

# Who are we?

- 1. **Carpathian Institute Incubator** – eco-energy and IT, we bring together such projects as:
  2. FII - development of IT systems in the field of energy,
  3. Smart Lighting - IT systems for street and industrial lighting,
  4. Extenso - IT systems for industrial lighting,
  5. MObilizer - synchronisation of data transfer in IT systems.

# Objectives of the system

- **Optimisation of electricity consumption by street and industrial lighting**
- **Automatic control of street and industrial lighting**
- **Information on the current state of the lighting system and its components**

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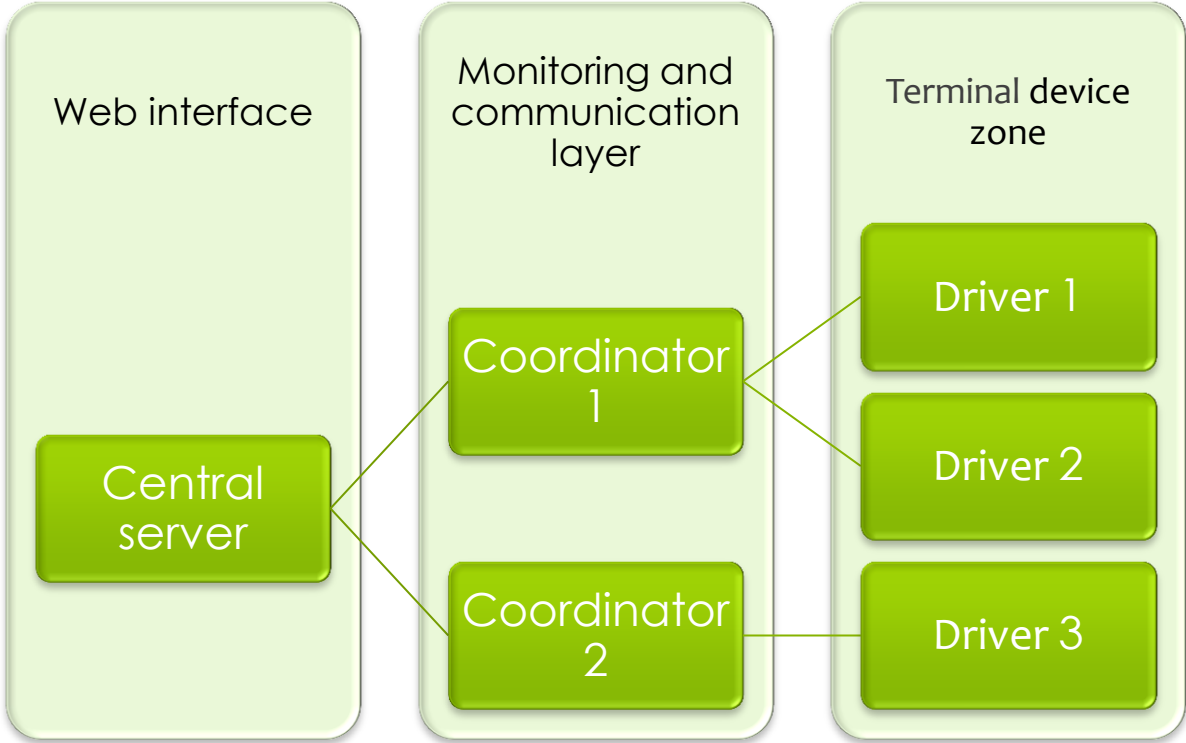
# Features of the system

- **Wireless** device control
- Control via a central system with a web interface
- Control form (at present): turn on; turn off; adjust the power (1-10V)
- Detection of additional phenomena by drivers (light intensity, movement, selective identification of other appearing devices)

# Architecture of the system

- The central server with a web interface transmitting commands from a web application and receiving messages from Drivers and Coordinators in industrial halls
- Coordinators monitor Drivers and provide reports on their status to the central server
- Drivers receive commands from a Coordinator and inform it of their condition

# Independent areas of the system



# Central system

- Defining device operation schemes (Coordinators and Drivers)
- Adding drivers of devices and locating them on a map or a building plan
- Grouping drivers of devices to assign them to a single configuration set
- Manual (emergency) control
- Reporting on device condition

# Operational scheme of the central system



Develop an operational scheme of a device

Forward the scheme to a relevant coordinator

Check device condition and compare it to the scheme in place



# Coordinator

- It monitors the operation of lamps subordinate to it via drivers
- It receives signals recorded by drivers
- It sends control commands at a specific time interval, according to device schemes in place
- It sends a report on device condition to the central server via a communication channel

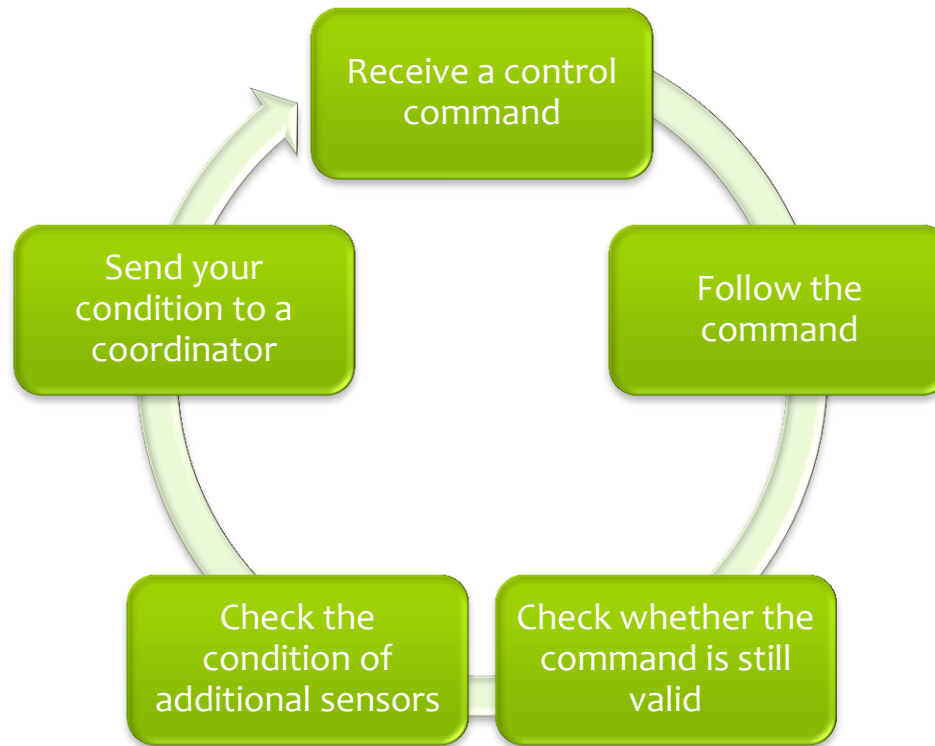
# Operational scheme of a coordinator



# Drivers

- They receive messages from coordinators via a connected (wireless) communication module
- They inform of their condition
- They inform of additional phenomena detected by additional sensors:
  - Light intensity
  - Movement detection
  - Detection of another incoming device (Beacon)
  - And more...

# Operational scheme of a driver



# Communication

- Drivers form the "mesh" network.
- Drivers communicate with a coordinator via an external protocol
- The coordinator communicates with the central server via TCP/IP

# Lighting control schemes

- Astro (twilight or sunset for a specific location)
- Standard (hourly lighting intervals)
- Dark (lighting thresholds, including setting the desired light intensity for an area)
- Supplementary:
  - Light maintenance
  - Reduction curves
  - Movement detection
  - Detection of other appearing devices (Beacon)

# Control of other devices

- We develop an operational scheme for a device
- We define additional factors whose detection influences the operation of the device
- The scheme is sent to a coordinator
- If a driver detects any phenomenon with its sensor, it transmits a signal to the coordinator
- The coordinator checks whether the phenomenon and its degree of intensity necessitates changing the operation of the device and, if so, sends a relevant control command

# Manual control

- When switched into its manual control mode, a device is excluded for a specific time from a configuration set in place for a group
- When switching it into the manual control mode, we specify what action the device should take (turn on/off) and for how long
- After that period, the device will go back to the previous configuration set in place



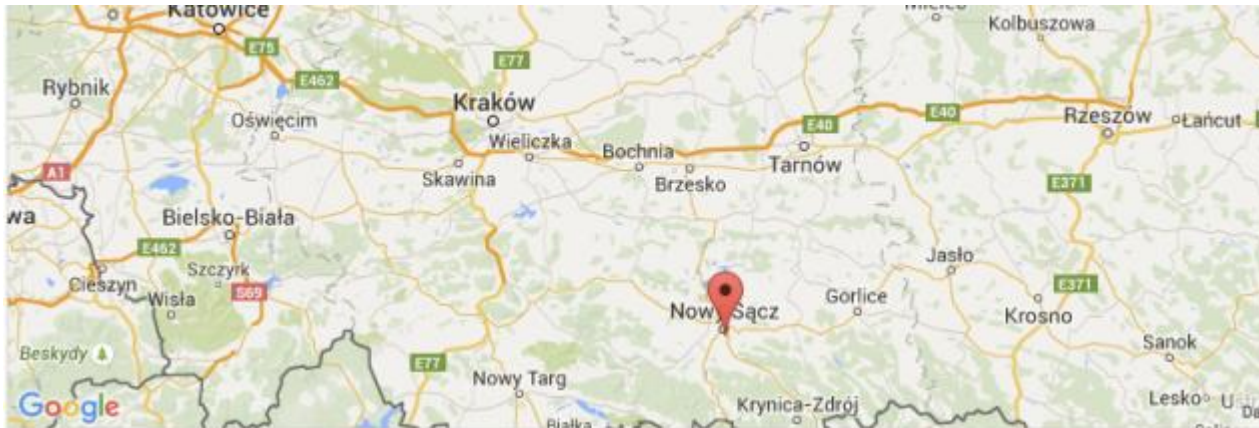
# Additional functions

- Alert module
  - We define alert conditions (notice/warning/critical)
  - We define recipients and what types of alerts they want to receive
  - We define in what form communication is to take place (email, SMS)
- Module of an external API
  - We provide defined users with SOAP API to control devices
  - A user specifies: what action s/he wants to perform (turn on/off devices), for how long, on what area the action is to take place in relation to his/her position

# Contact details

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