



DICECELL

SMART CITY BY CALZAVARA

Rev.2 05/11/2021



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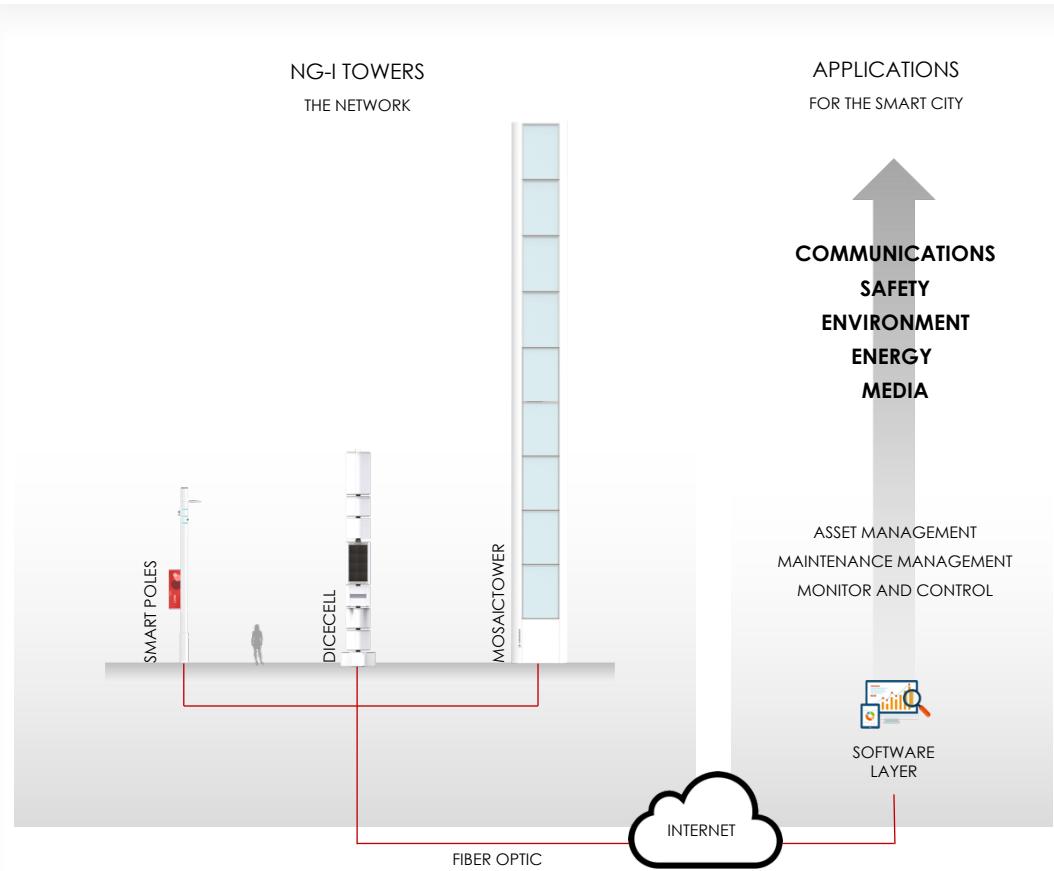
With a long history of telecommunications infrastructures delivery, **Calzavara** developed a modular and flexible piece of infrastructure that allows to:

- accommodate and integrate Telecommunications and Smart City equipment;
- get started providing connectivity and also services for citizens;
- make cities better places for the citizens.

CALZAVARA'S SMART INFRASTRUCTURE

The Smart City infrastructure that **Calzavara** provides consists of:

- a family of smart structures (smart poles, Dicecells and Mosaictowers) to **build a network**, widespread and well integrated in the city fabric.
- the **software layer** to provide the Customer with simple management tools.



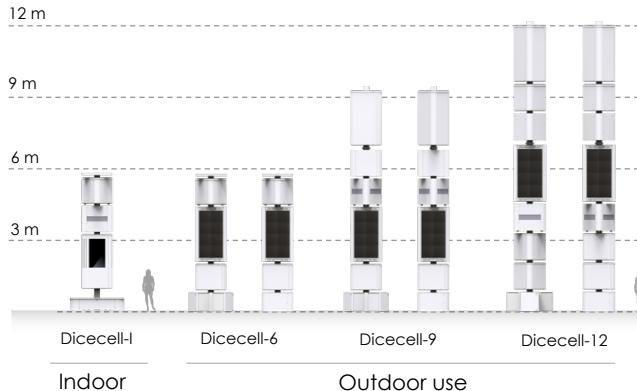
DICECELL: HIGHLY CUSTOMIZABLE MODULAR DESIGN



Dicecell represents the infrastructural answer to the growing demand to integrate smart equipment in the urban fabric.

Its modular design consists of **5 elements**: a small module, a large module, 3 different types of base. The combination of modules allows infinite configurations, but **4 standard configurations** have been defined to make **Dicecell** easily adaptable to any type of location.

STANDARD CONFIGURATIONS



Indoor

Outdoor use



Base

Base with rack cabinet

Base with bench



Dicecell-i is the indoor version of Dicecell; it can accommodate Wi-Fi access point and small cell antennas while offering functions related to communications (LCD screens, Digital clock) and security (dome cameras).

FUNCTIONAL ZONES AND INCLUDED ADD-INS

• Lighting

A special top element contains three LED spotlights.

• Antenna section

A small module integrates a Wi-Fi AP leaving additional space available for small cells and radio equipment. The module also integrates three mini dome cameras in the lower corners.

• Add-ins section

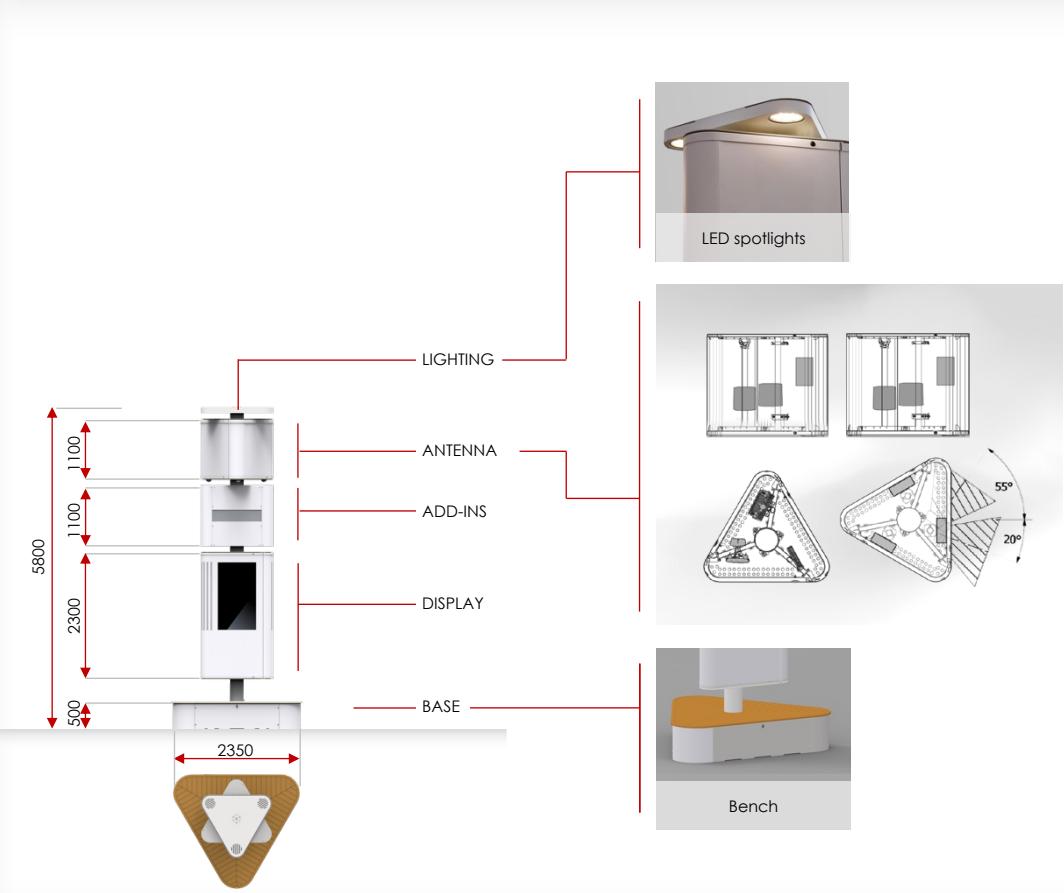
A small module includes three digital clocks.

• Display section

Three LCD screens are integrated on each side of a large module.

• Bench

The base consists of a comfortable bench to accommodate people.



DICECELL-6



Dicecell-6 can accommodate small cell antennas for one Mobile Network Operator while offering functions related to communications (LED screens) and security (public lighting, dome cameras).

FUNCTIONAL ZONES AND INCLUDED ADD-INS

• **Lighting**

A special top element contains three LED spotlights.

• **Antenna section**

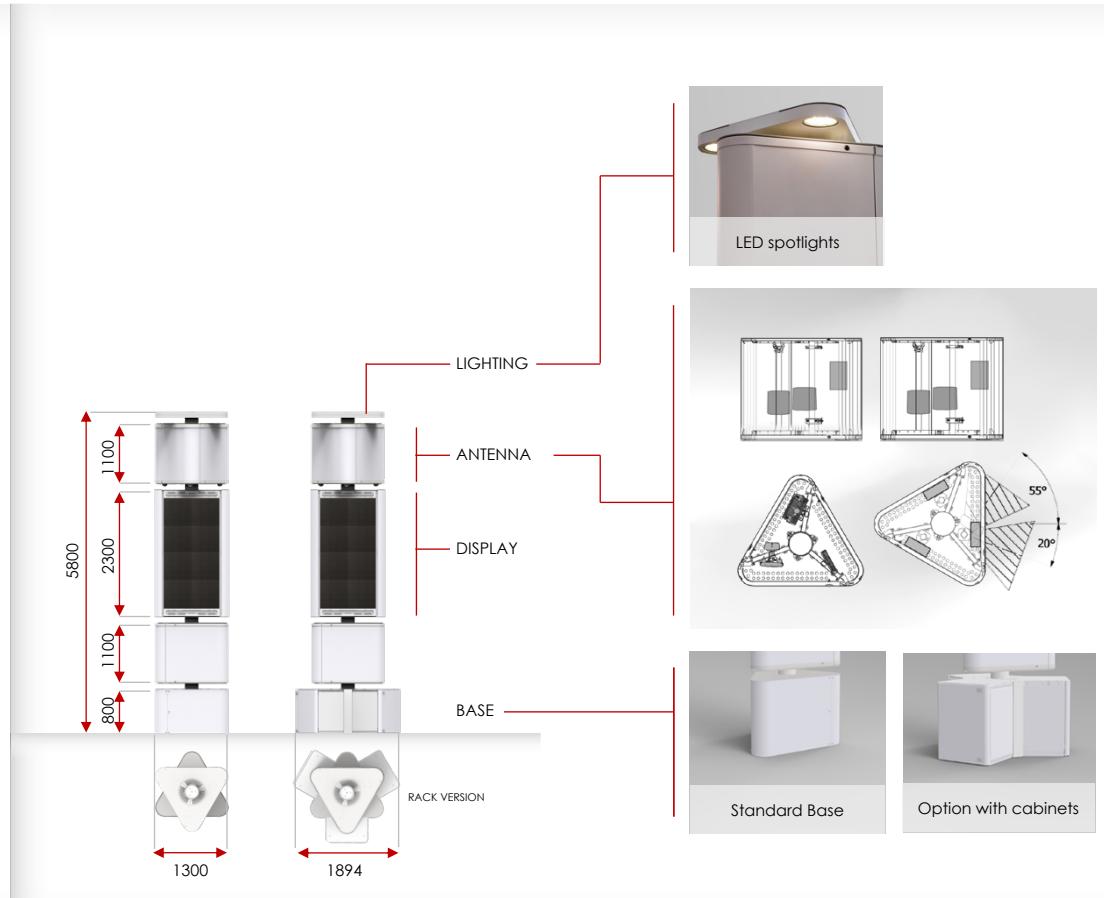
A small module integrates a Wi-Fi AP leaving additional space available for small cells and radio equipment. The module also integrates three mini dome cameras in the lower corners.

• **Display section**

Three LED walls are integrated on each side of a large module.

• **Base**

The base serves the main purpose of housing the tower equipment. There is also a "rack version" with cabinets capable to host three 8U racks.





Dicecell-9 can accommodate a wide range of small cell antennas while offering functions related to communications (city clock, LED screens) and security (public lighting, dome cameras).

FUNCTIONAL ZONES AND INCLUDED ADD-INS

• Antenna section

A large antenna module integrates a Wi-Fi AP leaving additional space available for small cells and radio equipment from multiple operators.

• Lighting

A small module (version with removable panels) houses three LED spotlights in its lower corners.

• Add-ins section

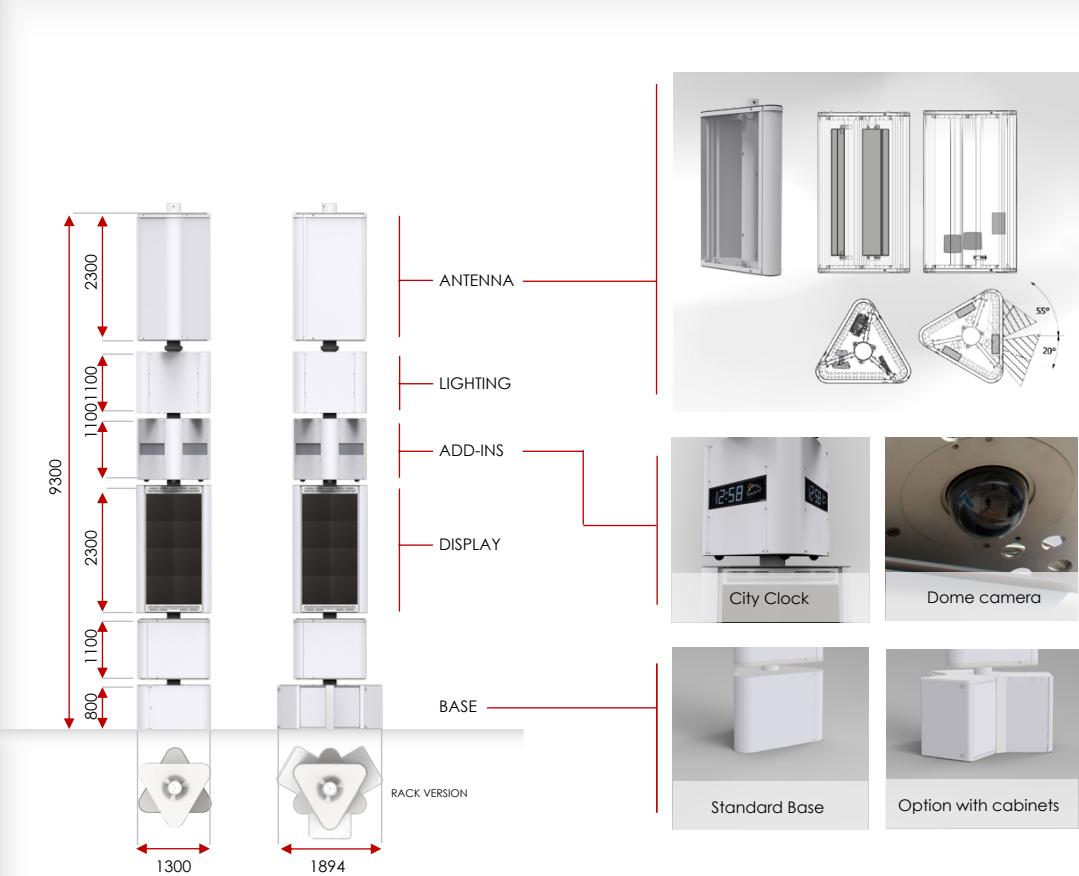
A small module includes the set of built-in add-ins: three minidome cameras and three city clocks.

• Display section

Three LED walls are integrated on each side of a large module.

• Base

The base serves the main purpose of housing the tower equipment. There is also a "rack version" with cabinets capable to host three 8U racks.





Dicecell-12 is a multi-operator tower that hosts a wide range of small cell antennas while offering functions related to communications (city clock, LED screens) and security (public lighting, dome cameras).

FUNCTIONAL ZONES AND INCLUDED ADD-INS

• Antenna section

The antennas and the radio equipment of multiple operators can be housed in the two upper modules. A Wi-Fi Access Point is included.

• Lighting

A small module contains three LED spotlights in its lower corners.

• Display section

Three LED walls are integrated on each side of a large module.

• Add-ins section

A small module includes the set of built-in add-ins: three minidome cameras and three city clocks.

• Base

The base serves the main purpose of housing the tower equipment. There is also a "rack version" with cabinets capable to host three 8U racks.



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1. COMMUNICATIONS



5G SMALL CELLS



PUBLIC WI-FI



CITY CLOCK



ADVERTISING
LOOK



CUSTOM LOOK

2. SAFETY



LIGHTING



VIDEO
SURVEILLANCE

3. ENVIRONMENT



CLIMATE
MONITORING



AIR QUALITY
MONITORING

4. MEDIA



DIGITAL
SIGNAGE

1. COMMUNICATIONS – 5G CAPABILITY



5G CAPABILITY

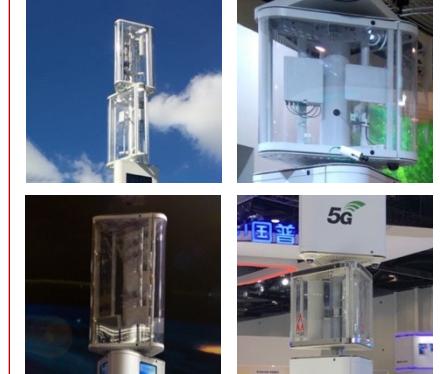
Dicecell is a neutral host piece of urban infrastructure, hosting small cell antennas within the structure and enabling the discrete deployment of new 5G network infrastructure.

MOBILE EDGE COMPUTING

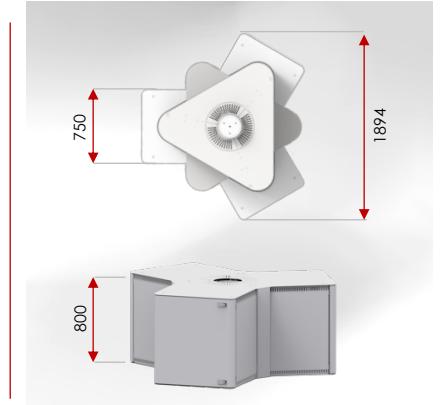
A special version of the base provides spaces for Mobile Edge Computing, having cabinets that house 8U racks as if they were micro-datacenters. Doors are reinforced and equipped with locks. Racks are easily removable from the cabinet by pull-out tracks.



5G
5G SMALL CELLS



EDGE COMPUTING



1. COMMUNICATIONS – PUBLIC WI-FI



PUBLIC WI-FI

At the heart of every smart city, there are cellular and Wi-Fi networks working together, as part of the wireless infrastructure, to provide real-time access to vital information and services. Whether it's public safety, emergency response, traffic control, utility grids, waste management or person-to-person interactions, mobile and fixed devices using cellular and Wi-Fi are part of the picture.

High-density Wi-Fi access point (AP) gives long-range coverage to give access to the general public and to connect devices remotely to the internet.



PUBLIC WI-FI



Radios

1 x 5 GHz radio (802.11 a/n/ac), 2x2
1 x 2.4 GHz (802.11 b/g/n), 2x2
SU-MIMO / MU-MIMO: 2 streams

PHY Rate

2.4 GHz radio: 300 Mbps
5 GHz radio: 867 Mbps

Antenna

Antenna Internal sector antenna
10.5 dBi (2.4 GHz) 13 dBi (5 GHz)

Max EIRP

36 dBm (2.4 GHz)
36 dBm (5 GHz)

WLAN

WLAN 256 clients, 16 SSIDs WPA-TKIP, WPA2 AES, 802.1x, 802.11w PMF

1. COMMUNICATIONS – CITY CLOCK



CITY CLOCK

When it comes to engaging citizens by offering useful information, the City Clock is a highly regarded add-in for providing a free public service with accurate information on:

- Date and time
- temperature and humidity detected by integrated sensor
- events-counter or countdown timer

The City Clocks are installed on the vertical surfaces of the sides of the modules.



11:00

CITY CLOCK

Device Type

Colour

Luminance

Protocols



LED matrix luminous NTP clock designed to display four-digit time, date and weather report

White

7400 cd/m²

DHCP, NTP/SNTP; TIME; DAYTIME;

1. COMMUNICATIONS – CUSTOM LOOK



ADVERTISING LOOK

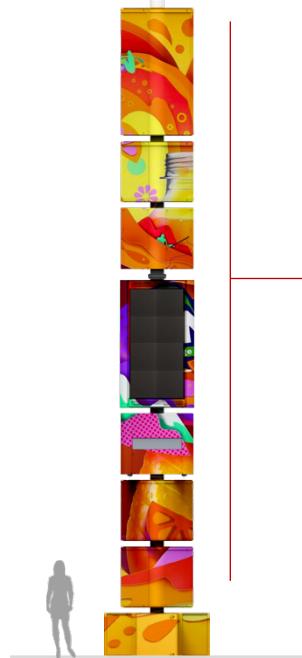
In the cities of the future, technological and structural interventions must aim at creating beauty, strengthening attractiveness and remodeling city branding.

Dicecell is a design tower aesthetically consistent with high-profile locations, contributing to build a strong place identity. The overall appearance is customizable by various graphics themes for a range of outdoor messaging needs to promote local events, festivals and exhibitions, with eye-catching creative used to enhance the public space.

DECORATIVE LIGHTING

Lighting plays a key role in visual communication, because it modifies the perception of spaces, shapes and the atmosphere.

Dicecell can enhance its appearance thanks to the support of LED strips for decorative lighting.



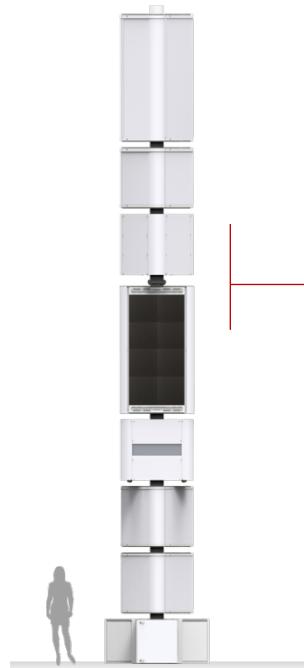
2. SAFETY – LIGHTING



PUBLIC LIGHTING

Lighting has not only an aesthetic functionality, helping to enhance and define the identity of a place. Lighting contributes also to everyone's sense of safety and well-being. Good lighting improves the safety of cyclists and pedestrians by increasing the visibility of routes and reducing the chances of accidents.

Dicecell houses the LED spotlights in the lower corners of the modules. A special element is provided when it comes to installing spotlights on top of the structure.



LIGHTING

Device Type



LED Spotlight

Luminous flux



11880 lm

Temperature

4000 K

CRI

80

2. SAFETY – VIDEOSURVEILLANCE



MINIDOME CAMERAS

The improvement in the quality of life in the Smart Cities also includes safety: a Smart City does not exist without a Safe City.

Dicecell perfectly integrates fixed CCTV minidome cameras for outdoor use, hiding them internally in the lower corners of the modules.

The built-in model offers CCTV services with HDTV 1080p video, IR capability for night vision, a wide focal length for wide area coverage and detailed surveillance at a distance.



VIDEO SURVEILLANCE

Device Type	H.265 IR Dome Camera
Focal Length	F1.6(Wide)~F2.9(Tele)
Resolution	5 Megapixel (2592 x 1944)
Framerate	H.265/H.264: Max. 30fps/25fps(60Hz/50Hz)
Min. Illumination	Colour: 0.15Lux(F1.6, 1/30sec) BW: 0Lux(IR LED on)



3. ENVIRONMENT – SENSORS



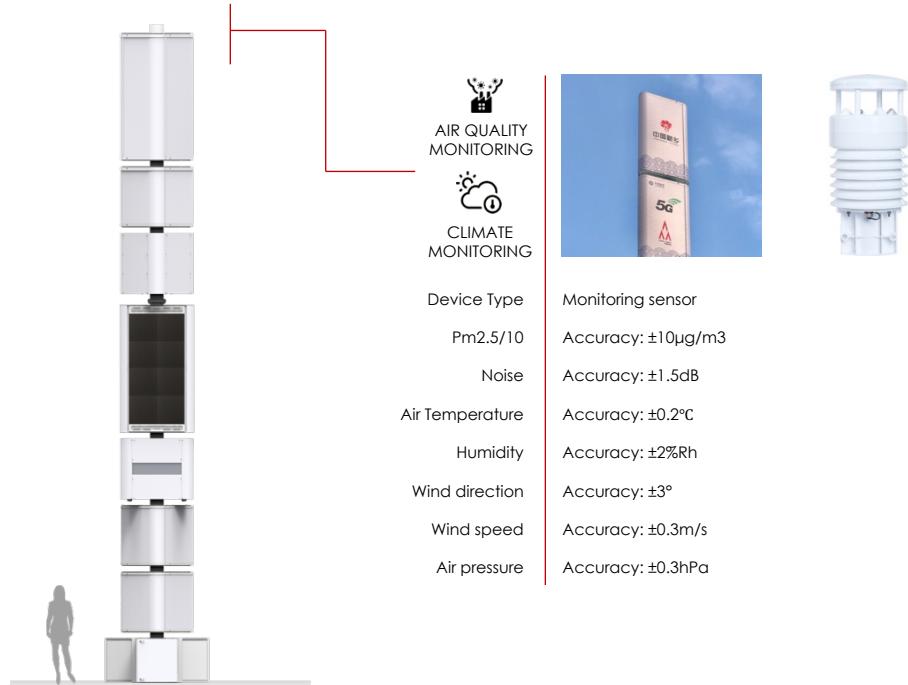
CLIMATE MONITORING

Climate factors have a major impact on the health and wellbeing of communities. By measuring temperature, humidity and pressure in the public space, authorities can proactively encourage positive outcomes.

Dicecell can host a weather station at the top of the structure to monitor, analyse and display climate data.

AIR QUALITY MONITORING

Tiny particles from exhaust fumes, car traffic and pollen all pose a risk to people as they navigate public spaces. Poor air quality can contribute to respiratory and coronary diseases. As such, measuring the Air Quality Index is an essential function of every Smart City.



4. MEDIA – LED WALL AND LCD SCREENS



SCREENS

Dicecell is designed to carry LCD screens or LED walls.

Visual display monitors are now a staple in Smart Cities, and provide an on-the-go resource for the public to access information and stay connected. They have a role not only in reshaping a city's visual landscape, but also in reshaping the relationships between people and their community.

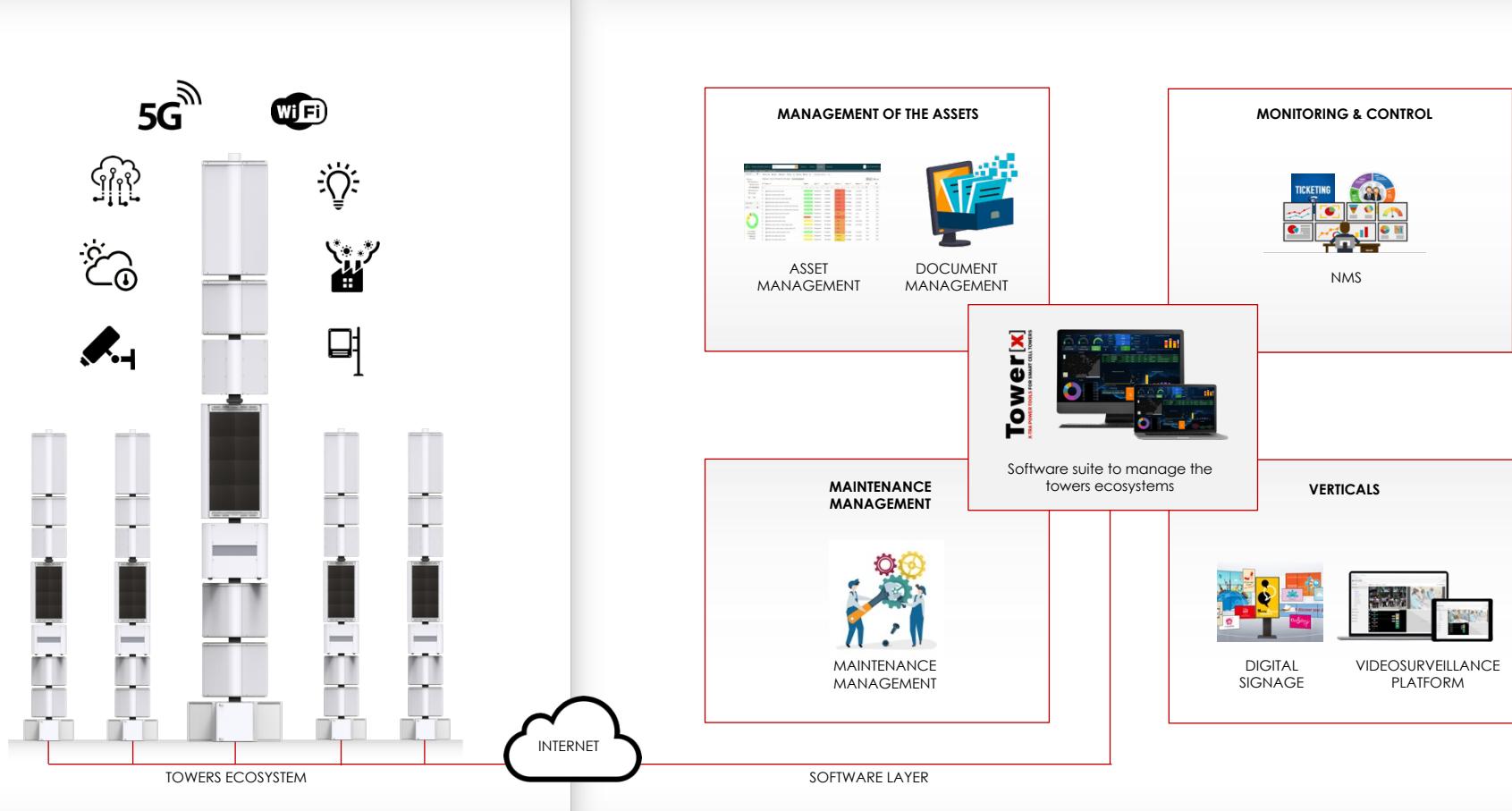
DIGITAL SIGNAGE

Uses for visual display screens include:

- Commercials
- Weather updates
- Public transport schedules
- Live wayfinding
- City service information
- Local community information
- Emergency notifications



TOWER-X SUITE: THE MANAGEMENT PLATFORM



DICECELL IS A STRATEGIC TOOL TO ENABLE THE SMART CITY



The roll-out of Smart City infrastructure opens the way for major advances in the way cities communicate, provide care for the environment, keep people safe and coordinate events. Never before have city authorities been so empowered to improve citizen's lives.

Dicecell is a strategic tool that combines three pillars of the Smart City into a single structure: telecommunications, security, better urban experience for the citizens.

- ✓ Strong in Telecommunication applications, 5G ready, multiple MNO supported
- ✓ Strong in Security: video-surveillance, street lighting, support for additional components dedicated to citizen safety
- ✓ Beautiful design, easily integrated into the urban landscape. Better urban experience thanks to the support of a wide range of accessories, including large LED screens.
- ✓ Not just a structure, but a network of connected equipment, managed by a software layer
- ✓ A ready-to-use platform to begin providing services for the Smart City

SOME REFERENCES

T-MOBILE HEADQUARTERS, POLAND



Country	Warsaw, Poland (T-Mobile Headquarters)
Year	2020
Height	6 meters
Add-Ins	1 x public wi-fi 3 x 55" LED screens 3 x City Clock

NOKIA SHANGHAI BELL HEADQUARTERS, CHINA



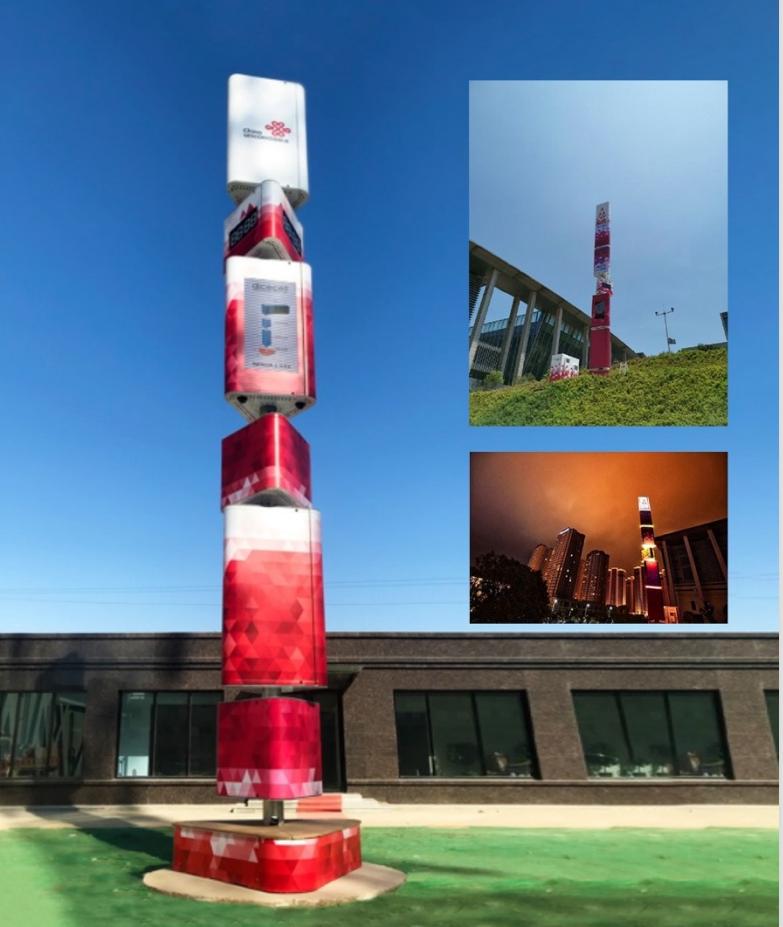
Country	Shanghai, China (Nokia Shanghai Bell Headquarters)
Year	2019
Height	7,5 meters
Add-Ins	<ul style="list-style-type: none">3 x Small cells 5G3 x City Clock3 x Minidome Security Camera3 x 55" LED Screens

TIANJIN, CINA



Country	Tianjin, China (Meijiang Exhibition Center)
Year	2019
Height	12 meters
Add-Ins	3 x 2 Small cells 5G (site sharing with 2 MNO) 3 x Dome Security Camera 3 x City Clock

XIONG'AN NEW AREA BEIJING, CHINA



Country	Beijing, China (Xiong'an New Area)
Year	2018
Height	12 meters
Add-Ins	3 x Small cells 5G 3 x City Clock 3 x 55" LED Screens 3 x Dome camera

ZHENGZHOU XINZHENG INTERNATIONAL AIRPORT, CHINA



Country	Zhengzhou, China (Zhengzhou Xinzheng International Airport)
Year	2017
Height	12 meters
Add-Ins	3 x Small cells 5G 3 x 55" LED Screens USB charger station

