

International Civil Aviation Organization

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**Twenty Ninth Meeting of the Communications/
Navigation and Surveillance Sub-group (CNS SG/29)
of APANPIRG**

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Agenda Item 14: Innovation and New Technologies**REAL-TIME TRACKING OF OUTDOOR ACTIVITIES TO IMPROVE SAFETY AND
EMERGENCY RESPONSE**

(Presented by Hong Kong China)

SUMMARY

This paper shares the experience of Hong Kong China in conducting trials of a tracker application for outdoor activities, leveraging the Government-Wide IoT Network (GWIN), which enables real-time tracking and monitoring of outdoor activities. This has improved safety of outdoor activities and strengthened the search and rescue operations as well as emergency response capabilities.

1. INTRODUCTION

1.1 In Hong Kong China, citizens engage in various types of outdoor activities, including hiking, cycling, water sports and air sports (e.g. paragliding). Given the growing popularity of these outdoor activities and increasing concerns on their safety following several incidents in recent years, there is an increasing need to apply advanced technologies to improve tracking and monitoring of outdoor activities and strengthen emergency response capabilities.

1.2 A tracker application, leveraging the GWIN, a secure and robust communication infrastructure in Hong Kong China, plays an important role in improving the safety of outdoor activities by facilitating efficient search and rescue operations. In the event of an emergency or situations requiring immediate assistance, the tracker application provides the search and rescue teams with accurate location data of the individual in need. This marks a significant advancement in improving the safety of outdoor activities in Hong Kong China while strengthening emergency response capabilities.

2. DISCUSSION

2.1 GWIN is a Government's network of wireless sensors installed throughout the territory of Hong Kong China, which supports various smart applications for improvement of quality in public services. Traditional sensors require a public mobile network to connect to the backend servers, whereas GWIN sensors connect to the GWIN gateways via private LoRa (Long Range) network. The LoRa network, characterized by its low energy usage, simplifies the installation and reduces the installation cost of the sensors. It also enhances the network security by using a private network. The reliability and cost-effectiveness of GWIN is well proven by the following applications of GWIN:

- Flood monitoring

- Smart toilets
- Smart Car-parking system

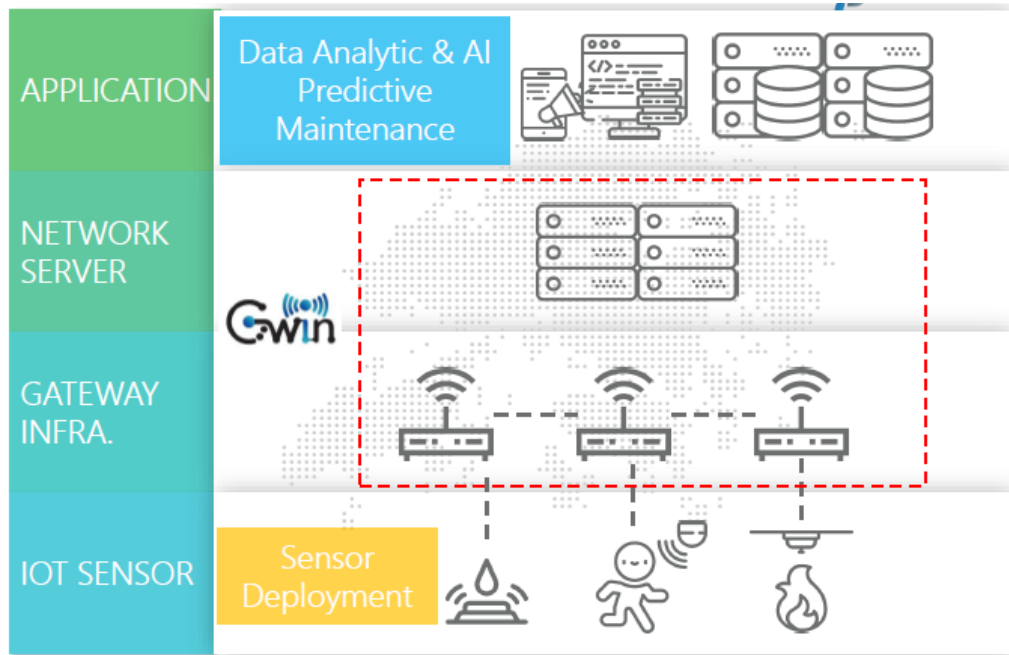


Figure 1 – GWIN Infrastructure

2.2 A GWIN tracking tag, designed for outdoor location tracking purpose, is compact in size weighing approximately 60 grams for convenient carriage during activities. A GWIN tracking tag receives GPS signals to determine their own locations. It is capable of reporting its location to the backend server by dedicated GWIN, and/or public mobile network (i.e. LTE/5G). Meanwhile, a new type of GWIN tracking tag, which could further improve its coverage by deploying Beidou satellite datalink, is being developed.



Figure 2 – A paraglider equipped with a GWIN tracking tag

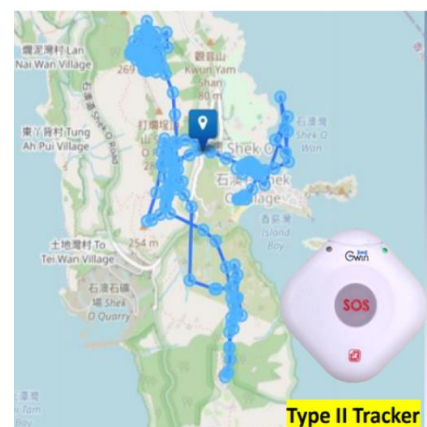


Figure 3 – a tracker application with real-time monitoring of paragliding activities

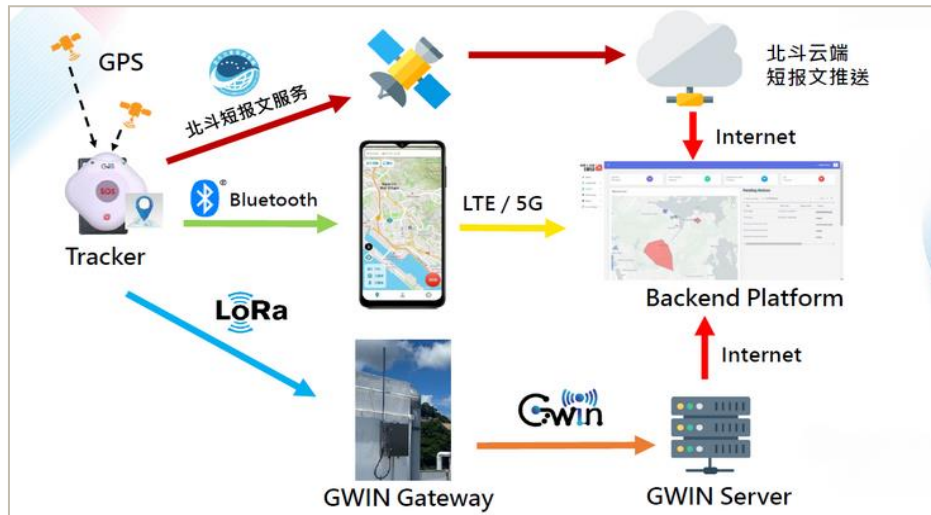


Figure 4 – Tracking Process

2.3 A tracker application, leveraging GWIN and tracking tags, offers a cost-effective solution for real-time tracking and monitoring of outdoor activities, enabling swift identification of individuals in the event of distress, especially in hard-to-reach areas.

2.4 The successful trials, including conduct of coverage checks using drones and operational checks using real paragliders, have validated the effectiveness and reliability of GWIN in providing real-time tracking and monitoring of outdoor activities, improving safety and strengthening the search and rescue operations and emergency response capabilities.

2.5 The technical excellence of the tracker application with GWIN was internationally recognized at the recent 50th International Exhibition of Inventions of Geneva, which was held between 9 and 13 April 2025 in Geneva, Switzerland, where it won a Gold Medal with Congratulations of Jury prize at the exhibition.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the initiatives of Hong Kong China in applying Government-Wide IoT Network (GWIN) to improve tracking and monitoring of outdoor activities in real-time manner, with a view to enhancing the safety of such activities and strengthening the search and rescue operations and emergency response capabilities;
- b) note the international recognitions on the technical excellence of the tracker application with GWIN;
- c) encourage States/Administrations, who have undertaken similar feasibility studies and trials, to share their experience and lessons learnt; and
- d) discuss any relevant matter as appropriate.
