

EPSRC Centre for Innovative Manufacturing

Through-life Engineering Services



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Through-life Engineering Services (TES)

Are the technical services that are necessary to guarantee the required and predictable performance of a complex engineering system throughout its expected operational life with the optimum whole-life cost



Context

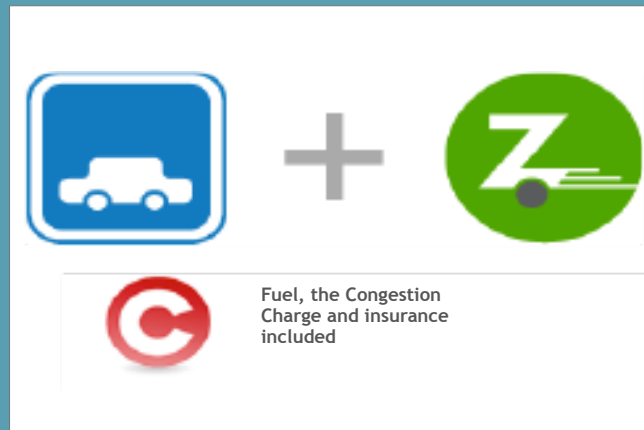
Product-Service Systems: job and revenue creation



Service: Availability contracts



Service: Total care



Pay-as-you-go personal transport



EPSRC Centre for Innovative Manufacturing

Through-life Engineering Services



The Centre provides

- **World Class Expertise**
- **Thought Leadership**
- **Technology Solutions**
- **R&D Capability**

To enable UK plc to deliver high value products with outstanding availability, predictability and reliability at the optimum whole-life cost



A collaboration between Cranfield and Durham Universities

Cranfield
UNIVERSITY



Supported by

EPSRC

Pioneering research
and skills



Industrial partners



Rolls-Royce

BAE SYSTEMS



MINISTRY OF DEFENCE

BOMBARDIER



NORTHROP GRUMMAN

Sperry Marine



SIEMENS

THE Manufacturer

gom
Optical Measuring Techniques

UKCEB

PRICE
Optimize tomorrow today.™

bsi.

SaRS
SAFETY AND RELIABILITY SOCIETY



Intelligent Energy™

NATIONAL INSTRUMENTS™



**Degradation studies:
components and systems**

*Service
Intelligence:
data analytics*

Autonomous Maintenance

Diagnostics and Prognostics:
Remaining Useful Life (RUL)

Obsolescence Management

**Design and Manufacturing
for Maintenance**

TES

Service Cost Modelling

Virtual Service Engineering

*Maintenance,
Repair and
Overhaul
(MRO)*

**Maintenance training
and visualisation:
augmented reality**



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- An initial investment of £11.2m
 - 14 Senior academics
 - 9 Researchers
 - 11 PhD students
 - 20 Feasibility Studies
 - Close industry partnerships
 - International collaboration CIRP



Knowledge grown through six core projects:

- No fault found
- Degradation of components
- Systems design
- Self-healing systems
- Autonomous maintenance
- Deterioration of linear machines



Additional areas of expertise:

- **Obsolescence management**
- **Service cost modelling**
- **Sensor verification and validation**
- **Virtual service engineering**
- **Augmented reality based training**



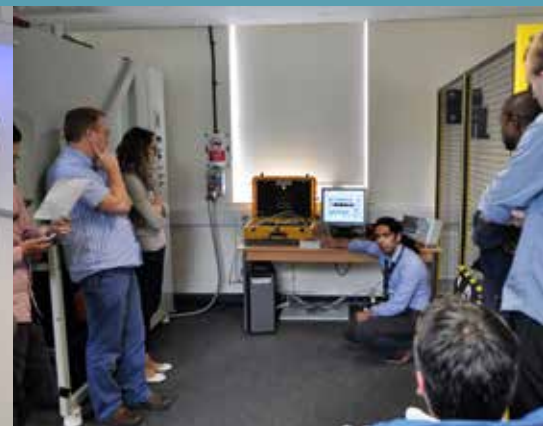
Key achievements:

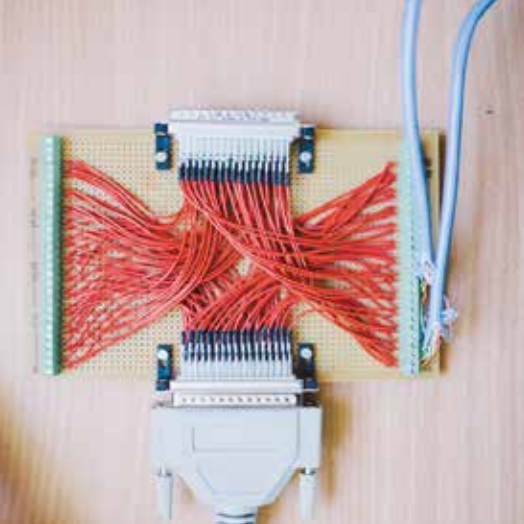
- Patents, papers and industry use cases
- Executive Masters Programme
- Annual International Summer School
- Annual International Conference
- £8m new funding
- Annual TES Industry Award
- Publication of the first TES Book



Operations Excellence Institute

- £6m HEFCE/industry funding
- Through-life Operations Simulation Lab
- Augmented Reality
 - Maintenance Training
 - Innovative Blended Learning
 - Extensions to Executive Masters
- Component Degradation Facility
- A Manufacturing Cooperative for SMEs







Contacts for more information

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