



UKCRIC

UK COLLABORIUM
FOR RESEARCH ON
INFRASTRUCTURE & CITIES
**Inspired infrastructure
for better living**

Data Driven Solutions

UKCRIC Lead: Dr Jennifer Schooling

17 May 2022

To measure is to know. If you don't measure it, you cannot improve it.

- Lord Kelvin, 1883

Curation of a data driven solution

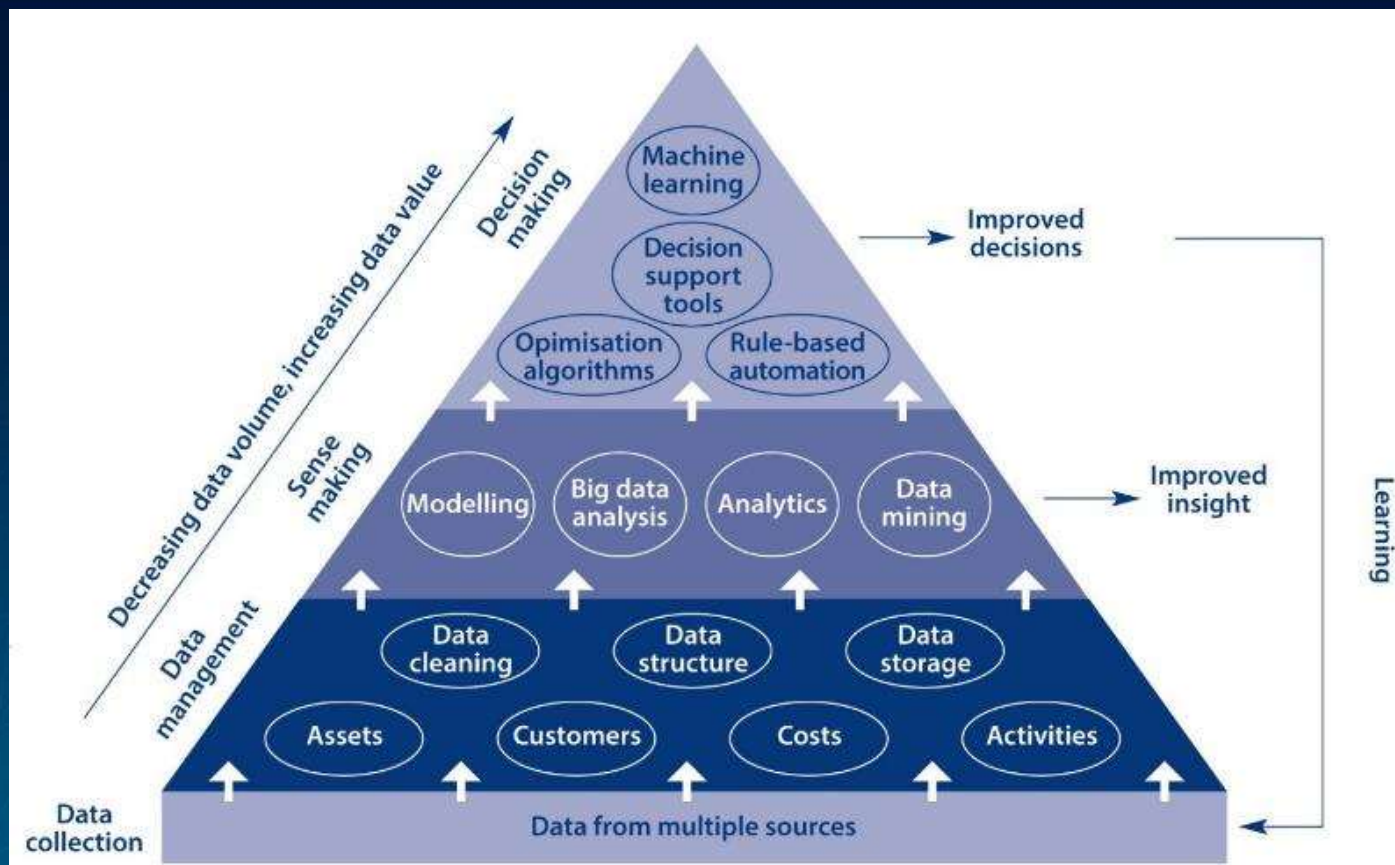


Image: Cambridge Centre for Smart Infrastructure and Construction (CSIC), University of Cambridge.

Across UKCRIC



Geo-tagged photos

Laser scanning

Automated sensing systems such as mixed reality solutions for construction progress monitoring

Sensors attached to buildings

Remote sensing including satellite acquisitions

Scanned images

GIS and BIM

Drone surveys

Drone surveys

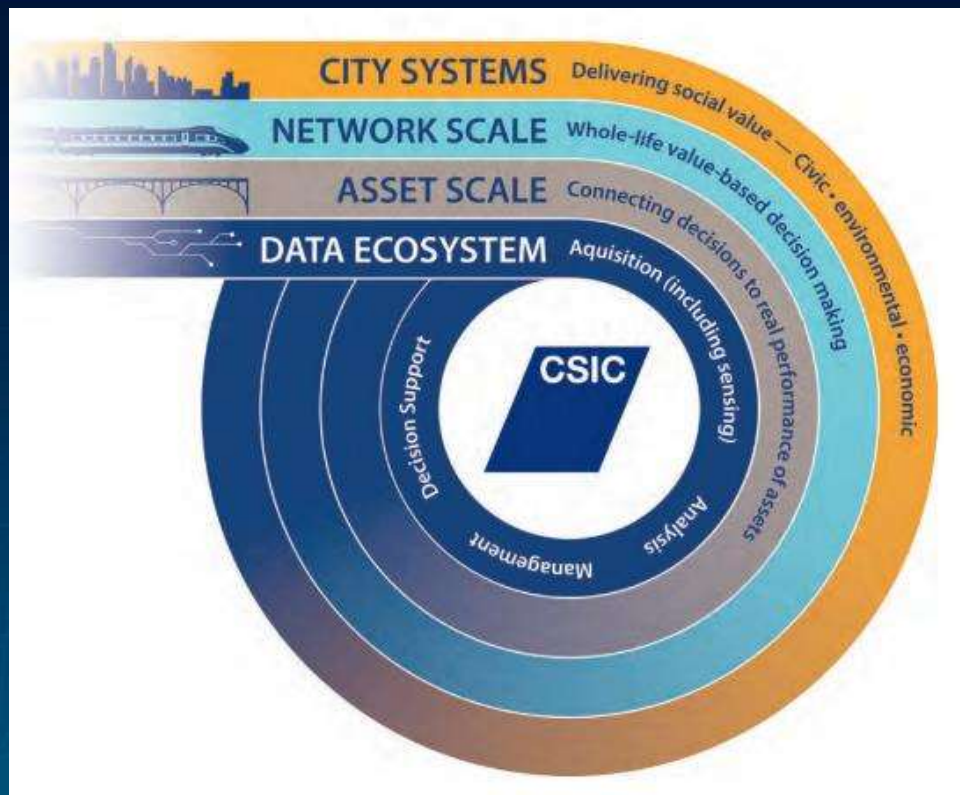
GPS from mobile phones

Traffic cameras

Embedded sensing systems installed in new structure and piles

Social media

The journey of data



Data throughout the infrastructure and construction ecosystem enables smarter decisions to deliver a more sustainable, economical and resilient infrastructure system for the people it serves.

Image: Cambridge Centre for Smart Infrastructure and Construction (CSIC), University of Cambridge.

UKCRIC Facilities and Observatories



Laboratory Facilities

- National Research Facility for Infrastructure Sensing, Cambridge
- The National Robotarium, Heriot-Watt & Edinburgh
- Centre for Future Infrastructure, Edinburgh
- National Green Infrastructure Facility, Newcastle

Urban Observatories

- Newcastle Urban Observatory
- Bristol Infrastructure Collaboratory
- Urban Flows Observatory, Sheffield
- Cranfield Urban Observatory
- Manchester Urban Observatory
- Birmingham Urban Observatory

Data and Analytics

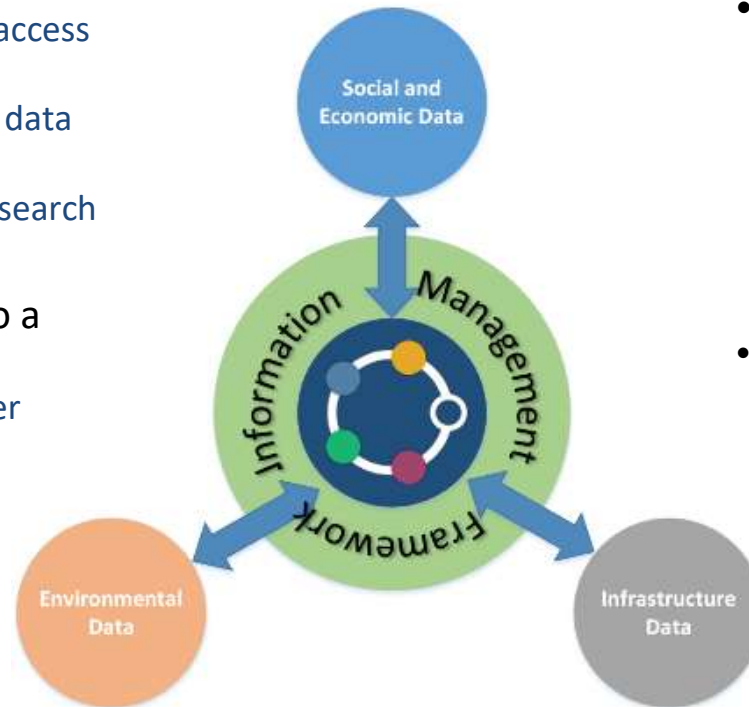
- DAFNI - Data and Analytics Facility for Infrastructure



Marion Samler, DAFNI Partnership Manager

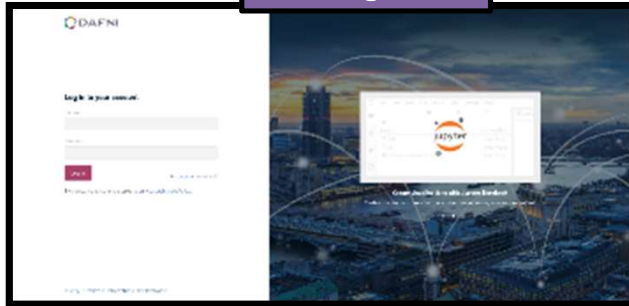


- DAFNI provides a Data Hub
 - A trusted secure space to hold and access data
 - Importing from and linking to other data sources
 - metadata framework and common search and access
- Upload models from anywhere into a model repository
 - Models “containerised” using Docker
 - Independent of code and operating systems
 - Framework
 - Chaining models together
 - Coupling models together

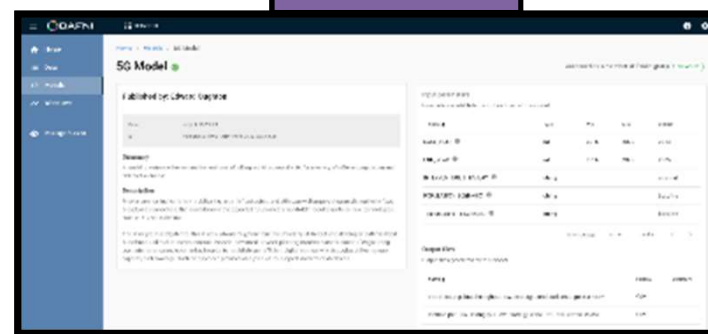


- A platform for integrating and combining data from different sources
 - Extensible to sectors: water, energy, transport ...
 - Support an Ontological framework for data
- A hybrid high-performance computing platform
 - Kubernetes orchestration of containers
 - Scale up models for more compute
 - Access to data in the NID
 - Access to visualisations

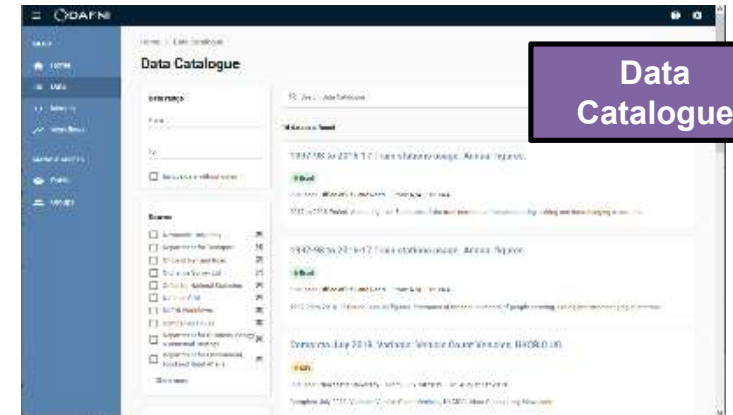
Login



Data



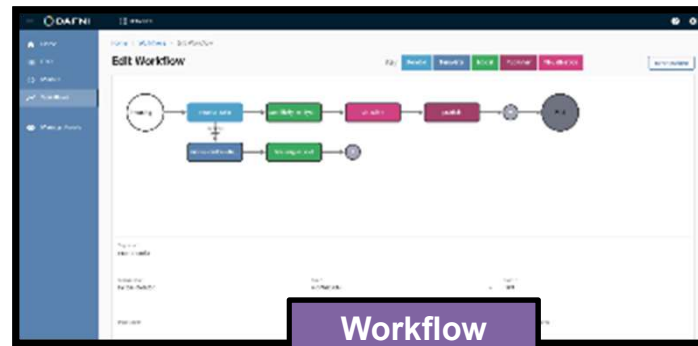
Data Catalogue



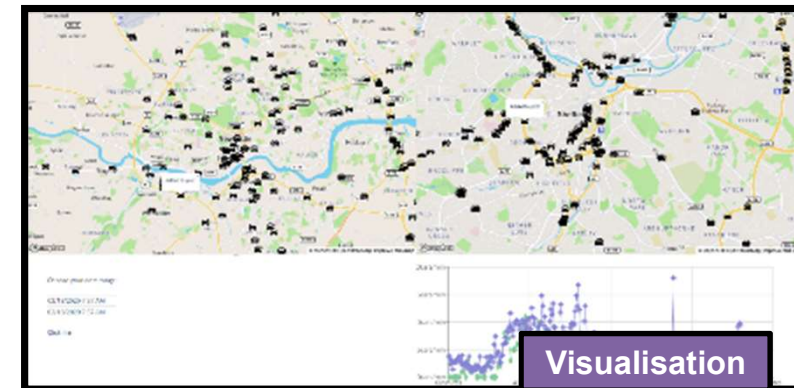
Models



Workflow Management



Visualisation



- A production platform
 - Setting up a service management environment
 - Operating the platform
 - User support, operations, help desk
- Looking towards Phase 2:
 - Digital Twins: running long-running models with real-time input and outputs
 - Support for Machine Learning models
 - Richer data infrastructure
 - An extended framework for integrating models.
- Developing our sustainability plan: DAFNI Phase 2
 - Long-term sustainability for production beyond September 2021
 - Seeking to establish a hybrid model: platform support and contributions from projects.
 - Webinars and Hackathons Roadshow across the UK
 - Final event –5th and 8th July 2021
- University hardware: £950,000 of investment into the 12 universities.
- Champions programme

DAFNI's Champion Programme:

University of Southampton: Simon Blainey, Adrian Hickford -
Transport Research Community

UCL: Mike Batty, Juste Raimbault - **MATSim (Multi-agent Transport Simulation) framework**

Cranfield University: Simon Jude - **Integration of DAFNI and UKCRIC Urban Observatories**

Sheffield University: Daniel Coca, Cristian Genes - **DAFNI as a Digital Twin Platform**

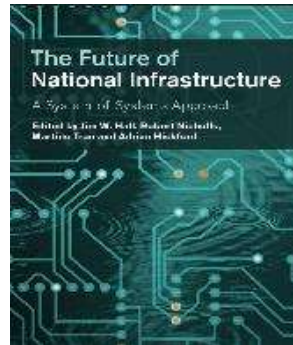
UCL : Liz Varga, Andrey Postnikov, Lauren McMillan; Oxford: Tom Russell; Newcastle: Luke Smith; Cranfield: Stephen Hallett, Ian Truckell - **Infrastructure Research Ontology**



Traffic Digital Twin in Sheffield



NISMOD has migrated to DAFNI



Digital Twin Urban Analytics - Towards A Flexible, Sustainable Urban Energy System



Green Finance: DAFNI part of a new £10M UK centre for climate and environmental risk for the financial industry.





Thank You

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NRFIS

**National Research Facility for
Infrastructure Sensing**

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