

WMCA / MAA Aerospace Sector Action Plan
Work in Progress
November 2020

Black Country *LEP*

Overview

This action plan is a sub-set of the West Midlands Local Industrial Strategy (WMLIS) that was published in May 2019. It aims, firstly, to outline a strategy specific to the aerospace industry in the context of this WMLIS and, secondly, to set out the region’s response to the effects of COVID- 19 on this industry. This aerospace action plan aims to recognise the current state of the sector in the West Midlands, and to propose potential solutions to the challenges it faces and the distinct opportunities presenting themselves. Given the particularly severe effects of the pandemic on aerospace, globally, this document is now integrated fundamentally with the plan: ‘*Rescuing and Recovering Aerospace Supply Chains at the Heart of UK Manufacturing*’, published by the Midlands Aerospace Alliance in July 2020. We shall refer to the plan in this document by its working title: *The Five Point Plan*. Furthermore, the West Midlands Combined Authority published, in June 2020, *Recharge the West Midlands*, its investment case to Government in the light of the regional impact of COVID-19. The line of thinking adopted in this document will, align additionally with the direction of the ‘Recharge’ offer.

At the time of writing no additional commitments or funds are attached to this action plan, but through a strategic focus and buy-in from a range of sector stakeholders, we aim to make the case for further investment and intervention in the West Midlands aerospace sector so that it can fulfil its potential.

This action plan has been produced by Black Country Consortium on behalf of the West Midlands Combined Authority and, crucially, in partnership with key regional aerospace sector stakeholders, in particular, the Midlands Aerospace Alliance.

It’s crucial that the action plan is led by the industry and relates to specific market failures that we can aim to correct, and opportunities we can maximise. An overarching feature of the industrial strategy is that it is steered by the public sector, but, importantly, delivered by the private sector.

This aerospace action plan initially provides a regional strategy for the sector up until 2025.

Local Industrial Strategy

The Government’s Industrial Strategy sets out intentions for building a prosperous and more inclusive country for the long-term.

As shown in the diagram to the right, the national industrial strategy is driven by 5 “foundations of productivity”: ideas, people, infrastructure, business environment and places. In this action plan we summarise the importance of these foundations in an aerospace context, particularly in the West Midlands.

The ‘local’ element is a key part of the Industrial Strategy, with areas across the country in the process of developing local industrial strategies. A trailblazer in developing an industrial strategy, the West Midlands is the first to publish a LIS. It will set out the priorities to increase the productivity of the West Midlands and to drive inclusive growth across the region.

Our five foundations align to our vision for a transformed economy



Multiple components come together to create the overarching framework that will help drive a successful delivery of the West Midlands LIS. This framework is displayed in the diagram below, demonstrating the relationship between the foundations of productivity, the key West Midlands sectors and four major market opportunities specific to the region:

- The Future of Mobility
- Data-Driven Healthcare and Life Sciences
- Modern Services
- Creative Content, Techniques and Technologies

Taking advantage of these market-driven opportunities is central to the West Midlands LIS, requiring action across key policy areas, reflected in the inclusion of key foundations of productivity: people, ideas, infrastructure and business environment.

Crucially, the region’s key sectors will ultimately deliver the benefits of the strategic opportunities, including firms of all sizes and from across supply and value chains. Different sectors will have a varying impact on the four opportunities, but it’s vital to recognise sector-led growth in this way rather than the strategic opportunities in isolation. A mix of horizontal policies, through the productivity foundations, and sector-led actions, is the best way to maximise success in achieving the strategic opportunities.

Sector-led actions are being developed within a suite of section action plans such as this one. As depicted in the framework across, the sector action plans sit below the strategic opportunities as their vital delivery vehicles, each within the context of the foundations of productivity and led by the needs and ambitions of industry. The four major market opportunities should be seen as opportunities for all sectors to capitalise on, driven through the sector action plans and eventual implementation of these.

The predominant impact of the **aerospace sector will be to help deliver the Future Mobility** strategic opportunity. This sector action plan will outline the priorities for maximising the potential of the West Midlands aerospace sector, ensuring it contributes significantly to the region’s future mobility ambition, whilst adapting itself to the new normal of a COVID-19 and post-COVID-19 world. Throughout this document we intend to make this link clear, and we provide a summary of this alignment below.



The Impact of Aerospace on the Future of Mobility Opportunity

The West Midlands LIS identifies Future of Mobility as a key opportunity for the region going forward – contributing to the government’s mobility ‘Grand Challenge’. Our region is the centre of transport innovation in the UK, leading the smart, low carbon movement of people and goods. Adapting to the large-scale change within mobility – electric vehicles, connected/autonomous vehicles, 5G – creates huge economic opportunities for the region, of which multiple sectors will drive forward.

The aerospace sector will play a vital role in delivering the future of mobility opportunity regionally, particularly given the major technologies disrupting aerospace and our strength in wide-ranging aspects of aerospace manufacturing. This action plan outlines these features in more detail, and also provides **detailed sections on a number of opportunity areas (p.28)** that we feel are crucially important in driving the aerospace sector’s contribution to the Future of Mobility opportunity:

- Electrification of Aircraft
- Materials and Lightweighting
- Additive Manufacturing
- Industry 4.0

Significant action to harness the potential of the above would support the West Midlands aerospace sector in adapting successfully to new modes of mobility and all of our proposed interventions (outlined on p.5), are relevant to the successful delivery of this opportunity. Boosting the capabilities of aerospace across key policy areas (e.g. innovation, energy, skills, business support) in the right way will ultimately help the sector diversify and improve productivity. Notably, the bearing of COVID-19 on the aerospace industry means that it must transform particularly swiftly in order to meet the rapidly changing situation and needs of its major client- the aviation sector. Undeniably, aerospace is in crisis, globally. However, the contributions and evolution of the technologies, business models and systems developed by and for the sector in our region are most likely to present significant opportunities to *reset, rebuild and recharge* it. This will help UK aerospace to remain a vanguard of innovation.

The sector in the West Midlands could still remain Britain’s strongest industry cluster. It is well placed to maintain its position as a global asset in the supply chain if it continues to demonstrate agility and adaptability in relation to itself and in exploiting new supply chain and commercialisable innovation openings in other sectors. Notably, it has been one of the strongest and most rapid industries in the region to organise itself, share intelligence and engage in clustering. Being swift to respond to COVID-19, perhaps because of the severity of sector impact, but no doubt because of its proactive nature it has been one of the few sectors to issue a region- specific sector strategy written for industry by industry. Moreover, the strategy pays much more than passing attention to diversification and reaching out to industries in a spirit of partnership.

As well as acknowledging the West Midlands aerospace industry’s inter-connectedness with other sectors such as metals/materials and automotive, it’s important to recognise the independent role of the sector in delivering the regional Future of Mobility opportunity. Our aerospace sector action plan here reflects this and provides the strategic focus for the industry to maximise its potential across key policy areas.

Other Strategic Opportunities and Aerospace

The four strategic opportunities are designed to appeal to all sectors and therefore have broad, wide-ranging definitions. This means that the link between aerospace and the other three strategic

opportunities may be more apparent than first thought. We intend to link each of our aerospace sector interventions to at least one of the strategic opportunities, showing how sector-led action in aerospace can contribute to the delivery of all of the key West Midlands opportunities identified by the overarching LIS. In the interventions table below, we indicate the alignment using the following symbols:

| | | | |
|--|--|--|--|
| Future of Mobility  | Health and Life Sciences  | Modern Services  | Creative Content  |
|--|--|--|--|

Full List of Proposed Interventions

Before going into the detail of the full document, the table on the next page lists all of this action plan’s proposed interventions. These have been developed in partnership with industry and are backed up by robust evidence, including that of distinct market failures that currently hold the industry back. The proposed interventions are grouped under the industrial strategy foundations of productivity and the relevant strategic opportunities that they will help deliver. Some of the proposed interventions are government asks, whilst others are industry suggestions and ideas. Importantly, the proposed interventions are not committed to and all will require further detail and appropriate business cases.

We believe that changes in these areas can provide the West Midlands aerospace industry with the right environment to succeed in the future.

| IS Foundation | Proposed Intervention | Strategic Opportunity |
|---------------|---|---|
| Ideas | 1 The WMCA, LEPs and the MAA will work with ATI and government to improve the quantity of aerospace innovation/R&D funding accessed by West Midlands firms throughout the aerospace supply chain, particularly SMEs. |   |
| | 2 Local partners will drive a new regional approach to innovation - providing sector-specific mentoring and strategic support on innovation to supply chain firms – seeking government support for this as it develops. |  |
| | 3 Utilise the West Midlands Innovation Programme (WMIP) for aerospace priorities, including the CITEC programme, 5G, supporting future flight and electrification, and bidding into national schemes. Enable synergies across sectors to add value to all participating industries but also mitigate aerospace risks until the sector recovers. Scale-up this bottom-up innovation approach championed by the WM aerospace sector. |   |
| | 4 Provide better matching of skills supply and industry demand – e.g. through extending the Black Country Skills Factory and developing a focus on digital/coding skills for aerospace. Build in skills flexibility to allow for sector |  |

| IS Foundation | Proposed Intervention | Strategic Opportunity |
|-----------------------------|---|---|
| People | changes, diversification and redeployment to save businesses and jobs. | |
| | 5 Work in collaboration with other sectors to improve skills development and careers advice, e.g. by implementing the findings of the emerging WMCA's automotive skills plan. |  |
| | 6 Build on good practice to take action on encouraging diversity and inclusion in the sector, e.g. through Women in Aviation and via the MAA's Diversity & Inclusion group. |   |
| Business Environment | 7 Develop a COVID-19 safe working environment and good health and safety practice for the region's aerospace workforce in line with the MAA's Five Point Plan. |    |
| | 8 Work with the MAA and government departments to ensure an efficient, scaled-up and agile productivity ecosystem, e.g. through the emerging Productivity Factory and promoting national schemes like SC-21 and NMCL. |    |
| | 9 MAA & other local partners to maximise the sector's trade and investment potential, including the utilisation of the Midlands Engine brand, and boosting the number of SMEs that export. |   |
| | 10 Deliver the Midland Aerospace Alliance Five Point Plan to rescue and recover the industry after the severe damage caused by COVID-19. Ensure especially that financial emergency aid and other financial and business support mechanisms are in place to enable the region's sector and individual businesses to survive and stabilise. |   |
| | 11 The sector supports regional momentum on improving infrastructure, e.g. the bid for the regional Energy Innovation Zones and regional transport programme to improve connectivity. |    |
| Infrastructure | 12 Work collaboratively to provide a step-change in the accessibility of key innovation assets to aerospace supply chain firms, creating a more productive use of existing assets. |   |
| | 13 Maximise emerging developments to raise the availability of land for industrial use so that aerospace firms can invest in new sites once sector begins to recover and its size, structure and priorities are clearer. |   |
| Place | 14 Enhance the promotion of the West Midlands as a key aerospace cluster in the UK. Tie this closely to consolidated region-specific business support, information and intelligence to strengthen the Cluster ensuring that the whole supply chain benefits and increases in agility and flexibility. |   |
| | 15 Commit to working across boundaries with other clusters when possible and relevant (e.g. on innovation). Consolidate region-specific information and intelligence to strengthen the Cluster, ensuring that the whole supply chain benefits from cross-sector synergies and collaborations. |   |

The Impact of COVID-19 on the Aerospace Sector

The unprecedented plunge in demand for air travel since the emergence of COVID-19 and its catastrophic impact on civil aviation has bruised the aerospace industry very severely. Globally, revenues are down to 2005 levels. The pandemic will wipe out an estimated \$8.5 trillion worth of outputs from the industry between now and 2022 (Source, United Nations). Indeed, it is unlikely to recover to pre-COVID-19 levels until at least 2025 (Source, IATA and Roland Berger). With 25% of the UK aerospace industry based in the West Midlands and the region's sector being an international leader in component design and manufacture, members and sector organisations have had to act immediately to set about rescuing rebuilding and redirecting. In July, the Midlands Aerospace Alliance published its Five Point Plan, *'Rescuing and Recovering Aerospace Supply Chains at the Heart of UK Manufacturing'*, setting out a strategic paradigm shift and a way forward.

The Five Point Plan adopts a whole-system approach. In sum, it lays out five key priorities: **business development, supply chains, technology and innovation, people** and **finance**. From these flow twenty critical actions, focused on stabilising the region's industry and addressing opportunities for and risks to businesses.

The Five Points

People: *Ensure safe and productive workplaces.* Safety is a top priority. We also need to protect capabilities and skills.

New Business: *Opportunity creation.* There are still real business opportunities but companies may need to be inventive to widen markets.

Finance: *Relaunch support for supply chain companies.* A race to the bottom in terms of price could have damaging effects so companies need to think long-term.

Supply chain: *Develop a resilient supply network.* The whole supply chain needs to be factored into planning.

Innovation: *Turn ideas into revenue.* Innovation can be key to increasing productivity and diversity in order to survive the crisis

The Critical Actions

Safe workplaces - continue to share industry best practice as government advice evolves

Transition to a 'new normal' - maintain higher levels of flexibility and remote working where possible to help retain talent

Redeployment - preserve the skills and capabilities of our sector by helping to find alternative employment

Keep apprenticeships - National funding and local support is required for the future skills base

Support industry entrants - Current trainees need to be able to enter the industry and must not feel abandoned

Promotion - Work together to promote the advanced capabilities of the Midlands aerospace network

Information - Share market knowledge and updates about changing demand with all supply chain tiers

Diversification - share and enable opportunities for aerospace companies to enter new markets

Digital - explore digital solutions to support companies while the crisis continues

Explore - Organise regional 'meet the buyer' events for lower tier companies and build renewed outreach to global primes

Safeguard working capital - Help companies manage working capital until aircraft demand turns up

Cashflow support fund - Organise finance that is repayable based on business performance

On-time payment - Large firms must pay suppliers as originally agreed

Think before applying price-down pressure - Large firms should be creative, agreeing sustainable, long-term cost targets with suppliers

The overall position taken is one of *collaboration, consolidation and diversification*. There is a strong sense of determination to make the best of existing resources and relationships, creating robust self-knowledge and carefully crafting evidence-rich business cases for external engagement before reaching for grants and investments. The identification of resources including not only finance, but expertise, knowledge, skills and innovative approaches is core to the Five Point line of travel. Fundamental, also, is the role of the supply chain and the SMEs that comprise it. They have a dynamic role as not only suppliers of components but dynamic assets capable of innovating and meeting the needs of a much transformed sector.

What the civil aviation sub-sector may be transformed into, emerging from COVID-19, is too early to determine, as there are too many unknowns at this stage. The defence aviation sub-sector is more stable. Yet, it is a considerably smaller market and cannot, thus, provide a counterweight to rebalance its larger sibling's shortfall situation. This will mean that businesses must diversify to survive and thrive, and for some this may mean diversifying beyond or even out of the industry, temporarily or permanently. Likewise, the skills base will need to become especially transferable and agile to match the shifting operations and fortunes of companies.

Sector shrinkage is inevitable, with smaller order numbers of new fleet and, perhaps, smaller sizes of aircraft (Source: Flightglobal webinar, 26.03.20) going forwards. But with recovery predicted, albeit in the longer term (ca. 5 years), the intention of the region's businesses is to return to growth. In addition, with the sector being one of the world's most technologically and digitally advanced, it has much to offer other markets and is likely to innovate and regain lost ground in an unexpected but fortuitous way.

The West Midlands aerospace sector may be very well positioned for it does not manufacture aircraft but rather materials and components. Its greatest strengths are in digital, electrical, structural and mechanical systems and sub-systems. Its industry primes are in propulsion. So these elements and the companies creating them may find welcome synergies in and outwith aerospace activities. Potentially fertile areas include developing niche and high-value products and services that will allow SMEs entry into or expansion in the aerospace long tail and facilitate a timely escape from high-volume, low-cost and 'price-down' pressures. Outside of the industry, areas such as multi-modal digitally enhanced transport (central to the Future of Mobility) and mobility as a service (MaaS) may provide appropriate niches for innovators at ease with high-tech, precision-engineered and advanced digital solutions. Additionally, it is worth recognising here that the aerospace industry is one of the most highly servitized sectors in the world and it understands customisation and fine tuning very well. Its need to operate in environments of high precision reacting to human interaction and physical

conditions makes it an especially attractive sector with which to partner from both a manufacturing and services point of view. So, for the West Midlands aerospace sector, adaptability will be less of an issue than it is amongst more innovation-averse or service-unfamiliar manufacturing sectors, which bodes well for a bright future.

National Aerospace Sector Deal

Some areas of this document refer to the national aerospace sector deal document announced 6th December 2018. Our WM document here broadly reflects the sentiments asserted within this, and the mutual commitments between the aerospace industry and government set out in this document will:

- Help develop and take commercial advantage of the future technologies that will shape the aerospace sector in the years ahead.
- Position the West Midlands and the UK to take advantage of the global move towards hybrid-electric and electric propulsion, and to capitalise on new markets such as drones and Urban Air Mobility.
- Ensure aerospace is more competitive, productive, and can boost its technological advantage.
- Make the industry more diverse and ensure a future pipeline of talented people are ready and able to work in aerospace.
- Support SMEs in the UK aerospace supply chain.

However, we are aiming to provide a more localised action plan that has a diverse set of interventions to support the whole aerospace sector regionally. Crucially this should include harnessing the quality of our small and medium supply chain companies which are traditionally underrepresented in aerospace policy, strategy and funding allocations in the UK.

Given our position at the heart of the aerospace industry, we intend to play an integral role within the sector's UK and international ambitions. This will be delivered through our sector action plan, sitting alongside both the national aerospace sector deal and beneath the overarching West Midlands LIS.

1) Sector Summary

Within this work, the aerospace sector comprises the SIC code 30.30 – ‘Manufacture of air and spacecraft and related machinery’. However, it’s clear that the SIC code system obscures much of the West Midlands’ considerable aerospace activity, often disguised by other classifications such as ‘metal working’ or ‘electro-mechanical equipment’. Through wider analysis and evidence, the scale of aerospace in the West Midlands is now better understood, and it clearly goes beyond the modest figures revealed by SIC codes. The data sheet below shows the key figures for GVA, jobs and businesses for the aerospace sector in the WMCA based solely on the SIC code 30.30. The remainder of this section looks deeper into the sector and gives a more accurate account of its size.

Aerospace Sector Data Sheet

Pre-Covid Summary Statistics: Aerospace

- Estimated **£272m** GVA attributed to aerospace manufacturing in WMCA. The 2030 ambition for this sub-sector is £367m. There are **2,850 jobs** in the sub-sector locally.
- However, this data understates the extent of aerospace activity in the WMCA, as it only reflects the SIC code: 30.30 Manufacture of air and spacecraft and related machinery. Wider evidence suggests a much broader aerospace sector locally, with a **stronger cluster of activity in the WM region than suggested here (see earlier slides)**
- National body ADS estimate UK aerospace turnover of £35bn. The West Midlands is roughly 10% of the sector nationally, thus representing approx. £3.5bn turnover. ADS estimate that GVA is 30% of turnover in aerospace so **aerospace GVA in the WM is around £1bn.**
- ADS estimate that there are 123,000 direct aerospace jobs in the UK, and double this when you include indirect jobs. This means that around **25,000 jobs in the WM are aerospace.**
- Only measuring for SIC 30.30 ensures that much activity that is primarily for aerospace is not recorded. This aerospace activity is disguised as ‘metal working’ or ‘electro-mechanical equipment’.



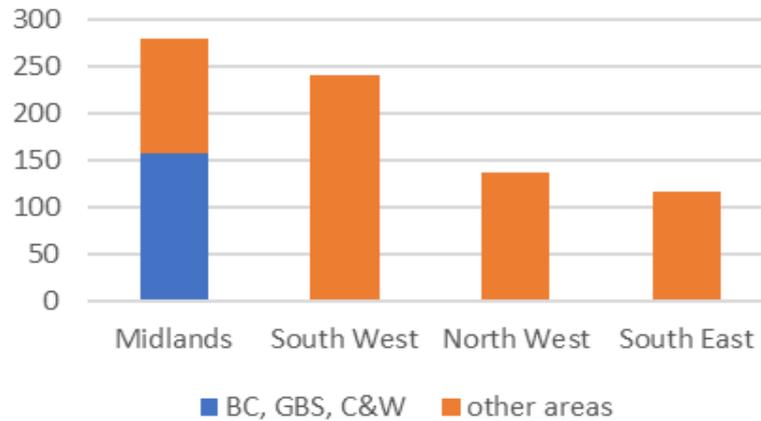
1a) Sector Strength Regionally

The Midlands has a substantial aerospace cluster which is one of the largest in the UK and Europe. Whilst the cluster doesn’t produce aircraft, several significant global aerospace companies have operations in the region, most notably Rolls-Royce in Derby (and Birmingham), but also Meggitt, UTC Aerospace and Moog in the West Midlands. Distinct supply chains are built around these key locations, and here the cluster extends into other sectors, particularly automotive and power generation. Many aerospace parts manufacturers and support companies also supply other advanced engineering sectors, reflecting the cross-overs between manufacturing industries.

When it comes to members of regional aerospace alliances, the Midlands is the UK’s largest aerospace cluster. Almost 300 companies are members of the Midlands Aerospace Alliance (MAA), and as the below graph shows, over half of these are based in the WMCA. 160 of the MAA’s membership are based in the WMCA - this is more than both the North West and South East regions and represents

21% of the UK's total. This doesn't suggest that the WMCA's aerospace cluster makes up 21% of the sector nationally (as WMCA aerospace companies tend to be smaller than other regions), but it does go some way to confirming a significant aerospace industry locally.

Members of regional aerospace alliances

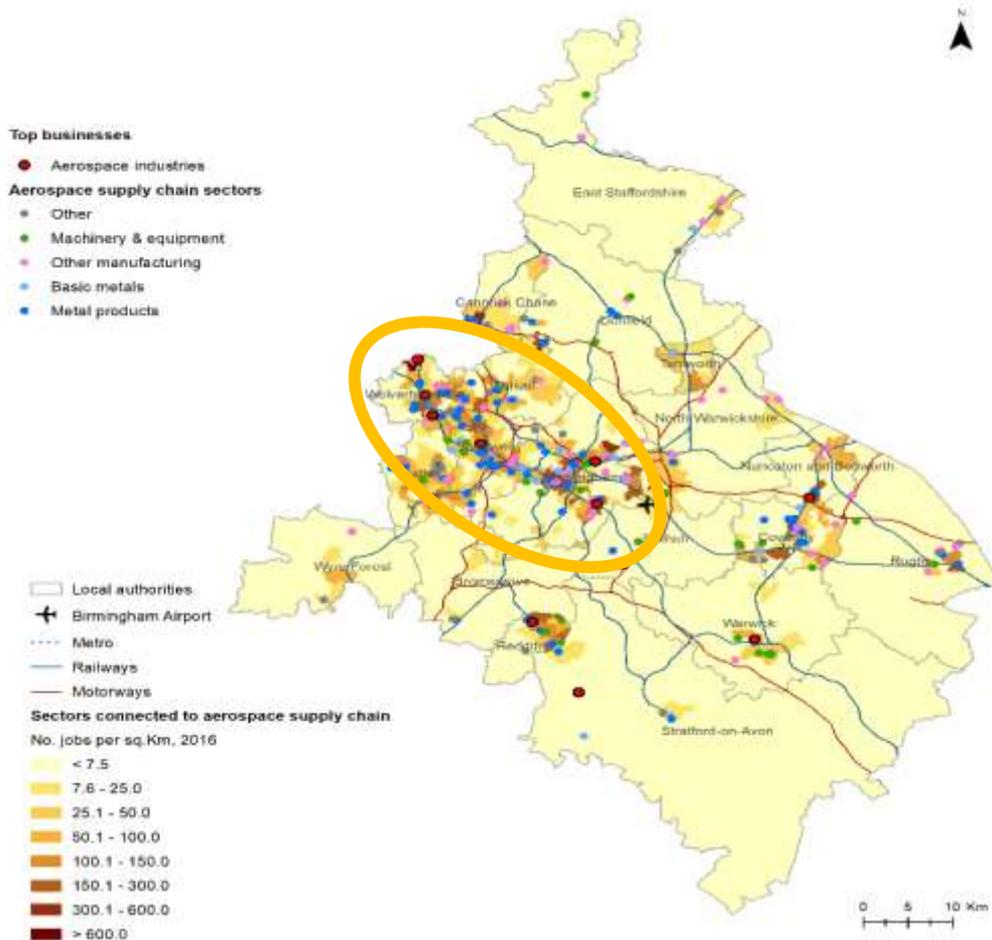


The West Midlands' share of UK aerospace is more like 10%. Using ADS (the national sector body) data, the West Midlands share of UK aerospace turnover is approximately £3.5bn, which puts West Midlands GVA at around £1bn.¹ As the WMCA 3-LEP makes up approx. 87% of West Midlands aerospace companies, we can estimate aerospace **GVA in the WMCA at around £870m**. Using the same methodology, the number of aerospace **jobs in the WMCA region is approximately 21,750**. These figures are much larger than those suggested using SIC 30.30 alone (£272m and 2,850 jobs), reflecting again the issue of measuring aerospace in this way. Many West Midlands suppliers, who tend to be small and supplying other sectors as well, are classified under other SIC codes and thus not captured under aerospace despite playing a crucial part in the supply chain. This is most obvious when you consider that MAA's research reveals 160 aerospace companies in the WMCA – using SIC codes this number is only 35. In the West Midlands Science and Innovation Audit, this measuring issue is confirmed:

“Feedback and further evidence provided by local partners in the development of the WM SIA indicates that the level of employment supported by aerospace is likely to be significantly higher in practice than the SIC data suggest.”

We can therefore say with some confidence that the WMCA makes up around 10% UK aerospace output, for both GVA and jobs. This is broadly validated by analysis showing that 44 of the 418 innovation actions in the 2013-17 National Aerospace Technology Programme (NATEP) were in the WMCA area – 11%. The GVA and jobs figures represent around 1% of the local economy, but 12% of advanced manufacturing jobs and 8% of advanced manufacturing GVA. Aerospace is a significant manufacturing sub-sector in the WMCA, evidently more important than SIC code measurement gives it credit for. The scale of the sector locally is displayed in the map below of the West Midlands aerospace cluster. There's an obvious concentration of activity in and across the 3-LEP area.

¹ Using ADS assumption that aerospace GVA is 30% of turnover



Radiating from Rolls-Royce's East Midlands presence, the engine supply chain is one prevalent characteristic of aerospace in the WMCA. Spatially, this is particularly important in Birmingham and Coventry, with Rolls-Royce producing control systems for engines in the former, and the latter hosting companies such as Meggitt. A second cluster overlaps with the engine supply chain but is organised around Meggitt Aircraft Braking Systems, UTC Aerospace and Moog, supplying the electro-mechanical systems that control an aircraft's moving parts to OEMs (e.g. wing flaps, landing gear, brakes). UTC and Moog are both located at Wolverhampton's i54 business park and are good examples of major aerospace factory re-locations in recent years regionally. Other successful examples are Rolls Royce to Birmingham Business Park and Meggitt's future move to Ansty Park.

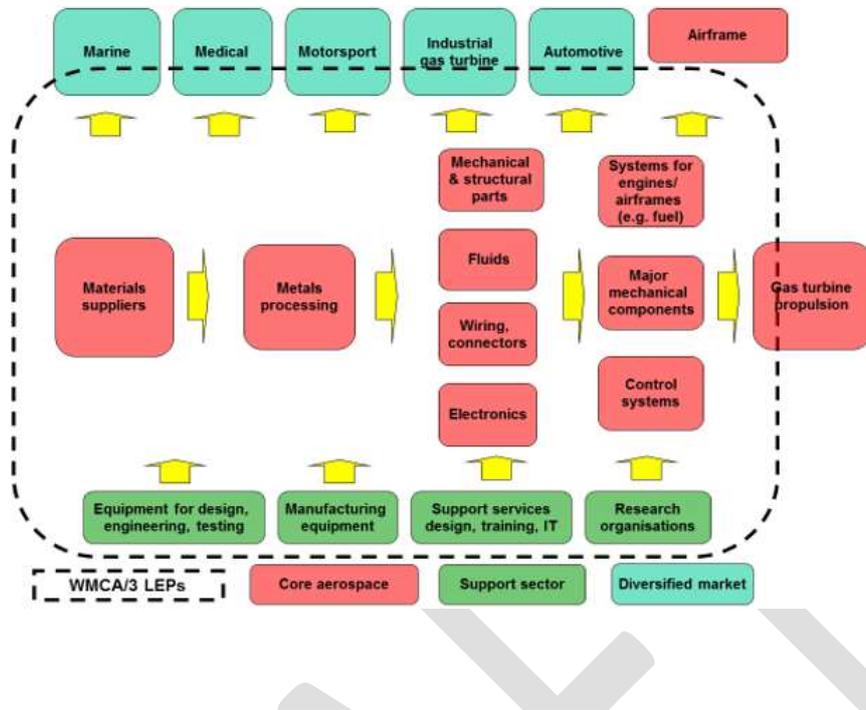
Beyond the presence of aircraft production, aerospace firms in the WMCA manufacture products and provide services across the supply chain. At the base of this, the WMCA hosts a number of specialist aerospace materials producers, such as Timet (titanium). The region's historic presence within metals and materials manufacturing is a vital input to today's aerospace sector, providing larger companies with easily accessible base materials. The below image demonstrates the aerospace supply chain in the UK, visualising the type of products contributing to the industry. WMCA aerospace is characterised by many features in the tier 1 section (particularly landing gear and actuation), and similarly a number of products produced lower down the supply chain (tier 2, 3, 4).



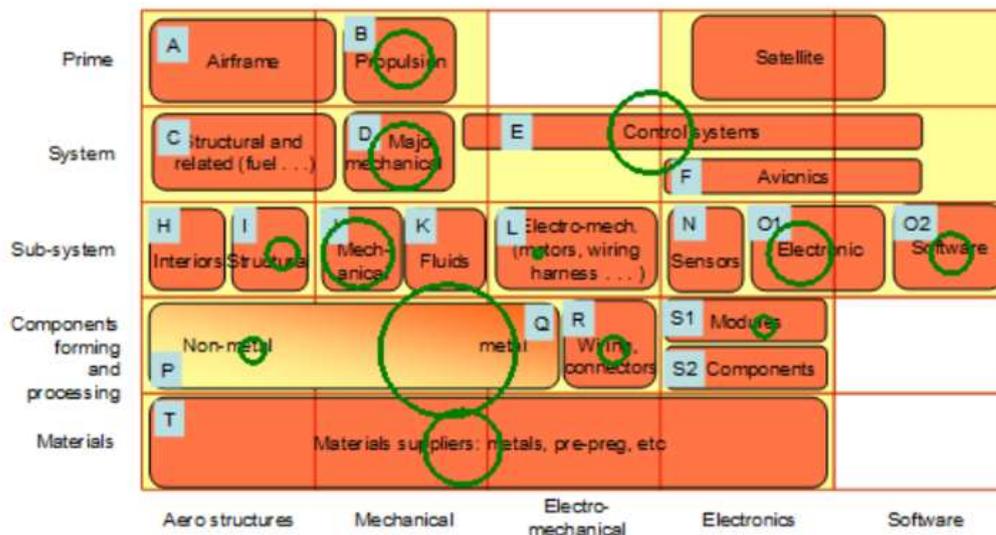
With many small companies in the lower supply chain tiers, the WMCA has developed an unrivalled lead in aerospace component design and manufacture. This is underpinned by a well-integrated supply chain, populated by companies that combine intimate collaboration and intense competition to drive cluster dynamics. Capability in the WMCA covers most of the key aspects of the aerospace supply chain, demonstrated by the diagram below. The absence of airframe and engine production are the only exceptions when it comes to major aerospace products, with clear capabilities present across other areas of the supply chain. This reflects West Midlands aerospace’s SME-based characteristic – in the absence of an aircraft OEM the vast majority of our aerospace employment works in supply chain SMEs. Also reflected in the below image is the supply chain linkages with other manufacturing sectors, particularly automotive and industrial gas turbine.

The second image provides further detail of where the West Midlands’ aerospace strengths lie. As you can see, the region has particular supply specialisms across the supply chain, from prime (within propulsion) down to base materials. The image demonstrates the formidable metals and materials supply and treatment sub-sector locally, as well as the key production of control systems, major mechanical systems for aircraft, and the supply chains attached to these. The West Midlands has a historic presence within metals manufacture and treatment, but also contains the largest concentration of materials related jobs in the UK. The success of these foundation sectors is crucial to the success of aerospace, and any sector strategy like this one must consider interventions that not only suit aerospace, but suit thriving metals and materials sectors that underpin it.

West Midlands Integrated Aerospace Supply Chain



West Midlands aerospace “flying parts” sectors – relative sizes



Aircraft historically have contained a considerable number of products manufactured in the WMCA region. This continues today, for major aircraft produced by both Boeing and Airbus, and including military aircraft (to a lesser extent). It's thought that up to 70 West Midlands companies supply a variety of quality parts to the latest passenger planes, including the products considered above. A depiction of this wide capability is offered below, which shows an Airbus A380 and some of the Midlands businesses that supplied products and services to its manufacture; circled in yellow are contributions from WMCA companies.



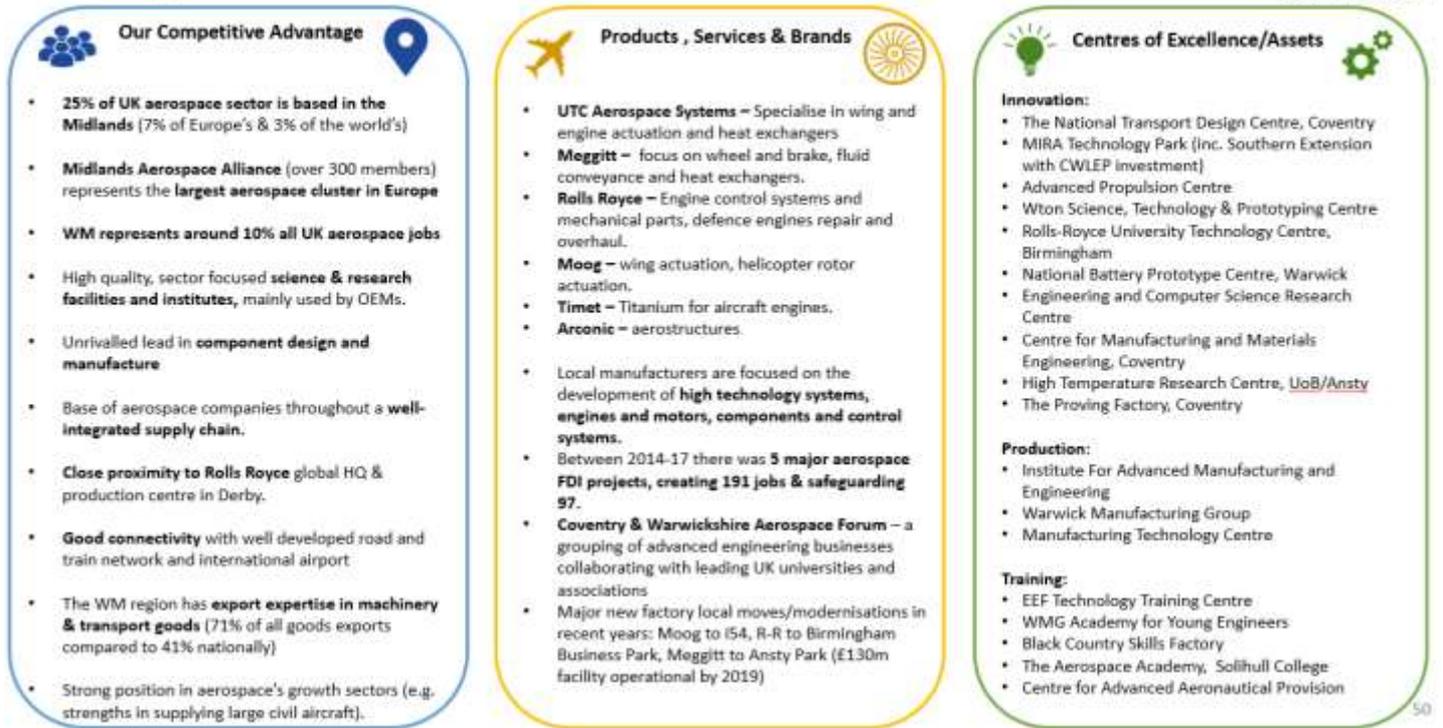
From Mettis Aerospace supplying large aerostructure parts to UNIMERCO supplying cutting tools, the broadness of the WMCA’s aerospace cluster is clear to see. Our companies are crucial providers of products that ensure aeroplanes are as safe and efficient as possible. Relevant to this, aerospace in our region is more weighted towards the civil aircraft market compared to military. In UK aerospace overall, the civil/military split of activity is about 50/50, but in the West Midlands it’s more like 80% focused on civil. Given that in general the civil aerospace sector is growing at a much faster rate than military, this bodes well for future growth of the regional cluster.

In addition, the WMCA already has some of the building blocks required to maintain a sustainable and successful aerospace sector in the region. A set of high quality, sector focused science & research facilities and institutes support the regional aerospace sector, including the Manufacturing Technology Centre (MTC), Warwick Manufacturing Group (WMG) and the Institute for Advanced Manufacturing and Engineering. These provide vital facilities for innovation and product development, tending to be especially important and utilised by large companies and not so much by SMEs. The latter are better represented within the MAA, the area’s business-led cluster organisation for aerospace. The MAA support and represent the aerospace industry across the whole Midlands region and are an extremely useful part of the sector’s regional base; analysis of aerospace cluster bodies globally suggests that there are more member organisations in the WMCA footprint than in the recognised aerospace centres Connecticut, Hamburg, Piemonte or Lombardy.

The evidence given, from both regional and national sources, suggests a considerable aerospace sector cluster in the WMCA area, more than double the size suggested by simple SIC code analysis. This is underpinned by a strong base of firms across the supply chain, world-class research and innovation assets, and an intertwined set of advanced manufacturing sectors. Given these features of the local economy, the WMCA as a region is well-placed to take advantage of the future growth expected in civil aerospace, but also must evolve – particularly to improve its SME innovation, skills levels and to adaptation to disruptive technologies such as electrification.

The following industry profile shows some of the key Aerospace assets that contribute to the strength of the sector in the WMCA area.

Industry Profile



1b) Sector Strength in the UK

The UK's aerospace industry makes a major contribution to growth and prosperity to many parts of the UK, setting an example to follow in boosting productivity and competing successfully around the world. The sector directly employs around 120,000 people in the UK, delivering high value jobs for a highly skilled workforce, and supporting a further 118,000 jobs indirectly. According to ADS, UK aerospace output has grown by 39% since 2011, with annual turnover now reaching nearly £32bn.

Aerospace is one of the most productive sectors in the UK – almost double the national average according to the ATI's 2015 'Raising Ambition' report. This states that UK aerospace sector productivity has grown by nearly 10% per year since the financial crisis in 2009. Aerospace is one of a few UK manufacturing sectors with global scale, competing with other advanced nations and emerging low-cost economies looking to gain a foot hold in this prized industry. The sector has generally benefited in recent years through a strong partnership with Government, and in total UK Aerospace output has grown 39% since 2011 (ADS).

1c) The West Midlands: Opportunity Now

Using the technological changes and opportunities to continue to provide a robust WM supply chain which can embrace the growing market outlined below. Building on strengths, but improving skills levels and innovation, particularly within SMEs, can ensure the sector locally maximises its potential.

- World fleet expected to double over the next 20 years

- New passenger aircraft worth \$6.2 trillion will need to be delivered between 2016 and 2035 to meet this demand.
- The through-life-support opportunities associated with this growing number of aircraft are estimated at over \$1.9 trillion, and the market for commercial unmanned aircraft systems will expand and could be worth in excess of \$60 billion over the next 20 years.
- Over the next 20 years, based on a 3.2% average annual growth in global GDP, air passenger traffic is forecast to increase by an estimated 4.8% annum and the world fleet is expected to grow over 3.6% per annum. This is driven by strong and continued economic growth in emerging markets
- Unmanned Aerial systems market: seen rapid growth over the last decade due to technology advancements, easing regulations and increasing number of customer applications. Expected to enable new business modes such as drones as a service (DaaS)
- Growth of China gives opportunity for supply chain collaboration.
- *Due to impact of COVID-19 these forecasts may be revised downwards.*

The potential for future new and updated platform development programmes presents significant opportunities to the WMCA aerospace supply chain. Local aerospace capabilities are positioned to service both aircraft upgrades and all new platforms across the priority value streams – propulsion, structures and systems, but most significantly within the propulsion and systems activities.

This includes the emerging trend of electric aircraft production. Although much of the limelight remains on the automotive sector when it comes to electric vehicles, this new way of driving propulsion is just as big and important in aerospace. In the West Midlands, where we have many of the supply chain capabilities that produce current aircraft, it's crucial that supply chains and technologies adapt in order to respond to technological changes in the market. Ensuring we can build a robust and broad supply chain to support the electric aircraft market should be a key priority for the region going forward.

The broader technological revolution of present provides all areas of the UK and West Midlands aerospace sector with the opportunity to enhance productivity and maximise potential. Specific cross-cutting aerospace opportunities in the decades to come include:

- High-value design (HVD) - roles, tools, processes, activities and facilities that are needed for defining and integrating products.
- Industry 4.0 – transforming the industry - including autonomous flight, optimised flexible manufacturing, high-fidelity design, more intelligent through-life support.
- Additive manufacturing - relatively low production volumes in aerospace lend themselves to AM – for parts and tooling.
- Autonomy - autonomous systems will be critical to reducing aircrew workload and enabling higher-capacity, safer air transport systems. And they'll offer cost advantages.
- Through-life services – UK aerospace MROL segment reportedly worth £16bn a year, particularly driven by vehicle health management, repair/inspection, and servitized business models are growing fast.

More specifically, the ATI outline key strategic themes, the following which we have identified to be particularly important and impactful on West Midlands aerospace:

- 1) **Aircraft of the future** - strengthening the UK's whole-aircraft design & system capability

- Global growth of aviation is driving the need for improved fuel efficiency through optimised flight trajectories, improved safety and security, and accommodation of autonomous systems.
- Demand for more fuel-efficient, greener & cost-competitive commercial aircraft will drive improved integration of **more efficient turbofan engines**.

2) Smart, connected and more electric aircraft

- Beyond 2030, new propulsion architectures will require disruptive electrical power system technology – this is important in the WMCA particularly revolving around Rolls Royce and their engine control system supply chain.
- **Key areas of WMCA’s aerospace cluster, including landing gear, power generation, power conversion and distribution, electrical actuation**, are all fundamental to improving fuel burn emissions, operational capability etc.
- Over the next 20 years, the large aircraft market is expected to drive significant demand for new and upgraded systems. This includes:
 - Electric systems and components – for control and high-power transmission
 - Lightweight lower-cost landing gear
 - Intelligent, more autonomous control and health management systems

3) Propulsion of the future – advancing a new generation of more efficient propulsion tech

- The UK is a world leader in turbofan engines and components, with future opportunities in wide-body, narrow-body and business jet markets. Lighter, higher bypass ratio turbofans with improved thermodynamics are making aircraft more efficient and quieter.
- The market is likely to continue to take advantage of new engine options, focused on increasing fuel efficiency and reducing through-life cost.
- The shift to more frequent engine updates presents a challenge for engine OEMs, and their supply chain (much of which is within the WM), to adjust how they recover non-recurring costs over shorter product life spans – generating the need to dramatically reduce new technology/manufacturing costs.

These technological trends are a particular opportunity for UK aerospace to deliver on the prospects provided by the positive aerospace market projections long into the future. They all also relate to the four key technology opportunity areas that we outline in this action plan (key sections from page 28).

If we can provide the right environment and resources in the West Midlands – innovation assets, the right skills, and a favourable business environment – then the West Midlands aerospace sector can build on its success and thrive, directly via embracing the technology revolution presenting itself and being aware of the demands of customers and OEMs. Aerospace SMEs, of which there are many in the West Midlands, need to be encouraged that they can be a part of the regional capitalisation of these opportunities - that the benefits need not be felt wholly by OEMs and larger firms. As will be explained later, part of ensuring greater SME involvement and exploitation of these grand opportunities will be about providing extra capacity for industry trade bodies like the MAA. These organisations can facilitate collaborative activity that has the potential to unleash the productivity of aerospace’s ‘long tail’ of underperforming SMEs.

2) Aerospace Sector Strategy by Theme²

2a) Ideas

Opportunity

Demand-driven innovation within supply chain companies

In the short-term, higher volume operations require new manufacturing technology solutions, and new aerospace system technologies require new component and part technologies – this is particularly important in the West Midlands. In order to meet the needs of these technology trends, this sector action plan can help:

- Tackling SME risk aversion to innovation, ensuring innovation funding reaches all parts of the supply chain, and optimising the potential of cross-sector innovation partnerships.
- Maximising Industry 4.0 potential.
- Opening up the opportunities of exporting within local aerospace firms

The West Midlands aerospace sector has a golden opportunity to invest in manufacturing technology and supply chains, including new digitally enabled production systems. Enhancing innovation can be a key contributing factor to improved productivity and collaboration in the industry. Shifting to a more innovative structure and extending already successful R&D programmes like NATEP will help to further grow the sector regionally through a boosting of the so-called ‘missing middle’ of SMEs. Critically, innovation should be demand-led and include more cross-industry activities. The emerging **CITEC** programme would deliver this and should be pursued further with the investment required from both the public and private sector. There is also the potential to include aerospace companies in the emerging ‘**Productivity Factory**’ being developed within this LIS.

Some particular themes that aerospace companies can exploit are:

- **Design and Manufacturing Processes and Technologies** - increasing productivity and speed of aircraft development through design, testing and verification technologies could change the economics of exploiting more specific segments of the market with optimised aircraft.
- **Additive Manufacturing** techniques such as 3D printing are gaining prominence in the aerospace sector and are expected to have a profound impact on the future competitiveness of the sector. According to Deloitte, AM could drive down the cost of manufacturing by up to 50% and time to market down by up to 64%.
- **Energy Storage, Transmission and Conversion** - electrical power technologies are increasingly replacing the hydraulics and pneumatics on aircraft, offering advantages in performance as well as weight and maintenance.
- **Autonomy** will play an important role in civil aviation, and its applications range from vehicles and platforms to airspace operations, or health management systems.
- **Digital Technologies/Industry 4.0** – the sector is characterised by its strengths in innovation, productivity and intensive quality rigor, yet is now faced with unprecedented levels of order backlog. As the industry tries to tackle these challenges through multiple operational channels, technology plays a key role in enabling the sector towards achieving these ambitions (e.g. computing, big data/IOT, security/encryption)

² Places does not feature as this has cross-cutting relevance within all aspects of our “local industrial strategy.”

There is global demand for the ideas and new technologies developed in our region, representing a huge opportunity to develop ideas for sale in the UK and abroad.

The emerging **West Midlands Innovation Programme** provides a timely mechanism for which to guide innovation investment in the aerospace sector. Leading the delivery of this programme, **Innovation Alliance West Midlands (IAWM)** have an established focus on the aerospace sector and are developing project proposals to drive the uptake of new technologies in the industry. Once the WM Innovation Programme is fully developed and funded, this can provide a key framework for guiding aerospace investment in innovation. This will be a crucial delivery vehicle for all the suggested innovation interventions (see below). Within this work, IAWM will work alongside industry to embed innovation in the sector, learning from other sectors such as automotive and energy.

The overarching focus of the Innovation Programme is ‘to drive up levels of demand-led business innovation across all areas of the region’, including ‘deepening innovation networks and supporting improvements to business capacity’. As featured in the final West Midlands LIS document, an underpinning **Innovation Framework** will prioritise five core pillars of an effective innovation ecosystem:

- Networks and linkages
- Investment programmes
- Talent
- Intelligence
- Culture

Overview of Current and Planned Work

A number of innovation assets exist within the WMCA area which can potentially be tapped into by industry, including two High Value Manufacturing Catapult centres (at Warwick Manufacturing Group and the Manufacturing Technology Centre at Ansty Park). In addition to this, the region hosts the National Transport Design Centre, the MIRA Technology Park and the Rolls Royce University Technology Centre. There are already several mechanisms primarily focused on delivering organic business growth including Sharing in Growth, SC21, NATEP, ATI and AGP initiatives such the ‘Supply Chain Charter’.

For example, NATEP is a successful Aerospace Growth Partnership initiative led by ADS, the Premier Trade Organisation for companies in the UK Aerospace, Defence, Security and Space Sectors. The programme supports companies in the aerospace supply chain to develop innovative technologies, working in collaboration with others and supported by higher tier companies. It equips them to win new business with existing customers and to diversify their customer base. As well as grant funding, the programme provides high calibre technical and management resource to help those companies accelerate the technology development towards market readiness.

Issues

Despite the region’s innovation assets, most aerospace research & development takes place within industry and not at these third-party centres of excellence. Industry does sometimes outsource to these organisations, but only the large companies have the resources to do so. Smaller firms are more averse to innovation and R&D, feeling unable to engage with larger firms and Catapult centres. Though there have been successful programmes (e.g. NATEP), attempts to support innovation are patchy and poorly co-ordinated, with a disproportionate focus on large businesses. Whilst the region is home to

several institutions that could work with supply chain companies (as well as OEMs) but aren't currently in any systematic way. The lack of collaboration between our OEMs and SMEs, and poor engagement on the side of Catapult centres, has led to little scientific R&D in supply chains and ensures that companies of all sizes cannot sufficiently capitalise on the vast opportunities presenting themselves.

Many aerospace firms have difficulty in knowing exactly what innovation to undertake and a lack of understanding of how to innovate. Whilst there's a view that supporting innovation in large OEMs, or Tier 1s, will inevitably result in innovation trickling through the supply chain, in aerospace this appears not the case with SMEs reporting they feel unable to engage with large firms. An Aerospace Technology Institute report from 2016 suggests that more than 60% of aerospace expenditure in R&D activity comes from companies employing 5,000 or more people, and that less than 3% comes from SMEs. This is much less than their share of sector turnover or GVA and highlights relative underinvestment. The ATI describes a "missing middle" of UK aerospace – medium sized businesses that are not fulfilling their potential, partly due to misdirected support. The industry is skewed between a few large OEMs and Tier 1s, and a sprawling population of diverse and small businesses. Research is not taking place at the scale expected of a thriving supply chain in an innovation intensive industry like aerospace. There's a risk that our supply chain is becoming increasingly 'long tail' and ends up competing on price with low-cost markets.

There are nuances in understanding why SMEs innovate less than large companies in the UK. Large companies report the main barriers to innovation are high cost and high risk; whilst SMEs report these too, relative to large companies the cost and availability of finance are disproportionately significant factors for SMEs (UK Innovation Survey). Given that ATI spend approximately 98% of their Midlands R&D funding on one company – Rolls Royce – there's clearly scope for more distributive and inclusive approach to innovation in the sector. This is an obvious market failure that is leaving many SMEs unable to reach their potential and improve productivity. There is significant unrealised potential for smaller and supply chain companies to draw on technology knowledge from the Midlands universities and research and technology organisations (RTOs) to become more innovative.

More broadly, West Midlands aerospace has large pools of know-how and historic expertise that is not currently converted into knowledge and IP. Without commercialising this knowledge and better connecting supply chain companies with OEMs, we run the risk of not making successful technology leaps into additive manufacturing and electric propulsion where other regional clusters will do. The fact that only 1.8% of ATI's spend in the UK goes into the West Midlands already puts us at a distinct disadvantage.

Furthermore, innovation support mechanisms have been too supply-side focused in the past, and the local industrial strategy provides us with an opportunity to boost demand-led approaches as well. We will need more innovation pull to complement successful local idea/technology push approaches in order to optimise the impact of innovation on productivity. This will particularly help SMEs in industries like aerospace which often find ideas falling in the so-called 'valley of death'; de-risking this through extended innovation pull initiatives will be vital for increasing the region's innovative capacity across sectors, including aerospace. A proposed Framework for Leading Innovation through Challenge (FLIC) (through Innovation Alliance WM) offers an enhanced and joined up approach to stimulating demand for and pull through of innovation into public and private markets in the West Midlands, stimulated by market and societal challenges.

Potential Solutions

The WMCA, LEPs and the MAA will work with ATI and government to improve the quantity of aerospace innovation/R&D funding accessed by West Midlands firms throughout the aerospace supply chain, particularly SMEs.

Supply chains are absolutely crucial to the success of the aerospace sector, and the West Midlands is a world-leading region for this activity. OEMs all over the globe are dependant on our supply chains and arguably they, nor the industry, look after this base of largely SMEs well enough. This has resulted in the lack of aerospace SME innovation previously described, a current drawback in the industry that needs to be reversed.

Local partners including the WMCA, the MAA and government departments should work with the ATI to ensure the benefits of R&D funding reaches smaller supply chain companies in the West Midlands. For transparency, a key first step would be to mandate the ATI to publish their R&D funding awards in the West Midlands; following this, targets for more funding for SMEs should be set and delivered collaboratively. Unleashing the innovative potential of our aerospace supply chain can make the industry more profitable, productive and successful in future.

ATI's spend on West Midlands aerospace should increase from 1.8% share of their UK investment to 5% immediately, and similarly the ATI should increase SME spend far above its current 3-4% share. Linking in with the work around CITEC, big ATI projects should be bottom-up (not top down), sufficiently including suppliers as major project assets rather than mere sub-contractors.

Local partners will drive a new regional approach to innovation - providing sector-specific mentoring and strategic support on innovation to supply chain firms – seeking government support for this as it develops.

Greater Birmingham and Solihull LEP are due to launch a new pilot programme focused on innovation “challenge events” and company-centric innovation support. This aims to test and demonstrate effective approaches to increasing business innovation in key growth industries. The pilot programme responds to consultancy findings (Optimat 2018) which identified:

- Industry demand for challenge-led events capable of stimulating demand-led innovation projects including via cross-sector engagement and collaboration;
- A lack of company-centric innovation support in the GBSLEP area;
- Need and demand for small scale innovation grants.

The pilot programme therefore seeks to test and demonstrate effective models of industry challenge-based innovation activities, company-centric support and small-scale innovation grants.

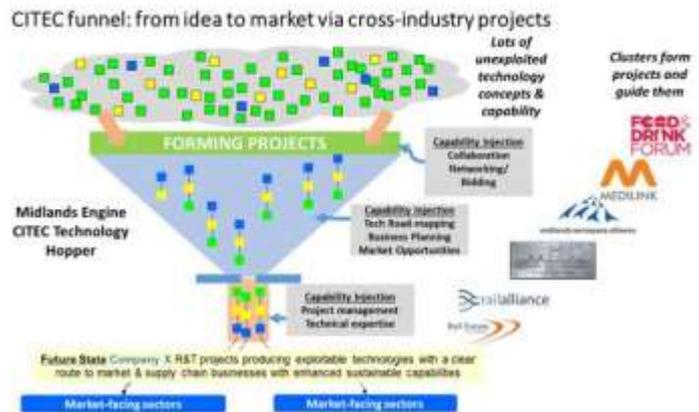
This pilot programme provides an opportunity for aerospace firms, particularly those in the supply chain, to receive demand-led, industry-led support for innovation – brokering the relationship between the private sector and the innovation landscape. If the pilot is a success, national and regional partners should support the scaling up of this approach to innovation support which has the potential to provide transformative boosts to innovative capability and productivity within sectors like aerospace.

Utilise the West Midlands Innovation Programme (WMIP) for aerospace priorities, including the CITEC programme, 5G, supporting future flight and electrification, and bidding into national schemes. Enable synergies across sectors to add value to all participating industries but also mitigate

aerospace risks until the sector recovers. Scale-up this bottom-up innovation approach championed by the WM aerospace sector.

The ambition of CITEC is to facilitate R&D projects that transfer technology between industry supply chains (i.e. “horizontally”) for commercial exploitation. It will focus on the Midlands Engine four priority markets (including aerospace) and three enabling competencies identified in the ME Science and Innovation Audit. It will mobilise key Midlands business cluster networks which will work collaboratively to identify and mentor projects, harnessing guidance from leading major firms to accelerate the unrealised potential of many supply chain firms to innovate.

This concept will deliver 300 cross-cluster technology transfer projects to create new industrial value chains and seed emerging industries at the heart of the Midlands Engine economy, creating 4,000 jobs directly, contributing to enhanced productivity and reorienting Midlands supply chains towards future global markets. CITEC has a particular focus on raising productivity through creating or injecting IP and kick-starting its exploitation in so-called “long-tail” of supply chain companies.



CITEC adopts a small-firm bottom-up innovation model developed and proven in the Midlands, by the aerospace supply chain since 2006 (involving Rolls-Royce, UTC Aerospace Systems and other Midlands Tier 1s), and since 2012 used by four English regional aerospace clusters in the £40m NATEP programme. NATEP has identified many cross-industry opportunities it cannot properly exploit – the kinds of opportunities that CITEC could exploit. CITEC also injects lessons from a horizontal innovation programme involving the Motorsport Industry Association and the Institute for Engineering and Technology.

The project will mobilise key market-facing Midlands industry cluster networks (e.g. Midlands Aerospace Alliance, Rail Alliance, Medilink Midlands) to identify, develop and guide projects into diverse future markets using strong customer support and expert mentoring.

At a value of £120m over 2017-2021 (50% of which is industry matched funds), CITEC could be delivered at different geographies, either the Midlands as a whole or specifically in the WMCA area. The programme recently received £40,000 from Midlands Engine funds to develop the concept; we are clear in our ask for further commitment and £12m funding (to be match funded by industry) to this demand-driven and cross-sectoral innovation project.

Ideas – Proposed Interventions by Type

| Super-charge | Build | Maintain | Consolidate |
|--|---|----------|-------------|
| Local partners will drive a new regional approach to innovation - providing sector-specific mentoring and strategic support on innovation to supply chain firms – seeking government support for this as it develops. | The WMCA, LEPs and the MAA will work with ATI and government to improve the quantity of aerospace innovation/R&D funding accessed by West Midlands firms throughout the aerospace supply chain, particularly SMEs | | |
| Utilise the West Midlands Innovation Programme (WMIP) for aerospace priorities, including the CITEC programme, 5G, supporting future flight and electrification, and bidding into national schemes. Enable synergies across sectors to add value to all participating industries but also mitigate aerospace risks until the sector recovers. Scale-up this bottom-up innovation approach championed by the WM aerospace sector. | | | |

2b) People

Opportunity

Creation of a Modern and Specialised Workforce

- Filling gaps in local provision through an employer-led approach.
- Increasing employer awareness of training opportunities.
- Improving the supply of candidates from the local area.
- Fill current and future skills needs with emphasis on transferable and agile skills and knowledge.
- Create a safe working environment for all sections of the sector’s workforce.

The regional aerospace sector has a long-term commitment to, and involvement in, education and training which will have created a modern, specialised workforce. Becoming a more desirable employer able to attract the highest calibre recruits is a key sector ambition.

Overview of Current and Planned Work

Much work has been carried out in the recent past in an attempt to raise the skills levels of employees within advanced manufacturing and engineering in the WMCA. The Black Country Skills Factory is a LEP initiative aimed at addressing skills shortages in the High Value Manufacturing (HVM) sector in the Black Country. It has been a highly successful project aimed at addressing skills shortages in advanced manufacturing companies. The Skills Factory team have a detailed understanding of training provision in the HVM sector in the Black Country and can offer employers impartial and independent advice on up-skilling training courses, apprenticeships and funding opportunities in the Black Country. The main strands of the project are:

- Upskilling the existing workforce
- Increasing the number of SMEs taking engineering-based apprentices
- Schools engagement

The key success factors of the Skills Factory's model are its employer-led nature, an understanding of the granularity of the training requires, and its independence (& of impartiality) of training providers. Black Country Skills Factory has significantly improved the ability of advanced manufacturing businesses to access the training provision they require.

Issues

A skills shortage exists across the manufacturing sector, due to a number of factors: an ageing workforce, competition for skilled staff and a lack of STEM trained graduates and school leavers entering the industry. This shortage could potentially be exasperated by Brexit. Current skills provision is focused heavily upon apprenticeships and whilst of value, they're not currently available for all the technical needs of the aerospace sector and therefore not always suitable for upskilling the workforce. Investment is required in productivity-related skills and training and training solutions that can be delivered at or near SME locations.

ADS report a specific concern related to access to skills for innovation. 1 in 3 companies that ADS surveyed are not confident they will be able to access the necessary design and engineering or R&D skills to drive innovation. Also, 1 in 5 businesses are concerned over the ability to access skills in data analytics; this will be a growing problem as increased automation and digitalisation becomes important for companies to maintain their competitiveness (as asserted in the previous 'ideas' section of this document).

Manufacturing and engineering is not seen as an attractive career choice for young people and there has been an erosion of vocational education and training in the last few decades. There has been little or no focus on practical skills in schools, with a huge decline in young people taking practical subjects.

Training for school leavers is fragmented, often uncoordinated and does not meet companies' needs – this is especially true for smaller companies. Provision relevant to the aerospace sector has suffered as a result of some training providers not being responsive to industry demands.

Potential Solutions

Industry partners and the WMCA recognise the similar skills challenges occurring within manufacturing sub-sectors, such as automotive and aerospace. Therefore, the potential solutions to reverse these issues will vary only slightly across different manufacturing/engineering sub-sectors. The key skills ask within the WM Local Industrial Strategy for these sub-sectors is an extension of the successful **Black Country Skills Factory**:

The Black Country Skills Factory has expertise in the delivery of flexible, bite-sized training courses. It has proved to have a very successful model in ensuring that courses like this are delivered by providers and are driven by the specific skills needs of employers. The Skills Factory has so far focused on the Advanced Manufacturing and Engineering sector and has therefore already experienced working with the aerospace sector locally. There's opportunity for an extension of this work, to make available easy access courses delivering real value on skills across the whole of the region's aerospace sector. Widening the scope of the Skills Factory to include the whole WMCA area will provide additional capacity and impact.

Facilities such as the Elite Centre for Manufacturing Skills (ECMS) and Dudley's Institute of Technology will be crucial in delivering the skills employers need, and this capacity will help maximise their potential. Employer-led training provision for aerospace skills will be a crucial part of developing the skills needed by firms in the West Midlands. Developing appropriate apprenticeships and T-levels for companies across sectors will be another important activity, as well as transforming the perception of careers in manufacturing and engineering careers.

The overall Skills Factory project aims to continue to expand and grow the bite-sized and apprenticeship provision to upskill the West Midlands workforce, including within aerospace as a key sector locally. In particular the future Skills Factory should be closely integrated with the new Productivity Factory and the upskilling offered by the Skills Factory should especially be tailored to help SME's become more productive.

Work in collaboration with other sectors to improve skills development and careers advice, e.g. by implementing the findings of the emerging WMCA's automotive skills plan.

Partners are committed to listening to the findings of the automotive skills plan due to be released soon at the West Midlands level. We will work collaboratively with industry and other localities to ensure the recommendations of the plan are implemented successfully not just for automotive, but more widely to boost skills levels in aerospace as well.

Build on good practice to take action on encouraging diversity and inclusion in the sector, e.g. through Women in Aviation and via the MAA's Diversity & Inclusion group.

An important way of attracting new skilled people into the workforce is to continue broadening the pool of labour that the aerospace sector employs. This means making further progress on gender equality in the sector - e.g. through the work of Women in Aviation – and other underrepresented groups such as BAME and those with disabilities. Key to the success of this regionally will be improving the diversity of companies and organisations that do have a proactive, forward-thinking stance on workplace diversity and inclusion. Through the WMCA Leadership Commission a regional focus has already begun within this, and aerospace needs to ensure the sector contributes to this important agenda.

Develop a COVID-19 safe working environment and good health and safety practice for the region's aerospace workforce in line with the MAA's Five Point Plan.

In order for businesses in the aerospace sector to continue to operate during the ongoing pandemic it is vital that work is done to develop best practice in working safety for all aerospace employees and contractors in response the government, HSE and industry guidelines. This can be done by developing inductions, training and updates, and ongoing staff support approaches, and by monitoring progress through risk management protocols and logging systems to promote supported continuous learning in this uncertain and volatile COVID-19 climate.

People – Proposed Interventions by Type

| Super-charge | Build | Maintain | Consolidate |
|--|---|--|---|
| Provide better matching of skills supply and industry demand – e.g. through extending the Black Country Skills Factory and developing a focus on digital/coding skills for aerospace. Build in skills flexibility to allow for sector changes, diversification and redeployment to save businesses and jobs. | Work in collaboration with other sectors to improve skills development and careers advice, e.g. by implementing the findings of the emerging WMCA’s automotive skills plan. | Develop a COVID-19 safe working environment and good health and safety practice for the region’s aerospace workforce in line with the MAA’s Five Point Plan. | Build on good practice to take action on encouraging diversity and inclusion in the sector, e.g. through Women in Aviation and via the MAA’s Diversity & Inclusion group. |

2c) Business Environment

Opportunity

Through the significant mobilisation of the existing resource base, partners (industry bodies and the public sector) can better support small aerospace companies with manufacturing productivity. An increase in this facilitative activity would raise awareness, opportunities and performance within smaller firms. There’s an opportunity to link any business support commitments through our proposed **‘Productivity Factory’** programme which will offer a programme of activity to supply chain companies with the aim of improving their productivity. Developing a stronger, more innovative and responsive aerospace supply chain will considerably reinforce the sector as a whole in the West Midlands. This will allow the region to capitalise on the industry’s distinct opportunities outlined previously.

The world’s aerospace industry desperately needs the capacity of aerospace-qualified suppliers that are also high-performing, to make aircraft parts. The West Midlands’ supply chain and expertise can contribute massively to this demand, which has risen dramatically in the last few decades – e.g. Airbus made 4 or 5 aircraft a month in the 1990’s, now they make 3 aircraft a day as well as 2 engines.

Overview of Current and Planned Activity

The three Growth Hubs within the WMCA are key business support organisations. Growth Hubs provide impartial and transparent guide for businesses to ensure they find the appropriate support, whatever their needs. Growth Hubs cover all sectors, so all aerospace sector companies within the WMCA can be signposted to various types of business support and funding by the region’s Growth Hubs.

More aerospace specific representation is provided by the Midlands Aerospace Alliance (MAA). The MAA has more member organisations than any other UK regional aerospace alliance, and provides aerospace companies across the Midlands with expertise/advice, networking, promotion, funding support amongst other support.

Issues

While the MAA is an extremely valuable organisation for the regional sector, it has a lack of capacity to deliver the significant impact that is required. Not enough companies, particularly small, supply-chain firms, are obtaining the knowledge, advice and guidance that organisations like the MAA can offer. This is currently an important market failure that is maintaining the industry's long-tail of low productivity businesses.

Similar to innovation support, trade support currently isn't sufficiently meeting the needs of our small and medium aerospace suppliers. Many companies seem to fall between national programmes and Midlands Engine activity which is generally too generic and short-term.

Not sufficiently supporting SMEs and our aerospace supply chain is dangerous in the context of low-cost competition abroad and heavily subsidised OEMs that can use suppliers from foreign clusters. This has the potential to take large parts of the aerospace industry away from the West Midlands.

Potential Solutions

Work with the MAA and government departments to ensure an efficient, scaled-up and agile productivity ecosystem, e.g. through the emerging Productivity Factory and promoting national schemes like SC-21 and NMCL.

Unleashing the potential of the aerospace sector in the West Midlands and across the UK will require greater capacity for industry, particularly through trade bodies like the MAA. A commitment to funding and support of this organisation from central government would provide a crucial expert 'middle man' between the public sector and industry. Currently under-utilised and under-resourced, commitment from government to industry bodies will create an effective working interface of support across a wide range of themes to enhance the productivity and performance of aerospace companies. This executive capacity would produce a combined unit of expertise for businesses of all sizes to tap into, whether that be awareness of new sector opportunities or funding advice. Similar programmes of practical support have been successful in the past, though it's important to ensure that the support remains principally demand-led.

Enhancing this sector specific business development should be in line with our emerging '**Productivity Factory**' programme. This is a new type of productivity support to support supply chain companies in the region raise productivity. £million worth of investment is proposed over a three-year period for a 12-month programme of activity to support small businesses with a potential to grow through: initial benchmarking & diagnostic, masterclasses, one-to-one coaching from industry experts, peer-to-peer mentoring and support, and a final evaluation. Initial benchmarking with an expert will identify the most effective ways of achieving growth. The expertise of the MAA should be integral to any aerospace involvement within the Productivity Factory.

This will tackle the lack of reference to supply chain development and productivity in the national aerospace sector deal. A greater amount of support is required to support local clusters to engage with national programmes and to succeed in wider activity such as export. We see the Productivity Factory as the vehicle that can drive this improvement in the long-tail within sectors such as aerospace, building regional strengths in the supply chain.

MAA & other local partners to maximise the sector's trade and investment potential, including the utilisation of the Midlands Engine brand, and boosting the number of SMEs that export.

Current trade support is not sufficient to help much of our aerospace industry grow through exporting. There's a real need to fill the hole in export support at present to provide targeted and specific trade support for aerospace companies, either through the Productivity Factory and/or via the Department for International Trade. Capacity needs to be dramatically increased in this area in order for our firms to capitalise on global opportunities.

Coupled with the impressive opportunities presented in the global aerospace industry, it's importantly regionally to maximise the Midlands Engine brand in order to attract further investment and build on our supply chain excellence. The WMCA, MAA and other local stakeholders will continue to work collaboratively at the Midlands Engine level to ensure aerospace continues to be a priority area.

Deliver the Midland Aerospace Alliance Five Point Plan to rescue and recover the industry after the severe damage caused by COVID-19. Ensure especially that financial emergency aid and other financial and business support mechanisms are in place to enable the region's sector and individual businesses to survive and stabilise.

In the light of the ongoing Covid-19 pandemic, it is important that the aerospace sector adapts in line with the changing picture. To do this it should perform a stock take of capabilities and resources as a regional cluster, ensure favourable financial and business support and develop an action plan for the WM Aerospace cluster following the Five Point plan. A vital element of this is to connect, immediately, the most vulnerable companies to emergency financial grants and loans, and business support. Work with government, industry and financial bodies on influencing changes to payment, credit and investment conditions and help business to increase liquidity to mitigate medium term risks. It is important to work with business in all tiers to form an action plan in order to make sure that the sector can continue to operate effectively throughout this period.

Business Environment – Proposed Interventions by Type

| Super-charge | Build | Maintain | Consolidate |
|---|---|--|-------------|
| Work with the MAA and government departments to ensure an efficient, scaled-up and agile productivity ecosystem, e.g. through the emerging Productivity Factory and promoting national schemes like SC-21 and NMCL. | Deliver the Midland Aerospace Alliance Five Point Plan to rescue and recover the industry after the severe damage caused by COVID-19. Ensure especially that financial emergency aid and other financial and business support mechanisms are in place to enable the region's sector and individual businesses to survive and stabilise. | MAA & other local partners to maximise the sector's trade and investment potential, including the utilisation of the Midlands Engine brand, and boosting the number of SMEs that export. | |

2d) Infrastructure

Opportunity

Energy

The ambition is for a more competitive environment for heavy local industry, who continue to be plagued with high energy prices. A fairer, more sustainable energy system will ensure more competitive and productivity manufacturing industries (such as aerospace), giving them the ability to win more orders and re-invest back into improving their businesses.

Innovation

Whilst there doesn't seem appetite for a specific SME innovation centre in the region, opening up assets such as the MTC and WMG more widely would have a positive impact on aerospace innovation. Breaking down the current barriers for supply chain companies to engage in such resources would help realise the innovative potential of our companies, particularly some of those in the perceived long-tail.

Overview of Current and Planned Activity

Energy

Much recent work has been carried out on the energy agenda in the West Midlands, largely through the Energy Capital partnership and through 'Energy Innovation Zones' (EIZs). EIZs are a powerful concept because they enable energy infrastructure planning and investment to be managed locally coupled with regulatory simplifications appropriate to local needs. The region asked Sir David King to chair an independent commission on regional energy, which reported to central government in March 2018, and has framed the regional energy strategy around the concept of EIZs. There is a strong partnership supporting this activity in the form of Energy Capital, which brings energy infrastructure providers together with customers including major industries, local authorities and LEPs and reports into the WMCA's Strategic Economic Development Board.

Innovation

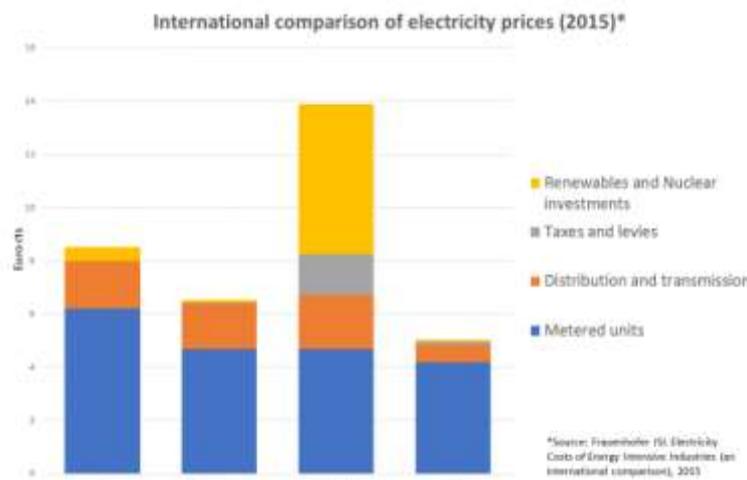
A number of innovation assets exist within the WMCA area which can potentially be tapped into by industry, including two High Value Manufacturing Catapult centres (at Warwick Manufacturing Group and the Manufacturing Technology Centre at Ansty Park). In addition to this, the region hosts the National Transport Design Centre, the MIRA Technology Park and the Rolls Royce University Technology Centre.

Issues

Energy

Energy prices are a significant issue. Without secure and affordable energy, some aerospace companies cannot exist, wherever they're located. The current high price of energy, particularly for heavy industry (much of which we have in the WMCA area) is proving to be a burden on competitiveness for aerospace industry companies. Dieter Helm's review of energy prices correctly asserts that "the cost of energy is too high", citing that prices for energy intensive users in particular have increased rapidly since 2011. Recent research commissioned by the Black Country LEP confirms that UK energy costs in many sectors are up to 40% higher than those of competitor economies.

Within the same report, a breakdown of electricity costs for a medium-size Black Country manufacturer is presented, showing that around half of costs are the apportioned costs of regional and national infrastructure investments. Because of their magnitude and impact, the way these costs are apportioned between sectors is treated as an industrial strategy decision in many other economies. For example, in Germany there is a ‘privilege’ system which allocates network and renewables costs variably between industrial sectors, favouring some sectors and penalising others. Thus, although average industrial energy costs in Germany often appear on face value higher than the UK, in practice they are significantly lower in many manufacturing sectors and even higher in other sectors (including the domestic sector) to ensure that the overall numbers balance (see figure below). The costs are creating a competitive disadvantage for aerospace companies in the UK, which particularly affects areas with clusters of this activity like the West Midlands.



Source: Black Country LEP, Energy as an Enabler report (2018)

An estimated £6.7bn is spent annually on energy by West Midlands businesses and households, and within this £960m is spent by the industrial and manufacturing sectors.³ This spend has a direct impact on productivity and GVA; if this could be reduced significantly then the GVA and productivity of the local economy would improve hugely. This would in part be driven in particular by energy-intensive industries such as aerospace manufacturing via a reduction in costs, providing spare resources for re-investment.

Innovation

There are considerable barriers to small supply chain companies engaging with existing centres of expertise like MTC and WMG. These centres are dominated by large companies working on major projects that often seem far away from the capabilities of most West Midlands SMEs. Smaller firms have a restricted view of the demands of OEMs and Tier 1 suppliers and feel unable to engage with larger firms and Catapult centres. The aerospace supply chain generally feels that the Government’s attempt to support innovation are patchy and poorly co-ordinated, with a disproportionate focus on large businesses.

Land Availability

Land availability for industrial premises is an important barrier to growth in the West Midlands, as reported in the findings of the West Midlands Land Commission. In aerospace specifically, the right site for which to serve existing and potential employees is particularly important, so a healthy supply

³ Black Country LEP, Energy as an Enabler (2018)

of land for industrial use is pivotal for the sector's regional ecosystem. Without a step-change in the availability of land regionally, the West Midlands will struggle to retain and attract aerospace firms.

Potential Solutions

Energy

The sector supports regional momentum on improving infrastructure, e.g. the bid for the regional Energy Innovation Zones and regional transport programme to improve connectivity.

A fair, competitive energy market can be carried out in the form of flexible regional energy policy, put forward through 'Energy Innovation Zones' (EIZs) in the recent West Midlands Regional Energy Commission. EIZs would enable energy infrastructure planning and investment to be managed locally coupled with regulatory simplifications appropriate to local needs, and the aerospace sector supports this approach to regional energy policy and suggests this could be an effective way of improving energy policy for local industry.

Through the '**Better Energy**' strategic programme, we are working across sectors to deliver on three key themes: reducing energy costs for manufacturing; optimising energy infrastructure; and eliminating energy poverty. Energy cost reduction for manufacturers is most relevant to the aerospace sector – support of this activity will benefit West Midlands aerospace companies that currently struggle with high energy prices.

Innovation

Work collaboratively to provide a step-change in the accessibility of key innovation assets to aerospace supply chain firms, creating a more productive use of existing assets.

A combination of local partners, including the WMCA and the MAA need to engage with innovation assets such as the MTC and WMG in order to shift their focus. It should be our focus to ensure these Catapult and innovation centres are mandated to use at least a specific percentage of their engagement (say 10%) on West Midlands SMEs. Opening up these centres combined with the previous ask to ATI on R&D spending will ensure the lifting of innovation levels among West Midlands aerospace suppliers.

Land Availability

Maximise emerging developments to raise the availability of land for industrial use so that aerospace firms can invest in new sites once sector begins to recover and its size, structure and priorities are clearer.

Regional partners must continue their focus on land, including remediation activities. Maximising emerging facilities such as the National Brownfield Institute in Wolverhampton will be crucial to ensuring a healthy supply of available industrial land in the local area. This will give sectors like aerospace the confidence to invest in the region and ensure our strong, inter-connected supply chains are maintained for the long-term.

Infrastructure – Proposed Interventions by Type

| Super-charge | Build | Maintain | Consolidate |
|---|-------|----------|--|
| <p>The sector supports regional momentum on improving infrastructure, e.g. the bid for the regional Energy Innovation Zones and regional transport programme to improve connectivity.</p> | | | <p>Maximise emerging developments to raise the availability of land for industrial use so that aerospace firms can invest in new sites once sector begins to recover and its size, structure and priorities are clearer.</p> |
| <p>Work collaboratively to provide a step-change in the accessibility of key innovation assets to aerospace supply chain firms, creating a more productive use of existing assets.</p> | | | |

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3) Key Technology Opportunities

The suggested actions outlined above should be delivered in the context of major opportunity areas for the aerospace sector. As previously outlined, four areas will be particularly important: electrification of aircraft, materials and lightweighting, additive manufacturing and industry 4.0. An industry-wide adoption of these technologies will ensure the aerospace sector's contribution to the West Midlands' four strategic opportunities – particularly future of mobility. This will be in the form of a more innovative, collaborative and decarbonised aerospace industry in the region. The interventions outlined in this action plan can support this ambition becoming a reality: the whole aerospace sector helping to deliver smart mobility through key technologies:

- Electrification of Aircraft
- Materials and Lightweighting
- Additive Manufacturing
- Industry 4.0

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4) Proposed Interventions/Actions

4a) Aerospace Supercharge Actions across Key Foundations

| Ideas | People | Business Environment | Infrastructure |
|---|---|--|---|
| <p>Local partners will drive a new regional approach to innovation - providing sector-specific mentoring and strategic support on innovation to supply chain firms – seeking government support for this as it develops.</p> | <p>Provide better matching of skills supply and industry demand – e.g. through extending the Black Country Skills Factory and developing a focus on digital/coding skills for aerospace. Build in skills flexibility to allow for sector changes, diversification and redeployment to save businesses and jobs.</p> | <p>Work with the MAA and government departments to ensure an efficient, scaled-up and agile productivity ecosystem, e.g. through the emerging Productivity Factory and promoting national schemes like SC-21 and NMCL.</p> | <p>The sector supports regional momentum on improving infrastructure, e.g. the bid for the regional Energy Innovation Zones and regional transport programme to improve connectivity.</p> |
| <p>Utilise the West Midlands Innovation Programme (WMIP) for aerospace priorities, including the CITEC programme, 5G, supporting future flight and electrification, and bidding into national schemes. Enable synergies across sectors to add value to all participating industries but also mitigate aerospace risks until the sector recovers. Scale-up this bottom-up innovation approach championed by the WM aerospace sector.</p> | <p></p> | <p></p> | <p>Work collaboratively to provide a step-change in the accessibility of key innovation assets to aerospace supply chain firms, creating a more productive use of existing assets.</p> |

4b) Full List of Proposed Interventions

| IS Foundation | Proposed Intervention | Strategic Opportunity |
|----------------------|--|---|
| Ideas | 1 The WMCA, LEPs and the MAA will work with ATI and government to improve the quantity of aerospace innovation/R&D funding accessed by West Midlands firms throughout the aerospace supply chain, particularly SMEs. |   |
| | 2 Local partners will drive a new regional approach to innovation - providing sector-specific mentoring and strategic support on innovation to supply chain firms – seeking government support for this as it develops. |  |
| | 3 Utilise the West Midlands Innovation Programme (WMIP) for aerospace priorities, including the CITEC programme, 5G, supporting future flight and electrification, and bidding into national schemes. Enable synergies across sectors to add value to all participating industries but also mitigate aerospace risks until the sector recovers. Scale-up this bottom-up innovation approach championed by the WM aerospace sector. |   |
| People | 4 Provide better matching of skills supply and industry demand – e.g. through extending the Black Country Skills Factory and developing a focus on digital/coding skills for aerospace. Build in skills flexibility to allow for sector changes, diversification and redeployment to save businesses and jobs. |  |
| | 5 Work in collaboration with other sectors to improve skills development and careers advice, e.g. by implementing the findings of the emerging WMCA’s automotive skills plan. |  |
| | 6 Build on good practice to take action on encouraging diversity and inclusion in the sector, e.g. through Women in Aviation and via the MAA’s Diversity & Inclusion group. |   |
| | 7 Develop a COVID-19 safe working environment and good health and safety practice for the region’s aerospace workforce in line with the MAA’s Five Point Plan. |    |
| Business Environment | 8 Work with the MAA and government departments to ensure an efficient, scaled-up and agile productivity ecosystem, e.g. through the emerging Productivity Factory and promoting national schemes like SC-21 and NMCL. |    |
| | 9 MAA & other local partners to maximise the sector’s trade and investment potential, including the utilisation of the Midlands Engine brand, and boosting the number of SMEs that export. |   |
| | 10 Deliver the Midland Aerospace Alliance Five Point Plan to rescue and recover the industry after the severe damage caused by COVID-19. Ensure especially that financial emergency aid and other financial and business support mechanisms are in place to enable the region’s sector and individual businesses to survive and stabilise. |   |
| | 11 The sector supports regional momentum on improving infrastructure, e.g. the bid for the regional Energy Innovation |    |

| IS Foundation | Proposed Intervention | Strategic Opportunity |
|-----------------------|--|---|
| Infrastructure | Zones and regional transport programme to improve connectivity. | |
| | 12 Work collaboratively to provide a step-change in the accessibility of key innovation assets to aerospace supply chain firms, creating a more productive use of existing assets. |   |
| | 13 Maximise emerging developments to raise the availability of land for industrial use so that aerospace firms can invest in new sites once sector begins to recover and its size, structure and priorities are clearer. |   |
| Place | 14 Enhance the promotion of the West Midlands as a key aerospace cluster in the UK. Tie this closely to consolidated region-specific business support, information and intelligence to strengthen the Cluster ensuring that the whole supply chain benefits and increases in agility and flexibility. |   |
| | 15 Commit to working across boundaries with other clusters when possible and relevant (e.g. on innovation). Consolidate region-specific information and intelligence to strengthen the Cluster, ensuring that the whole supply chain benefits from cross- sector synergies and collaborations. |   |

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