# Blind Opportunistic Navigation With Unknown Radio Signals.

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## 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

Patent Pending

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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

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2021-739-0

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