UCI Beall Applied Innovation

Research Translation Group

Research Translation Group

Available Technologies

Contact Us

Request Information

Permalink

Sub-Meter Accurate Navigation And Cycle Slip Detection With Long-Term Evolution (LTE) Carrier Phase Measurements

Tech ID: 34254 / UC Case 2020-606-0

BRIEF DESCRIPTION

A novel navigation framework leveraging LTE cellular signals enables sub-meter level accurate UAV positioning in GNSS-challenged environments.

FULL DESCRIPTION

This technology utilizes long-term evolution (LTE) carrier phase measurements to achieve sub-meter-level accurate unmanned aerial device (UAV) navigation. It overcomes limitations of Global Navigation Satellite System (GNSS) in urban canyons and interference-prone areas. Experimental results demonstrate an 81 cm two-dimensional positioning accuracy over a 605 m UAV trajectory, offering a reliable alternative or complement to GNSS for UAV navigation.

SUGGESTED USES

- >> Unmanned aerial vehicle navigation for package delivery and traffic monitoring in urban areas.
- >> Military and defense UAV operations requiring secure and reliable positioning.
- >> Agriculture, construction, mining, mapping, and surveying using UAVs in GNSS-challenged terrains.
- >> Integration with automotive and aerospace navigation systems for enhanced location accuracy.
- >> First responders and emergency services deploying UAVs in complex environments.

ADVANTAGES

- >> Provides sub-meter level positioning accuracy in environments where GNSS signals are weak or unreliable.
- » Robust against jamming and spoofing attacks common in GNSS systems due to LTE signal diversity and power.
- >> Utilizes existing cellular infrastructure without requiring additional hardware deployment.
- >> Innovative cycle slip detection enhances measurement reliability and navigation accuracy.
- >> Fuses multiple LTE signal measurements to improve UAV position and velocity estimates in real time.

PATENT STATUS

Country Type Number Dated Case

CONTACT

Ben Chu ben.chu@uci.edu tel: .



OTHER INFORMATION

KEYWORDS

Navigation, Precise
Positioning, Unmanned
Aerial Vehicles (UAVs),
Signal of Opportunity, LongTerm Evolution (LTE)

CATEGORIZED AS

- » Communications
 - » Wireless
- » Security and Defense
 - » Other

» Sensors &

- Instrumentation
 - » Position sensors
- » Transportation
 - » Aerospace
 - » Automotive

RELATED CASES

2020-606-0

RELATED MATERIALS

>> Shamaei, K., Kassas, Z. M. (2019). Sub-meter accurate UAV navigation and cycle slip detection with LTE carrier phase measurements. ION GNSS+. - 09/16/2019

UCI Beall Applied Innovation

5270 California Avenue / Irvine, CA 92697-7700 / Tel: 949.824.2683



© 2025, The Regents of the University of California Terms of use Privacy Notice