ENVIRONMENTAL MODULE

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Tesla Blatná

1958 - Establishment of TESLA BLATNÁ company

Our Business Portfolio:

- Passive electronic components.
- Electronic modules – battery charge management, motor controllers, customer electronics.
- Parts for automotive industry – ignition wires, fuses, coils, bulbs.
- Sensors – sensor elements, complete solution for specific purpose.

Outline

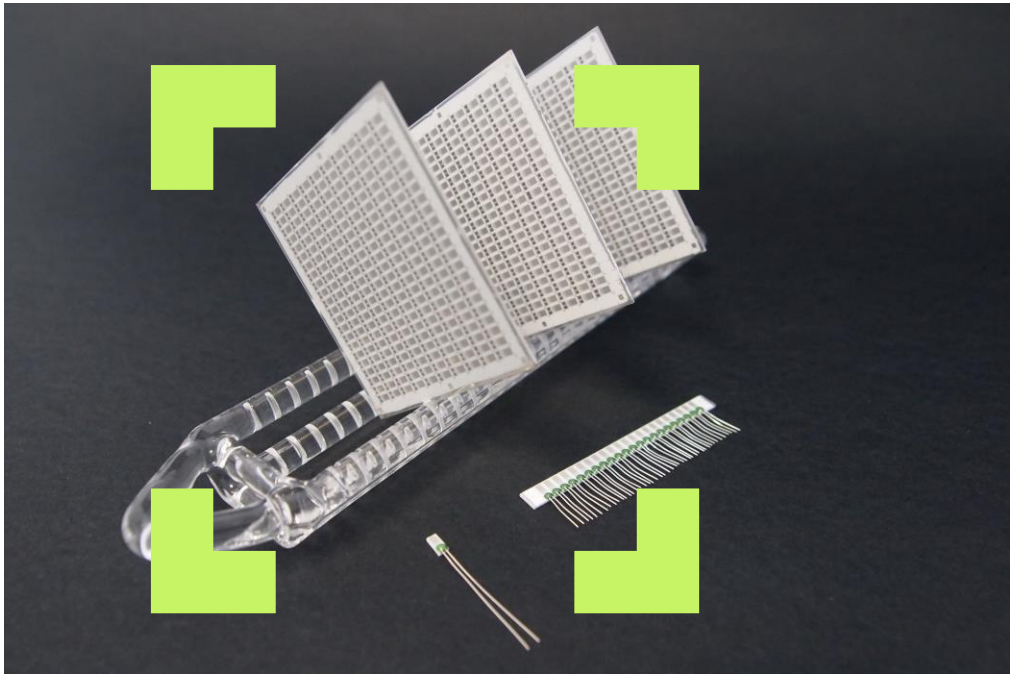
- Concept of our Sensors.
- Smart City.
- Company equipment.
- Design.
- Conclusion.

1.

Concept of our Sensors

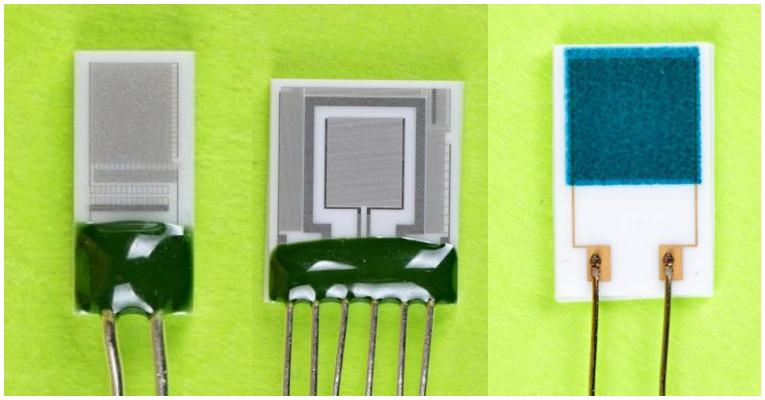
Concept of our Sensors

Tesla began with the development of thin-film sensors about 10 years ago. The company has a clean room laboratory that uses it to develop new sensors and produce temperature sensors and sensor platforms.



Concept of our Sensors

Sensor Elements
We develop new sensitive materials, new sensors platforms etc.



Sensor Modules
When we developed the sensors elements the next step of our research is data acquisition, measure and visualization.

We need sensor modules!!!

Environmental Module

Environmental Module

The module is designed to measure environmental conditions in an urban area. The device is composed of 9 independent sensors that measure air quality, temperature, humidity, pressure, light and dust particles.

Module Technical Conditions:

CO	0….500 ppm (0….617 mg/m^3)
NO_2	0….20 ppm (0….40,5 mg/m^3)
SO_2	0….50 ppm (0…141 mg/m^3)
O_3	0….20 ppm (0….42,3 mg/m^3)
Temperature	-40….125 °C
Pressure	260…1260 hPa
Humidity	0….100 %RH
Light (VIS, UVA, UVB)	0….100 %
Dust (PM2.5)	25….500 μg/m^3

2.

Smart City

Immission limit

The Air Protection Act (CZ 201/2012 Coll.)

Pollutants	Averaging time	Immission limit		Maximum number of overshoot per year
		[µg.m^{-3}]	[ppm]	
SO_2	1 hour	350 µg.m^{-3}	**0,124**	24
SO_2	24 hours	125 µg.m^{-3}		3
NO_2	1 hour	200 µg.m^{-3}	**0,1**	18
NO_2	1 year	40 µg.m^{-3}		0
CO	Max. eight hour average	10 mg.m^{-3}	**8,11**	0
PM_{10}	24 hours	50 µg.m^{-3}		35
PM_{10}	1 years	40 µg.m^{-3}		0
$PM_{2,5}$	1 years	25 µg.m^{-3}		0
O_3	. eight hour average	120 µg.m^{-3}	**0,06**	

Smart City - Visualization

TCP cloud – data procesing (5 modules)

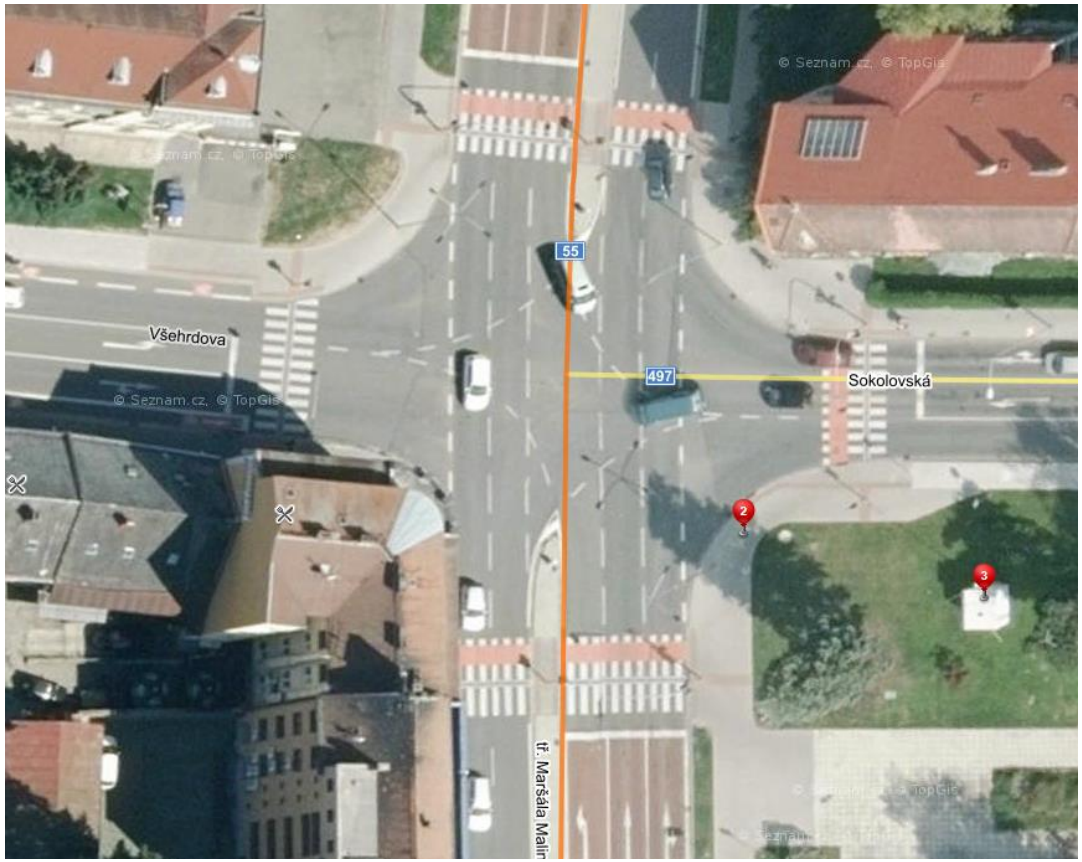
Smart City - Visualization

IQRF aliance

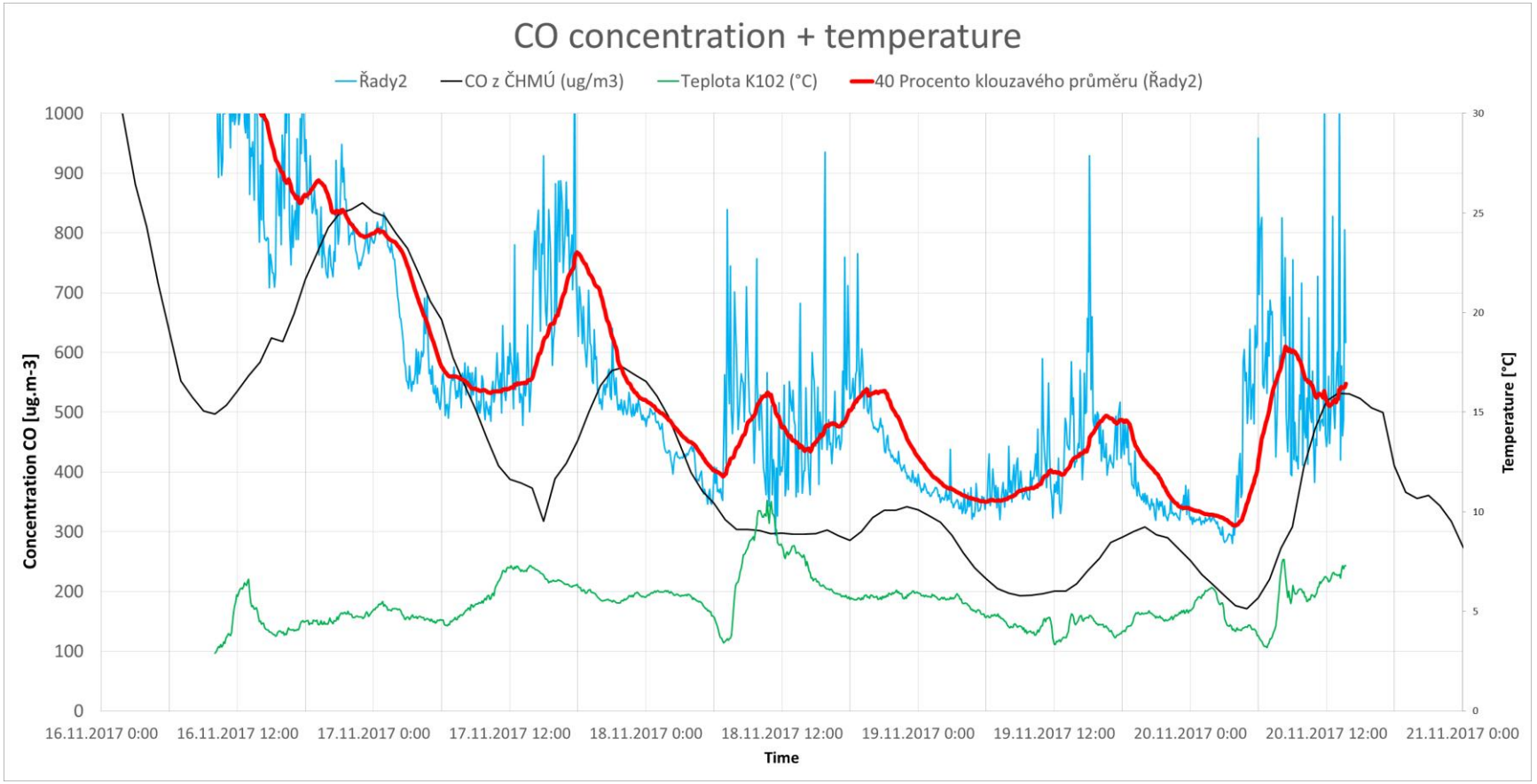
Smart City – Validation

Environmental module versus CHMI equipment (Czech hydrometeorological institute)

Point 2 – Tesla (K102)
Point 3 - CHMI



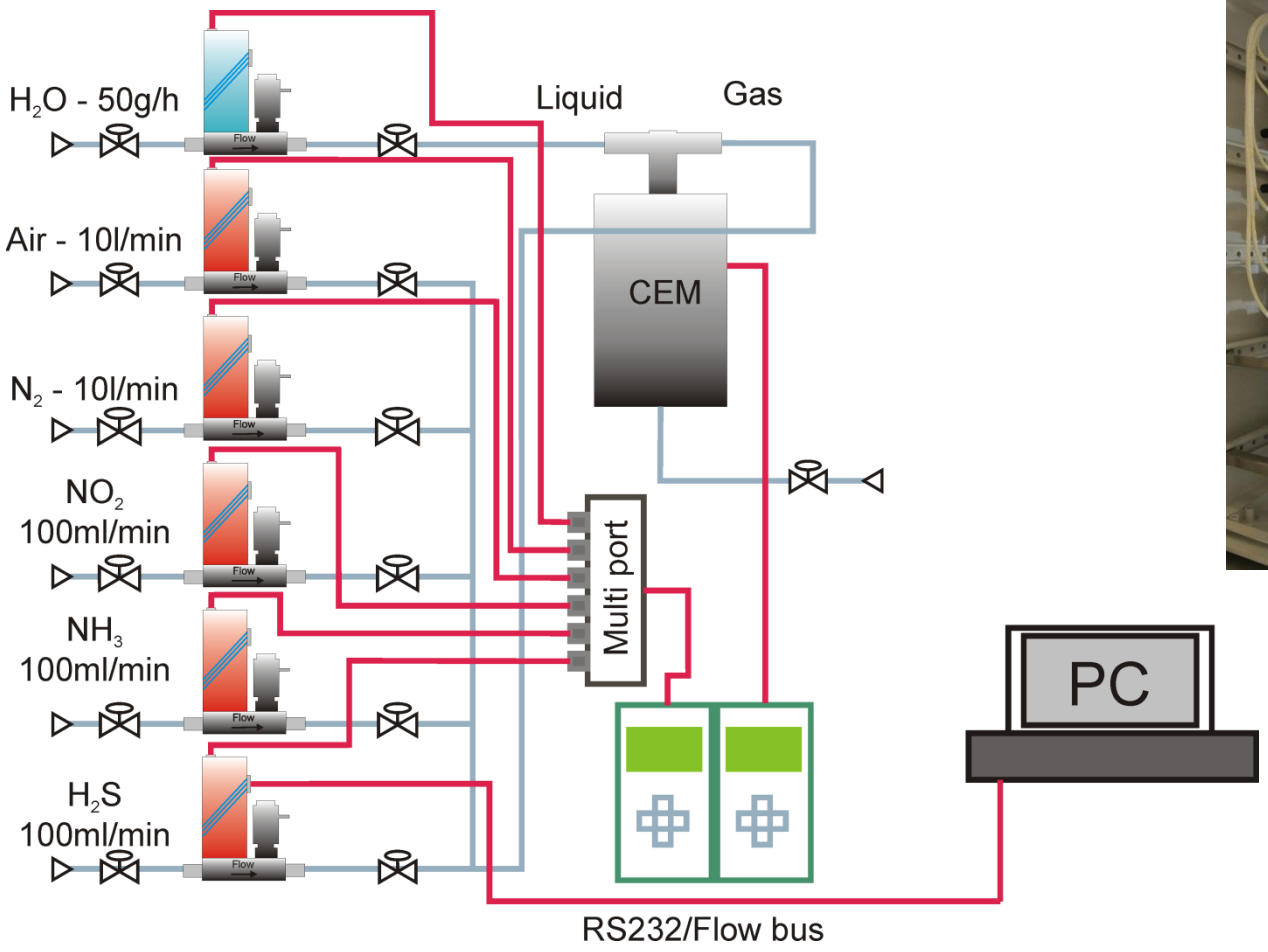
Smart City - Validation



3.

Company Equipment

Gas Mixture Equipment



Gasses for Calibration

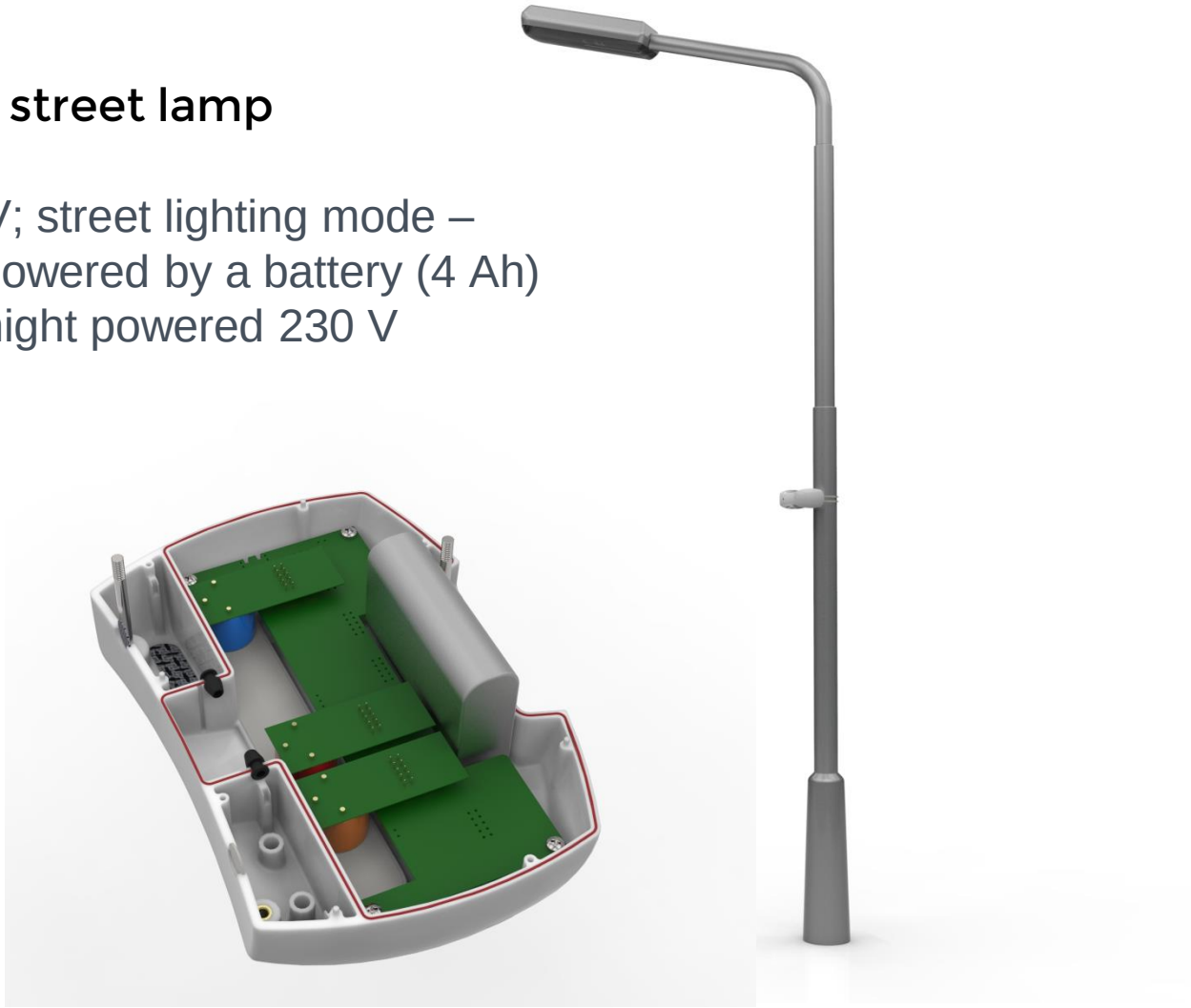
4.

Design

Design I.

Instalation on the street lamp

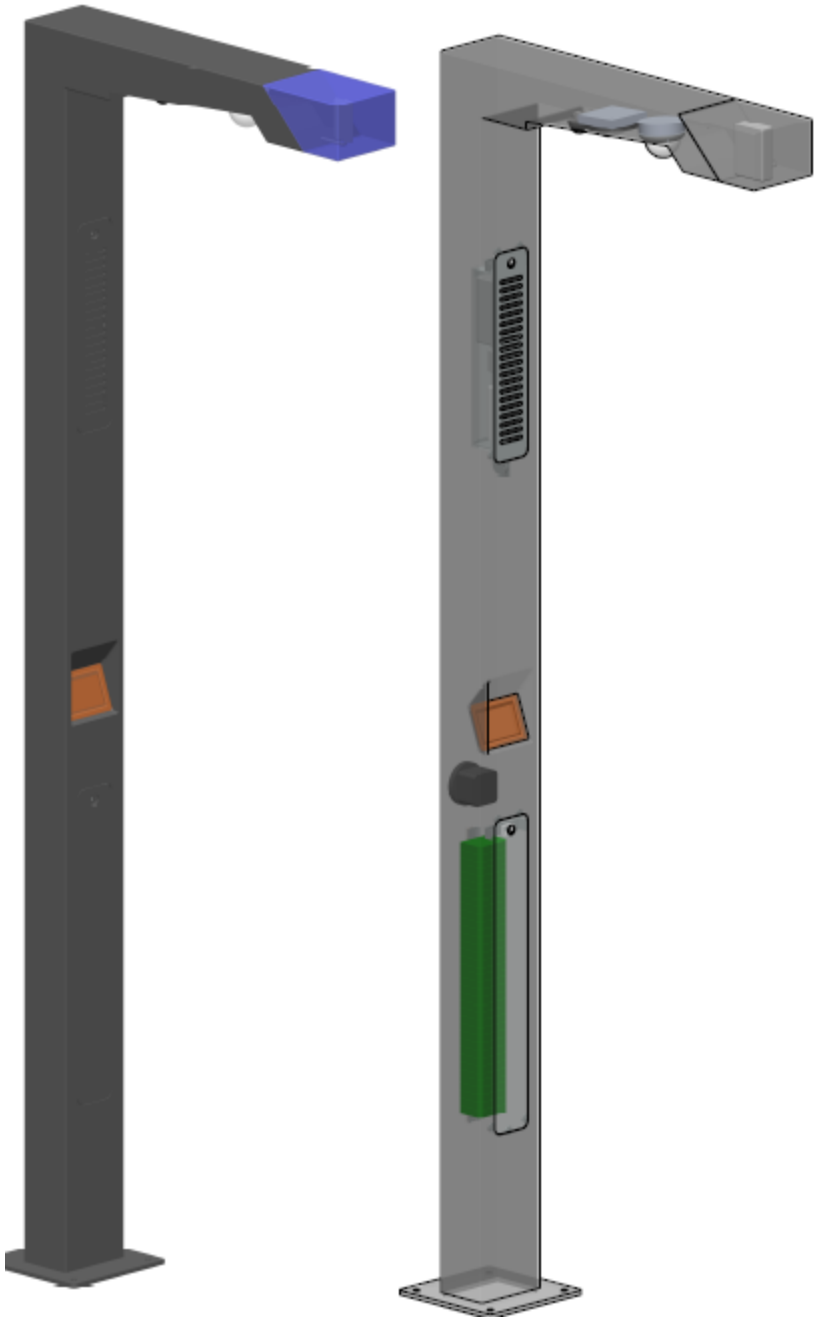
Power supply: 230 V; street lighting mode –
day powered by a battery (4 Ah)
and night powered 230 V



Design II.

Instalation inside the street lamp

Collaboration with companies:
TECO a.s. and Kooperativa, v.o.d.

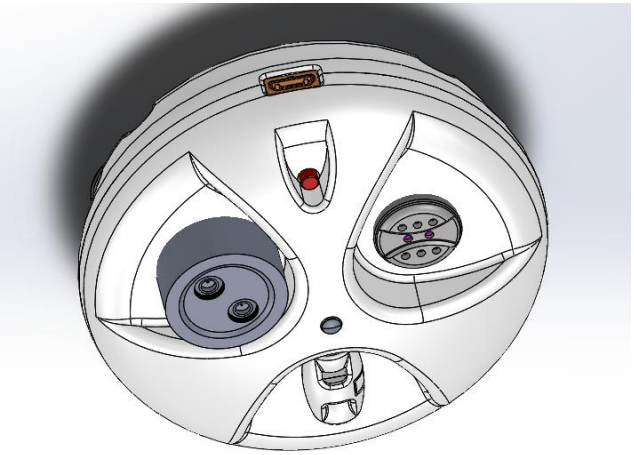


5.

Conclusion

Conclusion

- Modular design solution.
- Optional sensor set.
- Other gasses: CO, CL2, NH3, HCN, HCl,Ethylene Oxide (C_2H_4O), H2,
  Phosphine (PH_3), H2S, NO, NO2, SO2
- Possible splitting into separate modules – low power solution, 1-3 sensor etc.



Thank You!

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