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Blind Opportunistic Navigation With Unknown Radio Signals.

Tech ID: 34257 / UC Case 2021-739-0

BRIEF DESCRIPTION

A novel navigation framework enabling accurate positioning using unknown signals of opportunity without relying on Global Navigation Satellite System (GNSS).

FULL DESCRIPTION

This technology introduces a Blind Opportunistic Navigation (BON) framework designed to acquire and track unknown signals of opportunity (SOPs), such as those from private broadband systems and low Earth orbit (LEO) satellites, whose signal specifications are not publicly available. By leveraging standard modulation assumptions, the BON receiver blindly detects unknown pseudonoise sequences and performs Doppler estimation and tracking to provide reliable navigation solutions. This approach overcomes the limitations of existing receivers that require known signal parameters and enables operation in constrained environments without violating size, weight, and power constraints.

SUGGESTED USES

- » Mobile device manufacturers and cell service providers.
- » Unmanned Aerial Vehicle (UAV) manufacturers.
- » Automotive industry for autonomous vehicles.
- » Aerospace and defense contractors.
- » GNSS device manufacturers.

ADVANTAGES

- » Enables navigation using unknown and partially known signals without prior knowledge of signal specifications.
- » Robust blind Doppler estimation and tracking to handle time-varying frequency shifts.
- » Improved accuracy and speed compared to existing blind signal detection algorithms.
- » Operates efficiently under size, weight, and power constraints suitable for autonomous systems.
- » Online or pre-navigation training stage for blind pseudonoise sequence detection.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12,517,209	01/06/2026	2021-739

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OTHER INFORMATION

KEYWORDS

Navigation, Positioning, Aviation, Autonomous Vehicles, Signals of Opportunity

CATEGORIZED AS

- » **Communications**
 - » Wireless
- » **Sensors & Instrumentation**
 - » Position sensors
- » **Transportation**
 - » Aerospace
 - » Automotive

RELATED CASES

2021-739-0

RELATED MATERIALS

» Khalife, J., et al. Kassas, Z. M. (2020). Blind Doppler estimation from LEO satellite signals: a case study with real 5G signals. ION GNSS+. - 09/20/2020

» Neinavaie, M., et al. Kassas, Z. M. (2020). Blind opportunistic navigation: cognitive deciphering of partially known signals of opportunity. ION GNSS+. - 09/20/2020

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