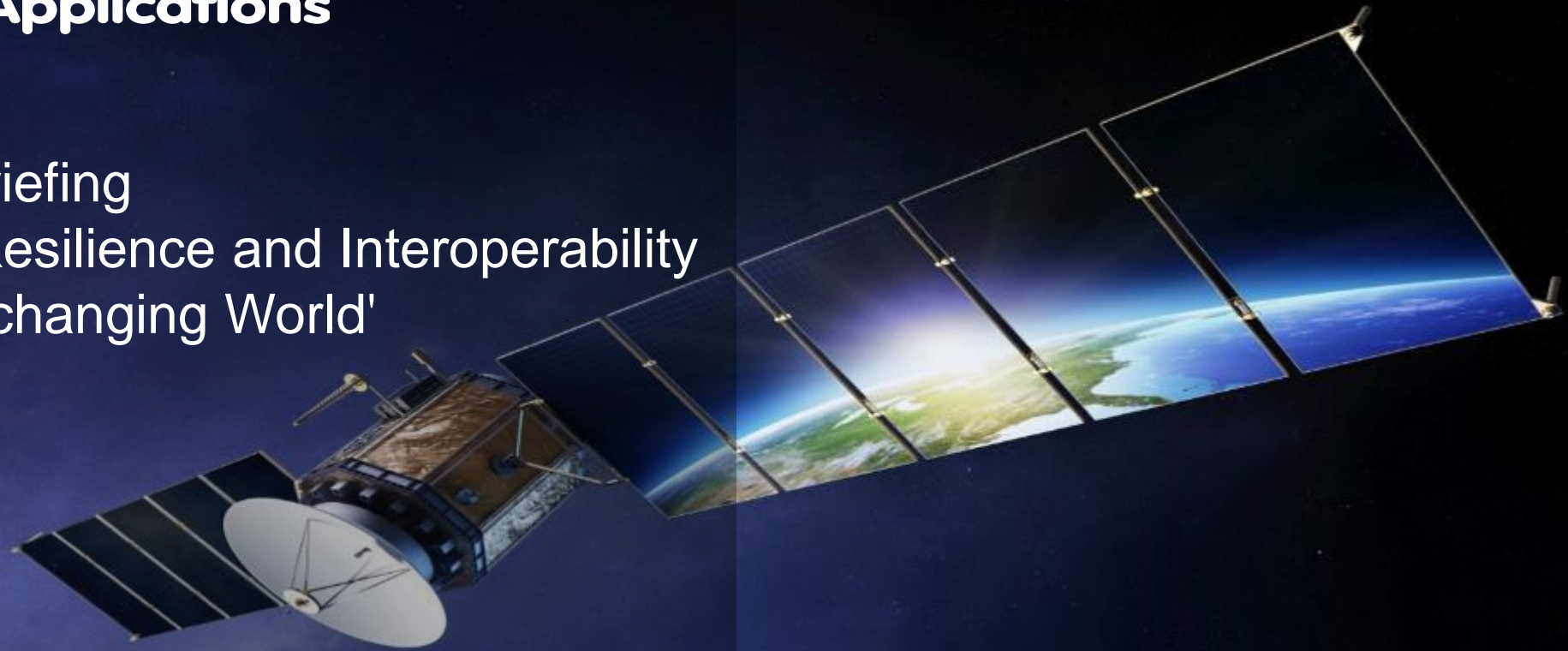


Satellite Applications

Catapult Briefing
'Ubiquity, Resilience and Interoperability
in an ever-changing World'



December 2015

Presentation Outline

Catapults – What are they?



Emergency Services Use-Cases



Ubiquity, Resilience, Interoperability



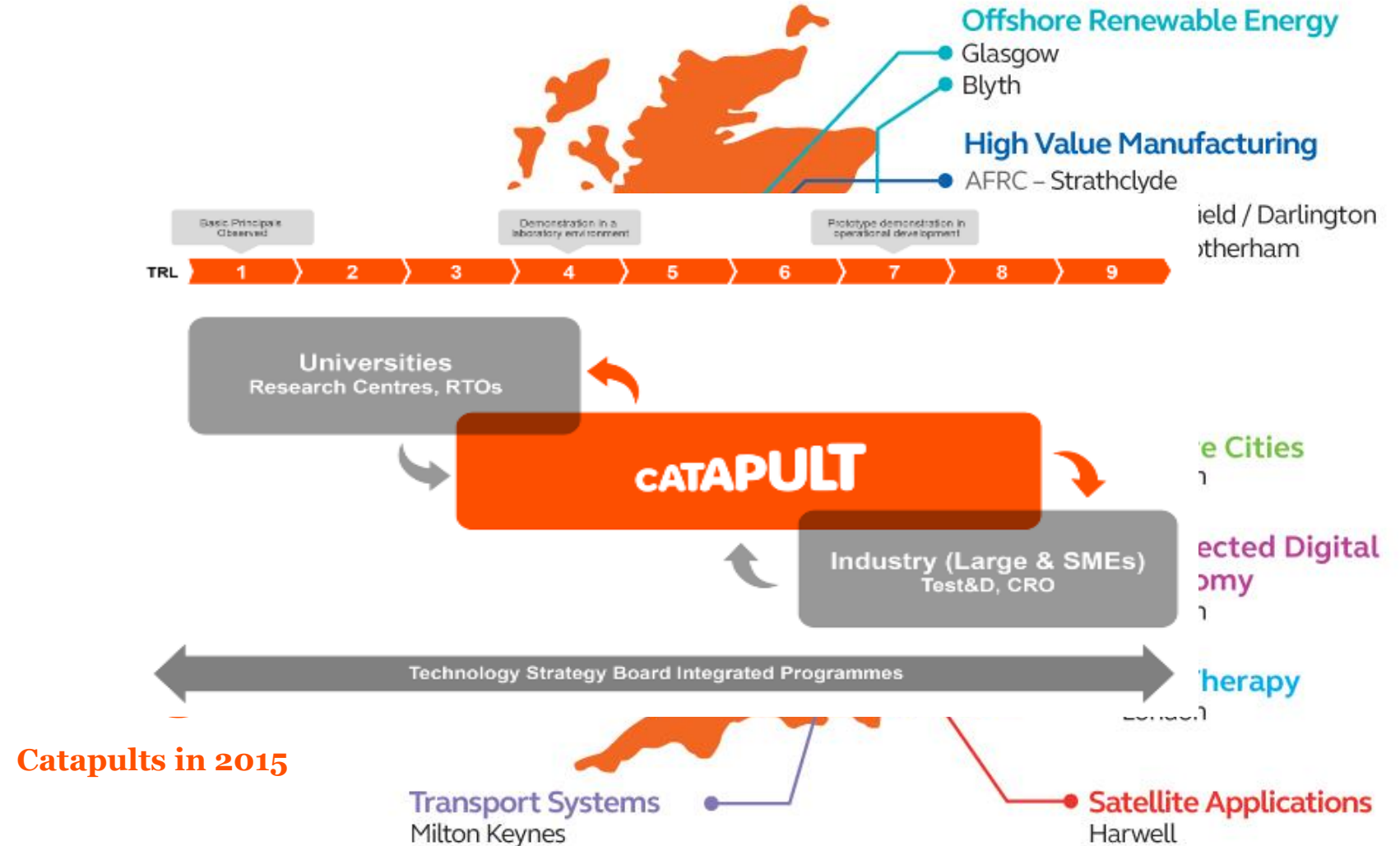
Emergency Services Futures

Catapults – a new force for innovation & growth in UK

£1bn

Private & public
sector investment

11/12/2015



Catapults in 2015

Hauser Report 2014 – A brief summary

“...substantive support for an elite group of Technology and Innovation Centres.”

Dr. Herman Hauser, 2010

“Catapult centres act as a neutral convener, the place where collaboration across TRLs can take place effortlessly.”

Dr. Herman Hauser, 2014

1) Maintain Long term Investment
2) Maintain 1/3 1/3 1/3 funding model

• Collaborative R&D is key to ensure relevance

3) Grow network of Catapults
4) Budget increase for Innovation

• Interaction & collaboration between Catapults is **vital**

5) SME Engagement Strategies

• Centres-of-excellence as an important approach

6) University Engagement Strategies

• Coherent approach between Catapults is required

7) KPIs for impact, engagement, R&D

• R&D related KPIs are important for growth

8) Neutral Convenor – business challenges

• Disruptive business models; Access to finance

9) Business-Led Physical Infrastructure Based

• Exploitable Infrastructure; Focus on Delivery

Satellite Applications Catapult – part of Harwell Space Cluster

ESA Business Incubator

STFC: Jasmine HPC
DataCentre

Space Industry & SME
Business Units

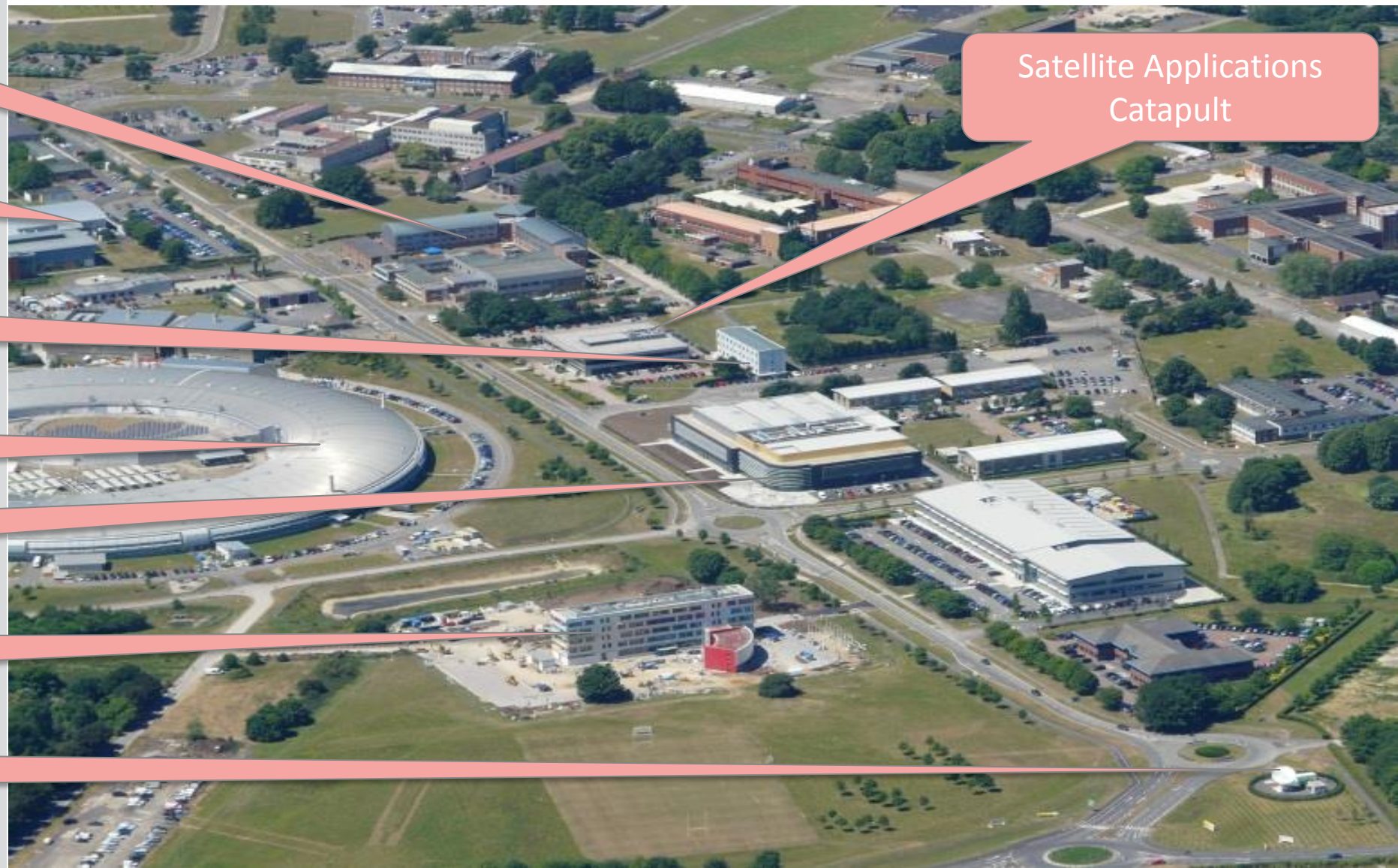
STFC:
Diamond Light Source

Rutherford Appleton Labs

ESA ECSAT

EDRS Gateway

Satellite Applications
Catapult

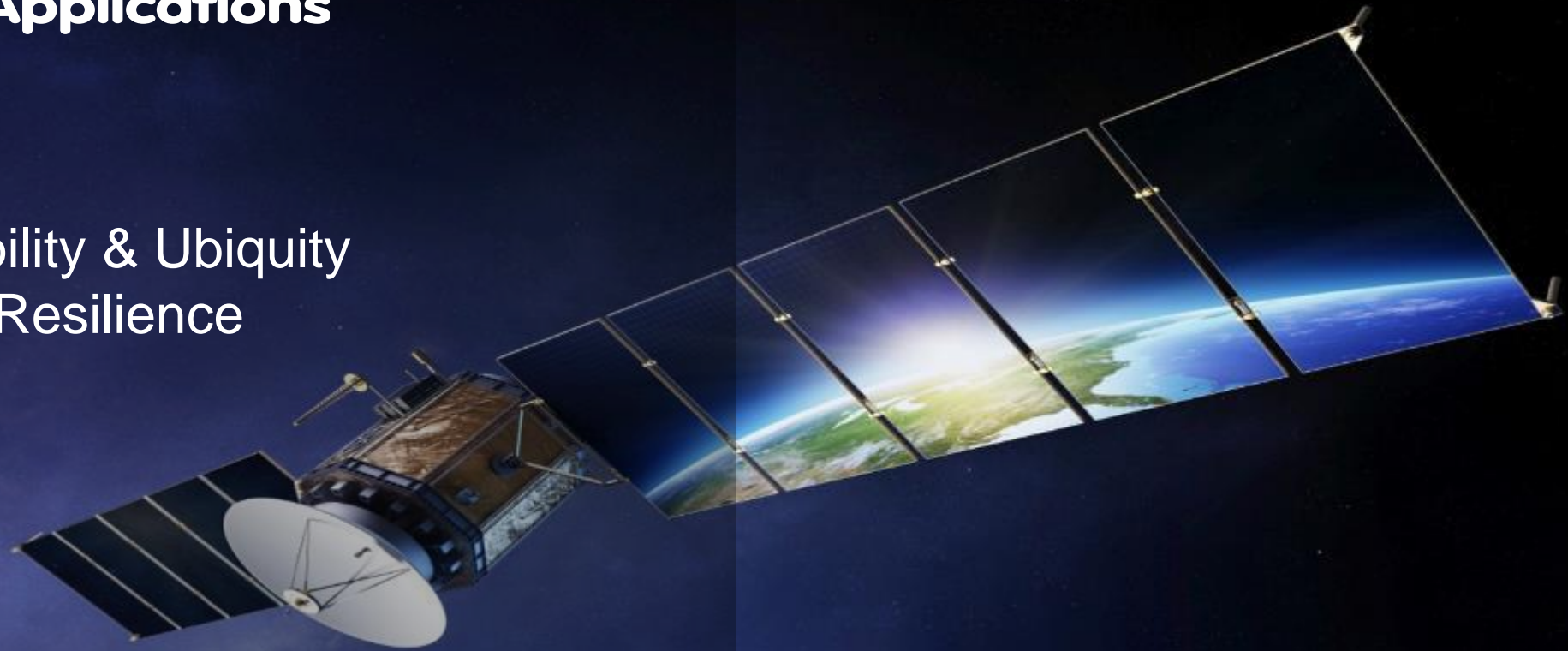


Satellite Applications

Use Cases

Interoperability & Ubiquity

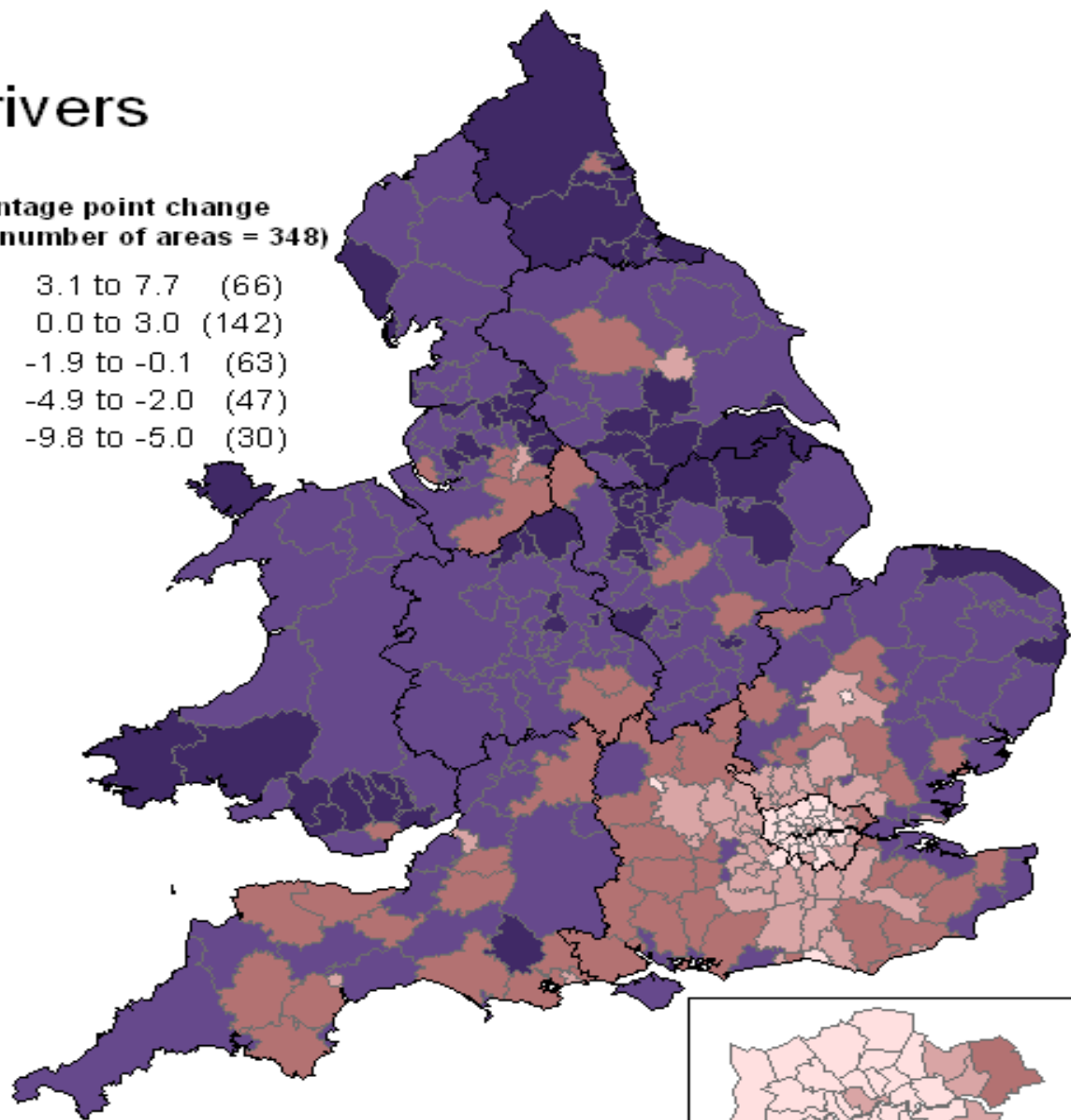
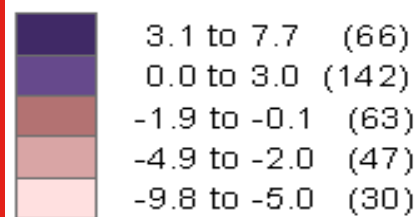
Security & Resilience



November 2015

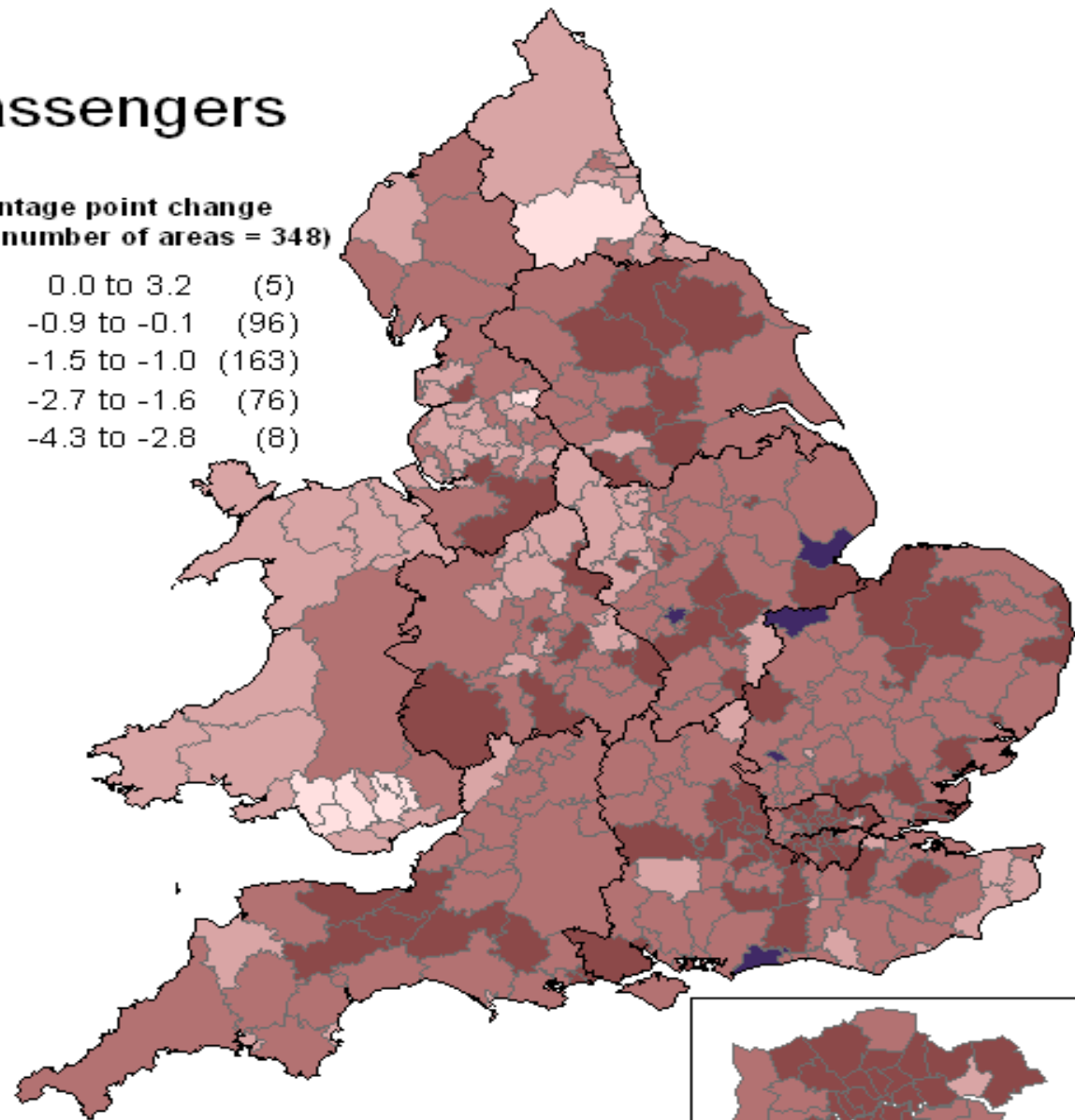
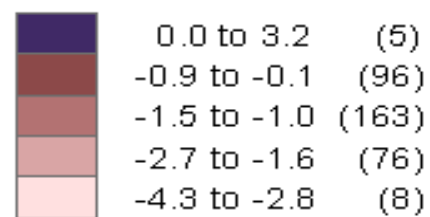
Drivers

Percentage point change
(Total number of areas = 348)



Passengers

Percentage point change
(Total number of areas = 348)



Mobile Data Communications Service Coverage

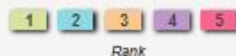
UK Mobile Services Map 2013

Level of outdoor mobile coverage by administrative authority



What do these scores mean?

Click on a region on the map to see more information



3G coverage by geographic area

Each area has been ranked from 1 to 5 on the level of mobile coverage.

- 1= 90% or more
- 2= 70% - less than 90%
- 3= 50% - less than 70%
- 4= 25% - less than 50%
- 5= less than 25%

Map options

- 2G coverage by premises
- 2G coverage by geographic area
- 3G coverage by premises
- 3G coverage by geographic area

The percentage of geographic area over which all operators have 3G coverage (outdoor reception). Click on a region for information on the percentage of geographic area with no reliable signal from any operator and mobile broadband data volumes per premises for June 2013.

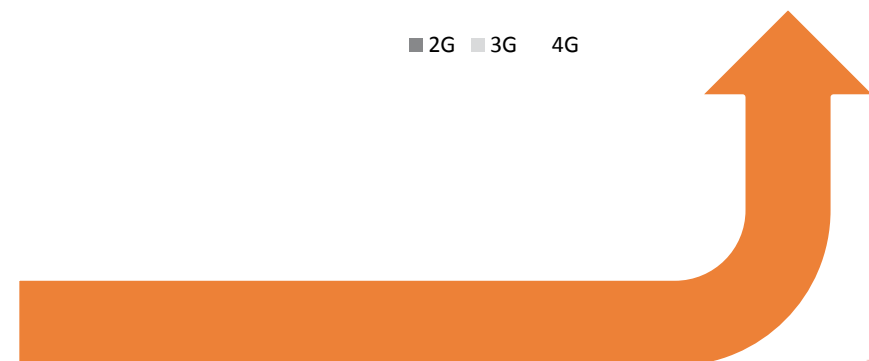
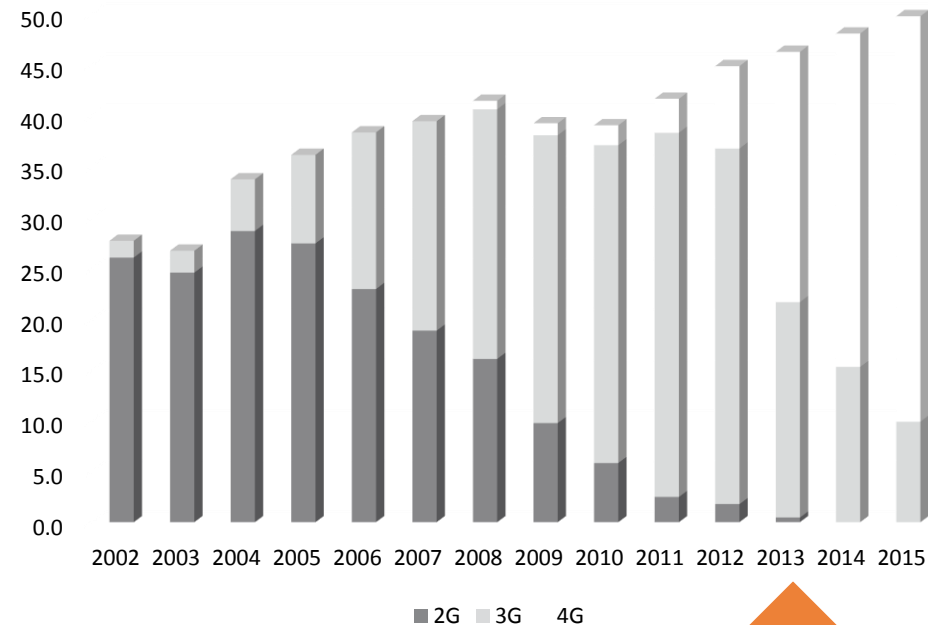
About this map

Ofcom's maps form part of our ongoing work to provide useful information about communications services in the UK.

Download Data

[UK Infrastructure data 2013 \(28kB\)](#) [CSV](#)

Global Annual Mobile Investment (\$Bn)



Incidents occur anywhere and everywhere



Incidents and events don't always occur where there is sufficient or available communication



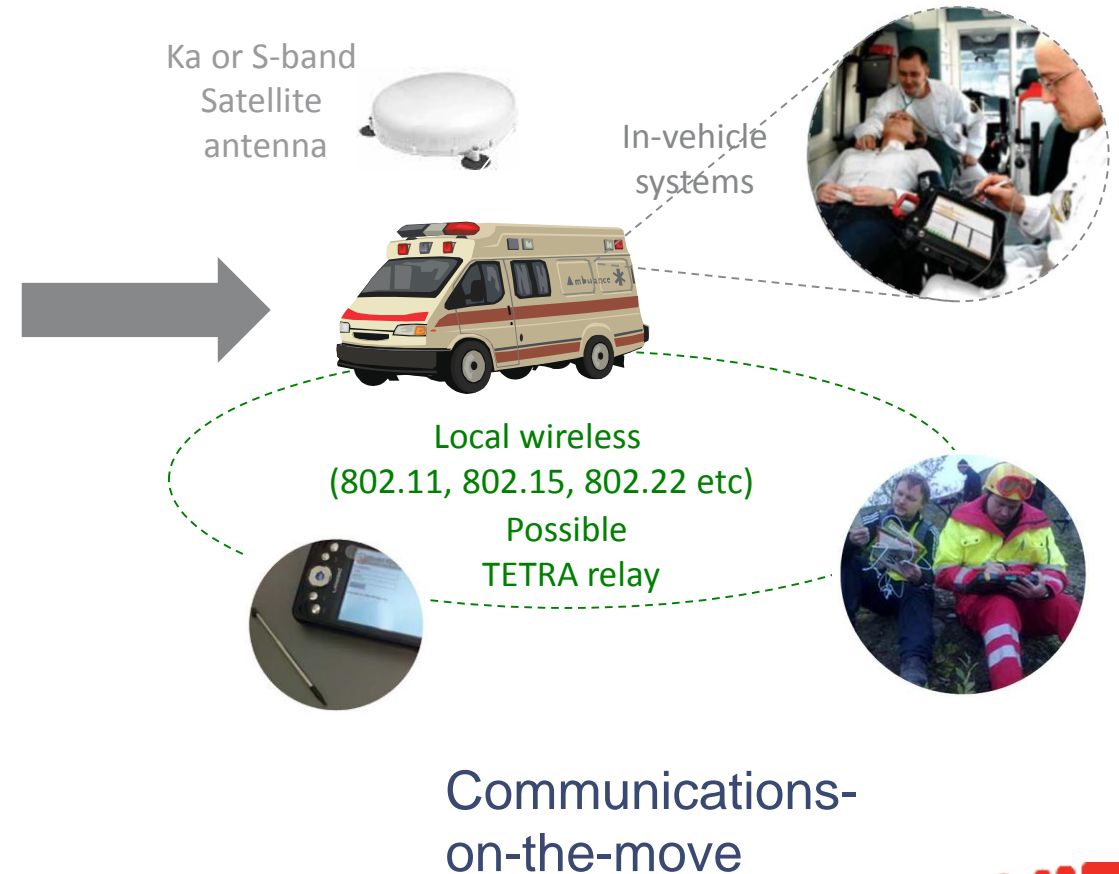
Incident Management Trends



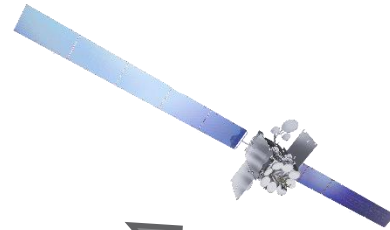
Ku-band
Satellite
antenna



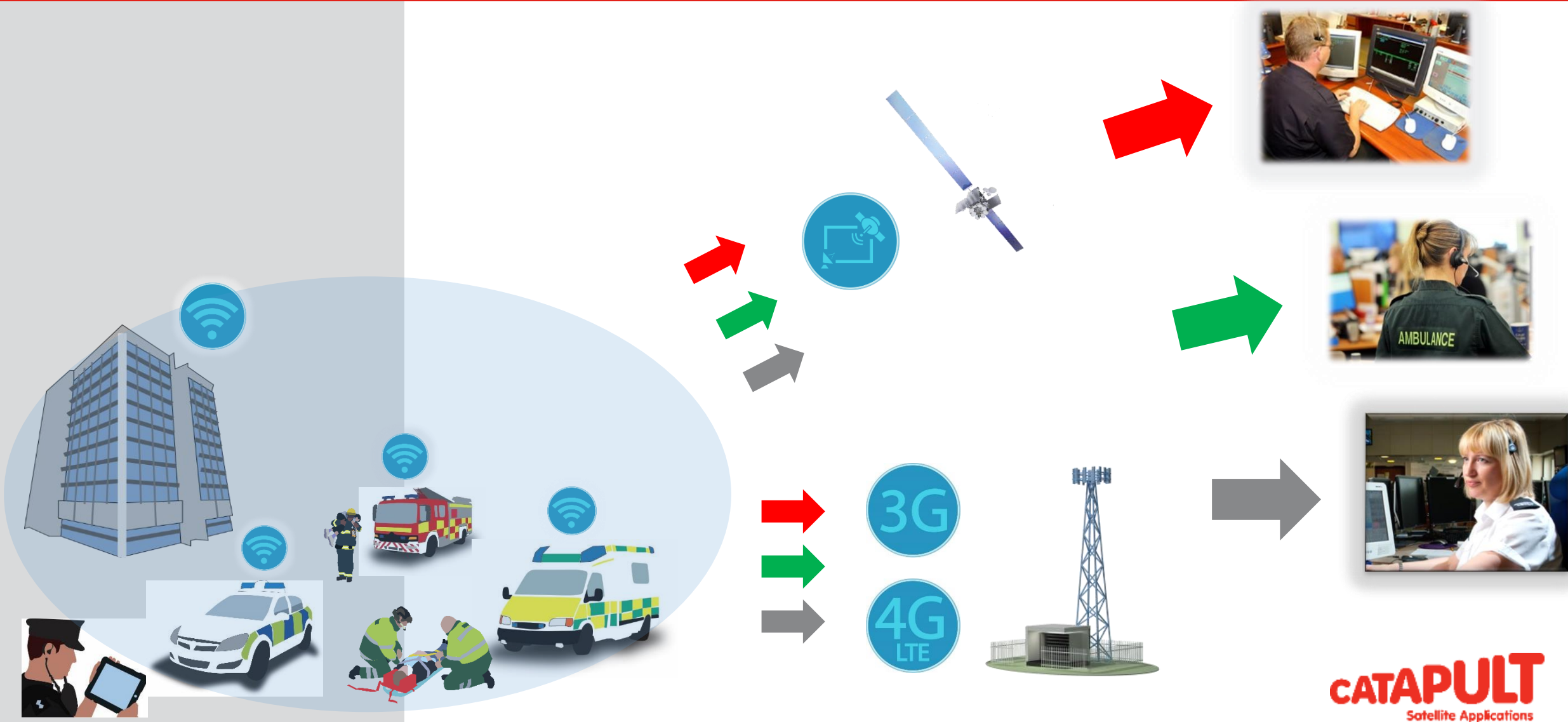
Rapid-deployment
command vehicles



Resilience and Ubiquity

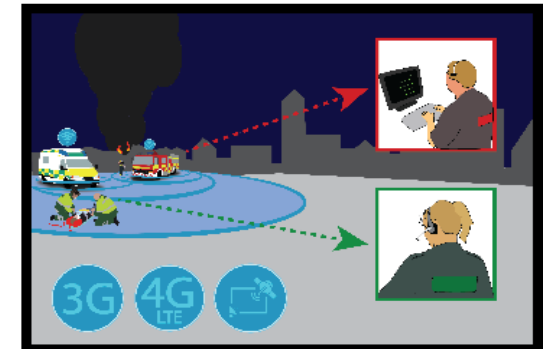


Flexibility & Interoperability

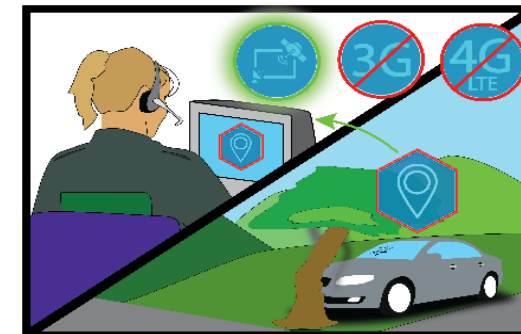
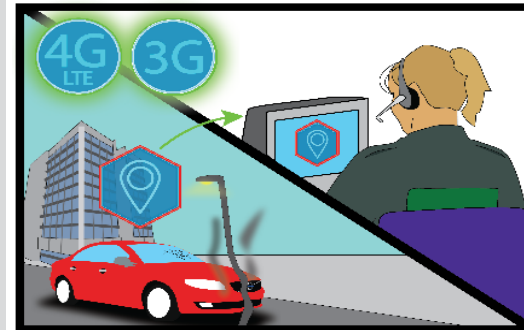


Example Use-Cases

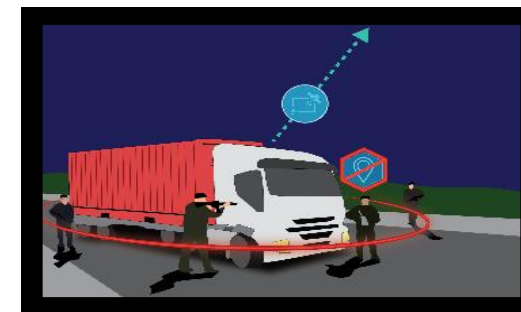
Emergency services network – seamless connectivity and information sharing



Automated emergency calls from any location

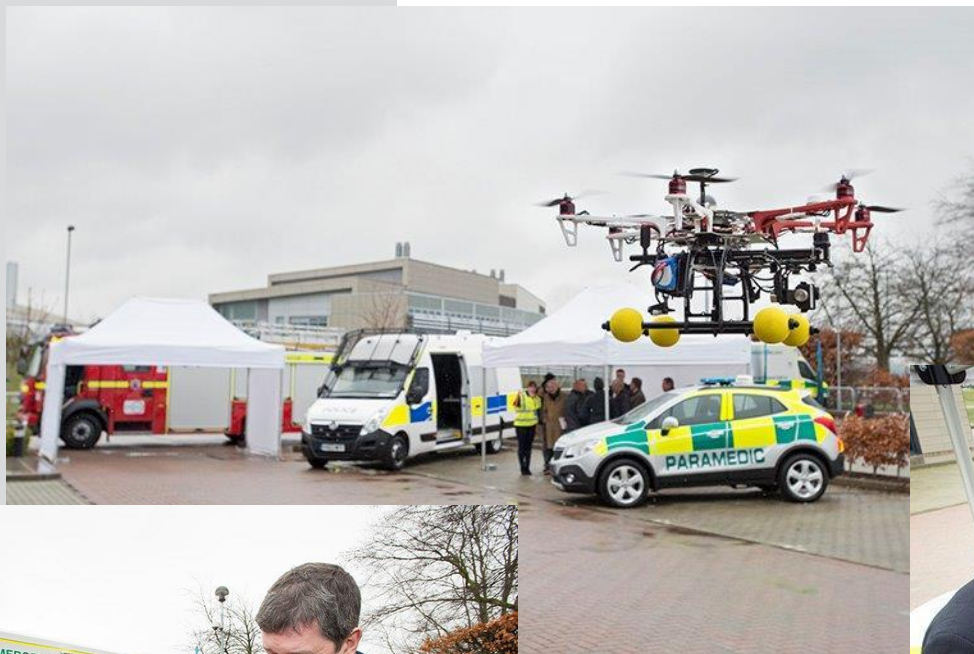


Robust positioning and multi-agency incident response



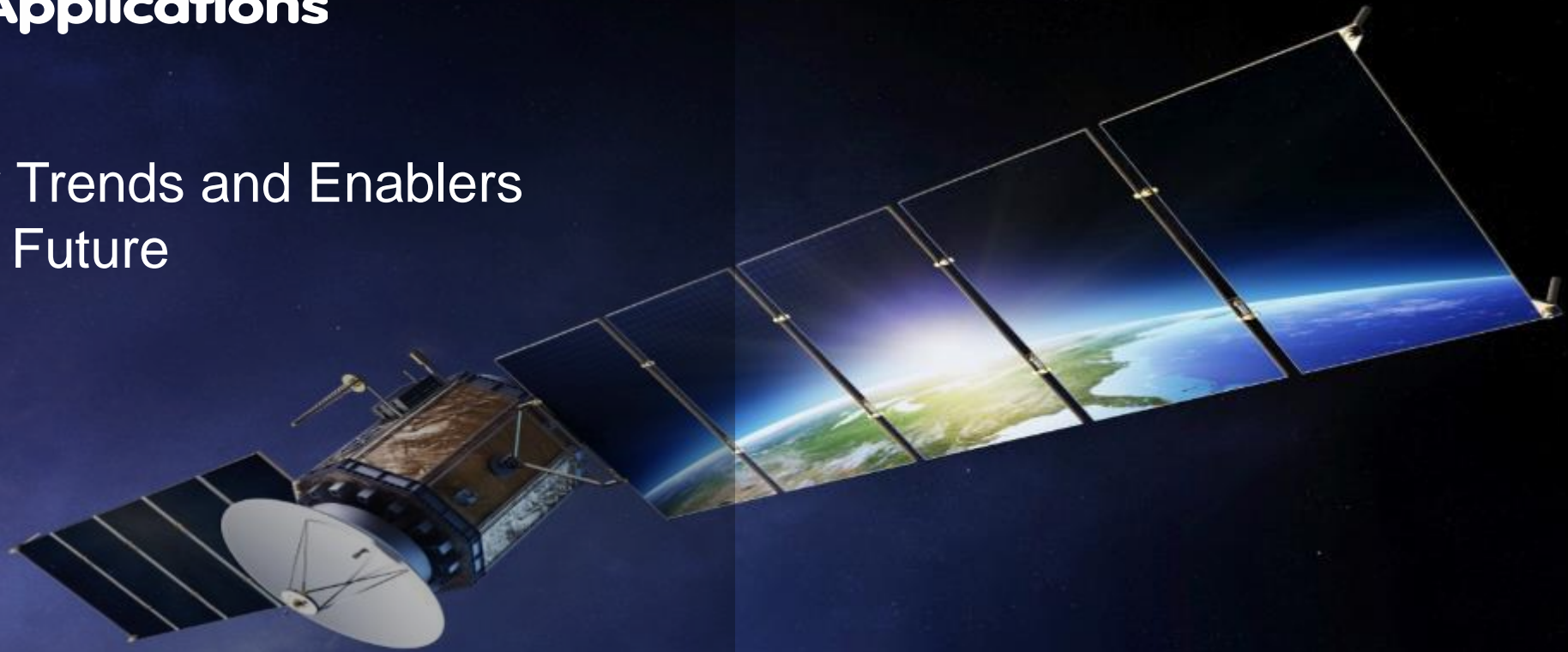
12/11/2015

ESCMP Capability Demonstration Day



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Technology Trends and Enablers
Anticipated Future



November 2015

2015-2020: Technology, Service and Applications Enablers



GNSS augmentations



Cloud Services



Open Geo-Spatial Platforms

GNSS and augmentation systems

- 4 GNSS systems; Galileo PRS
- Low power devices, integrated inertial measurement
- Ubiquitous sub-10cm accuracy positioning, PPP-RTK

Power of the cloud

- Real time data analytics
- Image recognition / cognitive computing
- Integration into global IT systems

Geo-spatial systems

- Harmonisation and Standardisation – OASIS
- Geo-spatial incident response – XChangeCore
- Open Interoperability & visualisation frameworks

2015-2020: Technology, Service and Applications Enablers



Mobile M2M



Seamless Communications



Connected Vehicles

Connected world

- Trends in device power consumption and wireless tech
- Distributed data/information processing architectures
- Wireless innovation to leverage M2M service attributes

The 5th Generation of Cellular technology

- Seamless connectivity has improved user experience and delivers smarter applications – user demand for connectivity
- Innovation to leverage 5G seamless connectivity

Intelligent Transport and Connected Car

- Metamaterials driving antenna technology to enable easy deployment of connectivity solutions
- Innovation to leverage connected vehicles

2020 ITS and Emergency Services Vision

11/12/2015

System of Systems – Catapult Technology, Platforms, Skills

**Core Capability and
Functionality**



Satellite Missions &
Technology



Networks and Systems



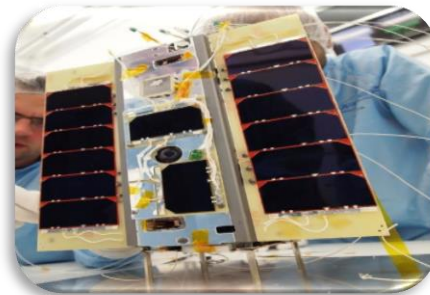
Applied Digital
Intelligence



Applications and
Solutions



**Development and
Operational Platforms**



**Seamless End-End
Delivery**

**Evolving satellite
and terrestrial
technologies**

**Resilience, ubiquity
Integration, testing
and deployment**

**Intelligent processing
of data into geo-
spatial information**

**Incident management
applications and
operations show-case**

Satellite Applications

Thank You!

11/12/2015