Session Five

Urban Data

Ben Boutcher-West

Head of Mobility

AppyParking

appyparking™
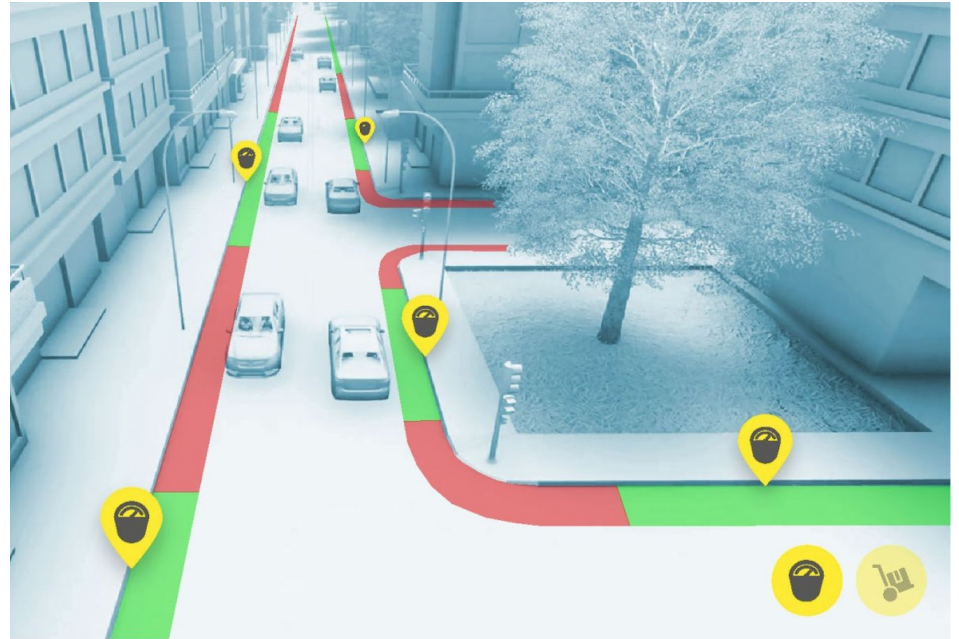
MAKE PARKING FORGETTABLE

'Make parking truly forgettable by providing kerbside navigation and automated payments to connected vehicles'

AppyParking
About Us

AppyParking™ is more than just another parking app. We're a connected car and intelligent kerbside management solution that provides a platform for the fragmented public and private sector to manage their on and off-street parking and traffic management data.

The Parking Platform™ understands every possible rule, restriction and tariff and provides the world's first standardised parking and traffic management data set. Available as an API, app and web application, AppyParking not only saves drivers time, money and parking fines but save cities from congestion and most importantly pollution.

Looking ahead, how will connected autonomous vehicles pay for parking and avoid tickets?

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Parking Allowed
No Parking
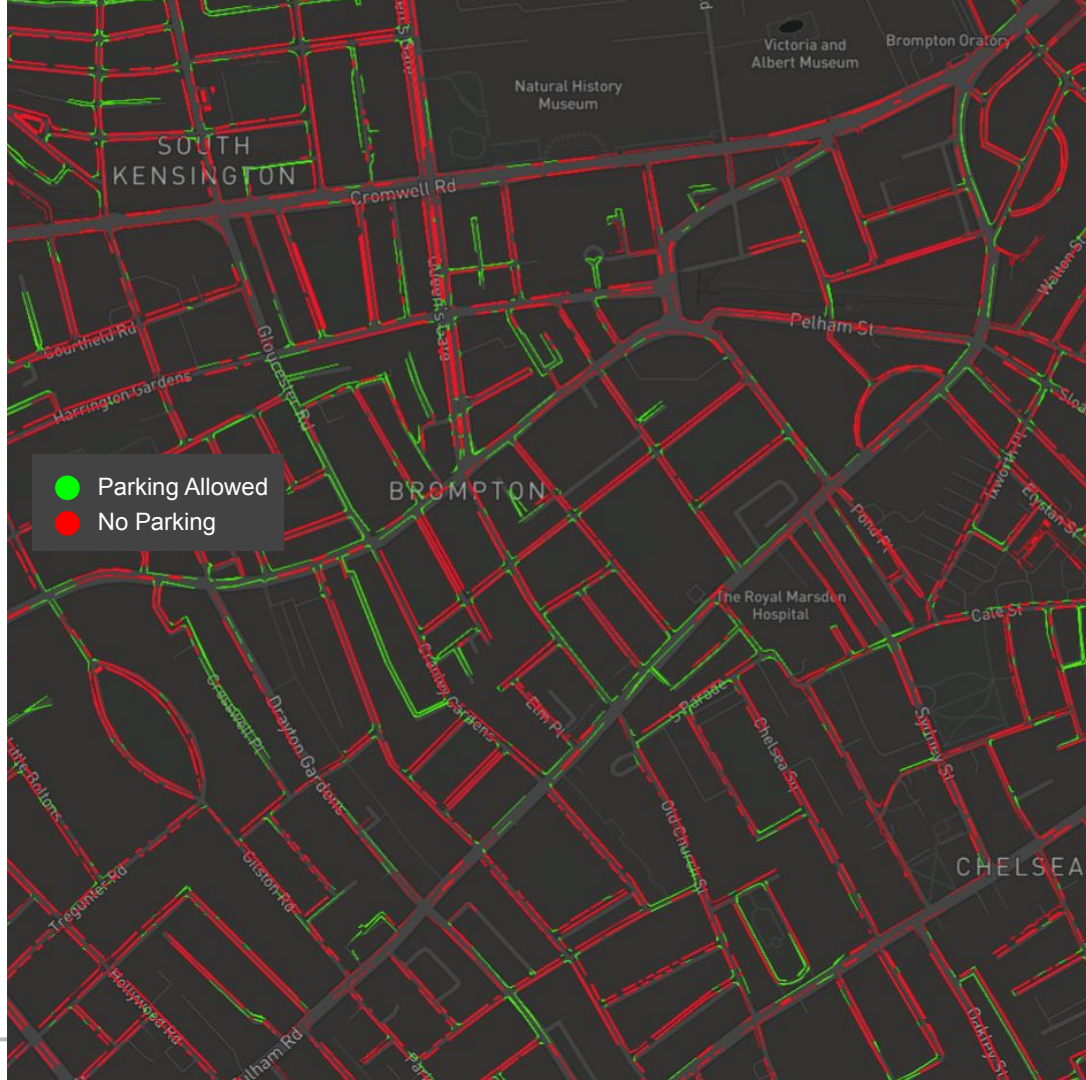
Problem Definition

There are currently no standardised kerbside maps that exist in the world

Confusing Street Signage and suspensions

Old fashioned paper receipts are issued from P&D machines.

No centralised marketplace means dozens of apps for payments and parking data.

London spends £100m on enforcement and some councils don't cover costs.

Connected cars will be stupid if the physical and digital infrastructure are not connected.
Who's accountable if a CAV gets a ticket?

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'Air Traffic Control' for Kerbside Management
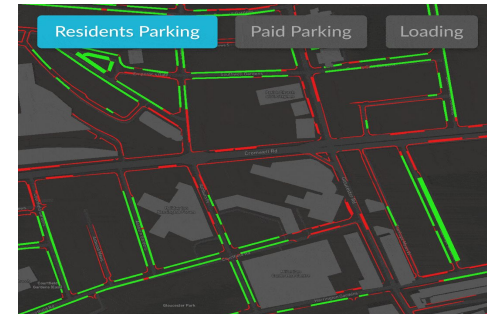
KERBSIDE MANAGEMENT FOR CITIES
AppyPlatform - SaaS

DIGITAL GREASE FOR MaaS

KERBSIDE ACCESS FOR MaaS
Data and Payments - DaaS

Residents Parking · Paid Parking · Loading

B2B and B2C Clients

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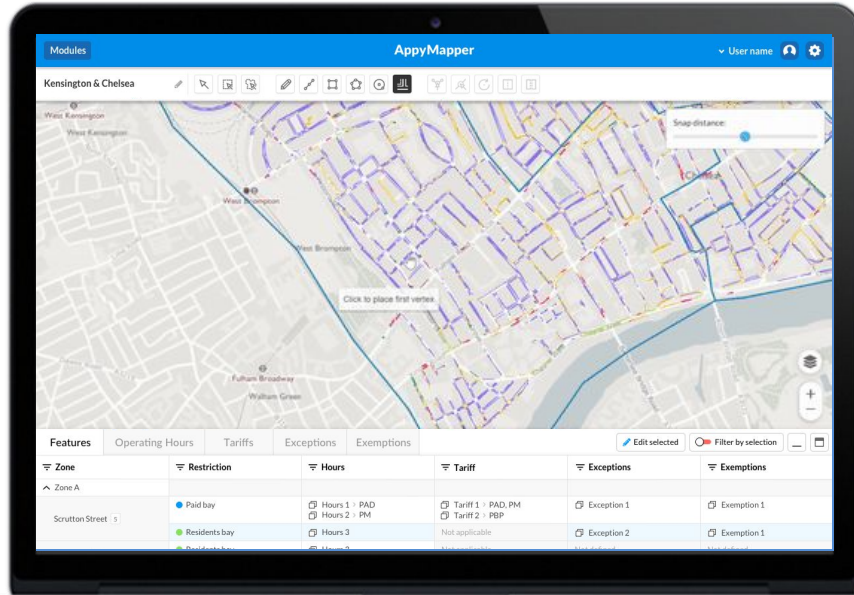
AppyMapper - Fleet Management tools

Streamline operations (E.g. delivery requests).

Promote positive parking

Managed enforcement and revenue

Common TMO data format ready for Alliance of Parking Data Standards.

- **Holistic end-to-end digital kerbside management platform**
- **Localised management on a global standardised platform**

Kerbside Data - API

HD Kerbside data is the world's first API layer that provides a standardised digital blueprint of every metre of paint on the road related to parking and traffic flow. The granular nature of data allows any type of vehicle to understand all relevant restrictions, tariffs and exemptions. The power of the data offers Last Metre Navigation™ and enables vehicles to become fully compliant at the kerbside. Our Innovate UK project, ParkAV, explores this data's application to ensure CAV's are kerbside compliant

Available On Street Data Sets	
Point of Interest Type (Map Pins)	Paid Bays
	Disabled Bays*
	Electric Bays*
	Motorbike Bays*
Location	Latitude
	Longitude
Cashess Operator	Operator
	Operator Website
	Operator Telephone
	Location ID
Info	Price per hour
	Restricted Hours
	Restricted Days
	Number of Bays*
	Max Stay*
	No Return*
Controlled Parking Zones	Polygons
	Restricted Hours
	Restricted Days
	Bank Holidays
	Match Days*
	* where available

Integrated HD maps - example integration

Frictionless Payments

Target clients e.g. Uk councils, EV bay operators

Launching in 5 UK towns in 2019, our sensor solution delivers real time availability of parking and enables our patent pending one click technology for payment. How it works:
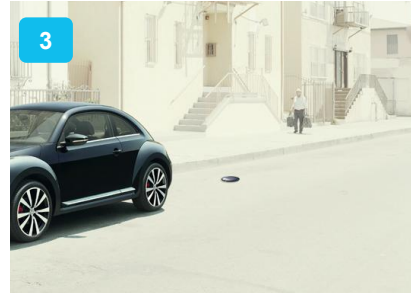
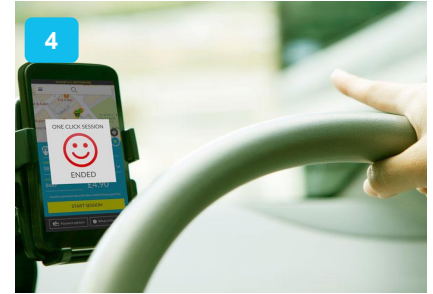| Drivers finds nearest available spot using real-time on-street sensors | Parking session begins with a single click | Car drivers away and session automatically ends | Driver only pays for the minutes of their stay |

1

2

3

4

The world's largest deployment of intelligent sensors rolling out December 2018 - 14,000 sensors!

Harrogate BOROUGH COUNCIL

Portsmouth CITY COUNCIL

Calderdale Council

Worcester CITY COUNCIL

Dundee City Council

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Corporate parking management

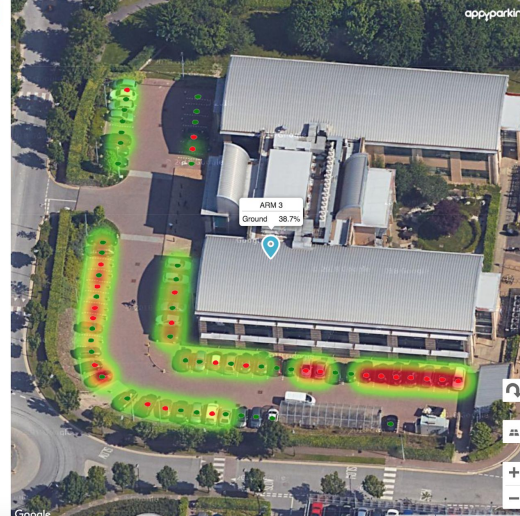Target clients; roff street parking, rail, campus areas, industrial parks and offices.

Current Analytics operation ARM, Cambridge deployed in 2018

ARM in Cambridge.

Real Time Management and Analytics portal supplied to ARM along with our sensors:

We are launching this in: Harrogate, Halifax, Worcester, Portsmouth, Dundee and many more
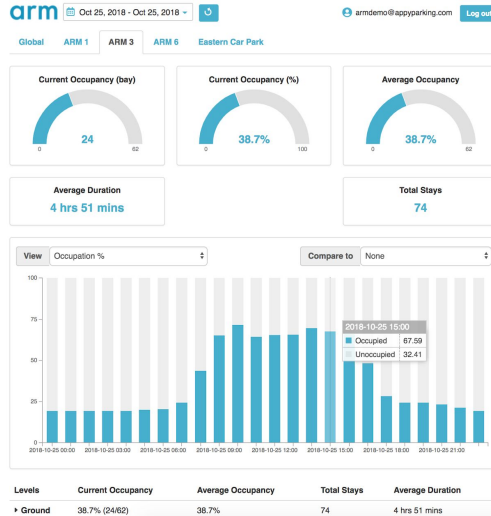
Incentivise car share uptake via premium parking

Bay management for Car clubs

7 day management of real estate, rentals

Integration to local mobility services such as Taxi and EV.

Part of total industrial park mobility management

Combine Physical & Digital Infrastructure

AppyParking

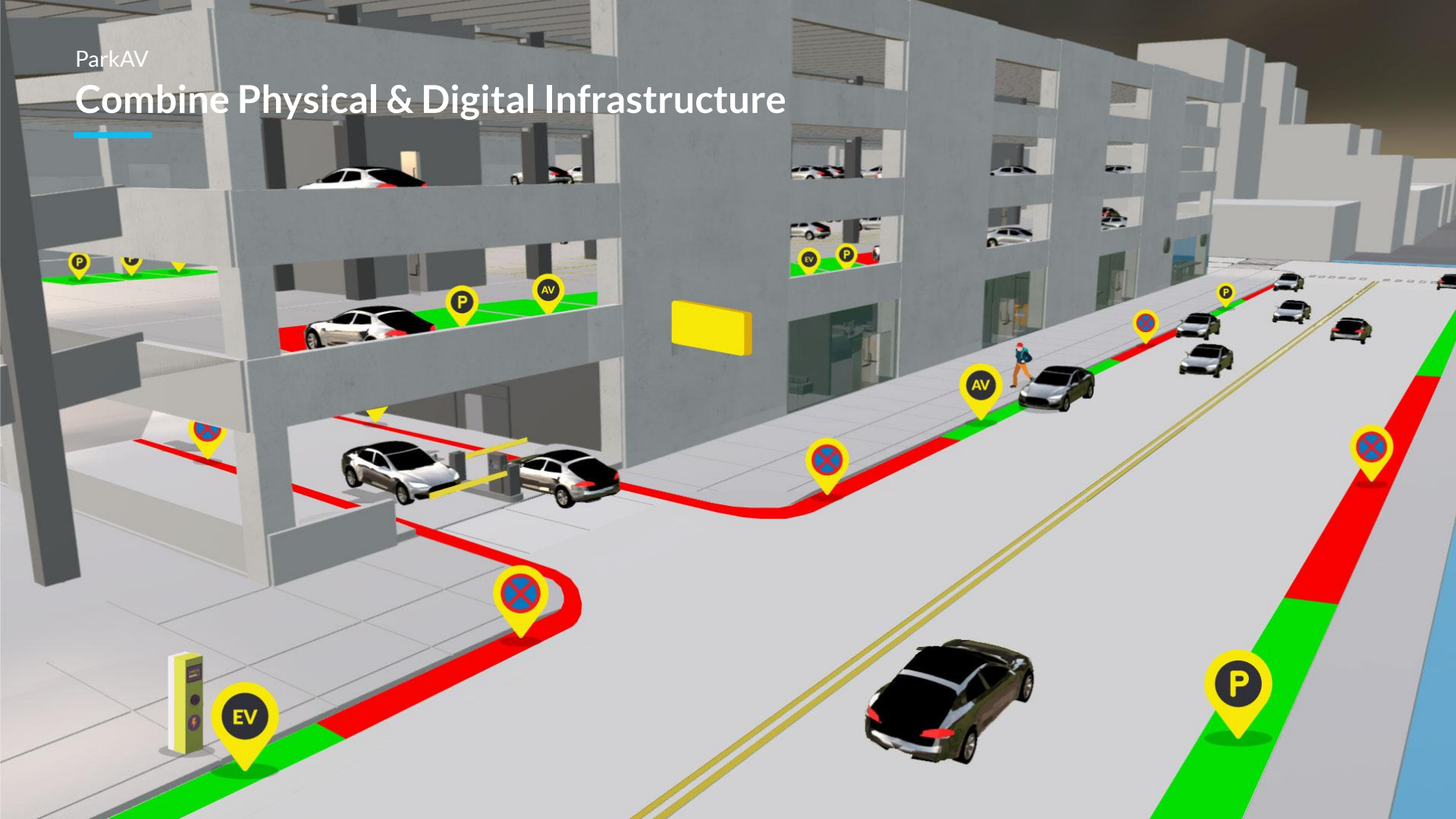# How do we do digitise the world?

Due to poor government resources and legacy software, Traffic Regulation Orders (TRO) are generally out of date and incomplete. Our systems and processes allow us to ingest what data is available and turn it into a standardised digital blueprint. We call this HD Kerbside Data.

Completing the HD Kerbside Data jigsaw

Vast 'data black spots' resulted in AppyParking inventing a **patent pending** rapid data capture process to complete the HD Kerbside data jigsaw. Mobile LiDAR surveys capture up to 50km a day at an accuracy of 3cm - 8cm. The cost, speed and accuracy of this capture is 10x more superior than traditional ground based manpowered mapping methods.

LiDAR and 360 'street view' mobile unit

This approach has been proven in California, Spain, France and the Netherlands - in 2019 we are looking at a wider presence in Europe
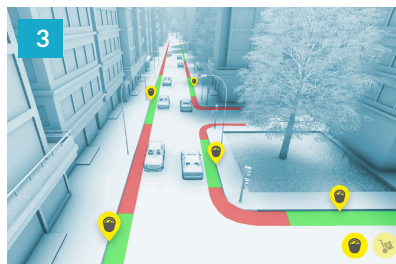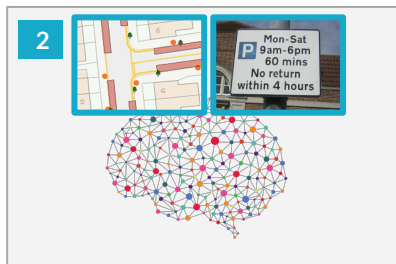
1 We collate the base lidar survey, 360 imagery and GIS data

2 Using a neural network we bring the data sets together and validate the result via our own GIS expertise

3 The result is a data set that matches the physical world exactly but has the traffic regulation order over layed. Any GPS coordinate now has aTRO attached to it.

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AppyParking

End to End - Benefits

Driver Benefits

No more overpayments

No more parking fines

Increased Productivity

Government and Operator Benefits

Increased parking utilisation

Revenue monitoring and optimisation

Improve customer satisfaction and reduce frustration

Increase parking revenues

Reduced enforcement costs

Reduce congestion and pollution

MaaS is a £265bn opportunity by 2025.

Short, Mid, Long Term Vision

Kerbside Management for B2G and operators
Provide Local Authorities with a powerful platform to digitise and manage their kerbside. This will create a digital infrastructure required for the
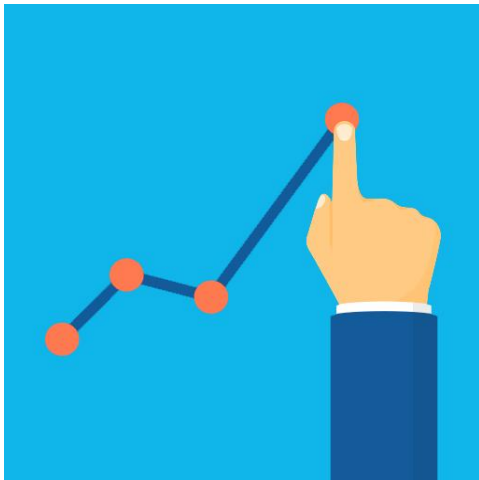
Kerbside Access for Intelligent Mobility
Local Authorities provide an authoritative source of data to CAV's allowing mobility operators to have fully compliant fleets at kerbside.
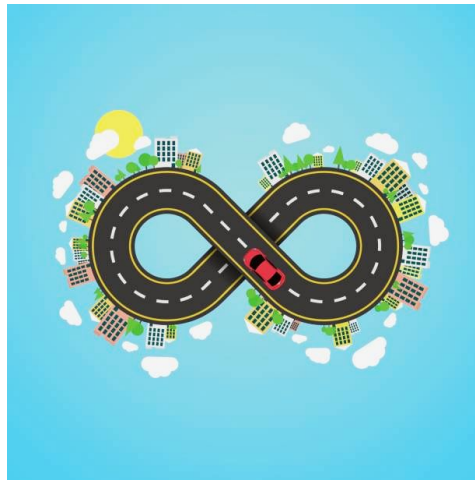
Air Traffic Control for Smart Cities to manage Robo Taxis

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AppyParking

The UK's most awarded parking startup

2018
- Fleet European Start up award - 2nd
- British Parking Awards - Innovation Winner
- Intertraffic - Innovation Finalist
- Mobility Startup of Europe - Finalist
- Mobility Pioneers - Finalist
- Honest John - App of the year
- Car Buyer - Best parking App

2017
- Best UK Parking App 2017 - Independent
- Best UK Parking App 2017 - Sussex Express
- Best UK Parking App 2017 - Brighton & Hove Independent
- Best UK Parking App 2017 - iNews
- Best UK Parking App 2017 - WhatCar
- Best UK Parking App - Auto Express 2017
- Best British Mobile 2017 - Credit Suisse

2016
- Disrupt 100 - 15th Most Disruptive Business in the World - 2016
- Best IoT Investment UKBAA sponsored by Cisco - One to Watch - 2016
- British Parking Awards 2016, Intelligent Future Parking - Winner
- British Parking Awards 2016, Exceptional Customer Service - Finalist
- British Parking Awards 2016, Parking Partnerships - Finalist
- British Parking Awards 2016, Parking Person of the Year - Commended

2015
- Evening Standard 2015 - London's Top Travel Apps
- Selected for Israel Smart City Trade Mission with the Mayor of London
- Virgin Business 'Pitch to Rich' 2015 - People's Choice

2014
- Stuff Magazine 2014 - Top 8 Apps
- Shanghai Ford Motors Project 2014 - People's Choice
- British Parking Awards 2014, British Parking Awards - Commended
- Ford London Congestion Challenge 2014 - Winner & People's Choice

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In the News

Forbes <https://www.forbes.com/sites/trevorclawson/2019/01/30/genteel-but-cutting-edge-a-startup-is-bringing-smart-city-tech-to-a-yorkshire-spa-town/#2467a63713a2>

The Guardian

THE TIMES

HUFFPOST

THE SUN

RACONTEUR

WHATCAR?

CB INSIGHTS

THE SUNDAY TIMES

Auto EXPRESS

Coventry Telegraph

WhatVan?

DISRUPTOR DAILY
DISRUPTION FROM AROUND THE GLOBE

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Meet the Team +52

BUSINESS OPERATIONS

Dan Hubert
CEO & Founder

Stephen Jones
CTO

Lee Hudson
COO

Jack Taylor
Head of Operations

Sam Baker
Operations Associate

MARKETING

Garry Thornton
Head of Marketing

FINANCE

Richard Shardlow
Finance Director

Diana Cosa
Junior Accountant

GIS

Sophie Mould
GIS Team Lead

Mia Papachristou
GIS Tech Lead

Elisender Montaner
GIS Technician (C)

Anna Izdebska
GIS Technician

SALES

Kieran Fitsall
Regional Director Asia-Pacific

Alex Rayson
Operations Manager

Minesh Naran
BDM

Ben Boutcher-West
Head of Mobility

PRODUCT

Alex Henry
Snr. Product Mgr

Paul Junior Kasseyet
Product Owner

Adem Besim
Product Owner

Stu James
UX & UI Designer

Pawel Orzech
UX Designer

Noorullah Kamili
QA Analyst

PROJECTS

Charlie Hewson
Snr. Project Mgr (C)

Richard Brown
Project Manager

SUPPORT

Aurelio Bartolone
Support Manager

ENGINEERING

Kenneth Truyers
Lead Developer

Lucas Martin
Senior Developer

Tristan Rhodes
Senior Developer

David Ireland
Senior Developer

Jorge Rodríguez Galán
Developer (C)

Sergio Lima
Senior Developer

Stephen Dunford
Senior Developer

Milian Lichere
Senior Developer

Phil Larner
Developer (C)

Kymme Hayley
Developer (C)

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Onwards and Driverless!

Please contact;
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07908723283

Bola Adegbulu

Co-founder & CEO

Predina

Predina: AI to dynamically predict and prevent crashes
Where & When crashes are likely to occur

Predina at a glance...

Deep Technology company supported by leading technology, regulatory and industry stakeholders.

Founder

BOLA ADEGBULU - Founder & CEO

Founded & exited Telematics startup (AutoMosys)

Managed dealer relationships with Jaguar Land Rover, Audi, BMW and Toyota at Enterprise Rent-A-Car

Project engineer at General Electric

Team

Team of 10 including:

4 PhDs+ Machine Learning
20 years of Automotive Data
15 years of Smart Cities

BMW, Imperial University, KTH, UCL, Kapsch Trafficcom and KPMG

Board

The Linde Group
Customer & Investor

Entrepreneur First

Leading AI
Investor

Press/Awards

AI Startups to watch - Techworld
EU Datapitch Winner - €100K
Machine Intelligence Winner (Sponsored by Google)
Pitch at Palace Finalist

Google for Startups

TechCrunch

PITCH@ PALACE

Technology at a glance

We use historic incident data to predict the risk of crashes

2M historical accident data and 28 contextual data variables validated to be predictive of crashes.

Contextual variables
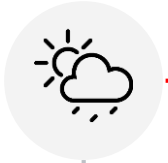
Environmental   Vehicle type   Geospatial   Macroeconomic   Events

28 contextual variables

Predina Contextual Platform

83% prediction accuracy

Before the Journey **(48 Hours)**.
During the Journey **(in Real time)**.
After the Journey **(anytime)**.

Contextual Risk Intelligence

Likelihood   Severity   Cause

Data visualisations: API, Pdf, Mobile App and Web
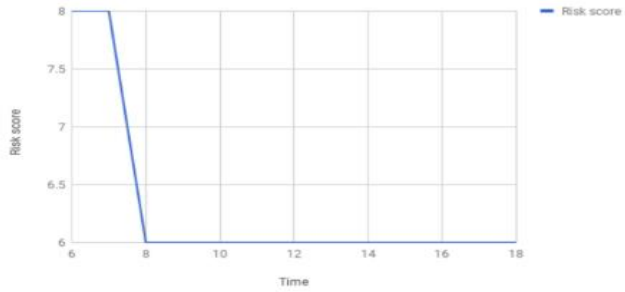
The world of mobility is changing... quickly

UberBLACK

TESLA

AI to solve future mobility challenges

Uber

- Understand real world "demand" and "supply"
- For more "accurate" dynamic pricing
- For market entry and scaling

TESLA

- Understand real world performance
- Detect hazards
- Train it's AI for autonomous vehicles

ZEELO

- On-demand coach service, using AI to predict demand for unscheduled and direct coach routes.

The Alan Turing Institute

- AI and data science to better estimate and accurately forecast air pollution across the city of London - GLA

Your data is an <u>asset</u>

USE IT.

bola@predina.com

How ?

Key steps

1. Define the "problem" you are trying to solve
2. Assess the datasets you have internally
3. Decide how "core" it is to your business - "Build" or "Buy"
4. Find data specialists who have deep expertise solving that problem
   a. Companies i.e Predina etc.
   b. Research Institutions i.e. Alan Turing
   c. Kaggle
   d. Startup programmes i.e. Entrepreneur First
   e. Consultancies
5. Collaborate with them to agree on "what good looks like", business KPIs and get "buy in"
6. "Protect" and "integrate" insights

Your data is an <u>asset</u>

USE IT.

bola@predina.com

Ross Basnett

Strategic Account Director

mobilleo

mobilleo
Consolidating Travel & Fleet Data in a MaaS platform

BVRLA Future Mobility Congress

What is a MaaS platform

One platform

Consolidated travel modes

Smart choices available depending on user preferences

Seamless booking / paying

In-journey support and suggestions

Consolidated Data
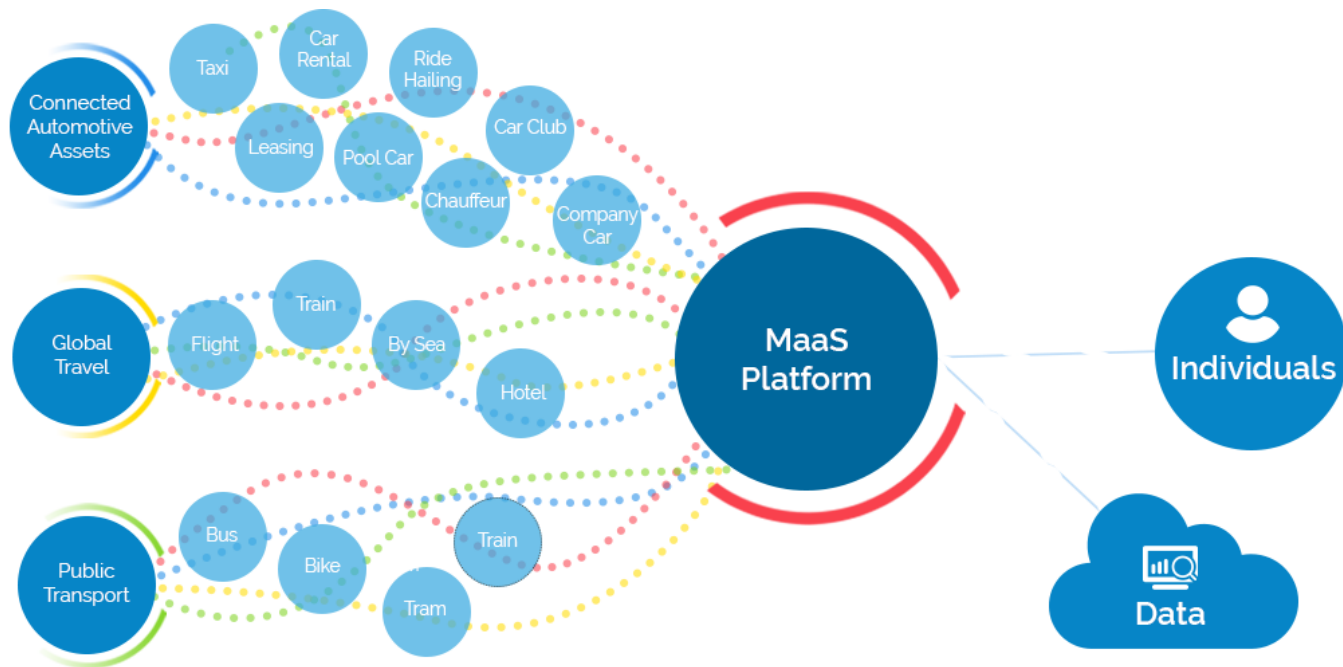
Different Applications

Corporate

- ✔ Cost control
- ✔ CSR & CO2 reduction
- ✔ Productivity
- ✔ Employee Benefits

Public Body

- ✔ Congestion reduction
- ✔ Air quality
- ✔ Accessibility
- ✔ Active Travel

Use Case - Client

- Multi-national brand

- Sell multiple products in all major retailers

- Highly mobile sales and account team

- Mixture of Urban and Rural Store Locations

Use Case – Client Objectives

Sustainability – more 'green' travel solutions

Cost Effectiveness – reduce duplicate costs of car and public transport travel

Flexibility – meet a range of employee needs and be able to offer choice

Client Sales - Overview

- 139 employees eligible for Tool cars

- Three types of roles:
  - Account Management – fully external (travel to customer 1-2 times per week / fortnight)
  - Category and Shopper Design – internal / external
  - Market Strategy – internal / external

- Two locations in UK + one in Ireland

Account Management

Market Strategy

Category Management & Shopper Design

Sales Locations

Variety of travel means and needs depending on customer location / distance from office / distance from home

- E.g.: Boots – travel from London/Surrey to Nottingham – usually via train

- Amazon – central London – usually via tube

- Asda – travel from Leeds/Harrogate – usually via car

Typical Expenses

	Car-Related Expenses	Non Car-Related Expenses
Total Expenditure (129 employees*)	£46,424.39	£84,887.96
Average Expenditure per person	£359.88	£658.05

Opportunity

The 'Clean' Car

Fully electric car model choice only
Same cost to company (TCO) as providing current car
Shorter leasing periods to keep pace with technological advancement
Offered only where the market has the appropriate infrastructure
Standard refuelling rate to manage charging variations
Retain car for full lease term if chosen (unless swap opportunity)

"Win" for the employee in terms of reduced carbon footprint, significantly lower taxes and aspirational car brands

BMW i3
VW e-Golf
Nissan Leaf

The "Flex-Pot"

Full mobility choice via a menu of options to meet business/personal needs
No dedicated company car
Value of "Credits" linked to the same TCO of car options
Operated via a 3rd party app for easy bookings and BIK taxation
Additional flexibility via a limited roll-over of non-utilised expenses
Many choices: Pool/rental cars, taxi, daily/season transport tickets, car share,...
Family utilisation (for designated driver) if credits after business travel
Freedom to choose every year

"Win" for the employee in terms of ultimate flexibility for all transport needs

No Dedicated Car

The Future of Tool Cars

The 'Long Distance" Car

A fuel- and time-efficient model for those driving regular long distances
A choice of a non-plug in Hybrid or "clean" petrol/diesel
Mileage reimbursement rates set to incentivise charging
Narrow car choice (1/2 models) but with variants
Retain car for full lease term if chosen (unless swap opportunity)

"Win" for the employee in terms of improved carbon footprint, lower taxes vs today's fleet models and more flexibility vis-à-vis charging on the go

Toyota Prius
VW Passat GTE

The 'Trade Down, Flex Up' Car

"Trade down" to small electric or non-plug-in hybrid car   .
Plus flex pot for on-top tailored transport flexibility
Same cost to company as other options
Option to reinvest unused "credits" into sustainable initiatives
Differing refuelling rate linked to choice of car
Retain car for full lease term if chosen (unless swap opportunity)

"Win" for the employee in terms of reduced carbon footprint , significantly lower taxes and flexibility to choose top-up solutions

Toyota Yaris
VW e-Up

Company Car Driver
Sarah Morgan

As a field-based Sales Manager, Sarah spends much of her time either travelling or at home. Her company car is used on average 3 days a week to attend customers on-site and on important internal meetings. Sarah is provided with a mid-sized executive vehicle. Living just outside Leeds, transport links for national travel are good and Sarah's preference is to attend internal meetings in Manchester & London by train.

Sarah believes she should be allowed more flexibility with her total mobility budget. This would allow her to opt for a more tax efficient vehicle and use the remaining sum on other mobility solutions to carry out her duties. With a young family, Sarah's car is the main family vehicle and they regularly head out at the weekend to see friends within the local area.

Name: Sarah Morgan
Age: 30
Family: Married, 2 children
Job: Sales Manager
Location: Leeds

TRAVEL PROFILE
- Travel required for job
- Car – status symbol
- High mileage
- Regular use of other transport

LIMITATIONS OF TRADITIONAL SOLUTION
- Allocated vehicle 24/7
- Tax Liability
- Long-term lease
- Inflexible method

HOW MAAS WORKS

1. Expensive company car replaced by cheaper model or reoccurring hire car booking to cover just the days required
2. Remaining TCO allocated to MaaS budget (on top of estimate for existing public travel) for acess to public and private service providers
3. Mobilleo can develop bespoke mobility packages for individual employees or groups
4. Sarah uses budget to fund both business and personal travel
5. BiK & NI payable only on private element

WHY MAAS WORKS

Employer	Employee
TCM transparency & control	BiK reduction
Employee Satisfaction	Flexibility
Reduced risk	Tax benefit on private journeys

Perk Driver
Julian Walsh

Julian predominantly uses his company car for commuting to work, to an office inside the M25. When he does travel for business, Julian prefers to take the train to be able to work while on the move. He sees the car as a status symbol but is aware that the cost in taxation is high and the environmental impact as a solo traveler is on his mind. Julian also worries about parking his car at home, due to limited space.

When considering taking a cash opt-out at the next renewal point in his 3 year cycle, Julian's calculations suggest that although he would like to save money, he would struggle to fund an equivalent car through cash allowance due to income tax & NI.

Name: Julian Walsh
Age: 32
Family: Married, no children
Job: Data Analyst
Location: Luton

TRAVEL PROFILE
- Low Yearly Mileage
- Commutes to a fixed location
- Car – Status Symbol
- Urban Living

LIMITATIONS OF TRADITIONAL SOLUTION
- Car Downtime
- Tax Liability
- Long-term Commitment to Vehicle
- Inflexible Benefit

HOW MAAS WORKS

1. Company vehicle replaced with TCO equivalent (or less) amount for mobility budget
2. Julian uses this budget for both personal and business journeys by accessing public & private service providers (recording the status of each journey)
3. He is able to maintain a car element of his mobility if this is included in his preference
4. Julian and the business only pay tax / NI on the cost of private journeys & BiK when a dedicated car is utilised

WHY MAAS WORKS

Employer	Employee
Cost Savings – TCM	Flexibility of travel
CSR Benefits	Cost Savings – Tax
Sustainability	Solution for Individual Need
Corporate Personalisation	Convenience
Policy Control	Smart Technology
Reporting Transparency	
Specific Mobility Budget	

Welcome to the Mobility Inflection Point

Occasional Traveller
Anita Taylor

Anita lives in the North of the UK. She commutes to the office by bus and does little business travel. When she needs to travel to other sites, she will take a pool car and expense the fuel used.

Anita sees the use of a pool car as a useful benefit, but finds it can be restrictive as the vehicle must be returned to the main office site and the booking process/check-out procedures can be time-consuming.

The other business sites have limited parking and this can cause her an issue upon arrival.

Name: Anita Taylor
Age: 24
Family: Single
Job: Account Executive
Location: Doncaster

TRAVEL PROFILE
- Infrequent Business Travel
- Pool Car Usage
- Frequent Commute to Fixed Location
- No BiK Liability

LIMITATIONS OF TRADITIONAL SOLUTION
- Reliant on antiquated booking methods and procedures
- Limited visibility of business travel spend
- Finite number of pool vehicles
- Pool utilisation rates and expense

HOW MAAS WORKS

1. Each colleague is provided with a Mobilleo profile, replacing the pool car fleet

2. Before each business journey, the employee completes a Mobilleo 'Smart Search'. This will produce a range of complete journey options and displays total travel time and cost

3. The employee can make an informed decision, guided by business policy, to select and book their mobility

WHY MAAS WORKS

Employer	Employee
TCM transparency & control	Flexibility
Employee Satisfaction	Improved forward planning
Reduced risk	Increased number of options for travel
Potential increased employee productivity	

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MaaS for the Masses
Workforce Commute

The commuting status quo is individually focused. We know that, for medium to large businesses, there is likely to be an element of many people commuting to and from one place of work. A typical workforce employs different modes of transport accessing both public and private transport methods.

Most often people commute in their private car, alone. This has significant cost implications for the individual and an environmental impact for both the employee & employer to consider. Another factor is the storing of vehicles once employees are in the workplace. This often results in large company carparks or high cost of parking on private sites for the individual.

HOW MAAS WORKS

1. Analysis of the total workforce commute

2. Identification of common journeys or commute synergies

3. Deployment of appropriate cost effective solution

4. Pre-planned & on-demand mobility using public and private service providers

5. Cost of provision can be covered by employee or employer or combination

6. Models built and customisable for employee groups

TRAVEL PROFILE
- Many employees heading to one location
- Most travelling alone
- Arriving and departing at similar times
- Parking costs and incurred or business owned spaces required

LIMITATIONS OF TRADITIONAL SOLUTION
- High total cost of commute for employees
- Environmental impact of solo driving
- Car downtime during work hours
- No employee benefits
- Risk increased by the number of journeys

WHY MAAS WORKS

Employer	Employee
Provides holistic TCM (total cost of mobility) for entire workforce	Reduces direct and associated cost of commuting
Increases visibility of employee mobility and reduces commuter risk	Converts commuting from a job requirement to a company benefit
Reduces need for office parking space	Increases employee engagement and interaction
Increases environmental credentials while reducing corporate carbon footprint	
Increases employee satisfaction by providing additional benefits & supporting CSR	

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Welcome to the Mobility Inflection Point