TECH OFFER

Private Mobile Network To Enable Drone, Unmanned Platforms And Industry 4.0 Applications

KEY INFORMATION

TECHNOLOGY CATEGORY:

Infocomm - Networks & Communications

TECHNOLOGY READINESS LEVEL (TRL): TRL7
COUNTRY: SINGAPORE
ID NUMBER: TO174222

OVERVIEW

This Technology Offer is a private mobile network. Private mobile network technologies can be used for effective and reliable control of unmanned platforms - drones, Unmanned Aerial Vehicle (UAV), Unmanned Surface Vehicle (USV), Unmanned Ground Vehicle (UGV), robots - and other mission and business critical applications. These applications require live, uninterrupted wireless video streaming with wide bandwidth and low latencies, using dedicated spectrum channels. Without these, there is a much higher risk of drone/vehicle crash, jammed communications during emergencies, and loss of precision control in Industry 4.0 operations. Other wireless and mobile technologies cannot fulfil these requirements because of: a) undedicated unlicensed shared spectrum (e.g., WiFi, Bluetooth, Sigfox, LoRa), which are also subjected to frequent interference; b) small coverage area and slow moving mobility speeds in km/hour (eg WiFi, Bluetooth); c) public use (public mobile network); d) narrow bandwidth and cannot carry live video well (e.g., LMR, Tetra, IDEN).

TECHNOLOGY FEATURES & SPECIFICATIONS

This private mobile network leverages on standardised 3GPP-compliant ecosystem for cost-effectiveness. Yet, it retains the technological superiority of advanced mobile telecommunications. The technology has these advantages:

1) Targeted Coverage: Cover localised operating zones including isolated or remote areas with poor or no public network coverage (e.g., remote mines and offshore islands).

2) Better performance: Better capacity, privacy, data security, compliance and cellular network performance with customised design and deployment.

3) Better Protection: Against industrial espionage and cyber attacks. Data and Control planes in private networks are totally isolated from the Internet and public networks.

4) Better Control: can be optimized to handle specific traffic types with specific capacity and specific latency requirements. Public mobile networks serve primarily consumer and public which requires more downloading of content, and hence they are configured for more downlink time slots. But most enterprise applications requires more uploading (e.g., live video streaming from drone to control centre). Private mobile networks can be adjusted to have more uplink time slots to serve more uploading.

5) Innovative combination of TV White Space and LTE/5G technologies to expand spectrum options.

POTENTIAL APPLICATIONS

1. Remote live video streaming and Beyond Visual-line-of-sight (BVLOS) control of drones, UAV, USV, UGV, and robots
2. Critical communications amongst First Responders (police, civil defence, coastal defence)
3. Industry 4.0 applications that require critical control and moving assets: Closed-loop control with multiple sensors including on mobile devices performing continuous, instant measurements Motion control has the highest requirements in terms of latency and service availability. Exchange of real-time data, including emergency stop button

UNIQUE VALUE PROPOSITION

- Effective, safe and reliable control of unmanned platforms (drones, UAV, UGV, USV, robots)
- Precision control of assets (especially moving assets) in Industry 4.0 environment
- Cost effective as solutions are based on standardised technologies