

**Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)**

**Submission Title:** Future Applications of NG OCC

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**Re:**

**Abstract:** Present the Future Application for IEEE 802.15 IG NG-OCC

**Purpose:** Presentation for contribution on IEEE 802.15 IG NG-OCC

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# Future Applications for NG OCC

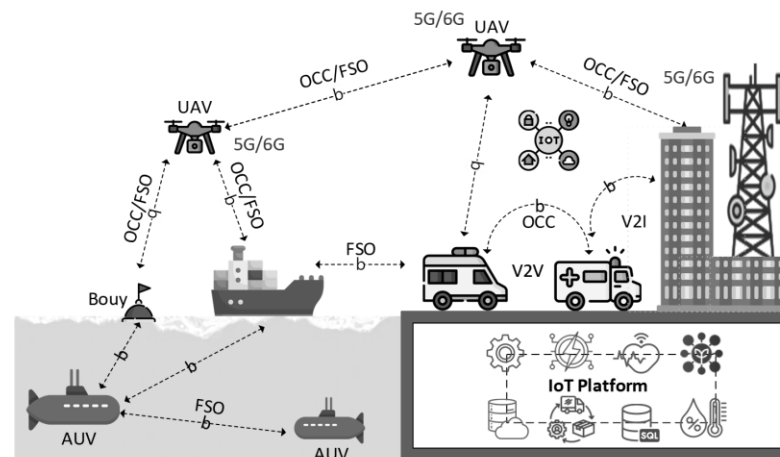
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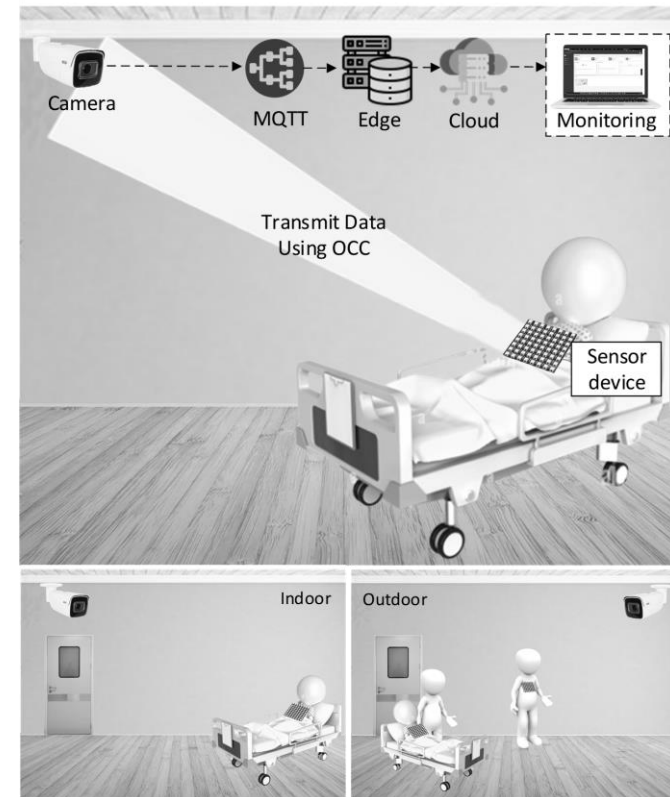
# Background

- OWC-based services have become a significant topic in recent years.
- The implementation of OCC as a subsystem of OWC is expanding, encompassing fields such as the Internet of Things (IoT), underwater communication, and transportation (V2V, D2D, etc.).
- Nevertheless, the direction of future OCC implementation has not yet been determined.
- Therefore, future research is needed to guide the implementation of OCC across various fields to maximize its potential in each application.



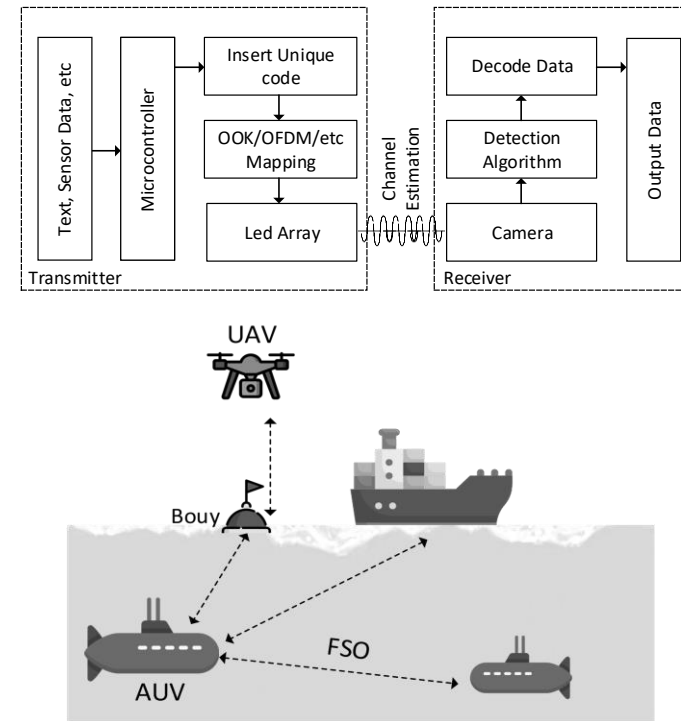
# Indoor Application

- Currently, OCC in IoT serves as a data delivery medium and a communication tool for data security.
- In Medical IoT, OCC is used solely for patient data collection without data processing, such as prediction or anomaly detection.
- Latency in the OCC system has not been considered, leading to a lack of real-time data transmission and causing delays in response and decision-making.
- Future implementation of the OCC platform is crucial for integration with edge and cloud servers, creating a monitoring tool for real-time prediction and anomaly detection in various fields.
- Future integration of 5G/6G technology and OCC is essential to reduce latency and enhance bandwidth in communication systems.



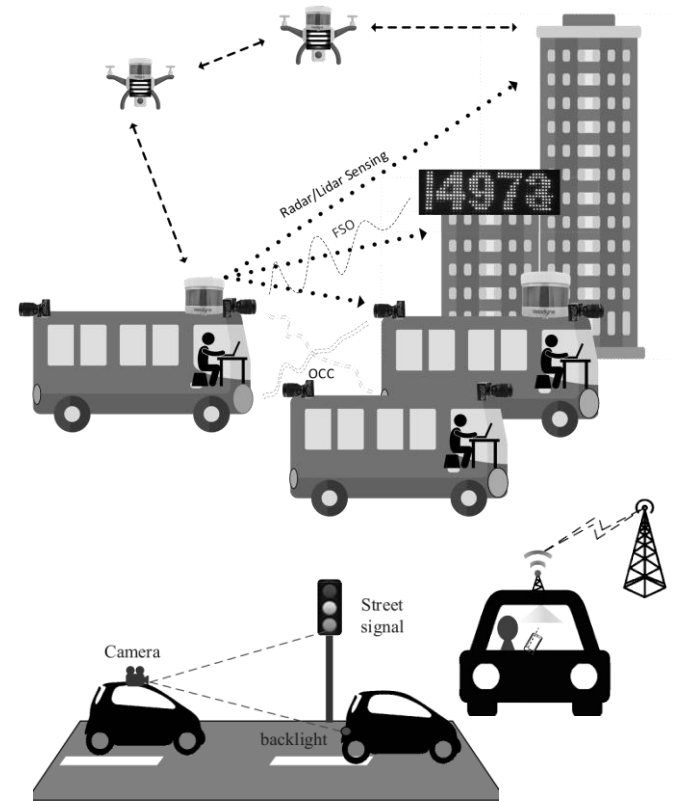
# Underwater Application

- Currently, the implementation of OCC is still limited to unidirectional communication.
- Broadcasting and underwater OCC communication are solely focused on data speed and transmission distance.
- However, in real-life scenarios, senders and receivers of information can be more than one, thus requiring bidirectional communication in the future to enhance interaction and facilitate effective data exchange.
- The implementation of bidirectional communication in OCC will enable senders and receivers to interact with each other and provide a more responsive communication pathway.
- Underwater communication must also consider channel characteristics, as these characteristics impact communication quality, a consideration that also applies to ground communication.



# Transportation and Autonomous Vehicular Application

- Currently, public transportation such as buses, private cars, and ambulances cannot access RF networks due to its mobility and isolation between them and open air.
- Additionally, autonomous vehicles must meet specifications such as unmanned driving capabilities, avoiding accidents on the road, accurate position determination, and integrating multi-heterogeneous embedded networks to perform various auxiliary tasks.
- In the future, in public transportation, OCC technology can support small aid networks that transfer requests through the RF spectrum, providing suitable data speeds for internet access.
- In the future, for autonomous vehicles, OCC technology can serve additional features such as position determination, vehicle information forwarding, and a hybrid RF/OCC/FSO network.



# Conclusion

- The scenario of implementing OCC can be expanded by integrating existing technologies across various application fields.
- Future implementations of edge and cloud-based OCC technology support efficient data storage and monitoring.
- Integration of OCC into 5G/6G networks in the future is necessary to reduce latency when monitoring data, particularly in patient monitoring.
- Future OCC applications need to consider channel characteristics to enhance data quality, especially in underwater communication and extreme weather conditions.
- OCC will be capable of providing position determination, vehicle information forwarding, and a hybrid RF/OCC/FSO network.



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