

SMART CLUSTER



TOTAL CONNECTIVITY

SMART CLUSTER. Services



4G/5G/Wi-Fi/
IoT/Macro cell
Positioning beacon

Basic services:

- Smart lighting
- Decorative lighting
- Weather & pollution control
- Video surveillance
- Audio playback & alerting
- Video playback
- Voice attendant
- Auto charging station
- SOS / info panel

Smart Pole

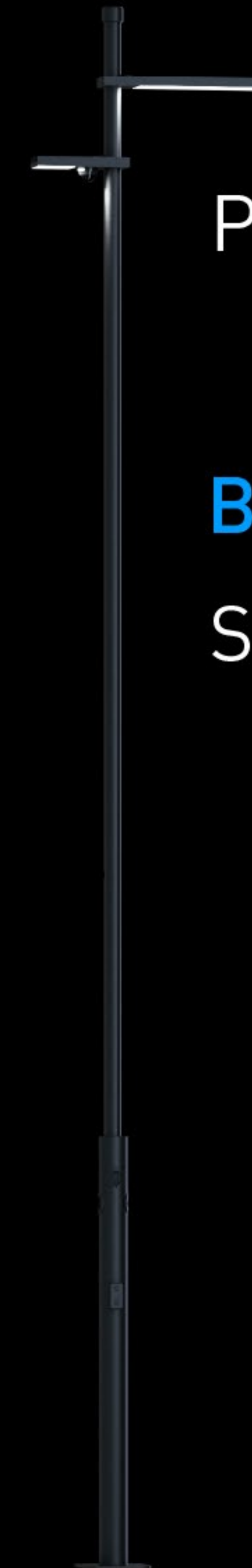


4G/5G/Wi-Fi/
IoT/Macro cell
Positioning beacon

Basic services:

- Smart lighting
- Video playback & alert
- Auto charging station

Smart Lite



Positioning beacon

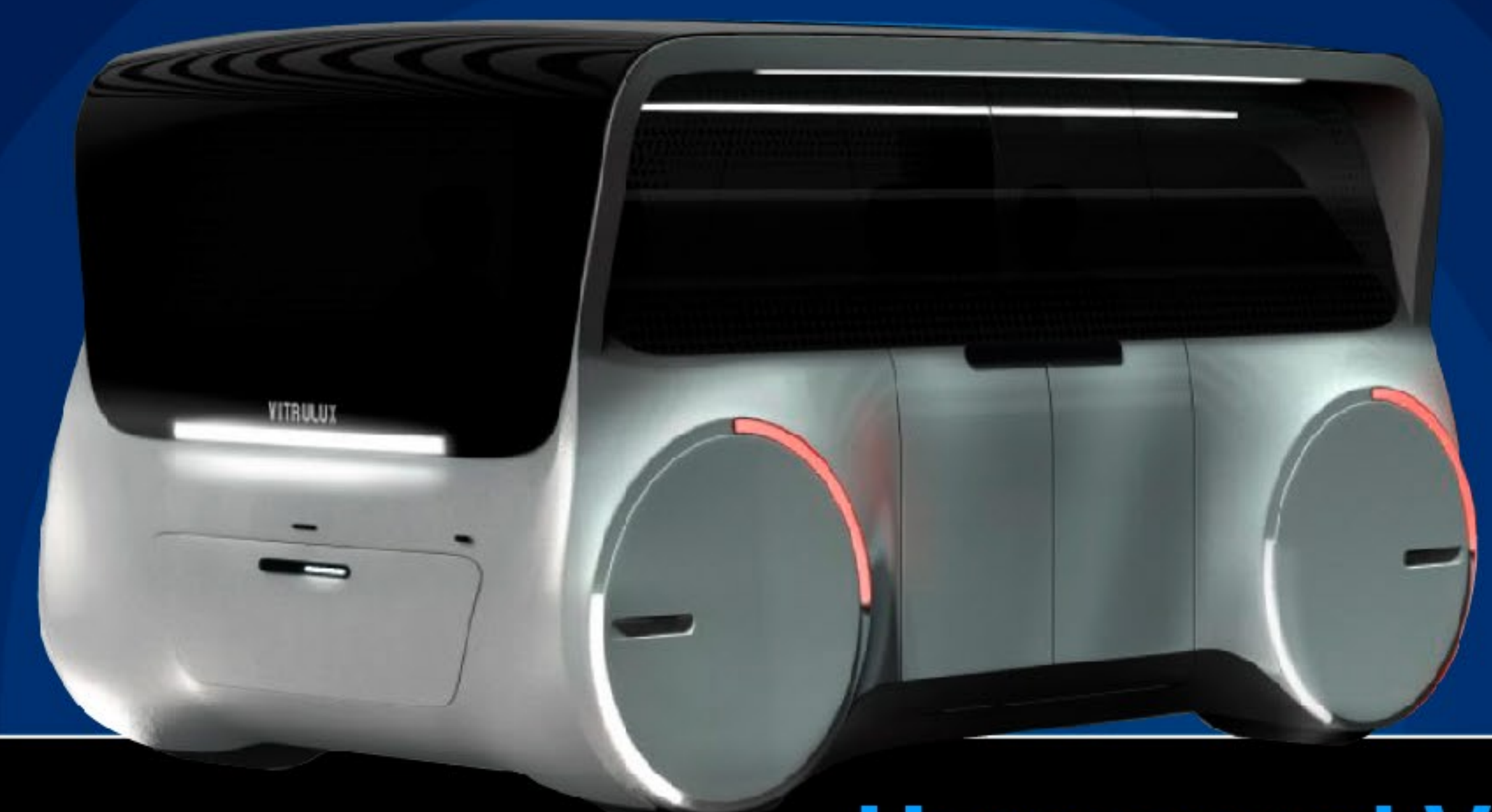
Basic services:

- Smart lighting

Smart Light



Drones



Unmanned Vehicles

Ultra-precise positioning & control system
for Drones & Unmanned Vehicles

SMART CLUSTER. Features

Suitability - for new & existing city areas

Scalability - the uniform modular & scalable solution

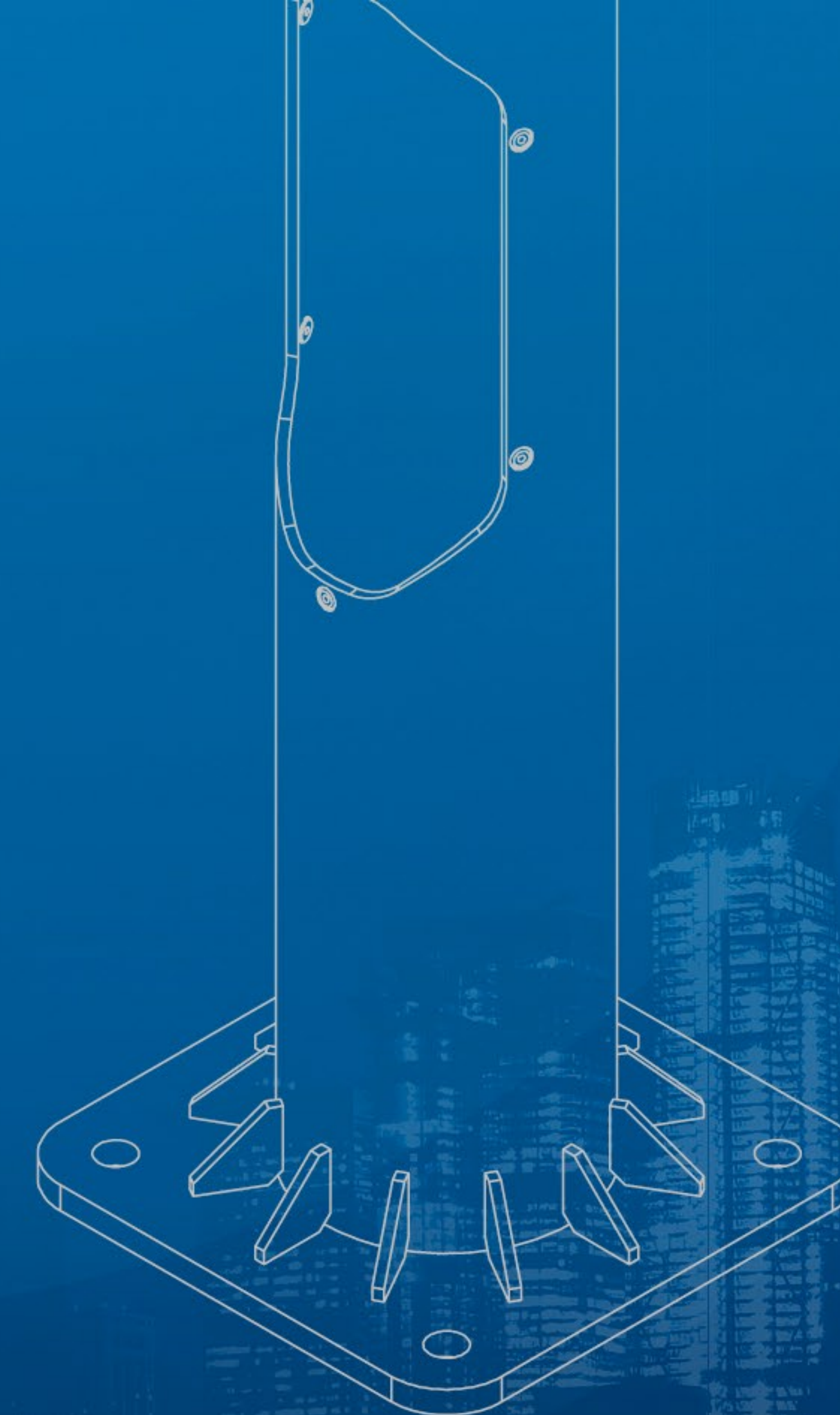
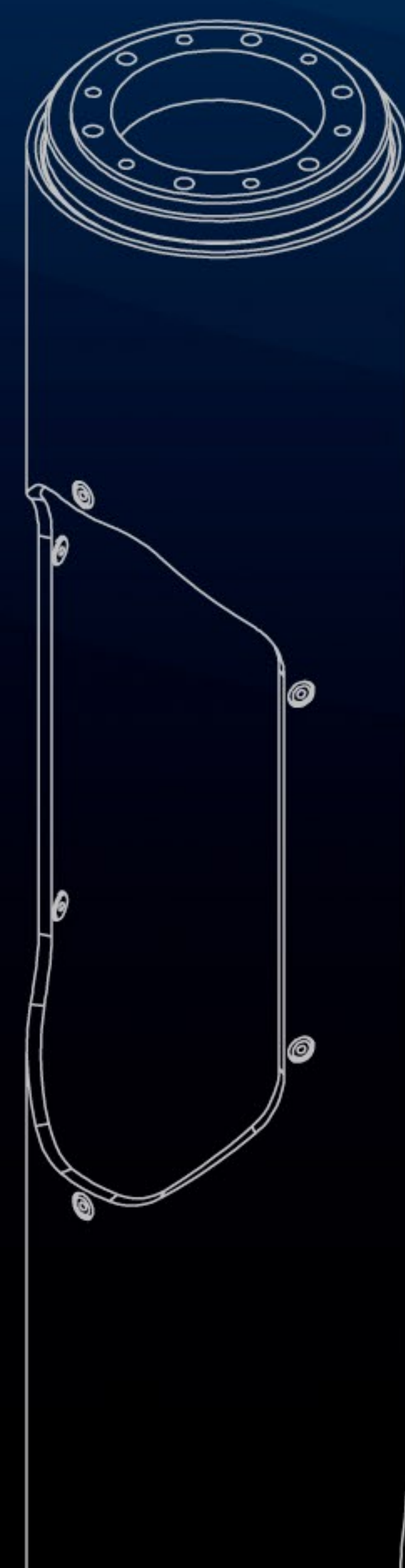
Step by step implementation

Complete solution for existing and future services

Flexible & maintenance friendly

SMART POLE for SMART CITIES

The core element of the Smart Cluster.



Full range of functional modules

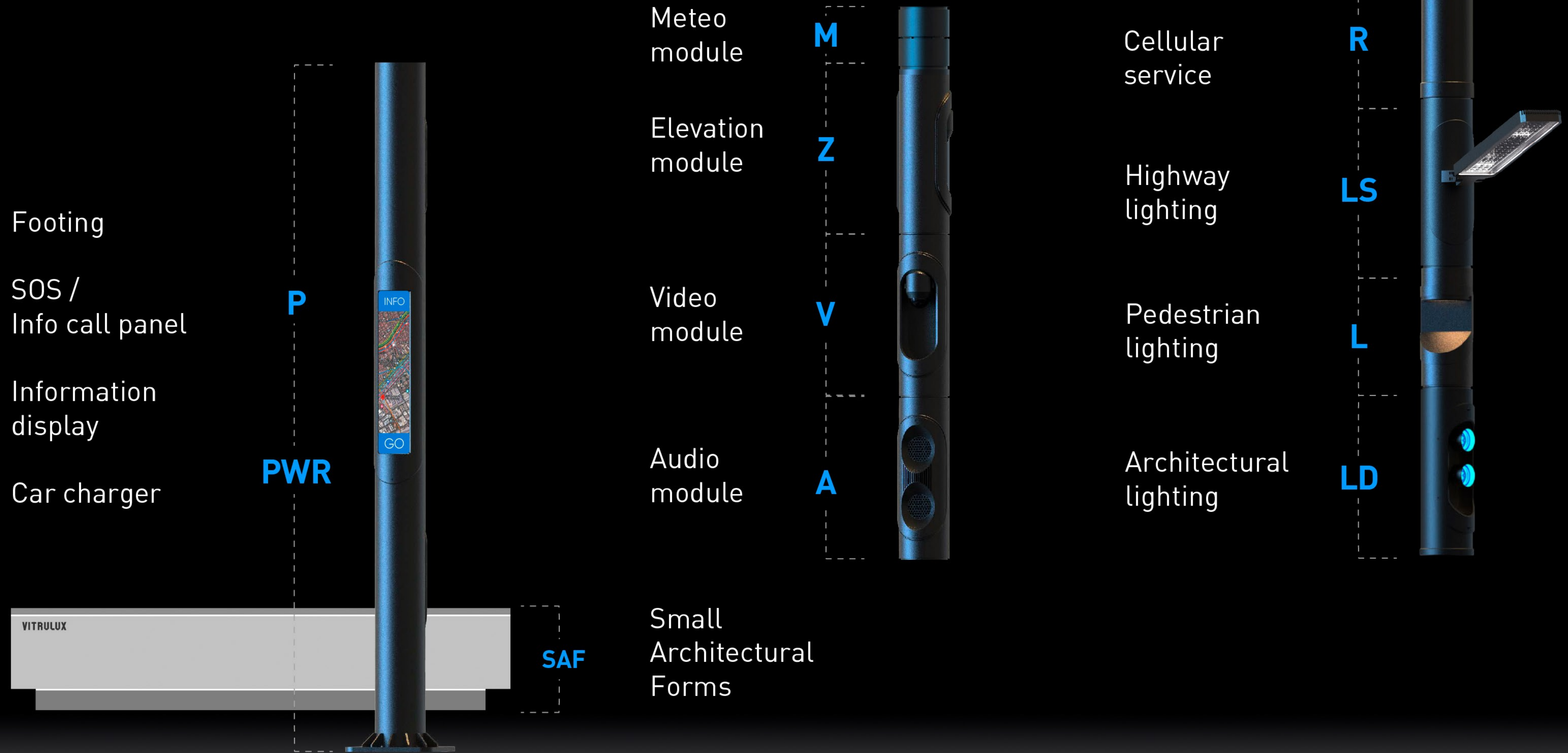
Room for processing power
- control the cluster
- video analytics, etc

**Connection to the core
power & data networks**

We're not
scientists,
but we totally
get it.

Information
more storage

SMART POLE. Modular structure



SMART POLE. Open architecture

Interchangeable modules.
Wide range of third party
terminal equipment adopted.



Radio Services

Lighting modules.

Video modules.

Acoustic modules.

Modules can be turned to a desired angle without disassembling the pole.

The Footing modules

3m high unified module.

Places most of the main equipment. Provides reliable support for the higher modules.

Basic footing

P1

Footing with a SOS / info call panel

P2

Footing equipped with the information display touch panel

P3

+ Additional optional modules

PWR1
USB charger module

PWR2
electric car charger module with TYPE 2 outlet, 7/11/22kW

PWR3
wireless cell phone/tablet charger module.

Three service hatches enable comfortable maintenance. Opening is monitored for service / safety purpose.

M

T

I

W

R

LS

LD

L

A

V

Z

WR

P

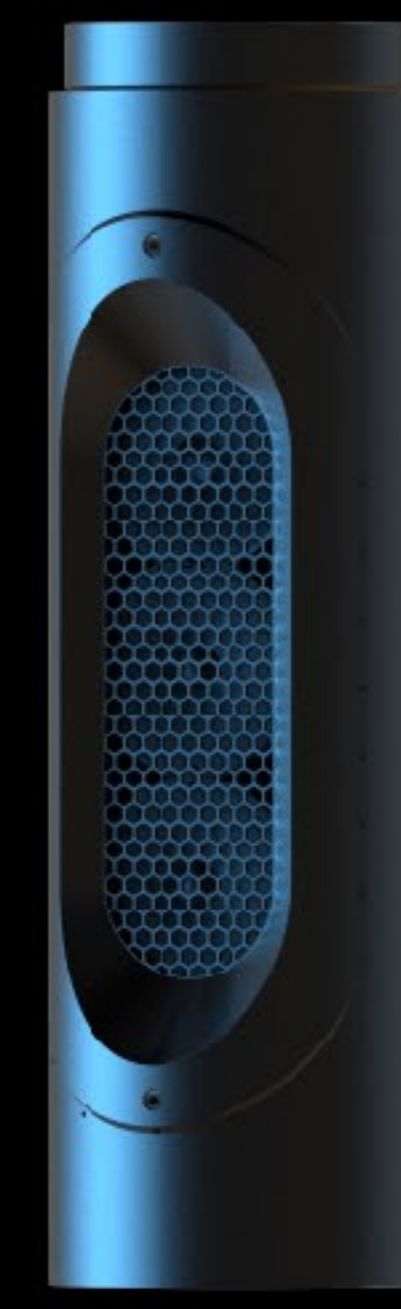
SAF

Acoustic system modules



A1

Rated power
35W



A2

Rated power
80W

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SAF

Designed for background sound/music, with priority public announcement interface.

Video surveillance modules



V1

Public areas
monitoring



V2

High resolution
ready for analytics



V3

High speed PTZ dome
camera with 180° sector



V4

External hanged
PTZ camera

M

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SAF

Wide selection of cameras supported. Pole inbuilt video analytics server available.

The elevation module

Elevation module has a standard interface for a functional module covered by a hatch for future functionality development.

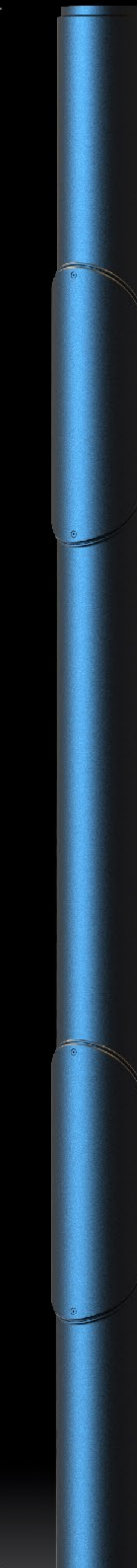
0.7m high **Z1**



1.5m high **Z2**



3m high **Z3**



+ (CUSTOMER SPECIFIED) **Z4**

Aluminium plated steel modules of the pole ensure high bearing capacity and strong corrosion protection. Specially selected polymer paint is environment resistant and maintainable.

M

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Functional & Street lighting modules



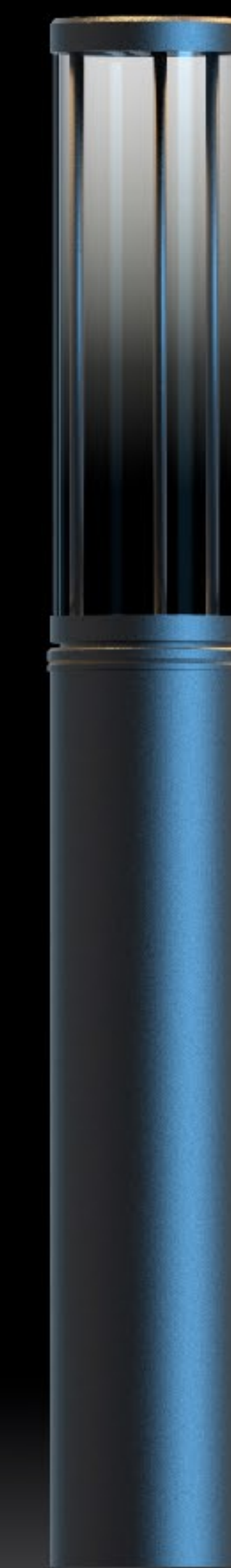
L1

Sector 120°
Designed for
pedestrian areas
lighting



LS1-LS3

Designed for
roads, highways,
parking areas
100-200 W



L2

360° pole top module
Designed for
pedestrian areas
lighting

High light output 120 lm/W. Various light distribution diagrams available.
Light controller is usually located in the footing module.

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SAF

Decorative lighting modules



LD3

A decorative element for pole roof marking.



LD2

Goboprojector, 60W



LD1

White or RGBW accent lighting / architecture backlight module. Two spots 24/40/60W

Decorative modules help to create a special ambience around.

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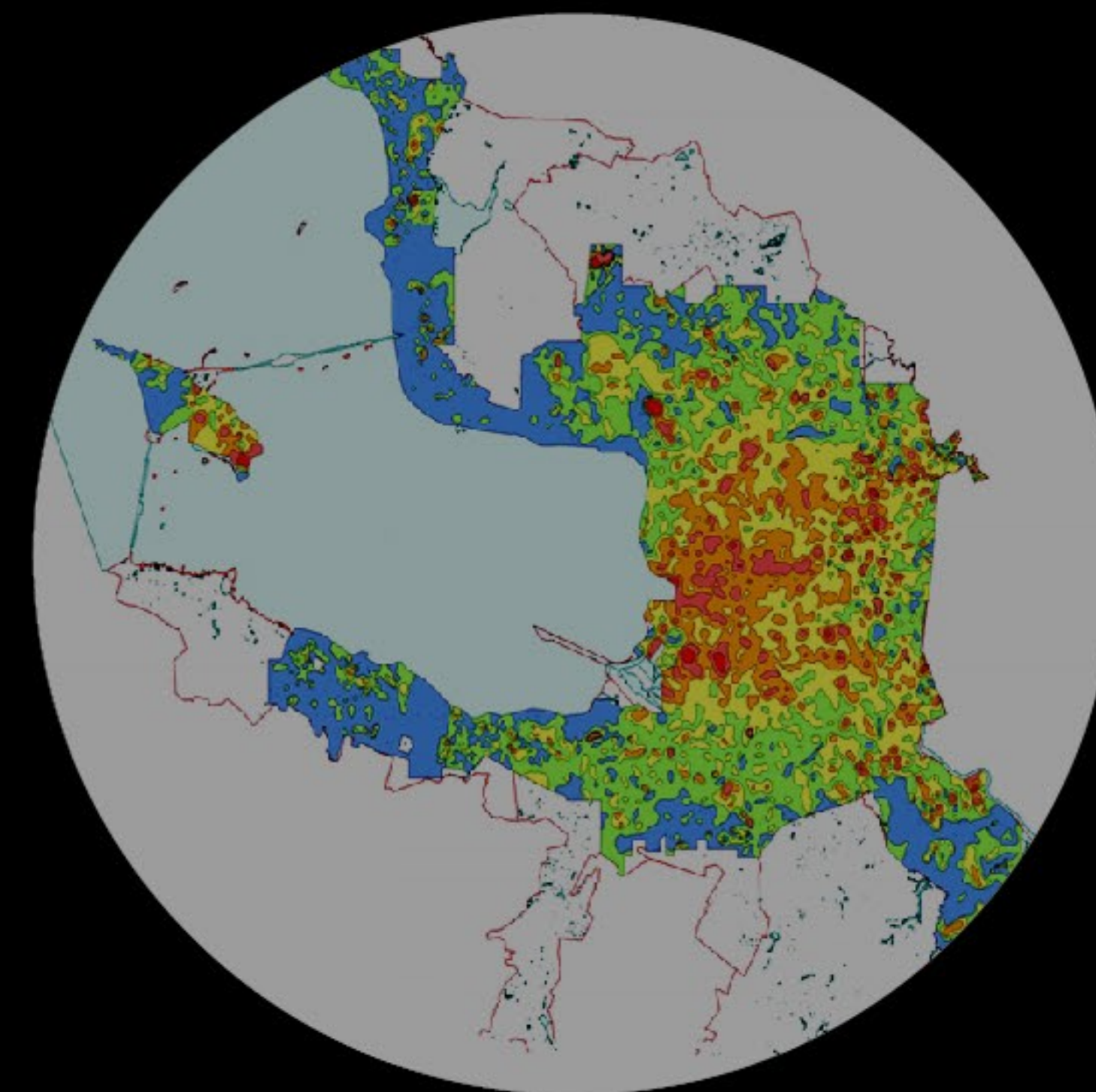
WR

P

SAF

Pollution level analysis

Meteo module
CO₂ sensor



< 400 healthy, normal outside level.
500-750 acceptable with some complaints possible.
1000-2000 General drowsiness.
> 2500 Hazardous level.

Other polluting substances on demand. External meteo stations available.

Cellular Antenna Module

R1 Single-band

Type R1D1
1-2-3 sector
1.7-2.7 GHz
3x65° X-pol
10.5-17.5dB Gain
2x2 MIMO
VET

Type R1D3
Quasi-omni
1.7-2.7 GHz
360° X-pol
8dB Gain
2x2 MIMO
FET

R2 Dual-band

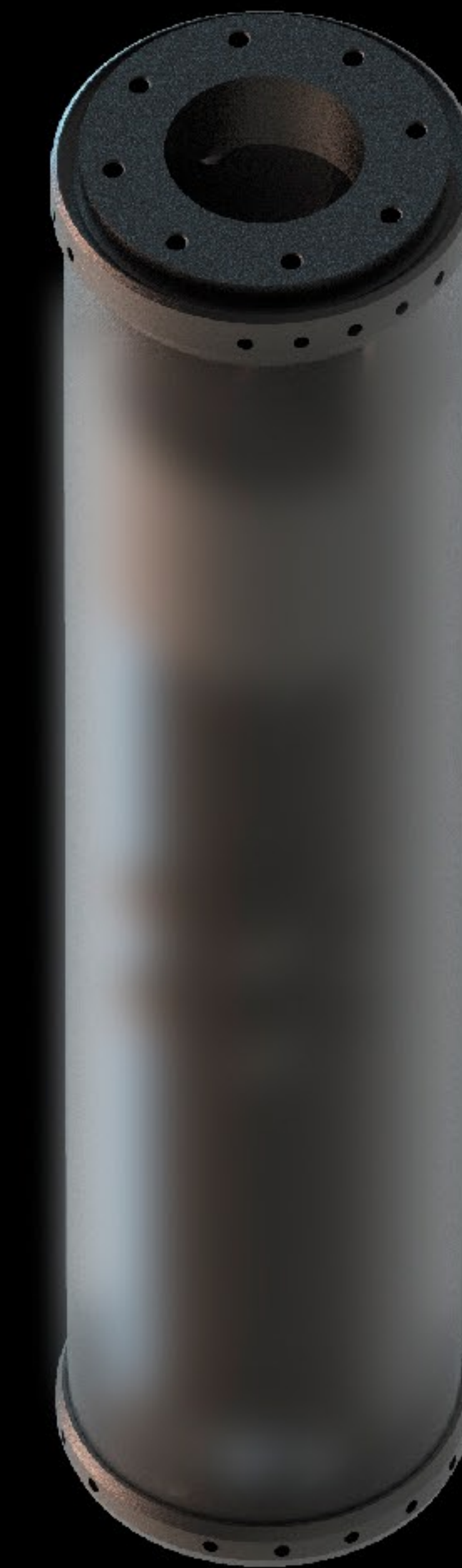
Type R2D40
1-2-3 sector
790-960/1710-2690 MHz
360° X-pol
15/-17.5dB Gain
2x2 MIMO
FET/RET

R4 4.9 GHz 5G band

Under development

R5 3.5 GHz 5G band

Under development



Antenna module is inbuilt to the pole and covered with radio transparent enclosure that makes it indistinguishable from the other modules. Various macro-and micro-cell antennas are available in the shape of the pole tube.

M

T

I

W

R

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LD

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SAF

Cellular Antenna. Comparison

Popular
market
leader

Dimensions:
Net Weight - 35.2 kg
Length - 1446 mm
Outer Diameter - 370 mm

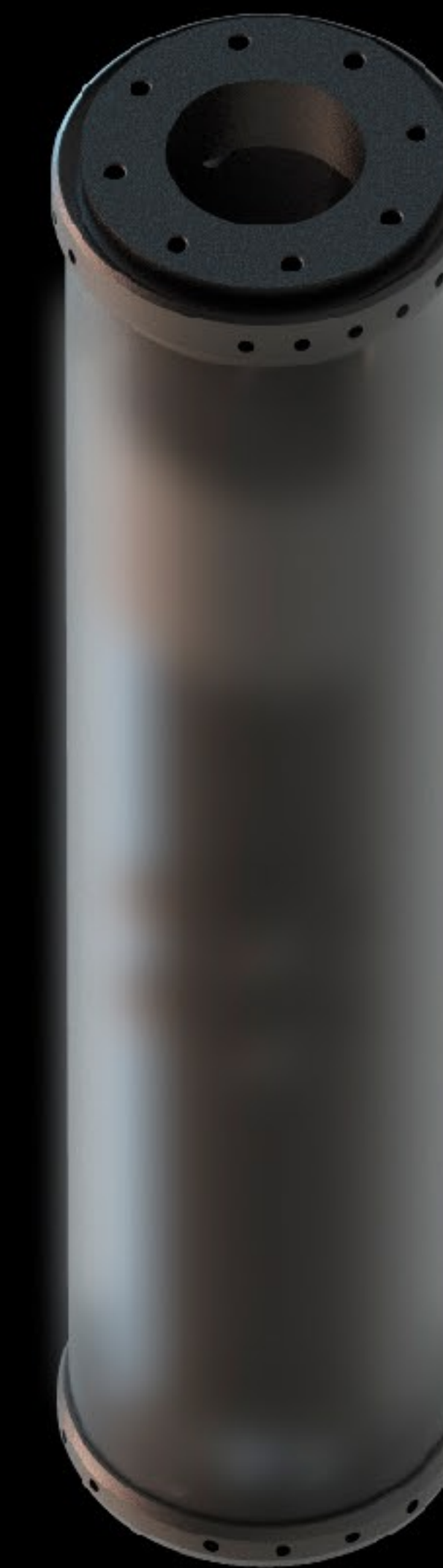
1446



32.2 kg

Ø370

13 kg



1300

Ø220

VITRULUX

Compact
✓ Tall
Light



Dimensions:
Net Weight - 13 kg
Length - 1300 mm
Outer Diameter - 220 mm

Drone integration module

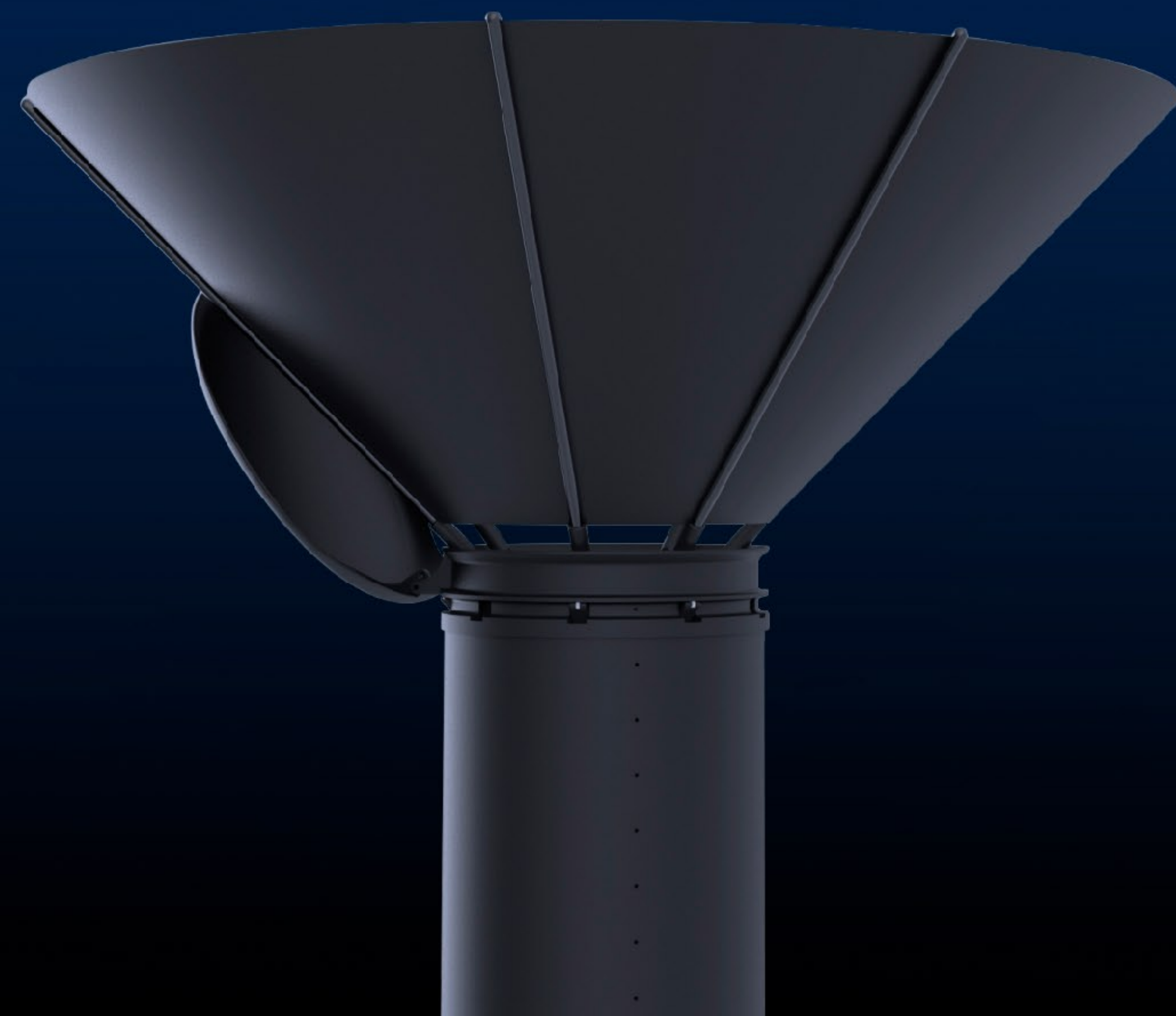
Unique solution by Vitrulux



A compact and powerful axial drone.

Fully automatic takeoff, navigation and landing.

Integrated into Smart Cluster.



Novus Drone

Equipped with TV camera, microphone, speaker and compact goods holder.

Routine proactive and preventive security duty.

Monitoring & filming

Remote voice communication

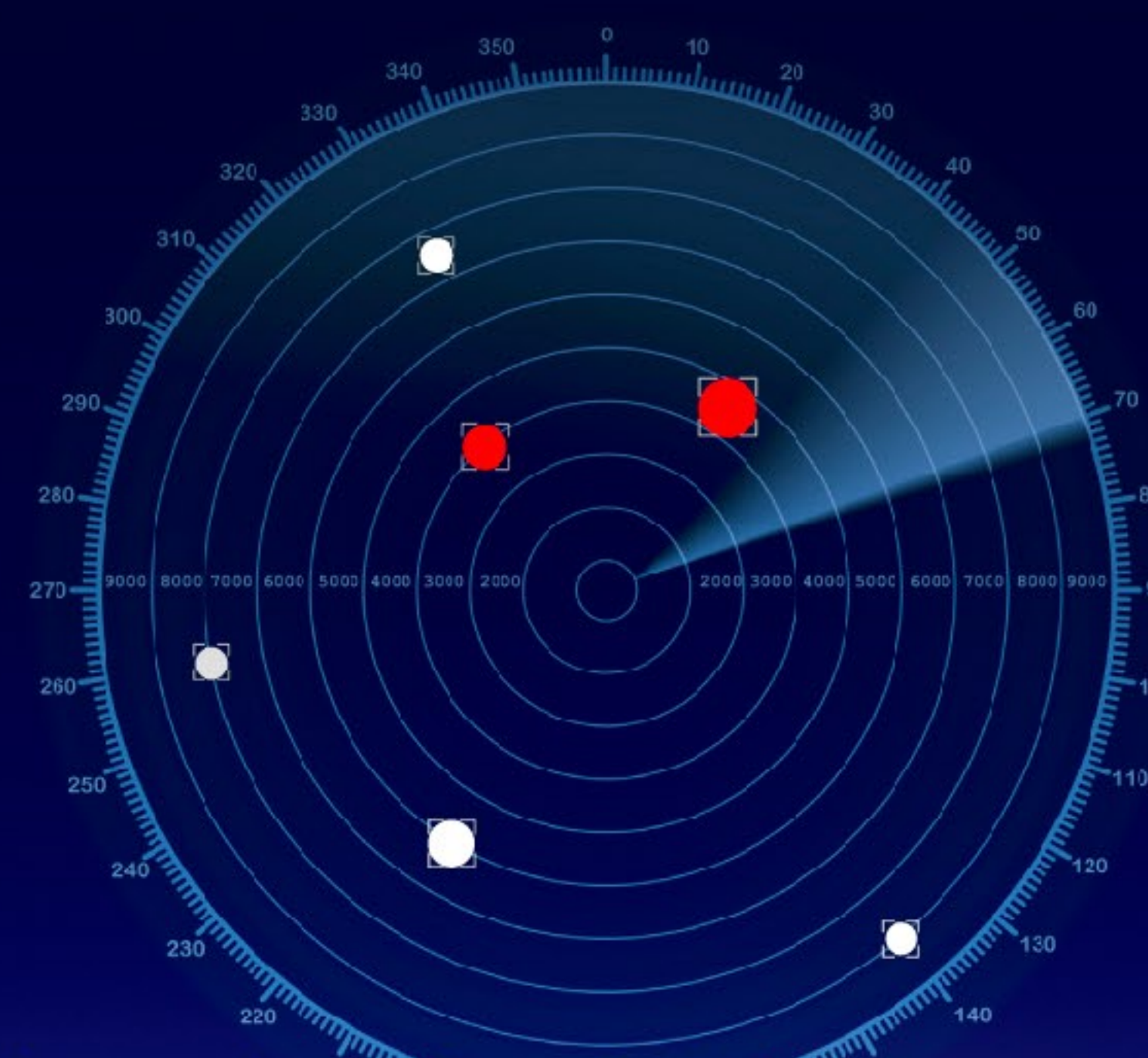
Means of salvation delivery.



Communication, navigation, housing and recharging are performed by the Smart Poles of Smart Cluster.



Designed for continuous protection of large-scale sites, the SkySmartShield stationary unit supports customization and construction according to the specific site and user demands to completely cover the surrounding airspace.



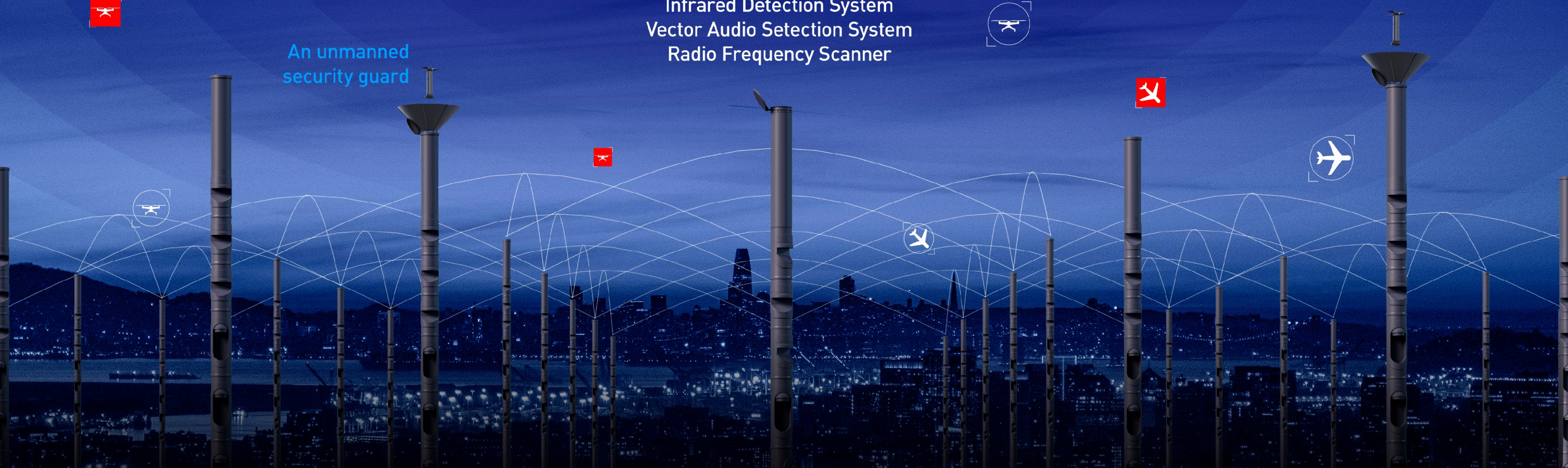
Monitoring data can be integrated with users' existing security systems to efficiently provide an integrated monitoring system. This system also supports public cloud, private cloud, and local deployment, capable of meeting specific needs such as off-site monitoring and data segregation.

We look at the sky. We listen to the sky.
SkySmartShield

- AI Video System
- Infrared Detection System
- Vector Audio Selection System
- Radio Frequency Scanner



An unmanned security guard



An uniform transport platform for Smart City

Unique solution by Vitrulux

Universal modular
electrical platform.

- Fully automatic
- Zero emission



Interchangeable body
various purposes:

- Cargo
- Public transit
- taxi

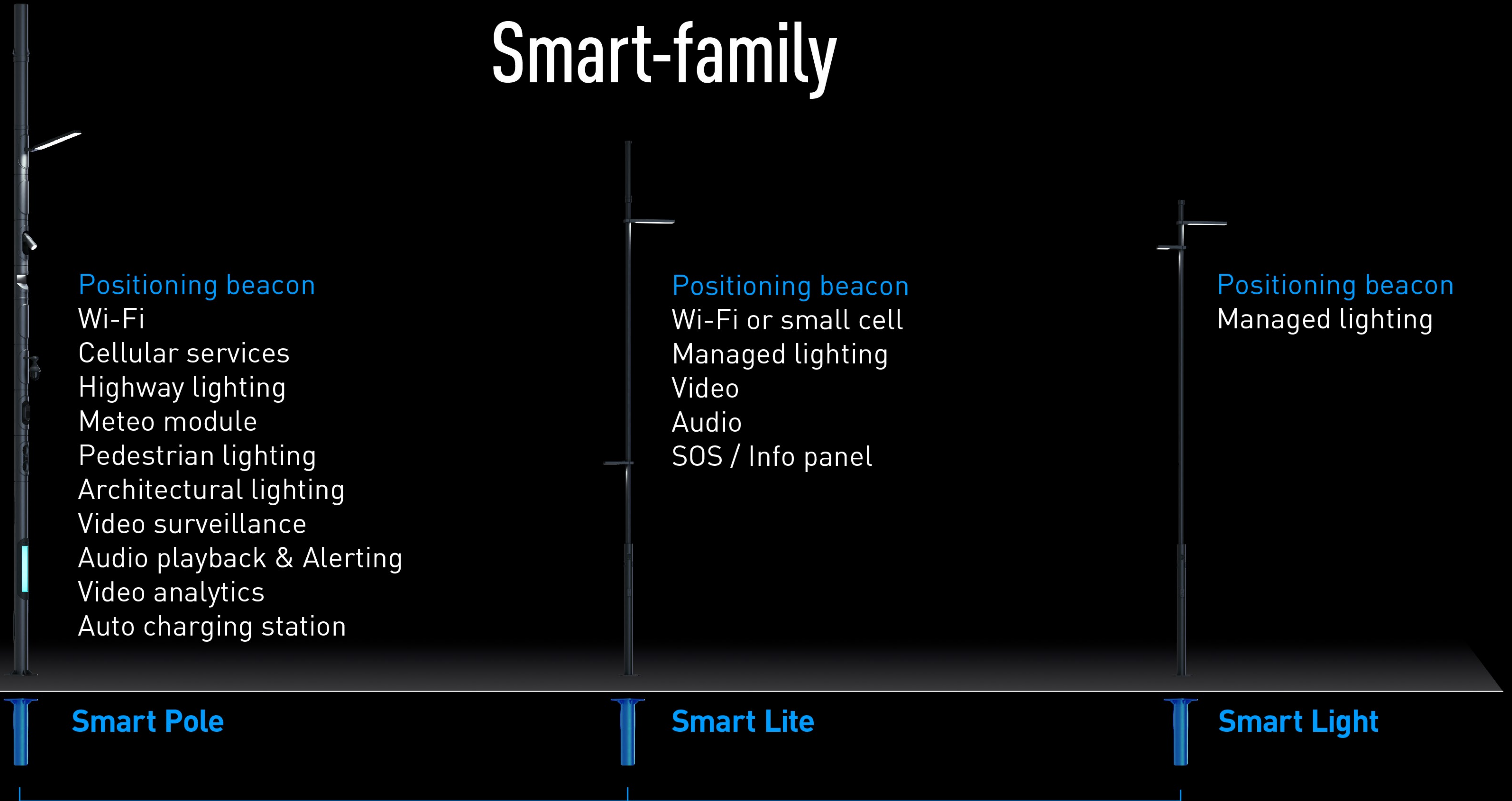
The Ultra Precise Real Time Positioning System (UPRTPS)
Guided, powered and controlled by Smart Cluster

The personified



of future bringing the people freedom of moving

Smart-family



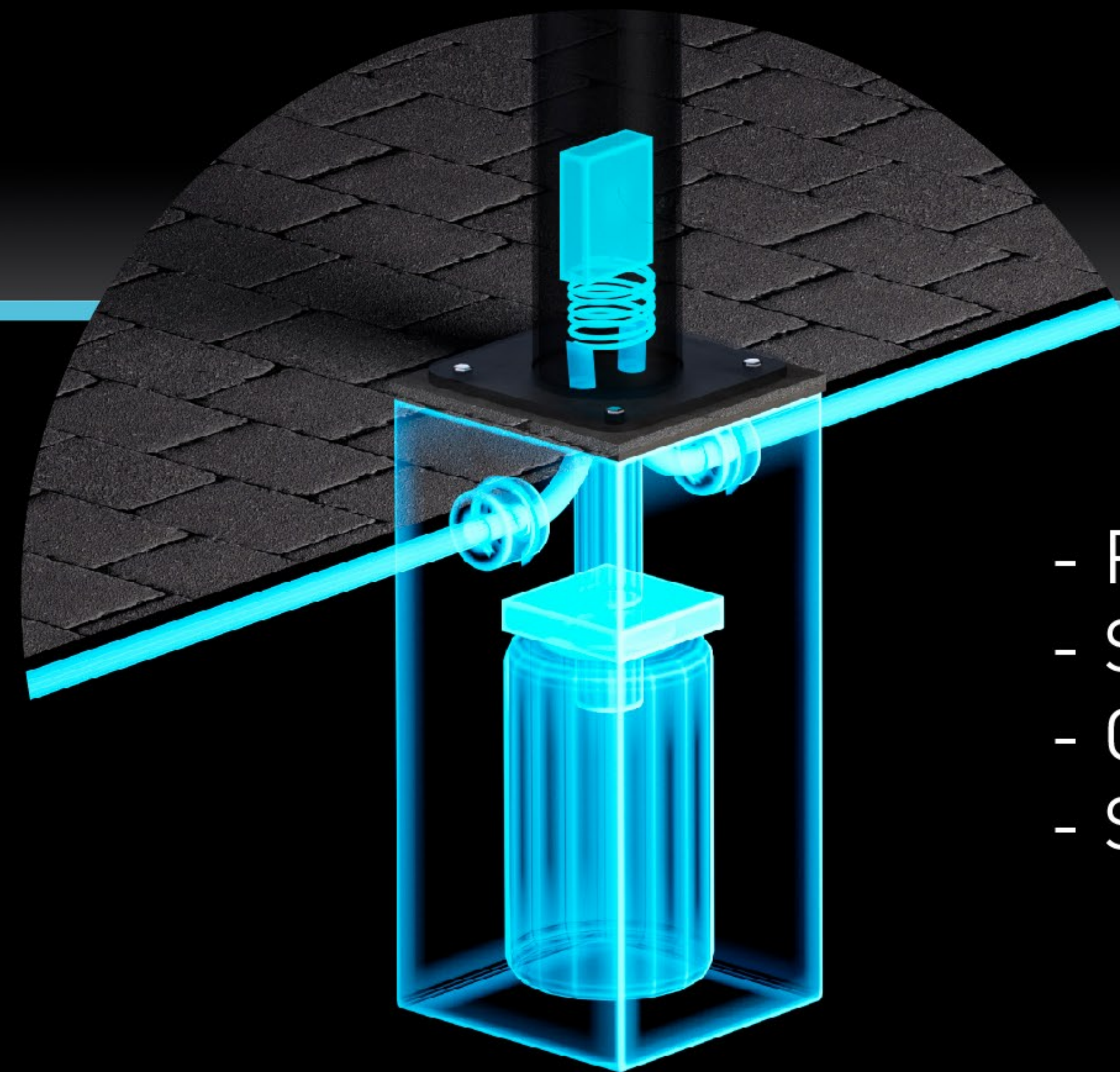
Uniform footing module. **type A**

What's under

← Typical distance 35m →

Pre-terminated
hybrid cable assemblies

- Power
- Fiber Optics
- Signal Wires



- Pre-configured boxes
- Spiral reserve length storage
- Cable entry module
- Super-flywheel power storage module

No manholes | Less earthwork | Less landscaping

Uniform footing module. **type B**

Smart Cluster Complete Solution

Enter the future today:

- Plan the starting functional
- Decide the initial topology
- Create once
- Add cluster by cluster
- Use, amend and modify for years

Get the advantages of:

- total connectivity -
power / fiber / Wi-Fi / IoT / 4G / 5G
- uniform data transport protocol
- virtual separation and isolation of the systems
- uniform management & maintenance system

Cut running costs

- Focus for tomorrow, you're ready:
- redundant power is distributed and stored for system backup & recharge the vehicles
 - modern data / IoT network is at your service
 - ultra-precise positioning system is ready to take care for unmanned vehicles & drones.

The system that grows and alters in step with the city.

Smart maintenance

Physical layer

Higher modules are reachable with unique modular self-supported ladder. There's no need to use lifting machines to perform maintenance works. Smart accessories form the friendly environment for the workers.

10%

90%

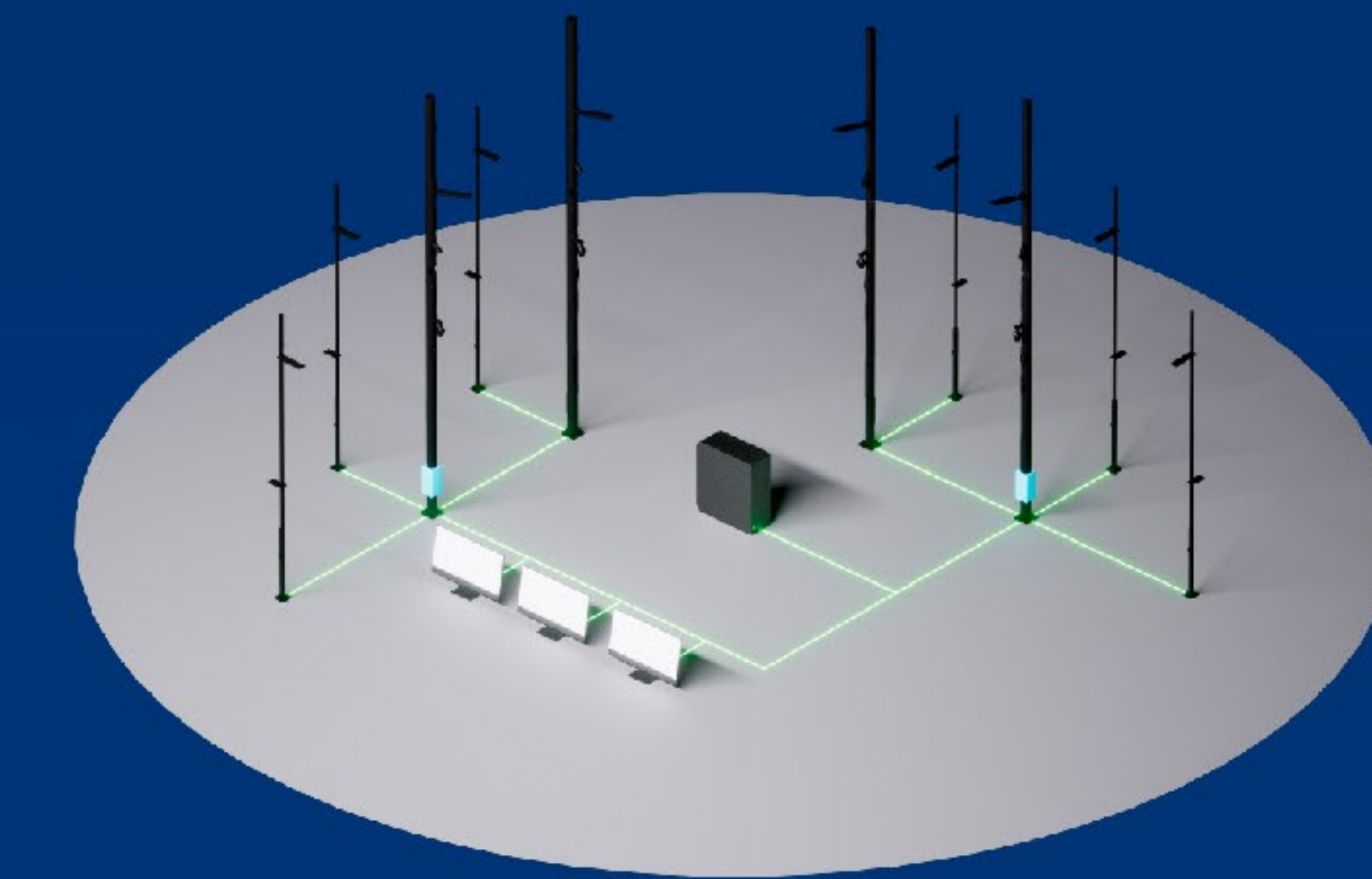
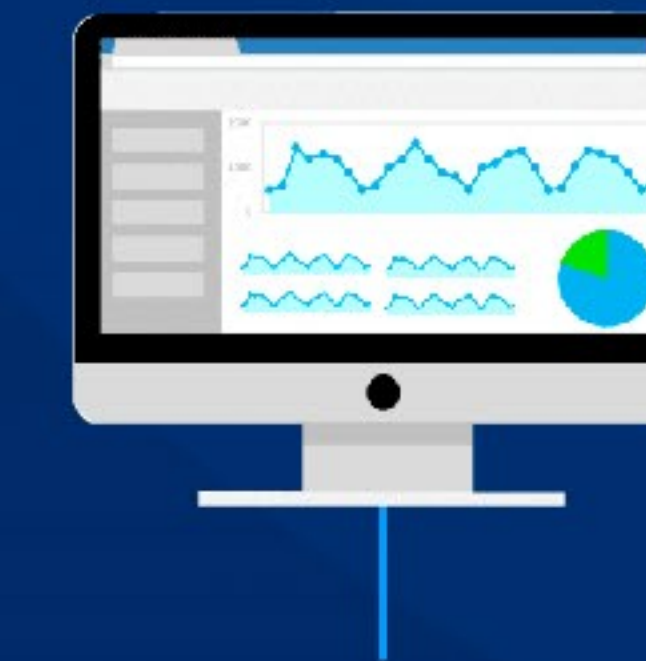
Most of active devices are fit in the footing module and reachable from ground. An uniform crossconnection module enables to check the life parameters promptly.

Network layer

Parameters are constantly monitored via SNMP agents. Most of faults are diagnosed remotely and managed almost automatically. Maintenance and repair templates increase the ratio of cases resolved at 1st line.



The "Engineer in-the-box" system enables the competence to be brought to the right place at the right moment.



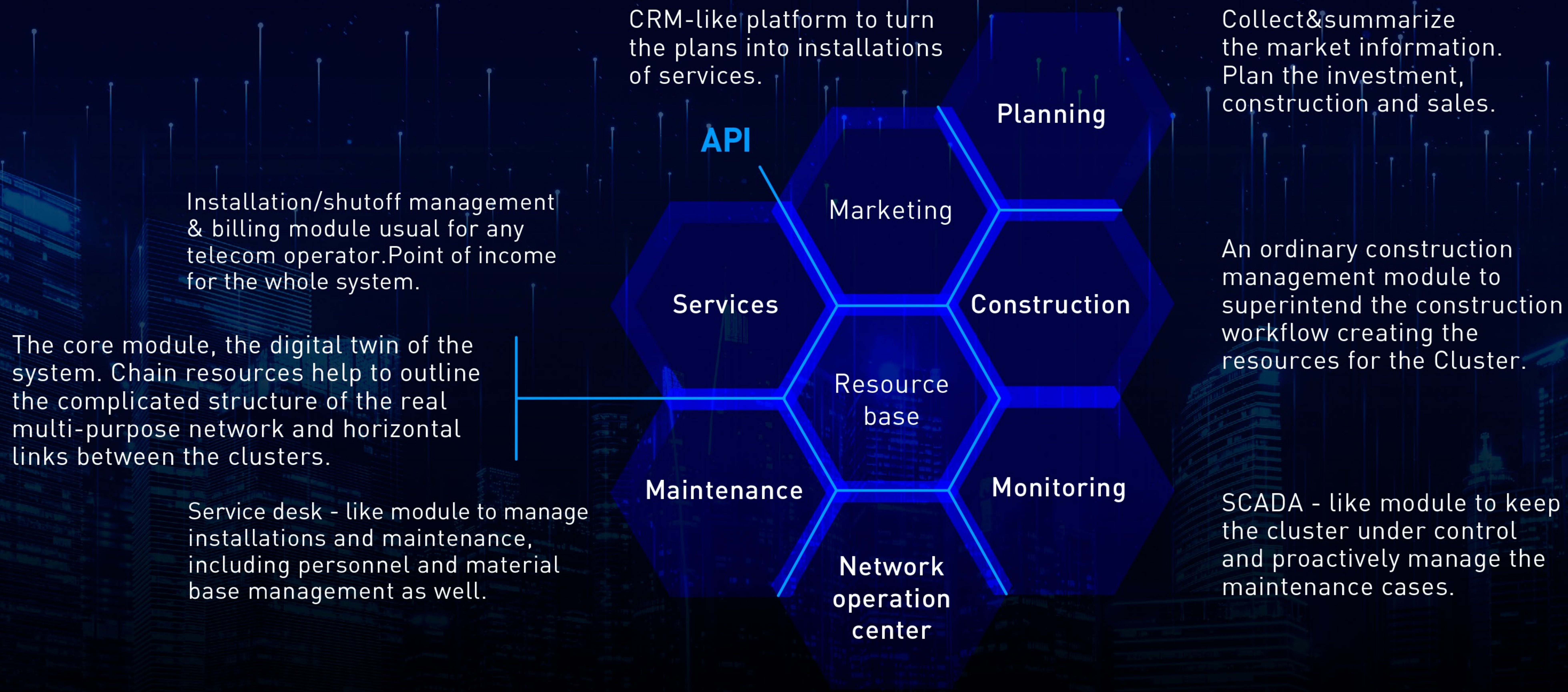
System layer

Total control of resources helps to make the management effective. The registration and analysis of all cases form the background for proactive management system. Knowledge database is the foundation.



Modular software for infrastructure operator

Modules are linked with API interfaces that make the system flexible, scalable and maintainable



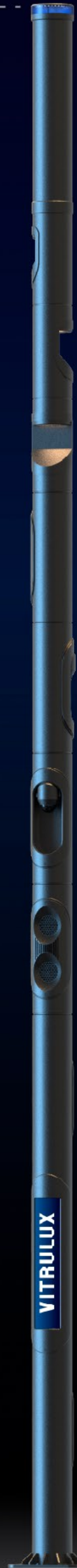
VITRULUX
SMART CLUSTER

Flexible and versatile,
ready grow with the city.

A system that takes into
account all interconnected
subsystems of the city.

Saving energy and
human resources.

Embedded in an
aesthetic form.



Distributed computing power
for artificial intelligence networks

Ultra precise positioning system.
Radio planning of the mobile
networks 2G-5G

IoT networks
Radio planning of Wi-Fi

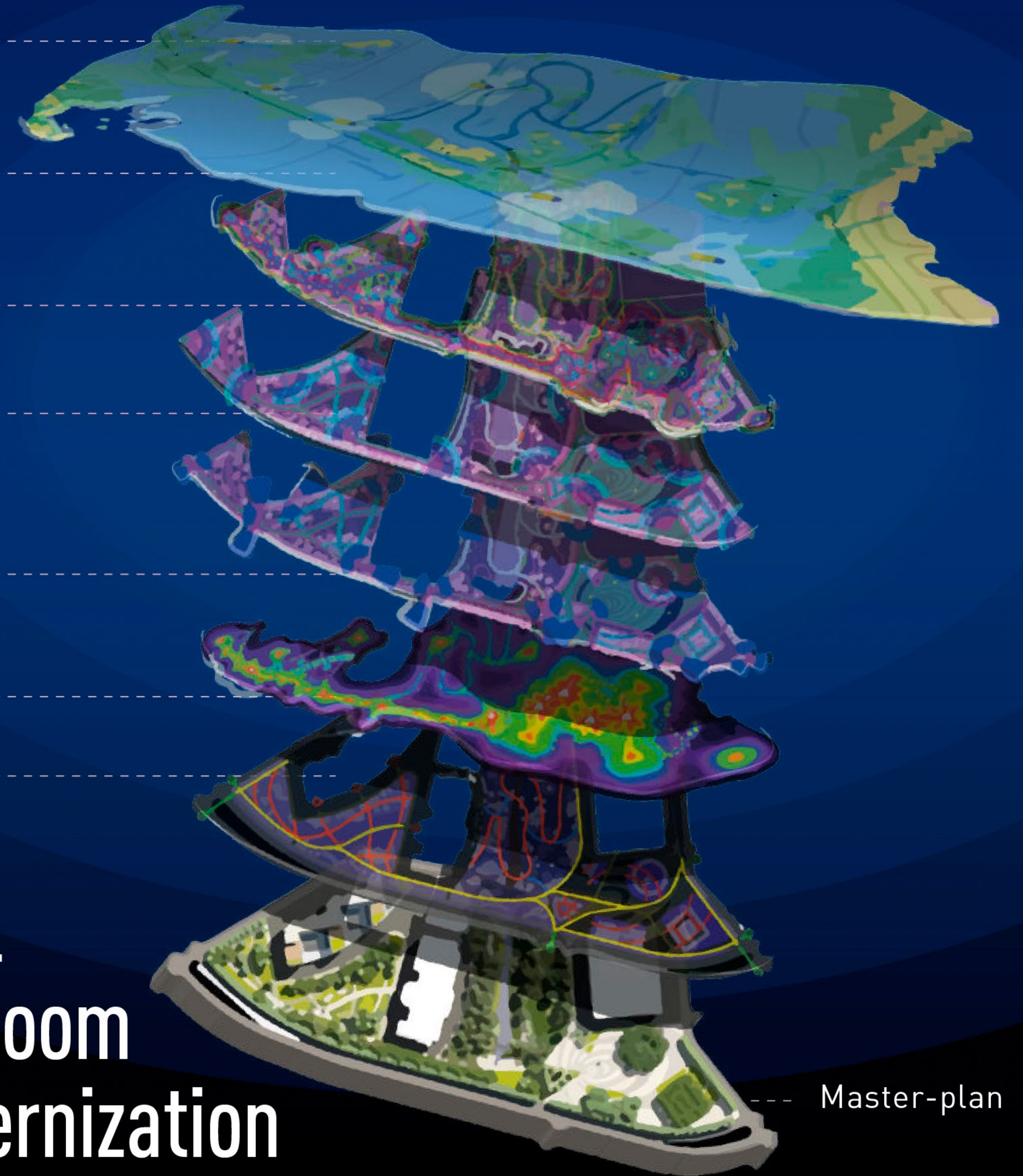
Audio and notification
systems planning

Video Surveillance
+System of informing
and navigation

Lighting

Cable network

**Building a multilevel
infrastructure with room
for growth and modernization**



Master-plan

We thank you for your attention

VITRULUX
, SMART CLUSTER '