

PROJECT ABSTRACT

GSM Bike Theft Alert with GPS

A motorcycle anti-theft system that texts the owner with a GPS maps link the moment tampering is detected while armed, with live location on demand and SMS-controlled remote ignition immobilization.

Project type: Hybrid (hardware + software)

Availability: Built to order

Price: Request a quotation

Suitable branches: IoT/Embedded

Technologies: Arduino-class controller, SIM800L GSM, NEO-6M GPS, SW-420 vibration sensor, ignition relay, web dashboard

01 Title

GSM Bike Theft Alert with GPS

02 Introduction / Background

Two-wheeler theft is common and recovery rates are poor, largely because owners learn about it hours later with no idea where the vehicle went. Commercial GPS trackers with theft alerts exist but carry subscriptions and are closed boxes a student cannot open, modify or defend in a viva. The open alternative combines four commodity parts: a vibration sensor to detect tampering, a GSM module to reach the owner's phone, a GPS receiver to locate the bike, and a relay to cut the ignition on command. This project wires those parts into a compact unit that hides on the bike, runs on the 12 V battery with a low-power armed standby, and is driven entirely by SMS commands from the registered owner number — plus a dashboard mirroring location, guard state and a full alert history.

03 Problem Statement

Owners discover two-wheeler theft too late and have no live location to share with police, while commercial trackers are closed and subscription-bound. There is a need for an open, buildable anti-theft unit that alerts within seconds of tampering, reports GPS location by SMS, and lets the owner immobilize the vehicle remotely.

04 Objectives

- Detect tampering with a vibration sensor while the system is armed and alert the owner by SMS within seconds.
- Include live GPS coordinates as a tappable maps link in every alert and on-demand LOC reply.

- Implement remote ignition immobilization and restoration via SMS-driven relay.
- Accept commands only from the registered owner number; ignore all others silently.
- Run on the bike's 12 V battery with a low-power armed standby and a mirrored web dashboard.

05 Proposed System / Working

While armed, the controller samples the SW-420 vibration sensor continuously; sustained vibration above the sensitivity threshold counts as a tamper event. On trigger it wakes the NEO-6M GPS receiver, waits for a fix, and the SIM800L sends an SMS to the registered owner number carrying the coordinates as a maps link, then sounds the on-board buzzer. If the bike keeps moving, follow-up SMS updates with fresh coordinates go out at the configured interval while the alert is active. The owner replies with text commands: LOC returns the current position link, IMMOB opens the ignition-cutoff relay so the engine cannot start, MOB restores it, ARM/DISARM change the guard state — each confirmed by SMS. Incoming messages are parsed only when they originate from the registered owner number. Every event and command is logged with timestamps and synced over GPRS to the dashboard, which shows the live map, guard state and alert history.

06 Technologies / Components Used

Arduino-class controller (Arduino-core firmware); SIM800L quad-band GSM module (SMS + GPRS) with antenna; NEO-6M GPS receiver with antenna; SW-420 vibration sensor module with sensitivity trimmer; ignition-cutoff relay module and buzzer; bike 12 V battery power with low-power armed standby; web dashboard (live map, arm/disarm, alert log).

07 Key Features

- Tamper SMS alert with GPS maps link, sent within seconds of a confirmed trigger.
- Live location on demand via the LOC command; dashboard live map.
- Remote ignition immobilizer (IMMOB) and restore (MOB) through a relay.
- Arm/disarm by SMS with confirmation; dashboard toggle mirrors state.
- Buzzer deterrent sounding at the scene on tamper.
- Owner-number lock: commands from any other number are ignored.
- Low-power armed standby to protect the bike battery.
- Timestamped alert and command log on the dashboard.

08 Applications / Use Cases

- Motorcycle and scooter theft deterrence and recovery support.
- Fleet two-wheelers (delivery bikes) with supervisor alerting.
- Bicycle security variant (battery-powered) as a documented extension.
- Academic demonstration of GSM AT-command control, GPS and low-power design.

09 Results & Scope

Design target: tamper-to-SMS latency of seconds plus GPS fix time (cold start typically under ~30 s with clear sky), verified by the documented first-alert test procedure measuring trigger-to-SMS time. SMS delivery depends on the mobile network and can be delayed or lost in poor coverage; GPS needs sky view and degrades in basements and dense urban canyons. The SIM800L needs 2G/GPRS coverage on the buyer's carrier. Scope is deterrence, alerting and immobilization — a thief who finds and removes the unit defeats it, and the report states this openly.

10 Conclusion

The project delivers a complete security loop — sensor to phone to dashboard to immobilizer — from open, explainable parts: a genuinely buildable answer to a real and common crime.

11 References

- SIMCom SIM800L AT command manual (SMS text mode, GPRS).
- u-blox NEO-6M datasheet — acquisition and tracking sensitivity.
- SW-420 vibration sensor module documentation.