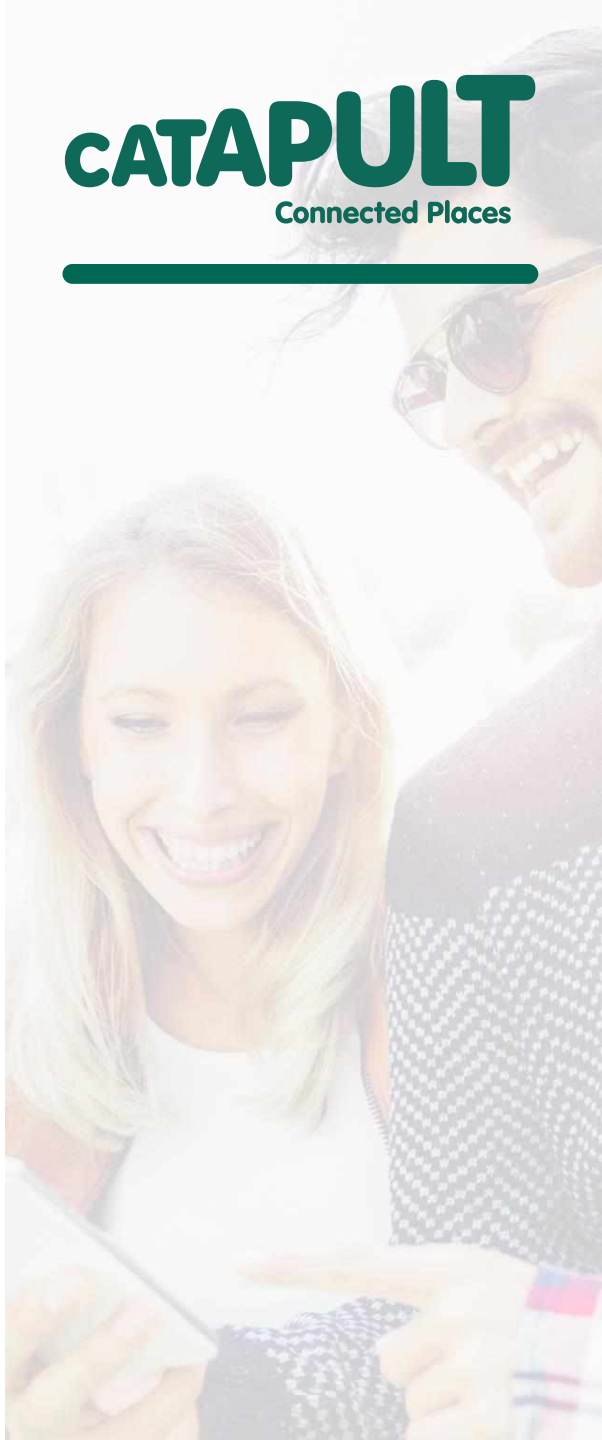
Low-Cost Air Pollution Monitoring Systems: Testing and Evaluation of the Whole Ecosystem

Dr Christopher Rushton
Senior Technologist, Air Pollution and Vehicle Emissions

CATAPULT
Connected Places

Talk Outline

- Why This and Why Us?
- Project and Team Overview
- Work To Date
- Next Steps
- Impact



Why This and Why Us?

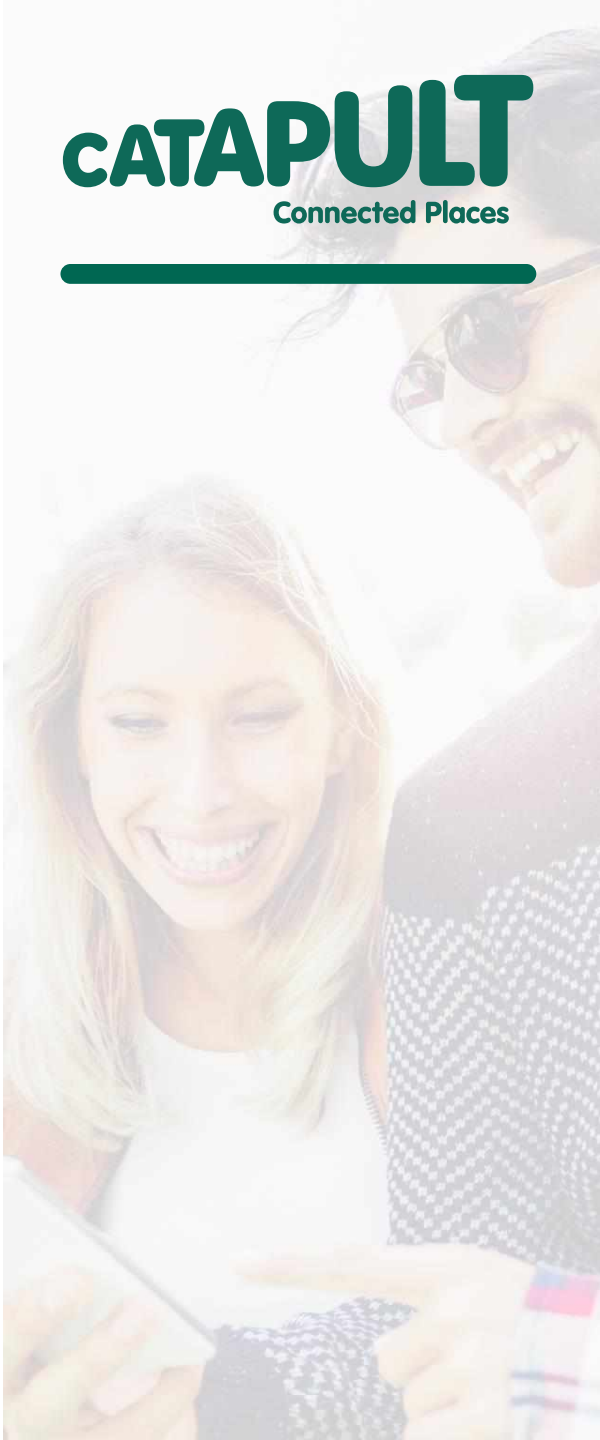
Why Connected Places Catapult?

The dominant cause of air pollution in cities is transport

Air pollution is a negative external cost, therefore markets won't develop their own solutions

Problem requires engagement with commercial, academic and authority stakeholders

CPC's neutral third-party status allows us to report in an unbiased manner to all stakeholders



Why This and Why Us?

What is the system for clean growth?

How can stakeholders that are doing science support and develop innovative business models?

Innovative business model

World-leading science

How can the value of new and innovative business models and products be demonstrated?

We can't assume this shortcut will deliver results!

Efficacy of solution in real world

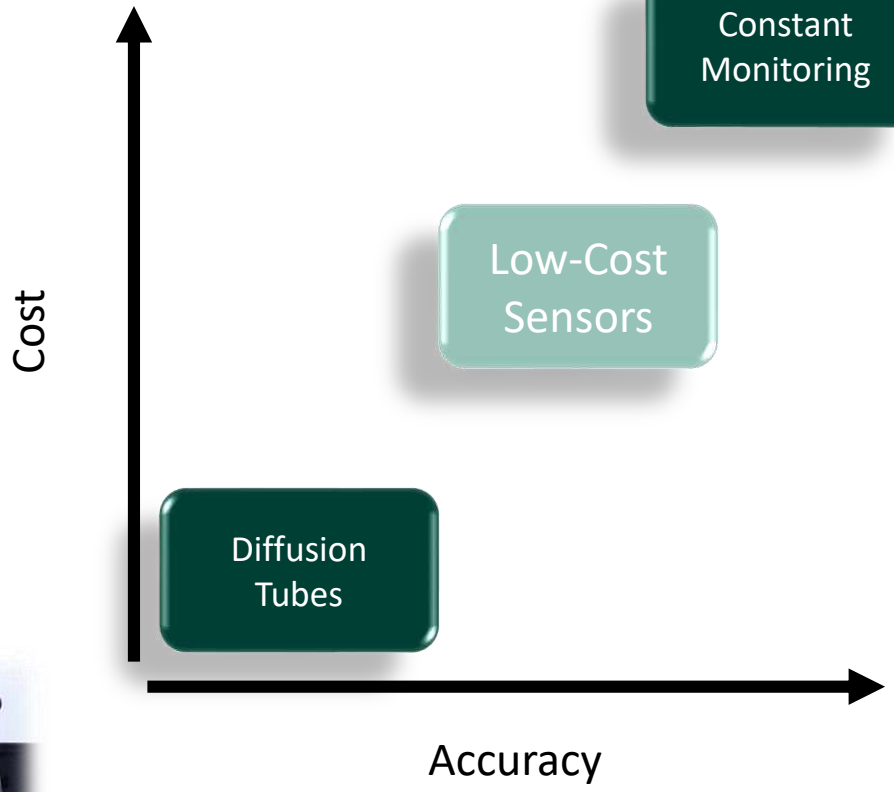
Customer may have limited resources to do own R&D

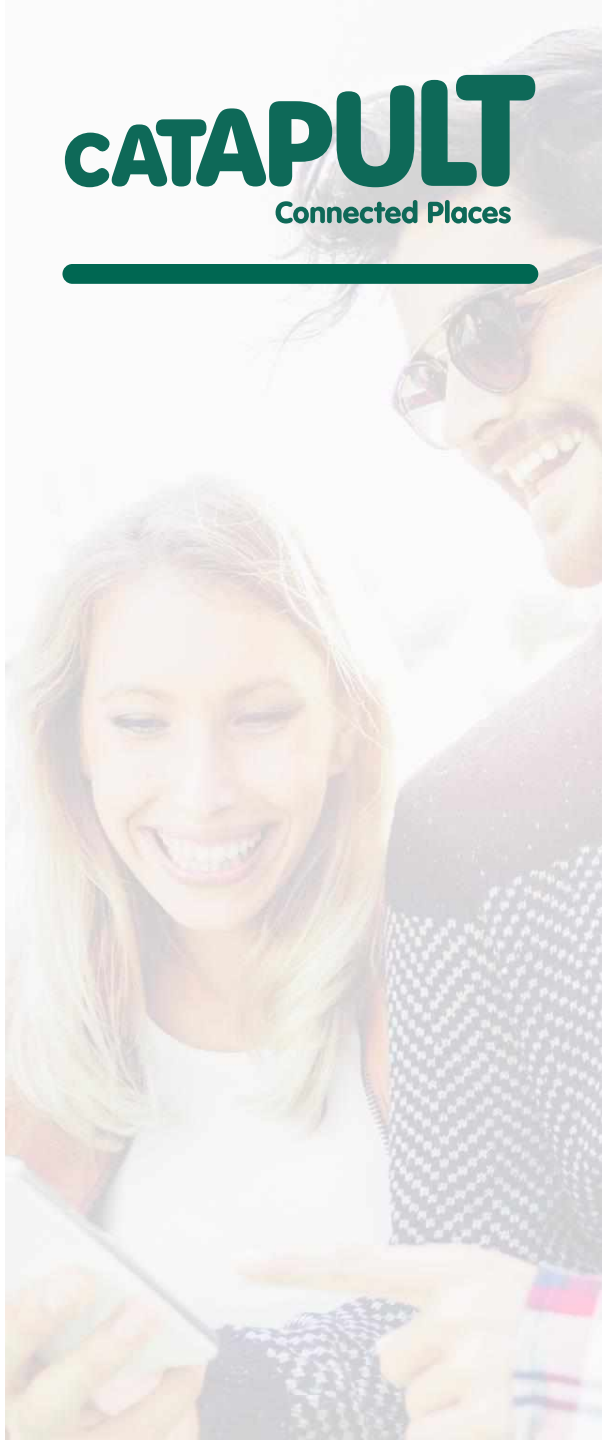
How can real-world demonstrators effectively address the information gap between supplier and customer?

- *Give good advice*
- *Deliver value for money*
- *Improve air quality and reduce GHG*
- *Make profit for business*

Why This and Why Us?

Current Market State



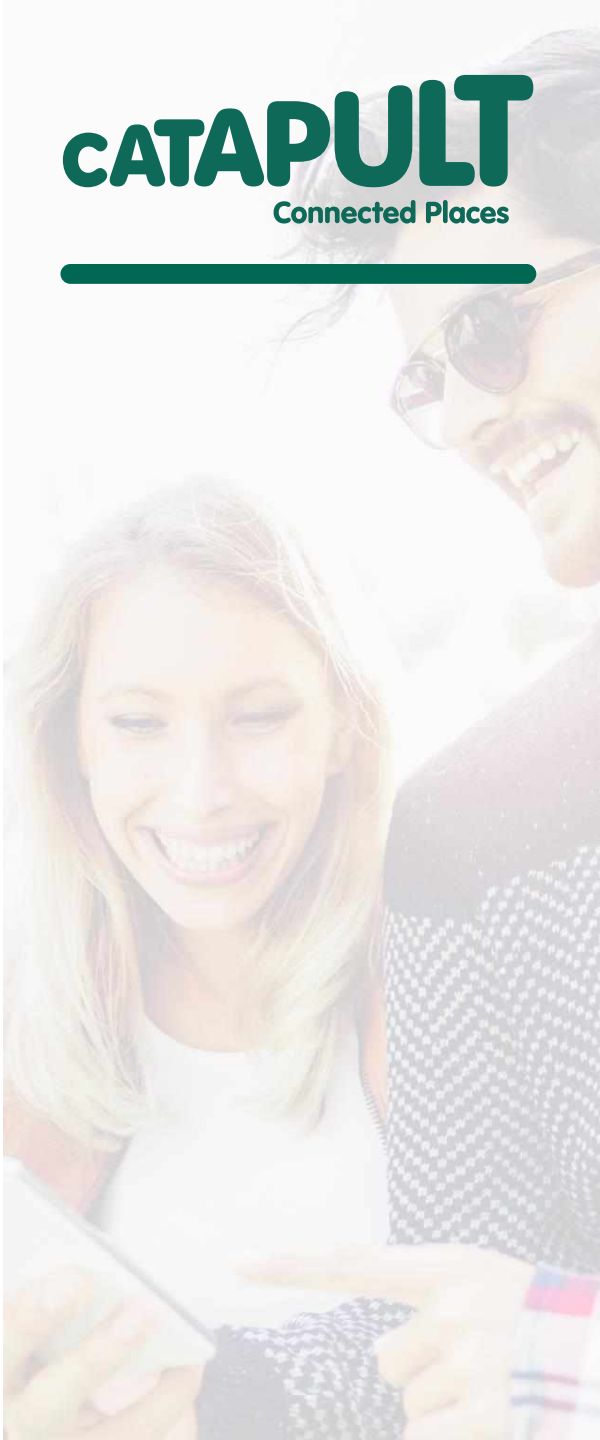


Why This and Why Us?

Current Market Complications

Show value to local authority early adopters	Allow DEFRA to advise LA with confidence	Reduce friction for sensor vendors
Need to deliver value for money to taxpayers	Academics want to do precise science	Outline processes for vendors
Need to address air quality issue or face fines	Businesses want to sell units	Validate instruments in the real world
No budget or expertise to do own R&D	DEFRA need to give good advice	

CATAPULT Connected Places



Why This and Why Us?

What are we going to do?

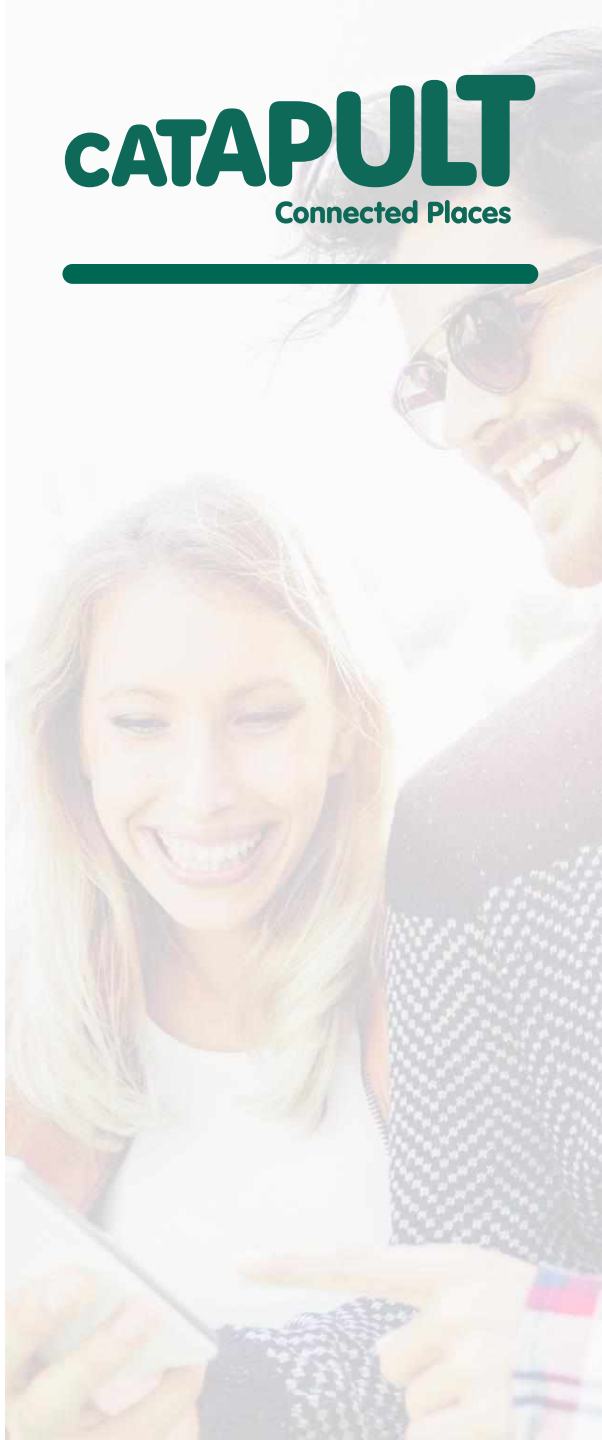
CATAPULT Connected Places

Ecosystem Review	Data Collection	Data Analysis and Reporting	Dissemination of results
Complete	Targeting 6 months of data collected and compared to best available sensors	Develop transparent and repeatable methodology	
	5 sensors installed at 4 continuous monitoring sites around the UK	Report quality of results in a fair and sensitive way	
	Bradford, Manchester, Sheffield and Milton Keynes	Evaluate the ecosystem around deployment of sensors, e.g. power supply	

Work To Date

Ecosystem Review

State of the Science	State of the Market	State of Legislation
Health impacts of air pollution	Market drivers and outlook	Air quality legislation and monitoring requirements
Technical elements of low-cost sensors	Sensors for this project	Examples of work currently being done by authorities
Summary of projects being undertaken	Additional sensor systems	Funding



Work To Date

Sites Selected: Sheffield, Bradford, Milton Keynes, Manchester University

Manchester site, full installation

Bradford site, partial installation

Work To Date

All sensor installations complete
Data collection live
Analysis methodology complete
Data analysis in preliminary stages

Impact?

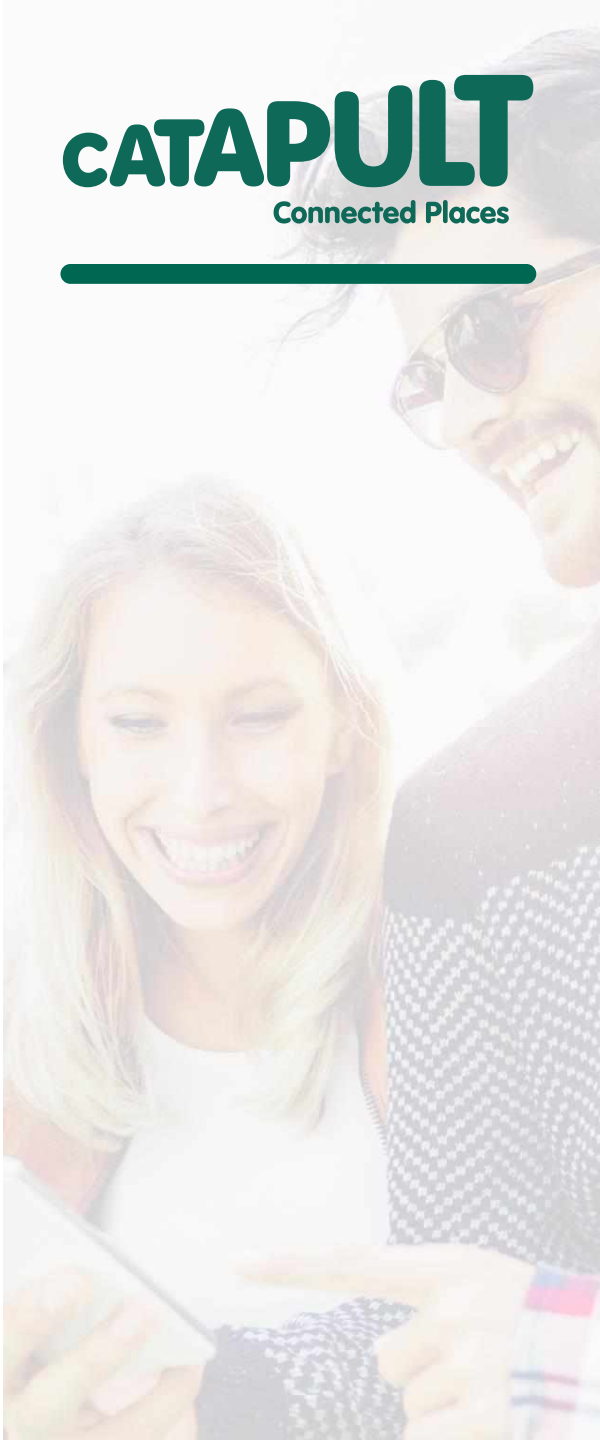
What do we hope to achieve?

Provide evidence that supports the case for deployment of sensors in polluted areas

Identify pain points in the deployment of the sensors so local authorities and vendors aren't surprised

Show the use cases where the deployment is suitable and not suitable

→ Support the growth of a sector that the UK can lead in, and is applicable world-wide



Head of Project Delivery:
Paul Bate

Project Manager:
Claudiu Stefanescu

Technical Lead:
Chris Rushton

Team Lead:
Marcel Pooke

Technical Contributor:
Richard Tusting

Technical Contributor:
James Ferguson-Moore

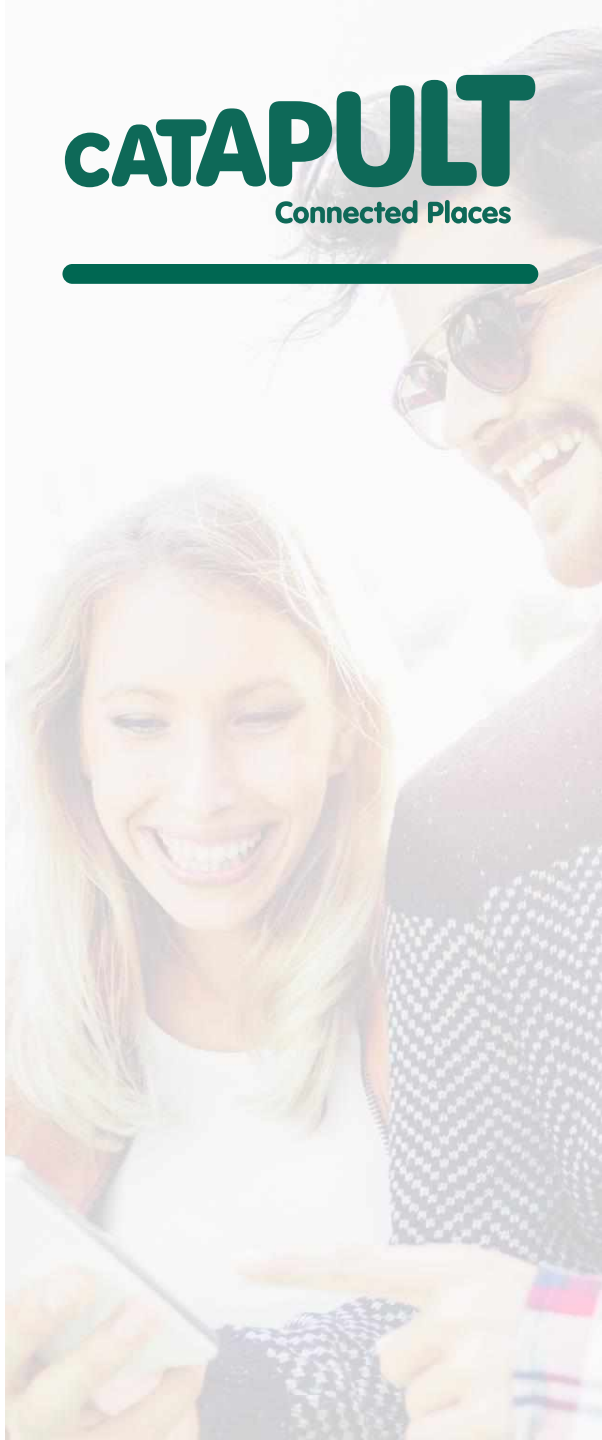
Technical Contributor:
Fabio Galatioto

Technical Contributor:
Aditya Thirunavukkarasu

Technical Contributor:
Domas Zemaitis

Technical Contributor:
Erik Nielsen

Contact: *chris.rushton@ts.catapult.org.uk*



Thankyou
and Q&A