

velocity

(bike)

(city)

A BOSTON BIKE LANE MONITOR



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WHY MONITOR BIKE LANES?

As bike lanes become more popular and bike crashes more frequent, bike safety is more critical than ever to understand.

But existing count data is *fragmented* and *difficult to analyze*.

We investigate the magnitude of separated bike lane usage in Cambridge to help inform safety implementation.

SYSTEM OVERVIEW

Pole-mounted device that uses radar to bi-directionally count bikes and communicate with one another via long range wireless radio.

- Counts gets collected, processed, and posted to a server
- Data is collected at all times except at night (1:00 am to 6:00 am) and posted every 30 minutes

INDUSTRIAL DESIGN

Inspired by Boston's
historic, natural gas lamps



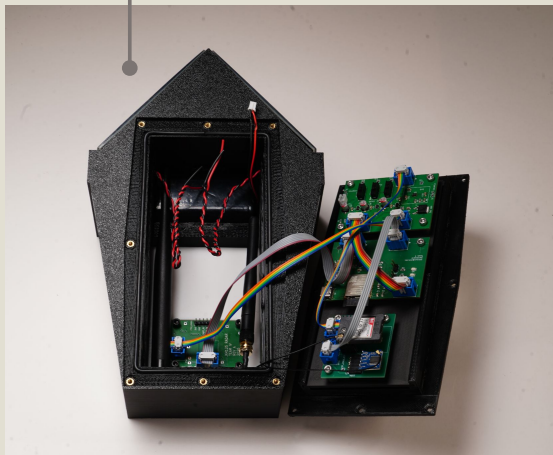
Modularity for easy access

Slanted solar panels to
capture solar power

MOUNTED
ELECTRONICS

SOLAR PANELS TO
RECHARGE BATTERY

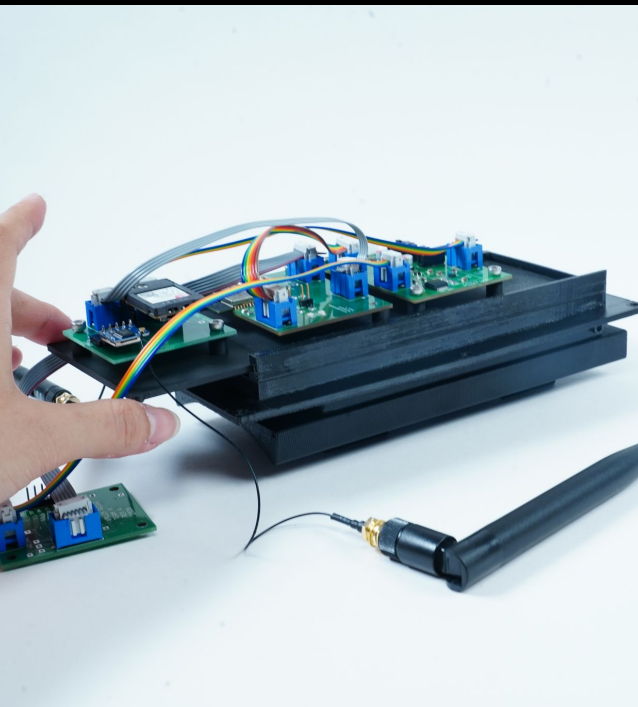
RADAR SENSOR PANEL
TO DETECT BIKERS AND
THEIR VELOCITY
- ANGLED $\sim 45^\circ$
TOWARDS THE BIKE
LANE



SIDE PANELS TO ENHANCE
LAMP AESTHETIC



DETACHABLE,
POLE-MOUNTABLE BACKING
FOR EASIER ACCESS
- MOUNTED AT 5 FT WITH
STEEL HOSE CLAMPS

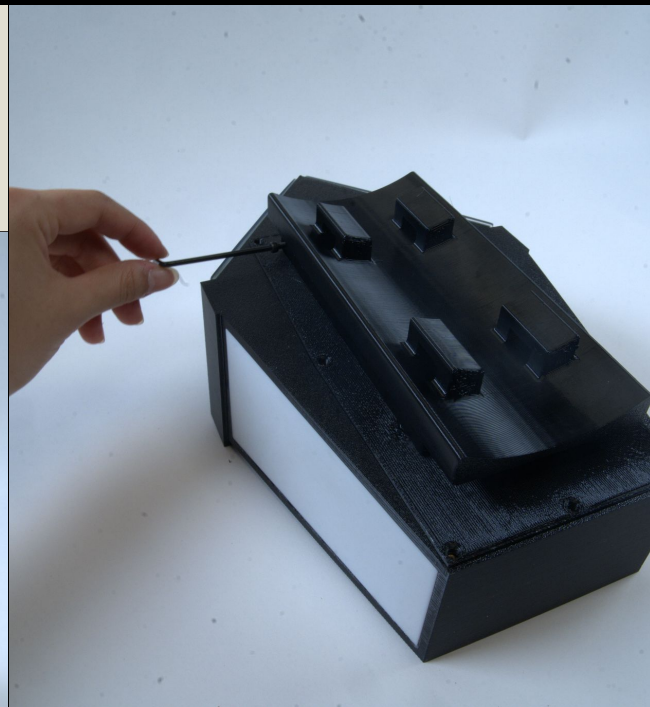


MOUNTING BOARD PLATE FOR ELECTRONICS

Board plate slides into screw-in lid.

SLIDING POLE ATTACHMENT FOR EASY ACCESS

Pole attachment slides onto screw-in lid.



SIDE SCREW FOR SECURITY

Pole attachment screws into lid to prevent theft.

Key Specifications

Core System Goals

- ◎ Cyclist Detection
Counts bicycles and the direction of travel (+ velocity, pedestrians)
- ↘ Off Grid Power
Rechargeable Li-Ion Battery + Solar powered operation
- ↔ Wireless Reporting
LoRa network with Cell gateway upload
- ⊕ Privacy Preserving
No cameras or personal data collected

Deployment Features

- ⌘ Easy Installation
Pole mounted, no roadway modification
- ☁ Outdoor Operation
Designed for year round weather exposure
- 🔄 Low Maintenance
Autonomous long term deployment
- ◎ Scalable System
Supports multiple deployed sensor nodes

BOM/COGS

Hub device	Electronics:	\$65.26	BOM: \$106.05
	Enclosure:	\$40.79	
	Assembly:	\$25.00	
	Total (COGS):	\$131.05	
Node device	Electronics:	\$41.96	BOM: \$82.75
	Enclosure:	\$40.79	
	Assembly:	\$25.00	
	Total (COGS):	\$107.75	

Live Demonstration

Interactive Website: <https://efpi-14.mit.edu/>



**THANK
YOU!**

Qs?

