

IEEE 1900.7 White Space Radio Internet of Things Use Case

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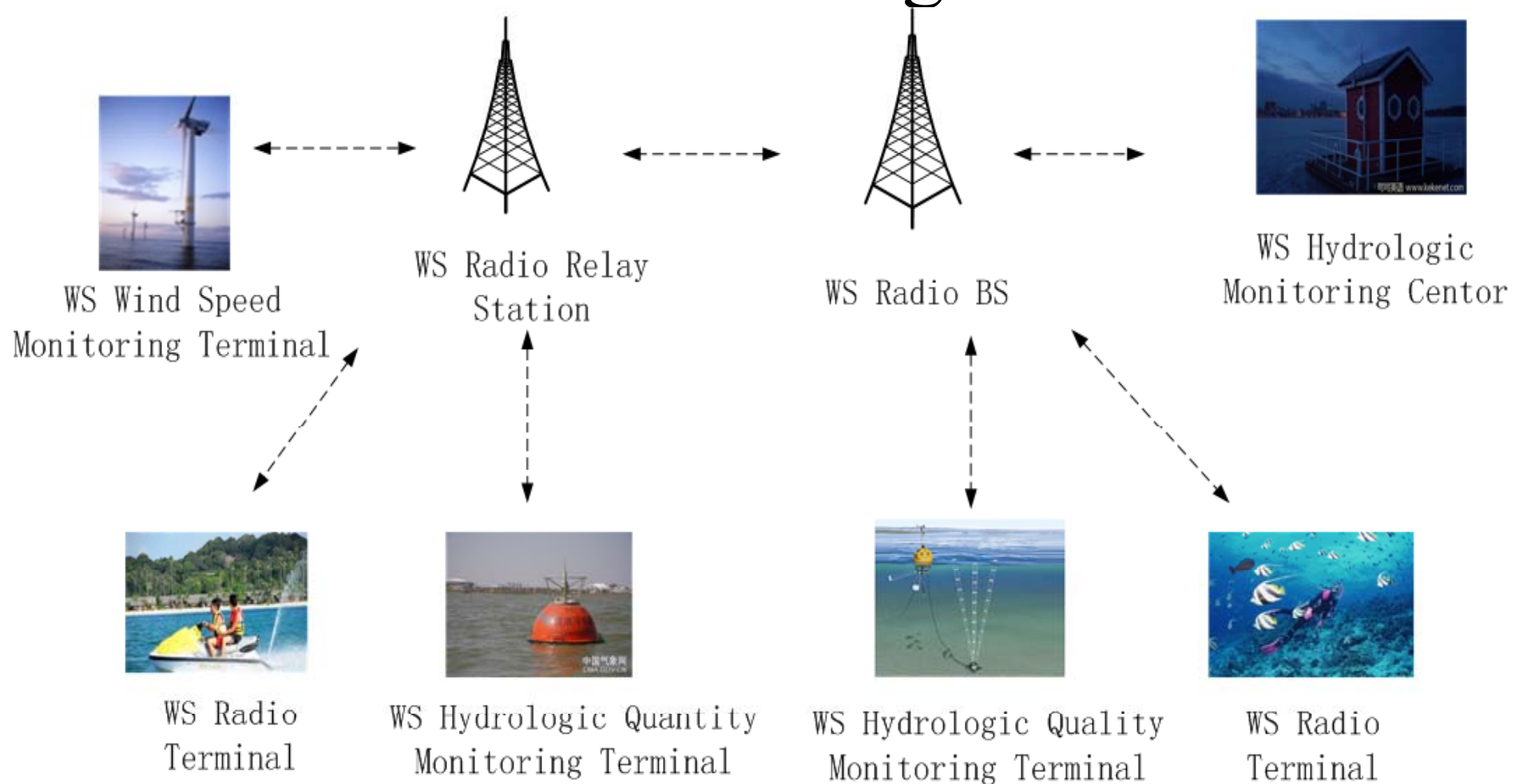
Objective

- ➔ Proposing the use of TV White Space Communications to provide network access for the following Internet of Things applications:
 1. Hydrologic Monitoring.
 2. Crane Security Monitoring.
 3. Forestry Monitoring.

Wireless Access Network for Hydrologic Monitoring

- ➔ White space radio could be used to provide high data rate network access for hydrologic monitoring operating in remote areas.
- ➔ Potential applications
 - Quick-to-deploy temporary networks
 - Remote Monitoring
 - Video Streaming
 - Quality, Quantity and Temperature Surveillance

Wireless Access Network for Hydrologic Monitoring

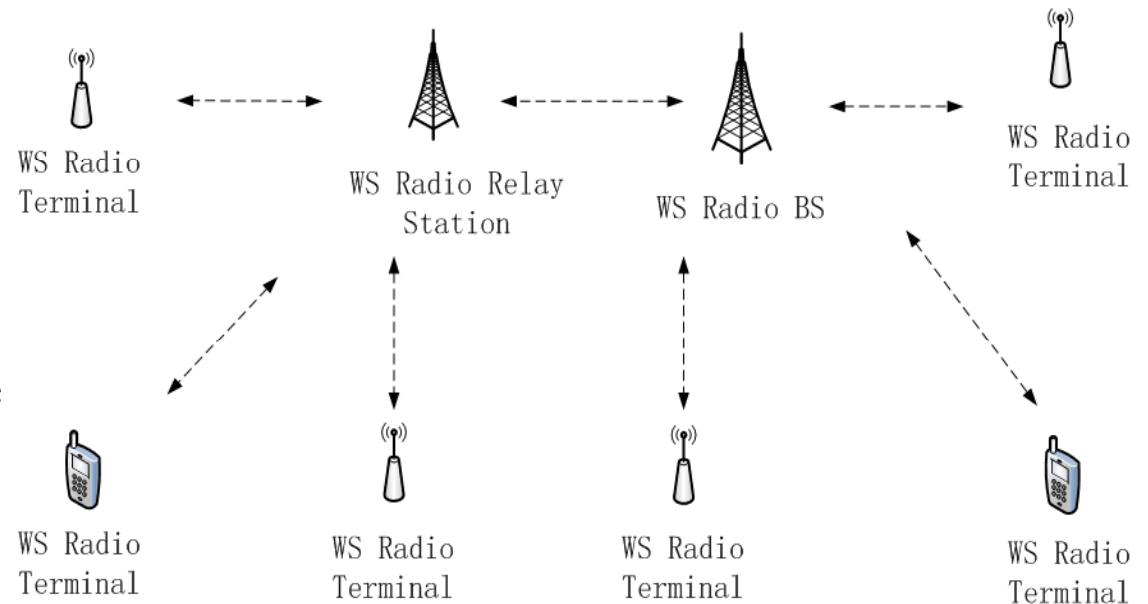


Wireless Access Network for Hydrologic Monitoring

Propagation environment	Outdoor LOS, NLOS
Peak data rate per terminal	30 Kbps
Maximum transmission range	10km
Maximum mobility speed	Portable
Tolerable delay	High
Security level	Medium
Number of terminals per base station	10– 20

Wireless Access Network for Hydrologic Monitoring

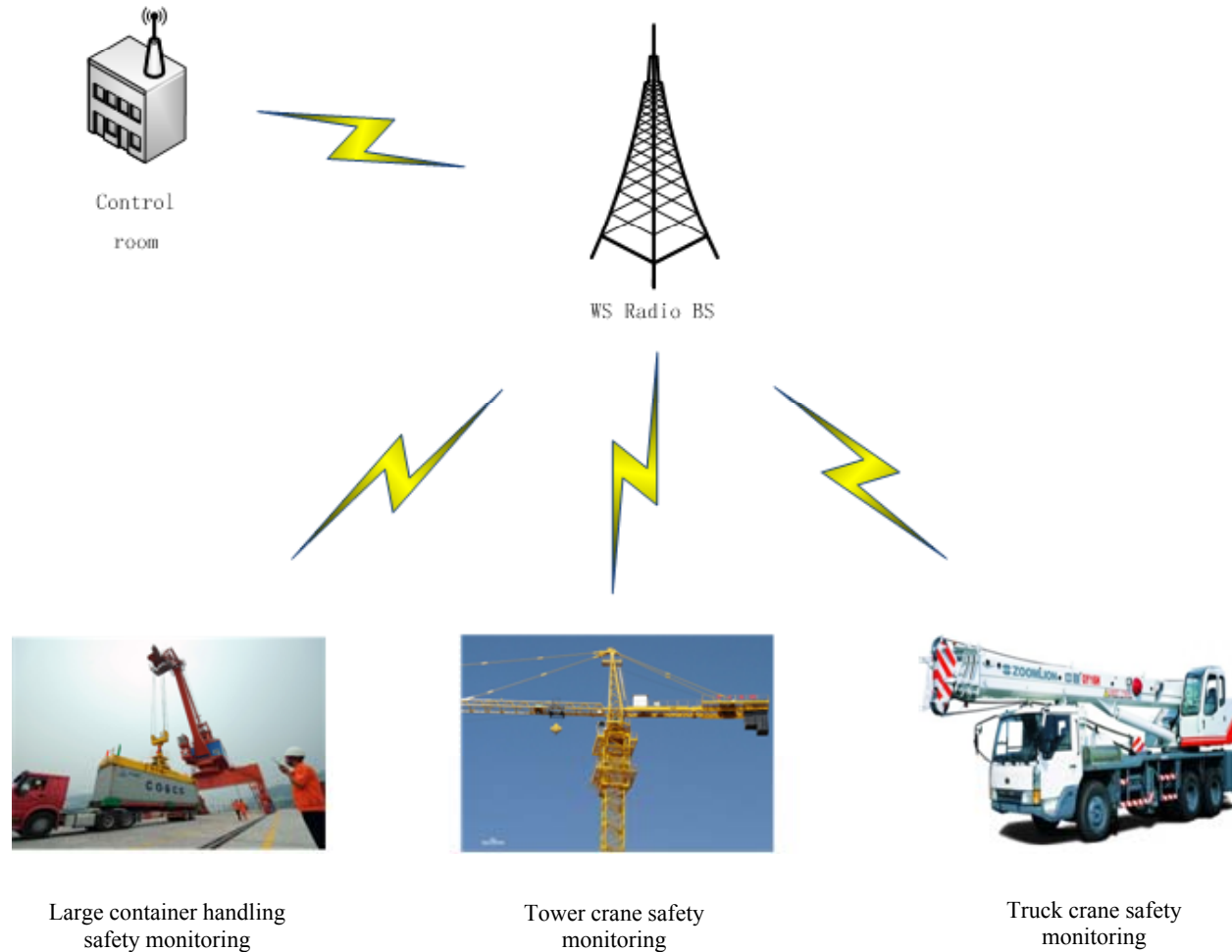
- ➔ WS Radio Base Station is fixed
- ➔ WS Relay Stations are fixed
- ➔ WS Radio Terminals are fixed/mobile



Crane Security Monitoring

- ➔ Wireless communication in the field of crane safety monitoring is needed to ensure independently or cooperatively safe operation. The low frequency white space is suitable in this case.
- ➔ Firstly, equipments should send real-time video data to control room, which is necessary when investigating the cause of the accident. Secondly, equipment should send warning message to technician when something is wrong. Thirdly, equipments working together should keep communication to avoid collision.
- ➔ It can provide wide bandwidth, small transmission loss and high QoS.

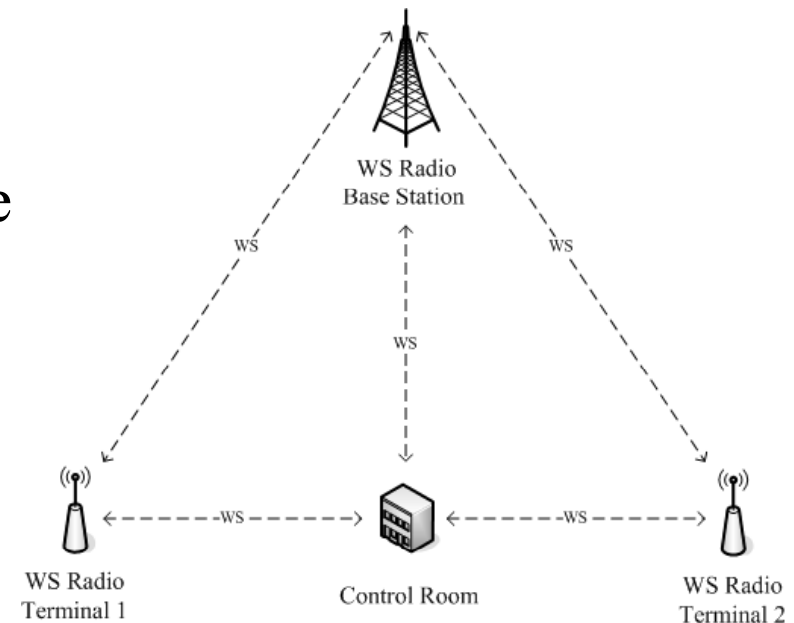
Crane Security Monitoring Network



Crane Security Monitoring Network

~Topology~

- WS Radio Base Station is fixed
- Control room is fixed
- WS Radio Terminal 1 is fixed
- WS Radio Terminal 2 is portable



Crane Security Monitoring Network

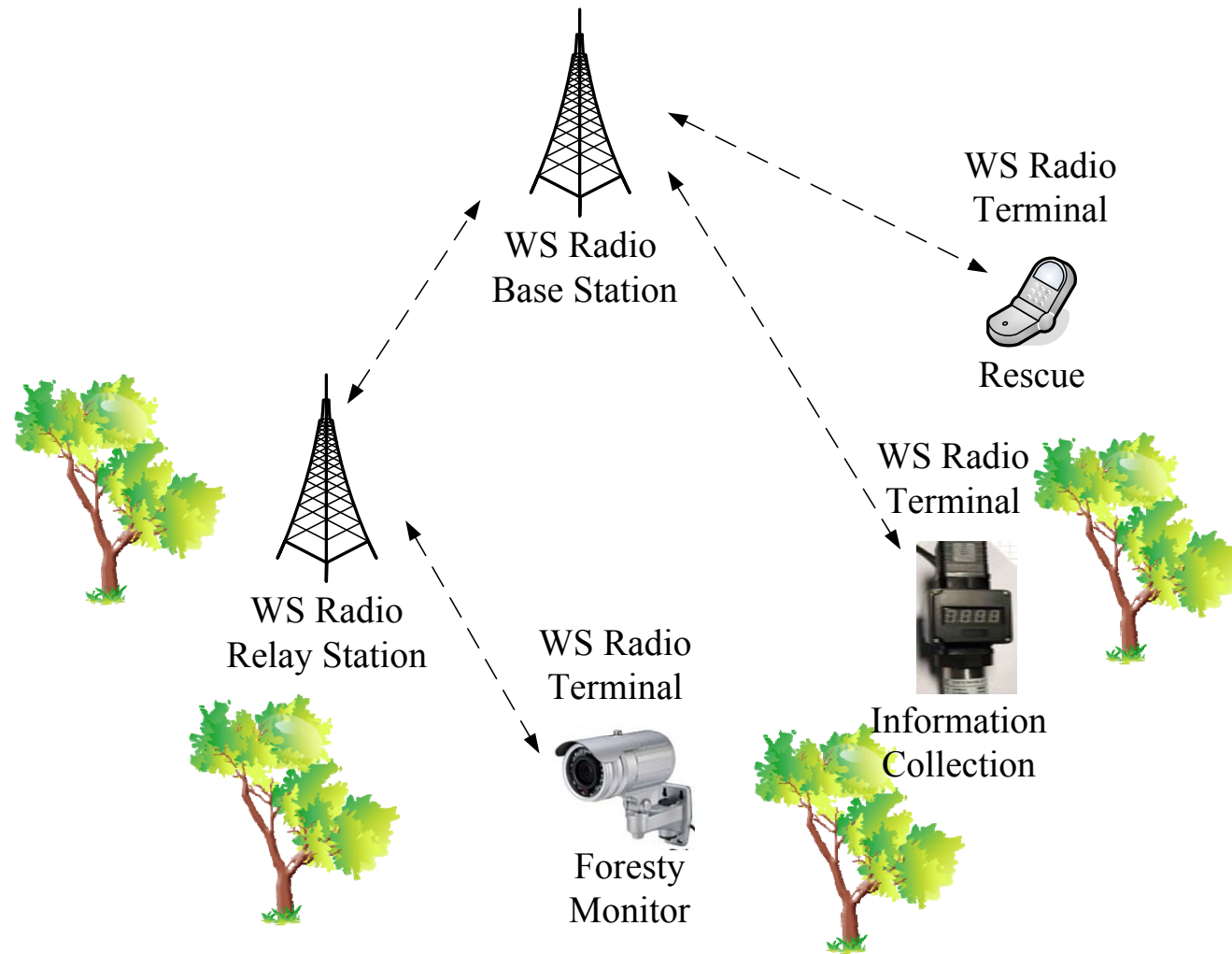
~System Parameter Requirements~

Propagation environment	Outdoor/Indoor. LOS/NLOS
Data rate	Up to hundreds of Mbps
Range	Several tens to several thousands of meters
Mobility	Fixed, or low speed motion
Latency requirement	High
Security level	Medium
Reliability requirement	High
Application examples	Tower crane safety monitoring, truck crane safety monitoring, large container handling safety monitoring

Wireless Access Network for Forestry Monitoring

- ➔ White space radio could be used to provide low data rate and high reliability forestry network.
- ➔ Potential applications
 - Ecological Monitoring
 - Disaster Warning and Rescue
 - Natural Resource Management and Conservation

Wireless Access Network for Forestry Monitoring



Wireless Access Network for Forestry Monitoring

Propagation environment	Outdoor LOS, NLOS
Peak data rate per terminal	250 kbps
Expected Base Station Aggregate Data Rate	10 Mbps
Maximum transmission range	100 m
Maximum mobility speed	Fixed/Portable
Tolerable delay	Low
Security level	High
Number of terminals per base station	254

Wireless Access Network for Forestry Monitoring

- ➔ WS Radio Base Station is fixed
- ➔ WS Relay Stations are fixed/Portable
- ➔ WS Radio Terminals are fixed/Portable

