

VITRULUX



Smart **Pole**
for Smart Cities



Smart Cities

Every modern city dweller is surrounded by multiple services that have become common as air. As the new technologies are getting more accessible and affordable, they bring the necessary infrastructure to our streets, back yards, and parks. What will it be like? What changes are coming to our yards, our cities, and our planet in the near future?

We are propelling new ideas, bringing the future closer, integrating the nerve ends of the city organism into its architectural landscape. The service space becomes denser, and at the same time more invisible and human-friendly.

Welcome **The Smart Pole!**

What is

Smart City

The city
that's
bright

The care for the environmental policy with reduction of pollution and carbon footprint requires the lighting systems to become intellectual, technologically advanced, and energy efficient.

The city
with the
established

modern digital infrastructure, designed to meet the existing and future requirements, succinctly fit into the city's architectural shape, operating for the city growth and people's benefit.

The city
where it's
comfortable to

- move freely;
- communicate and socialize;
- feel safe about your life and health;
- enjoy the atmosphere and the aesthetics of the ambience.

Vitrulux Smart Pole Technology is the synthesis of ergonomics and modern engineering, with design modularity, flexibility, and variety of technological solutions kept in an elegant form.

Smart City Construction Principles:

- Building a multilevel infrastructure with room for growth and modernization;
- Layered design with implementation of BIM technology.
- Unification and scalability;
- Unified design concept;



Law & security
enforcement;



Civil information
& alarm system;



Emergency services
call availability;



Urban systems
monitoring;



Video surveillance
& analytics;



Wireless
network access;



Energy efficiency
& manageability;



Environmental
monitoring;



Attractive
& fittable design;

1st Principle

Unified design accepted in the city



Smart Poles are long term architectural objects which will become members of the "architectural family" of the neighborhood for decades.

2nd Principle

building a multilevel infrastructure with room for growth and modernization.

Radio
planning
of the mobile
networks 2G-5G

Radio
planning of WiFi

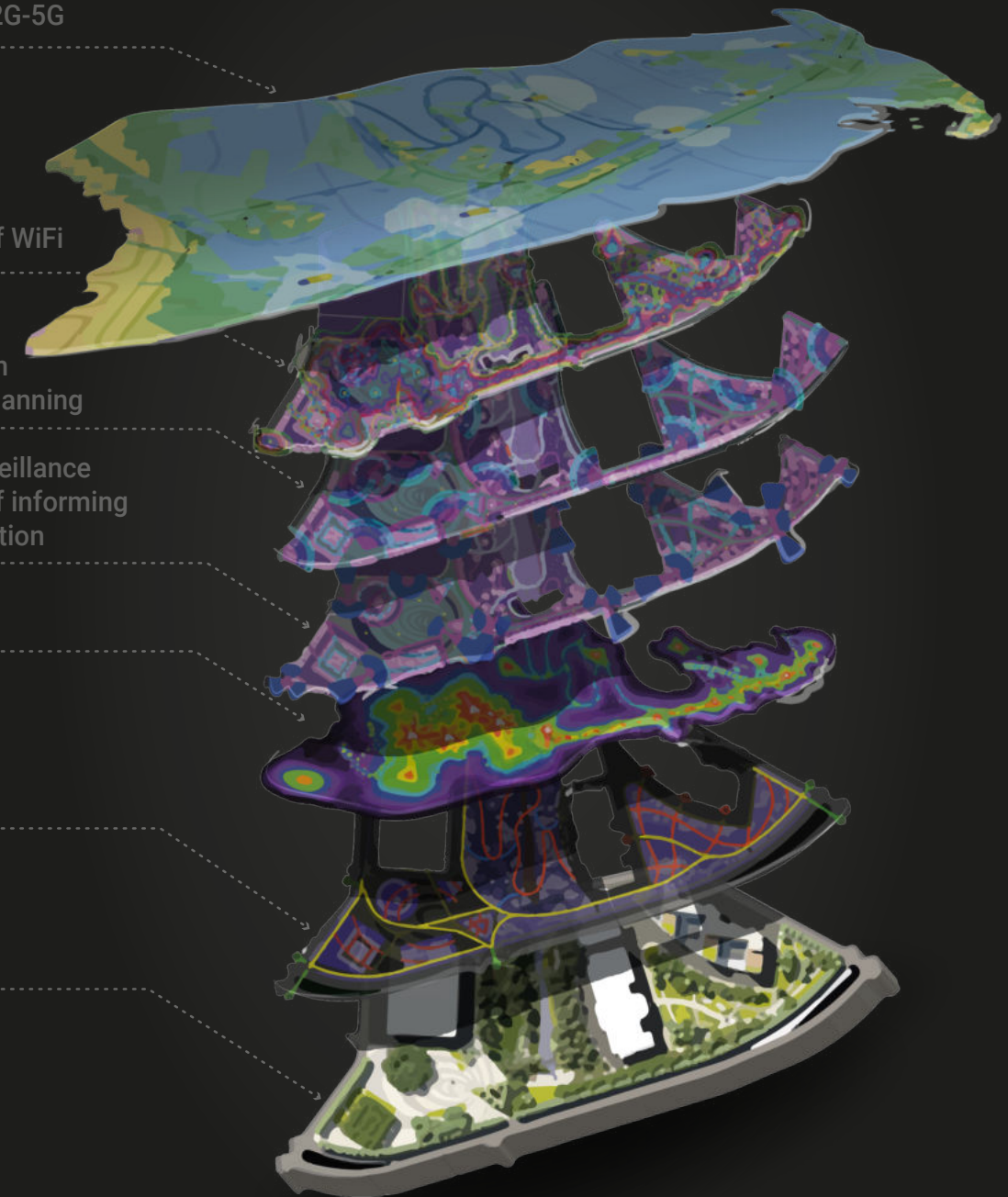
Audio and
notification
systems planning

Video Surveillance
+System of informing
and navigation

Lighting

Cable
network

Master-
plan



Layered design with implementation of BIM technology allows to avoid intersection and duplication of engineering systems, correct calculation of capacity and bearing capabilities, and plan enough room for development, which is particularly relevant in situations with extensive excavation work and further landscaping of the territory.

Unification of typical elements, hardware units, and infrastructural requirements, cluster construction principal utilizing Smart Poles as data control and processing centers allows to scale, alter, and add systems with no risk of overloading and loss of control.

3rd Principle

unification and scalability
while building multi-level
infrastructure.

Major highways

- dense road traffic flows;
- plazas, large intersections;

Low Smart Poles density;
High load per pole;
Large data flow;
Bright lighting requirement;

Pole height: *up to 15 meters*
Number of modules: *starting at 8*

Secondary streets

- High volume of pedestrian traffic;
- Abundance of intersections;

High concentration of services;
High Smart Pole density;
High dynamics of data flow;

Pole height: *8-9 meters*
Number of modules: *4-6*

Yards and Parks

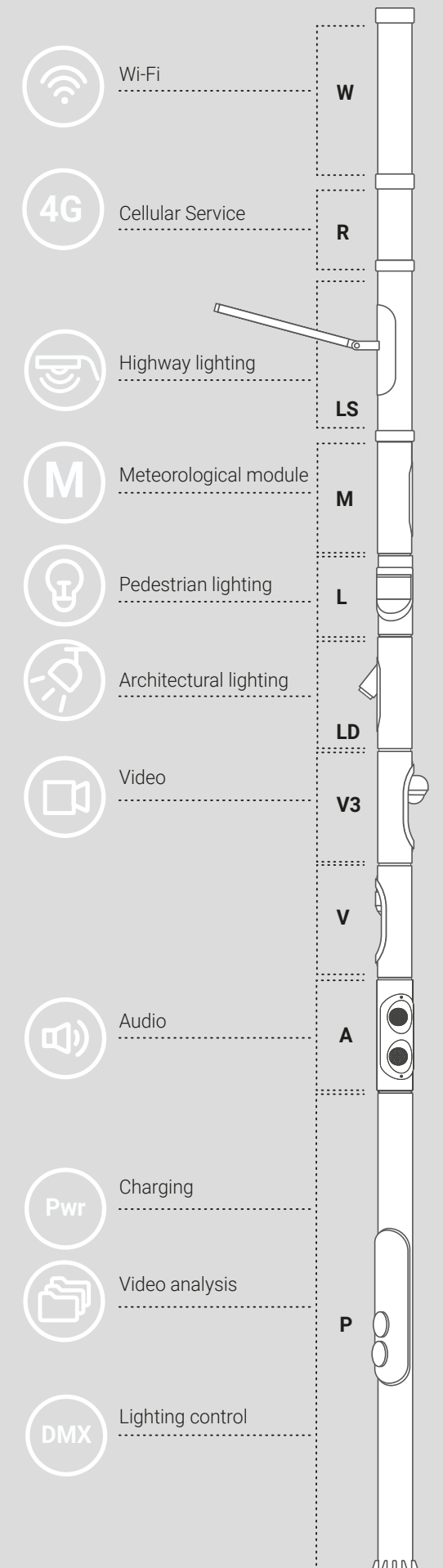
- small territories;
- low traffic density;

Distributed lighting systems;
Low quantity and density of services;
Mostly static field;

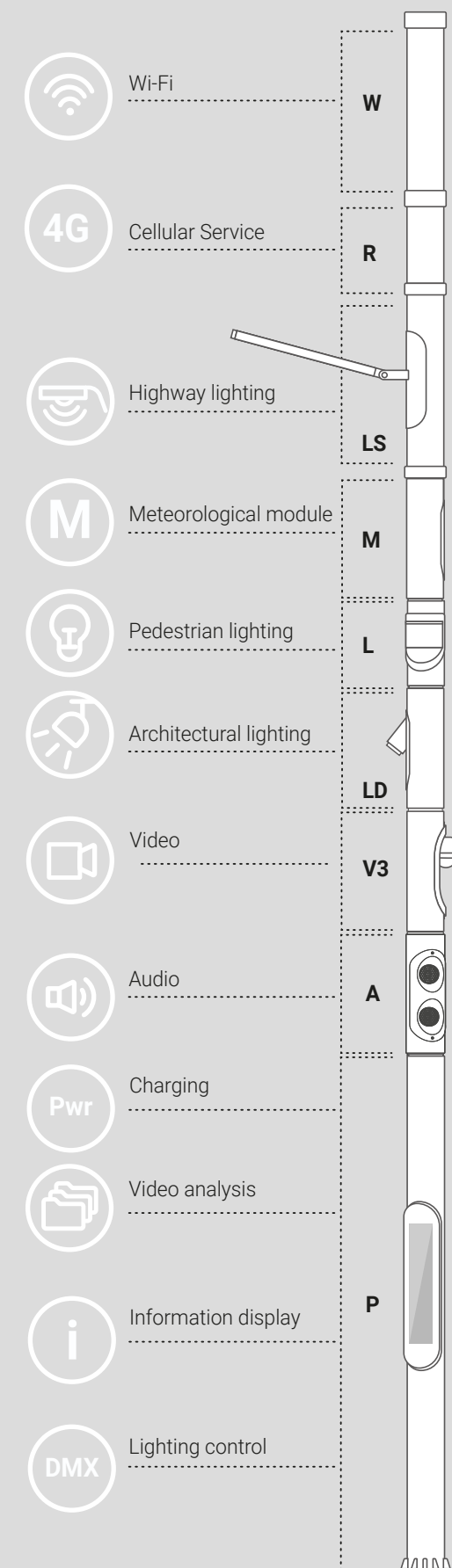
Pole height: *up to 6 meters*
Number of modules: *2-4*



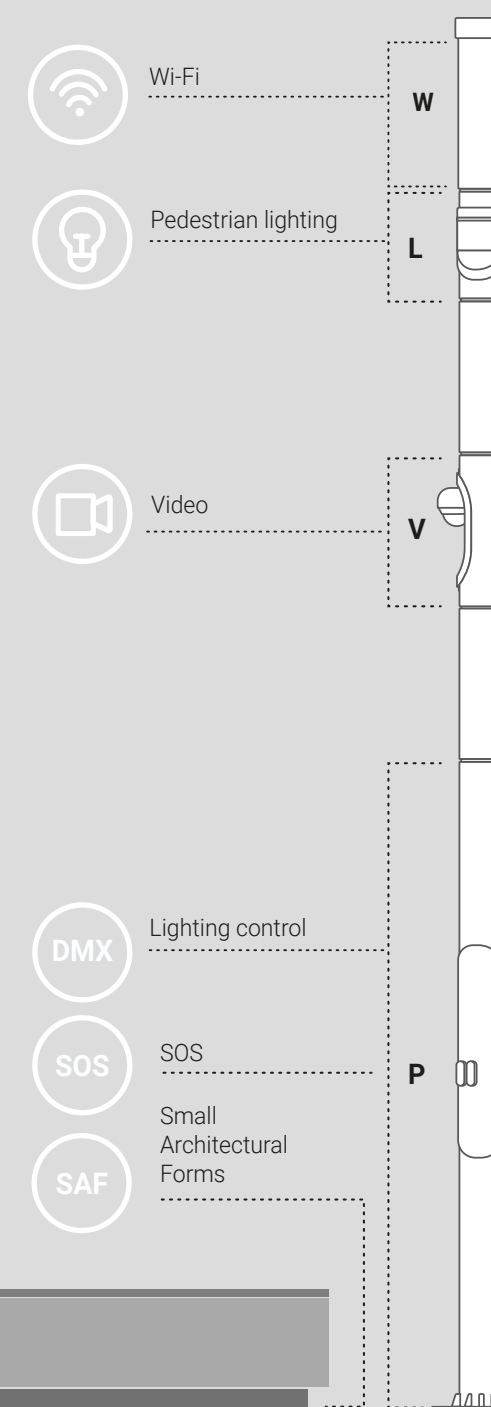
● Major Highways

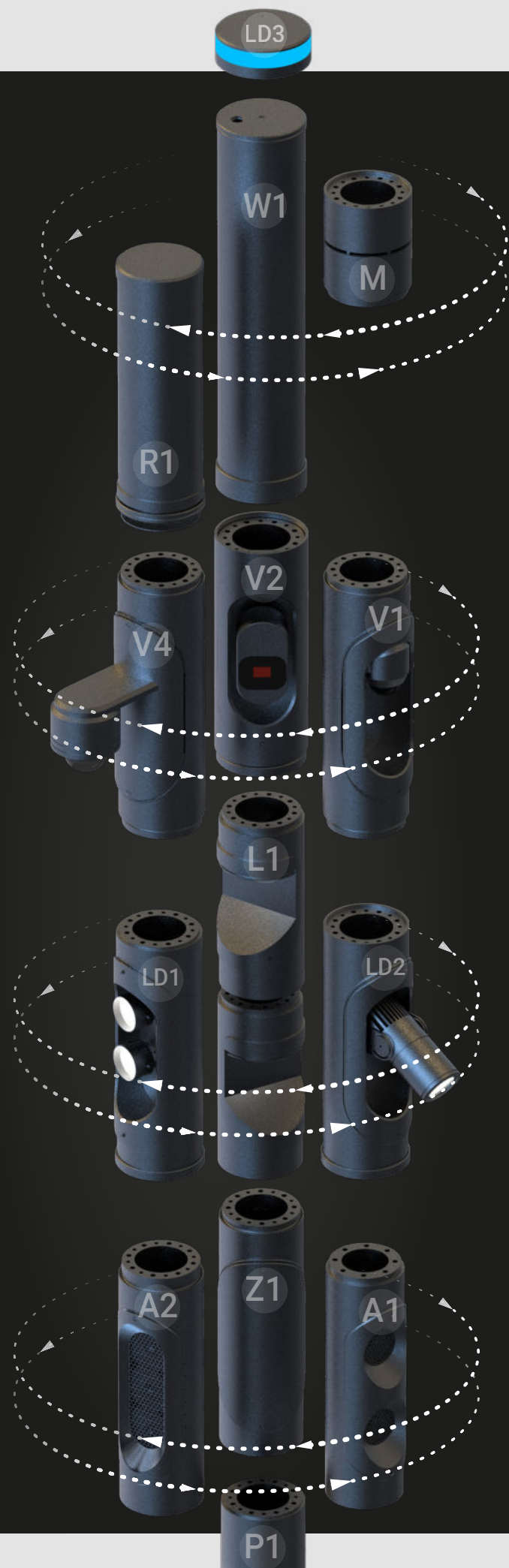


Secondary Streets



Yards and Parks





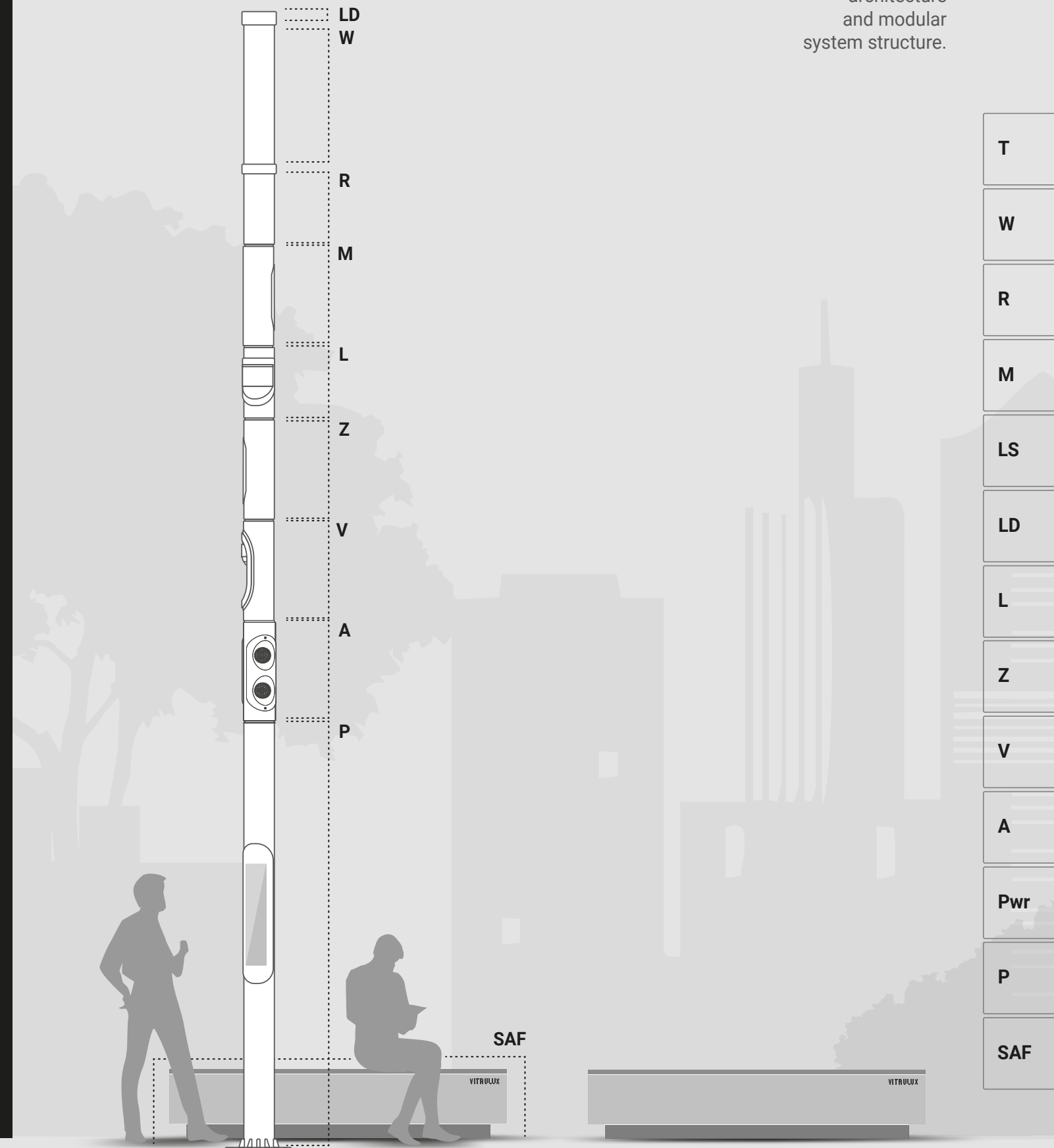
Modular structure principle provides the Smart Pole system with unique flexibility of functionality choice. The possibility of equipment integration from practically any manufacturer allows users to utilize the equipment they are familiar with.

The majority of functional modules have unified placement constructions, which allows interchanging and increasing functionality as needed.

Module parts can be rotated to a desired angle without disassembling the pole.

4th Principle

open
architecture
and modular
system structure.



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Pwr

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SAF

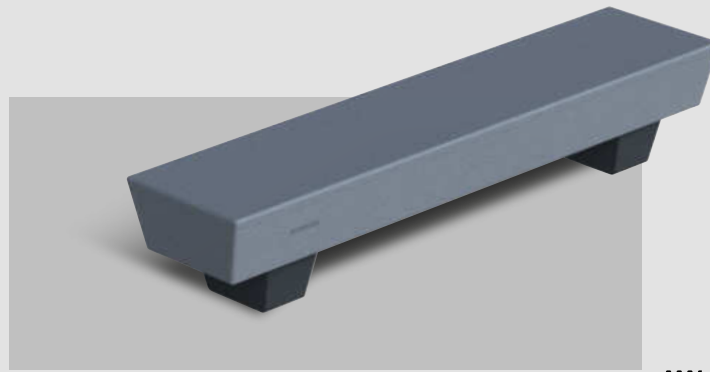


SAF

Small Architectural Forms (SAF) are used for cellular service base station placement in situations when pole integration is impossible.

SAF design is individually matched with the object. Usually, they are shaped as a bench, flower-bed, or information board.

SAF # 1



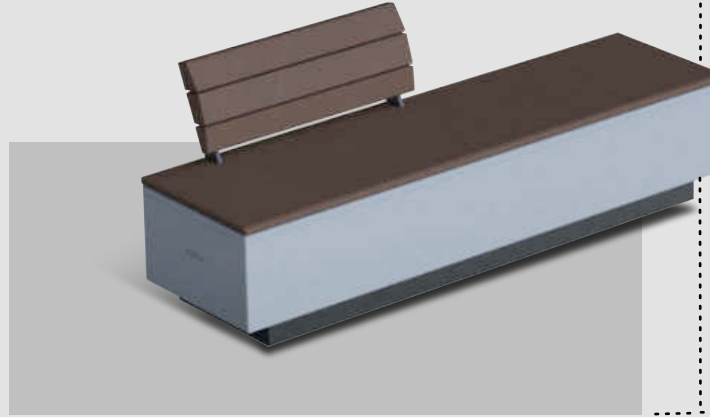
Materials: concrete

SAF # 2



Materials: concrete

SAF # 3



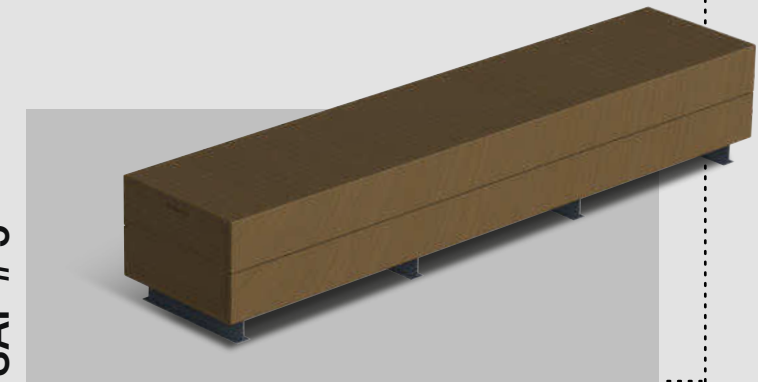
Materials: concrete | wood | metal

SAF # 4



Materials: concrete | wood | metal

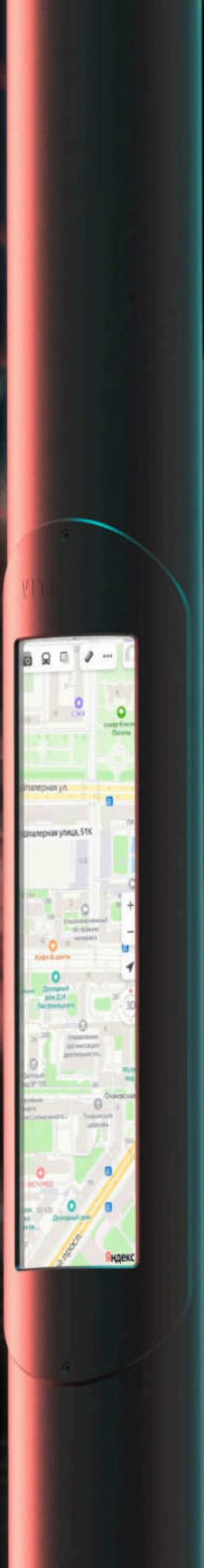
SAF # 5



Materials: wood | metal

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The foundation module



P1

The **basic foundation**, is used for cable line insertion and placement of main pole communication equipment. It has three lockable service hatches with an option of opening monitoring.

P2

The foundation with the call **SOS/info panel**.

P3

The foundation equipped with **the information display**.

Additional modules, custom installation:

- PWR1** - usb charger module;
- PWR2** - electric car charger module with Type2 outlet;
- PWR3** - wireless cell phone/tablet charger module.

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Acoustic
system
modules



A1

rated power 35watt

A2

rated power 80watt

Speakers	Coaxial speakers with 120W peak output
IP	65
Frequency, Hz	90-22000
Impedance, Ohm	4
Sensitivity, dB	90
Speaker head	Titanium dome

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Video Surveillance module



V1

Public areas monitoring

Fixed dome camera

Image sensor, CMOS	1/2,8"
Effective pixels, Mpix	3,2
Focus distance, mm	2.8-12
IP67	-50..+50°C

V2

High resolution ready for analytics

Image sensor, CMOS	1/2,8"
Effective pixels, Mpix	5
Focus distance, mm	2.8-12
IP67	-50..+50°C

V3

High speed PTZ dome camera with 180° visible sector

Image sensor, CMOS	1/2,8"
Effective pixels, Mpix	2-5
Focus distance, mm	4.7-141
IP67	-50..+50°C

V4

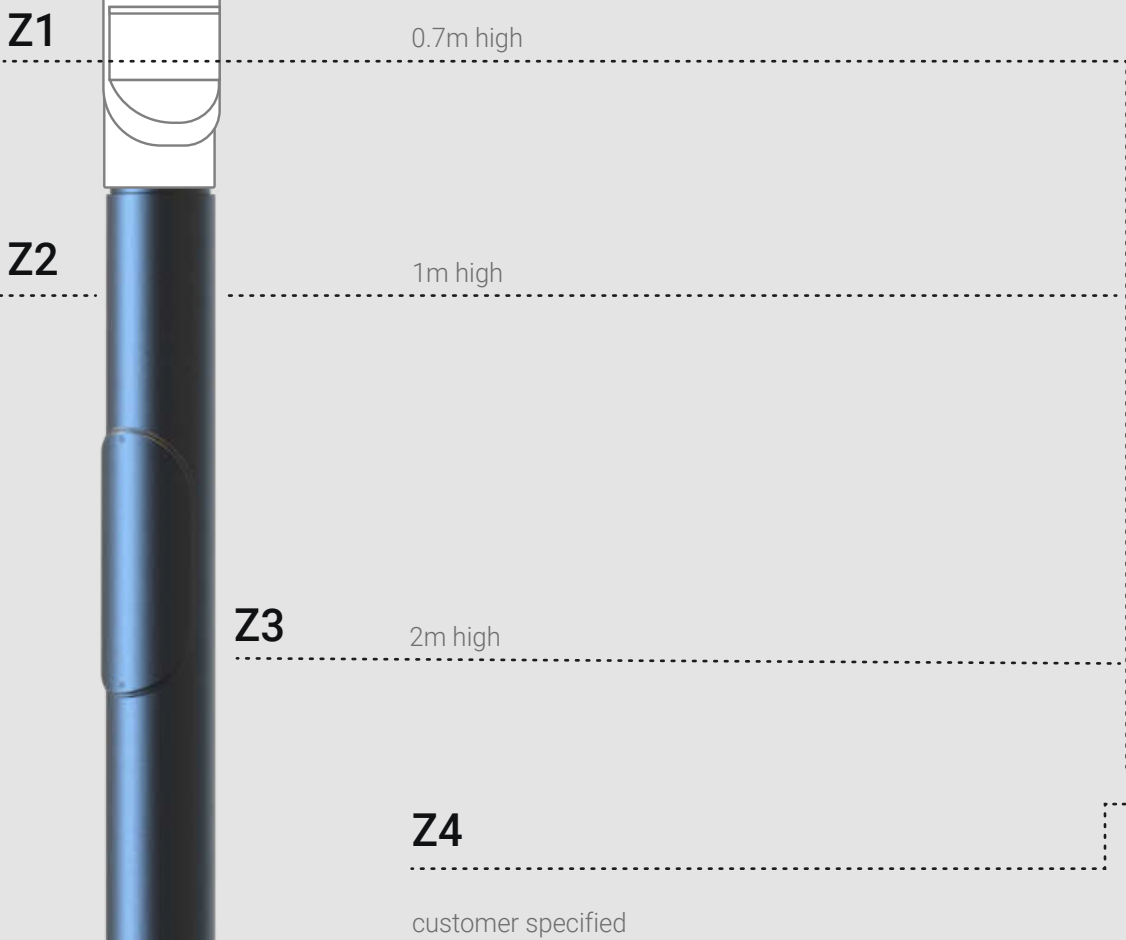
External hanged PTZ camera

Typical parameters are shown above.

Various camera types can be integrated according to the Customer's technical task.

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Elevation module

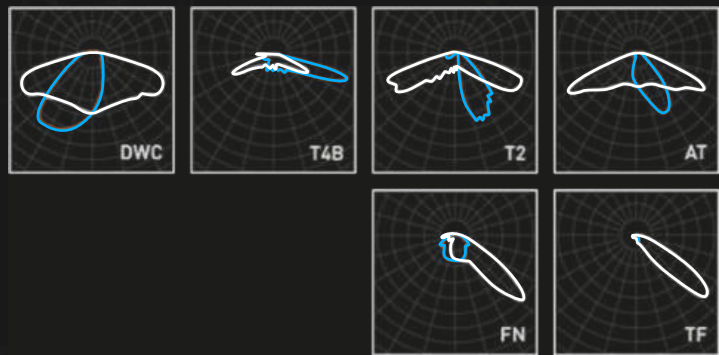


Elevation module
has a standard interface for a functional module covered by a hatch for future functionality development.

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Functional lighting module

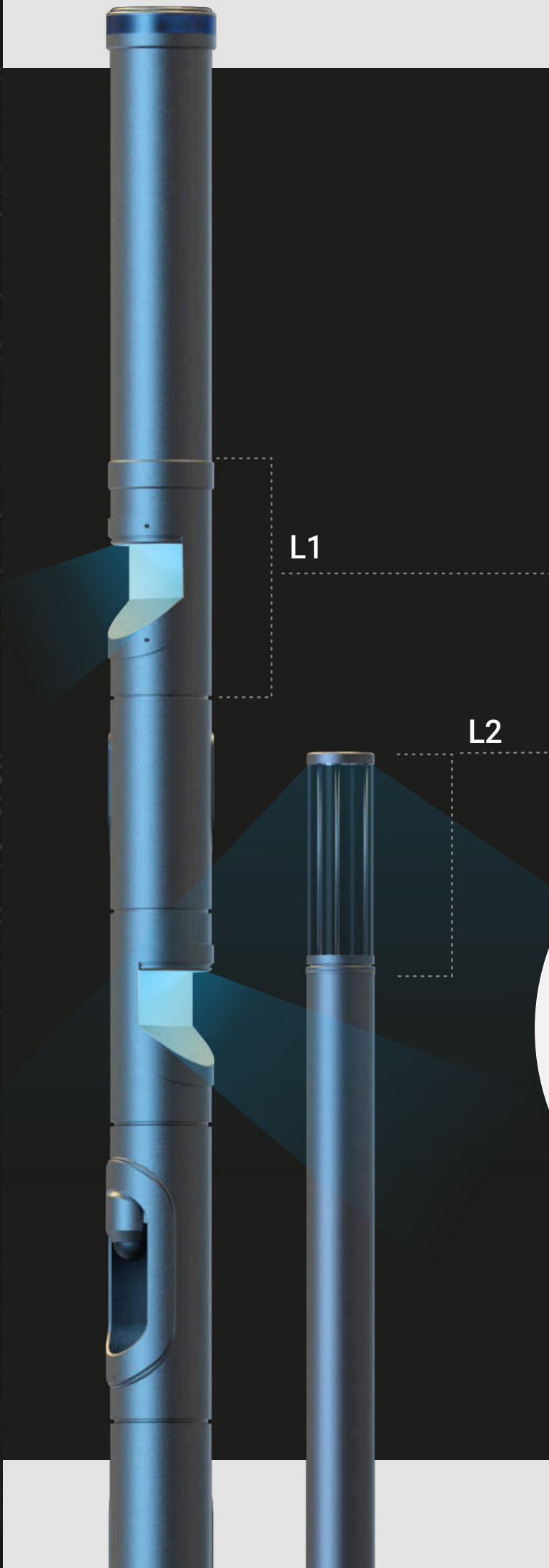
Light beam diagrams



W_{ATT}	40-80 W Power		4600-9600 Lm Light stream
	120 Lm/ W Light output		2700-5000 K Light temperature
CRI INDEX	≥ 85 CRI index		Any RAL on de mand Case color
	УХЛ-1 Harsh enviroment resistent	°C	-60°...+50°C outdoor temperature range
IP_{xx} CODE	IP 67 IP class	IK_{xx} CODE	IK07 Vandal proof code






Lighting modules L

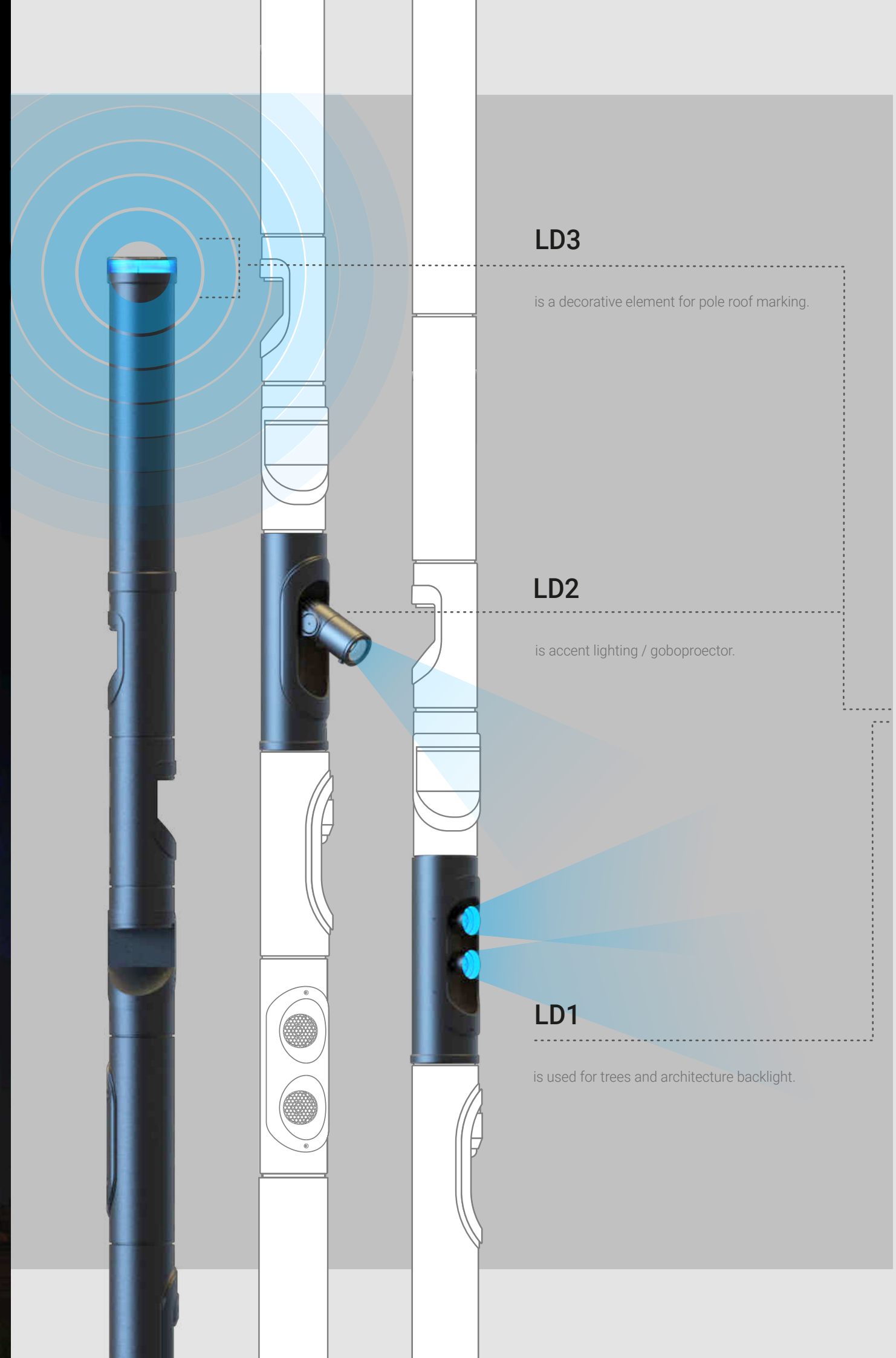
Designed for pedestrian areas lighting



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Decorative lighting modules

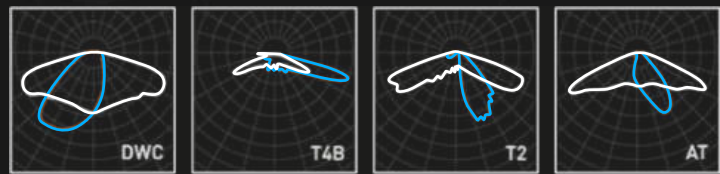
W_{ATT}	Up to 10-70 W Power		Up to 1760 Lm Light stream
	110 Lm/ W Light output		2700-5000 K Light temperature
CRI INDEX	≥ 85 CRI index		Any RAL on de mand Case color
	УХЛ-1 Harsh enviroment resistent	°C	-60°...+50°C outdoor temperature range
IP_{xx} CODE	IP 67 IP class	IK_{xx} CODE	IK07 Vandal proof code



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Street lighting modules

Light beam diagrams



WATT	100-225 W Power		12000-24000 Lm Light stream
	120 Lm/ W Light output		2700-5000 K Light temperature
CRI INDEX	≥ 85 CRI index		Any RAL on de mand Case color
	УХЛ-1 Harsh enviroment resistent		-60°...+50°C outdoor temperature range
IP_{xx} CODE	IP 67 IP class	IK_{xx} CODE	IK07 Vandal proof code



LS1

100 W

LS2

150 W

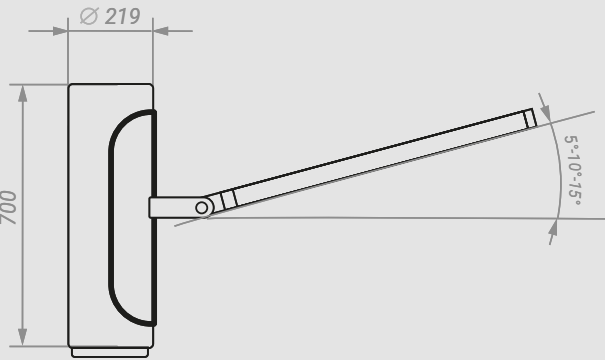
LS3

200 W

Lighting modules LS

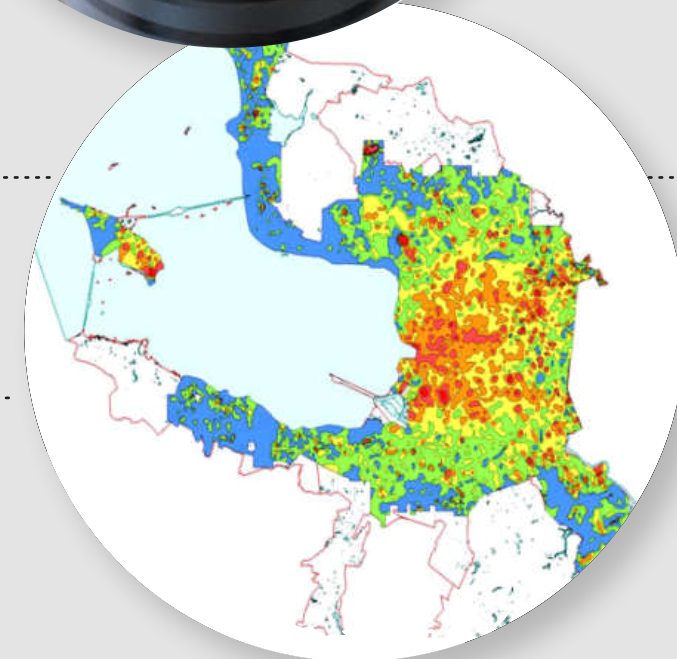
are designed for roads, highways, and parking areas.

Tilt angle: 5° / 10° / 15°



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Meteo
module with
CO₂ sensor



Pollution level analysis

CO₂ level measurement is the common method to gauge the air quality Basic CO₂ levels, ppm:

- 1. <400 healthy, normal outside level
- 2. 500-750 acceptable with some complaints possible
- 3. 1000-2000 General drowsiness
- 4. > 2500 Hazardous level

T

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Cellular
antenna
module



R1 passive

Antenna module is inbuilt to the pole under radio transparent coverage.
IT allows to operate 3G/4G/5G signals within 1.7-2.7GHz band from radio modules integrated into the pole or SAF.

Type 1

3-sector
1710-2690 MHz
3x65° X-pol
13.5 dB gain
2x2 MIMO

Type 2

Quasi-omni
1710-2690 MHz
360° X-pol
6 dB gain
2x2 MIMO

Type 3

Single panel
1710-2690 MHz
65° X-pol
10.5 dB gain
2x2 MIMO



R2 active

The active antenna module integrated into the pole.
Completed case - Huawei AAU5940

R3 active

Customer specified design.

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Wi-Fi module

W1

- up to 256 users
- 802.11a/b/n/ac
- up to 1.75 Gbit/s throughput

W2

- up to 512 users
- 802.11a/b/n/ac, ac_Wave2
- up to 3.46 Gbit/s throughput

W3 (Wi-Fi 6)

- up to 600 users
- 802.11a/b/g/n/ac/ac wave 2 /ax
- MIMO** up to 8x8
- up to 10.3 Gbit/s throughput



Optical
fiber

Aggre-
gation
switch








Core
switch

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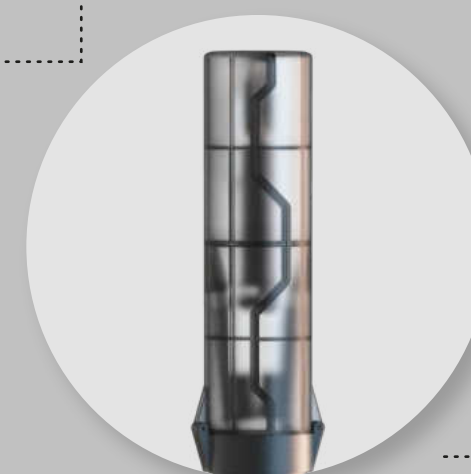
Drone integration module



Drone parameters (type 1)

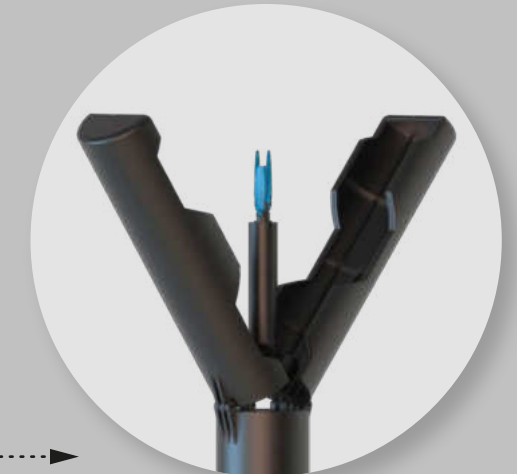
	70*70*340 dimensions, mm		1200 g weight including battery
	50 km/h cruise speed		20 min autonomous flight time
	170 g payload		-20°...+40°C temperature range
	IP 67 protection level		

Drone integration module



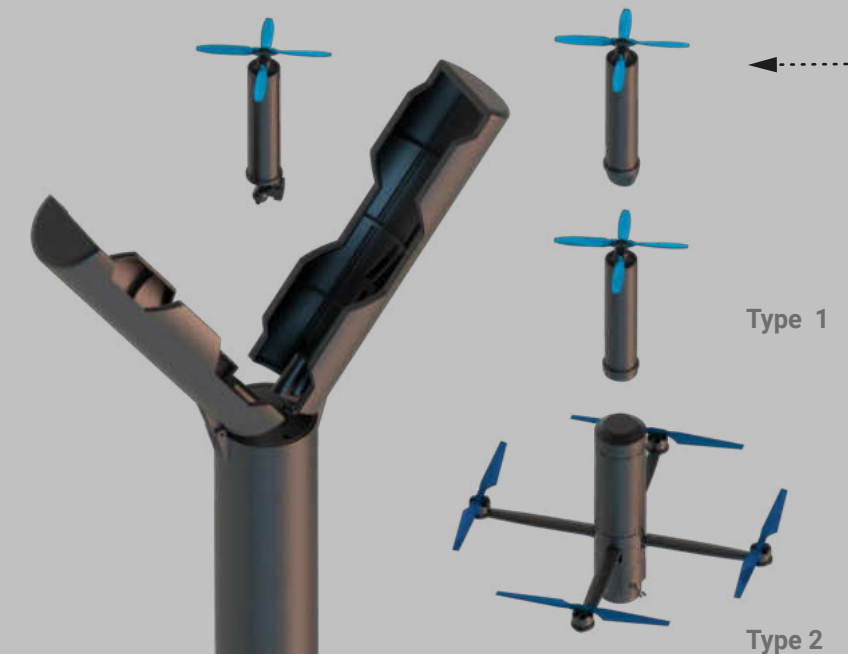
Standby mode

Drone is waiting for the orders



Active mode

After the order is received, drone activates, the capsule opens



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SAF

We
create
worlds
of light

VITRULUX

