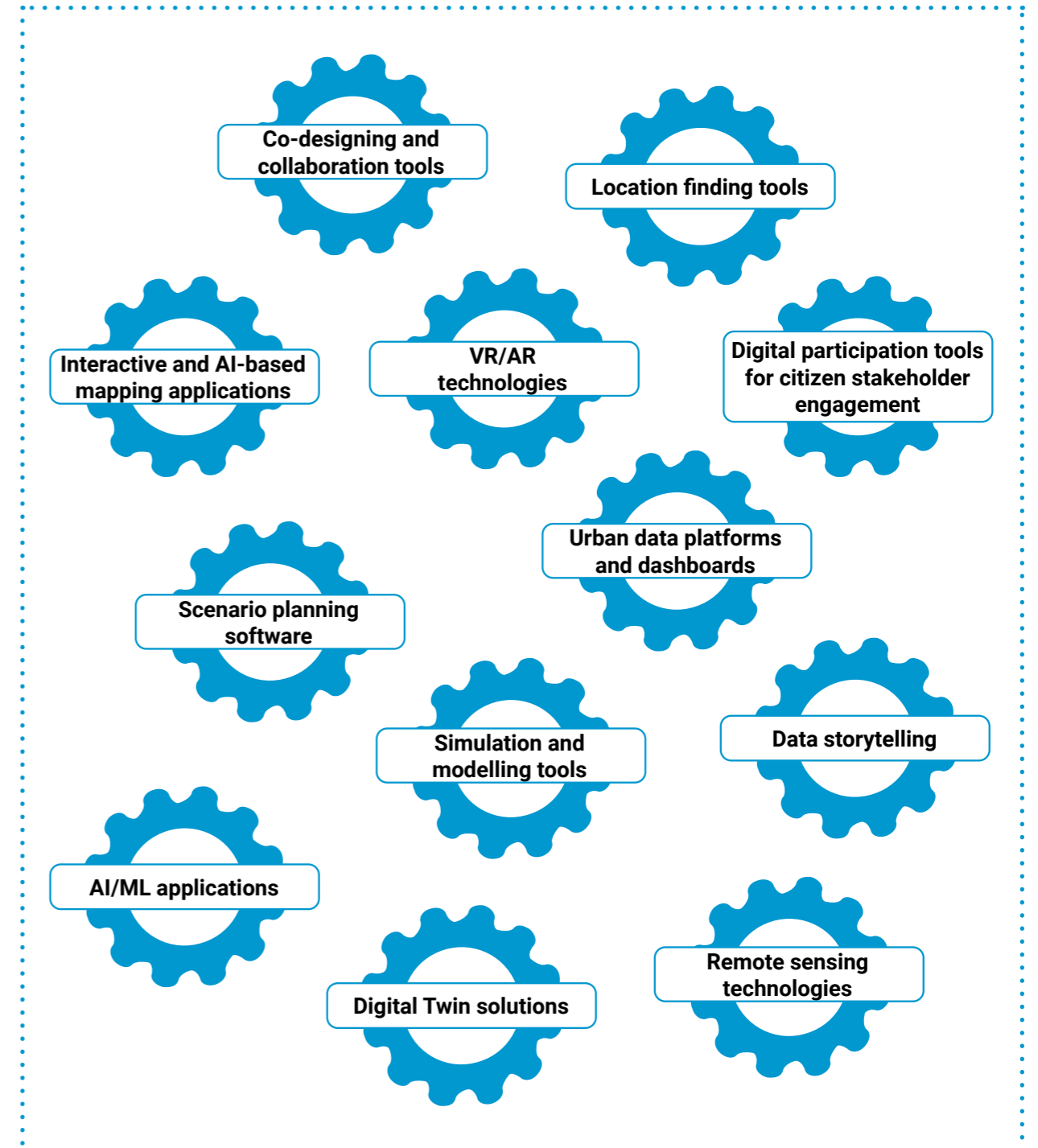
Roman Okhrimchuk
Data Scientist



Vamsi Gunturi
Technical Lead

UNITAC Toolbox

UNITAC has developed and tested a wide variety of tools and technology in the urban context:

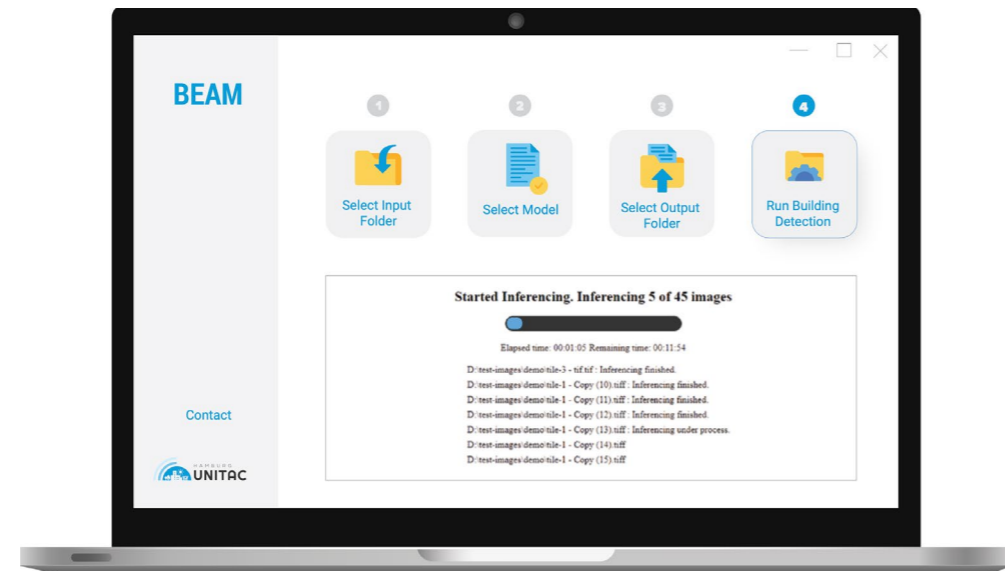


Building Establishment Automated Mapper (BEAM)

BEAM is an AI tool developed to automatically map rooftops of buildings in informal settlements for a variety of benefits. eThekweni 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. Municipalities in Central America, such as Guatemala City use BEAM to gain an understanding of the morphological characteristics of informal settlements.



Buildings mapped using BEAM in Guatemala and Santo Domingo



Desktop view of BEAM tool processing aerial images

Find the user manual [here](#).

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

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, eThekweni Municipality



Partners

Human Settlements Department, eThekweni 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

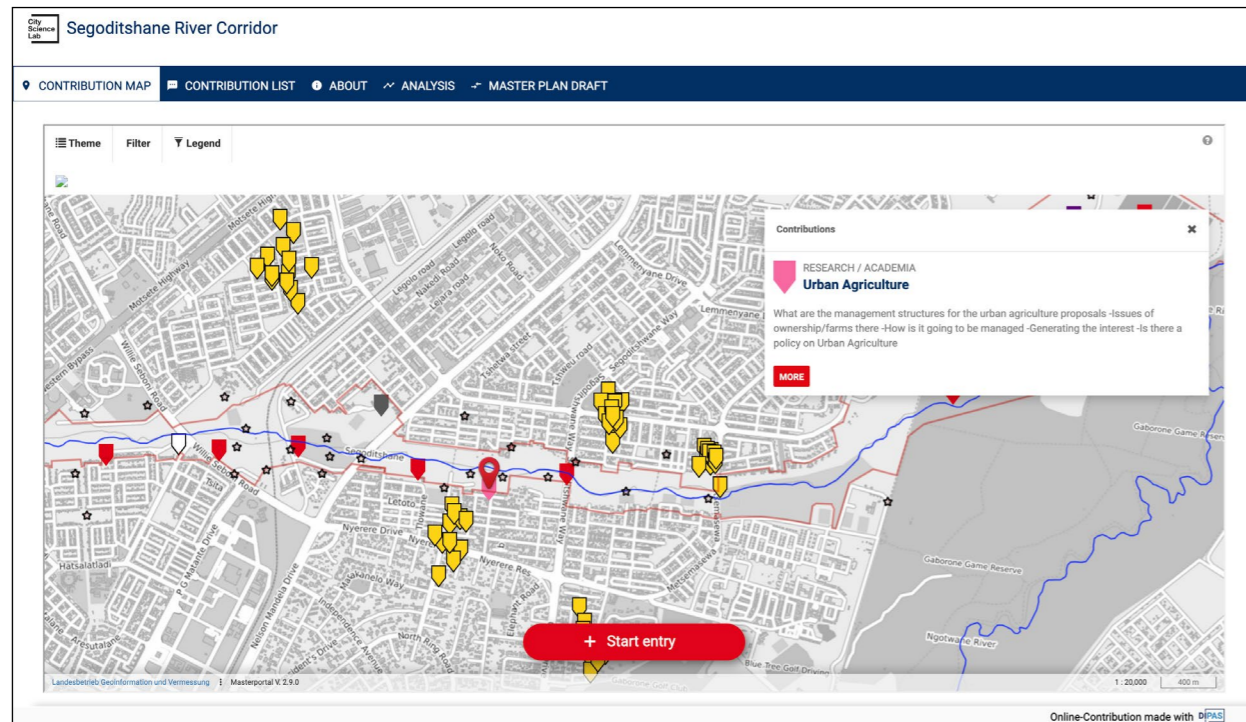
- maintain up-to-date records and maps
- better prioritise upgrading interventions
- improve basic service delivery



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.

Digital Participation System (DIPAS)



DIPAS contribution map showing comments entered by stakeholders of the Segoditshane River Corridor in Botswana

You can find the [code repository here](#)
 Contact unitac@un.org for more information about how to use the tool in your region.

DIPAS is an open-source web-based digital platform to improve public participation in urban planning. The application works on a browser, and it is accessible from any device (e.g., laptop, mobile, touch table). The tool caters for 2 user groups: 1. citizens and stakeholders and 2. public officials, developers or consultants responsible for public engagement. The tool allows users to view master plans or proposed developments and to provide localised feedback (information, suggestions, or questions) on a location, street or area. The added value for public officials, planners or consultants is that they can download the georeferenced and structured feedback in CSV and

GeoJSON file formats as well as view and download graphs and maps to use in their reports, analysis, designs or policy recommendations.

The content is fully customisable and suitable for many planning topics with strong spatial reference, (e.g., development concept, master plan, public space design, mobility, waste management, or climate).

DIPAS was first developed by the City Science Lab, Hamburg with the City of Hamburg BSW and LGV Hamburg ([see here](#)).



Partners

Botswana Ministry of Foreign Affairs, Botswana Ministry of Land, Water and Housing, Botswana Digital and Innovation Hub



Impact

DIPAS can complement traditional public consultation processes in the following ways:

- provide digital forms of online public participation in urban planning, not limited to those that attend an event.
- allow for real time digital data collection, analysis and reporting.
- enable communication between urban planners, city officials and the community by making participation more accessible, transparent, and efficient.



Scalability

As a web-based application, DIPAS has proven scalability and replicability in other cities, with interest from governments in Ukraine, South Africa and Botswana.



Stakeholders and experts commenting on the proposed revitalisation of the Segoditshane River Corridor in Botswana.

Digital Job Card

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

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.

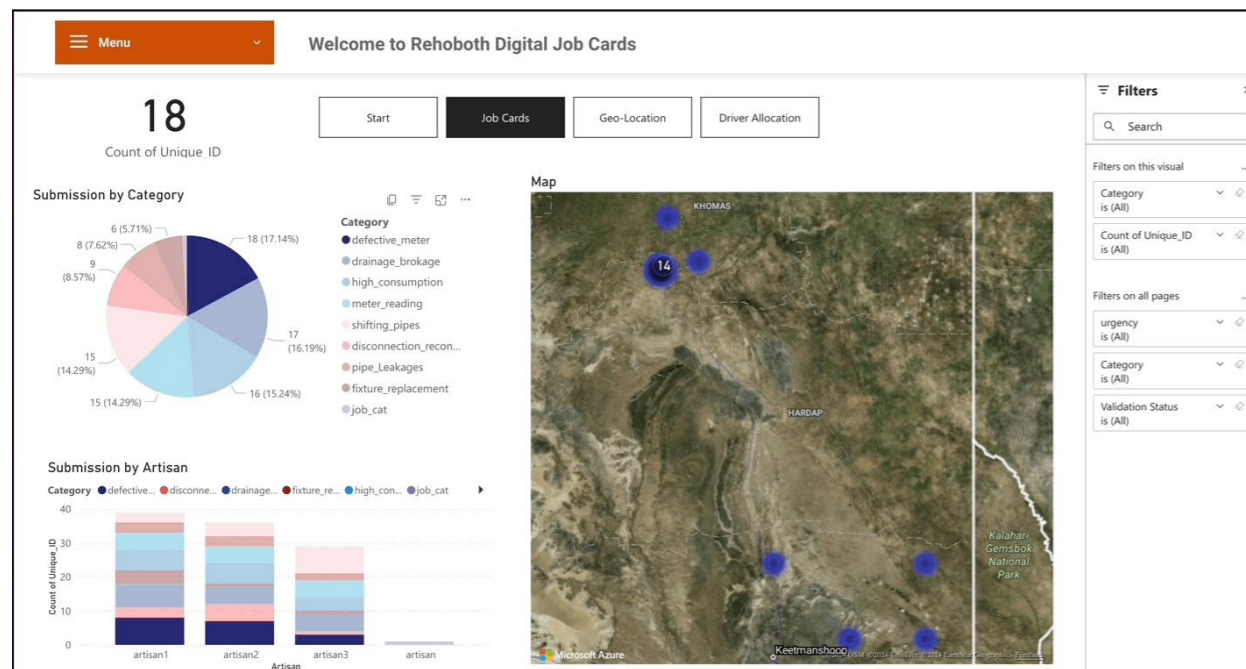
With this system, technical staff and clerks can track and report on the completion of their tasks or the status of the issue, allowing supervisors and managers to have sight of the data in near real time. The collected information can be used for monitoring processes, data management, analysis and visualisation, 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 user testing sessions.

The application leverages koboTool-Box 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.



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



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



Partners

Rehoboth Town Council, Namibia



Impact

The Digital Job Card's innovativeness lies in its simplicity. The application is:

- Easily customisable 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. 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.

Cockpit for Social Infrastructure (COSI)

CoSI is a web-based open-source digital tool developed to facilitate stakeholder engagement with relevant geospatial and statistical data and support informed decision-making in urban planning. It is a Spatial Decision Support Systems (SDSS) for urban stakeholders who may not have expertise using available proprietary GIS software.

CoSI assists with analysis of spatial relationships, including proximity and overlap, containment, and distribution patterns of geodata. It supports site selection, resource allocation, network routing, location-allocation and service coverage (accessibility or reachability analysis). Users can visualise, analyse, or simulate various development scenarios

in a selected area of a settlement or overall settlement.

CoSI requires geospatial data to function. For instance, if you want to find out if your city is a “15-minute city” with accessible bus stops, you need the exact coordinates. This data helps CoSI assess accessibility and lead to meaningful discussion.

CoSI was first developed for Hamburg by the City Science Lab Hamburg in collaboration with the BSW and LGV Hamburg. In 2024, CoSI features are used as a reference for the crisis recovery planning system to be developed in Ukraine, using OpenStreetMap baseline data, partner-collected data.



Partners

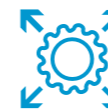
Makariv Hromada, Ukraine



Impact

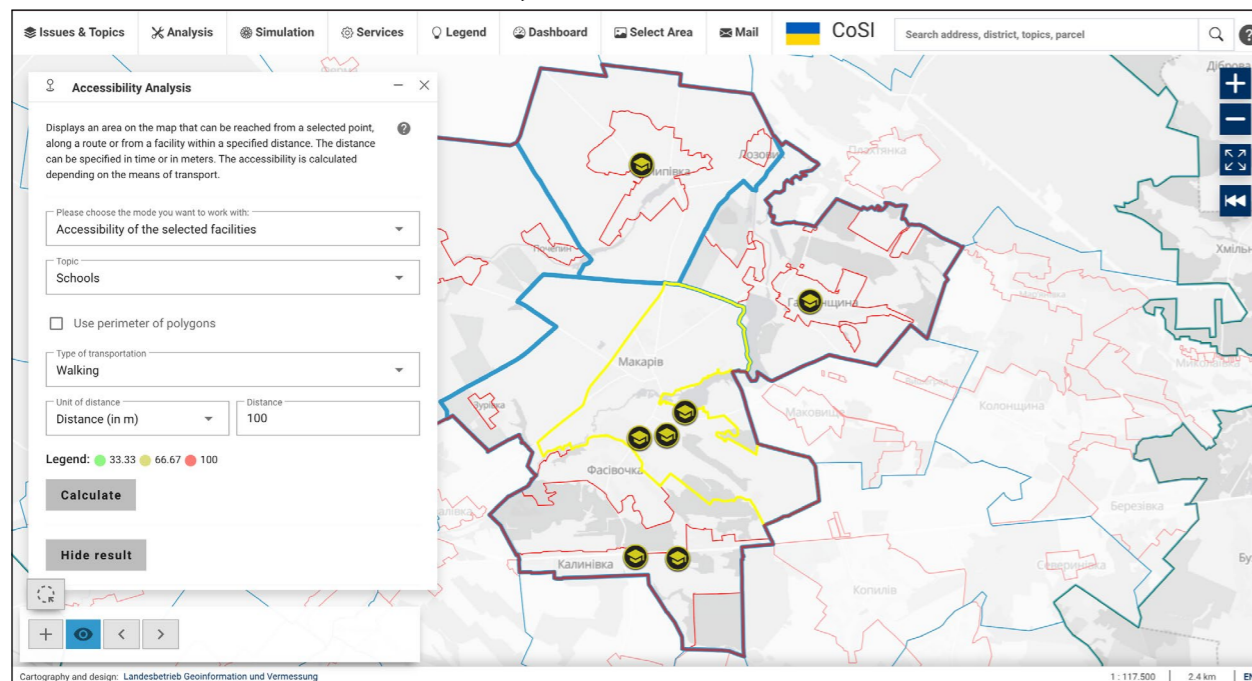
CoSI helps to:

- Facilitate effective collaboration among stakeholders, including architects, engineers, representatives from the private sector, investors and public authorities from various departments, leading to more comprehensive solutions that address multiple aspects of an urban project
- Consolidate statistical, geospatial and non-spatial data for accurate analysis and planning
- Enable the simulation of planning scenarios, improving foresight in urban development



Scalability

Because CoSI requires geospatial data for analysis, the tool is most suitable for environments where such data is accessible.



Accessibility analysis demonstrated on CoSI with synthetic data of Makariv Hromada in Ukraine



Stakeholders interacting with the COSI tool on a smart table at HafenCity Lab, Hamburg

You can find the code repository [here](#)

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

EnerGIS

EnerGIS is a map-based application designed to help local governments in planning and evaluating the transition to renewable (solar) energy. By leveraging geospatial data, the tool streamlines the assessment of rooftop solar potential, making it a valuable asset for city officials, urban planners, and sustainability experts, and aiding cities in achieving their sustainability goals.

The tool enables users to select buildings and immediately analyze their solar potential, providing valuable insights such as the number of

photovoltaic panels that can be installed, estimated energy output, cost savings, and CO2 emission reductions. It also allows users to export data and generate reports from insights. These insights assist municipalities in making informed decisions and seeking investment for renewable energy projects.

In addition to the assessments, the tool provides basic information on PV panels, storage units, and installation procedures, empowering users with the knowledge to support the transition to renewable energy.



Partners

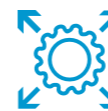
Drohobych Hromada, Ukraine



Impact

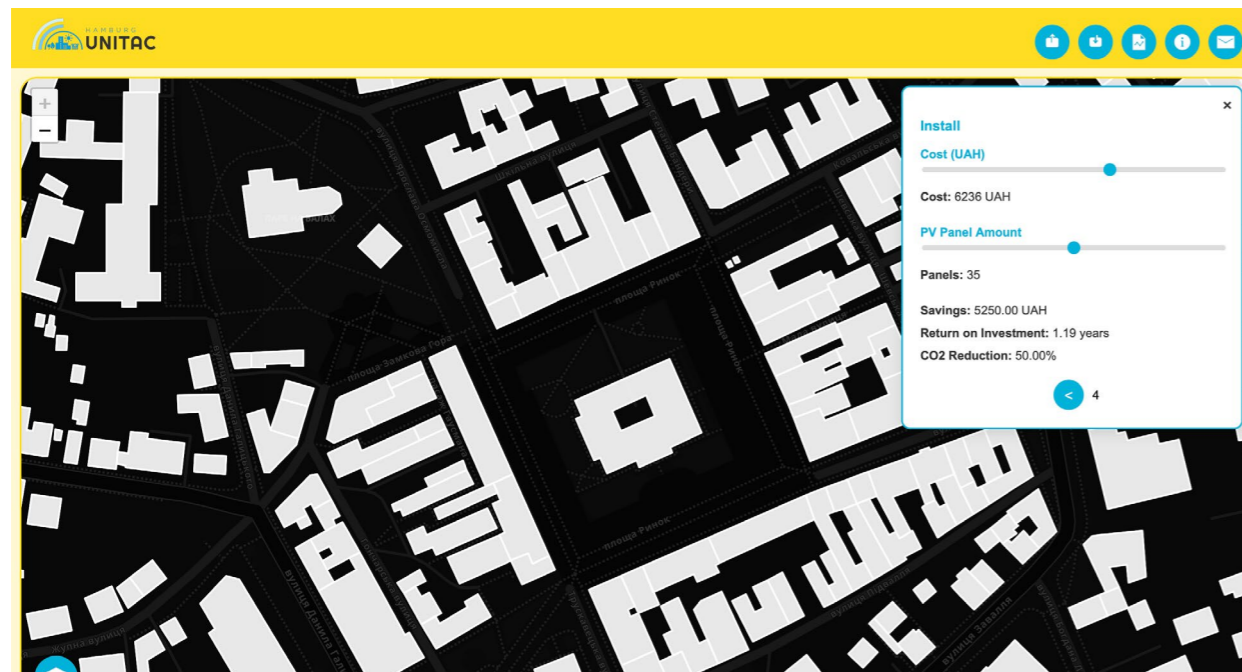
EnerGIS empowers municipalities to effortlessly achieve their sustainability goals. The tool

- helps cities quickly identify high-potential sites for PV installation, speeding up renewable energy adoption
- optimize investments in solar energy, ensuring maximum return on sustainability efforts
- ensures decisions are aligned with the latest regulations and innovations
- contributes to long-term sustainable urban development



Scalability

Initially prototyped with and in Drohobych hromada, the tool is ready for scale-up to other pilot hromadas in Ukraine. Designed with flexibility, the tool can be adapted for cities of any size, from small towns to large metropolitan areas. Access to detailed energy-related data is required for accurate analysis and projections.



EnerGIS tool showing potential cost savings and CO2 Reduction from rooftop Solar PV in Ukraine.



Solar Roof Top PV installations require data on the investment requirements and benefits.

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

Map Preview

Map Preview is a tool that enables anyone without GIS software or expertise to open and explore geospatial data files such as Geojson, Shapefile, csv. In our experience working with different stakeholders, there is a considerable digital divide, where urban planners in under-resourced local authorities do not have access to a server and/or software to even open and explore their own spatial data. This creates a bottleneck to our collaboration with different stakeholders. To mitigate this, we have developed this tool to function without a server and not be

constrained by fixed data table structures, enabling rapid deployment.

Furthermore, 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. The tool deploys simple web technologies such as HTML, geospatial Javascript libraries and CSS.



Using Map Preview to open and explore spatial data from Rundu, Namibia



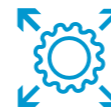
Partners

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



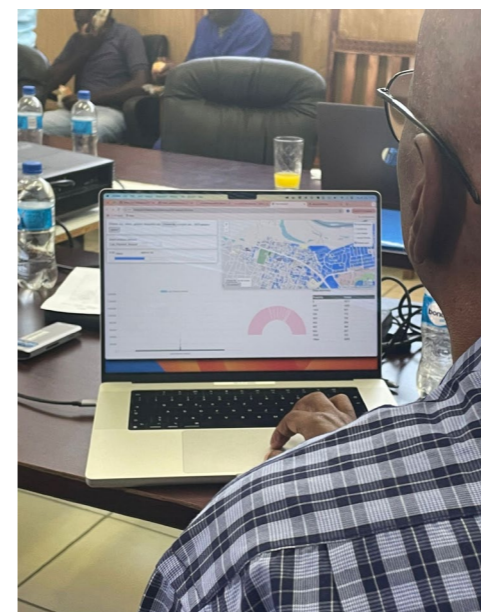
Impact

- 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

Map Preview has been used by the UNITAC team in several projects and prototypes especially in Namibia to work with different stakeholders such as GIZ 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

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

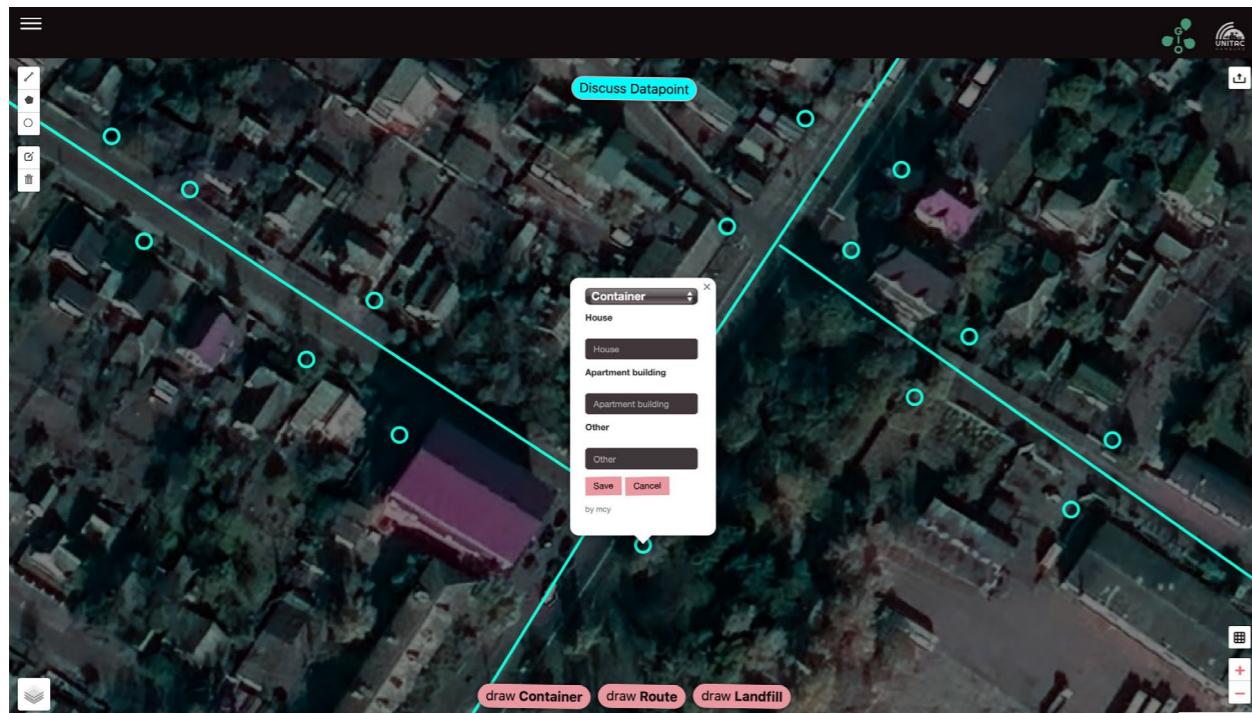
Map Draw

Map Draw is a web-based open-source application designed for the visualisation 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 upscaled

in Makariv hromada, 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.



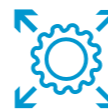
Partners

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
- uploads and edits existing datasets, allowing for data validation



Scalability

Map Draw 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.

You can find the code repository [here](#).

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

Synthetic Data Generator

The Synthetic Data Generator automates creation of Synthetic data for various use cases. The tool works as a wrapper for the [Open buildings data](#). In other words, using the tool can generate any sort of synthetic data for a particular city or region across the world. For example, we have utilized the tool for UNITAC projects in Namibia and Ukraine where we successfully generated synthetic data related to public spaces such as hospitals, clinics etc., as well as data related to digital job cards based on predefined templates of Kobo toolbox forms. Overall, we have made use of the data generated by the tool to bridge the gap between idea and prototype so that we can

manage the expectations of local authorities as well as facilitate tangible milestones and establish data standards.

The entire tech stack of the tool is based on front end light weight technologies and libraries based on HTML, JavaScript and CSS. Users can double click on the HTML and upload the geojson file with buildings data of a particular city, and tool generates the synthetic data automatically. There is a Python based Streamlit wrapper provided in addition to the tool which makes it easy to download the data of a particular city or region, which will internally be fed into the tool for synthetic data generation.



Partners

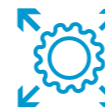
Internal testing with Ukraine and Namibia prototype development



Impact

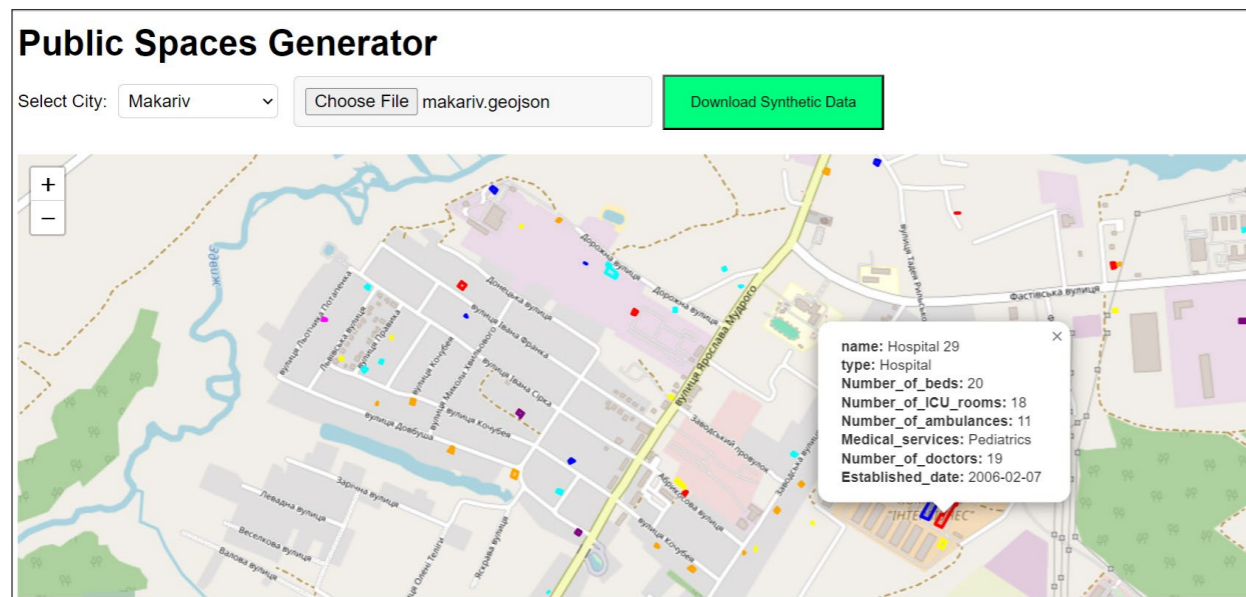
The Synthetic Data Generator

- Expediates prototyping of digital prototypes and dashboards which require geospatial data.
- Enables the demonstration of technical solutions or data analysis where the real data is unavailable, inaccurate, or inaccessible.
- Scales easily to any place on the globe as the data generation is based on specific buildings of a particular city or region.
- Invaluable for researchers and academics to showcase their work without worrying about data privacy regulations.
- Can be scaled easily to any type of use-case.
- Completely Dockerized set-up for ease of deployment across different environments.

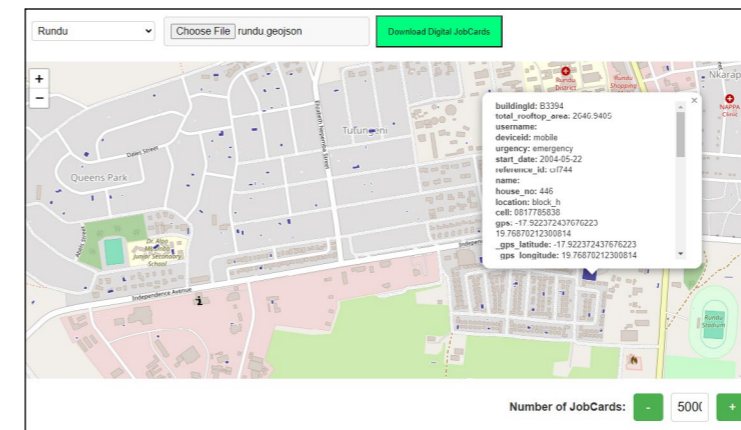


Scalability

The Synthetic Data Generator has been used by the UNITAC team in several projects and prototypes. It is available for other developers and researchers to use. The best part of the tool is that it doesn't need any server for deployment and can completely function offline with very few requirements to use the tool to generate synthetic data.



Example of Synthetic data generated for public health care facilities in Ukraine



Example of Synthetic data generated for service reports in Rundu to prototype the Digital Job Card

Contact unitac@un.org for free access to the code and more information about how to use the tool

UNITAC projects

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



UNITAC is not restricted to any specific region and can collaborate with all UN Member States. To select pilot projects, UNITAC has established a Call for Innovative Projects –

a modality designed to identify concrete, short-term innovation initiatives that contribute to making smart cities more people-centered.

● project sites ● office sites

Participatory urban planning with DIPAS in Botswana

The Segoditshane River flows through the city of Gaborone over 13 kms. The river can hamper mobility across neighbourhoods, is often used as a waste dumping site, and harbours petty criminal activities. The Department of Town & Country Planning (DTCP) has developed a detailed draft Master Plan for the Segoditshane River Corridor following extensive consultations to address one of Gaborone’s most pressing resilience challenges – flooding - while simultane-

ously creating opportunities for urban transformation related to public spaces, commercial and housing development, and multi-modal transport routes. The Digital Participation System (DIPAS) tool was used to digitally collect feedback on the river corridor and the masterplan, complementing DTCP’s ongoing efforts. Furthermore, the collaboration sparked a discussion on digital technologies and innovation that could further support sustainable urban planning in Botswana.

Through the stakeholder and community consultation sessions in Gaborone, participants dived deep into the features and functionalities of DIPAS and ideated on how the tool could be further developed and adapted to the local context of Gaborone and Botswana.

DIPAS was also used to introduce the Segoditshane river corridor draft masterplan to the public. Together with colleagues from DTCP, SmartBots, Department of Local Governance and BA ISAGO University, UNITAC supported public consultations in two busy areas of Gaborone: the Bus Rank and the Main Mall. Participants were eager to share their personal experiences of the river corridor, as well as their ideas and wishes concerning its future.

You get to consult a variety of people across different sectors, across different population classes.

Ms. Taboka Mabayani
Urban Planner Department of Town & Country Planning (DTCP), Ministry of Land & Water Affairs

We really believe that digital participatory systems can be an advantage in the uptake of projects by the community, especially the youth

Mr. David Ramatlare
Chief Physical Planner
Gaborone City Council

I love the idea of us going towards the digital kgotla, even us, the youth can be involved, in terms of participation.

Ms. Teboyaone Moreetsi
Student, Master of Arts
Urban & Regional Planning
University of Botswana



Stakeholders entering their comments and feedback on the Segoditshane river corridor plan using DIPAS in Botswana

Innovation component

In 2023, UNITAC worked with the Department of Town & Country Planning (DTCP) of Botswana and the Botswana Digital & Innovation Hub (BDIH) to gather stakeholder feedback on the masterplan for the Segoditshane river corridor. This was the first time that digital tools were used to facilitate public participation in Gaborone.

DIPAS is a consultation tool that enables both online and in-person participation. With DIPAS, citizens can access spatial information, such as digital maps, aerial photographs, 3D models and other geodata from home using their smartphones or at events with the help of interactive data tables and provide localized feedback on different areas or planning projects.

Project results

Participants of the stakeholder consultation came up with different innovative concepts around digital tools that could assist Botswana in its transition to smart and sustainable cities and communities. The group discussions resulted in 12 ideas: some groups proposed solutions for traffic and transport monitoring, while others focused on the topic of fault detection and reporting. Multiple teams ideated on data infrastructure and management: interoperability and integration of spatial datasets were key components of these proposals. Inspired by DIPAS, some teams addressed the topic of participation and developed the concept of the ‘digital kgotla*.’

While using DIPAS during the community consultation, participants also shared their views and ideas on the application of DIPAS, for instance various locations were suggested where the tool could be on display and be accessible to local communities. Given the richness of languages in Botswana, the need for a user

interface in Setswana and the necessity of offering other language options was also highlighted.

In the discussions, there was a consensus that tools such as DIPAS have the potential to attract a wider audience, especially young people, therefore it could complement existing consultation processes, such as the kgotla*. The inputs also raised the importance of two-way communication to build trust between local communities and the city: contributors welcomed the opportunity to share their thoughts and opinion, but they also highlighted the need for receiving response to their contributions, therefore assuring that their feedback is heard and taken into account. Ranging from usability to privacy topics, participants brought up various further ideas on how DIPAS could be enhanced and appropriated.

*A kgotla is a traditional community meeting or tribal gathering where participants discuss and make decisions about relevant issues affecting the community.

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



Ground truthing maps of Informal settlements in eThekweni Municipality

“BEAM changed our workflows and accelerated detection processes... we're able to get a turnaround time now of 72 hours across the whole of eThekweni. BEAM has been a great help.”

Snobani Dweku
Corporate GIS, eThekweni Municipality

In South Africa, the eThekweni Municipality has the largest number of informal settlements in the country, with over a quarter of the city's population living in informal areas. Continued urbanisation 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 eThekweni Municipality applied for UNITAC's open call 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. eThekweni has used BEAM to map buildings throughout the whole city, providing accurate and up-to-date information to its officials.

The BEAM tool is currently 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 identifying informal structures in the back yards of formal residences.

Innovation component

Prior to the introduction of the BEAM tool, informal structures in eThekweni 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.

To assist the municipality in automating their building mapping process, BEAM uses Machine Learning to radically accelerate the spatial recognition of building structures based on aerial imagery. In this way, 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 georeferencing the pixels that are likely rooftops.

The version used by eThekweni 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.

Images available [here](#).

Project Results

The following results have been achieved with the tool

- Fast, accurate mapping of buildings in informal areas – allowing the city of eThekweni to extract building footprints for the whole municipality in 72 hours
- Pixel level accuracy on high resolution aerial imagery: Over 90%
- Pixel level accuracy on high resolution satellite imagery: Over 84%
- Machine learning has been used on both aerial and satellite imagery to scale and optimize the time-consuming process of identifying informal structures

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

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, 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.

Innovation component

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.

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
- Reduces time and effort spent on fetching water
- Ensures and provides access to affordable and clean water

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

The project “Just Transitions: Digital Tools and Capacity for Inclusive, Smart, and Resilient Urban Recovery in Ukraine” aims to support Ukrainian local governments with digital and data tools to facilitate smart, inclusive, and democratic recovery and development towards people-centered smart cities. The project focuses on making a sustainable impact on data governance, data collection, and its application to spatial planning with a specific emphasis on transparency, participation, and climate

resilience. The project collaborates with various levels of the Ukrainian government, including the Ministry of Restoration, and local governments of Makariv, Drohobych, Irpin and Kamianets. 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 like UN agencies, civil society organizations, and academia.

The success of reconstruction depends not only on the rapid pace of recovery, but also on what priorities we set for future development. The support and assistance of our partners in developing a document that will contain an “action plan” or recommendations on ways to achieve sustainable development is very important for us. This document will give us opportunities to solve the main problems that inhibit the sustainable development of our community”

Anatolii Karbovskii,
Deputy Mayor of Makariv Territorial Community



photo credit: Oleksandr Ratushniak

Innovation component

UNITAC’s Just Transitions project in Ukraine tackles urban recovery through a multifaceted digital innovation strategy. First, it leverages knowledge and expertise from existing tools such as the Masterportal

(Geoportal), DIPAS (Digital Participation System), and CoSi (Cockpit Social Infrastructure). These digital solutions facilitate 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 is developing analysis and visualization of urban profiling diagnostics that guide the urban recovery process. Recognizing the need for context-specific solutions, UNITAC remains open to developing new tools based on emerging needs.

However, the project recognizes that technological solutions alone are insufficient. 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 necessary to actively participate in shaping the recovery with digital tools. By empowering communities to make data-driven decisions, UNITAC bridges the digital divide and fosters a more inclusive and sustainable urban future for Ukraine.

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 navigate and support their 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. Drawing learnings from DIPAS, a digital tool for public participation aims to support participatory processes by collecting georeferenced feedback from the public and allow prioritization of public proposals, while CoSi has been used as a reference to develop a crisis recovery planning system that allows conflict-affected cities to map, visualise, and analyse datasets for informed decision-making at the settlement level. Some of the use cases to support sustainable evidence-based decisions are solid waste management,

including war debris, and energy efficiency. These and other tools developed within the project will be **handed over to Ukrainian stakeholders** for further independent application to recovery and spatial planning.

To equip local urban professionals with the necessary digital skills, the project launched a new course for Kyiv School of Economics with 25 graduated students in 2024. The course ‘Urban Data Science and Quantitative Methods’ is developed and taught as a part of the Master’s Programme in Urban Studies and Postwar Reconstruction at Kyiv School of Economics. The course aims to introduce students to the rapidly evolving field of urban data science and equip them with the necessary skills to succeed in this exciting and dynamic field as future municipal managers, community leaders, and urban planners. The course is decided to be offered again in the next academic year.

Digital solutions for more climate resilient informal settlements in Namibia

Our project in Namibia aims to build digital and data capacity of the national and local governments to support urban decision making and planning. At a national level, upgrading informal settlements is a priority for the Ministry of Urban and Rural Development. We are supporting various stakeholders active in the field of sustainable urban development in their efforts to collect and analyse data to better understand the dynamics of informal settlements. The Namibia Housing Action Group (affiliated to the Shack-Dwellers International) has a community-led approach to profiling and upgrading

informal settlements, and the GIZ Integrated Sustainable Urban Development (ISUD) Programme has applied a participatory approach to neighbourhood planning. Together with these 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 together with local governments 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

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 removal.

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 exploring how to support public participation in the development of 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



UNITAC Hamburg

Hongkongstraße 8
20457 Hamburg, Germany

 unitac.un.org
 unitac@un.org