A national strategy for engineering services

Delivering UK economic growth by making things work better for longer
Around 16.8% or £275.2bn of the UK economy is attributable to sectors that could be influenced by engineering services. Of this at least 1.9% or £31.6bn is potentially associated with the creation or application of through-life engineering services.

Through-life engineering services

As used in this strategy the definition of “through-life engineering services” (TES) is: the design, creation and in-service sustainment of complex engineering products with a focus on their entire life cycle, using high-quality information to maximise their availability, predictability and reliability at the lowest possible through-life cost.

The proposition is that by collaboratively accelerating the development of capability in engineering services significant improvements can be made in output and productivity in high value added manufacturing sectors which currently account for some 16.8% of UK GVA.
Contents

Foreword 5
Introduction 7
What is TES? 8
Why is TES important? 11
Practice examples 13
The size of the prize 16
The imperative 18
Cross sector action 19
The journey 21
What does success feel like? 22
Key performance indicators 25
The challenge for firms 27
How do we deliver success? 28
The strategic plan 30
Delivering the plan 33
How to get involved 34

Background

Some 50 firms and organisations with an interest in TES were convened by Cranfield University at a workshop in May 2015 to explore the opportunity for cooperative development of capability in TES and the specific action areas that might provide greatest impact. This was written up in a white paper that prompted the subscribers to this strategy document to form a steering group to develop a National industrial strategy for TES summarised in this document1.

Development of this strategy was facilitated by Cranfield University and funded directly by the EPSRC Centre for Innovative Manufacturing in Through-life Engineering Services (grant number EP/I033246/1). Cranfield University are grateful to Rolls-Royce and the High Value Manufacturing Catapult for their leadership and to all other participants for their contributions.

A huge proportion of UK annual Gross Value Add is critically dependent on the creation or uses of high value, long-life assets: making things work better for longer. Assets that work well generate value, those that do not generate cost.

Around 16.8% or £275.2bn of the UK economy is attributable to sectors that could be influenced by engineering services. Of this at least 1.9% or £31.6bn is potentially associated with the creation or application of through-life engineering services.

The goal of this strategy is to achieve a 20% reduction in cost with a 20% improvement in asset availability across more than £20bn of UK economic output, a 20:20 vision. This would be a significant transformation of national productivity and global.

The time to do this is now. The world is rapidly shifting to a service economy, demanding increased manufacturing flexibility and closeness to customers. Customers are increasingly buying uses, not ownership of assets: service is future manufacturing.

As an early adopter of engineering services, the UK is uniquely positioned to profit from this shift. Achieving the bold goals of the 20:20 vision will require significant changes in behaviours, the adoption of new business and economic models, and the exploitation of new and emerging technology.

The ability of the UK to provide global leadership in this future is enabled by TES.

The industrial sponsors of the strategy commit to forming a cross-sector National “TES Council” to inspire UK industry, lead delivery of these benefits and seek government support for this venture.

Get involved to join the race to the top. The more firms and organisation that join to collaborate and innovate together the better and faster will be the improvement.
The UK has a proud manufacturing tradition and we have led in terms of creativity and design since the industrial revolution. This remains true today as we enter the “fourth epoch” of manufacturing created through digital innovation and the ‘Internet of Things’. New technology and development and new business models – new ways of satisfying customers’ demand for value – are increasingly enabling the next generation of innovation.

The developing trend of “servitised manufacturing” is a specific example of UK innovation that has allowed early adopters to develop successful differentiated offerings in the global market. Services within manufacturing, and indeed other sectors, are increasingly becoming a pre-requisite for success. But experience tells us that the transformation is difficult and there is a strong argument that UK capability needs to be built more quickly, across a broader front in order to maintain and develop our lead.

The market influence for engineering services, manufacturing and technology, where new methods and business models are applicable, is huge. This has been assessed for the first time by Professor Alan Hughes of the University of Cambridge and the Department for Business, Innovation and Skills, being potentially of the order of at least £31bn or 1.9% Gross Value Added, as well as having significant export potential.

As Co-Chair of the All-Party Parliamentary Manufacturing Group, I agree with the Department for Business, Innovation and Skills and the Ministry of Defence, as well as the firms and academic institutions who have helped develop this strategy, and believe the UK needs a collaborative approach to capability development in “engineering services” to accelerate productivity and growth. The opportunity is one that we must seize. We need to better integrate capability development and innovation between manufacturing, engineering and technology, between engineering and business model innovation, and across sectors.

This strategy provides a framework for this cooperative capacity and capability development across all relevant industrial sectors that rely on, or provide, “complex engineering assets”. I commend all involved in the writing of this report and endorse its proposals.

Chris White MP
Co-Chair, All-Party Parliamentary Manufacturing Group

Foreword
Industrial support

This Strategy has been developed under the leadership of Rolls-Royce plc and the High Value Manufacturing Catapult with direct support from Government (BIS and MOD), BAE Systems, Bombardier Transportation Ltd, Babcock International plc and eleven other firms and organisations. In total representatives of some 106 organisations were consulted during development of the strategy.
Introduction

Much progress has been made in UK manufacturing in recent years through a focus on high-added value production but the sector remains challenging and highly competitive. Increasingly leading UK companies are turning to service provision to differentiate themselves in the global market.

The High Value Manufacturing Catapult, sponsored by BIS and Innovate UK is accelerating development in this area. Rolls-Royce continues to pioneer engineering for service: selling “power by the hour” to airlines and aircraft lessors generating more than 50% of its civil aerospace revenue.

Leading manufacturing companies, and indeed those in many other sectors from construction to transport to energy, recognise the imperative to provide services as a pre-requisite for success – to “servitize”. Engineering services for high-value manufacturers and owners or operators of complex assets and infrastructure are increasingly critical to productivity and growth. Our UK capability in this area is, and must continue to be a real differentiator in the global market.

But there is a significant challenge. It is very difficult to add engineering services to conventional manufacture: to change from project delivery to the collaborative long-term outcomes characteristic of service. There is not sufficient strength in depth in the UK to support our global market leaders let alone the export ambitions of new adopters and SMEs. We need an agenda of cooperative capability development, aligning UK manufacturing and our “engineering plc” with business model innovation across all industrial sectors that rely on, or provide “complex engineering assets”. This strategy is intended to provide the agenda.

At present the “wheel” is being continuously re-invented and the early practitioners, such as Rolls-Royce, BAE Systems, Bombardier Transportation, Siemens and Babcock International, all seek to increase the strength and capacity of their “TES-enabled” domestic supply networks. Other sectors such as built environment, healthcare, renewable energy, machinery and industrial biotechnology recognise the issues but use a different language inhibiting cross-sector learning and development. The early practitioners propose this strategy as a means to accelerate capability development in the UK in these important but poorly understood fields of engineering, manufacturing and technology. This will benefit traditional manufacturing as well as the other and emerging industries that use products sensitive to improvements in TES capability.

Our proposition is that a nationally coordinated approach to capability development in through-life engineering services, supported by government, will significantly improve productivity and competitiveness at firm and national level.

Dave Benbow
Global Head of Engineering for Services
Rolls-Royce plc

Phill Cartwright
Chief Technology Officer
High Value Manufacturing Catapult
What is TES?

Through-life engineering services” (TES) comprise the design, creation and in-service sustainment of complex engineering products with a focus on their entire life cycle, using high-quality information to maximise their availability, predictability and reliability at the lowest possible through-life cost.

TES integrates manufacturing, engineering and technology with new service-based business models such as leasing and benefit sharing, to ensure that the manufacturer and, or maintainer is incentivised to provide great user value at reduced cost.

TES is much more than just maintenance. It comprises the integration of engineering tools and techniques along the whole lifecycle – hence, “through-life engineering services” – that ensure assets are designed, manufactured (or installed), serviced and retired at optimum whole life cost.

TES applies across many sectors of industry although often with different terms for very similar concepts – for example “whole life cost” in construction. Work towards this strategy2 has highlighted many “high-value manufacturing” and other sectors that that use or make complex engineering assets which are already adopting TES principles or to which these principles are clearly applicable.

“Customers need complex assets to be more dependable, more reliable and to have much reduced whole life cost”

Professor Rajkumar Roy - Cranfield University

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2 A national strategy for engineering services, Cranfield 2016, www.through-life-engineering-services.org/strategy
“Working closely with our UK MoD customer, we have pioneered ‘availability contracting’ for high-performance military aircraft, reducing the effective cost per flying hour by some 50%. This has transformed our business, but no-one contemplating the opportunities of servitized engineering should underestimate the scale of the business transformation challenge.”

Steve Worsnip - Vice President F35 Sustainment, BAE Systems PLC

“At Rolls-Royce we have consistently delivered shareholder value through being market leaders in engineering services: ensuring that our engines are designed, manufactured and supported in-service to deliver power for our customer whenever required throughout their lifetime.”

Dave Benbow Global Head of Engineering for Services Rolls-Royce plc

“In numerous engineering and technology domains, we have found that by taking responsibility for ‘outputs’ - asset performance - we have been able to give our customers more value than the simple delivery of discrete products or programmes.”

Jon Hall, Managing Director - Marine & Technology, Babcock International Group
... and why TES is important

“Customers don’t want to own products: they only value the functionality those products provide”
Professor Andy Neely - Institute for Manufacturing, University of Cambridge

A focus on TES allows

• Owners and operators to get best value from their assets
• Manufacturers and maintainers to capture value by actively supporting the desired user outcomes (such as performance, reliability, availability and experience)

UK companies already lead globally where the service model is replacing ownership across a number of industrial sectors. This has driven productivity and exports. But leading practice is limited to a few early and successful adopters of “servitized manufacturing” and TES.

These companies, leading on TES, predominantly from aerospace, defence, rail and ICT (information and computing technologies) say they lack strength in depth, and breadth, in their supply chains to win full value from an integrated technology-services approach. They need to work to improve support from their service supply chain. But they are also well placed to help build capability across other relevant sectors including the built environment, healthcare, renewable energy, machinery and industrial biotechnology as well as emerging sectors such as bio-renewables.

These opportunities – to broaden and strengthen existing service supply chains whilst improving national capability – are supported by the programme of cooperative capability development, outlined in this strategy. This aligns UK manufacturing and our “engineering plc” with business model innovation across all industrial sectors that rely on, or provide “complex engineering assets”.

Collaborative development of national capability in TES will deliver productivity and global differentiation across a significant proportion of the UK economy in a future where the service model has replaced ownership and where attention to the circular economy and environmental sustainability become critical.

“TES offer a significant opportunity to grow UK competitiveness and world share in the bio-renewables sector.”
Dr Fabien Deswarte, Business Development Unit Manager, Biorenewables Development Centre (to be confirmed)

“Technology is driving a profound shift towards services. What will manufacturers do?”
Titos Anastassocos - Managing Partner at Si2 Partners LLP
Babcock International, the UK’s largest engineering support services’ company, has harnessed digital and other emerging technologies to deliver a complex asset management solution across many sectors. Using such technologies, Babcock has improved the availability of a critical national communications service from around 50% to in excess of 99%. Utilising a programme of technological improvements, and enhancements to the methods of operation Babcock have been able to deliver service enhancements to its customer, whilst reducing year on year spend.

Bombardier Transportation knows that maintenance is vital to the smooth running of the UK’s rail operations. Bombardier support the Voyager fleet, among others, operated by Cross Country and the West Coast franchises and has introduced major efficiencies and availability improvements over the term of the contract regularly winning the industry “golden spanner” award. Bombardier’s support of London’s train operators during the Olympics resulted in record levels of availability and contributed to Bombardier winning the National Transport Award 2013 for supplier of the year.

Veolia is positioned at the crossover between the energy and environment sectors and as such is committed to extensive, long-term energy savings and the use of socially responsible and low carbon forms of energy. It’s pioneering work with the health sector in the provision of long term service contracts at the Lister Hospital NHS Trust for combined heat and power Veolia has guarantee savings of between £600k and £700k per annum whilst removing all plant maintenance risk from the Trust. It is also helping the Trust achieve its targets by reducing CO₂ emissions by 1,050 tonnes per annum as well as making the Hospital a net provider of electricity to the grid in the early years of the contract: all without any capital cost to the Trust.

Hughes rent kitchen appliances with servicing included. Their rental range comes with free delivery, installation and demonstration of equipment. They offer a same day in-home repair facility. Their engineers fix 90% of appliances first time and will organise a quick replacement if this is not possible meaning customers should never be without a service.

MAN Trucks UK was grown ten-fold over 20 years based on development of a technology-supported service business model. This now includes some £60m income from 10,000 operating units with a guaranteed pipeline of 4-5 years. Implementation of the “managed servitized” integrated approach through a better understanding of how the product is being used has captured more value for both the user and supplier. It has provided a “mobile R&D platform” whilst securing customers for the long-term to mutual benefit.

Rolls-Royce introduced TotalCare in 1997 providing “power by the hour” and transforming the engine services landscape by tying maintenance costs to usage. Since then it has evolved in response to maturing civil aviation engine fleets and the changing expectations of engine owners and lessors. Services now provide more than 50% of company revenues and contribute significantly to a £76.4bn (5.7 year) forward order book.
UK MOD examples TEsting the “20:20 vision”

The UK MOD Equipment and Support Continuous Improvement Team (ESCIT) is a key enabler for change and continuous improvement in DE&S. It is a central support enabler providing a sustainable in-house capability that works with MOD clients and industry suppliers to apply TES thinking across the wide range of the MOD’s numerous support systems: the goal is to provide the most efficient and effective equipment support for the British Armed Forces.

Having delivered circa £4.65bn of attributed benefit to defence since 2001 across all environments (air, land, sea and joint) from over 380 separate projects, ESCIT continues to offer the latest support products to its clients and industry partners, focussing on the provision of cutting-edge support systems thinking.

The application of these Through-life Engineering Services methodologies have consistently demonstrated benefits that decrease complex equipment support costs by a typical 18%, whilst delivering a 21% increase in equipment availability. Some recent projects include:

Land Programme designs new TES focused management process

This Team delivers and sustains Land equipment for the British Army. It was agreed that there was a disconnect between Customer requirements and the supply of support services, provisioned through a fragmented supply chain.

By incorporating the TES philosophy within new original practices and methodologies, the DE&S team worked with Industry to establish an integrated business planning process. This TES focused practice brought together the client, support activity planners and the extended supply chain, by sharing the “true” equipment demand requirements.

The joint team’s TES-centric approach has demonstrated efficiency and effectiveness improvements that fully support the 20/20 benefits identified.

Military Aircraft TES upgrade

A new innovative design of aircraft coming into operation required an affordable In-service support solution. Traditional support design approaches indicated that the maintenance proposals would not be financially viable.

When the combined DE&S & Industry team applied TES principals to re-examine the support engineering requirements, an upgraded support solution was unlocked: a key feature being the introduction of a shared integrated demand planning process.

Working together, the team introduced significant reductions in the financial risks the programme was facing. The overall effect was an 18% cost reduction whilst increasing equipment availability by 21%.

Award winning benefits for Maritime system support improvements

A key Naval System greatly benefitted from the practical application of TES thinking. DE&S System Support experts worked with key Industry subject matter experts, to help identify the correct “long term support arrangements” for a variety of Maritime systems.

The programme won the MinDEST’s top award for “greatest capability improvement in Defence”. The TES focused solution has “ensured the continued readiness and availability of this vital defence capability”. This united approach, once again delivered benefits of an 18% reduction in costs, with a commensurate 20% improvement in the system’s availability.
The size of the prize

A huge proportion of UK annual Gross Value Add is critically dependent on the creation or use of high value, long-life assets: making things work better for longer. Assets that work well generate value, those that do not generate cost.

Around 16.8% or £275.2bn of the UK economy is attributable to sectors that could be influenced by engineering services. Of this at least 1.9% or £31.6bn is potentially associated with the creation or application of through-life engineering services.

TES cuts across many manufacturing and other sectors, including those applying TES (User sectors) and those creating TES (Maker sectors) and those that do both, in particular, energy, and electronics and ICT.

Utilising expert user opinions to assess conservatively a lower bound potential market opportunity in both the User and Maker sectors (Table 1) has suggested that in terms of 2014 values this is at least around:

- £16.2bn or 1.0% of total UK GVA for TES Users
- £15.4bn or 0.9% of total UK GVA TES Makers.

These figures exclude SIC33 covering “repair, installation and maintenance” which is clearly TES related.
Table 1: Market Data Analysis

Showing the GVA reported for High Value Manufacturing sectors as a whole, all of which are potentially capable of transformation by TES. These are divided by judgement into those that use and those that make TES-susceptible products with upper and lower bound estimates of the degree to which TES may have penetrated these sectors by 2025. Note (1) that the HVM sector analysis excludes SIC33 (restoration and maintenance).

Both TES Makers and TES Users may adopt TES principles. The adoption of TES by Makers will have a direct effect on their economic output and global competitiveness, and application by Users will have major implications for their operational efficiency and global competitiveness. A national strategy to capture these potential effects is therefore of fundamental importance.

The goal of this strategy is to achieve a 20% reduction in cost with a 20% improvement in asset availability across more than £20bn of UK economic output: a 20/20 vision. This would be a significant transformation of national productivity and global competitiveness.

“Through Life Engineering Services is going to be one of the key levers to address the Productivity Puzzle”

Steve Foxley, Managing Director - Building Technologies, Siemens plc

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Table 1: Market Data Analysis

<table>
<thead>
<tr>
<th>Actual sector size (ONS data)</th>
<th>Lower bound estimated potential</th>
<th>Upper bound estimated potential</th>
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<tbody>
<tr>
<td>£bn</td>
<td>%GVA</td>
<td>£bn</td>
</tr>
<tr>
<td>All HVM sectors</td>
<td>£275.2</td>
<td>16.8%</td>
</tr>
<tr>
<td>TES Users</td>
<td>£194.0</td>
<td>11.8%</td>
</tr>
<tr>
<td>TES Makers</td>
<td>£81.2</td>
<td>5.0%</td>
</tr>
<tr>
<td>Restoration / Maintenance (1)</td>
<td>£7.4</td>
<td>0.5%</td>
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</table>

1Through-life Engineering Services (TES) Market and Data Review, Alan Hughes and Jonathan Hughes, Cranfield University 2016 www.through-life-engineering-services.org/strategy
The imperative

The time to do this is now. The world is shifting to a service economy, demanding increased manufacturing flexibility and closeness to customers. Customers are increasingly buying use, not ownership of assets: service is future manufacturing.

As an early adopter of engineering services, the UK is uniquely positioned to profit from this change. Achieving the bold goals of the 20:20 vision will require significant changes in behaviours, the adoption of new business and economic models, and exploitation of new and emerging technology.

Only a few practitioners are leading today – large Original Equipment Manufacturers or dedicated engineering services companies that are pushing change up the supply chain to influence customer change whilst pulling up supply chain capability. But the pace of change is slow and narrow. Unless this can be accelerated quickly UK leadership will wane and we will loose the significant opportunity afforded by taking action now.

Progress to consolidating and developing UK global leadership in TES is inhibited by:

• The market being too fragmented, with few common standards and perceived issues over the protection of intellectual property. The wheels continue to be re-invented as more firms attempt to servitize so service supply chains remain weak and the more experienced practitioners remain supressed

• This results in a structural failure to get economies of scale in servitized manufacture and other TES-applicable sectors. Tools and techniques do not yet exist to ensure effective management of life-cycle costs and the cost of risk

• Poor education and understanding of servitized manufacture and TES at firm and individual level, together with the lack of standards, inhibit supply chain communication and development and the behavioural change needed to deliver effective service

• The lack of pull from buyers, and government in particular who need to develop their understanding of TES and change procurement policies to reflect whole-life cost to drive overall whole-life value.

We are now at the crossroads and can choose strategic action to develop world-leading capability in TES to benefit from a future where the service model has replaced ownership, or we can continue to compete on first cost in “high-value manufacturing” and related sectors in the race to the bottom.

Rolls-Royce remains a leading practitioner, having been driving engineering for service excellence for over 15 years. In that time a focus on world leading engine health monitoring capability and proactive service support (Project zero) have driven a 73% reduction in customer disruption rate. A similar focus on ‘designing for service’ has enabled recent products to achieve an industry leading 99.97% first year on time dispatch reliability whilst increasing fuel efficiency and extending overhaul intervals. Despite these successes we still believe that a further 20% increase in overhaul intervals and a 20% reduction in cost are achievable with the right technologies, supply chain and focus.
...for cross-sector action

The imperative is now for a cross-sector initiative that will:

- Transfer leading practice across sectors, allowing more of UK industry to differentiate in a global service economy

- Strengthen the UK supply chain for engineering services enabling more businesses to compete for high-margin business and

- Develop global leadership for existing and emerging UK manufacturing, engineering, technology and associated financial services and fleet management companies.

In looking at sectors that produce TES complex engineering products as well as those that use them, the importance and opportunity for cross-sector, cross-disciplinary coordination and best practice learning is clear. Whilst an initiative that focuses only on those sectors that are early adopters – notably aerospace, defence and rail – will help in these areas, a wider campaign embracing all users and producers will allow big benefits in those sectors that could but do not yet embrace TES principles.

The focus needs to be on improving manufacturing and related sectors by providing competitive models for design/make/sell/support/retire and re-cycle complex products and assets delivering good outcomes for owners and users.
“We’re at the threshold of something amazing in manufacturing with amazing technologies coming to fruition. Imagine every machine is connected, measuring performance in real time, adapting to make things right first time, always, whilst linking design, make and operational support across the product life-cycle.

“Tomorrow is about developing technology solutions, playing to the UK’s strength in knowledge and innovation.”

Dave Benbow Global Head of Engineering for Services Rolls-Royce plc

“Within ten years a lot of the required technology for remote services may be ubiquitous - and offering Through-life Engineering Services is increasingly a great way for equipment providers to get their equipment out to customers and build market share. Capital equipment manufacturers will have more opportunities to sell equipment as part of a ‘service’ rather than a one-off capital sale.”

Martin Walder VP Industry UK Ireland, Schneider Electric

“With the digitisation of products and manufacturing we are seeing a re-invention of UK manufacturing and engineering. If we do not grasp this opportunity of a generation to get the very best creative minds engineering customer experiences and outcomes, then we will have let down the future of our children”

Nick Frank, Si2 Partners LLP

“At Bombardier, the service sector is a mainstay of our revenue growth targets and is critical to our future profitability, ever more so now that 35 year maintenance contracts are becoming the norm. Whilst the application of a TES approach and the associated tools and technologies have underpinned our current lead not just within the UK but globally, we can and must do more both horizontally and vertically within the supply chain and with support from academia and other industry sectors, in order to ensure we exploit the huge potential that TES offers.

“So for us, whether to apply a TES approach is no longer a question we debate, instead the question is about the pace of change and the rate of exploitation.”

Matt Byrne, Head of Service Execution WMA Region, Bombardier Transportation
The journey

The UK environment must incentivise growth and exploitation of the TES market. Users need to be educated and aware of the benefits of TES, becoming more demanding customers. TES innovators, including SMEs need to be able to adapt to the changing market more easily, with speed and less risk.

- Users gain more value from investment
- TES suppliers gain market share and revenue
- SMEs enter the market with less risk.

Our vision for the future is that the service model has replaced asset ownership and where attention to the circular economy and environmental sustainability are critical differentiators. Business and financial models are aligned to capture long-term value in use.

Although focused on the integration of manufacturing, engineering and technology with new business models, the programme must also address market and customer needs, cultural change and communication, financial and economic models, skills, standards and regulation.

The ability of the UK to provide global leadership in this future is enabled by TES.

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<th>Current State</th>
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<tr>
<td>- Opportunity is underestimated</td>
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<td>- There are islands of excellence</td>
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<td>- Minimal cross-sector learning, poor collaboration on the world stage. Collaboration inhibited by concerns over IP</td>
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<td>- Lack of collaborative standards</td>
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<td>- Business models and culture driven by acquisition cost.</td>
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<td>- Difficult to cost long term service or balance risk and opportunity in service provision</td>
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<td>- All solutions are bespoke with no economy of scale</td>
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<table>
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<th>TES Journey</th>
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<tr>
<td>- Developing TES-related capabilities:</td>
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<td>- Market knowledge, to “market with” a deep understanding of user and customer needs</td>
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<tr>
<td>- Innovation and innovating integrated business, economic, operational and technical models</td>
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<tr>
<td>- Lifecycle “end-to-end” technology innovation and analytics, design for service and degradation</td>
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<tr>
<td>- Integrated management of cooperative customer and supply networks</td>
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<tr>
<td>- Enablers:</td>
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<tr>
<td>- Transferable skills with a “TES-focus” and service culture through cross-institutional engagement</td>
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<tr>
<td>- Transformation of organisation culture and communication style to “service-led”</td>
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<tr>
<td>- Development of common integrated framework (or behavioral) process and technical standards</td>
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<tr>
<td>- Establishing a financial environment where life-cycle costing and value assessment is the norm</td>
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<table>
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<th>Vision 2025</th>
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<tr>
<td>- UK leads in a competitive world market where the service model has replaced ownership across many HVM sectors</td>
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<td>- Business models and financing are aligned to long-term value creation by the service enterprise</td>
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<tr>
<td>- Skills and capabilities enjoy robust institutional support</td>
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<td>- Risk management and cost efficiency not inhibited by IP ownership</td>
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<td>- Financial models reward long term value creation</td>
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What does success feel like?

Fantastic! A successful strategy will equip many more sectors and firms with a “through-life” service perspective and culture, and with the business, engineering and technical tools to make it work. These firms will be better differentiated on the world stage with higher-quality earnings – higher profits, with strong pipelines – providing a greater contribution to UK productivity and exports. They will attract the very best talent because they represent the most challenging environment bring together people, technology, data, communication and finance.

- UK government and industry are the most successful TES users
- UK industry leads TES innovation – TES optimized products are more productive at lower cost of ownership
- The UK has the most capable TES supply chain, supporting a global market

Date: 1 April 2025
To: MD, Control Gears UK Ltd
From: Customer Service Coordinator, TransCo plc
Subject: Service interrupt / near miss

Alison, many thanks to you and the team for your foresight in taking action ahead of plan to integrate customer and network resources for implementation of your Maintenance Routine 28B and design Mod 25C early and together. It is now clear that this action has not only saved us from a service interrupt but has also reduced future outage and service costs for implementation of Mods 26-28.

Gainshare credits will be distributed as normal at the end of the operating quarter. In the meantime we’ll look forward to integrating your e-network 360° collaboration report towards the annual performance distribution.

Best wishes
Chris
Key Performance Indicators

KPIs for the strategy will include:

- Sector and national GVA improvement
- UK productivity
- TES-related exports
- Cross-sector / institution common approach to ‘through-life’ standards, competencies and education
- Proportion of long-life asset acquisitions based on through-life considerations and financing
- Intangible investment in TES-related activity
- Profitability and order-book for participating firms

“The TES National Strategy presents an opportunity for us to fine-tune our delivery for our customers and provide value for money for the UK taxpayer. Additionally the framework, which is aimed at major contractors and SMEs alike, will improve the competitiveness of British Industry in a global defence export market.”

Mr Tony Douglas, CEO Defence Equipment and Support, Ministry of Defence
There is a considerable challenge for firms

Many smaller companies have tried and failed to servitize and we can speculate that this may have been because of the difficulties of integrating technologies and changing the organisational culture to support new service thinking.

But those that get it right profit. Transformation to a service-led manufacturer or business is non-trivial with significant cultural and technological challenges but there are examples, some of which are cited in this strategy, that demonstrate more value can be captured for both the user and supplier generating high quality earnings with a strong forward pipeline.

Where the manufacturer is also the service supplier it can also provide a mobile R&D platform generating the essential “feed-forward” of in-service performance to design upgrades and future products.

“At MAN we pioneered servitization in transport and this is now the most profitable part of the business with a guaranteed forward pipeline whilst sustaining c1,000 people across 70 locations in the UK. It may sound easy but it took 10 years to become an overnight success!

“There is a significant technology challenge and a huge cultural / leadership challenge in changing people’s behaviour which shouldn’t be underestimated.

“There is still a ‘product led’ mindset amongst vehicle manufacturer leadership groups that present barriers to full realisation of the value that can be obtained from a ‘through-life’, service perspective”

Des Evans, Former CEO MAN Truck & Bus UK Ltd 2004-14
How do we deliver success?

The industrial sponsors of the strategy commit to forming a cross-sector National “TES Council” to inspire UK industry, lead delivery of the benefits of the strategy and seek government support for this venture.

The companies that will lead implementation of this strategy recognise that it will strengthen their supply networks and transform customer behaviour, improving their global competitiveness.

They recognise the need to proactively reach out to other sectors to engage them with the potential benefits of TES: to learn from, and contribute to, similar journeys in other sectors, whether users or providers of “TES-applicable” products. This will reduce wasteful duplication and improve UK productivity and competitiveness.

For established sectors the best get better, whilst the followers get better and broader.

Cross-sector, cross-institution collaboration and coordination will be essential to deliver this strategy as a route to the future vision. The strategy is about both aligning existing sector strategies and institutions around a common thematic approach to “through-life” thinking and about transforming culture and business models and equipping practitioners with better engineering and technical tools. The strategy will build out from those sectors that are early adopters, such as defence and space, into all others that provide or use TES-sensitive products from rail and infrastructure to construction and health to renewables, food and pharma.
Government, industry and academia have roles in this journey:

- Government, industry and academia must work together to develop a collaborative approach to capability development

- Government and industry users of TES-sensitive products must lead in promoting business and financial models for procurement that demand through-life thinking and long term value creation

- Industry producers of TES-sensitive products must expand their offering to encompass their customers’ through-life and service based needs

- Academic and professional institutions must collaborate to better integrate technology, skills and standards development
The strategic plan

The plan is focused on achieving a “20:20” vision: a 20% reduction in cost of ownership and 20% improvement in availability for capital assets across at least 10% of the economy by 2025. This will be achieved by influencing:

- Industrial strategies for sectors that either use, or provide TES-applicable products – initially telling these sectors about TES and the TES Strategy and then influencing sector strategies themselves to recognize TES
- Technology programmes in research, development and application of new and related underpinning technologies – particularly regarding measurement and analytics, and degradation, preservation and self-repair
- Customers and users of TES-applicable products, particularly government, to highlight the benefits of demanding a whole-life perspective and to change their procurement and maintenance policies
- Education and training bodies, including professional institutions and the general public to ensure an awareness of TES and whole-life management as important elements of engineering, manufacture, procurement and project management

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<table>
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<tr>
<th>Initial Strategy and KPIs July 16</th>
<th>Broaden Engagement / refresh strategy</th>
<th>Tangible investment in capability</th>
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<tbody>
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<td>Increasing capacity</td>
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<tr>
<td>12/16</td>
<td>12/20</td>
<td>Sector strategies / institutions aligned</td>
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The implementation plan, illustrated below, has three main phases:

- Broadening and deepening the engagement – development of this initial strategy has engaged most sub-sectors within High Value Manufacturing and many non-manufacturing sectors. All those engaged have been supportive but this still represents a narrow sample of stakeholders. More work needs to be done with institutions and SMEs.

- Aligning sector strategies – for capability and market development, aligning standards’ development and the institutional agenda for education training and skills’ development: generally building investment in TES capability and intangible assets.

- Nurturing innovation and improvement – continuing to support cross-sector sharing and investment and measuring progressive improvement in the strategy KPIs.

“Within ten years many more companies will sell service capability across multiple platforms creating applications for economic growth at firm and national level”

Professor Rajkumar Roy - Cranfield University
Delivering the plan

Those companies that have supported development of this strategy wish to lead its implementation. Successful delivery will strengthen their supply networks and transform customer behaviour to improve their global competitiveness whilst benefitting the UK as a whole.

They recognise the need to learn from, and contribute to, similar journeys in other sectors, whether users or providers of “TES-applicable” products. This will reduce wasteful duplication and improve UK productivity and competitiveness.

“We the signatories to the TES Strategy are committed to ensuring its successful delivery and intend to continue to work together to this end.

“The programme for change is ambitious and we call on government to provide the support that will be essential for success.”

With government support, the firms that have led development of this strategy intend to cooperate to deliver the strategic plan. This will involve establishing working relationships with all the groups and organizations currently or potentially engaged in TES-based activity, including servitized manufacture.

Initial action will establish a National TES Council mirroring the example of other areas. This may then oversee other initiatives such as the establishment of a TES Catapult or other facility to scale and demonstrate technology and business capability: providing an incubation space for business model and technology innovation and a showcase for learning and capability development across large and small firms and academia.

With the support of government, this will involve establishing a separate, small independent management group to govern the cooperative endeavor, monitoring delivery to agreed KPIs based on agreed levels of investment. It is anticipated that this independent management group will report regularly to stakeholders and will provide an annual public progress report.

A detailed plan and governance group will be established during the fourth quarter 2016.
How to get involved

UK manufacturing competing on production price alone is a race to the bottom. Servitizing manufacturing of “TES-applicable” products can improve the quality of earnings and provide differentiation in the world market.

Users of “TES-applicable” products – even if “intelligent customers” – get poor value in use when procurement is only on a first cost basis and reliance placed on a traditional maintenance regime: these customers will increasingly seek to benefit from a change in their relationship with servitized suppliers in order to generate better value in use.

Industry – will gain through supporting the strategy
• A much broader level of understanding and engagement in TES value propositions with better strength in depth of the supply chain providing competitive advantage for all
• Innovation in, and development and exploitation of the underpinning processes, standards, capabilities, skills and technologies
• Better quality of earnings and global differentiation as a result of excellence in TES.

What needs to be done:
• An educated leadership and workforce with culture and behavior transformed to “service-thinking”
• A nationally engaged TES practitioner base drawing on and contributing to building and sharing of capabilities and resources through membership of / engagement with institutions aligned around a common “TES theme”
• Contribution to a national resource of TES case studies, success stories and other assets enabling broader, accelerated and more successful uptake of TES value opportunities

Government – must support the strategy
• To help with leadership and investment
• As the biggest but probably most diverse user of “TES-sensitive” products, government has a key role in leading the change in procurement practice and financial modeling resources through membership of / engagement with institutions aligned around a common “TES theme”
• Contribution to a national resource of TES case studies, success stories and other assets enabling broader, accelerated and more successful uptake of TES value opportunities.

Academia – must support the strategy, and work with professional bodies, government and industry
• To agree a long term programme for higher education and skills development
• A long term approach to cross-disciplinary, early and middle stage and applications-based research and development that creates TES-related new technology and business model innovation and integrates engineering, social science and business / economic enquiry.

Get involved to join the race to the top. The more firms and organisation that join to collaborate and innovate together the better and faster will be the improvement.
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