



POINTER Balboa Geolocation Inc.

POINTER

*Precision Outdoor and Indoor Navigation
and Tracking for Emergency Responders*

Problem

Need for centimeter to meter accuracy ("xyz" axis), real-time geolocation technology in GPS-denied environments where GPS and all other geolocation technologies fail to perform, resulting in unmitigated risk to human lives and high value assets.

Solution

POINTER is a precision positioning sensor that locates end users via low frequency magnetic fields that can transmit signals through materials including wood, concrete, brick, earth and metals for indoor, underground, underwater, and metallic environments.

End Users

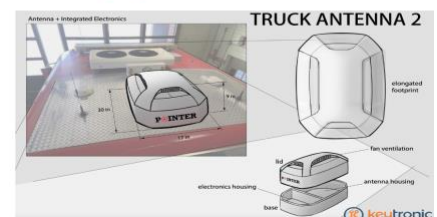
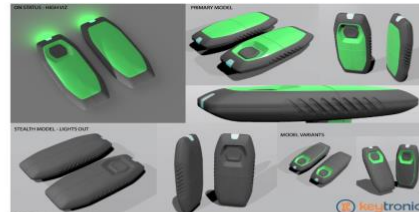
- Public Safety
- Military
- Industrial
- Commercial

Technology Sponsors

- DHS
- DoD
- CDC
- Industry



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About POINTER

Initiated and funded by the Department of Homeland Security Science and Technology Directorate (S&T) and developed at Caltech and NASA's Jet Propulsion Lab (JPL). POINTER is a groundbreaking positioning and navigation technology that allows end users to more precisely pinpoint individuals and high value assets in GPS-denied environments. POINTER provides real-time positioning and navigation information in the "xyz" axis, determine motion and velocity, and orientation. These data are easily visualized at a base station, which may consist of a laptop, tablet, or mobile phone. The system can be deployed in a fixed infrastructure including large commercial or industrial buildings, (warehouses, airports, schools, hospitals, etc.) making for a "smart building" solution. They system can also be deployed for field use on the fly for tactical purposes in various settings (public safety and defense). POINTER can also be used to optimize workflows, enhance robotic and autonomous performance. The data generated from the POINTER system can be used for training and education purposes, predictive modeling, and forensic analysis.

POINTER was the number one priority identified by DHS S&T's [First Responder Resource Group](#). Balboa continues to work closely with DHS S&T and other channel partners in connection with the planned launch and deployment POINTER. POINTER is scheduled to be commercially available in the second half of 2023.

How does POINTER work?

What are Magnetoquasistatic (M/EQS) fields?

M/EQS fields are magnetic fields with very slow temporal variations that appear static and can penetrate through natural materials just like the Earth's magnetic field. As a result, M/EQS can be used in a broad array of sensor applications.

How does POINTER's M/EQS positioning differ from other responder tracking technologies?

Several tracking technologies currently exist that use GPS, acoustic sensors, radar ranging, ultra-wideband ranging, inertial sensing or vision techniques. However, there are drawbacks, including: high error rates due to multi-path or signal bouncing in non-line-of-sight (Non-LoS) environments; inability to penetrate into buildings, underground, and underwater; a drift in position results that increases quickly over time or distance traveled; or requirements for a large network of built-in infrastructure in order to operate.

What is the POINTER system?

M/EQS fields can be used for short or long-range position sensing in Non-LoS environments. The POINTER system consists of three parts that each play a unique role in pinpointing responders' exact location within centimeters:

- **Transmitters** based at the incident scene generate M/EQS fields and use complex sensors and algorithms to solve for position and orientation in 3D space (**x, y, z axis**). This allows command to pinpoint end user's location precisely, including which floor an individual or fixed asset is located on and whether they are in motion and orientation. The Transmitter can be deployed affixed to vehicles, ships, and other modes of transport, or manually deployed in a portable case (i.e. SKB case)..
- **Receivers** (approximate - cell phone size) affixed to individuals or assets and detected in unique M/EQS fields.
- **Base Station** allows operator to view end user's or asset locations in real-time on a laptop, tablet, or mobile phone.

FAQs

Who is leading POINTER's research and development?

DHS S&T is funding NASA's Jet Propulsion Laboratory, based at the California Institute of Technology in Pasadena, California, to develop the POINTER system. DHS S&T is also working with industry partner Balboa Geolocation, Inc. to prepare the technology for the commercial marketplace in 2023. Robust patent estate, including 13 issued and pending patents.

How accurate is POINTER's tracking capability?

POINTER can accurately track a responder's location to within centimeters to a meter from a standoff distance to 100 meters and may be extended to kilometers based upon system configuration and environment.

How many Receivers can be tracked and visualized by a single Transmitter and Base Station?

>100 Receivers (individuals)

Can POINTER be integrated with other technologies?

Yes. POINTER can be integrated with communication systems, visualization software, GPS, imagining (e.g., acoustic, thermal, radar), and other geolocation technologies. POINTER may also improve functionality of autonomous and robotic solutions.

When will POINTER be commercially available?

Commercial launch is targeted for second half of 2023. Updates will be posted on the DHS S&T website, as well as via industry partner [Balboa Geolocation, Inc.](https://www.balboageolocation.com) [balboageolocation.com](https://www.balboageolocation.com)