



EVERY SECOND COUNTS

ElectroCap pitch deck



Group 21:

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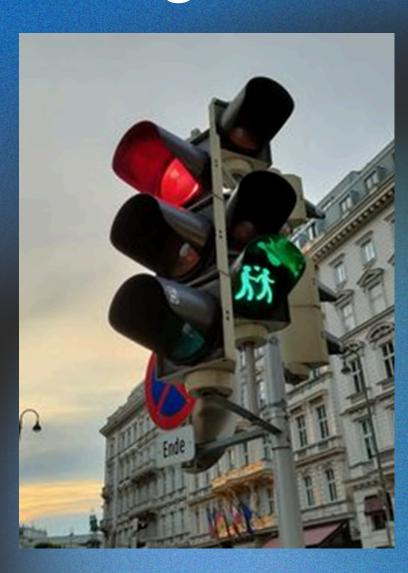
"EVERY TWO WEEKS, AT LEAST ONE AMBULANCE CRASHES DUE TO TRAFFIC. EMERGENCY CARE CAN'T AFFORD TO WAIT."

INTERVIEWED AMBULANCE DRIVER





How many lives are lost because of a red traffic light?



Emergency response times can mean the difference between life and death.

• Traffic and red lights force emergency vehicles to stop, delaying critical aid.

•! Even with sirens, many drivers fail to react in time. Priority at intersections isn't always clear.

 Ambulances should never stop — but traffic forces them to





THE SERVER PROCESSES GPS DATA AND CHECKS WHICH TRAFFIC LIGHTS ARE NEAR THE AMBULANCE AND WHETHER THEY BELONG TO A PREDEFINED GREEN WAY

IF THEY ARE PART OF A GREEN WAY, THE ENTIRE ROUTE IS OPENED AUTOMATICALLY

OPPOSING LIGHTS TURN RED IN SYNC TO AVOID COLLISIONS AND ENSURE SAFE PASSAGE.

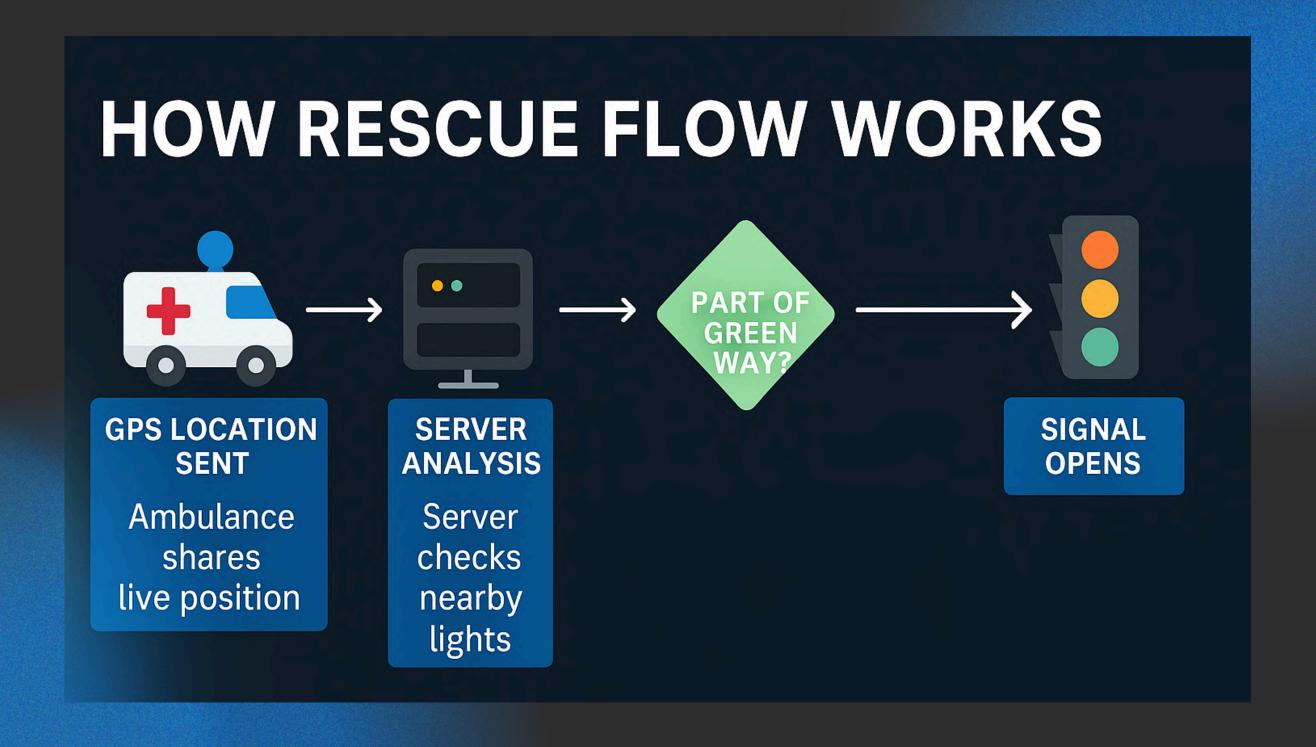
CONTINUOUS FLOW: TURNING LIGHTS GREEN ALLOWS VEHICLES AHEAD TO MOVE, CLEARING THE WAY FOR THE AMBULANCE.



SOLUTION



SOLUTION





From Breadboard to Cloud: A Small-Scale Rescue Flow Prototype

NARDWARE SETUP

- BREADBOARD + MICROCONTROLLER (ESP32)
- GPS MODULE TO DETERMINE AMBULANCE'S POSITION
- LED TRAFFIC LIGHTS
- RC CAR POWERED WITH BATTERIES

© CONNECTIVITY

- MICROCONTROLLER CONNECTED TO WI-FI
- SENDS GPS COORDINATES TO A REMOTE SERVER
- THE REMOTE SERVER THEN PROMPTS THE INTERSECTION TO OPEN

SECONTROL

- BACK-END HOSTED ON A RELIABLE REMOTE SERVER
- REAL-TIME DECISION-MAKING FROM GPS DATA
- SERVER RESPONDS TO THE PROTOTYPE, UPDATING LEDS

SIMULATED NETWORK COMMUNICATION

- VIRTUAL CITY GRID WITH TRAFFIC LIGHTS' LOCATIONS
- SIMULATED V2I (VEHICLE-TO-INFRASTRUCTURE) COMMUNICATION

TECHNICAL IMPLEMENTATION



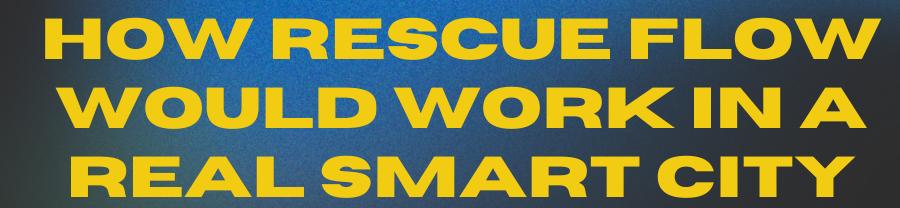


- Each vehicle must have a SIM card and mobile data plan
- Connects via Narrowband IoT (NB-IoT) ideal for:
 - Low power consumption
 - 6 Reliable coverage even in tunnels
 - Tightweight GPS data transmission
- Connects securely using a private APN

IN THE REAL WORLD, GPS ALONE ISN'T ENOUGH. TO ENABLE REAL-TIME COORDINATION, BOTH AMBULANCES AND TRAFFIC LIGHTS NEED INTERNET CONNECTIVITY



- Each smart intersection must also be connected to the internet
- Communicates with the remote server to receive activation commands
- Can be connected via:
 - NB-IoT modules
- Ensures real-time execution of green wave logic



✓ RESULT

RESCUE FLOW ENABLES SMART COMMUNICATION — AMBULANCES REPORT THEIR POSITION, THE SERVER PROCESSES IT, AND TRAFFIC LIGHTS REACT INSTANTLY TO CREATE A SAFE, OPEN CORRIDOR



Dynamic traffic light adjustment

Ensuring precise timing transitions (green → yellow → red) occur at the ideal moment.

Accurate vehicle location

Locating emergency vehicles with high precision to trigger system response at the right time.

Effective traffic signal control

Making sure the system never gets stuck or transitions into an incorrect state.

Efficient management of multiple ambulances

Coordinating green wave synchronization.

Front traffic clearing

Making sure the system helps clear stopped vehicles ahead to prevent blockages.

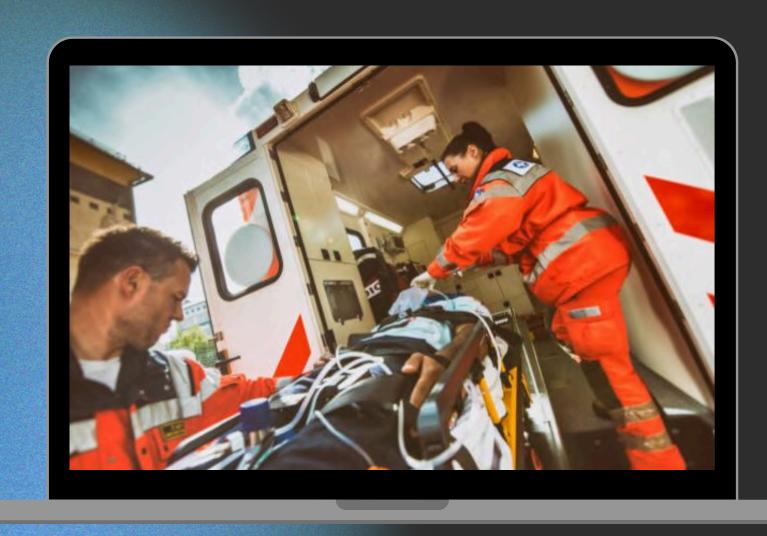
Vehicle-to-traffic light communication

immediate connection between emergency vehicles and traffic lights.

TECHNICAL CHALLENGES



TARGET AUDIENCE



All emergency service users

Me, You and Everyone else!

Anyone can face a life-threatening emergency.

Everyone deserves a faster, safer response!



COMPETITORS

System	Location	Technology	Functionality	Advantages	Disadvantages
Gertrudes Project	Lisbon (1985–2021)	Sensors & fixed programming	Traffic management	Established expertise	No real-time adaptation
SMiLis Project	Lisbon (since 2021)	Modern sensors, Al- based	Traffic management	Modern and more efficient technology	Still under recent implementation
Opticom	Global	RF/GPS communication	Prioritizing emergency vehicles	Direct, efficient communication	Requires specific onboard equipment
Toma Strobecom	USA	Light sensors	Control via emergency light	Simple and low cost	Prone to external interferences
Rescue Flow	Lisbon	GPS & dynamic logic	Prioritizing emergency vehicles	Efficient in real scenarios, scalable solution	Requires infrastructure integration

MEET THE RESCUE FLOW TEAM





Dinis Silva

Role: Testing & Coordination

Test development

Video production

Partner consultancy



Henrique Rodrigues

Role: Communication & Web
Communication with ambulance services
Website and blog development
Partner consultancy



Mafalda Lopes

Role: Communication & Design
Communication with ambulance services
Pitch deck
Cardboard traffic flow model



Martim Sousa

Role: Traffic Light Development
Traffic light system development
GPS module implementation
Website and blog support



Pedro Rodrigues

Role: GPS & Media
GPS module implementation
Video production
Poster design



Joana Teixeira

Role: Communication & Design
Communication with ambulance services
Poster design
Cardboard traffic flow model

- MOBILE DATA PLANS (SIM CARDS FOR AMBULANCES & TRAFFIC LIGHTS)
- ●■ IOT CONNECTIVITY SETUP (E.G. NB-IOT MODULES)
- REMOTE SERVER HANDLES GPS AND TRAFFIC LIGHTS
- MORE COMPLEX SYSTEM, REQUIRING EXPERTISE FOR IT'S MAINTENANCE

- # FASTER AMBULANCE RESPONSE TIMES

 = MORE LIVES SAVED
- SCALABLE TO OTHER CITIES OR EMERGENCY SERVICES
- FEWER AMBULANCE CRASHES THANKS TO SAFER INTERSECTIONS
- **OUTION** USES EXISTING INFRASTRUCTURE









RESULTS





TIME SPENT STOPPED BY EMERGENCY VEHICLES BECAUSE OF TRAFFIC

Testing/Observations*:

CARS DIDN'T STOP AT INTERSECTIONS (DUE TO NOT REALIZING WHERE THE **EMERGENCY VEHICLES ARE)**

CARS REFUSED TO CROSS INTERSECTIONS (EVEN WHEN IT WAS SAFE TO DO SO)

CARS WOULD MOVE IN DANGEROUS AND CONFUSING WAYS TO MAKE WAY

Results:

REDUCTION IN TIME SPENT BEHIND STOPPED VEHICLES DUE TO TRAFFIC LIGHTS

INCREASE IN SECURITY DUE TO VEHICLES BEING INDICATED TO MOVE AND STOP ACCORDINGLY AT INTERSECTIONS

Due to the nature of this project not being able to be tested in real life scenarios, we observed and analysed various cases in Lisbon.

For example, we saw an ambulance stay stuck in a intersection for a minute straight!





31% OF AMBULANCES TAKE MORE THAN 15 MINUTES TO REACH URBAN INCIDENTS.

EVERY MINUTE MATTERS, SOME DON'T GET A SECOND CHANCE

INDICADORES DE DESEMPENHO DO INEM





MOREINFORMATION



Site https://henriquetecas.github.io/PIC/



https://henriquetecas.github.io/PIC/blog.html



https://1drv.ms/v/c/b20c2e7c9c24883a/

ESNW VeGq 1Dup5oxIJ1EFIB ffT81InWcelK

QdmCnP24g?e=2gLQr0