ServCity

Robert Bateman
Nissan Technical Centre Europe
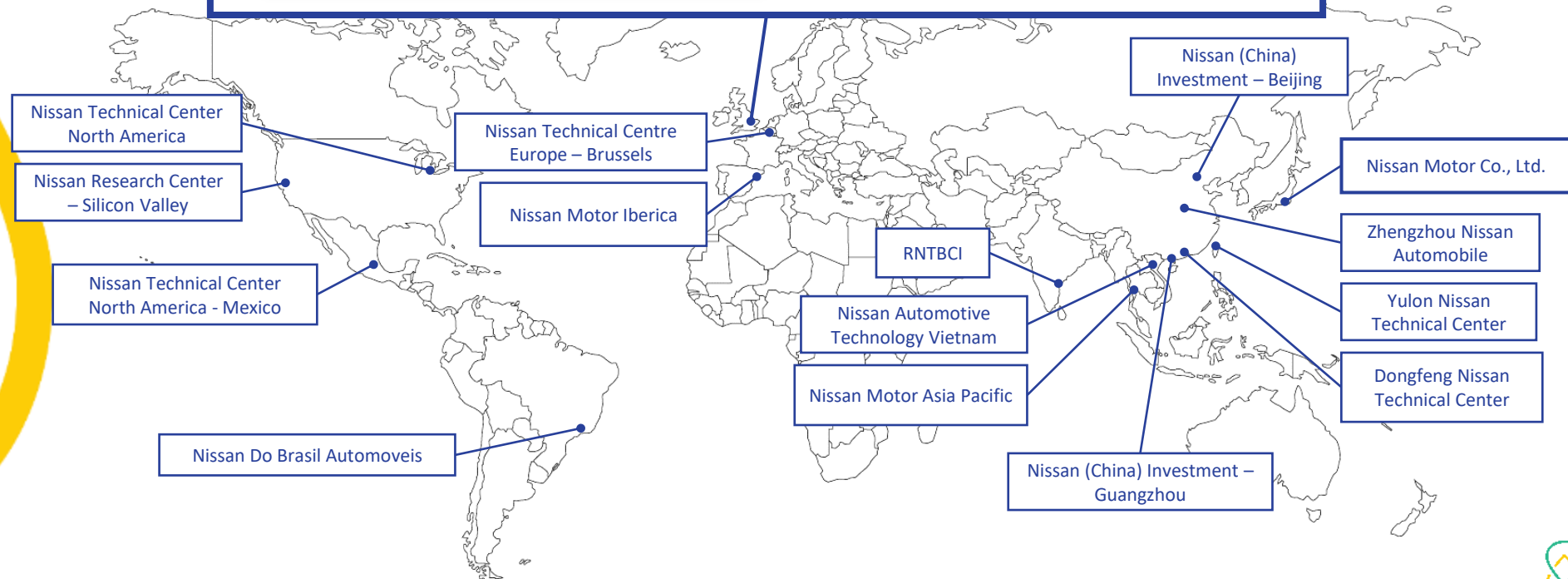
Thomas Tompkin
TRL

Nissan Global R&D Footprint

Nissan Technical Centre Europe – Cranfield

- ✓ Biggest R&D site in Nissan Europe
- ✓ Established in 1988
- ✓ Over 700 staff working

Nissan Technical Center North America

Nissan Research Center – Silicon Valley

Nissan Technical Center North America - Mexico

Nissan Technical Centre Europe – Brussels

Nissan Motor Iberica

Nissan (China) Investment – Beijing

Nissan Motor Co., Ltd.

Zhengzhou Nissan Automobile

Yulon Nissan Technical Center

Dongfeng Nissan Technical Center

RNTBCI

Nissan Automotive Technology Vietnam

Nissan Motor Asia Pacific

Nissan Do Brasil Automoveis

Nissan (China) Investment – Guangzhou

Nissan's Vision

ServCity

Autonomous Drive (AD) & Nissan's Vision

CLEANER

Zero Emissions Carbon Neutrality

SAFER

Zero Fatalities

INCLUSIVE

Enriching Mobility

Where are we with Autonomous Drive?

Nissan's AD Research in the UK

Objectives
- To establish AD technologies to cover typical use cases in the UK
- To build cooperation with British companies/academia & contribute UK supply chain

HUMAN DRIVE

Natural human-like drive on Motorways & Country Roads

From Cranfield to Sunderland

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Secured drive in busy environments on **Urban Arterial Roads**

In North Greenwich/London

Next Step

Secured drive in busy environment on Urban Residential Roads

In North Greenwich/London

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Busy Environment in London

Differences of environments on urban arterial roads

	California 🇺🇸	London 🇬🇧	Yokohama 🇯🇵
Road Shape	Wide & Straight	Narrow & Winding	Narrow & Straight
Traffic Flow	Fast	Fast & Dense	Slow & Dense
Obstacles	None	Parked cars & buses	Parked cars
Pedestrians	Fewer	Many	Many

What are unique & challenging in London
- **Fast & dense traffic flow on narrow & winding lanes**
- **Obstacles which may block driving lane** such as parked cars & buses at bus stops

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ServCity Consortium

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ServCity is jointly funded by government and industry.
The government's £100m Intelligent Mobility fund administered
by the Centre for Connected and Autonomous Vehicles (CCAV)
and delivered by the UK's innovation agency, Innovate UK.

To find out more visit: **www.servcity.co.uk**

Consortium members:

NISSAN

Lead partner responsible
for heading up the
autonomous vehicle (AV)
development for urban
environments.

HITACHI
Inspire the Next

Developer of the artificial
intelligence which enabled
accurate path planning on
urban roads.

CATAPULT
Connected Places

Lead on the project
management, economic
modelling and GIS analysis
elements of the project.
Geographic information
system (GIS).

University of Nottingham
UK | CHINA | MALAYSIA

Lead on the exploration
of AVs as a mobility service
and researching the
user experience.

TRL

Lead on the Smart
Mobility Living Lab (SMLL)
trials and dissemination
work package.

SBD

Lead on prototyping
a smartphone App
that supports users to
find, book and use
autonomous vehicles
as a mobility service.

AD Vehicle: For Urban Driving

Prototype autonomous vehicles based on Nissan LEAF
Communicable with Cooperative Infrastructure via DSRC [1)]

- 🔵 Laser scanner x4
- 🟡 Radar x1
- 🔴 Camera x9
- 🟣 V2I Antenna x1
- AD ECU x6
- Vehicle ECU x2
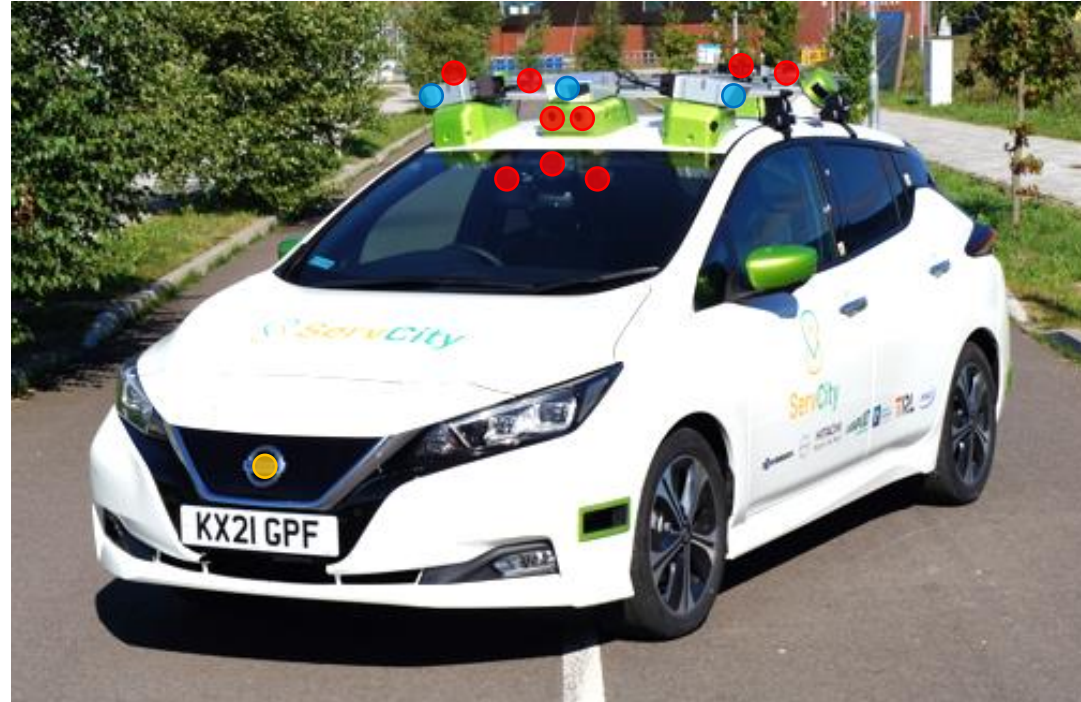
1) Dedicated Short-Range Communications

1,600 AUTONOMOUS DRIVING TEST MILES

83,231 TEST VEHICLE INTERACTIONS WITH OTHER VEHICLES AND PEDESTRIANS

270 CAMERAS FORMING THE SMART INFRASTRUCTURE

500K LINES OF CODE DEVELOPED

5.45M GIGABYTES OF AUTONOMOUS DRIVING TEST DATA CAPTURED

6 CONSORTIUM PARTNERS

15,954 WORKING DAYS SPENT ON THE PROJECT (TOTAL FOR ALL PARTNERS)

0 ROAD ACCIDENTS

£10.7M SPENT ON THE PROJECT

116 PEOPLE WORKED ON THE PROJECT

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Data sourced by Connected Places Catapult. Correct as of December 2022.

Technology

Smart Mobility Living Lab (SMLL)

Located in **Southeast London**, SMLL is the worlds most advanced **urban testbed** to accelerate the creation of **mobility solutions**.

TEST

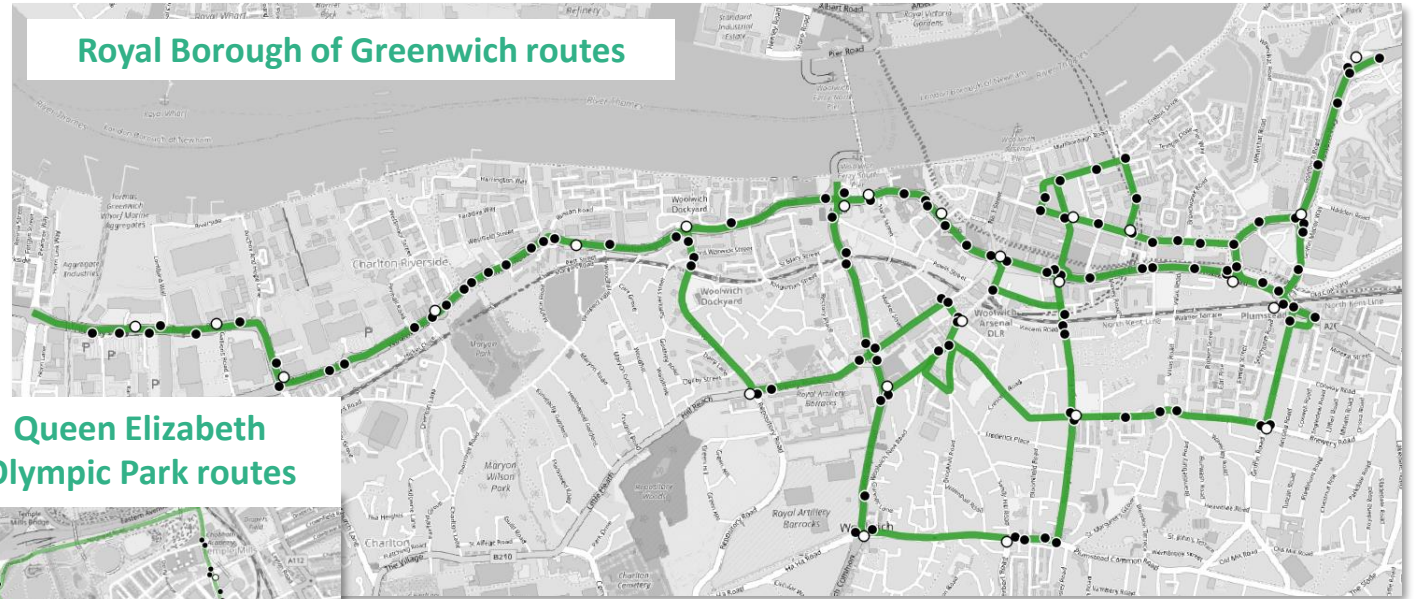**Real world** deployment & technology development

SIMULATE
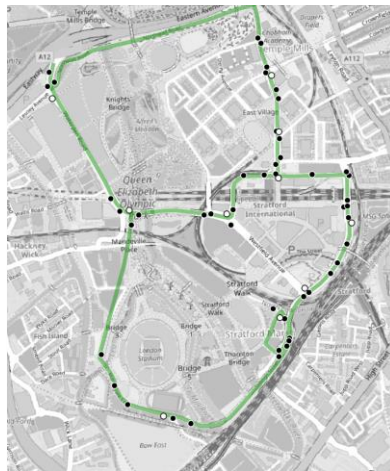
Virtual validation of technology in a digital twin

INNOVATE

Innovation community of 30+ organisations across multiple sectors

Royal Borough of Greenwich routes
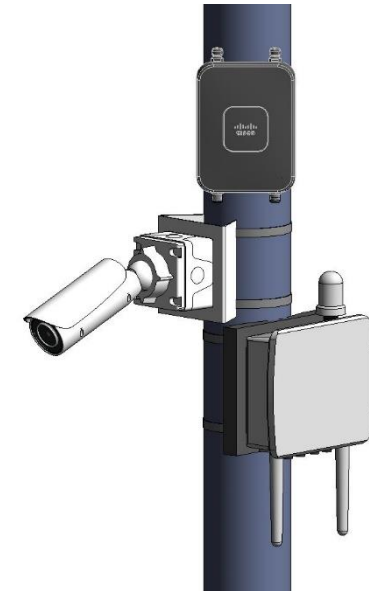
Queen Elizabeth Olympic Park routes

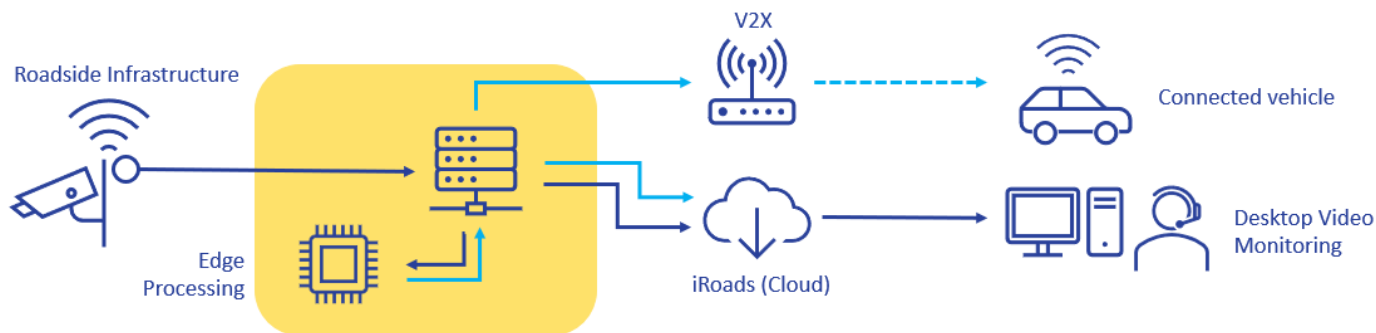SMLL public road testbed environment:
- 24 km of routes
- 200+ monitored locations
- 300+ cameras

Cooperative Infrastructure

- Object Detection and Positioning
- Parking Detection
- Standardised communication
- Edge processing
- Cloud video streaming

ServCity Test Route

2.7-mile (4.3 km) journey on urban arterial roads for 15-20 minutes per lap

Infrastructure camera x12   ■ RSU[1] x8

Smart Mobility Living Lab London

Bus stops

Open Street Map – https://www.openstreetmap.org/

1) Road Side Unit

Technologies

Roundabout

Narrow & Winding lanes

Fast & dense traffic flow on narrow & winding lane?

Nissan's Autonomous Vehicle (AV)

- ✓ Predicts future driving behavior and controls steering to reduce jerky motion with acceleration/deceleration in appropriate timing for accurate & comfort traceability

- ✓ Retains distance & relative speed to front & side vehicles for following traffic securely

- ✓ Anticipates other vehicles' direction and whether to leave or keep circling at roundabout
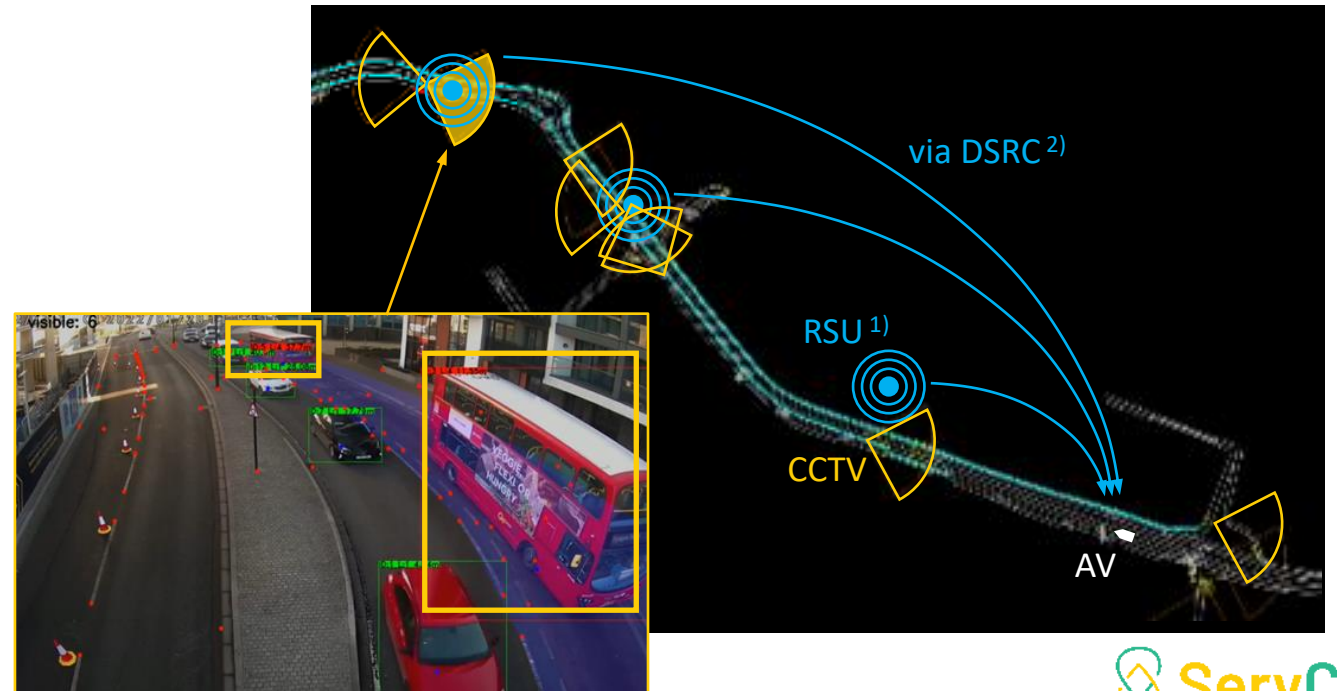

Boundary
Boundary
Trajectory

Normal vehicles
Large vehicles
AV

Technologies

Bus stops
Lane change
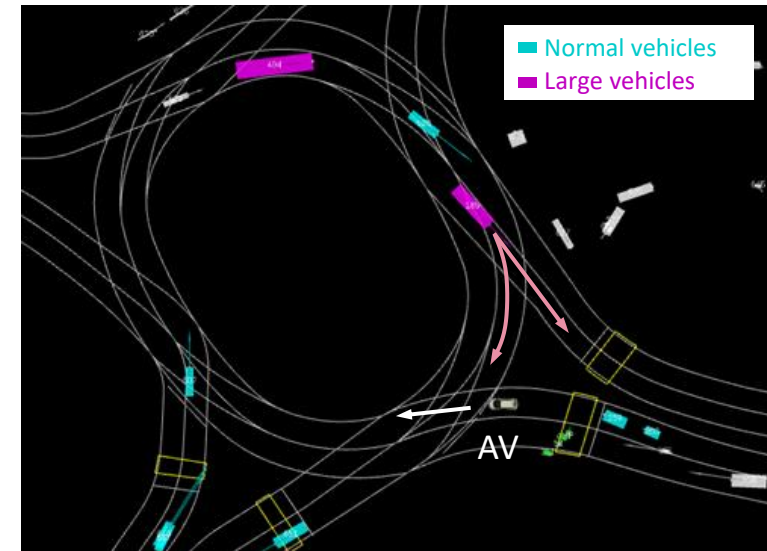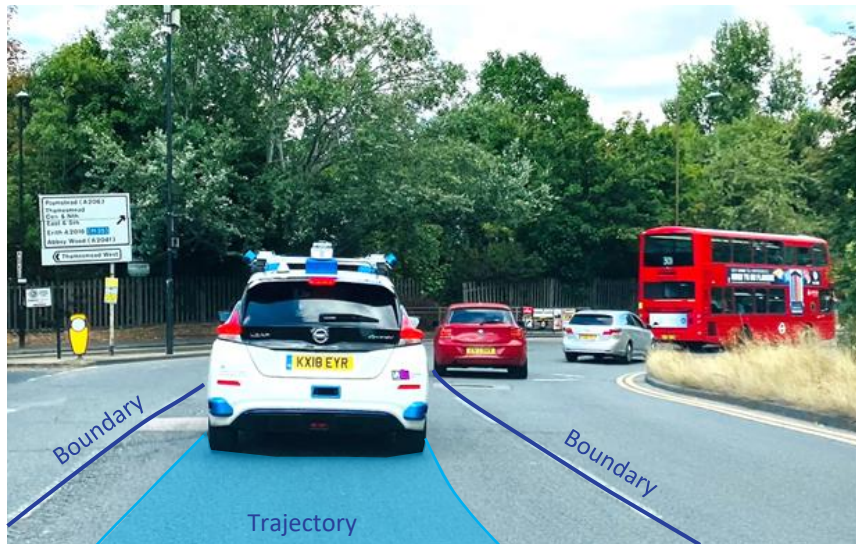
Obstacles which may block driving lane?

How Vehicle-to-Infrastructure (V2I) is utilised

- ✓ Cooperative Infrastructure detects traffic objects which are even invisible to AV, and transmits their data to the vehicle

- ✓ AV selects correct lane for flowing traffic – e.g., lane change is made in advance if the detected object(s) may expectedly block the driving lane

Lane change complicated where congested

Lane change more securely & comfortable

via DSRC [2]
RSU [1]
CCTV
AV
visible: 6

1) Road Side Unit   2) Dedicated Short-Range Communications

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Thank you

NISSAN · TRL · CATAPULT Connected Places · University of Nottingham UK | CHINA | MALAYSIA · SBD · HITACHI Inspire the Next

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