Airport Parking Spot Tracker

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Project Team

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Problem

In peak hours, it is difficult to find an available parking spot without driving right up to it. Driving around parking decks is wasteful (and not fun).

Requirements for the solution:

- under $100 per parking spot, installed
- no new conduit
- battery life of min. 1 year

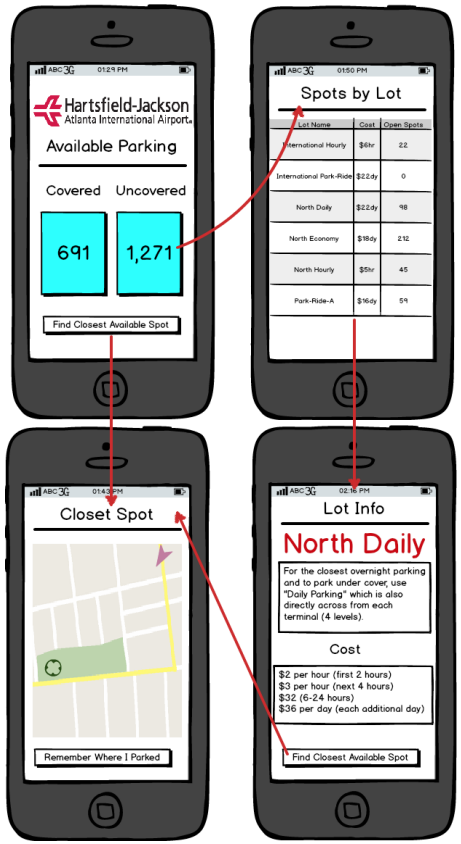
Problem, Restated as User Stories

As someone trying to find a parking spot...

- ...I'd like to see the available spots on my phone app
- ...I'd like to see the zones with available spots listed when I enter the lot / level
- ...I'd like to see if there is an available spot in the aisle while driving **past** the aisle (not **down** the aisle)

UX / User eXperience

App



Entering

at the entry, the signage displays “zones” with available parking spots

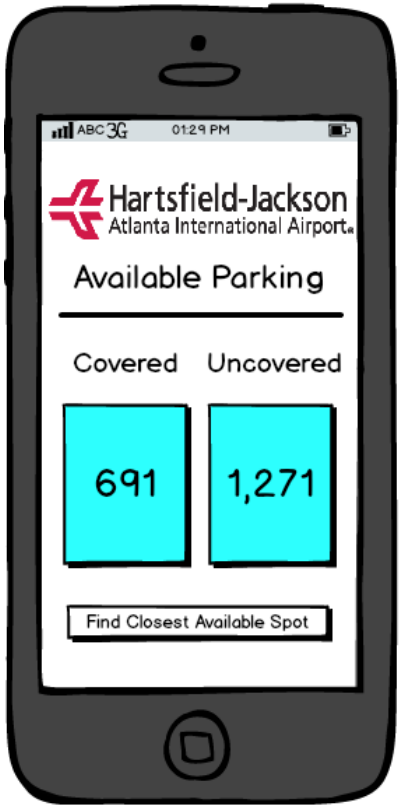
Driving

ceiling-mounted green light flashes

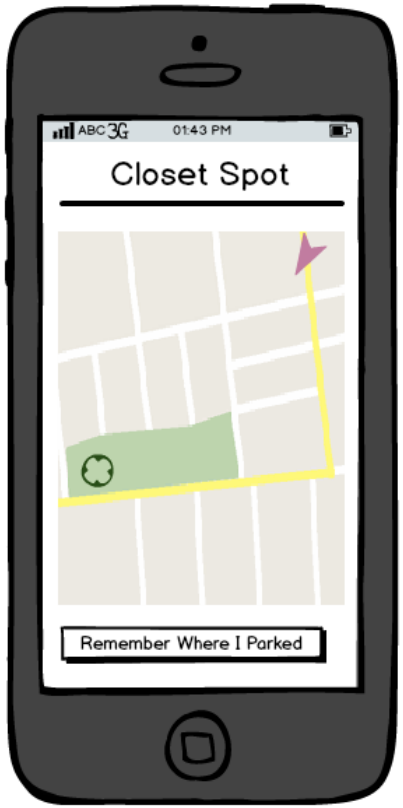
arrow projected on the floor flashes

App


Parking at the Airport is easy!


ABC 3G
01:29 PM
Hartsfield-Jackson
Atlanta International Airport
Available Parking
Covered
Uncovered
691
1,271
Find Closest Available Spot


ABC 3G
01:50 PM
Spots by Lot
Lot Name
Cost
Open Spots
International Hourly
$6hr
22
International Park-Ride
$22dy
0
North Daily
$22dy
98
North Economy
$18dy
212
North Hourly
$5hr
45
Park-Ride-A
$16dy
59


ABC 3G
01:43 PM
Closet Spot
Remember Where I Parked

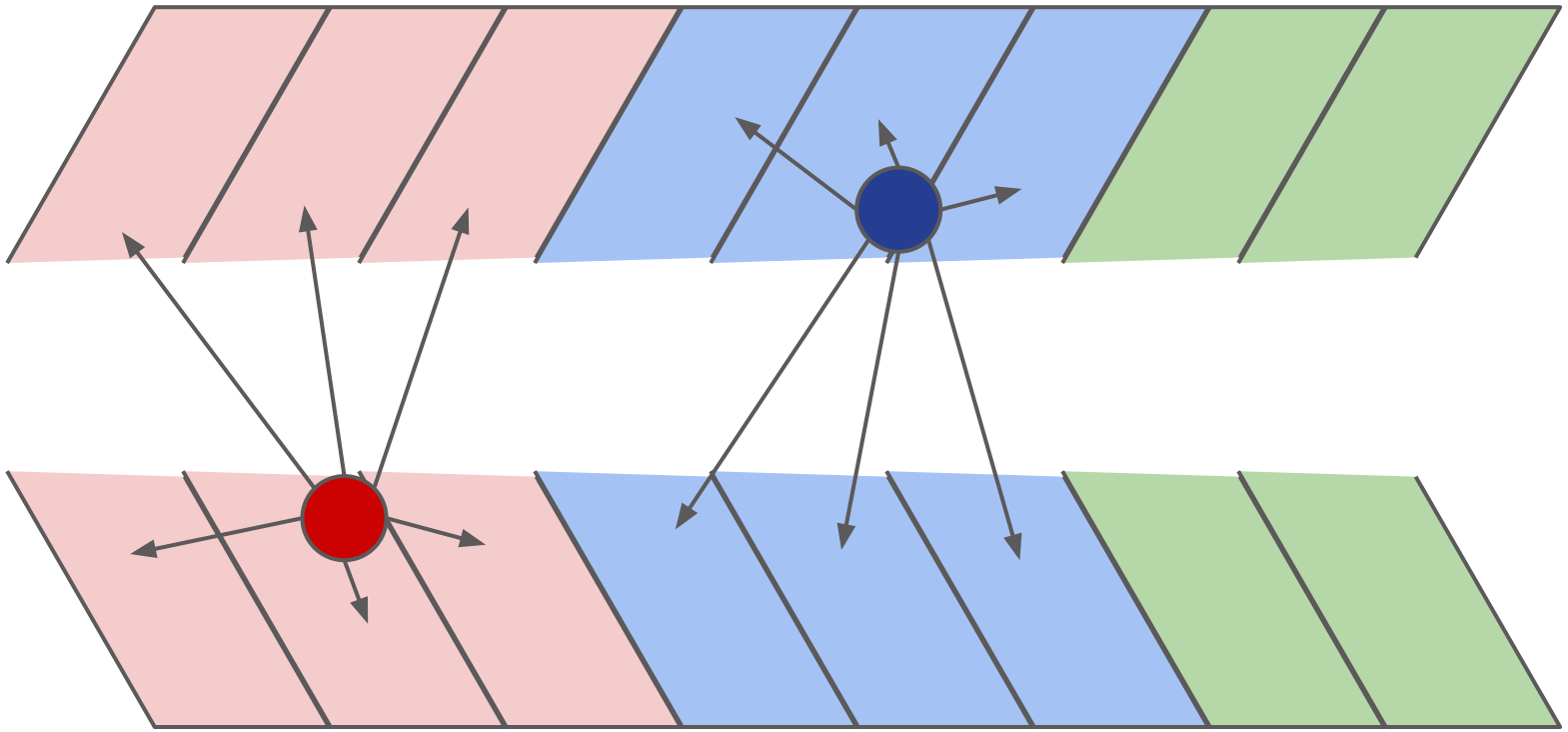

ABC 3G
02:16 PM
Lot Info
North Daily
For the closest overnight parking and to park under cover, use "Daily Parking" which is also directly across from each terminal (4 levels).
Cost
$2 per hour (first 2 hours)
$3 per hour (next 4 hours)
$32 (6-24 hours)
$36 per day (each additional day)
Find Closest Available Spot

“Lean” Solutions to Tough Problems

- Do more with less
- [Re]use what’s already there

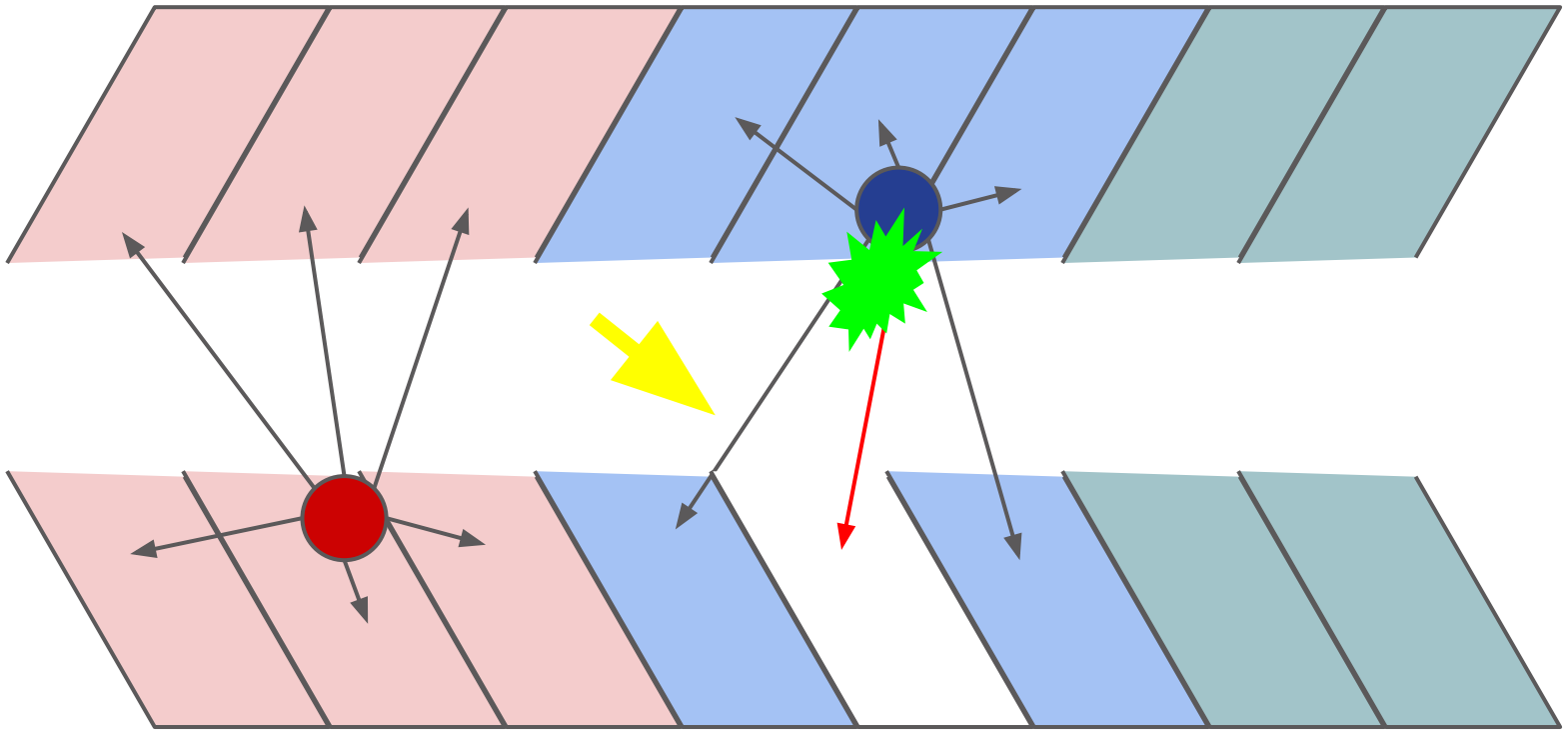
How Can We Do More With Less?

We can track several spots with one device:

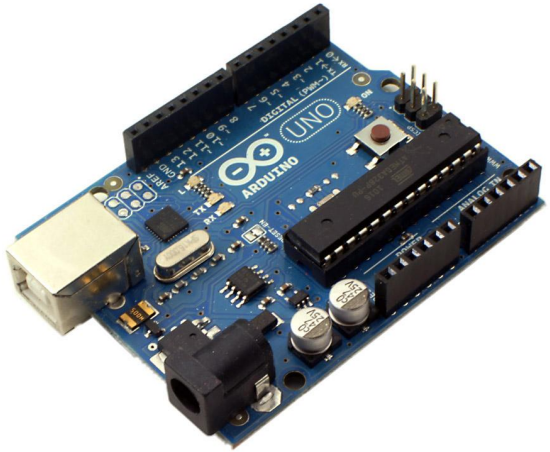


How Can We Do More With Less?

When at least 1 spot is available, we will flash the light / project a flashing arrow on the floor



What's Already There?



Lights!
4,000+ of them
(and A/C power lines)

Open Source
microcontrollers
(Arduino)

Lights and A/C Wiring

- the tracker is attached to the light fixture
- available A/C power is used to drive the tracker and the signal lights
- A/C wiring is used to network the trackers (Ethernet-over-Power - EoP)

Open Source Microcontrollers

- Arduino/ATmega328 microcontroller
- 6 x ultrasonic range finders (proximity sensors)
- relay for signal light
- Arduino Ethernet “Shield” (NIC)

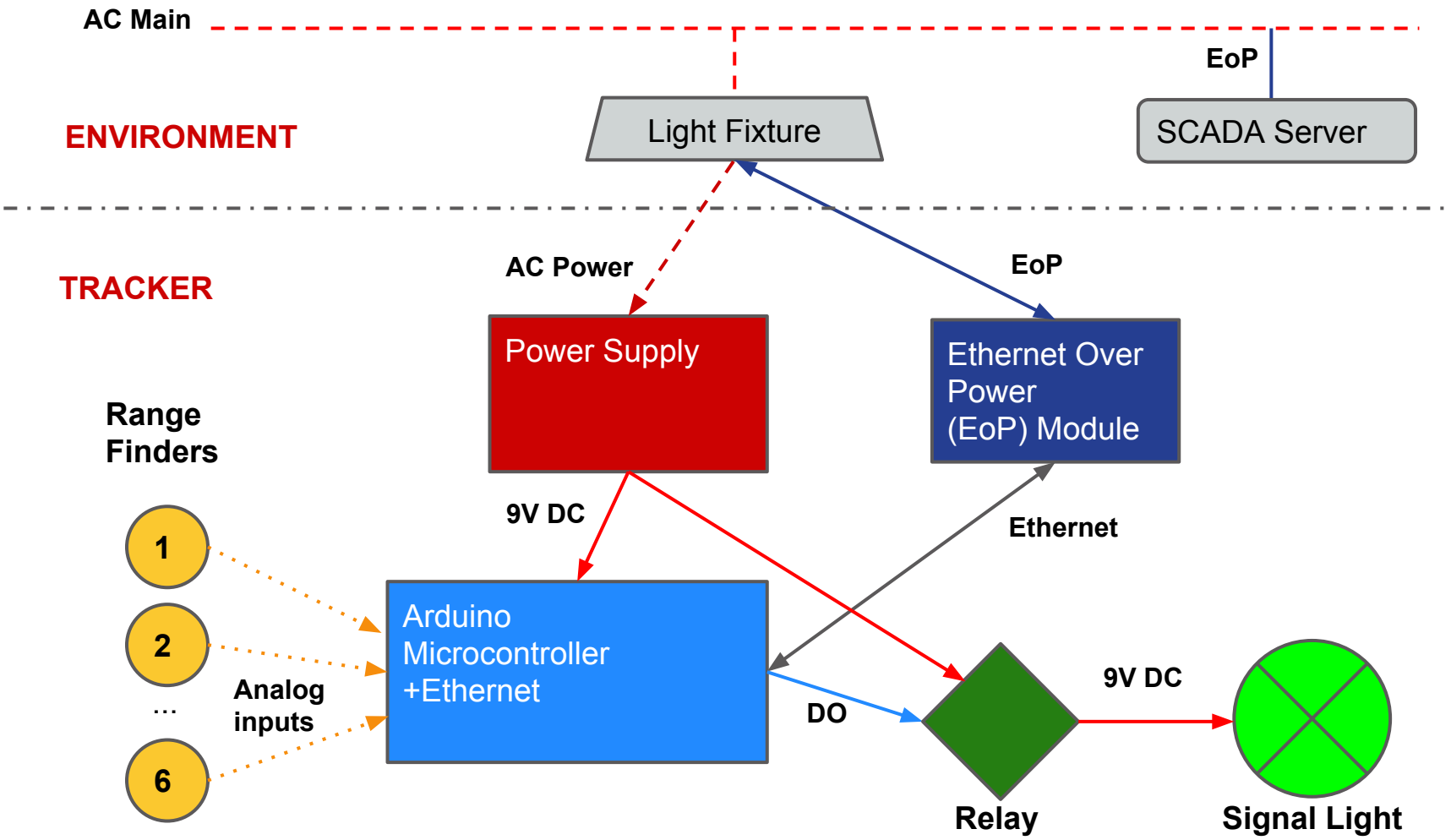
Other “Stuff”

- Power supply
- Signal Light (LED flashlight + color lens)
- Adjustable mounts for sensors
- Housing
- EoP (Ethernet over Power) Module

What's Not There? (To Be Built)

- tracker device assembly
- open source SCADA (supervisory control and data acquisition) server to collect tracker data (and may be control them)
- web front-end / mobile app for drivers
- facility management system interface for airport maintenance

Spot Tracker



Bill of Materials / Prototype

Arduino Uno Ethernet	$65	*RETAIL PRICING*
6 Proximity Sensors $25@	$150	
Power Supply	$10	
EoP Module	$20	
Signal Light + Relay	$30	
Housing, Bolts&Nuts, Wiring	$10	
Installation, 2 man/hr @$50	$100	
	=====	
	$385	

Divided by 6 parking spots: $64.15 per spot

But Wait! There is More!

- just add a light sensor, and we can tell if the light fixture is out!