

New data and models for integrating transport and land-use planning

Chair: Nick Richardson (Mott Macdonald)

Speakers: Richard Pemberton (Solent Transport), Ian Burden (Systra), Soraya Thompson (Vivacity), Oliver Charlesworth (Bentley/Citilabs), and John Preston (TRG)

TPS/CIHT Event Wednesday 27th November 2019.



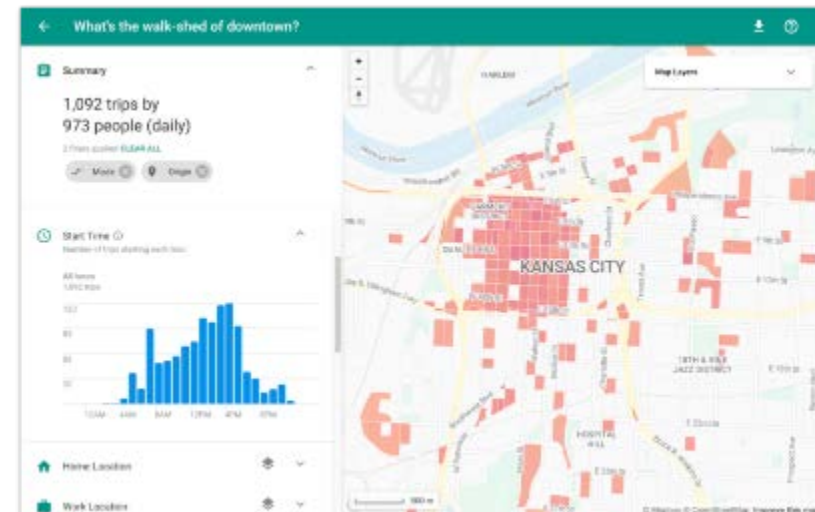
CIHT/ TPS event 27/11/19

New data and models for integrating land use and transport

Introduction- Richard Pemberton, Solent Transport

Introduction

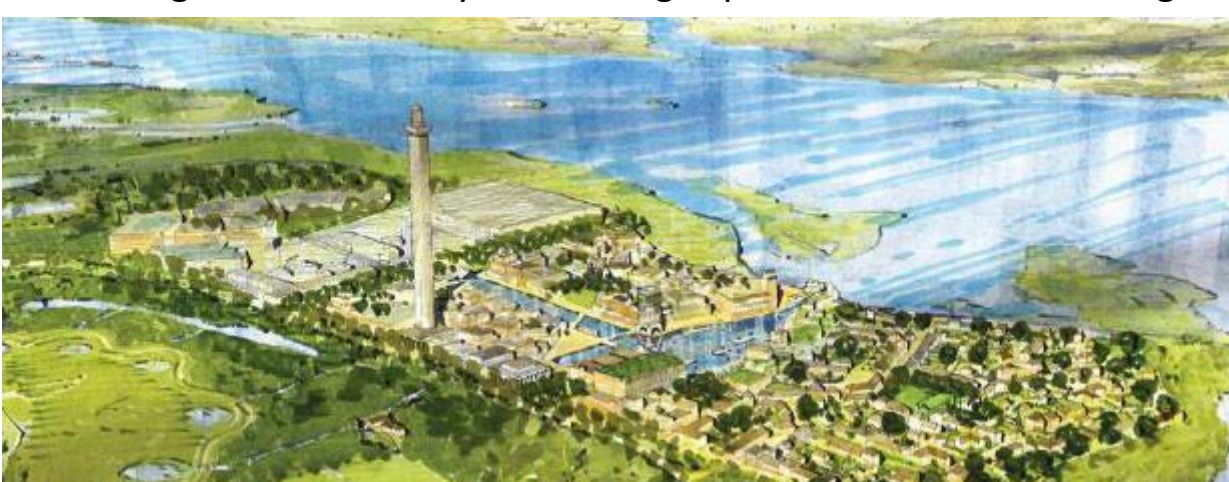
- Solent Sub-Regional Transport model: owned/ managed by Solent Transport in behalf of Solent LTAs
- Operated by SYSTRA consultancy
- Developed in 2010; major update 2015
- SATURN based multi-modal land use/ transport interaction model
- Has helped secure hundreds of millions of pounds of investment in transport schemes over last decade: a key tool in the LTAs' armoury and has repaid investment cost many times over
- WebTAG modelling standards: models need to be based on data no more than 6 years old
- Next year: approaching the edge of "fitness for purpose"
- Where do we go next?
- Commissioned University of Southampton TRG to undertake a broad sweep of issues and options to help inform our next steps- this event is part of that review commission



Aspirations and challenges for future SRTM

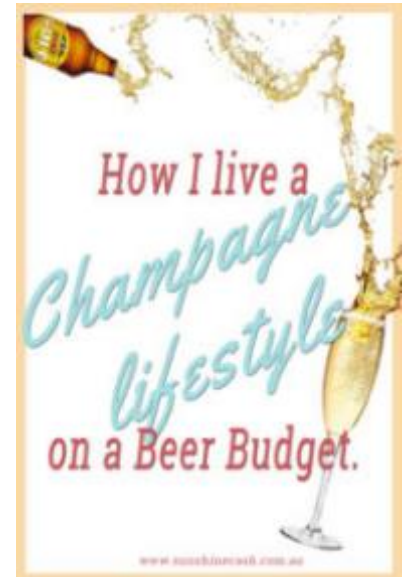
- **Aspirations**

- WebTAG compliance maintained (requirement!)
- Non-intrusive data collection for matrix development & cal/val : no more RSIs! Use of MND or alternatives
- Easier to use- less “clunky” and less manpower intensive
- Lower cost to operate - enable wider LA usage; encourage more private sector use
- Faster run times and results
- Ability to set up simple “ quick & dirty” tests eg as part of optioneering or potentially live traffic management-potentially without cost/ time requirements for consultant support
- Ability to model Connected/Autonomous Vehicles; ability to assign walk/cycle modes (rather than just forecast demand)
- Integrated Air Quality forecasting capabilities; better handling of freight demand/forecasting



Aspirations and challenges for future SRTM

- **Challenges**
- WebTAG compliance maintained (requirement!); DfT/ other funder acceptance of new platforms
- Level of detail, type/quality of outputs available from alternatives to SATURN
- Dealing with a changing society & economy: demographic changes; further transfer of commerce from bricks & mortar to online; economic changes eg Brexit; emerging disruptive technologies....
- Available budget: LTAs currently capital-rich (for infrastructure schemes) but revenue-poor (to pay for staff, tools, data to support non-capital projects): do not have £2m+ budget available for creation of original SRTM.
- Staff resource & modelling expertise a challenge in LTAs
- Numerous strategic highway improvement schemes on site in early 2020s: makes representative “neutral” data collection a challenge



If we have the right tools, what's the prize?

- **Large-scale coordinated land use, economic development and transport investment** being favoured by Government.
- Funding opportunities for transformative proposals of this nature have grown in value over last 5 years and seem set to continue to grow in future regardless of who wins GE!
- Addressing cost, time issues= ability for wider scope of optioneering and testing more scenarios
- Opportunity to sensitivity test and better future-proof our strategies (eg testing impacts of differing uptake of CAVs) = less risk /uncertainty around our proposals
- **Next page: one use case for Solent**

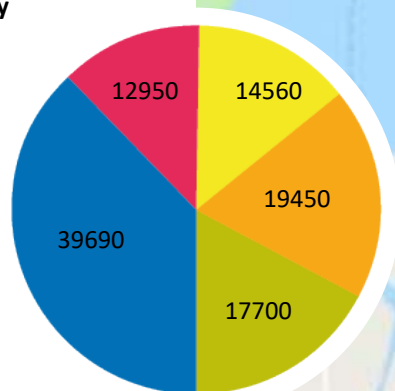


Wider context: current housing & land use trajectory

Of c. 104,000 additional homes planned across Solent (2011-2034), 33% are proposed within the two cities but 67% are proposed outside of the two cities, mostly on “sub-strategic” green field sites

Housing delivery to 2034 by site type (PUSH,2016)

- Portsmouth
- Southampton
- 3000+unit greenfield
- Smaller non-city sites
- Isle of Wight



+ 21%

highway trips

+ 37%

highway travel times

+ 149%

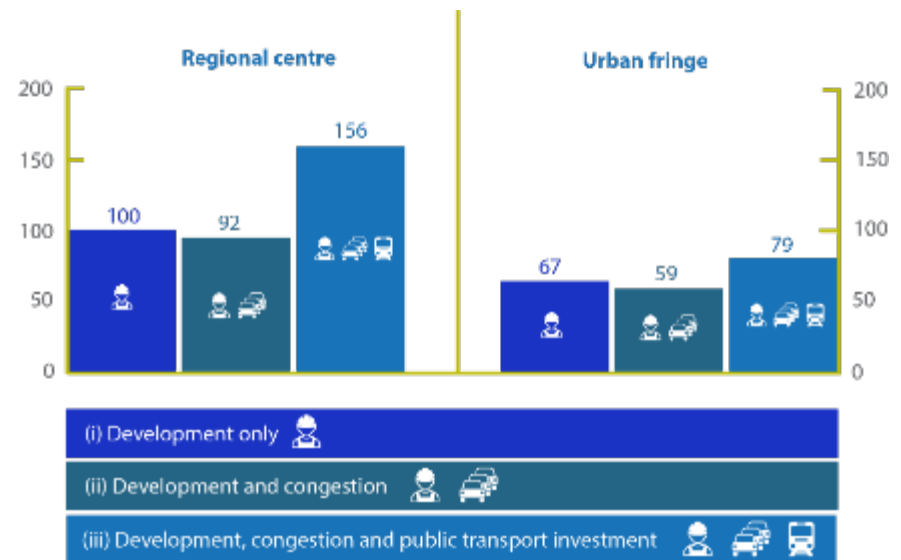
overcapacity queues

Evidence on economic impacts of greenfield development locations

- Despite current development being focused outside the two cities, recent research suggests **greater economic gains** may be achieved by focusing it on existing urban centres:

“Greater economic impacts are observable when developments are located in well-connected as opposed to less well-connected areas, with the employment and agglomeration impacts stimulating 50% more economic benefit’ - KPMG study on behalf of Greener Journeys

- With appropriate transport improvements, **development in urban centres** is forecast to generate **over 50% more economic benefit** than development at urban fringes



- A more concerted effort applying this approach to strategic planning could help implement a **“cities first” approach** with **greater economic (and environmental!) benefits** than the current development trajectory in Solent
- SRTM could **replicate this study methodology** today....but costly and time consuming to do on a large scale/ for multiple options (eg in potential Local Plans) at present. Most LPAs don’t have the budget to do something like this.
- Could an evolved SRTM help us & partners **shape future development plans** in this way, so they are more positive and sustainable for transport?

Conclusions

- Looking forwards to hearing some constructive discussion and debate this evening
- Engagement like this important to help ensure we are fully informed as we start work to update SRTM
- Fast-developing area of technology- hopefully everyone will learn something they didn't know. Thanks for your participation.



Wednesday 27 November 2019

SRTM Capabilities, Uses & Update

Ian Burden



What is the SRTM ?

- Model Components
- Model 2010 Development & 2015 Update

SRTM Applications & Successes

- Capabilities & Recent Applications
- SRTM – Delivery Funding across the Region

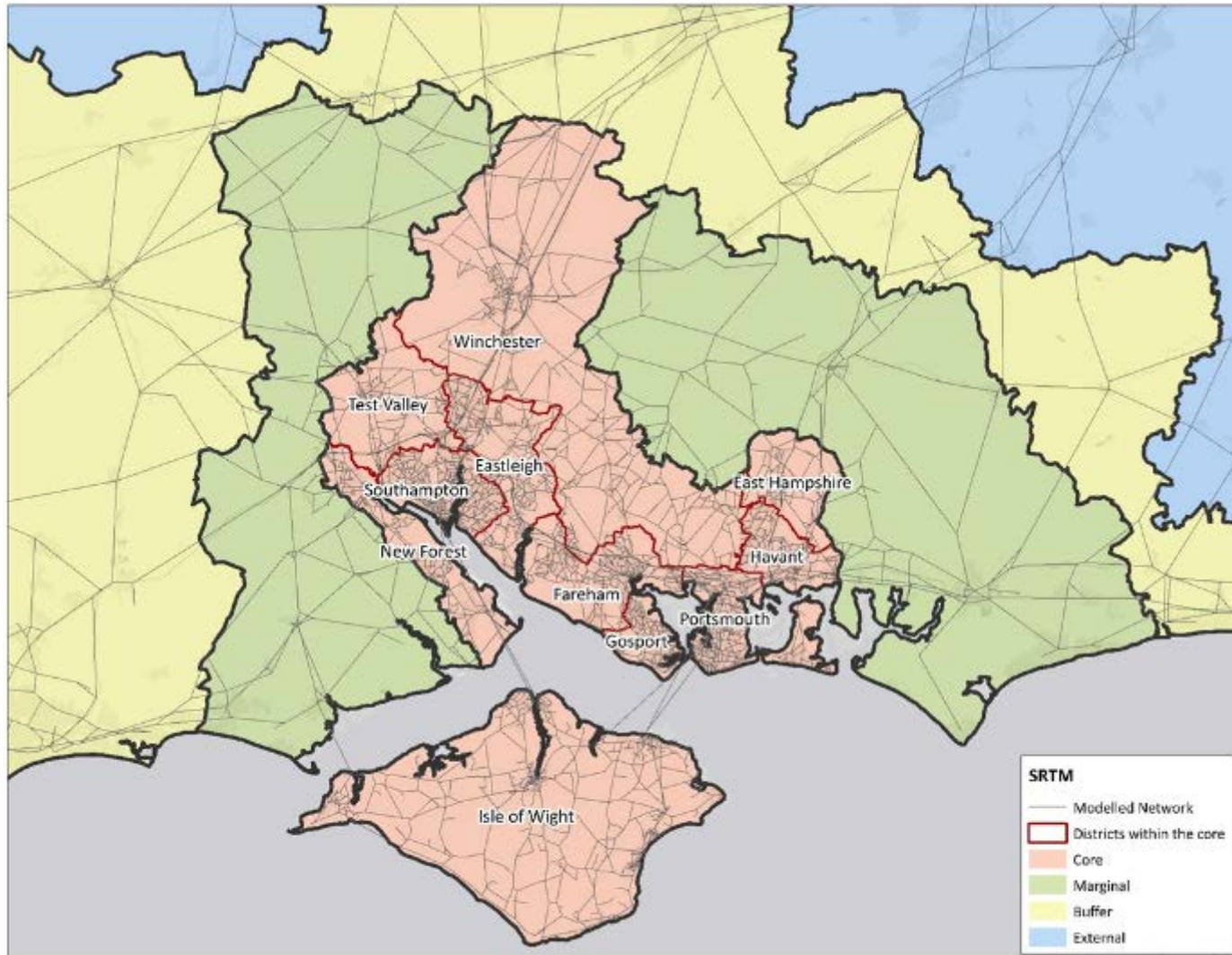
SRTM Model Pressures, Update & Data

- Users Pressures on SRTM scope
- Data Sources
- Fusion Issues



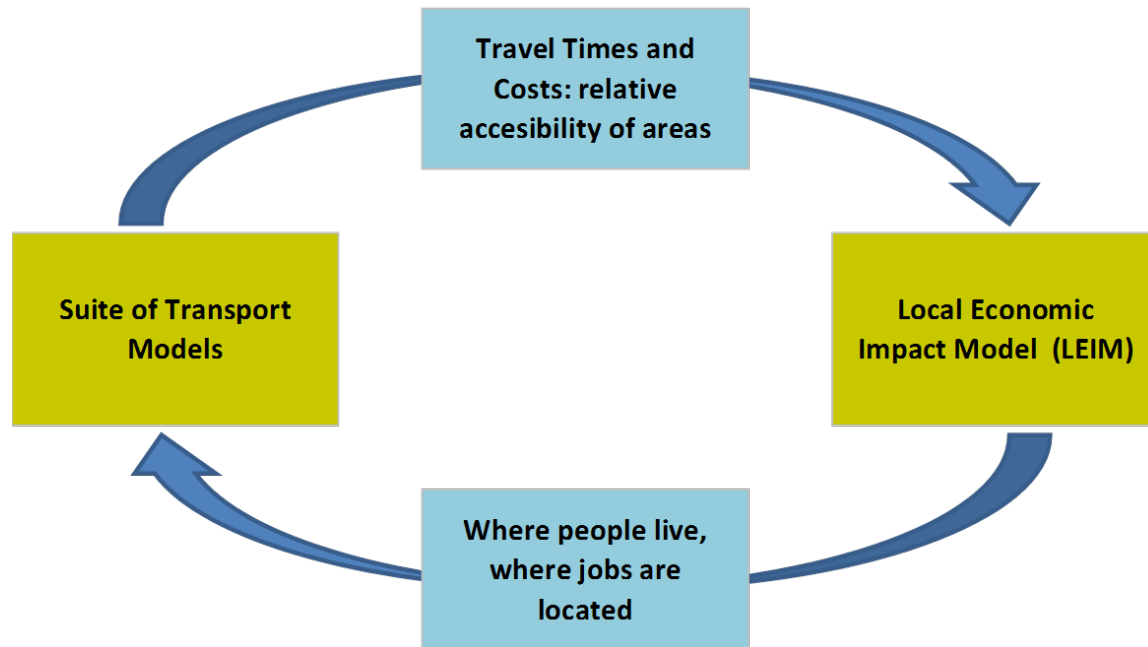
What is SRTM ?

SRTM Model Areas & Core Local Authorities



SRTM Concept

- Developed to test and compare alternative scenarios, proposals and the impacts they would have over many years.
- Looks at flows and journey times of traffic, public transport, (and active travel demand)
- relationship between transport provision and the local economy, and between transport and physical development.



- Developed to assist in the investigation and assessment of different policies, strategies and infrastructure, operational interventions and management on land-use and transport provision.

SRTM – Journey Purposes, Car Availability & Person Types

Abbr.	MDM and Demand Matrices	RTM Assignment Matrices	PTM Assignment Matrices
HBB	HB Employers Business	Employers Business	All Demand
NHB	Non HB Employers Business		
HBW	HB Work	Commuting and Other	
HBE	HB Education		
HBO	HB Other		
NHO	NHB Other		
LGV	Light Goods Vehicles	LGVs	
HGV	Other Goods Vehicles	OGVs	N/A

For personal trips, six trip purposes are modelled plus two types of goods vehicles

The three car availability classes are defined for households:

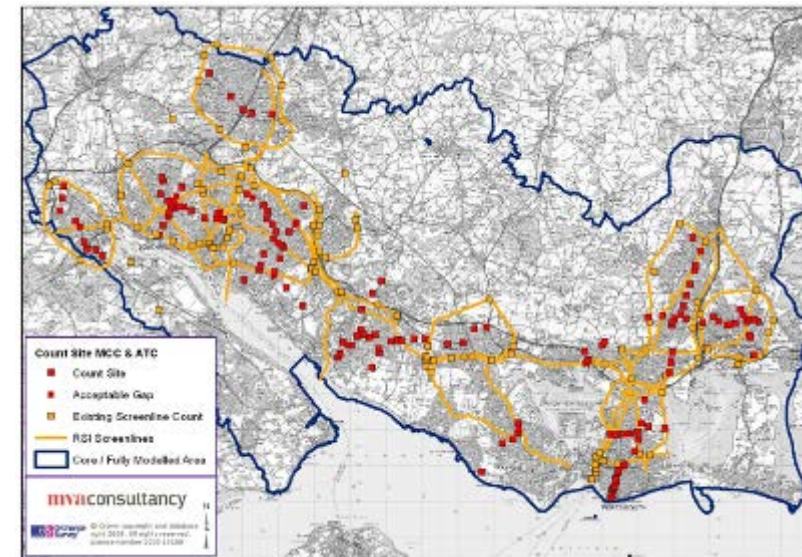
- households with no car,
- households with car competition (less cars than adults) and
- households with no car competition (number of cars is greater or equal to the number of adults).

The four person types are defined as: child, working adult, non working adult, retired.

Development of SRTM, Stakeholder Buy-In & 2015 Update

- **2008** Approval in Principle
- **2009** Evidence Base & Steering Group Est
- **2010** SYSTRA Consortium appointed
- **2008-2010** Data Collection
- **2011** SRTM (2010 Based) complete
- **2011 to date** SRTM in use supporting funding bids
- **2014** Approval in Principle for 2015 update
- **2015** Data collection (Blue items below updated)
- **2017** SRTM (2015 Based) complete

- Observed Traffic movements Road Side Interview Surveys (2008/09/10).
- Automatic Traffic Counts (Tubes and HA H-Eng Data)
- Automatic Number Plate
- Journey Time Surveys
- Rail Station, Bus Stop and Ferry Surveys
- Bus Cordon Surveys
- Electronic Ticket Information
- Port and Airport Surveys (inc Counts)





SRTM Applications & Successes

SYSTRA

SRTM Applications and Bid Funding History (Current Studies)

Business Case Preparation

- A Better Connected South Hampshire - LSTF £17.9m
- Better Bus Area Fund - BBAF £4.5m
- Southampton Bridges to Prosperity – Local Pinch Point £2.5m
- Dunsbury Hill Farm Asda Roundabout - LEP £3.7m

2014 Client Joint Committee:

“secured £28.6m, model costs £2.2m, Theoretical BCR of 13:1”

- Floating Bridge Replacement (Cowes) - LEP £4m
- Whiteley Way (North Whiteley) - LEP £17.8m
- Stubbington Bypass – Solent LEP £34m
- Solent Metro (Southampton) - LEP
- Highways England
 - Maintenance Assessments
 - M3 SMP £165m
 - M27 SMP £320m
 - M3 J9 (A34) £65m
 - M27(J9) £12m-£19m
 - Southampton Eastern Approach/M27 Junctions £20m-£100m
- M27(J10)
- Transforming Cities Fund (Southampton&Portsmouth) 2x£100m+

Local Development Planning

- Eastleigh (rejected, re-tested, examination)
- Fareham (Welborne development)
- Gosport
- Havant
- Southampton (City Centre Action Plan)
- New Forest
- Isle of Wight
- Portsmouth
- East Hampshire

Solent Transport Strategy Formulation

- DASTS → LTSIP → TDP
- PUSH Spatial Strategy

Air Quality Assessments (CAZ)

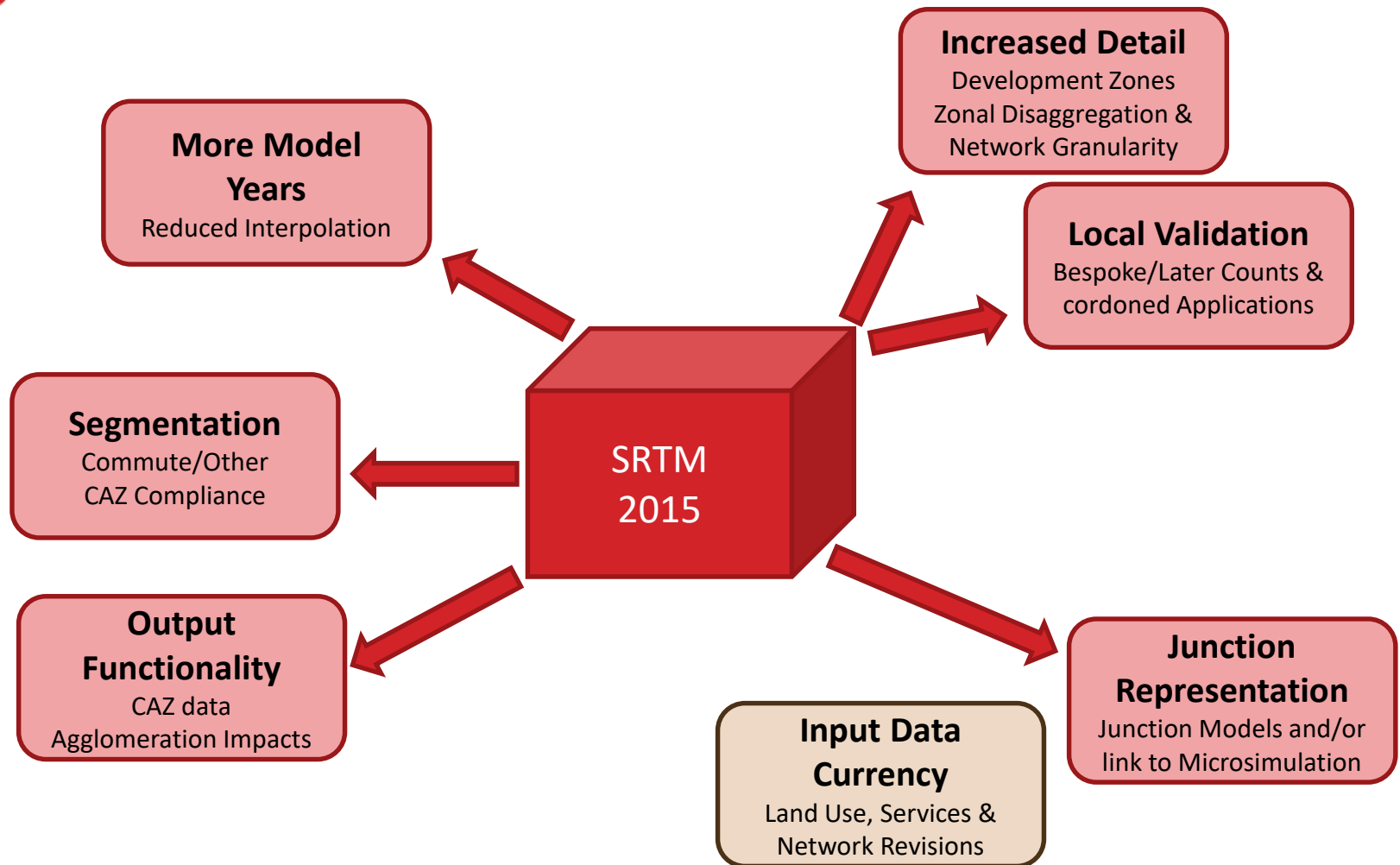
- Southampton CC (JAQU)
- Fareham
- Portsmouth CC & JAQU



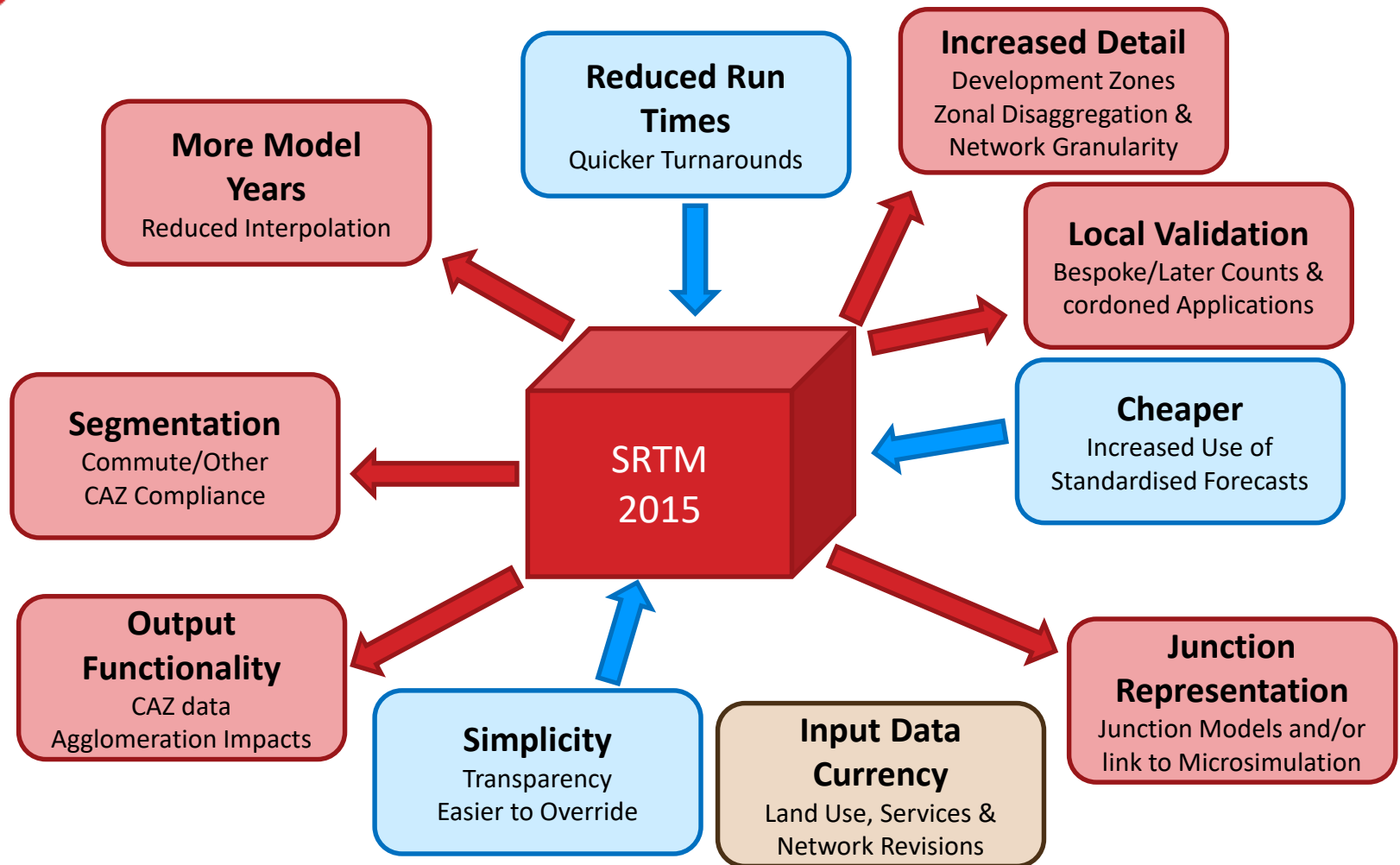


SRTM – Pressures, Update, Data

SRTM Pressures



SRTM Pressures



SRTM Update & Data

2020/21 SRTM update – why bother ?

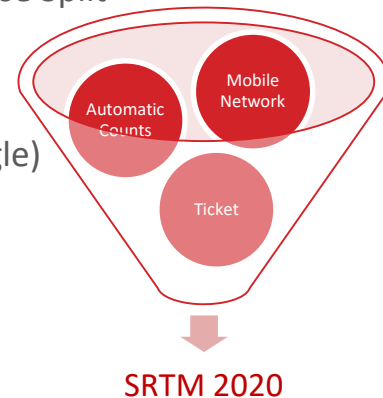
- Update required to retain credible evidence based tool to assess schemes & policies
- Update required by 2021 to remain WebTAG complaint status ...access to DfT / HEng / LEP funds.

How far to address pressures from Previous Slide

- Increasing computing power may offset the additional demands places on the tool
- Or – refocus on different capabilities ?
- Tiered Models - specialism but consistency divergence problems

Data

- Mobile Network Data
 - Short Trips missing (privacy) / Mode Disaggregation (road based inc walk/bike/bus) / Purpose Split
 - Consistency with other sources & Trip National Trip End
- Speed Data
 - Easier/more comprehensive alternatives to TrafficMaster (Mobile/Operator/TomTom/Google)
- Public Transport
 - Commercial and Compatibility barriers to access to extensive operator sources
 - Smart Ticketing / SolentGo monitoring information dividend ?
- Signal Data
 - MOVA / fixed time data / Traffic Count Information



Thank You....Questions?

Contact	Position	Email	Phone
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www.systra.co.uk



SYSTRA



New Data and Models for Integrating Transport and Land-use Planning

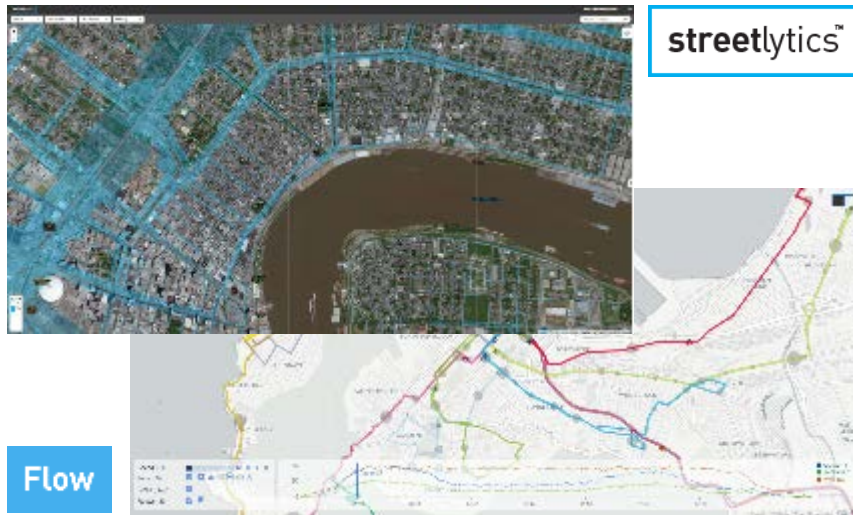
 **CITILABS** is now part of

Data Fusion and Prediction

Bentley[®]
Advancing Infrastructure

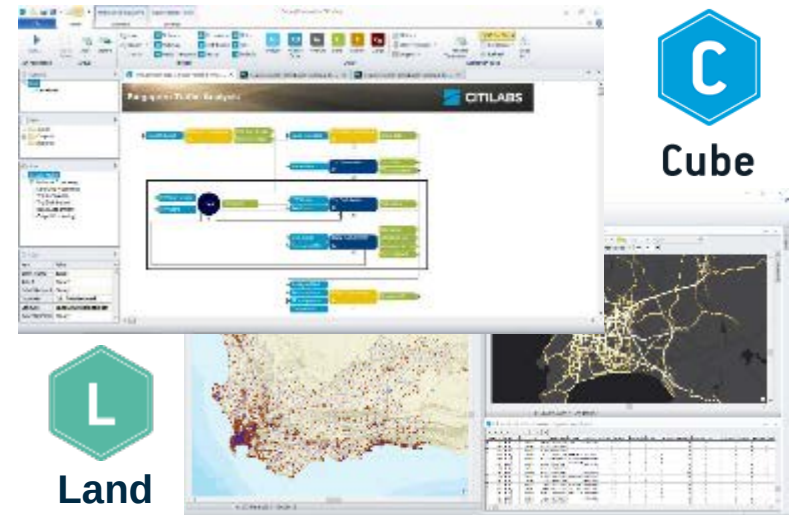
New Data for Transport & Land-use

‘Today’



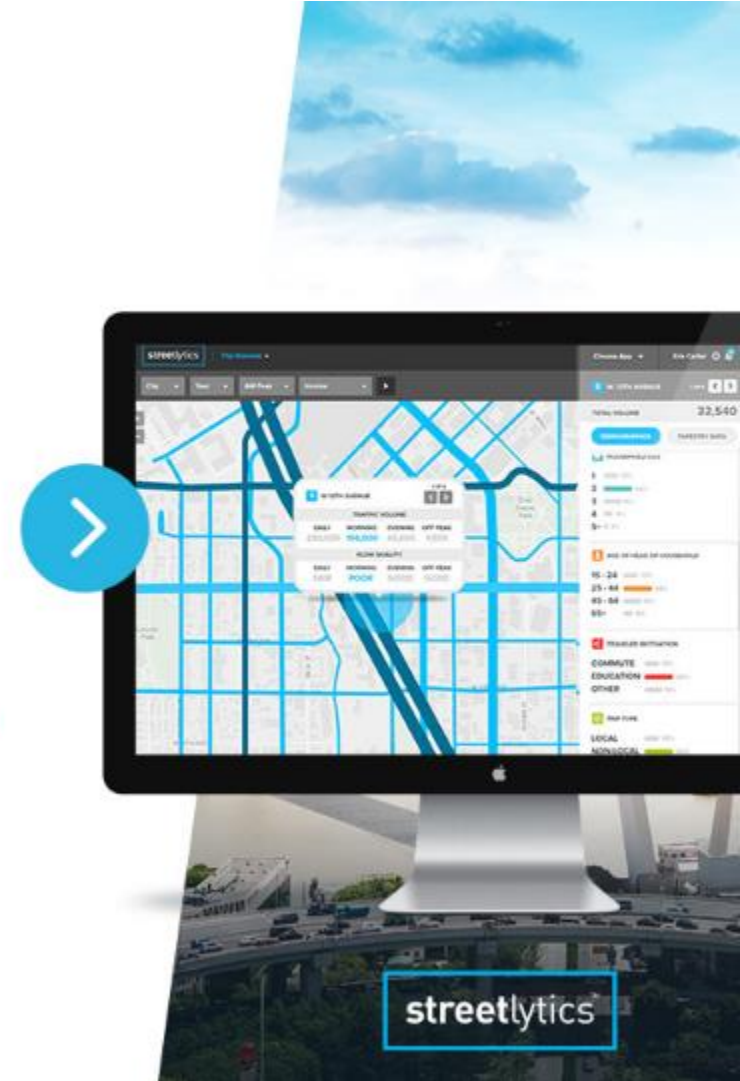
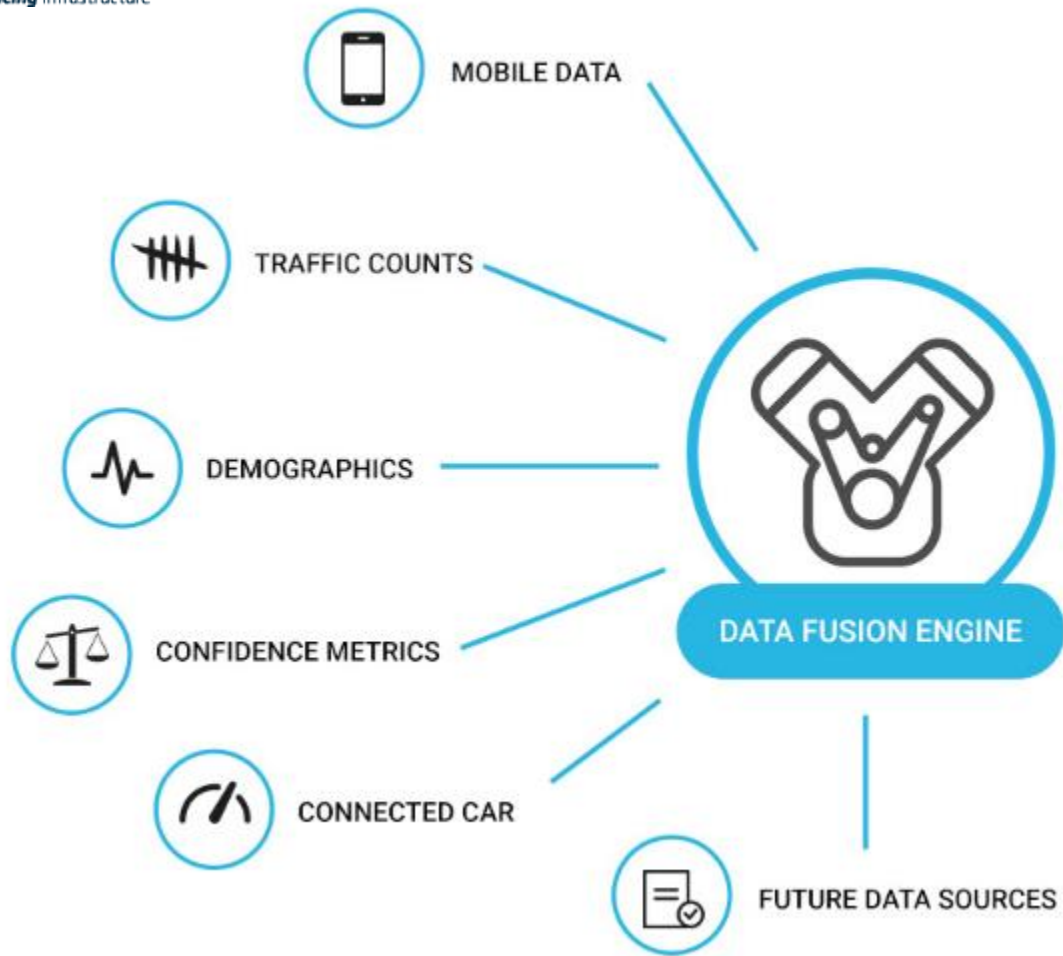
Data (Fusion)

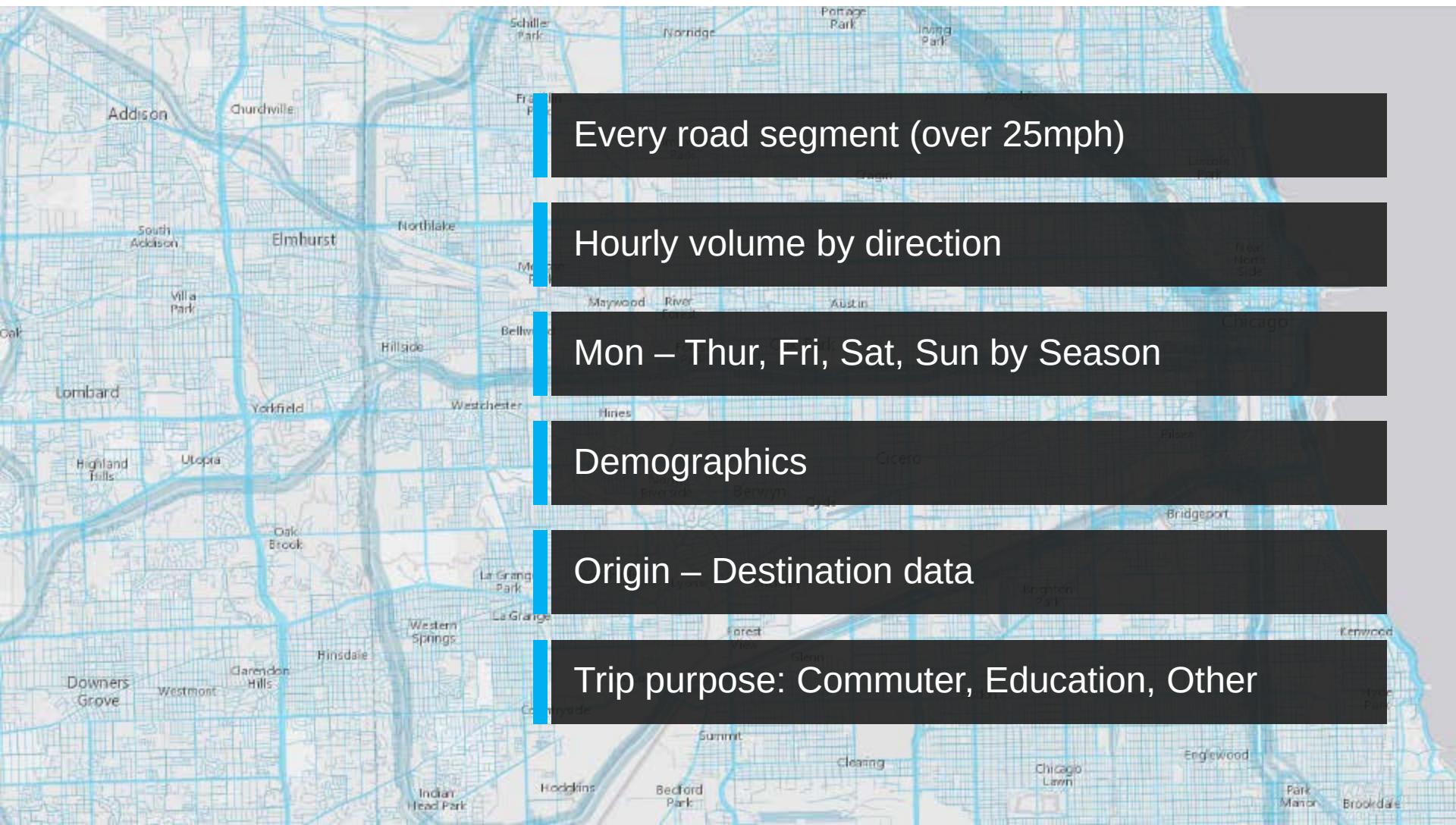
‘Tomorrow’



Forecasting

Highway Data Fusion





Every road segment (over 25mph)

Hourly volume by direction

Mon – Thur, Fri, Sat, Sun by Season

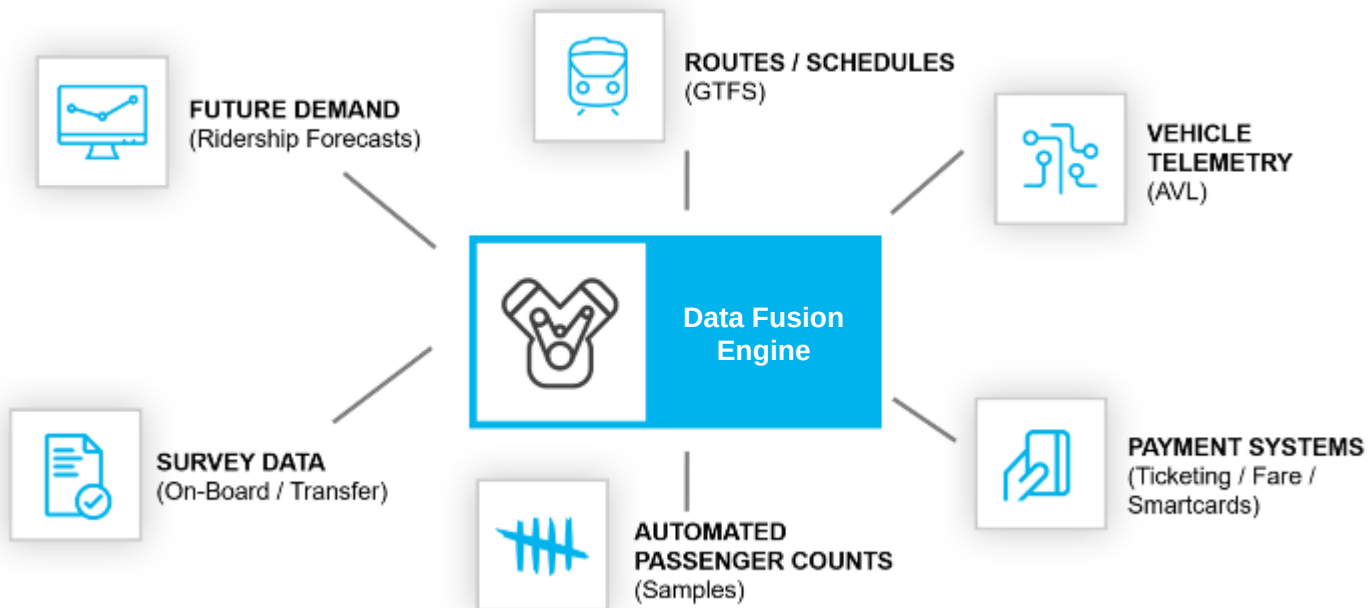
Demographics

Origin – Destination data

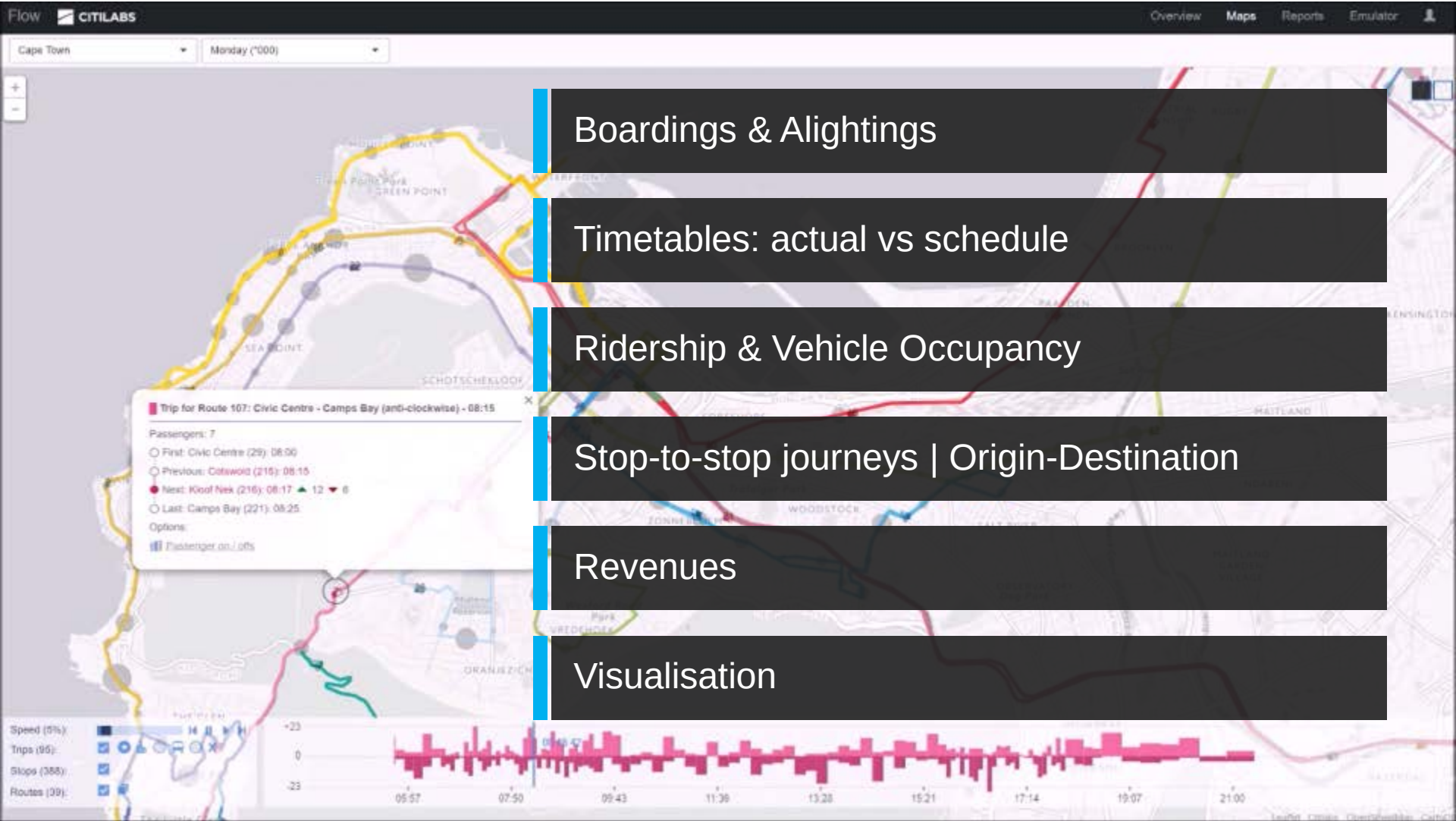
Trip purpose: Commuter, Education, Other

Public Transport Data Fusion

Flow



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New Data and Models for Integrating Transport and Land-use Planning

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Potential future updates and enhancements to the Solent Sub-Regional Transport Model (SRTM)



John Preston

Head of the Transportation Research Group (TRG)

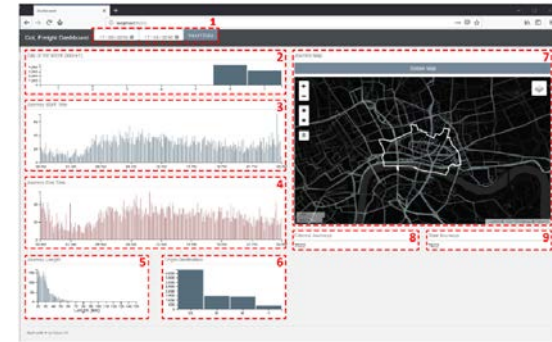
Presentation to TPS/CIHT 27 November 2019

Objectives

1. Review modelling platforms and their capabilities with respect to transport technologies, socio-demographic change, air quality, self-service and real time traffic management.
2. Review new data sources such as Mobile Network Data (MND), GPS, Bluetooth and Wi-Fi.
3. Undertake consultation with expert stakeholders
4. Draw conclusions concerning future updates and enhancements to the SRTM

Research undertaken February to June 2019.

Involved subject matter reviews and 13 interviews with 19 participants (9 Local Government, 3 National Government, 7 Private Sector). Mixture of model/data suppliers, consultants and users.



Method

Lead Author	Number	Title	Pages
Dr Matt Grote	1a	Sub-Regional Transport Model Overview	9
Dr Matt Grote	1b	Air Pollution Emissions Modelling	19
Prof John Preston	1c	Land-Use and Transport Interaction (LUTI)	6
Dr Simon Blainey	2	Geographical Information Systems, Public Transport and National Infrastructure	10
Prof Tom Cherrett	3	Freight Transport Data and Apps	14
Dr Ioannis Kaparias	4	Passenger Transport Data	14
Dr Ben Waterson	5	Potential Base Modelling Approaches	8
Dr Matt Grote	6	SRTM Stakeholder Engagement – Final Report	10
Prof John Preston	7	Synthesis Paper	10
TOTAL			100

Brief specified 21 Research Questions.

Semi-structured interviews based on 10 Questions.

Key Findings (I)

1. Reliability of SRTM forecasts.

Majority believed they were acceptable. A minority questioned use of historic snapshots and favoured use of 'persistent' data.

2. New Modes and Uncertain Behaviour

Typically participants believed CAVs (and other emerging modes) could be incorporated into SRTM but updating software seen as a substantial barrier. A minority supported a modelling paradigm shift to micro-level agent based modelling as in the new Oxfordshire Mobility Model.

3. Air Quality Modelling

Consensus that this was important and could be incorporated into SRTM (possibly using PITHEM type tools) but issues with DEFRA approval. Would still require detailed localised assessment of hotspots using AirViro or similar.

Key Findings (II)

4. Model Run Costs and Times

Some support for SRTM-lite or self-serve software but SRTM's proven track record (and WebTAG compatibility) a big advantage. Possible consideration of parallel and cloud computing (and programing) and multi-level models.

5. Real-Time Modelling for Traffic Management

Consensus that desirable but would be highly resource intensive if to be effective.

6. New Data Sources (e.g. MND, GPS, Bluetooth, Wi-Fi)

Some support but issues concerning spatial coverage, representativeness and future availability given privacy concerns. Scope for data fusion.

Conclusions (I)

- There are differences of opinion among the participants on most of the issues affecting the specification and procurement of future SRTM updates, which means complete consensus on appropriate courses of action will be difficult to achieve.
- In general, participants viewed all innovative data sources as being associated with advantages and disadvantages, and no single data source was considered adequate in isolation for the SRTM update. Instead, a blend of multiple data sources was regarded as necessary.
- Participants suggested it was important that the procurement process was underpinned by a clear understanding of the challenges in the Solent area, which should be translated into a clearly defined specification of the capabilities expected from the updated SRTM.

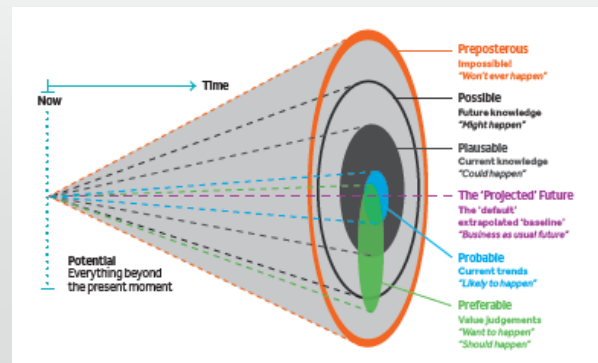
Conclusions (II)

- Technological developments, including low-cost ubiquitous sensors, pervasive communications and the internet of things, mean that we are better able to track vehicles, individuals and goods than ever before, whilst developments in high performance computing and big data analytics have provided the processing power and tools that are needed. Government initiatives towards open data have increased access to traditional databases.
- However, the new data sources have not yet demonstrated their comprehensiveness or accuracy. It seems that the most likely way forward will be a blend of the old and the new leading to both hybrid data sources and hybrid models. The exact nature of this hybridity can be market-tested.

Discussion Points

How will new data and models improve the planning of transport and land-use and take into account:

- The climate emergency
- Active travel/Micromobility
- Transformative public transport
- Transport for New Homes
- A less certain future?



CIHT

Better planning,
better transport,
better places

