

Connected vehicles in the UK – filling the gaps

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Setting the scene

- UK has many different roads authorities
 - Highways England, Traffic Wales, Traffic Scotland, Roads Service (strategic)
 - 3% by length, 30% of VMT
 - Over 150 Local Authorities for 97% of the road length
 - Transport for London (City) down to the Scilly Isles
 - 400 authorities with parking powers
 - 35 million vehicles
- *Connected and autonomous...* Is not one word.
 - National scale technology pilots coordinated by Zenic
 - But for many local authorities, even connected vehicles are not yet on the radar
 - Autonomy is scary
 - Many other pressures on budgets eg roads maintenance, social care, COVID, Brexit....
- Average UK vehicle age 7.9 years
 - So Connected new cars are not the only target
 - Freight, cycling, etc – connected vehicles
 - Connected vehicles include smartphones, PAYGI, dashcams, fleet management as well as DSRC (ITS-G5)

Examples of pilots to raise the radar return

- Low cost Local Authority led, Nationally funded
 - Tech used to support a well defined problem by an LA
 - Connecting organisations as well as devices
- Solving problems and sharing knowledge
 - In vehicle signs
 - GLOSA (SPaT)
 - Asset management data (Potholes, signposts, road condition)
 - Better signal setting
 - Smarter Parking

- Reinforces VMS
- VMS where you cant install
- More info than a VMS
- In a 7 year old VW Polo using MirrorLink

STRONG WINDS
FORECAST

VMS
STRONG WINDS
FORECAST
TODAY

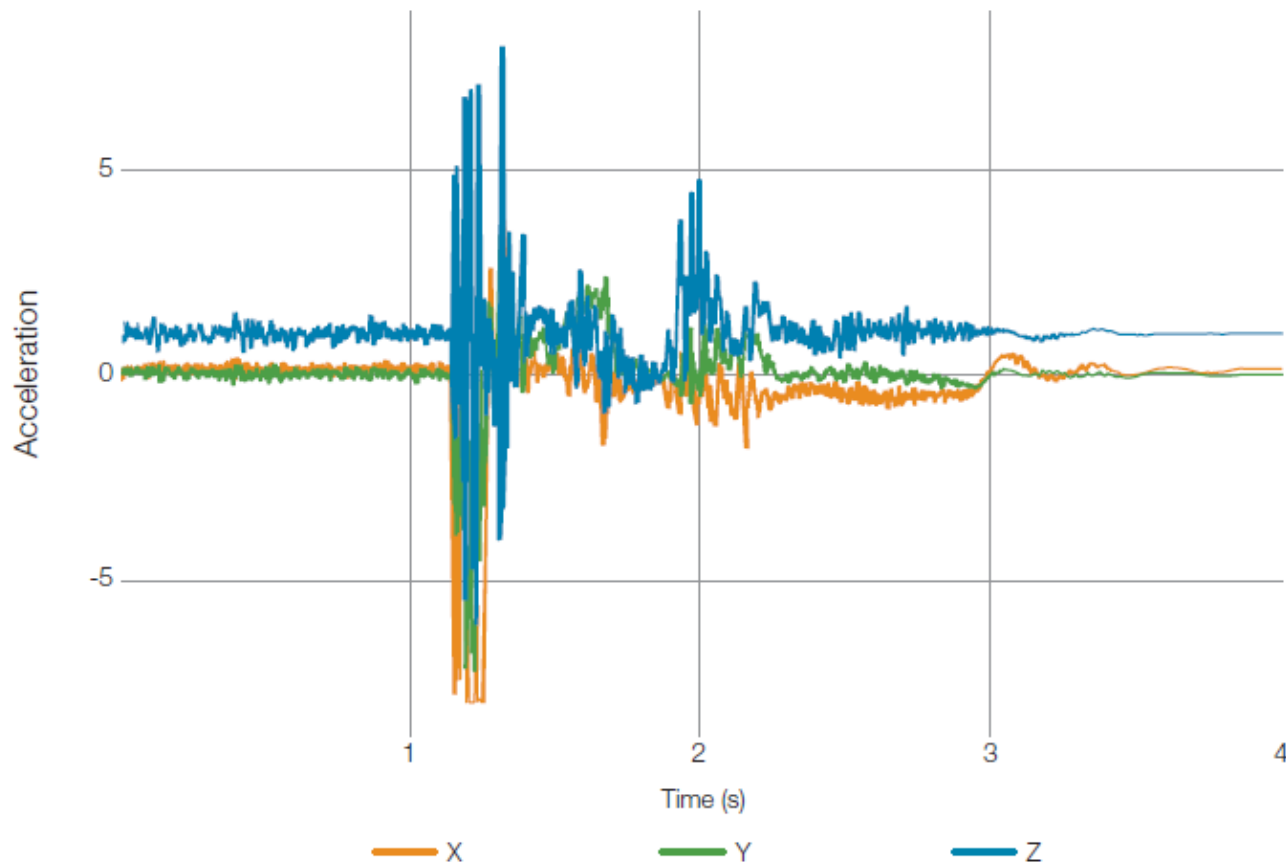
GPS UP /
CONNECTED

Highways England

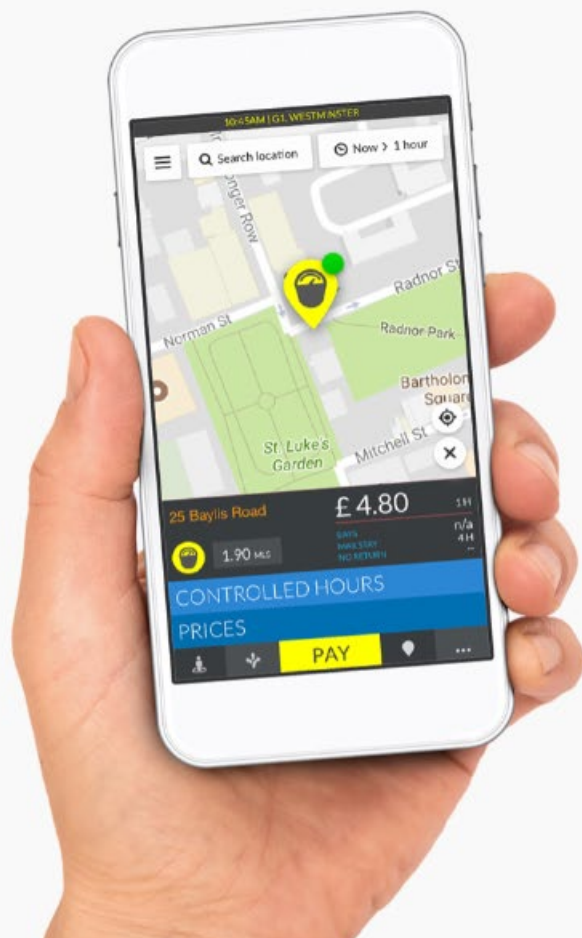
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- GLOSA linked to SCOOT (adaptive signals so a challenge as timings change continually)
- 14% stop reduction
- Done by cellular
- New projects use speech only





- Pothole data from OBD2 insurance dongle
- Thrown away by data collector as “not of any value”
- \$16B of unfilled potholes in the UK
- \$6bn a year on roads maintenance
- Annual surveys...



Award-Winning Apps

Giving drivers complete choice and peace of mind across the UK.

- ✓ Free Android and iOS app
- ✓ UK wide On-Street Parking Bays, Tariffs and Restrictions
- ✓ UK wide Off-Street Car Parks, tariffs and hours of operation
- ✓ UK wide Petrol Prices and locations
- ✓ Including Disabled, Electric, Motorcycle bays.
- ✓ Yellow Line Loading Rules
- ✓ Match Day and Public Holiday Rules



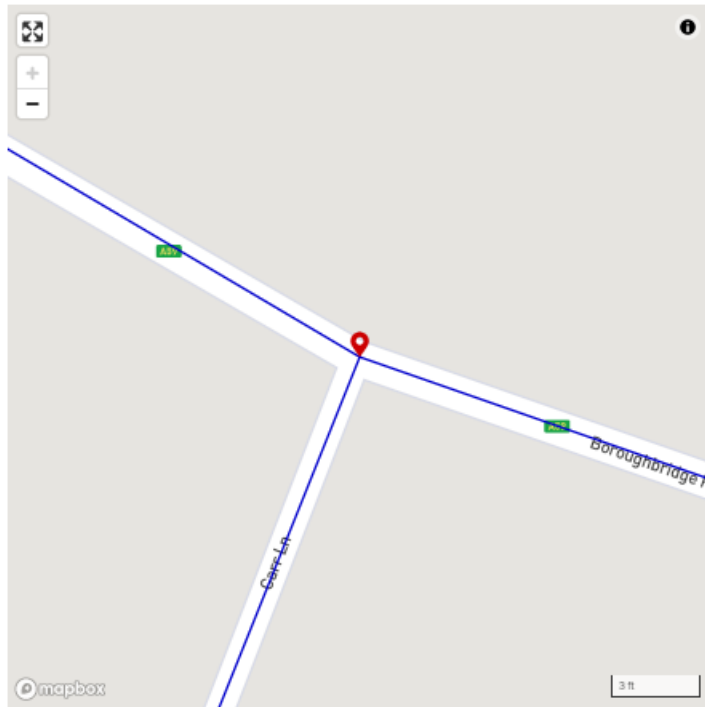
- Find a space
- Nav to that space
- Park and press pay
- Pay by the minute remotely
- Reduces costs
- Increases revenue
- Happy public
- Happy politicians
- Happy retail
- Post COVID , touchless parking

Node 278345292

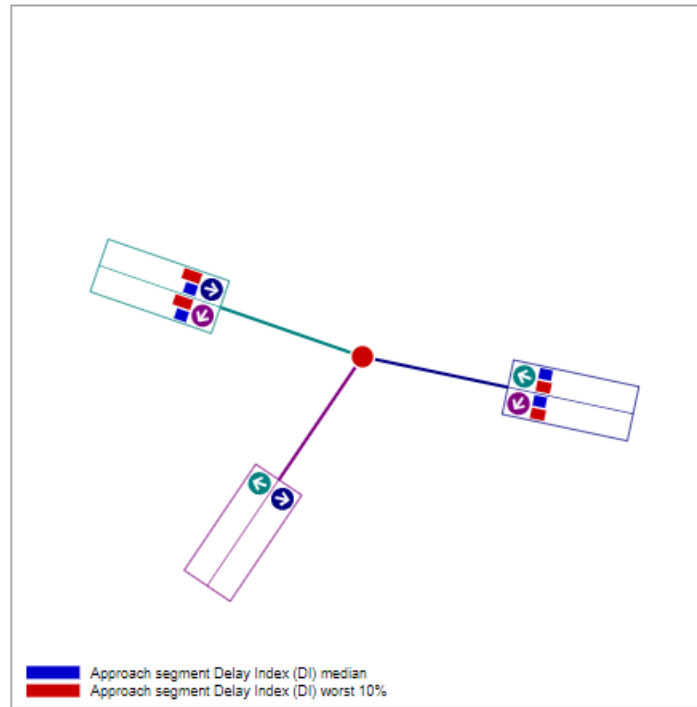
Carr Lane/Boroughbridge Road

Junction turns

Turn name (derived from OSM)	Segment fingerprint	Length [m]	Journey count	Min JT [s]	Avg JT [s]	Max JT [s]
Boroughbridge Road (North West) ⇒ Boroughbridge Road (West)	-170527717_0;-251474935_1	79.446	118	4	11	63
Boroughbridge Road (East) ⇒ Boroughbridge Road (East)	251474935_1;170527717_0	79.446	114	4	8	43
Boroughbridge Road (North West) ⇒ Carr Lane (South West)	-170527717_0;-25539742_8	97.361	26	7	14	42
Carr Lane (North) ⇒ Boroughbridge Road (East)	25539742_8;170527717_0	97.361	12	11	22	43
Boroughbridge Road (East) ⇒ Carr Lane (South West)	251474935_1;-25539742_8	93.155	12	6	22	71
Carr Lane (North) ⇒ Boroughbridge Road (West)	25539742_8;-251474935_1	93.155	10	9	33	65



The map above is generated from OpenStreetMap and shows the OSM ways intersecting at the junction node.



This diagram is generated automatically from the analysis of trips data harvested from vehicles by Inrix. Turning movements will only appear in this diagram only if they have been validated against Inrix data. Until all possible turning movements have been validated, some turning movements may be missing or incorrectly marked as one-way or no-entry.

- Using INRIX GPS individual vehicle data to measure delays at signals in 12 cities
- Use FVD instead of loops to set signals
- Work using this in York saved 10% of delay
- Maintenance of loops is ok but if the road they are cut in has gone...

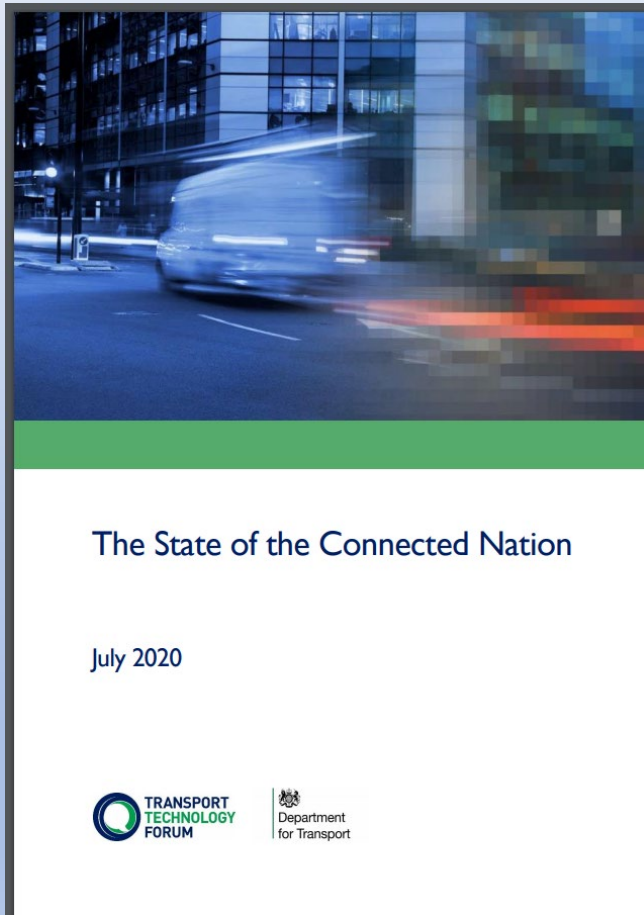


Managing competing demands in (old) York:

- Growth
- Tourism
- Commuting
- Air quality

- Roman Road layout
 - What did they ever do for us?
- Walled city
- Heritage zone (1472)
- Floods
- Not enough money

State of the Nation has more examples



https://www.ttf.uk.net/wp-content/uploads/2020/07/TTF_State_of_the_Nation_2020_Ed-1.pdf

So why aren't these benefits seen across the UK?

- RAC Foundation saw untapped potential
- Asked me – “what needs to become true for these benefits”?
 - At scale
 - Quickly – can't wait for autonomy
 - Where they impact most
- *All that UK needs to do is....*
 - *So looked at end to end data chain from feasibility and funding to driver uptake and trust*

So?

- Identified gaps and owners in detail
- Identified work arounds and ways to connect bits of the circuit
- Identified common issues

- NOT JUST TECHNOLOGY
- Softer end to end business case and business model
 - Why would drivers want this?
- Focus on outcomes and quick wins
 - GLOSA Saving HGV (truck) operating costs at signals = \$1 per stop
 - Improving traffic signals by better monitoring



Driven by information

Securing the benefits from
connected vehicles

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September 2020

Quick win: GLOSA for niche applications eg HGV routes

Highway authority

Data needs to be available and of high quality

Data needs to be turned into advice for drivers

Action: Road operators to publish data for key signal sites

Like your SPaT challenge

Data needs to be transmitted to vehicles

There needs to be equipment in the vehicle to receive the advice

Action: In vehicle service providers and freight industry to reduce distraction

Use existing comms and sat nav service

There needs to be a way to display/speak the message safely and clearly

Drivers react to the displayed message as they trust it

Action: In vehicle services need to access advice for apps or in-cab fleet management

Driver behaviour changes to reduce congestion and emissions

Gap to fill

Action underway

Enough is in place already

Vehicle

What needs to become true....?

- Quality Data easily available into and from vehicles/traffic systems
- User trust in data – think of the driver. Why use this?
- Driver distraction reduced
- Business case and model clear for all
- Skills available and training to keep them up
- Procurement of data and services simplified and aggregated
- Business processes linked to roads business not tech business
- Awareness of opportunity in LAs – confusion with autonomy
- But not just communications tech!

Transferrable messages for the US??

- End to end data chain – one break is all that’s needed for a fail
 - Users are a weak link, so harvesting data is easier than pushing information
- Cellular is good enough for now for non safety critical services
- Think **all vehicles not just new cars**
- Local Authority people need help
 - Civil engineers like me don’t do cyber security or data schemas
 - What are the benefits?
 - Convince them “It will make your day job easier in the long run”
- Central collection of the story and disseminate results to non adopters
- **THINK OF THE DRIVER**

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Drivers either Homer or Mr Spock

There are two types of travellers characterised by TV's Homer Simpson and Mr Spock, a study suggests.



Which one are you?

Professor Glenn Lyons, of the University of the West of England (UWE), in Bristol, says we make our travelling decisions along two lines.

Mr Spock types will use every source of information available to make an informed and economical choice of how to get from A to B.

While the Homers have a much more laid back approach to journeys.

RE
▶ U
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inte
—
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▶ M
▶ U
▶ P
RSS

- As engineers, we design for Mr Spock
- As drivers we want simplicity like Homer
- User experience is everything

Progress

- Working groups of LAs to share knowledge
 - Smart parking
 - Assets
 - SPaTULA (SpaT for Users, Local Authorities and Automotive)
 - Keen to link to US
- DfT Connected Vehicle Data Strategy coming soon
 - Address softer issues like training and awareness, data access ...
 - Single national plan
- Zenic roadmap for connected and automated mobility just updated
 - Roadmaps need to start at the origin as well as head for the destination
- Connections of people also helping in Covid
 - And connected vehicle data
 - 107 different data sets

Local authority travel and transport data weekly digest

Figure 3 – Overall daily average traffic flow change from baseline

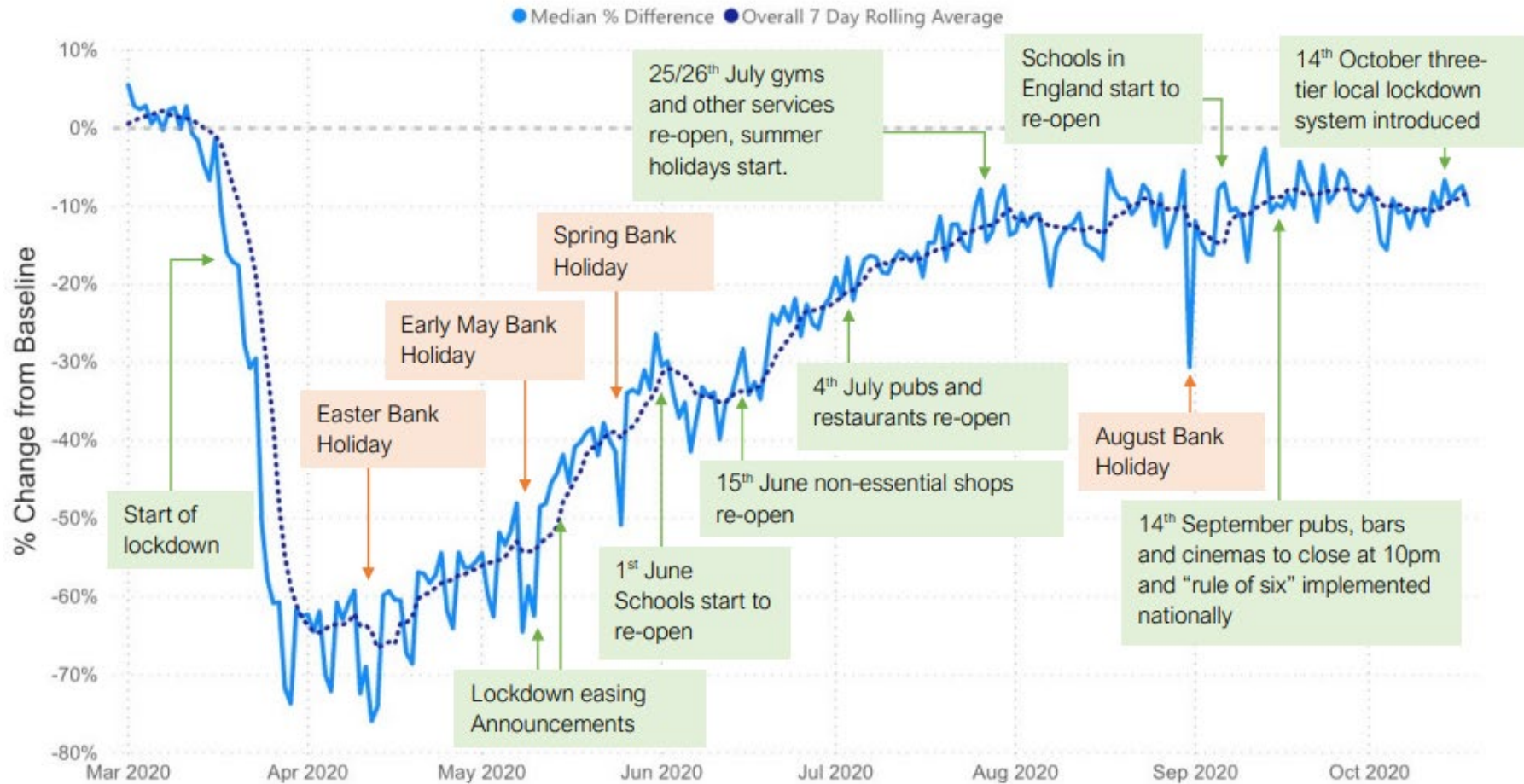


Figure 3: Change in national daily average traffic volumes since 01st March across all sources compared to the baseline (first week of February 2020)

Not just new cars....



- 1914 Model T Ford
- Built in the US so has steering wheel on the wrong side 😞
- No OBD2 port or USB 😊 (or even 12v supply)
- But with a smart phone giving location and Z axis movement becomes the UK's oldest connected vehicle (so far)
- GLOSA demo soon...
- Can the US beat this?
- Thanks – Q+A?

Useful links

- <https://www.racfoundation.org/>
 - Funders of this work and many other research projects
- <https://www.ttf.uk.net/>
 - Nationally funded group of local authority practitioners (seems to align well to CAT Coalition and SPaT Challenge)
- Zenzic <https://zenzic.io/>
 - National scale testbeds co-ordinators and holders of UK roadmap
- CCAV <https://www.gov.uk/government/organisations/centre-for-connected-and-autonomous-vehicles>
 - Government transport and industry co-ordination and policy
- Andy@whitewillow.biz
 - Please do get in touch with any queries