

# Customizable GPS Tracking Platform for Monitoring Assets at the Enterprise

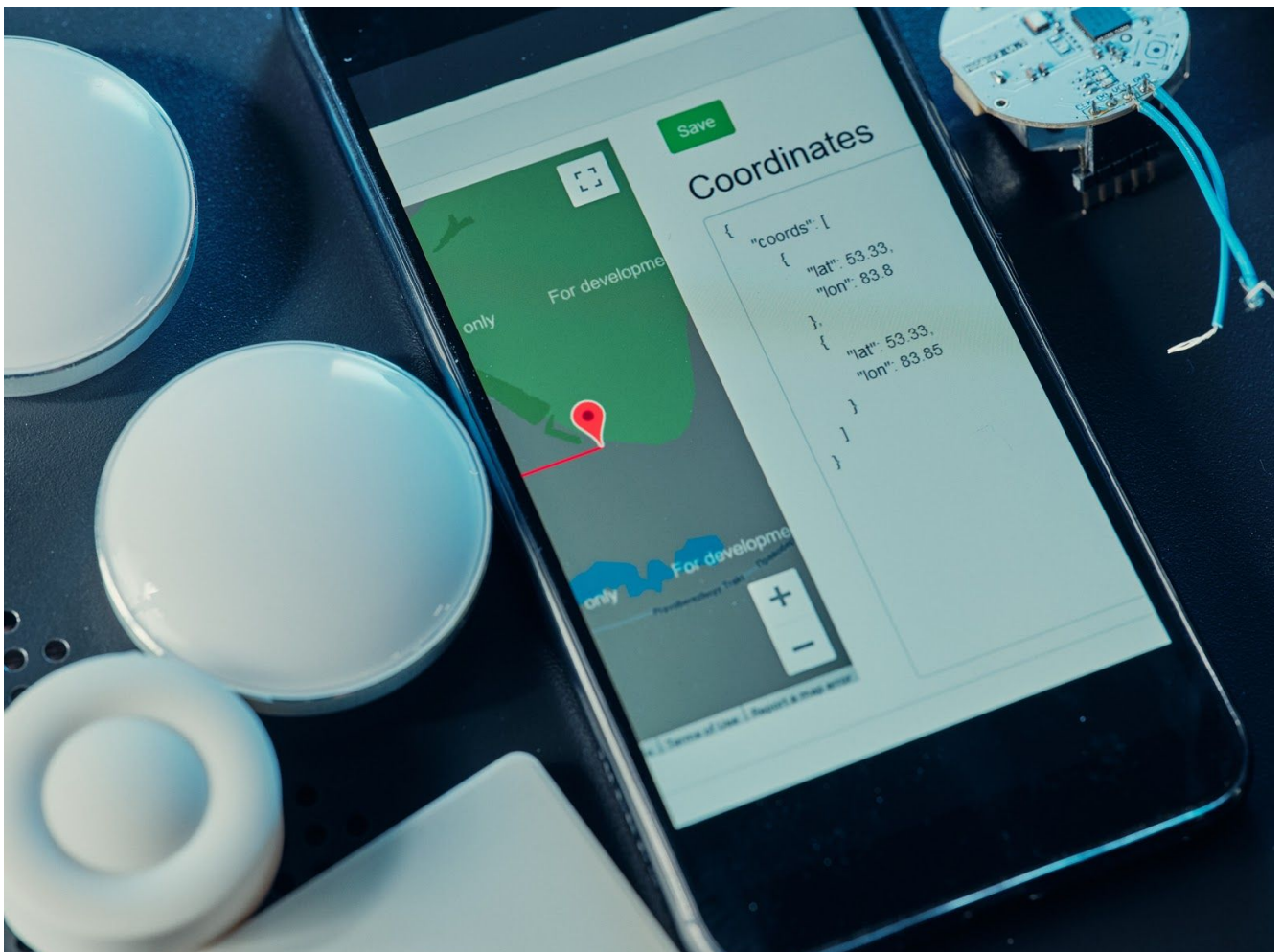
Industrial solutions | IoT | Wearable | embedded hardware development | embedded software development

## About

Viewing the location of assets or individuals in real-time is crucial for supply chain management and logistics. To track their assets companies use GPS tracking systems. These systems allow companies to know where and in what condition their products or vehicles are at any moment in time.

## Request

At Integra Sources, we often get requests from enterprise clients who are looking to develop GPS solutions for tracking the location of vehicles, people, or assets. Because this is quite a frequent project request, we decided to build our own customizable GPS tracking system that would allow our clients to build their solutions much faster and easier.



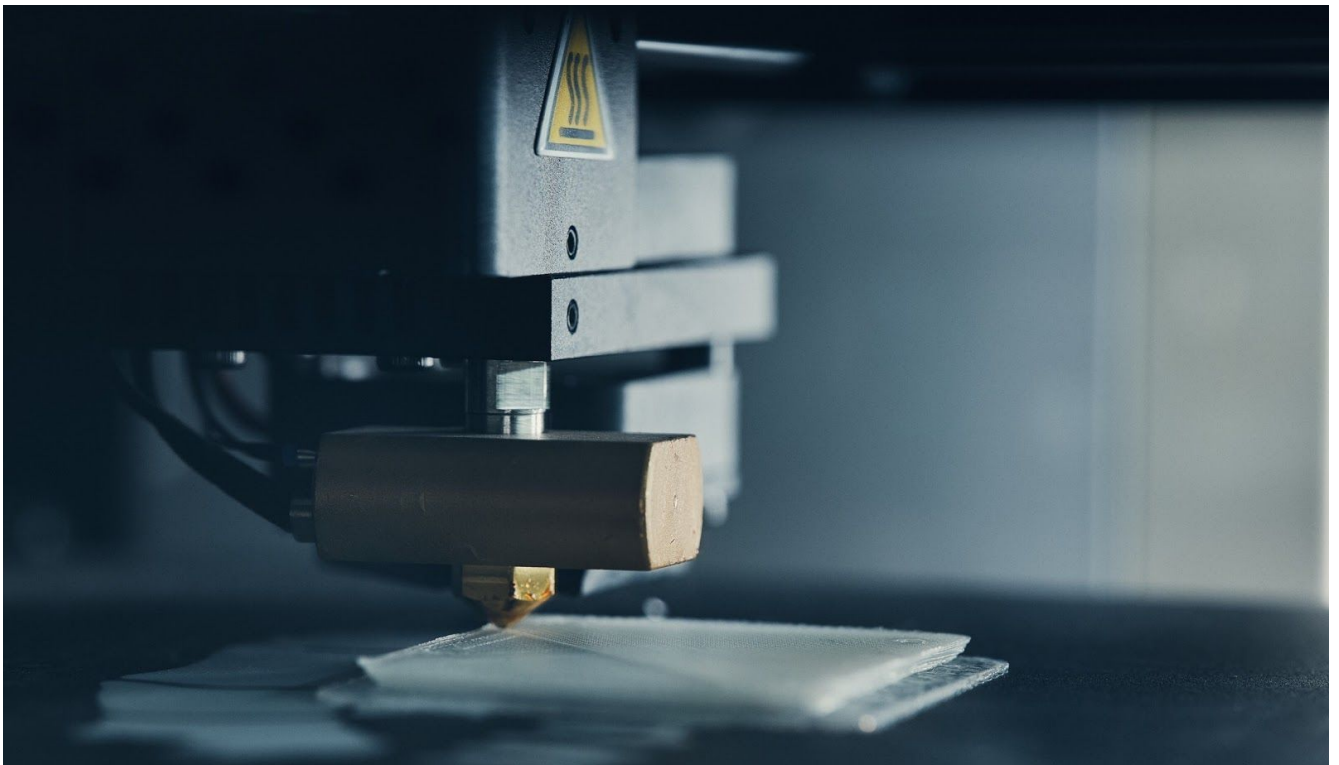
## Solution

The asset tracking solution we developed is comprised of a GPS tracking device and a cloud platform that stores the location of assets and displays it to users in real time via web and mobile user interfaces.

The main challenge of this project was to meet strict requirements for the device size and battery life. It had to work for about a month without charging.

## Technologies used:

- The GPS tracker has a set of sensors including **temperature**, **humidity**, **accelerometer**, **gyroscope**, **GPS**.
- We developed apps for **iOS** and **Android** which display the location and current state of the GPS tracker.
- The backend for the tracking platform is built in **PHP**.
- We used the **PostgreSQL** database.
- The firmware for the GPS tracker is written in **C/C++**.
- **Microsoft Visual Studio** with **Visual GDB** plugin was used for firmware implementation.
- The GPS Tracker has **BLE**, **WiFi**, and **GSM/HSPA** communication interfaces, which can be used in any combinations in the final solution.
- The GPS Tracker supports **HTTP**, **HTTPS**, and **MQTT** protocols.
- **FreeRTOS** was used for firmware development.
- **STM32L452** with **Cortex-M4** core was used as MCU in this project.
- The GPS tracker is equipped with an **SD-Card** which can be used to store tracks and sensors data.



## Scope of work

- Full cycle hardware development for GPS tracker from schematic design to the design of the housing.
- Firmware development for the GPS tracker
- Backend development
- Frontend development



## Result

The GPS tracker is a small device that gets attached to a vehicle, a container, or can be carried in pockets. It records the location and condition of assets and transfers this information to the server via Bluetooth, Wi-Fi, or GSM at defined time intervals. To enable indoor positioning, the device gathers data and signal strength from beacons and sends this information to the server where the exact location of the GPS tracker is calculated. The device is integrated with temperature, humidity, accelerometer, and gyroscope sensors to understand the condition of the asset.

In addition to the device, we also built a software platform that stores the data on assets and offers web and mobile user interfaces with Google Maps where a user can monitor the location of assets.

Our solution comes pre-equipped with basic asset tracking functionality. Because every client has special requirements for GPS tracking platforms, we can customize the platform for each customer. Our solution reduces the development time by 40-60%.

### Continuous work time

**Up to 1 month**

### Location accuracy

**1 meter**

### Device size (without housing and battery)

**40x40x6.8 cm**