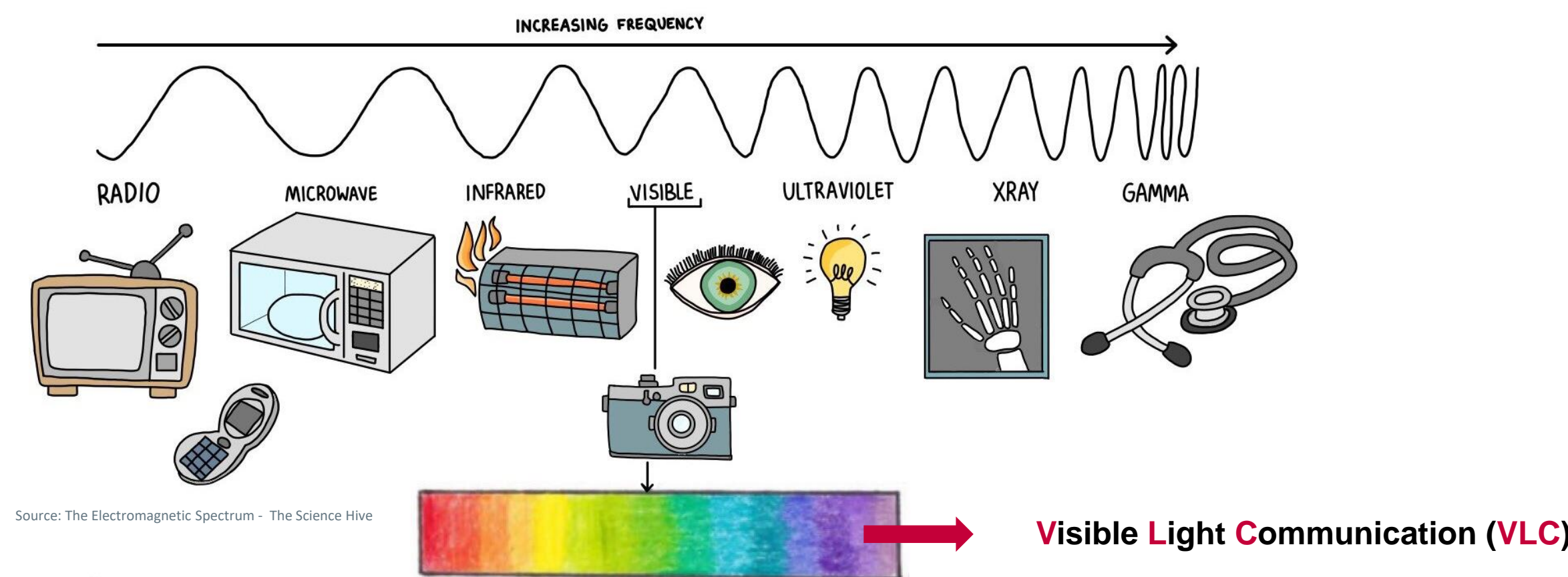


# Technical feasibility of Visible Light Communication systems for low bitrate Smart Cities and the Industry 4.0 applications

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## 1 Context



- The electromagnetic spectrum is a regulated
- The increase of wirelessly connected devices has increased drastically this last decade, saturating the available bandwidth
- There is a need to find alternative wireless technology to avoid a spectrum crunch
- VLC is a good candidate as the visible spectrum band is not regulated

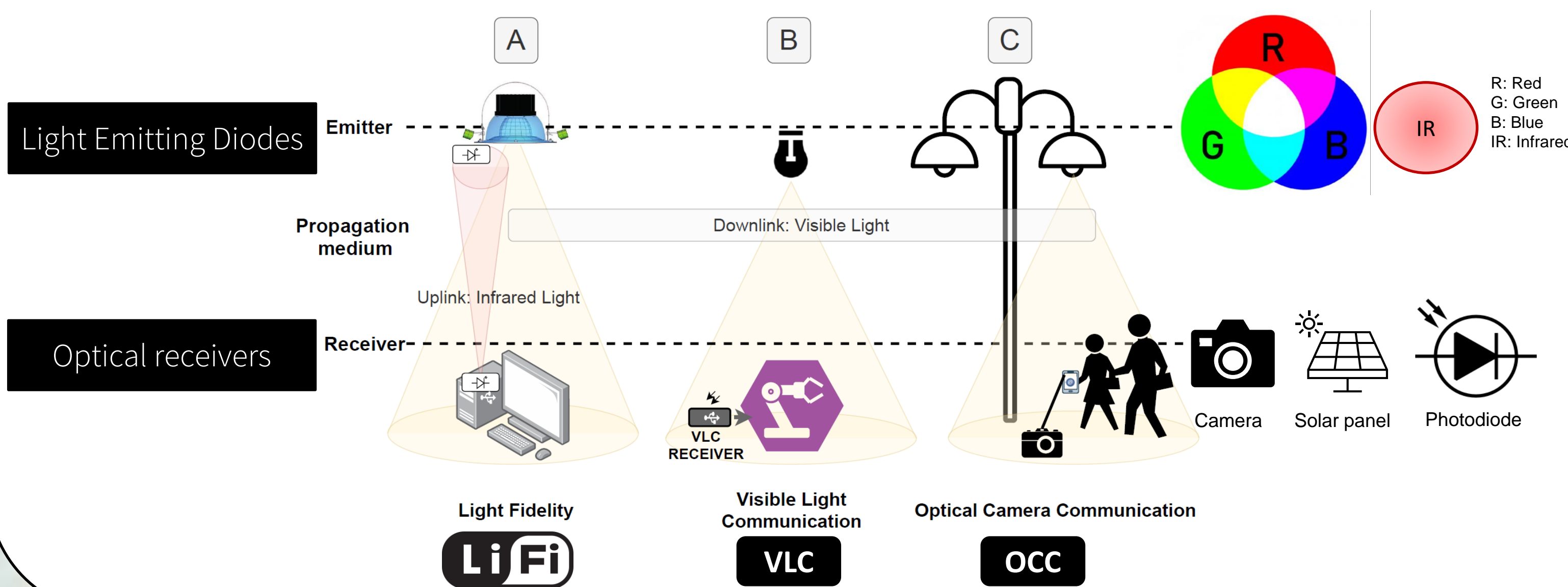
**But having a “free” portion of the spectrum is not sufficient to build a VLC system. The Light Emitting Diode is the KEY enabler of this technology**

### Outdoor and industrial environments

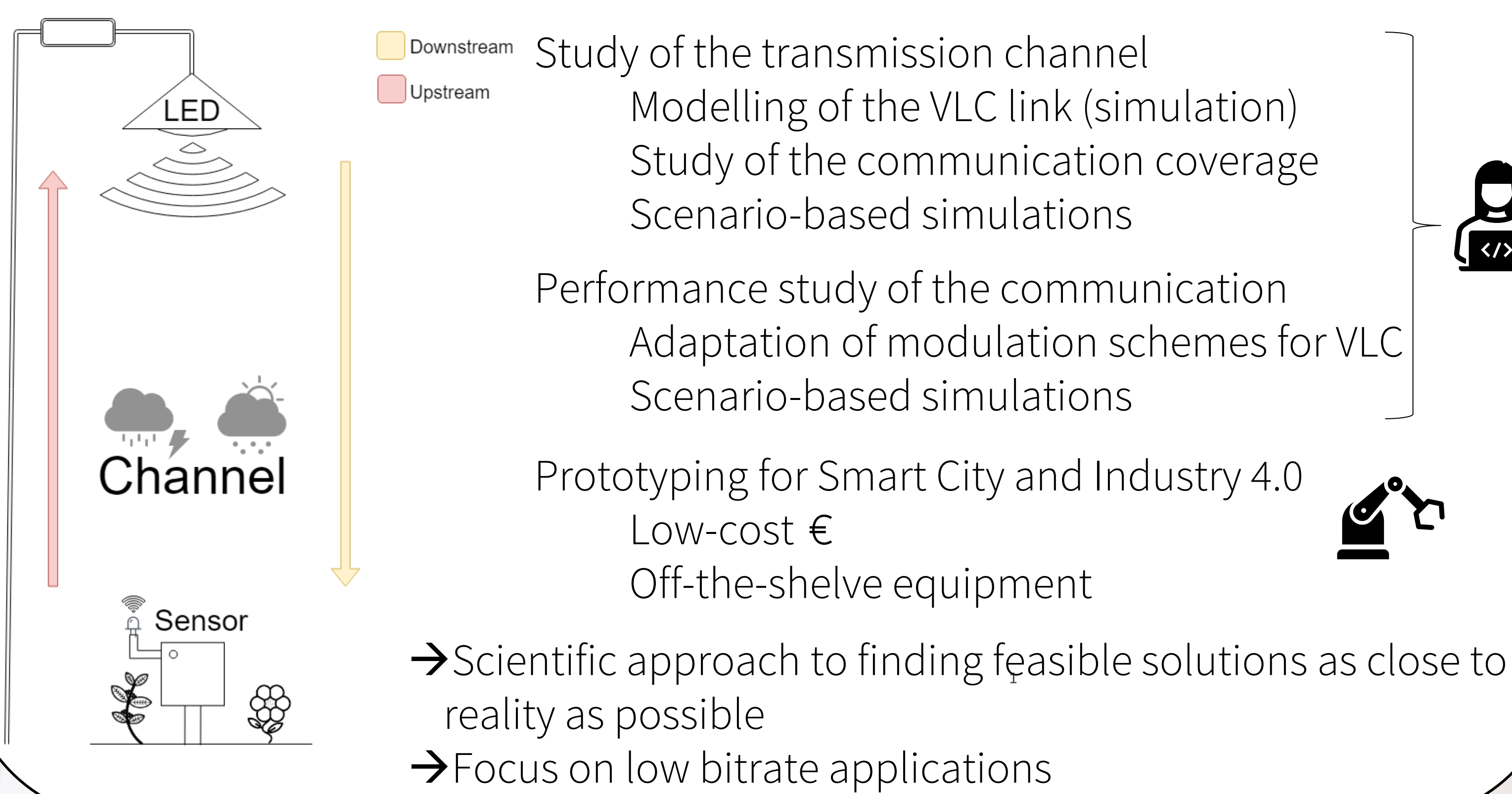
- Research on outdoor VLC gained interest in the last few years (mainly indoor)
- The weather is the main attenuators for outdoors communications ☁️ ☀️ ☔️
- Industrial environments tend to suffer from multipath effects (metallic structure) 🏭
- No clear answer on the relevancy of VLC for outdoor and industry

→ **Need for dimensioning tools to assess the suitability of VLC in harsh environments**

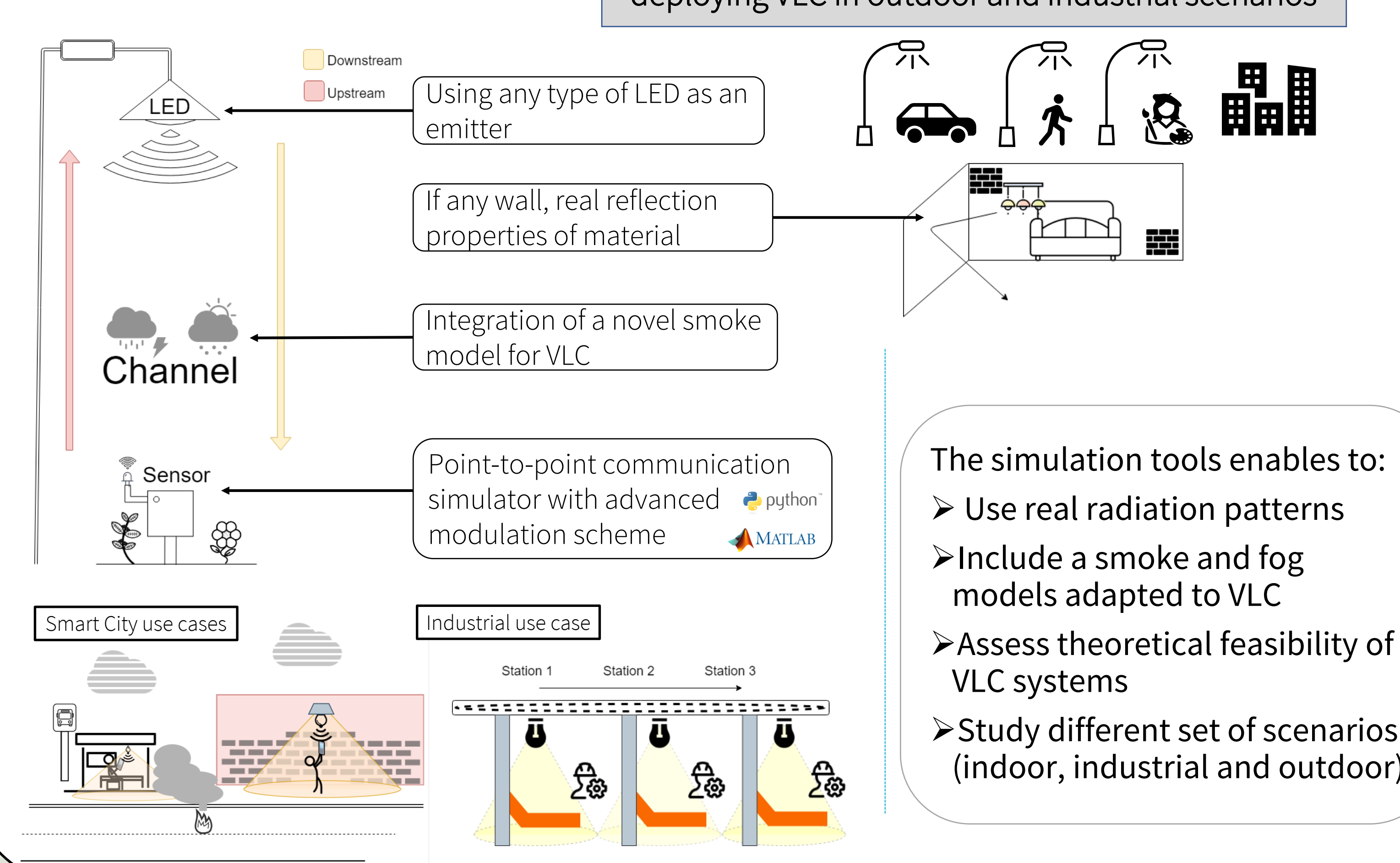
## 4 Examples of systems



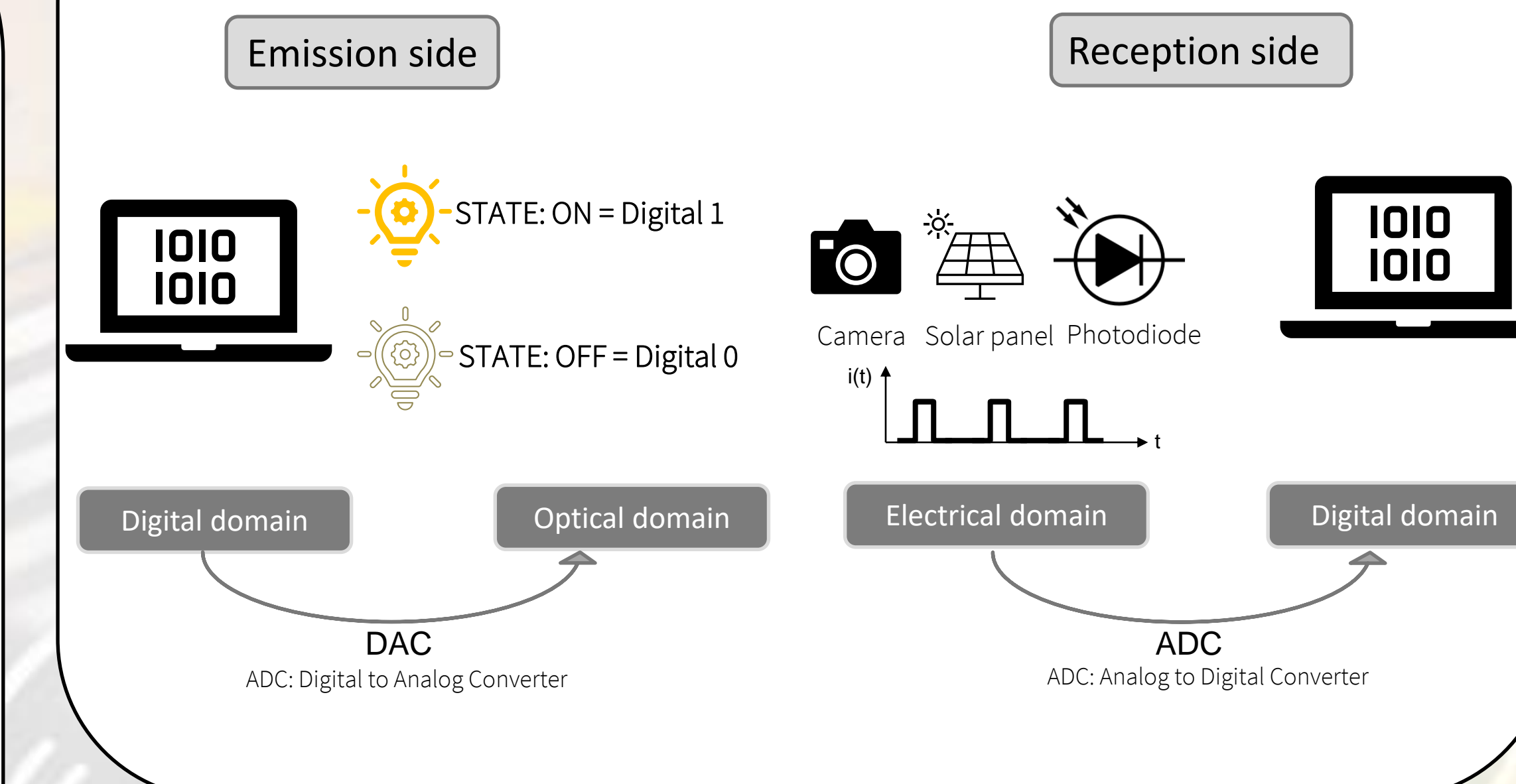
## 2 Objectives of the thesis



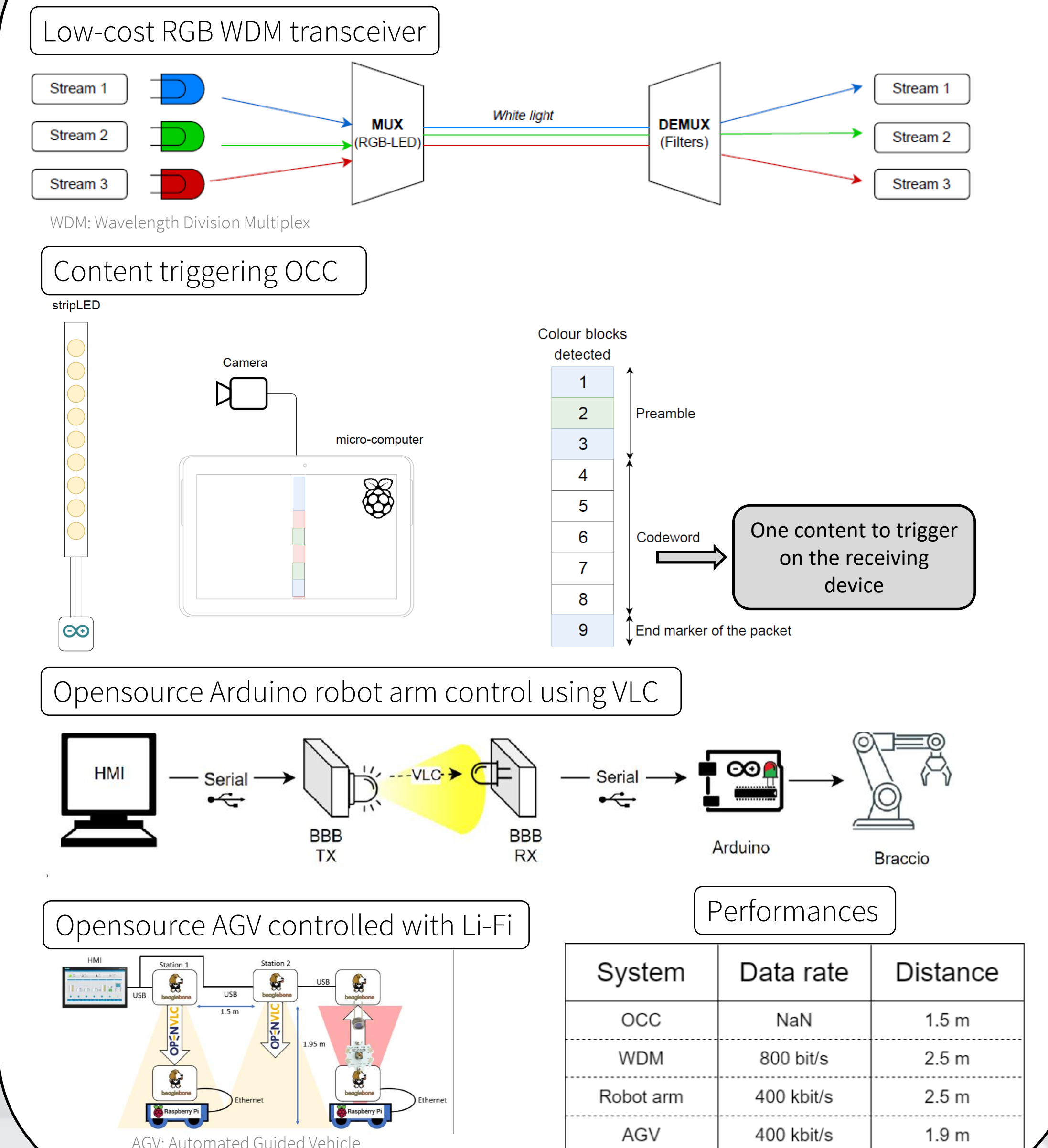
## 5 Novelities of the thesis



## 3 How it works

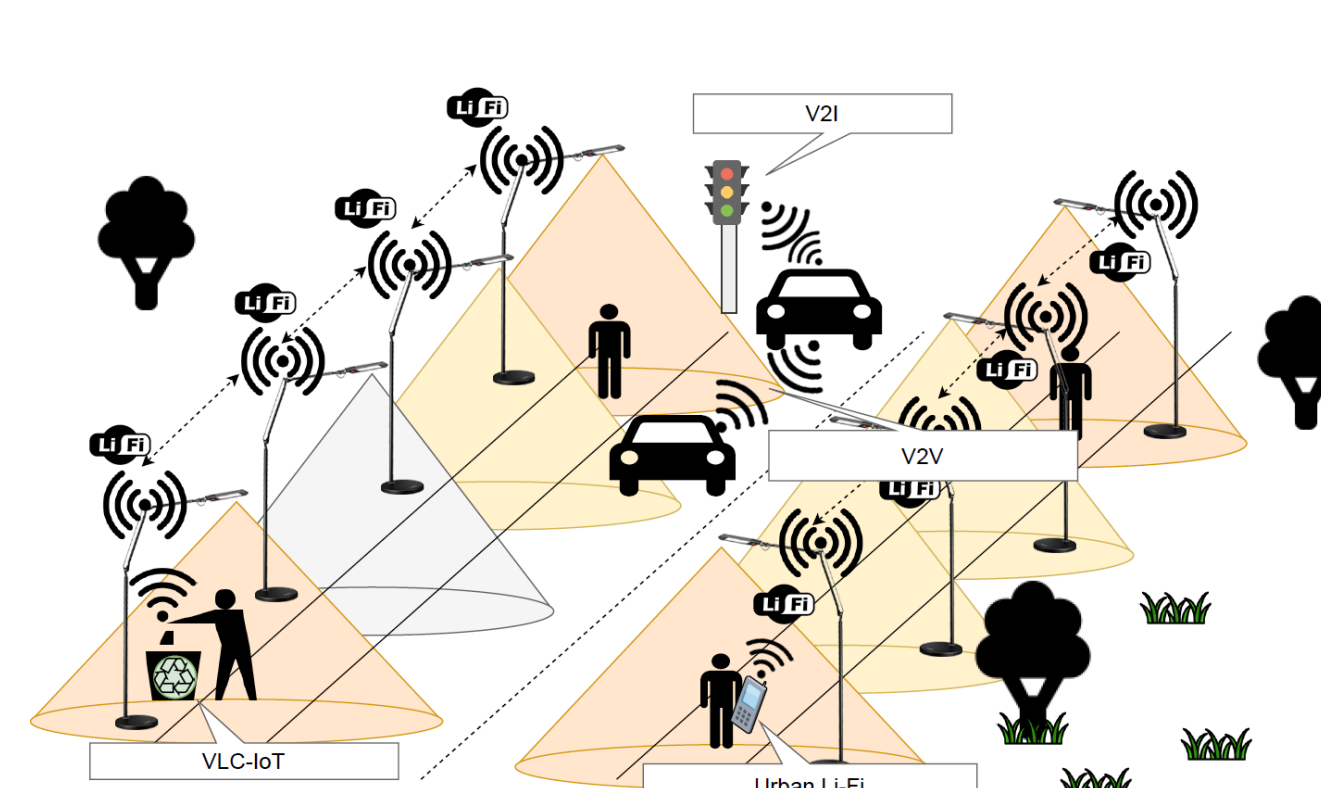


## 6 Prototyping



## 7 Conclusion

1. A free and open-source flexible simulator with parameters close to reality
2. Application of the simulator to realistic scenarios for smart city and the industry
3. The relevancy and working principle of VLC demonstrated in various publications



## 8 Perspectives

- From point-to-point to networks
- Collaborative infrastructure RIS (Reflective Intelligent Surfaces)
- Study of particles of car emission in semi-confined spaces such as tunnels
- Massive vehicle swarm MESH network (Drones, Cars, Robots, etc.)

