



Air and Space 2030 Strategy: Investing in the Evolution of King County's Aerospace Sector

Final Report

Spring 2023

Disclaimer

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King County

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Prepared For:
King County Aerospace Alliance

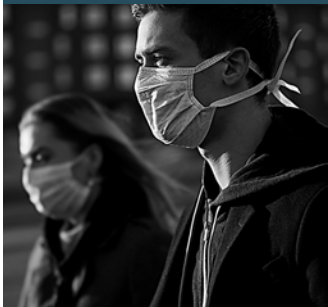


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Guidehouse Inc.

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The Air and Space 2030 Strategy evaluates the strength of the aerospace sector in King County and identifies investments and initiatives to bolster its sustainability and growth

Impacts of COVID-19 pandemic



Increased cost of doing business



Sector shifts



In the past several years, the aerospace sector in King County has experienced challenges due to increases in the cost of doing business, technological disruptions, rapid sector shifts, the COVID-19 pandemic, and shrinking employer footprints. In the fall of 2022, the King County Aerospace Alliance (KCAA) initiated the Air and Space 2030 effort to better understand the breadth and impacts of these challenges and establish a plan to **build the skills, technology, and capacity** needed to take advantage of emerging opportunities to **strengthen the competitiveness of the local aerospace sector**.

In collaboration with Guidehouse Inc., King County and its partners conducted a sector analysis and developed an accompanying strategy that includes the following components:

- An overview of King County's **aerospace sector**
- Deep dives into the local aerospace **supply chain** and **workforce**
- A scan of **aerospace trends** impacting the sector and a review of the county's readiness to capture opportunities related to the trends
- An analysis of how trends are expected to **impact the aerospace supply chain and workforce**
- The **strengths, weaknesses, opportunities, and challenges** in the county's economy and aerospace supply chain and workforce
- **Recommendations** on how to improve collaboration across the regional aerospace ecosystem, grow the sector, and build and diversify the workforce pipeline

Shrinking employer footprints



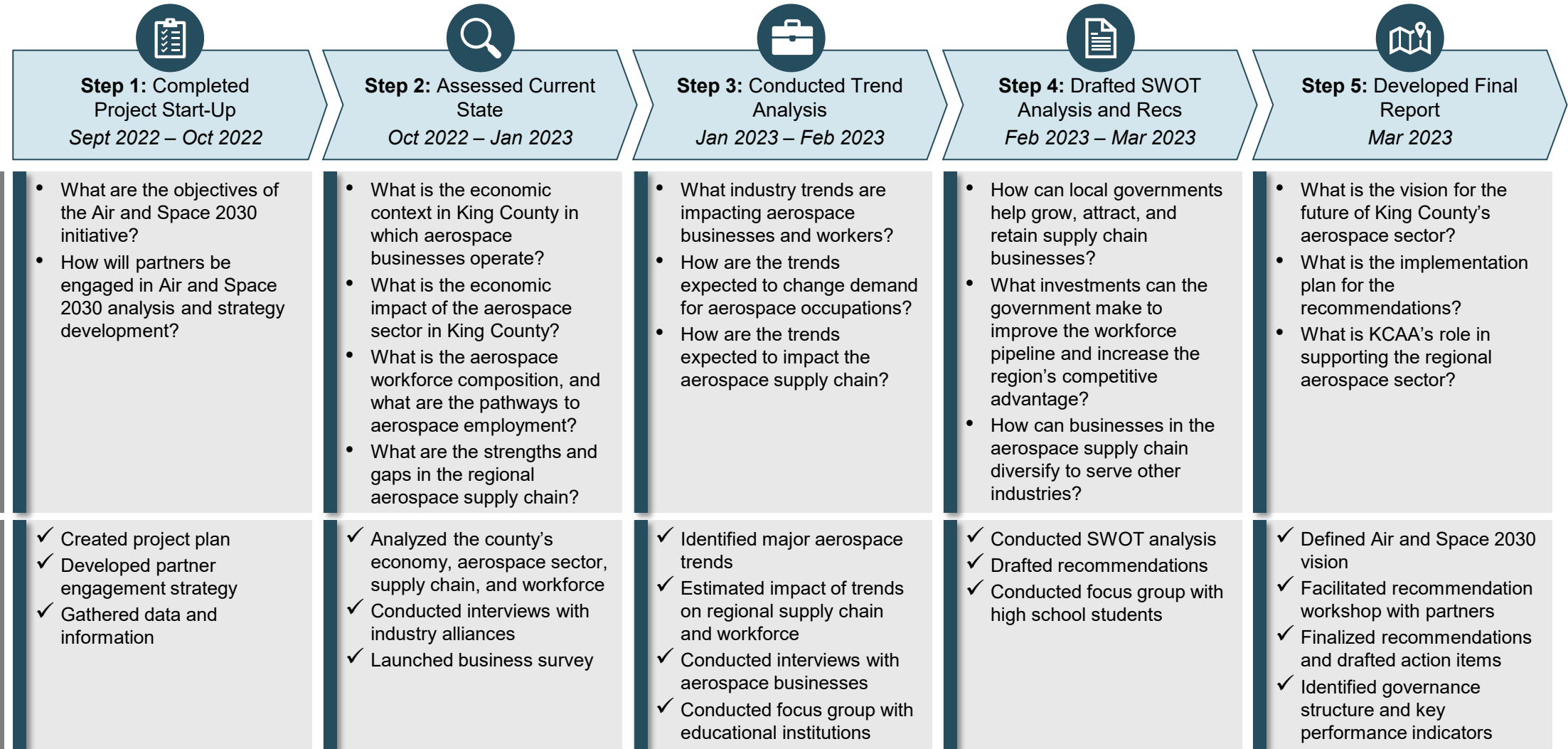
Technology disruption



Supply chain shortages



The strategy is the output of a six-month period of quantitative and qualitative analysis and partner engagement



The strategy includes in-depth analyses of King County's aerospace sector and a plan to increase its competitiveness

Air and Space 2030 Strategy Sections



The **Executive Summary** provides context on the Air and Space 2030 initiative and summarizes the strategy vision and recommendations.



The **Background** includes key findings from the current state analysis, trend analysis, SWOT assessment, and partner engagement.



The **Recommendations** section establishes a vision for the future and outlines actions that will help the KCAA and its partners achieve the vision.



The **Implementation Roadmap** outlines a tactical plan to execute the recommendations and proposes milestones, a governance model, and KPIs.



The **Appendices** includes the detailed analyses and sources supporting the Air and Space 2030 Strategy.

Facing new competitors and disruptive trends, King County needs a strategy to grow and evolve the aerospace sector

King County aerospace today

King County aerospace tomorrow



Aerospace Sector: King County’s standing as an aerospace powerhouse is being tested by limited ecosystem coordination, regulatory burdens, and the impacts of disruptive trends.

King County is a global leader in aerospace innovation with a cohesive and collaborative ecosystem of public, private, non-profit, and education partners.



Aerospace Supply Chain: King County has a robust network of aerospace businesses, but the ecosystem is weakened by global competition, supply chain gaps, and challenges to modernization.

King County supports a flourishing network of small, mid-size, and large aerospace suppliers and OEMs providing cutting-edge goods and services to the national and international markets.



Aerospace Workforce: Barriers to entry, regional and industrial competition for talent, and insufficient awareness have caused a labor shortage – particularly for specialized and technical roles.

King County has a strong and expanding pipeline of aerospace talent with equitable access to high-quality sector job opportunities.

A global aerospace shift is underway. King County needs to make strategic investments in its aerospace sector, supply chain, and workforce to adapt to aerospace trends and outpace competitors. **The Air and Space 2030 Strategy is a call to action for a holistic investment approach to secure and grow King County’s aerospace future.**

King County and its partners can help the sector navigate change and lead globally by investing in collaboration, infrastructure, business support, and workforce development

2030 Vision: King County is the **innovation epicenter** of the global aerospace sector – bringing **next-generation services and products** to national and global markets, attracting **top talent and businesses**, and creating **accessible, high-quality jobs** for county residents



Aerospace Sector

What resources and investments will help advance the sector?

- S1. Improve collaboration across the regional aerospace ecosystem
- S2. Increase the availability and accessibility of industrial land for aerospace manufacturing
- S3. Improve permitting processes and regulatory support
- S4. Increase access to capital for aerospace businesses
- S5. Build and market infrastructure that catalyzes innovation and supports sector growth



Supply Chain

What portions of the supply chain should King County focus on?

- SC1. Attract businesses that align with regional competitive advantages and sector trends
- SC2. Grow existing businesses and build the resiliency and performance of the supply chain



Workforce

What type of workforce investments does King County need to make?

- W1. Prepare residents for high-quality, in-demand aerospace occupations
- W2. Remove barriers to aerospace careers and promote career advancement
- W3. Increase awareness of sector opportunities and entry points

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Analyses and partner engagement indicate that the aerospace sector has a strong foundation in King County, but needs to evolve to stay competitive

1

County Economic Overview: King County's economy is concentrating in higher-income, service-providing industries, such as Information and Professional, Scientific, and Technical Services. This creates a competitive advantage, but also contributes to increased regional costs of living and intensifies competition for talent.

2

Aerospace Sector Overview: The aerospace sector is critical to King County's economy, generating \$19B in GDP and over 60.2K jobs in 2019. The sector is at an inflection point, as the economic impact of traditional aerospace manufacturing is in decline and the prominence of newer industries such as satellite manufacturing is growing rapidly.

3

Workforce Analysis: Aerospace sector employment in King County mirrors the economy-wide concentration in higher-income jobs but provides a mix of employment opportunities that are accessible to individuals of varying levels of educational attainment. Industry partners reported labor shortages, with particularly prominent gaps in technical and leadership roles.

4

Supply Chain Analysis: The aerospace supply chain in King County is comprised of a network of over 160 inputs and 15 outputs. Information services represent a strength in the aerospace supply chain, and gaps include complex manufactured commodities, such as aircraft parts and propulsion units.

5

Trend Analysis: Trends impacting the aerospace sector in King County include new space, advanced air mobility, supersonics & hypersonics, sustainability, and innovations in manufacturing and maintenance, repair, and operations. The trends are projected to have a global market size of \$803B by 2030.

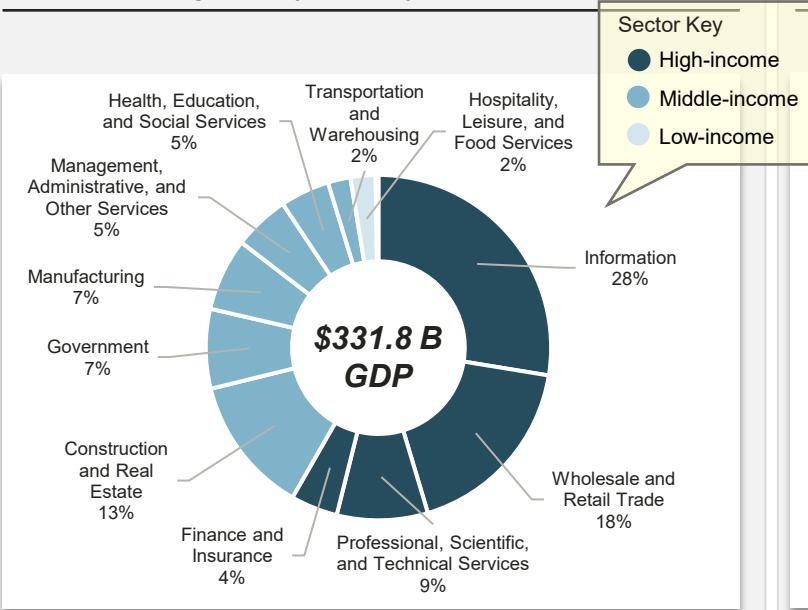
6

Trend Impacts: Aerospace trends are expected to create shifts in the aerospace supply chain and workforce. Industries expected to be impacted include Science & Technology Consulting and Energy, which is anticipated to increase the demand for software development and management roles.

1 King County’s economy is concentrating in higher-income, service-providing industries

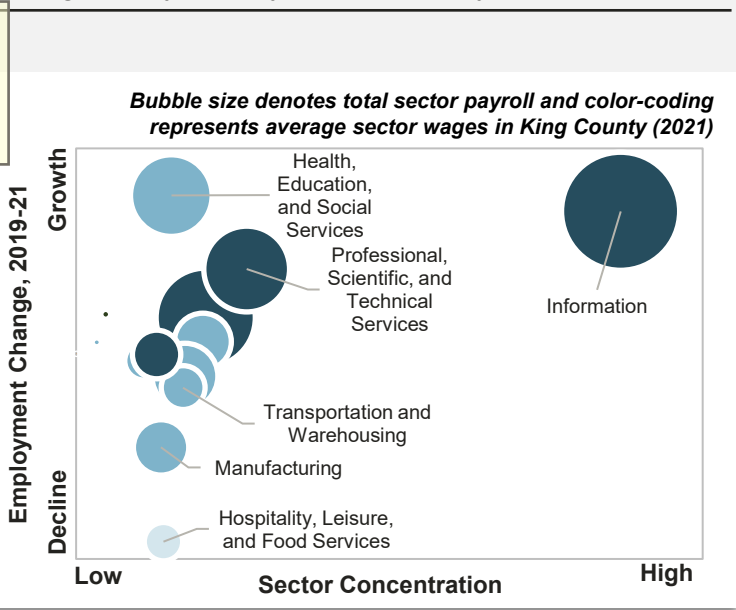
King County’s \$332 billion economy is concentrated in high-income information and service-based sectors (60% of total GDP).

King County GDP by Sector, 2020



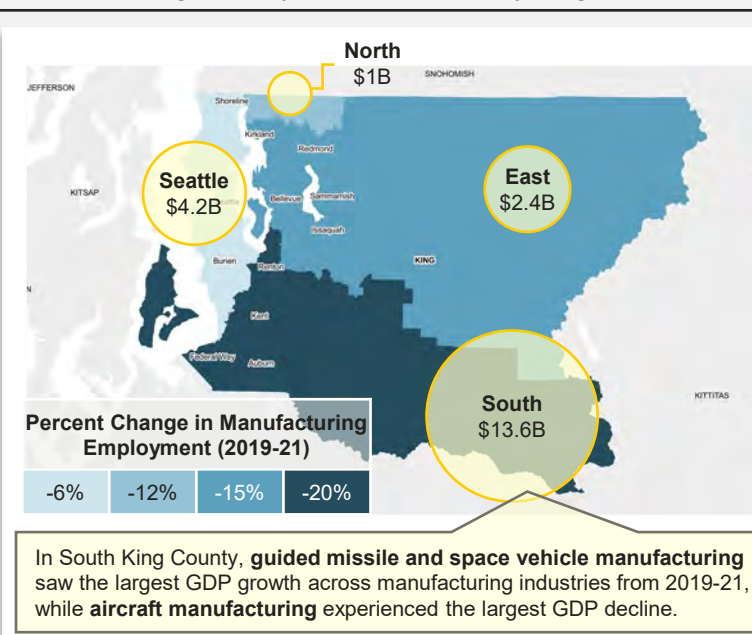
King County’s increasing economic concentration is driven by rapid growth in high-income, information-based sectors and a decline in middle-income, product-based sectors, relative to national averages.

King County Employment Growth by Sector, 2019-21



Economic concentration in King County is partially driven by a decline in Manufacturing, which saw a decrease in employment across all four regions of the county from 2019-21.

Manufacturing Employment and GDP by Region, 2019-21



In South King County, guided missile and space vehicle manufacturing saw the largest GDP growth across manufacturing industries from 2019-21, while aircraft manufacturing experienced the largest GDP decline.



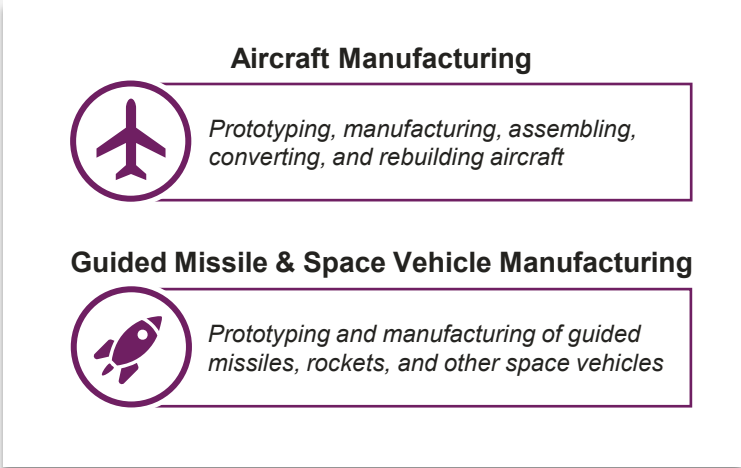
Partner Engagement Perspective

The growth of King County’s Information and Professional, Scientific, and Technical Services sectors creates a regional competitive advantage and attracts talent to the area. However, industry and educational partners indicated that because these sectors are attractive to young professionals, their growth contributes to heightened competition for talent.

2 The aerospace sector is critical to King County’s economy, generating \$19B in GDP and over 60K jobs; however, the sector is at an inflection point, as large, established industries decline and newer industries grow

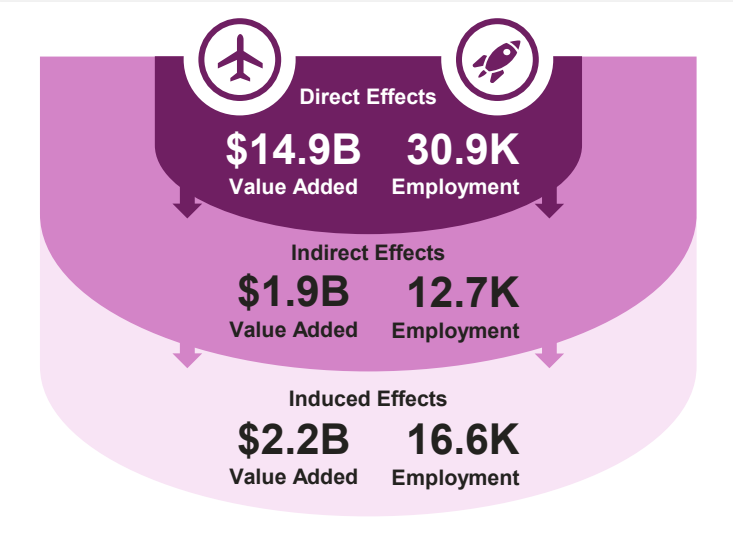
The aerospace sector is highly complex and includes a range of products and services. For the purpose of the report’s quantitative analyses, the sector is defined as the Aircraft and Guided Missile and Space Manufacturing industries and their suppliers.

Aerospace Sector Industries



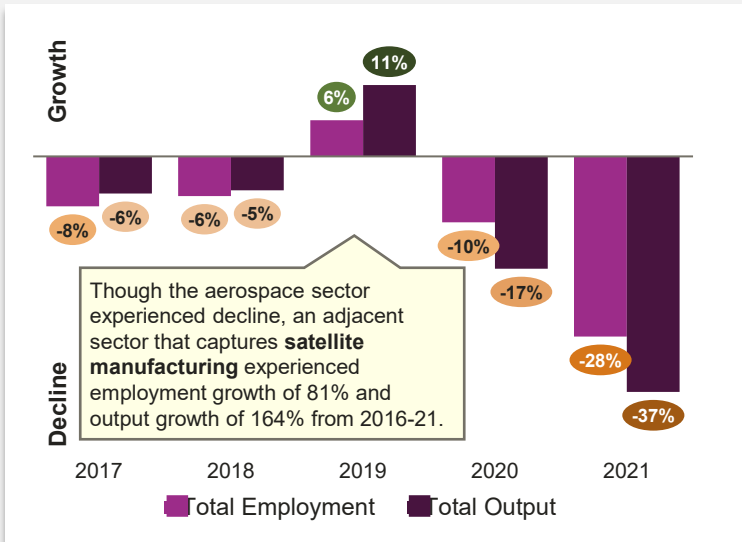
The aerospace sector’s direct, indirect, and induced economic impacts are important contributors to the county’s GDP and jobs. In 2019, the aerospace sector generated \$19B in GDP and over 60.2K jobs.

Value Added and Employment Impact, 2019



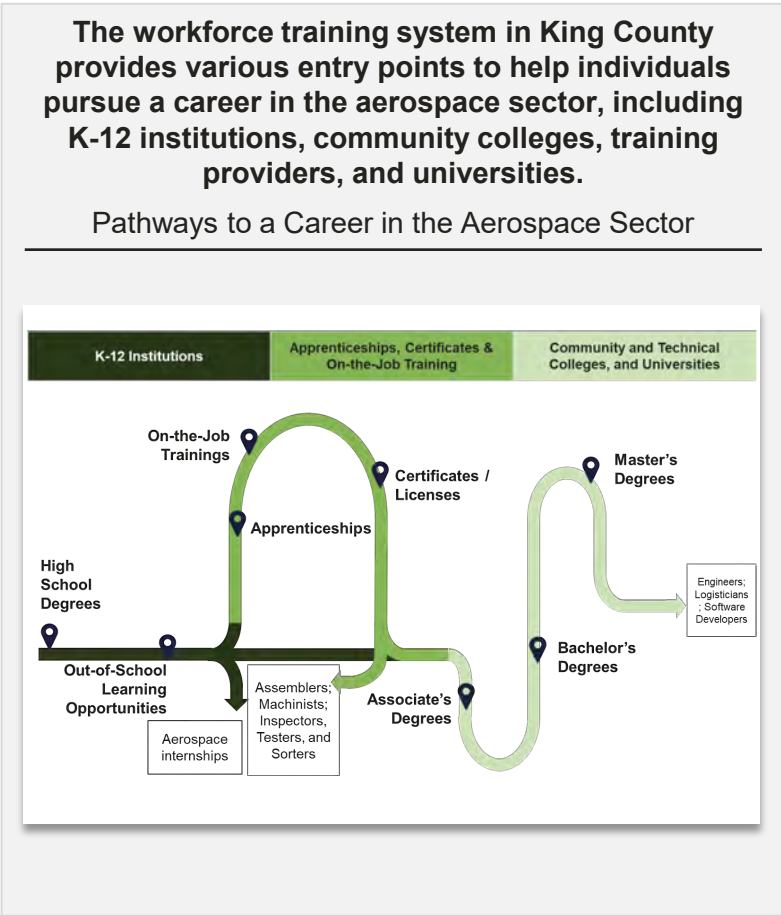
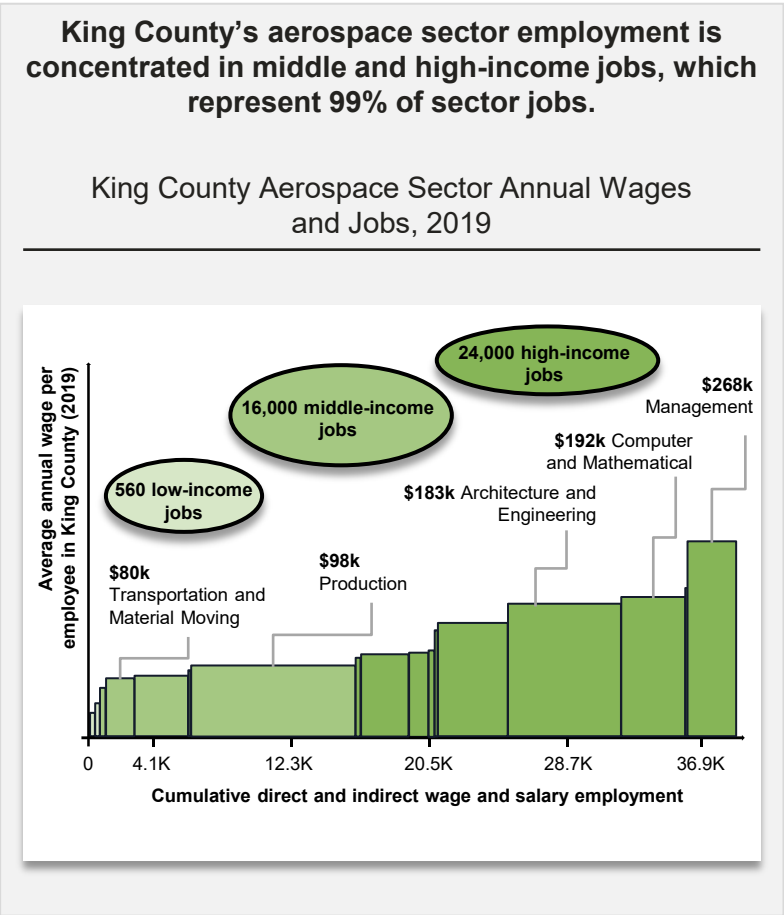
Traditional aerospace manufacturing is shrinking, having experienced a 36% and 48% decrease in employment and output, respectively, from 2019-21. At the same time, new space experienced rapid growth.

Year-Over-Year Change in Aerospace Employment and Output in King County, 2017-21



Partner Engagement Perspective
Aerospace industry partners indicated that one of the greatest benefits of operating in King County is the strength and diversity of the regional network of aerospace businesses. Businesses noted that proximity to suppliers and customers played a large role in their decision to locate and maintain operations in the region.

3 The aerospace sector offers a mix of middle- and high-income jobs that are accessible to individuals of varying levels of educational attainment



Top aerospace occupations are accessible to individuals of all levels of educational attainment and have overlapping educational requirements that can help individuals qualify for multiple roles.

King County Top Aerospace Occupations, 2019

Educational Requirement	Occupation	Employment
High School Degree	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	2,280
	Inspectors, Testers, Sorters, Samplers, and Weighers	1,460
	Machinists	1,220
Certification / OJT	Aircraft Mechanics and Service Technicians	1,100
Associate's Degree	Miscellaneous Assemblers and Fabricators	900
Bachelor's Degree or Higher	Software Developers	2,230
	Industrial Engineers	1,600
	Aerospace Engineers	1,390
	Mechanical Engineers	950
	Project Management and Business Operations Specialists	870

AVAILABILITY OF REQUIRED DEGREE OFFERINGS IN KING COUNTY:

High	Moderate	Low	Not Available	N/A

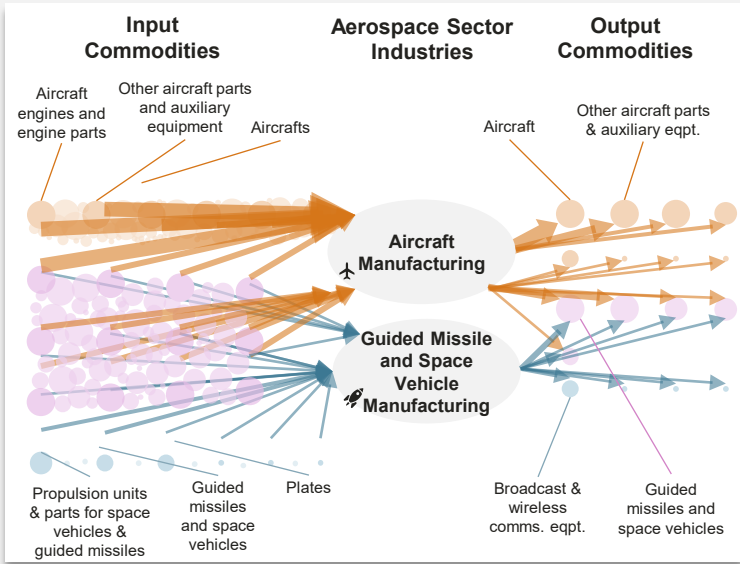
Partner Engagement Perspective

Industry partners reported a lack of available workers to fill open positions, particularly in the skilled trades and leadership roles. Partners indicated that workforce shortages may be due to a lack of interest in and understanding of manufacturing, intra- and inter-industry competition, and the region’s high cost of living. Continued public sector investment could help alleviate this workforce shortage by garnering interest in aerospace manufacturing and supporting specialized training programs that align with industry needs.

4 Information services represent a strength in the regional aerospace supply chain, whereas gaps include complex manufactured commodities, such as aircraft parts and propulsion units

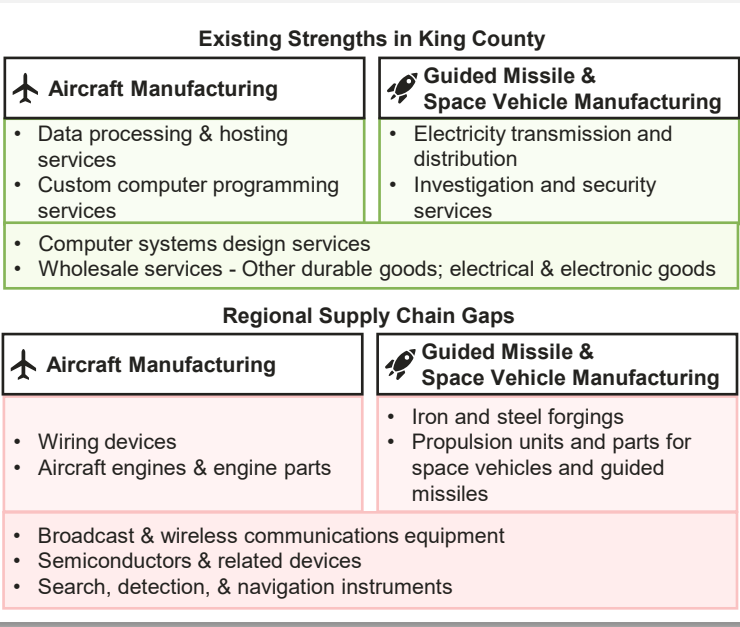
The aerospace supply chain consists of over 160 goods and services used as inputs in the production of over 15 aerospace product outputs. Around 16% of all inputs are purchased from local suppliers.

Aerospace Sector Supply Chain Map



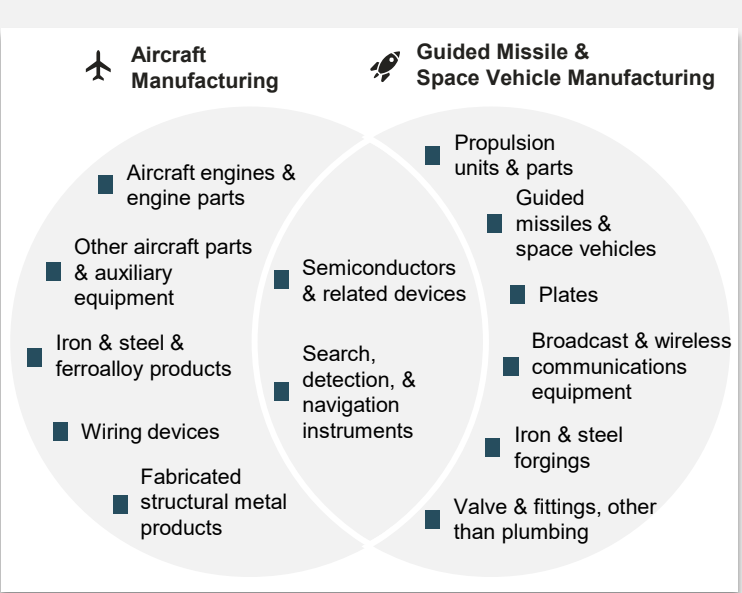
King County’s aerospace supply chain has strengths in information services and gaps in manufactured commodities, such as aircraft parts and propulsion units.

Strengths and Gaps in Regional Supply Chain



Commodities with large out-of-state spending and/or strong local supply chains were identified as potential targets for business attraction and growth efforts.

Opportunity Commodities in Regional Supply Chain



Partner Engagement Perspective

Partner engagement indicated that King County has strengths in industrial manufacturing (e.g., machinery), machining, and services (e.g., design, engineering, and testing), and opportunities to grow in metal finishing and processing (e.g., heat treating, coating, and anodizing), post-production services (e.g., MRO facilities), and specialized manufacturing (e.g., semiconductors, defense interiors, wiring devices, antennas, exotic materials, and high-complexity components).

5 The county is well-positioned to capture economic opportunities related to aerospace sector trends

Global aerospace trends are poised to create both opportunities and challenges for the King County aerospace sector.

Key Aerospace Trends

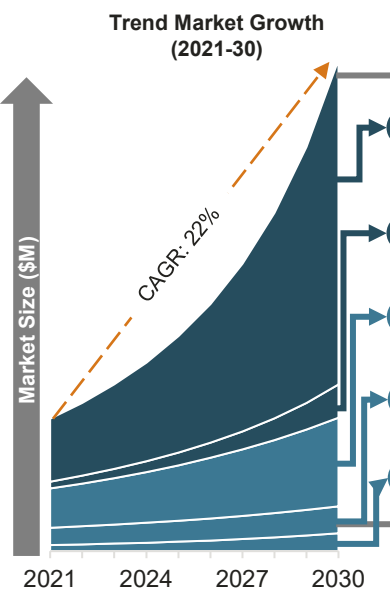
Trend Key

- New Markets & Technology
- Cross-Cutting Advancements

- Advanced Air Mobility** – A new era of air transportation in which cargo and people move between places, especially hard-to-reach places, more efficiently through the integration of innovative aerospace products and technologies.
- New Space** – The development of the private spaceflight industry – a community of individuals and firms working to create and advocate for low-cost spaceflight technologies.
- Supersonics & Hypersonics** – Vehicles capable of flying faster than the speed of sound, transporting passengers and cargo across the world in a matter of hours.
- Innovations in Manufacturing and Maintenance, Repair, and Operations (MRO)** – Innovative use of tech and/or services in the design, manufacture, maintenance, repair, and operation of aerospace products.
- Sustainability** – Movement to reduce emissions of aerospace products and services, as policy, regulatory, and consumer attention on climate change continues to grow.

The global growth of aerospace trends, which have a projected future market size of \$803B, is driven by emerging economies, rapid technological advancement, and social change.

Estimated Global Market Growth by Trend

Trend Market Growth (2021-30)	Trend	Est. Future Market Size (2030) (CAGR)
	Innovations in Manufacturing and MRO	\$534,571 M (29%)
	Sustainability	\$55,326 M (38%)
	Advanced Air Mobility	\$142,013 M (16%)
	Supersonics & Hypersonics	\$42,975 M (7%)
	New Space	\$29,012 M (18%)
	Total	\$803,898 M (22%)

King County’s existing market strengths provide a strong foundation for growth in Sustainability, Innovations in Manufacturing & MRO, and New Space.

Market Readiness Assessment

Trend	Assessment
Sustainability	Foundation Developed – Strong presence of relevant businesses, R&D programs, and skilled workforce, as well as strong government support
Innovations in Manufacturing and MRO	Foundation Developed – Strong presence of relevant businesses, R&D programs, and skilled workforce, as well as strong government support, but site scarcity presents a challenge
New Space	Foundation Developed – Strong presence of relevant businesses, R&D programs, and skilled workforce, but lacking financial capital and physical infrastructure compared to other regions
Advanced Air Mobility	Requires Development – Strong R&D and presence of skilled workforce, but stronger infrastructure and financial opportunities have created competitive advantages in other regions
Supersonics & Hypersonics	Requires Development – Strong R&D and presence of skilled workforce; however, lack of necessary infrastructure and access to private capital may hinder future growth



Partner Engagement Perspective

Industry partners indicated that – in addition to the trends listed above – other trends and sub-trends impacting the aerospace sector include sustainable aviation fuels, vertical airports, and automation (e.g., robots and cobots).

6 Sector trends are expected to create shifts in the supply chain and workforce, necessitating action to prepare for growth and mitigate disruption

Sustainability, New Space, and Innovations in Manufacturing and MRO are expected to create both disruptions and opportunities for growth across the supply chain.

The selected trends are also anticipated to drive changes in workforce demand, including increasing the need for software development and management roles, along with skilled labor to support advanced manufacturing.

Anticipated Supply Chain Impacts

Industries and occupations expected to decline or be disrupted will need support to meet the changing needs of the sector (e.g., diversification initiatives for businesses, reskilling programs for workers).

Anticipated Workforce Impacts*

Industries expected to decline

Industries involved in:

- Fossil-fuel based energy
- Inefficient composite materials
- Single-use plastics
- Labor-intensive manufacturing
- Traditional materials
- Conventional machining and fabrication

Industries expected to be disrupted

Industries involved in:

- Carbon-emission intensive manufacturing and materials
- Ground-based equipment
- Risk insurance
- Logistics
- Aerospace vehicle fueling

Top occupations in industries expected to decline

Occupations related to:

- Assembly and fabrication
- Software development and testing
- Engineering
- Management

Top occupations in industries expected to be disrupted

Occupations related to:

- Customer service and sales
- Cargo and freight
- Operation of planes and trucks
- Machinery
- Software development and testing
- Assembly

Industries expected to grow

Industries involved in:

- Data analysis and cloud storage
- Earth observations
- Space-based communication
- In-orbit servicing
- Biofuels
- Solar and electric power
- Connected services

Leading industries

Industries involved in:

- New space technologies
- Sustainable aviation
- Automation
- Advanced materials
- Cutting-edge machining and technologies

Top occupations in industries expected to grow

Occupations related to:

- Software development and testing
- Computer systems and support
- Management
- Sales
- Science

Top occupations in leading industries

Occupations related to:

- Software development and testing
- Assembly and fabrication
- Engineering
- Machinery
- Management
- Computer systems and support

Industries and occupations expected to grow or lead will need support to scale in King County (e.g., investment in testing facilities, workforce training programs).



Partner Engagement Perspective

Industry partners indicated that aerospace businesses may face challenges when adapting to sector trends. For example, innovations in manufacturing like robotics and automation require investing in and programming new technologies, which can be cost prohibitive for small and mid-size businesses with legacy technology.

Overall, King County's aerospace sector remains competitive but faces some pressing sector, supply chain, and workforce challenges

S

Strengths: King County has a well- and long-established aerospace sector, with strengths in its network of businesses and highly educated population.

W

Weaknesses: The county's traditional aerospace manufacturing base is shrinking as it faces national competition for businesses and local scarcity of resources.

O

Opportunities: The local aerospace sector is well-positioned to grow its competitive advantage in advanced technologies and establish leadership in key trends.

T

Threats: The strength of the local aerospace sector is at risk due to rising costs of doing business, lack of interest in manufacturing and skilled trades, and physical space limitations.

»» Resulting Guiding Principles for the Air and Space 2030 Strategy

- Foster intra- and inter-sector collaboration
- Ensure equitable access to jobs and funding
- Position local aerospace sector to meet the shifting demands of the industry
- Nurture existing network of aerospace suppliers and OEMs
- Attract and grow the next generation of leading businesses and entrepreneurs
- Reduce red tape and regulatory burdens
- Support the resiliency of small and disadvantaged businesses
- Engage youth and build the workforce pipeline

The **guiding principles**, which focus on **capitalizing** on strengths and opportunities and **mitigating** weaknesses and threats, informed the development of the **Air and Space 2030 Strategy recommendations**.

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The Air and Space 2030 Strategy establishes an ambitious vision for King County's aerospace sector

What does the King County aerospace sector look like in 2030?

King County is the **innovation epicenter** of the global aerospace sector — bringing **next-generation services and products** to national and global markets, **attracting top talent and businesses**, and creating **accessible, high-quality jobs** for County residents



King County is internationally recognized for developing creative, pioneering solutions to the sector's most challenging problems. Local businesses, research institutions, and entrepreneurs drive the global conversation on sector trends and technologies.



King County businesses design and produce cutting-edge products and services that revolutionize the way we travel, communicate, and transport goods. The sector's offerings incorporate the latest technology and are in-demand across the country and the world.

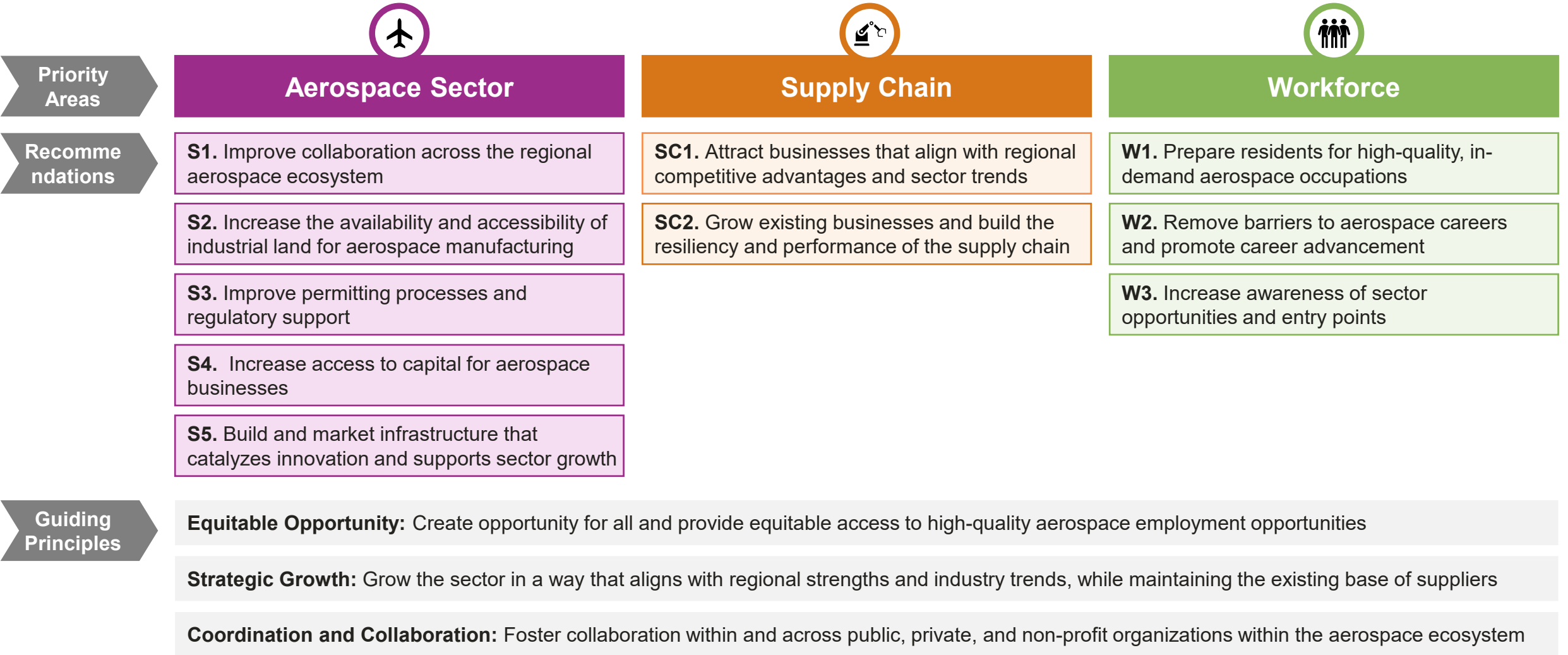


Leading businesses and workers choose to locate and stay in King County due to its competitive advantages, range of opportunities, and desirable quality of life. King County offers an attractive aerospace business environment and strong worker support.



King County's thriving aerospace sector creates jobs that equitably benefit residents. Aerospace jobs offer a living wage, benefits, and opportunities for advancement for individuals of all education levels.

The Air and Space 2030 recommendations take an ecosystem approach to growing the vitality and sustainability of the regional aerospace sector



Activity and outcome-based indicators can be used to monitor sector progression and measure the impact of the Air and Space 2030 Strategy

Priority Areas	 Aerospace Sector		 Supply Chain		 Workforce	
	Key Performance Indicator (KPI)	Proposed Source	Key Performance Indicator (KPI)	Proposed Source	Key Performance Indicator (KPI)	Proposed Source
Activity KPIs	Number of events held and/or sponsored	KCAA to track	Number of aerospace business attraction leads generated	KCAA and GSP to track	Number of apprenticeships and internships offered by local businesses and training providers	KCAA and WDC to track
	Number of industrial land projects completed	Local govts to track, KCAA to compile county-level data	Number of local business incentives provided to new and expanding aerospace businesses	KCAA to track	Number of awarded K-12 aerospace curriculum grants	KCAA to track
	Number of patents and other intellectual property generated by local aerospace firms	Business intelligence databases	Number of small aerospace businesses receiving funds for technology updates	KCAA to track	Amount of funding provided to businesses through aerospace workforce fund	KCAA to track
Outcome KPIs	Number of new aerospace companies that locate in the county	Business licenses via WA DOR, GSP reports	Number of local suppliers that serve the aerospace industry	Partner engagement and online research	Number of aerospace jobs with livable wages	BLS, partner engagement, economic modeling software
	Amount of investment in local aerospace research and development	Financial and industry reports and government funding data	Percentage of aerospace inputs that are produced locally	Economic modeling software (e.g., IMPLAN)	Number of local students completing aerospace-related degree programs	National Center for Education Statistics
	Amount of total value added (i.e., direct, indirect, and induced) by local aerospace businesses	Economic modeling software (e.g., IMPLAN)	Number of women and BIPOC-owned aerospace businesses	Partner engagement and online research	Number of K-12 students receiving aerospace instruction due to K-12 curriculum grants awarded	KCAA to track

The Air and Space 2030 Strategy includes a set of action items that help move the recommendations forward

The following section of the report outlines and analyzes 51 action items that will help the County and its partners operationalize the recommendations. The graphic below explains how to read and interpret the action items and accompanying impact and effort ratings on pages 24 through 49.

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
Action Item Number	Action Item Overview: Summary of the action item	Challenge: Brief statement defining the issue or opportunity that the action item is designed to address Approach: Specific steps or actions that can be taken to address the issue or opportunity identified in the challenge statement	Organization proposed to lead action item implementation	Organization(s) proposed to support action item implementation	Estimated effect the action item will have on the achievement of the recommendation	Estimated level of time and resources required to implement the action item	Projected timeline for setting up and implementing the action item

Impact and Effort Rating Scale

Level of Impact	High: Action item has potential to create significant change or have a major effect on the aerospace sector, supply chain, and/or workforce. May have immediately noticeable impact and/or long-lasting consequences (5+ years).	Medium: Action item has potential to cause some change or have some effect on the aerospace sector, supply chain, and/or workforce. Impacts are expected to be medium-term (3-5 years).	Low: Action item has potential to cause minimal change or have minimal effect on the aerospace sector, supply chain, and/or workforce. Impacts are expected to be short-term (<3 years).
Level of Effort	Low: Action item requires relatively few resources and lower levels of time to complete.	Medium: Action item requires some resources, time, or expertise to complete. May involve a moderate amount of planning or coordination or require specialized skills or knowledge.	High: Requires significant resources, time, or expertise to complete. May include multiple steps, require significant time or financial investment, or involve significant risk or uncertainty.

S1: Improve collaboration across the regional aerospace ecosystem (1/4)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
S1.1	Revitalize and restructure the KCAA	Challenge: Industry partners indicated that there is a lack of coordination across the players in the aerospace ecosystem in King County and the broader Puget Sound region, including businesses, local governments, educational institutions, workforce development organizations, and non-profits. The lack of coordination can create confusion for businesses and duplication of efforts for local governments and service providers. There is a need for a coordinating body that crafts and communicates a unified value proposition for the King County aerospace sector, identifies and addresses the needs of local businesses, and convenes local and regional players to align sector economic and workforce development efforts. Approach: King County can lead the reinvigoration of the KCAA as a coordinating body responsible for advancing the local aerospace sector as an epicenter of innovation through partner collaboration, advocacy, and strategic investments. Membership can include aerospace industry leaders, local governments, education and training providers, economic development and business interest groups, capital providers, and youth representatives. To incorporate a regional perspective and align efforts across the Puget Sound area, the KCAA can appoint an advisory board that includes representatives from regional agencies and neighboring counties. Additional details on the proposed structure and responsibilities of the updated KCAA are included in the Implementation Roadmap section.	King County	Local Govs, Businesses, Industry Alliances, Education and Training providers	High	High	1 year, then ongoing
S1.2	Secure funding for the KCAA	Challenge: Growing and supporting the aerospace sector requires significant investment over a sustained period. KCAA has historically had a limited budget and requires additional, reliable funds to increase its impact and implement the actions included in the Air and Space 2030 Strategy. Approach: KCAA can explore different funding models and sources to supplement its existing budget. Funding sources to consider include membership fees, corporate sponsorships, state funds (e.g., Washington State Innovation Cluster Accelerator grants), and federal funds (e.g., Small Business Administration's Regional Innovation Clusters initiative, Economic Development Administration's Regional Technology and Innovation Hub Program).	KCAA	Local Govs	Medium	High	6 months, then ongoing

Case Study: [Midlands Aerospace Alliance](#)



The Midlands Aerospace Alliance (MAA) was established in 2003 to support and represent the aerospace industry in the Midlands region of the United Kingdom. MAA is structured as a Company Limited by Guarantee (non-profit limited company), and aerospace companies are invited to join the organization as formal members. In 2007, MAA introduced subscription and annual renewal fees for members. The alliance currently has more than 300 members, and more than 50 people serve on the MAA board and/or one of three working groups – business development, technology development, and supply chain performance.

S1: Improve collaboration across the regional aerospace ecosystem (2/4)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
S1.3	Develop and advocate for an aerospace legislative agenda	Challenge: The competitiveness of the regional aerospace sector is impacted by the federal, state, and local policy landscape. For example, competitor states such as California and Florida offer a range of tax and other financial incentives to aerospace businesses, which can draw new and existing businesses away from Washington in the absence of similar incentives. The local aerospace sector would benefit from additional representation in the policymaking process to inform and advance policies that are supportive of future growth and nationally and globally competitive. Approach: KCAA can lead a collaborative effort to define aerospace policy priorities and identify specific bills and initiatives to support at the local, state, and federal level. Policies considered can include local tax credits for R&D and innovation, statewide aerospace engineer tax credits to attract aerospace engineering businesses and workers to the region, the expansion of retail sales and use tax exemptions, and other state tax credits for the construction of new facilities to test, manufacture, or repair spacecraft, satellites, and/or supersonic and hypersonic vehicles. KCAA representatives can also meet with local, state, and federal policymakers to provide information on the regional aerospace sector and advocate for its legislative agenda.	KCAA	Industry Alliances	Medium	Medium	3 months, then ongoing
S1.4	Update KCAA website and online presence	Challenge: The KCAA website has not been updated recently and includes limited information and resources. Approach: The KCAA can increase its visibility in the region and serve as an online hub of aerospace information and resources by updating its website. Additions can include a profile of the regional aerospace sector, data dashboards, lists of relevant resources and programs, information on regional assets and infrastructure, a calendar of events, and an updated description of the KCAA. The website can also increase awareness and connectivity of sector businesses by including a searchable directory of aerospace businesses in the county, including their names, products or services offered, location, contact information, and website. To drive traffic to the updated website, the KCAA can also create and update social media pages (e.g., LinkedIn, Instagram).	KCAA	N/A	Medium	Medium	6 months, then ongoing

Case Study: [Research Triangle Regional Partnership](#)

The Research Triangle Regional Partnership is an economic development organization in Central North Carolina that markets the region to external audiences as an attractive place to live and do business. The organization's website offers a wealth of information for businesses and workers interested in relocating to the area, including industry-specific data, lists of existing businesses, a compilation of incentives and grants, links to local investment groups, and a catalog of available sites and real estate.



S1: Improve collaboration across the regional aerospace ecosystem (3/4)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
S1.5	Compile and regularly update catalogs of aerospace sector data, businesses, programs, and assets	Challenge: Data on the regional aerospace sector is not easily accessible. With rapid shifts in the sector, data available on public sources can be inaccurate and misaligned with sector composition. Additionally, there is no consolidated list of regional aerospace businesses, programs, and assets, which can hinder coordination and business attraction efforts. Approach: The KCAA can improve the quality of sector data and better understand sector impact and evolution by conducting regular surveys with the business community to collect employment and output data. The KCAA can also aid business outreach and attraction efforts by compiling, publishing, and maintaining publicly available lists of regional aerospace businesses, assets, programs, and workforce development opportunities on its website.	KCAA	Businesses, Industry Alliances, PSRC	Medium	Medium	6 months, then ongoing
S1.6	Host and sponsor aerospace sector networking events	Challenge: King County is home to a robust ecosystem of aerospace businesses, entrepreneurs, education and training providers, and non-profits. However, the benefits of this co-location cannot be fully realized if ecosystem players do not regularly convene and collaborate. Collaboration can lead to improvements in production processes, innovations in products, and opening of new markets. Approach: The KCAA can enhance ecosystem connectivity by hosting aerospace networking meetings in rotating locations across the county. Invitees can include suppliers, OEMs, industry alliances, school districts, universities, workforce development programs, community colleges, and non-profits. The networking events can be used to showcase existing aerospace resources and infrastructure, provide updates on KCAA initiatives, feature sector speakers, identify common sector challenges, and create opportunities for connection. The KCAA can also sponsor regional conferences (e.g., the Joint Center for Aerospace Technology Innovation's annual symposium and the Pacific Northwest Aerospace Alliance's Annual Aerospace Conference) and fund the attendance of local businesses and/or businesses considering relocating or expanding into the region.	KCAA	Businesses, Industry Alliances	Medium	Low	6 months, then ongoing



Case Study: [The Aerospace Alliance](#)

The Aerospace Alliance is a private partnership formed in 2009 by Alabama, Florida, Louisiana, and Mississippi to promote the southeast region as a world-class aerospace and aviation corridor. The organization advocates for policies, programs, and projects at the local, state, and national level; increases awareness of the region's shared assets; elevates the talent pipeline; and promotes the region as a destination for aviation and aerospace manufacturing. The Alliance is guided by a board of directors consisting of the head of economic development and three appointees from each participating state.

S1: Improve collaboration across the regional aerospace ecosystem (4/4)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
S1.7	Co-host cross-sector events with other industry associations and alliances	Challenge: The aerospace sector in the region is changing. The economic impact of traditional aerospace manufacturing is declining, and sector trends are creating new opportunities and challenges for aerospace businesses. To adapt to these shifts and reduce the impact of future economic shocks, businesses in King County can work to diversify their product offerings and serve new customers and markets. Approach: The aerospace sector intersects and interacts with a wide range of other sectors in the region, including technology, telecommunications, and professional services. The KCAA can help create connectivity across sectors and facilitate diversification by co-hosting two cross-sector networking meetings per year in collaboration with industry alliances such as the Washington Technology Industry Association, the Pacific Northwest Defense Coalition, and the Information Systems Security Association.	KCAA	Industry Alliances, Businesses	Medium	Low	3 months, then ongoing
S1.8	Organize delegations to out-of-state events	Challenge: There are a variety of aerospace and aerospace-related conferences and events held across the country every year, including (but not limited to) the Space Symposium; AeroDef Manufacturing Conference and Exposition; Composites and Advanced Materials Expo; SpaceCom; and Maintenance, Repair, and Operations (MRO) Americas. Local businesses and governments could benefit from attending out-of-state aerospace events to build their networks, exchange knowledge, and raise awareness of King County's aerospace value proposition. Approach: The KCAA can organize delegations of local governments, business attraction organizations, and small businesses to attend out-of-state aerospace and aerospace-related conferences and events. The KCAA can work with members to select events that align with regional strengths (e.g., complex aerospace manufacturing), bring together a group of relevant small businesses and local governments to attend, and provide financial support for attendees, as needed. While at the event, local governments can meet with businesses to make connections and communicate King County's value proposition, while small businesses can network and identify investment opportunities.	KCAA	Local Govs, GSP, Businesses	Medium	Low	3 months, then ongoing

Case Study: [European Cluster Collaboration Platform's Matchmaking Event](#)



The European Cluster Collaboration Platform (ECCP) hosts a series of industry matchmaking events that facilitate connections across businesses in different sectors. In 2017, the ECCP hosted a cross-sectoral and inter-cluster matchmaking event for the aerospace sector. Businesses active in simulation technologies, technical textiles, advanced manufacturing technologies, and other areas linked to the aerospace value chain were matched with aerospace businesses to facilitate inter-sectoral collaborations.

S2: Increase the availability and accessibility of industrial land for aerospace manufacturing (1/3)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
S2.1	Restart King County Brownfields Program	Challenge: Contaminated sites (i.e., Brownfields) contribute to the scarcity of industrial land in the county. Though federal and state resources exist to help clean up contaminated sites, businesses, non-profits, and municipalities face barriers to accessing this funding and completing cleanup projects. Approach: King County can restart its Brownfields program to provide funding and technical assistance for local governments, non-profits, and businesses to identify and assess Brownfields, access funding, and complete cleanup projects. The program can prioritize projects that will be used for aerospace manufacturing.	King County	Local Govs, PSRC, Port of Seattle	High	Medium	1 year, then ongoing
S2.2	Explore strategies to increase the efficient use of existing land	Challenge: There is a strong demand for industrial land in King County and limited capacity to absorb growth in industrial subareas, including the Interbay-Ship Canal, Duwamish-North Tukwila, Kent-Renton, and SeaTac-Des Moines subareas. Approach: Local governments in these areas can increase the utilization of existing space by loosening zoning restrictions to allow small and medium-scale manufacturing to locate in mixed-use buildings and working with industrial users to utilize vacant portions of partially-developed parcels.	Local Govs	KCAA	Medium	Medium	6 months, then ongoing
S2.3	Update zoning codes to define and limit e-commerce uses of industrial land	Challenge: Aerospace businesses expressed concerns that e-commerce and logistics businesses are occupying an increasing number of industrial properties in King County and crowding out aerospace manufacturing. Approach: Local governments can update zoning codes to specifically define and limit e-commerce uses (e.g., fulfillment centers, warehousing, distribution) of industrial lands.	Local Govs	KCAA	Medium	Medium	3 months, then ongoing
S2.4	Consider the creation of special manufacturing districts	Challenge: Aerospace manufacturing businesses compete with other industries for scarce industrial land, which can cause them to locate or move outside of the county. Approach: Local governments can retain and attract aerospace manufacturing businesses and jobs by creating special manufacturing districts in high-demand industrial subareas. The special manufacturing districts can be designed to preserve space for manufacturing uses and offer streamlined permitting.	Local Govs	KCAA	High	High	1 year, then ongoing

S2: Increase the availability and accessibility of industrial land for aerospace manufacturing (2/3)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
S2.5	Implement relevant PSRC Industrial Lands Analysis recommendations	Challenge: Industry partners report a lack of coordination across entities in the aerospace ecosystem, resulting in duplication of efforts. The KCAA can increase ecosystem coordination by collaborating with other organizations that are working to improve the availability of industrial land. Approach: PSRC is currently undertaking an Industrial Lands Analysis. KCAA can promote regional collaboration by reviewing the completed study and supporting implementation of study recommendations that preserve and expand industrial land for aerospace manufacturing.	KCAA	PSRC, Local Govs	Medium	Medium	4 months, then ongoing
S2.6	Tailor site selection services to the needs of aerospace businesses	Challenge: A key barrier to growth identified by aerospace manufacturing businesses is difficulty locating facilities to rent or purchase that meet their specific needs (e.g., outside storage). Approach: Regional business attraction organizations such as GSP can increase the effectiveness of site selection services for aerospace businesses by 1) working with the KCAA and aerospace alliances to understand the information that is most relevant to aerospace businesses seeking to grow or expand, 2) gathering and regularly updating relevant information, and 3) marketing its site selection services to aerospace businesses through channels such as industry alliances. In order to grow the county's competitive advantage in advanced aerospace manufacturing, business attraction organizations can prioritize site selection outreach to aerospace businesses that use advanced manufacturing technologies and processes such as additive manufacturing, composite materials and machining, precision machining, and robotics in order to help them locate the space needed to grow and expand.	GSP	Industry Alliances, KCAA	Medium	Low	3 months, then ongoing
S2.7	Increase usage of state and federal funding for industrial land development	Challenge: There are a variety of state and federal funding sources available to support industrial development and Brownfield remediation projects (e.g., Industrial Revenue Development Bonds, Integrated Planning Grant); however, these funding opportunities can go underutilized. Approach: KCAA can help local governments and businesses access state and federal funding by identifying industrial land needs, cataloguing relevant funding opportunities, and providing technical assistance to businesses and local governments during the funding application process.	KCAA	Local Govs	Medium	Low	3 months, then ongoing

S2: Increase the availability and accessibility of industrial land for aerospace manufacturing (3/3)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
S2.8	Establish Aerospace Industrial Loan Fund	Challenge: There are few financing options available for the development of affordable industrial space. Approach: KCAA can increase industrial real estate projects completed in the county by establishing an Aerospace Industrial Loan Fund. The loan fund would pool public and private resources to provide financing for real estate development and renovation projects that create and preserve affordable industrial space for aerospace sector businesses. Eligible costs may include acquisition of land, properties, and/or equipment for industrial facilities. Qualified projects should create high-quality jobs in the aerospace sector. Prior to standing up the loan fund, the KCAA can organize a working group to understand developers' and manufacturers' financing needs and pain points and use resulting insights to inform fund design.	KCAA	Local Govs. PSRC, Businesses	High	High	1.5 years, then ongoing

Case Study: [New York City Industrial Development Loan Fund \(IDLF\)](#)



In 2015, the New York City Economic Development Corporation created the Industrial Development Loan Fund to provide strategic debt capital to real estate development and renovation projects with the goal of growing a more robust and resilient industrial ecosystem in the city. The IDLF intends to catalyze investment in 400,000 square feet of new or renovated industrial real estate, supporting the creation of as many as 1,200 quality industrial jobs.

S3: Improve permitting processes and regulatory support (1/2)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
S3.1	Facilitate an Aerospace Permitting Working Group	Challenge: In order to locate and grow in King County, aerospace businesses need to navigate a patchwork of local land use and permitting requirements and processes. Misalignment and inefficiencies in permitting processes across the region can create uncertainty, rework, and delays for aerospace businesses. Approach: To reduce the time and cost of permitting, the KCAA can establish and facilitate a monthly working group with representatives from local governments and industry to review existing industrial permitting processes and design the future state of aerospace permitting in the region. The working group can map current permitting requirements to identify inefficiencies and develop recommendations to reduce redundancies and align requirements across jurisdictions. Following the implementation of the recommendations, members can meet periodically to monitor progress and make adjustments, as needed.	KCAA	Local Govs, Businesses	Medium	Medium	1 year, then ongoing
S3.2	Increase staff in permitting offices	Challenge: Industry partners report long permitting timelines, resulting in project delays for both new construction and alterations to existing sites. Approach: Local governments can improve the customer experience for aerospace businesses and reduce the time required to complete aerospace industrial projects by increasing staff in permitting offices to reduce backlogs. To help recruit and retain new permitting staff, local governments can collaborate with the Workforce Development Council of Seattle-King County to leverage existing workforce programs (e.g., Workforce Innovation & Opportunity Act Adult Programs and Dislocated Worker Programs) to identify qualified jobseekers and provide them with the training and support needed to succeed.	Local Govs	WDC	Medium	Medium	1 year, then ongoing

Case Study: [City of Redmond's Commercial Permitting Process Improvement](#)



In 2014, the City of Redmond, OneRedmond, and local developers worked together to streamline the City's commercial permitting process. A multi-disciplinary team completed a week-long working session to document existing processes, identify pain points, and develop process improvements. Improvements included website updates, an online fee estimator, restructured review processes, and standardized training for permitting counter staff. These improvements increased the capacity within the City's permitting process, enhanced the quality of work, improved customer satisfaction, and lifted employee morale. As a result, there was a 58% reduction in permit lead times and a 72% reduction in process "waste" (i.e., actions, tasks, processes, or products that add time and cost without adding value for the customer).

S3: Improve permitting processes and regulatory support (2/2)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
S3.3	Establish a regionally-based permitting and regulatory concierge service	Challenge: Industry partners expressed difficulty understanding and navigating local, state, and federal permitting and regulatory requirements. Online resources are fragmented, and one-on-one support is typically limited to one jurisdiction. Approach: To ease the regulatory burden on aerospace businesses and encourage business attraction and retention, the KCAA can work with local jurisdictions to assign at least one business permitting and regulatory concierge per King County region (e.g., North, East, South, Seattle). The concierge will be responsible for liaising with businesses and permitting offices and helping businesses identify, navigate, and track applicable permitting and regulatory requirements. The concierge can also follow up on delayed permits and escalate issues, when needed. Though this concierge service will be helpful for aerospace businesses, businesses of all industries will be able to access these services to improve the efficiency and predictability of the permitting process.	Local Govs, Chambers of Commerce	KCAA	Medium	High	1 year, then ongoing



Case Study: [Washington State Governor's Office for Regulatory Innovation and Assistance](#)

In 2002, the Washington State legislature created the Governor's Office for Regulatory Innovation and Assistance. The purpose of the office is to help residents and businesses navigate the State's environmental and business regulatory systems. The office offers an online information center that provides information on local, state, and federal regulatory requirements. The office also collaborates with agencies and stakeholders statewide to improve efficiencies in regulatory systems.

S4: Increase access to capital for aerospace businesses

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
S4.1	Encourage Certified Development Corporations (CDCs) and Community Development Financial Institutions (CDFIs) to invest in aerospace businesses	Challenge: Starting, maintaining, and expanding an aerospace business is a capital-intensive process, as significant funding is needed for initial investment, production, and adoption of new technologies. A lack of access to capital can create barriers to sector entry and growth, particularly for small, mid-size, and socially disadvantaged businesses. Approach: Local governments can increase aerospace businesses' access to capital by partnering with local CDCs and CDFIs to incentivize investment in aerospace businesses. Local governments can offer investors a credit against their local income tax in exchange for making equity investments in local CDCs and CDFIs. To help aerospace businesses access these funds, the KCAA can facilitate connections between aerospace businesses, CDCs, and CDFIs through events such as panels and workshops. A list of CDFIs in the region is included in Appendix D.	Local Govs	KCAA, Local CDCs and CDFIs	Medium	Medium	6 months, then ongoing
S4.2	Connect local aerospace businesses with private investors	Challenge: Securing investments can be difficult for start-ups and small and mid-size businesses who lack established relationships with capital providers. Approach: The KCAA can act as a liaison between small and mid-sized aerospace businesses and providers of financial capital to increase private investment in the regional aerospace sector. KCAA can partner with the Seattle Metro Chamber to facilitate relationships between local businesses and investors by hosting events such as panels featuring key capital providers. Investors can include representatives from the private equity and venture capital sectors, as well as representatives from CDCs, CDFIs, and Small Business Investment Companies. Investees can include small and mid-size aerospace business that face challenges establishing relationships with capital providers.	KCAA	Seattle Metro Chamber, Local Govs	Medium	Medium	6 months, then ongoing
S4.3	Support local aerospace businesses in identifying and accessing state and federal funding	Challenge: Small and mid-size aerospace businesses may be underutilizing state and federal incentives and funding opportunities such as those created by the CHIPS Act and the Inflation Reduction Act. Approach: The KCAA, with assistance from the permitting and regulatory concierges (see S3.3), can provide technical assistance to support small- and mid-size businesses with identifying and applying for state and federal funding opportunities.	KCAA	Permitting and Regulatory Concierge, Seattle Metro Chamber	Medium	Low	6 months, then ongoing

Case Study: [Space Florida and Florida First Capital Finance Corporation Partnership](#)



In March of 2023, Florida's aerospace economic development agency, Space Florida, established a partnership with Florida First Capital Finance (FFC), a Certified Development Company (CDC). This partnership is intended to assist aerospace supply chain businesses by increasing opportunities to access capital and secure financial resources. Space Florida and FFC will collaborate to identify the growth needs of supply chain businesses and support their overall success.

S5: Build and market infrastructure that catalyzes innovation and supports sector growth (1/3)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
S5.1	Promote the use of existing R&D and innovation resources	Challenge: King County and the Puget Sound region are home to a variety of aerospace and aerospace-related R&D and innovation resources, including (but not limited to): the Center of Excellence for Aerospace & Advanced Manufacturing, UW CoMotion, Kirsten Wind Tunnel, Joint Center for Aerospace Technology Innovation, Northwest Tech Bridge, and the UW Center for Advanced Materials in Transport Aircraft Structures. However, not all businesses and entrepreneurs are aware of and utilizing these resources. Approach: The KCAA can promote R&D and innovation by encouraging businesses and residents to use existing centers and resources. This can include featuring the resources on KCAA's website, inviting center representatives to networking events, and including presentations on relevant resources in KCAA events.	KCAA	Educational Institutions	Medium	Low	3 months, then ongoing
S5.2	Continue to invest in and grow the Innovation Triangle	Challenge: Innovation districts are geographic areas in which educational institutions, businesses, incubators, and accelerators co-locate. The aerospace sector could benefit from the evolution of a technology, data science, and engineering innovation district in the county to promote knowledge transfer and open innovation. Approach: The Innovation Triangle is a partnership among the cities of Bellevue, Kirkland, and Redmond and the Port of Seattle to build and maintain a world-class innovation and technology center on Seattle's Eastside. The cities can renew efforts to evolve the Innovation Triangle by completing public projects that increase the attractiveness and connectivity of the district, including high-speed broadband, additional mobility options, and new and enhanced green spaces. The cities can also conduct targeted business development efforts to place businesses at the intersection of aerospace and technology in vacant office space. Finally, the cities can coordinate with the KCAA to apply for federal and state funding, such as the State of Washington's Innovation Cluster Accelerator program (see SC2.2), to help build its aerospace innovation cluster.	Cities of Bellevue, Kirkland, and Redmond	Port of Seattle, KCAA	Medium	Medium	6 months, then ongoing

Case Study: [Oklahoma City Innovation District](#)



Founded in 2019, the Oklahoma City Innovation District is a 501(c)(3) organization focused on creating an ecosystem of collaboration, innovation, and economic growth in Northeast Oklahoma City. Aerospace is one of the innovation district's target industries, as the city is located near the Tinker Air Force Base and offers access to the University of Oklahoma's Aerospace & Defense Innovation Institute, the Oklahoma Aerospace Institution for Research and Education, and Oklahoma State University's Unmanned Systems Research Institute. To support the growth of the aerospace industry, the innovation district created an interactive map of local aerospace industry assets, which can be found on their website.

S5: Build and market infrastructure that catalyzes innovation and supports sector growth (2/3)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
S5.3	Pursue public-private partnerships to develop space testing facilities	Challenge: There is a growing cluster of commercial space businesses and employment in King County and the broader Puget Sound region. According to a recent study by the Puget Sound Regional Council, space-related activities generated \$4.6 billion in economic activity and supported over 13,000 jobs in the region in 2021 (doubling from 2018 values). A significant portion of this growth was driven by the expansion of satellite manufacturing and satellite-related services, including SpaceX's Starlink constellation, Amazon's Project Kuiper, and LeoStella's constellation of satellites for BlackSky. However, satellite businesses currently have to travel to testing facilities across the United States to complete satellite environmental tests or build costly facilities onsite. To continue to attract and grow the commercial space cluster within the county, local governments can support the development specialized testing infrastructure. Approach: Local governments in King County can increase the competitiveness of the commercial space cluster by helping to establish public-private partnerships with space businesses and government entities to invest in environmental testing facilities in the region (e.g., vacuum chamber, vibration testing, and electromagnetic testing). Creating environmental testing infrastructure that is accessible to both small and large businesses can help drive down production costs for local space businesses and attract new businesses and entrepreneurs to the region. To further support the growth of the commercial space industry, local governments can also work with the State of Washington to advocate for federal support for a rocket testing facility within the state.	Local Govs	Businesses, State of WA	High	High	3 years, then ongoing

Case Study: [Johns Hopkins Applied Physics Laboratory Environmental Test Facility](#)



Johns Hopkins University's Applied Physics Laboratory (APL) is a not-for-profit university affiliated research center that solves complex research, engineering, and analytical problems. Civil space is one of APL's key mission areas, and APL's work in this area includes conducting research and space exploration; developing and applying space science, engineering, and technology; and producing spacecraft, instruments, and subsystems. APL's civil space facilities include an Environmental Test Facility (ETF) that hosts a range of equipment to prepare flight hardware for the extreme conditions of launch and outer space. The ETF's laboratories, instrumentation, and data-acquisition equipment enables thorough thermal vacuum, static-dynamic and electromagnetic interference and compatibility environmental testing of flight hardware at all levels of assembly. It offers a variety of capabilities including vibration, thermal vacuum, and electromagnetic effects.

S5: Build and market infrastructure that catalyzes innovation and supports sector growth (3/3)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
S5.4	Explore the creation of an Aerospace Sustainability Research & Development Center	Challenge: Snohomish County recently announced a partnership between the County and Washington State University to establish an applied Research & Development Center at Paine Field Airport focused on Sustainable Aviation Fuels (SAF). The Center aims to develop new technologies to reduce the dependence on carbon-based fuels and will include a SAF sample 'bank' and a combustion test facility. The Washington State Legislature has made a significant investment in the Center, allocating \$6.5 million in funding in the State's 2023-2025 Transportation Budget. To further advance the region's leadership in sustainability and aerospace, the KCAA can lead the exploration of a complementary investment in sustainability research and development. Further investment in sustainability research in the region would help increase businesses' access to the latest sustainability research and technologies and train the next generation of aerospace sustainability talent. Approach: The KCAA can work with Snohomish County, Washington State University, and local aerospace businesses to explore the creation of a research and development center in King County that would complement and enhance the capabilities of the Center at Paine Field Airport. Focus areas could include lightweight materials, aerodynamic design, recycling and waste reduction, and sustainable operations. To kickstart center development, King County and its partners can set aside an initial investment to explore and validate the focus area for the center and create a business plan. This business plan can then be used to make the case for public and private investment in the center.	KCAA	Local Govs, Washington State University, Businesses	Medium	High	1 year, then ongoing
S5.5	Continue to improve the regional transportation and logistics network	Challenge: Industry partners expressed that challenges related to the regional transportation and logistics network can create supply chain delays and limit their ability to attract workers. For example, aerospace manufacturing workers who work late shifts could benefit from access to 24/7 transit service. Additionally, according to the INRIX 2022 Global Traffic Scorecard, Seattle area drivers experienced 46 hours of delay per driver due to traffic, translating to freight delays and increased fuel costs. Approach: In alignment with its Mobility Strategy, King County can conduct a study to understand the travel patterns of manufacturing and other industrial workers and identify needs for transportation improvements. The study could help inform transportation subsidies for employers and/or transit route selection. More generally, local governments can continue to invest in building an innovative, efficient, and sustainable transportation logistics network that supports the aerospace sector. This could include improvements to logistics hubs, highways, transit improvements, and other systems needed to move materials and products efficiently through the supply chain (e.g., electric aircraft infrastructure at airports).	Local Govs	KCAA	High	High	1.5 years, then ongoing

SC1: Attract businesses that align with regional competitive advantages and sector trends (1/3)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
SC1.1	Attract businesses in high-tech, complex manufacturing	Challenge: King County's core aerospace sector industries (i.e., aircraft manufacturing and guided missile and space vehicle manufacturing) currently purchase over 80% of inputs from suppliers located outside of the county. Therefore, there is a large economic opportunity to attract businesses that fill supply chain gaps and increase spending on local suppliers. A significant portion of those inputs purchased out of the county are produced through high-tech, complex manufacturing. This type of manufacturing represents a strong business attraction opportunity for the county, as the region's engineering workforce and existing networks of manufacturers create a competitive advantage and a compelling value proposition for new businesses. Complex manufacturing also requires a high degree of experience and skill, making it difficult to outsource. Approach: In order to grow the local aerospace sector, the KCAA can work with GSP to attract businesses in high-tech, complex manufacturing. Potential targets for attraction within high-tech, complex manufacturing include businesses that 1) produce a product that is commonly purchased from suppliers outside of the county and 2) utilize advanced manufacturing technologies and processes, such as additive manufacturing, robotics, and composite materials and machining. Inputs commonly purchased from suppliers outside of the county include semiconductor and related devices; wiring devices; search, detection, and navigation instruments; propulsion units and parts for space vehicles and guides missiles; and broadcast and wireless communications equipment. Additional information on sector supply chain gaps is included Appendix A: Current State Assessment. The KCAA can also work with local governments and local business attraction organizations to develop specific business attraction targets within high-tech, complex manufacturing for cities and regions within King County. The targets can capitalize on hyperlocal strengths and growth trends, such as the growth of guided missile and space vehicle manufacturing in South King County; semiconductor and related device manufacturing in the Seattle area; and propulsion units and parts for space vehicles and guided missiles, as well as broadcast and wireless communications equipment manufacturing in East King County. To attract businesses in high-tech, complex manufacturing, KCAA can work with GSP and local governments to conduct targeted outreach to businesses and entrepreneurs, build relationships with industry leaders, develop and disseminate promotional materials, connect businesses to properties made available through the KCAA's industrial lands efforts (see S2), and represent the region at national and international trade shows (e.g., International Manufacturing Technology Show).	KCAA	GSP, Local Govs	High	Medium	6 months, then ongoing

SC1: Attract businesses that align with regional competitive advantages and sector trends (2/3)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
SC1.2	Build aerospace sector expertise within local economic development offices and organizations	Challenge: Economic development offices and organizations are best positioned to attract aerospace businesses when they have an in-depth understanding of sector businesses' needs and priorities. This allows them to better communicate the region's value proposition and create compelling, relevant incentive packages. Approach: Local governments and business development organizations can improve the efficiency and effectiveness of business attraction efforts by increasing their aerospace sector acumen. This can include hiring individuals with experience working in the aerospace sector and/or meeting regularly with sector businesses to understand their priorities. The KCAA can also offer briefings and trainings for local government employees on sector businesses, needs, and trends.	Local Govs	KCAA, GSP	Medium	Low	3 months, then ongoing
SC1.3	Work with regional business attraction organizations to align on targets and initiatives	Challenge: In order to grow the local aerospace sector, King County needs to be marketed nationally and internationally as a competitive destination for aerospace businesses. While there are many business attraction efforts being undertaken by local governments and business attraction organizations, targets and initiatives are not always aligned across organizations. Approach: The KCAA can partner with business attraction organizations such as Greater Seattle Partners (GSP) to identify targets and strategies for aerospace business expansion and attraction efforts. GSP has a rich understanding of current business expansion and attraction efforts, which can be paired with the KCAA's visibility into the regional aerospace sector. The KCAA can bring business growth and attraction targets to GSP based on ongoing feedback from members and provide information on the aerospace sector, assets, resources, and success stories to support GSP's business attraction initiatives.	GSP	KCAA	Medium	Low	3 months, then ongoing
SC1.4	Design and implement a digital media marketing campaign	Challenge: King County is known for its thriving aerospace sector, with major players such as Boeing and Blue Origin calling the county home. However, with increasing competition from other regions, there is a need to communicate the county's unique advantages to attract new businesses to the area. Approach: The KCAA can use digital media marketing to increase awareness of the county's value proposition to aerospace businesses. The campaign can leverage social media platforms, sector-specific forums, and digital advertising to reach businesses and highlight the unique advantages of locating in King County. The content of the marketing campaign should be tailored to the digital channels being used, such as Google Ads, LinkedIn Ads, and Facebook Ads. The success of the campaign can be measured through metrics such as website traffic, engagement rates, and lead generation.	KCAA	Businesses, Industry Alliances	Medium	Medium	3 months, then ongoing

SC1: Attract businesses that align with regional competitive advantages and sector trends (3/3)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
SC1.5	Create local business incentive programs for new and expanding aerospace businesses	Challenge: Cities in King County compete with municipalities in other regions and states to attract new and expanding aerospace businesses. Approach: Local governments can increase their attractiveness to aerospace businesses and grow local employment and capital investment by offering targeted business incentives for new and expanding small and mid-size aerospace businesses. Incentives can include reduced business and occupation (B&O) tax rates, exemptions, credits, and other non-financial incentives for aerospace businesses that create new jobs and/or make new capital investments. The incentive programs should incorporate equity considerations, such as requiring that new jobs pay family wages and offering increased incentives for businesses locating in low-to-moderate income areas.	Local Govs	KCAA	Medium	High	1 year, then ongoing



Case Study: [Florida’s Space Transportation Incentives](#)

Florida has some of the most developed space transportation infrastructure in the nation. Notably, Florida provides tax exemptions for various aspects of the space flight industry. Specifically, businesses involved in the manufacturing, processing, assembly, and administration of space facilities, space propulsion systems, space vehicles, satellites, and stations are exempt from the state's 6% sales tax on real estate rents. This exemption also covers launch facilities, flight operations, ground control, and ground support related to space flight. Furthermore, there is a 25% sales tax exemption on machinery and equipment used for space technology products and research. In addition to this, there is a 100% tax exemption on rockets, satellites, payloads, space-related components, and rocket and satellite fuel.

SC2: Grow existing businesses and build the resiliency and performance of the supply chain (1/4)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
SC2.1	Support manufacturing process improvement research and transfer	Challenge: Industry partners reported that while there are existing initiatives focused on developing and disseminating new aerospace technologies, there is a lack of resources dedicated to creating and transferring new manufacturing processes. Innovations in process improvement could allow local aerospace businesses to improve turnaround times, reduce waste levels and downtime, enhance design and quality, and widen their product range. Approach: The Joint Center for Aerospace Technology Innovation (JCATI) can support the development and transfer of innovations in aerospace manufacturing processes by expanding their scope to include process improvement. JCATI currently provides funding awards that pay for industry access to Washington's public university engineering expertise to help solve technology pain points. With support from the KCAA and industry partners, JCATI can expand its focus to include improving manufacturing productivity, with a focus on helping small and mid-size aerospace businesses adopt new processes.	JCATI	KCAA, Businesses	High	Medium	2 years, then ongoing
SC2.2	Increase regional participation in Washington's Innovation Cluster Accelerator program	Challenge: The State of Washington's Innovation Cluster Accelerator program currently supports nine industry-led innovation clusters, including several aerospace and aerospace-related clusters (Advanced Technology cluster, Hydrogen and Renewable Generated E-Fuels cluster, Sustainable Aerospace Technologies and Energies cluster, and Pacific Northwest Aerospace cluster). The program helps businesses drive innovation, overcome barriers, access new market opportunities, and attract talent and capital; however, not all aerospace businesses in the region are aware of cluster activities and resources. Approach: The KCAA can help expand participation in the Innovation Cluster Accelerator program by 1) encouraging local businesses to participate in existing cluster activities and 2) coordinating efforts to form one or more new clusters that reflect regional strengths (e.g., new space), as the state expands the program to include new clusters over the coming decade.	KCAA	King County, Industry Alliances, Businesses, WA Dept. of Commerce	Medium	Medium	6 months, then ongoing

Case Study: [European Regional Development Fund \(ERDF\)'s Aerospace Unlocking Potential \(Aerospace UP\)](#)



Aerospace UP is a £20M three-year project that aims to support the aerospace supply chain in the Midlands region of the United Kingdom by helping to unlock its innovation potential. The project is being delivered by the University of Nottingham and the Midlands Aerospace Alliance. Tailored support provided through the program can include access to experts, events and workshops, student and graduate services (e.g., industrial placements), support packages for aerospace businesses, and grants of £1,000 to £100,000 for research projects to develop innovative technologies or products and services.

SC2: Grow existing businesses and build the resiliency and performance of the supply chain (2/4)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
SC2.3	Provide tax credits for small businesses investing in R&D and innovation	Challenge: Process and product innovation are critical to maintaining a strong and competitive aerospace supply chain, but the demands of day-to-day operations can prevent small businesses from investing in innovation. Approach: Local municipalities can incentivize research and development by extending B&O tax credits to small aerospace businesses investing in innovation. These credits can be granted to aerospace businesses performing research, design, and engineering activities to develop and commercialize innovative processes and products. Qualifying investments can include the following: access to scientific, design, and engineering expertise (e.g., purchasing hours at the Pacific Northwest National Laboratory to work directly with researchers and gain access to technical equipment); support with commercialization of a new idea or service; and/or technical assessments of existing processes to gauge where improvements and innovation are needed.	Local Govs	KCAA	Medium	High	1 year, then ongoing
SC2.4	Lead coordinated effort to help small businesses make technology updates	Challenge: King County has been home to major aerospace OEMs and a large network of suppliers for over 100 years. Some supply chain businesses have been in operation for decades and made legacy investments in technologies that are now out-of-date. Small and mid-size businesses in particular can face financial barriers to updating legacy technologies. Approach: To ensure King County's aerospace sector stays on the cutting-edge of technological advancements, the KCAA can help aerospace businesses access capital for technology upgrades. This can be achieved by exploring ways to provide direct funding and financing (e.g., grants or low-cost loans) and/or by connecting businesses to loan opportunities through the US Small Business Administration (SBA). For example, a small and expanding aerospace business may qualify for an SBA microloan to update technology.	KCAA	Businesses, Local Govs	Medium	Medium	6 months, then ongoing



Case Study: [Rhode Island Commerce Corporation's Innovation Voucher Program](#)

The Rhode Island Commerce Corporation's Innovation Voucher Program provides grants of up to \$50,000 to companies with 500 employees or less to fund internal R&D projects. Grants can be used to: 1) support commercialization of a new product, process, or service, 2) access scientific, engineering, and design expertise, and/or 3) develop and scale innovative ideas.

SC2: Grow existing businesses and build the resiliency and performance of the supply chain (3/4)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
SC2.5	Provide funding to support supplier diversification and market penetration	Challenge: Aerospace suppliers that predominately serve one industry and/or business are exposed to risks associated with disruptive trends, fluctuations in consumer preferences, and national economic events. In order to mitigate these risks, suppliers can diversify their customer portfolio by serving a wider range of industries and businesses. Approach: The KCAA can partner with Seattle Metro Chamber and other ecosystem partners to help small and mid-size aerospace supply chain companies overcome both financial and knowledge barriers to diversification and market penetration. To address financial challenges, the KCAA can create a Certification Grant Program that draws from state and federal funding to help aerospace suppliers obtain the certifications needed to serve new industries (e.g., maritime, automotive, defense, and medical devices). These grants, ranging from \$10,000 to \$15,000, can support businesses through the process of obtaining credentials such as the ASD100D certification, which allows businesses to meet federal requirements set by DoD, NASA, and FAA, as well as the ISO 13485 certification, which enables businesses to produce medical devices. To address knowledge barriers, the KCAA can also work with the Seattle Metro Chamber to create a Cross-Sector Innovation Program to help small and mid-size businesses apply their processes and products to new markets. This can include helping aerospace businesses gain the information needed to serve adjacent industries or supporting businesses from other industry sectors in transferring their products and services to the aerospace market. This program would provide businesses the necessary funding and industry connections to address business needs in new markets, including R&D funding, subject matter expertise, and opportunities to connect with potential customers in new markets.	Seattle Metro Chamber	KCAA, Local Govs	Medium	High	1 year, then ongoing

Case Study: [West Midlands Innovation Programme PIVOT Pilot](#)



The Innovation Alliance for the Westmidlands and the Westmidlands Combined Authority launched the PIVOT pilot as a part of the Westmidlands Innovation Programme. The PIVOT pilot aims to accelerate cross-sector innovation in regional supply chains by helping companies take technologies and innovations from one industry and developing them so they can address business needs in different markets. PIVOT provides selected businesses R&D funding, expertise, customer advice, and project support.

SC2: Grow existing businesses and build the resiliency and performance of the supply chain (4/4)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
SC2.6	Support inclusion-focused business accelerators	Challenge: In the Greater Seattle area, there is a race-based disparity in business ownership. Though people of color represent 35% of the region’s workforce and own 24% of businesses overall, they own only 8% of high-growth firms. Approach: The KCAA can encourage aerospace entrepreneurship and reduce disparities in business ownership by connecting entrepreneurs of color with business accelerators that have a history of supporting BIPOC and women-owned businesses in scaling up their operations. Inclusion-focused business accelerators in the area include Endeavor NW, PortGen Accelerator, and Forward Together’s Minority Business Accelerator.	KCAA	Business Accelerators	Medium	Low	3 months, then ongoing

Case Study: [New York City Economic Development Corporation \(NYCEDC\)’s Futureworks NYC](#)



A key component of NYC’s Industrial Action Plan to help emerging and existing manufacturers adopt advanced technologies and increase local production, Futureworks NYC aims to inspire and equip New Yorkers to build a 21st-century production economy with a network of partnerships, services, educational programming, equipment, and spaces. The initiative is an \$8 million investment that will create over 2,000 well-paying jobs and provide key support services for businesses to start, grow, and thrive.

W1: Prepare residents for high-quality, in-demand aerospace occupations (1/2)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
W1.1	Advocate for the development of specialized degree programs	Challenge: Analysis conducted in the Air and Space 2030 Current State Assessment (see Appendix A) indicated that there is an opportunity for King County to strengthen its aerospace educational infrastructure through the development of specialized degree programs (e.g., Bachelor's in Manufacturing Engineering and Bachelor's in Propulsion, Stability, and Control). Approach: The KCAA can work with local educational institutions and aerospace businesses to explore opportunities to create new aerospace-focused specialized degree programs. New degree offerings can capitalize on and complement the proposed space testing facilities and Aerospace Sustainability Research & Development Center, identified in S5.3 and S5.4, respectively.	KCAA	Educational Institutions, Businesses	High	High	6 months, then ongoing
W1.2	Establish a flexible aerospace workforce fund	Challenge: Aerospace businesses and educational and training institutions in the region reported a variety of challenges related to workforce attraction, development, and retention. For example, employers noted gaps in workforce readiness (particularly in specialized skills), and education and training providers indicated that high costs of housing and childcare create barriers to pursuing aerospace education and employment. Approach: The KCAA can pursue federal funds and/or public-private partnerships to create a flexible aerospace workforce fund that can be used to fill gaps in existing funding sources and address a range of aerospace workforce challenges. Businesses, training providers, and non-profits can apply for grants to implement initiatives that support aerospace workforce development and retention. Uses of the fund could include “last mile” training for employers, technology upgrades for training providers, and capacity-building support for community-based organizations that help workers cover basic needs like housing and food.	KCAA	WDC, Local Govs, businesses	Medium	High	1 year, then ongoing

Case Study: [Scotland's Flexible Workforce Development Fund](#)



Launched in 2017, the Scottish government developed a fund that provides small to mid-size enterprises in Scotland up to £15,000 to access workforce training opportunities to address skills gaps and/or training needs in their existing workforce. Eligible employers can use the funds to create training programs that are delivered in partnership with local colleges, the Open University in Scotland, or an independent training provider. Since program launch, the number of employees supported has increased from around 9,000 (2017/18) to around 27,000 (2020/21). In the same time period, the Fund budget doubled from £10 million (2017/18) to £20 million (2020/21).

W1: Prepare residents for high-quality, in-demand aerospace occupations (2/2)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
W1.3	Provide apprenticeship consulting services to local aerospace businesses	Challenge: Aerospace businesses reported challenges filling skilled trade roles (e.g., machinists). Existing and new apprenticeship programs can help employers fill job openings and train the next generation of skilled tradespeople. Approach: The KCAA can partner with the WDC and AJAC to provide apprenticeship consulting services that assist aerospace businesses in identifying existing apprenticeship programs for occupations of interest and/or developing new registered apprenticeship training programs, where needed.	WDC	AJAC, KCAA	Medium	Medium	6 months, then ongoing
W1.4	Incorporate aerospace in the implementation of King County's Green Jobs Strategy	Challenge: The King County Green Jobs Strategy – completed in January 2023 – aims to connect frontline communities to living wage opportunities to build a diverse and skilled workforce. The strategy includes a variety of goals and action items that are relevant to the aerospace sector (e.g., Invest in local high-demand industry sectors, Facilitate Green Jobs Pipeline for frontline communities). As sustainability is a major trend in the aerospace sector, there is an opportunity to build the aerospace pipeline and increase the reach of the Green Jobs Strategy by incorporating aerospace into its implementation. Approach: King County can review the Green Jobs Strategy to identify concrete ways that aerospace-related opportunities and content can be incorporated into their actions. For example, the NextGen Climate Internship Program can assign an intern a project related to sustainable aviation policy.	King County	KCAA	Low	Low	3 months, then ongoing

Case Study: [California's Apprenticeship Initiative](#)

CALIFORNIA
APPRENTICESHIP
INITIATIVE

Supported by the California Community College's Chancellor's Office and the Division of Apprenticeship Standards, the California Apprenticeship Initiative (CAI) is a grant opportunity with \$70M in start-up funding that helps establish pre-apprenticeship and apprenticeship programs in high-growth industries, including aerospace and advanced manufacturing. The CAI supports pre-apprenticeship programs that specifically target underserved populations, including women, persons of color, foster youth, parolees, and veterans. The program aims to help the state grow the number of apprenticeships in California from 93,365 in 2020 to 500,000 in 2029.

W2: Remove barriers to aerospace careers and promote career advancement (1/2)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
W2.1	Address systemic barriers to aerospace education and employment	Challenge: BIPOC and low-income individuals in the region face systemic barriers to aerospace education and employment, including high housing costs and lack of affordable, accessible childcare options. For example, aerospace businesses reported that some parents are unable to fill aerospace manufacturing roles because employees cannot find childcare during late shifts. Approach: The KCAA can work with local governments to ensure that efforts aiming to reduce systemic barriers to workforce participation and wealth building, such as affordable housing and childcare initiatives, incorporate the perspective of aerospace businesses and workers and address their challenges and needs. For example, the KCAA and local governments can work with community members and aerospace businesses to identify specific pain points, remove barriers that fall within the purview of local government (e.g., updating zoning to allow for additional childcare facilities), and make connections across the ecosystem (e.g., connecting businesses to childcare resources such as the WA Employer-Supported Child Care Technical Assistance Program).	Local Govs	KCAA, Non-Profits, Businesses, Educational Institutions	High	High	1 year, then ongoing
W2.2	Compile and consolidate aerospace resources for individuals from marginalized communities	Challenge: There are a variety of available resources that support individuals from marginalized communities in entering, re-entering, or transitioning within the workforce. However, it can be challenging for individuals to identify relevant resources, and information may be inaccessible due to identity-affiliated barriers (e.g., language barriers, technology literacy). Approach: The WDC can work with the KCAA to compile, consolidate, and monitor impacts of existing aerospace-related resources for individuals from marginalized communities. Examples of resources may include (but are not limited to) programs, scholarships, and other financial incentives tailored to individuals who are immigrants, refugees, formerly incarcerated, and/or neurodivergent.	WDC	King County	Medium	Medium	3 months, then ongoing

Case Study: [Singapore's SkillsFuture Movement](#)



Launched in 2016, the SkillsFuture Movement provides workers with the skills needed to succeed in a rapidly changing job market, regardless of their starting point. The program provides funding for individuals to take courses and training programs that are relevant to their current or desired jobs. Resources are available for individuals in their schooling years, early-career, mid-career, or “silver years.” For example, the SkillsFuture Career Transition Programme (SCTP) helps mid-career individuals reskill and upskill in order to pivot to new sectors or roles. SkillsFuture also offers short, industry-relevant trainings to help Singaporeans build in-demand skills in the four growth areas: the care economy, the digital economy, the green economy, and Industry 4.0.

W2: Remove barriers to aerospace careers and promote career advancement (2/2)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
W2.3	Launch KCAA work-study role	Challenge: Internship experience is critical in accessing competitive entry-level roles in the aerospace sector. However, many students cannot forgo income in order to pursue unpaid internship opportunities. Approach: The KCAA can create a college-level work-study position within the alliance to help students gain valuable sector experience and incorporate a youth perspective on KCAA initiatives. Work-study can be completed in-person or remotely, and a portion of the student's gross wage can be reimbursed through state and federal funds. To increase access to the aerospace sector, the work-study role can prioritize candidates from historically underrepresented populations.	KCAA	State and Federal Govs	Medium	Medium	6 months, then ongoing
W2.4	Expand aerospace youth employment and enrichment opportunities	Challenge: Lack of exposure to aerospace as a child and young adult can limit individuals' awareness of and interest in potential aerospace career paths and lead to misconceptions about the sector. Approach: The KCAA can grow and diversify the aerospace sector pipeline by working with local businesses, non-profits, and educational institutions to expand existing and create new aerospace-related youth employment and enrichment activities (e.g., summer internships, aerospace camps and clubs, and school programming). The KCAA can 1) identify and help market existing youth opportunities, 2) hold sessions for interested businesses on how to start youth employment and enrichment programs and connect them with interested schools and youth organizations, and 3) coordinate with businesses to gather data on the impact of youth initiatives. Funding for the development of new opportunities can be funded through partnerships with businesses and/or through public grants (e.g., NASA Space Grant).	KCAA	Businesses, Educational Institutions, Non-Profits, Local Govs	Medium	Medium	9 months, then ongoing

Case Study: [The American Institute of Aeronautics and Astronautics' Students to Launch Initiative](#)



The American Institute of Aeronautics and Astronautics (AIAA) is the world's largest technical society dedicated to the global aerospace profession with ~30,000 members from 91 countries. In addition to the various resources for professionals, the AIAA has a portfolio of youth initiatives to increase interest in and exposure to aerospace. For example, the Students to Launch initiative hosts NASA mission-inspired activities in science centers, museums, and after-school programs across the county. Students who complete the activities are eligible for the opportunity to travel to NASA's Kennedy Space Center to witness a space launch, learn about the aerospace industry, and meet aerospace professionals.

W3: Increase awareness of sector opportunities and entry points (1/2)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
W3.1	Establish a grant for K-12 teachers who incorporate aerospace into their curriculum	Challenge: Exposure to aerospace education in grades K-12 can help increase awareness of and interest in aerospace careers. However, schools face challenges in hiring dedicated aerospace educators, as candidates can often command higher salaries in industry roles. Approach: King County and KCAA can increase exposure to aerospace education by partnering with industry to develop a grant of up to \$500 for K-12 teachers of all disciplines to cover costs related to incorporating aerospace content into their curriculum (e.g., art materials for model rockets and airplanes, airport and air museum field trips, and interactive history of aerospace lessons). The grant can help address the lack of dedicated aerospace teachers while also demonstrating the versatility of aerospace by incorporating sector information into a variety of subject areas.	King County	State Board of Education, K-12 Institutions	High	High	6 months, then ongoing
W3.2	Encourage the incorporation of aerospace in state and local STEM and STEAM initiatives	Challenge: Though many aerospace careers require STEM skills, aerospace jobs and opportunities can be underemphasized in national, state, and local STEM and STEAM initiatives. Approach: The KCAA can reach out to organizations leading state and local STEM and STEAM initiatives (e.g., Washington STEM) to increase integration of aerospace-related content. The KCAA can provide information on aerospace career opportunities and skill needs and advocate for more prominent inclusion of aerospace career paths in STEM and STEAM outreach, programs, and resources.	KCAA	Washington STEM, Educational Institutions, Non-Profits	Medium	Low	3 months, then ongoing
W3.3	Develop a youth-led marketing campaign	Challenge: Aerospace businesses expressed concern about the lack of interest in aerospace manufacturing careers, particularly among young people. Similarly, students reported a lack of interest in pursuing aerospace careers because of a perceived lack of prestige and a lack of awareness of the range of sector opportunities. Approach: The KCAA can task the work-study student (see W2.3) with developing, designing, and managing a marketing campaign that communicates the benefits and variety of aerospace careers. The marketing campaign can include multiple media platforms (e.g., social media, radio) and focus on reaching young people in the region. Though this action item is distinct from the digital marketing campaign in SC1.4, some content may be able to be used for both marketing efforts.	KCAA	Educational Institutions, Businesses	Medium	Medium	3 months, then ongoing



Case Study: [Virginia Department of Aviation's Teacher Grants](#)

To promote aviation education and awareness, the Virginia Department of Aviation developed a grant for Virginia K-12 teachers in any discipline to receive grants of up to \$500 to implement an aviation lesson plan for their class. To access funding, teachers complete an application that outlines how the funds will be spent, how the expenses align with the department's mission, how success will be measured, and how they will share the lesson with colleagues.

W3: Increase awareness of sector opportunities and entry points (2/2)

	Action Item	Description	Potential Lead	Potential Support	Level of Impact	Level of Effort	Est. Timeframe
W3.4	Work with aerospace businesses to increase their presence in and connections to K-12 schools	Challenge: Students indicated that listening to speakers from local aerospace businesses and participating in employer-sponsored programming helped develop their understanding of post-graduation opportunities. Furthermore, aerospace businesses expressed a desire to increase their presence in local schools to increase awareness and bolster recruiting efforts. Approach: The KCAA can facilitate connections between aerospace businesses and K-12 schools by matching businesses to school volunteering opportunities. The KCAA can reach out to aerospace businesses to solicit volunteers (e.g., via an online interest form) and match them to local K-12 schools to conduct aerospace-related programming (e.g., speaker series, mentorship, site visits).	KCAA	K- 12 Institutions, Businesses	Medium	Low	3 months, then ongoing
W3.5	Build out Aerospace Career Pathways	Challenge: Career pathways can help individuals build awareness of aerospace career options, understand ways to qualify for and enter aerospace careers, and identify relevant education and training programs. Though the WDC has already created several career pathway resources, there is an opportunity to increase the specificity and variety of career pathways for aerospace. Approach: The WDC can work with KCAA and aerospace businesses to further develop aerospace career pathways. The pathways can include potential roles, educational requirements, experience requirements, employers, entry points, wage expectations, and training and financial resources. Pathway development should include aerospace businesses to increase their resonance with the industry. The pathways can be used by job seekers to plan their careers, as well as training organizations to inform programming development. The WDC and KCAA can take a phased approach to pathway development to build momentum and buy-in, including the following actions: 1) working with local businesses to identify a short list of in-demand occupations, 2) developing and publicizing pathways for the short list of in-demand occupations, 3) monitoring pathway usage and impact, and 4) iterating on the first wave of aerospace pathways and developing new pathways for additional in-demand occupations, as needed.	KCAA	Businesses, Industry Alliances, WDC	Medium	Medium	6 months, then ongoing



Case Study: [South Carolina Aerospace's Online Aerospace Leadership Collective](#)

SC Aerospace is a collaborative effort across public, private, academic, and nonprofit sectors to advance and market South Carolina's aerospace industry cluster on the global stage. The SC Aerospace strategic plan for 2019 includes the creation of an online leadership collective platform. The platform will connect aerospace leaders with opportunities to volunteer in K-12 programs near them, provide schools a centralized resources to seek support, and increase overall aerospace awareness.

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The County can reinvigorate the KCAA to lead the implementation of the Air and Space 2030 Strategy

Mission:

Advance King County's aerospace sector as an epicenter of innovation through partner collaboration, advocacy, and strategic investments.

Proposed members:



Aerospace industry leaders



Local governments and regional governmental agencies



Educational and training providers and participants

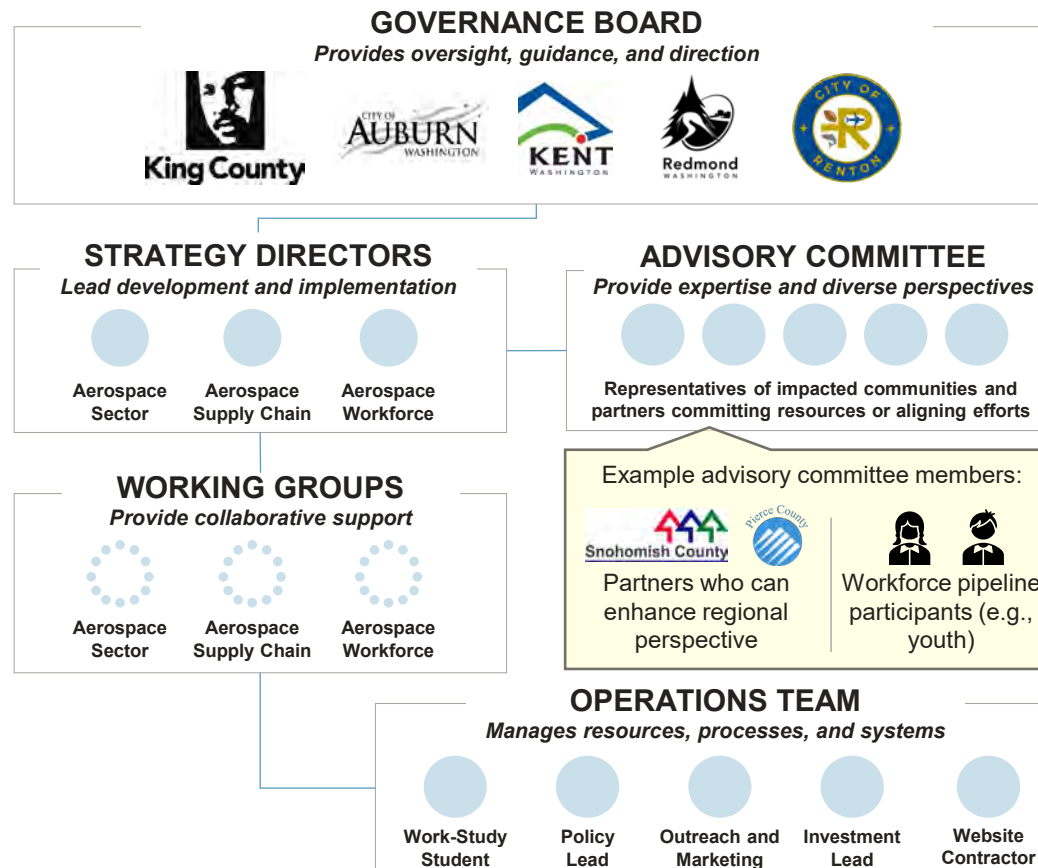


Economic development and business organizations



Capital providers

Potential governance structure:



Example responsibilities:



Establish Governance Board Charter and oversee implementation of Air & Space 2030



Develop and manage local aerospace asset inventory



Advocate for local, state, and federal policy changes



Establish platform for metric and milestone tracking and reporting



Convene partners, provide status updates, and facilitate cross-industry collaboration and networking



Pool resources and apply for funding to support industry-backed initiatives



Create web-based platform for aerospace business and worker attraction and retention resources

Milestones can be used to track progress towards the desired future state



**Aerospace
Sector**

June 2023

June 2024

June 2025

June 2026

June 2027

June 2028



**Supply
Chain**

June 2023

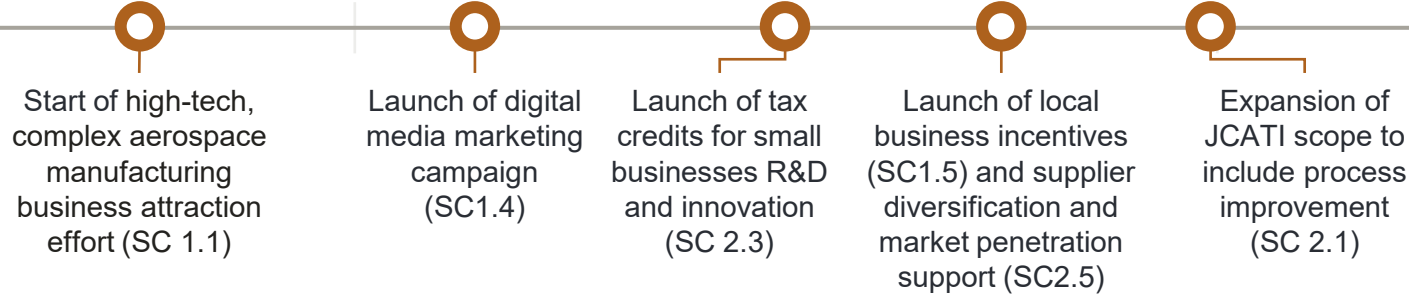
June 2024

June 2025

June 2026

June 2027

June 2028



Workforce

June 2023

June 2024

June 2025

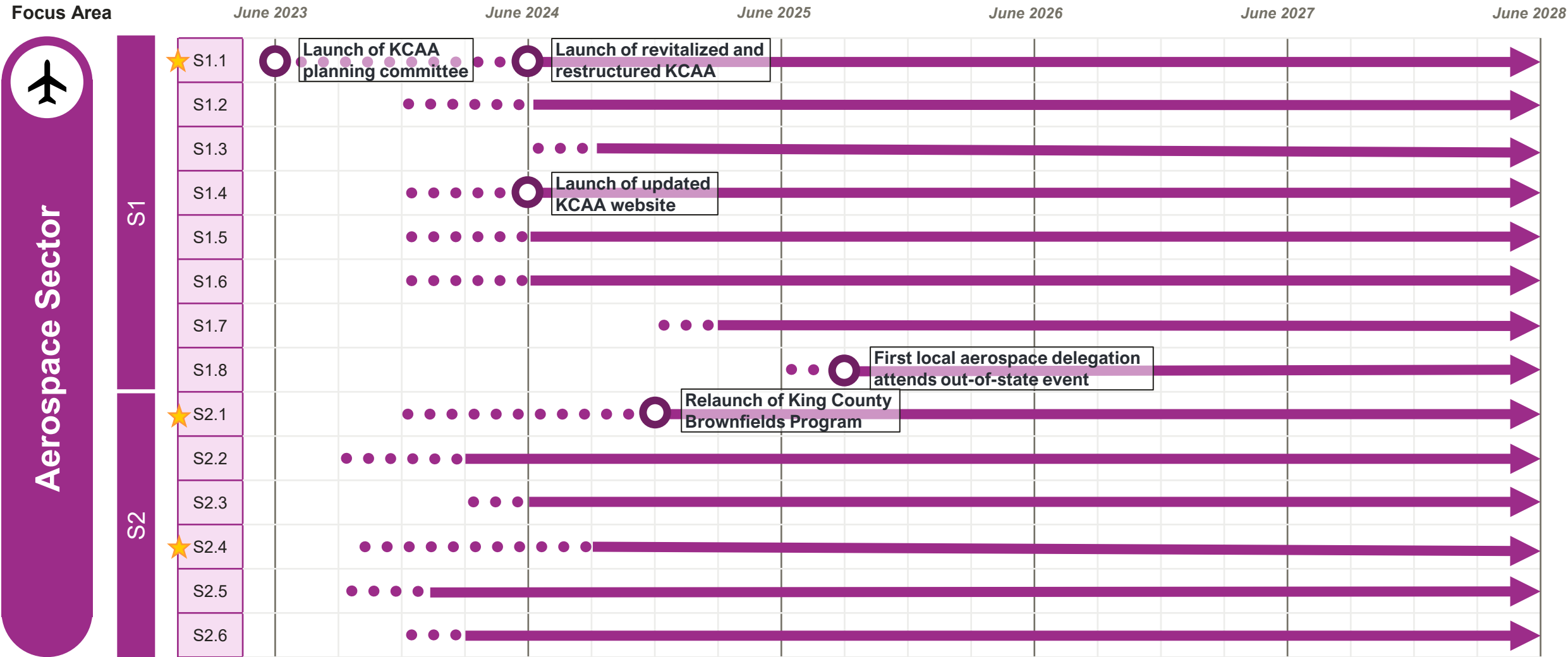
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June 2027

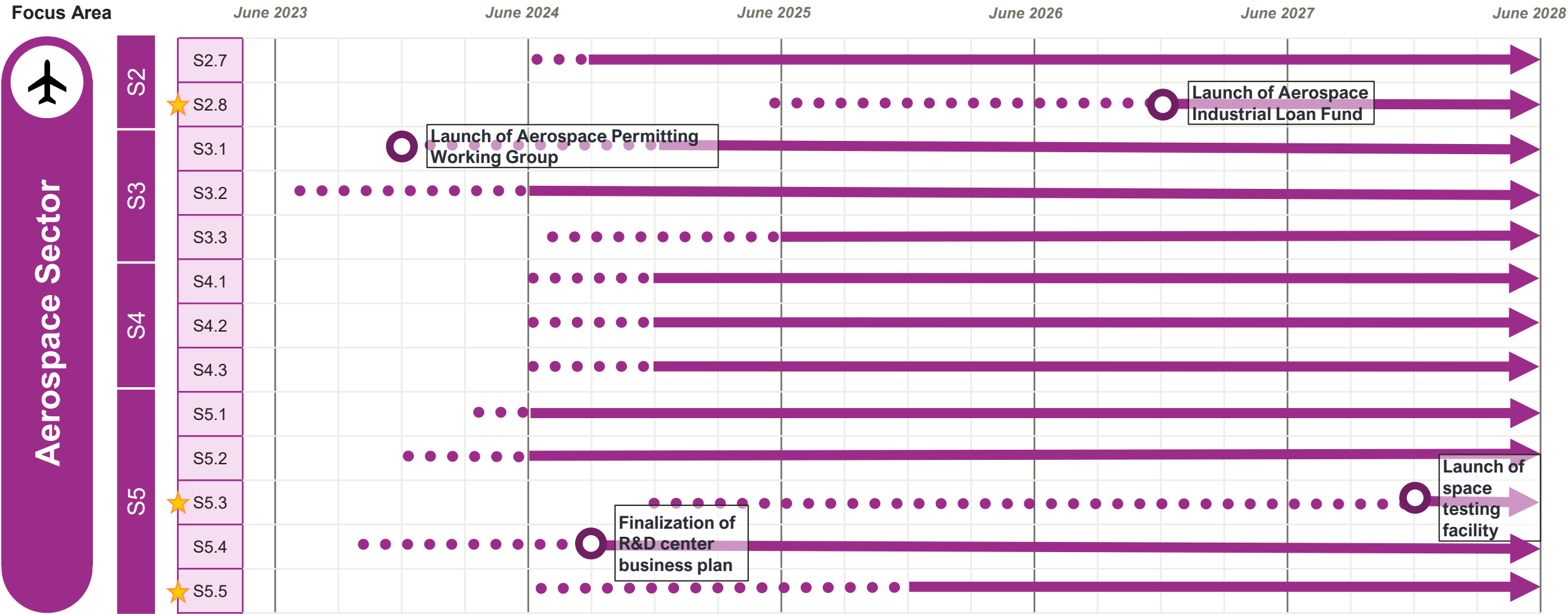
June 2028



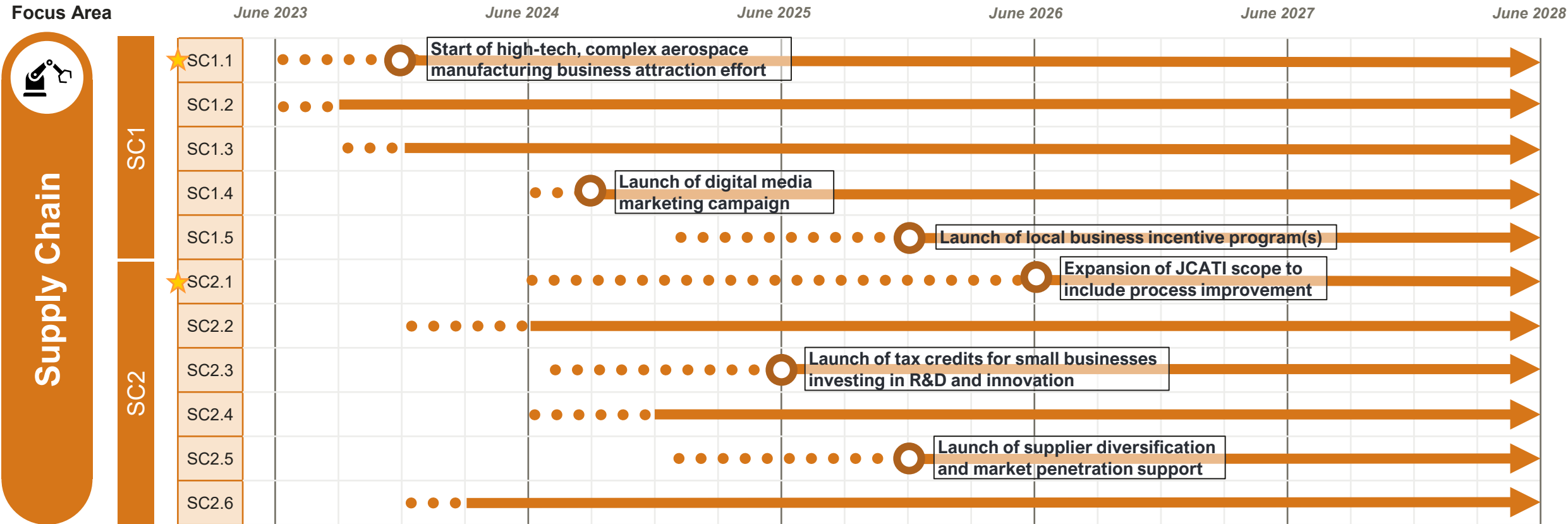
Aerospace sector implementation timeline with milestones (1/2)



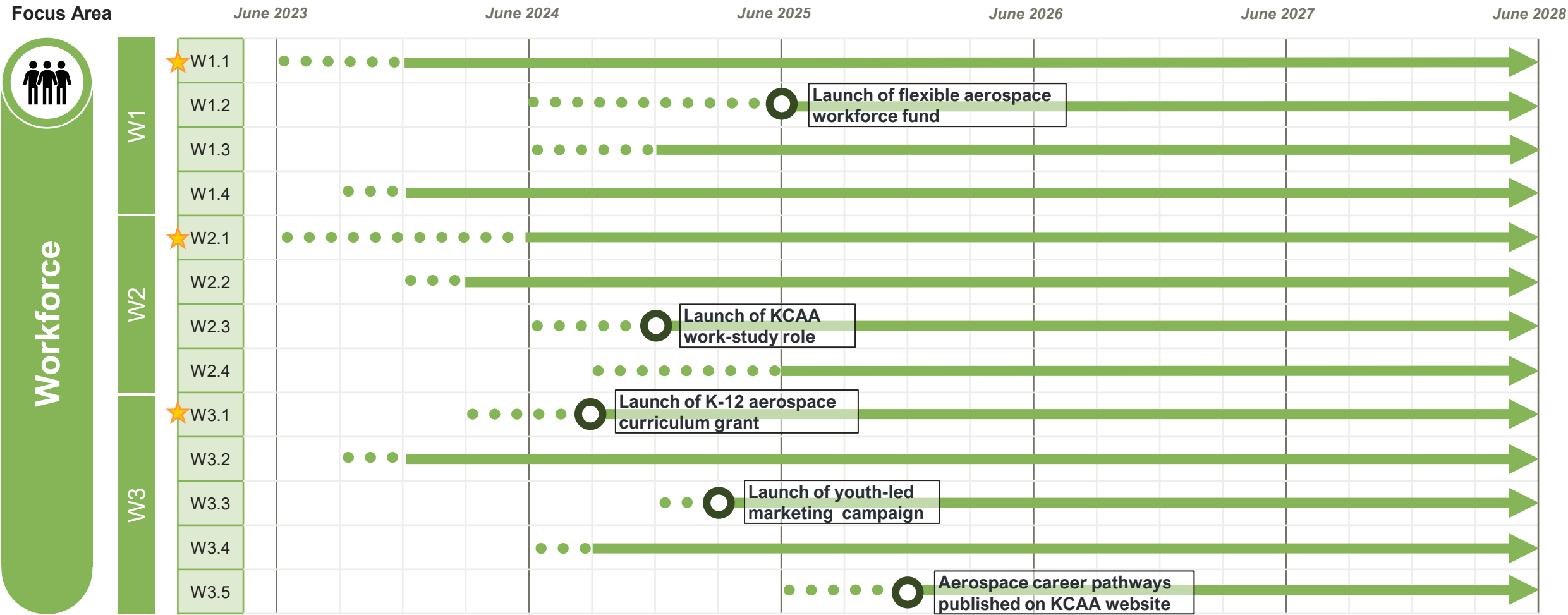
Aerospace sector implementation timeline with milestones (2/2)



Supply chain implementation timeline with milestones



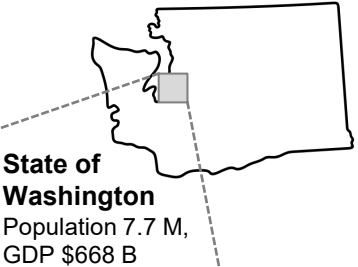
Workforce implementation timeline with milestones



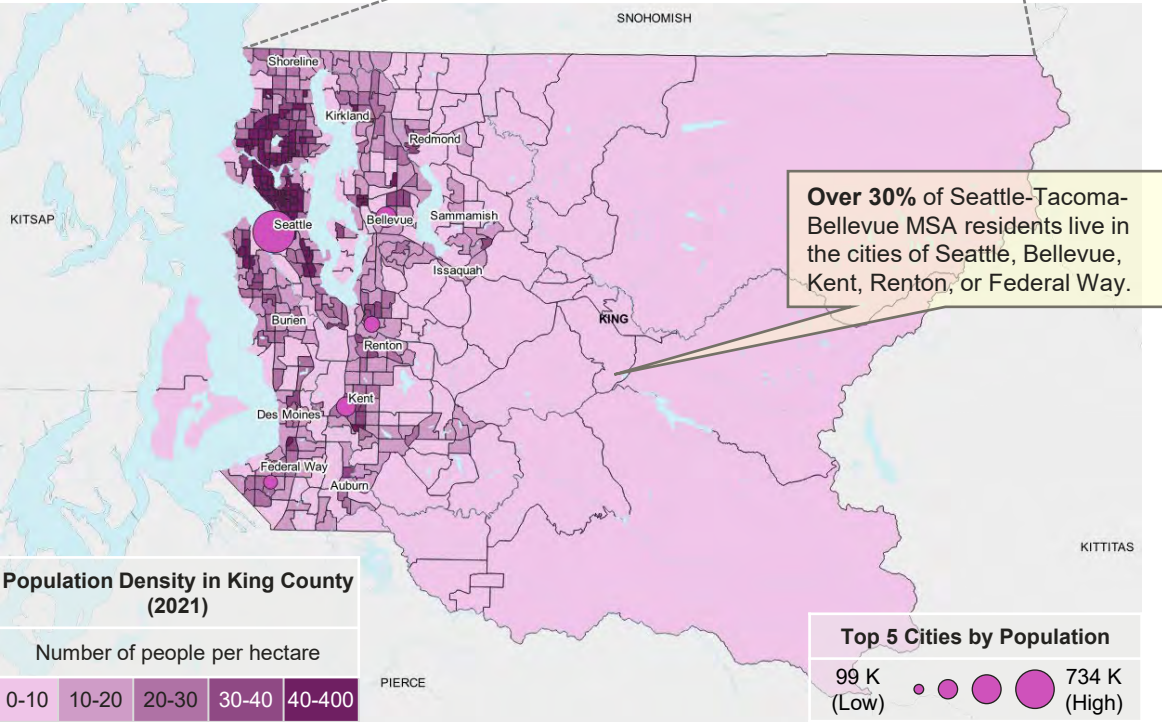
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King County, the most populous and diverse county in Washington, plays a critical role in the regional and state economy

Spanning 2,115 square miles between the Puget Sound and the Cascade Range, King County is home to 39 towns and cities, including high-density urban areas to the west, suburban neighborhoods east of Lake Washington, and rural areas to the east and southeast. King County is a global hub for aerospace, but this strength has been tested in recent years by economy-wide and industry-specific challenges. The aerospace sector has been negatively impacted by companies moving manufacturing operations out of the region and by the COVID-19 crisis, both of which caused declines in sector employment. Decline in the aerospace sector presents a threat to the county's economic durability, as sector businesses and jobs are critical to the region's economic diversity.



Key statistics: King County	
Population (2021)	2,252,305 <i>56% of the Seattle-Tacoma-Bellevue MSA</i>
GDP (2020)	\$332 B <i>78% of the Seattle-Tacoma-Bellevue MSA</i>
Median household income (2021)	\$110,586 <i>Compared to \$101,721 in the Seattle-Tacoma-Bellevue MSA</i>
Top industries (2021, by total annual wages)	Information (\$39.8 B); Trade, Transportation, and Utilities (\$34.2 B); Professional and Business Services (\$30.6 B)
Large employers* (2021)	Amazon, Costco, Microsoft, Starbucks, Paccar, Nordstrom, Boeing, the University of Washington, and local and regional government
Labor force (by place of occupation, 2021)	1,278,003 <i>4.3% unemployment rate compared to 4.8% in Seattle-Tacoma-Bellevue MSA</i>
Education (2021)	56% population 25 years and over hold bachelor's degree or higher, compared to 47% in the Seattle-Tacoma-Bellevue MSA <i>32 higher education institutions – 12 public and 20 private, or 23 four+-year, 4 two to four-year, and 5 less than two-year</i>

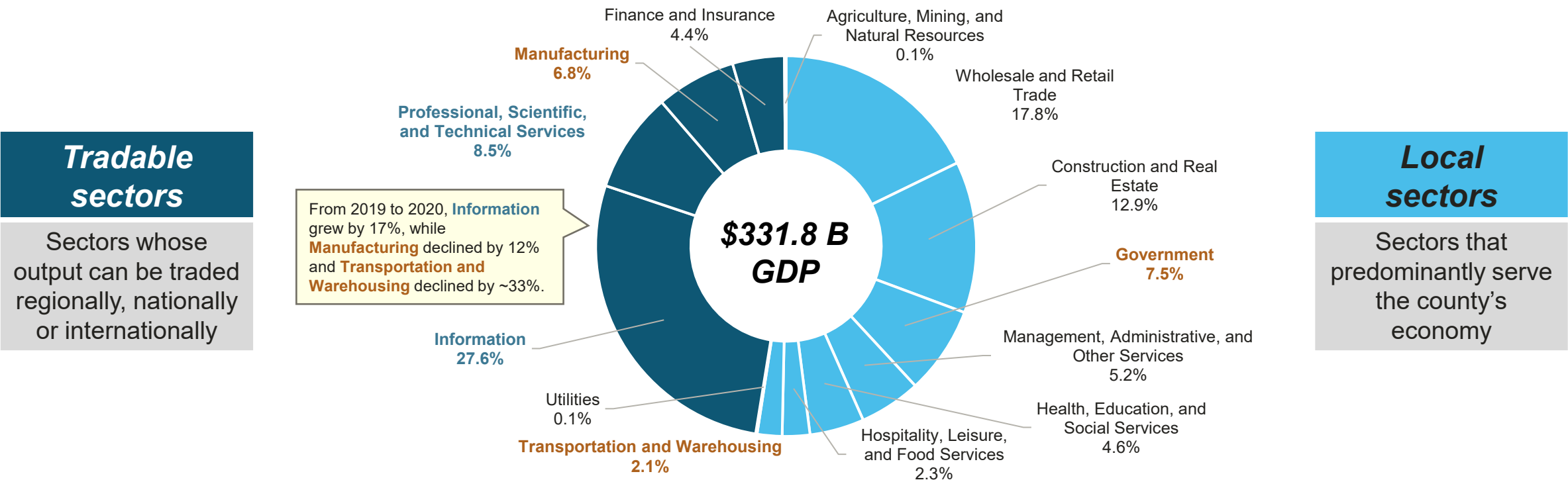


Note: The data shown in the table above is from the most recent American Community Survey (ACS) and the Bureau of Labor Statistics (BLS), unless otherwise noted. A metropolitan statistical area (MSA) is defined as a region with a dense population concentration that has a high degree of social and economic integration with the surrounding area. The Seattle-Tacoma-Bellevue MSA includes King, Snohomish, and Pierce counties and was selected as a reference point to offer a comparison to the wider region.

* Data is from King County Office of Economic and Financial Analysis.

King County’s \$332 billion economy is becoming increasingly concentrated in information and service-based sectors

Nearly 50% of King County’s GDP stems from tradable sectors. A tradable sector is one whose output can be traded regionally, nationally or internationally – i.e., it contributes to an economy by bringing revenue into a region. Tradable sectors attract investment and talent to the county and grow the regional economy. A local sector is one that primarily serves a local economy and may include, for example, healthcare providers, real estate, and government functions.



RELATIONSHIP TO THE AEROSPACE SECTOR
Throughout this section, sectors highlighted in **orange** include activities directly related to the aerospace sector (e.g., air and spacecraft manufacturing), and sectors highlighted in **blue** include indirectly-related activities (e.g., research and development and satellite telecommunications), among other economic activities.

The COVID-19 pandemic accelerated employment concentration in service-providing sectors

Both leading up to and during the pandemic, employment growth was most pronounced in service-providing industries such as Information. This growth resulted in increased industry concentration, measured by location quotient (LQ). LQ indicates the concentration of employment of a given sector in King County compared to national averages. For example, the county has an LQ of 0.75 in the Manufacturing industry, meaning that its concentration is 0.75 times that of the US average. Factors impacting the concentration of industries in the county may include available resources (e.g., skilled workforce) and access to infrastructure and finance.

Economic sectors in King County	King County						Seattle MSA			United States	
	Employment (2021)	Wages (2021)	Average annual wage per job (2021)	Employment LQ (2021)	Pre-COVID employment change (2016-19)	COVID-Impacted employment change (2019-21)	Employment (2021)	Employment LQ (2021)	COVID-Impacted employment change (2019-21)	Employment (2021)	COVID-Impacted employment change (2019-21)
 Manufacturing	88,137	\$8.7 B	\$98,281	0.75	1.1% ↑	-16.4% ↓	154,535	0.93	-15.7%	12.4 M	-3.7%
 Transportation and Warehousing	62,061	\$5.4 B	\$86,886	0.94	6.2% ↑	-5.8% ↓	91,297	0.98	0.2%	6.9 M	7.0%
 Government	42,175	\$4.1 B	\$98,169	0.60	5.6% ↑	-3.2% ↓	72,069	0.72	-1.5%	7.4 M	-1.0%
 Professional, Scientific, and Technical Services	143,435	\$21.0 B	\$146,742	1.50	10.9% ↑	8.4% ↑	168,391	1.25	7.9%	10.0 M	3.7%
 Information	135,752	\$39.8 B	\$293,352	4.78	25.9% ↑	10.3% ↑	141,045	3.53	8.2%	3.0 M	-0.8%
 Health, Education, and Social Services	272,173	\$19.0 B	\$69,776	0.84	31.4% ↑	-2.4% ↓	392,459	0.86	-1.7%	34.0 M	-2.6%
 Wholesale and Retail Trade	229,766	\$28.1 B	\$122,315	1.14	11.6% ↑	2.6% ↑	323,177	1.14	1.8%	21.1 M	-2.1%
 Management, Administrative, and Other Services	143,248	\$12.2 B	\$85,437	0.96	6.2% ↑	-6.5% ↓	198,274	0.94	-5.9%	15.7 M	-4.3%
 Hospitality, Leisure, and Food Services	106,670	\$4.1 B	\$38,778	0.77	8.0% ↑	-28.4% ↓	160,518	0.82	-23.5%	14.5 M	-14.2%
 Construction and Real Estate	104,813	\$9.1 B	\$86,860	1.11	11.8% ↑	-0.5% ↓	162,504	1.23	0.5%	9.9 M	-1.1%
 Finance and Insurance	41,776	\$6.6 B	\$158,796	0.71	2.3% ↑	-1.0% ↓	59,250	0.71	-1.3%	6.2 M	2.0%
 Agriculture, Mining, and Natural Resources	3,064	\$0.2 B	\$66,685	0.18	-2.2% ↓	0.8% ↑	6,336	0.27	5.7%	1.8 M	-9.1%
 Utilities	1,997	\$0.2 B	\$124,103	0.26	-65.0% ↓	0.2% ↑	4,158	0.38	0.5%	0.8 M	-0.9%
 Unclassified	5	\$0.0 B	\$149,991	0.00	N/A	N/A	6	0.00	N/A	0.2 M	N/A
TOTAL	1,375,072	\$158.7 B	\$115,431	-	13.0% ↑	-3.7% ↓	1,934,019	-	-3.5%	143.8 M	-2.9%

Employment is less concentrated in the county compared to national averages (LQ < 0.75)

Employment concentration in the county reflects national averages (LQ = 0.75 - 1.25)

Employment is more concentrated in the county compared to national averages (LQ = 1.26 - 1.99)

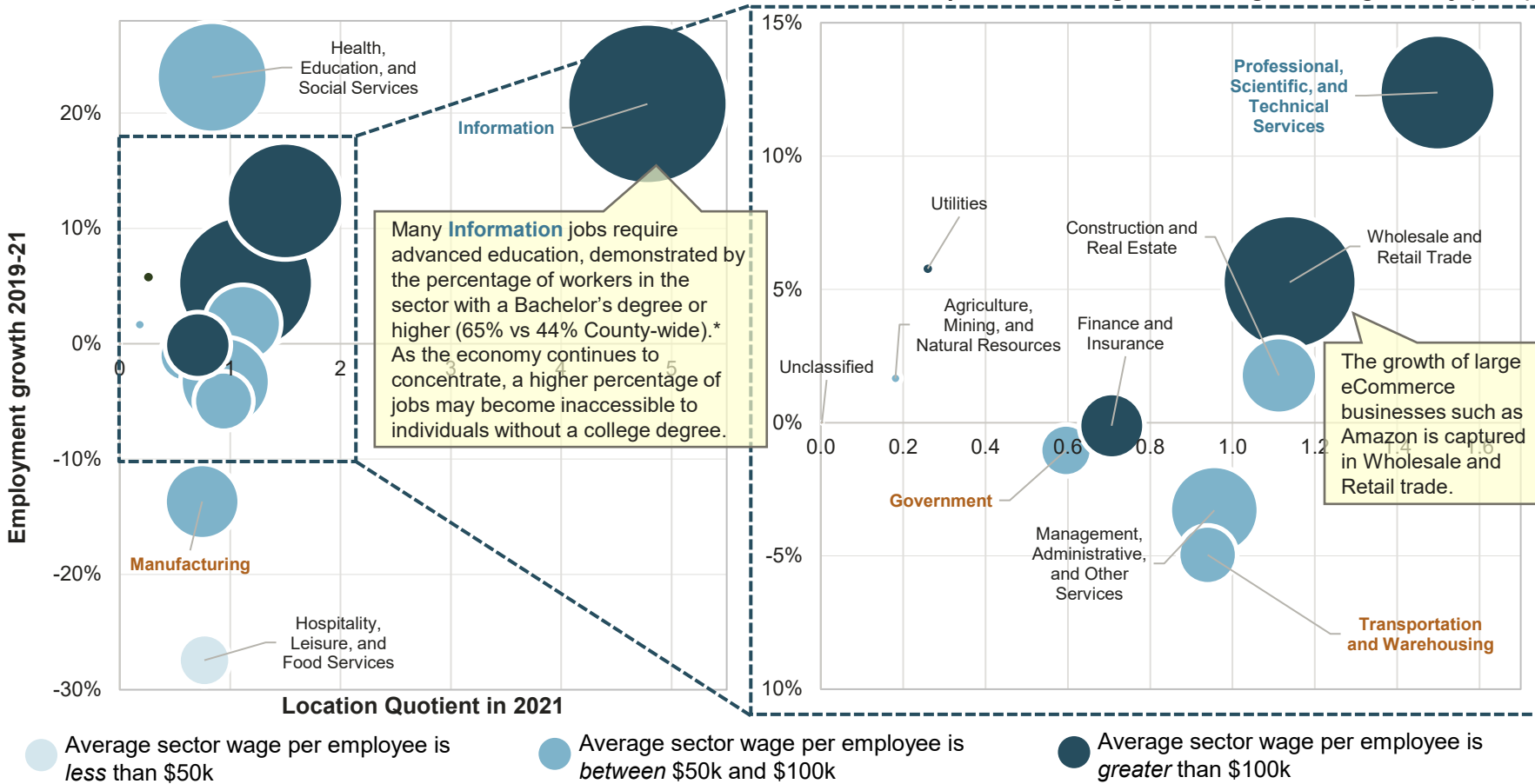
Employment is highly concentrated in the county compared to national averages (LQ = 2+)

Manufacturing in the county underperformed the sector's national growth rate of 3.9% prior to COVID and experienced sharper decline during the pandemic.

Increasing economic concentration in high-income sectors has heightened the county's exposure to national economic shocks

Bubble size denotes total sector payroll and color-coding represents average sector wages in King County (2021)

- Many sectors that experienced employment growth from 2019 to 2021 were already concentrated in the county, while sectors that experienced decline were typically less concentrated, leading to an economy that is increasingly dependent on key industries.
- From 2019 to 2021, employment growth in the **Information** and **Professional, Scientific, and Professional Services** sectors outpaced national growth rates (10.3% versus -0.8% and 8.4% versus 3.7%, respectively), meaning that these industries are becoming more concentrated in King County.
- **Manufacturing** and **Transportation and Warehousing** have both declined faster than the national rate (-28.4% versus -14.2% and -16.4% versus -3.7%, respectively), meaning that these industries are becoming less concentrated in the county.



*Note: Approximation based on the BLS National Employment Matrix and Employment Projections.

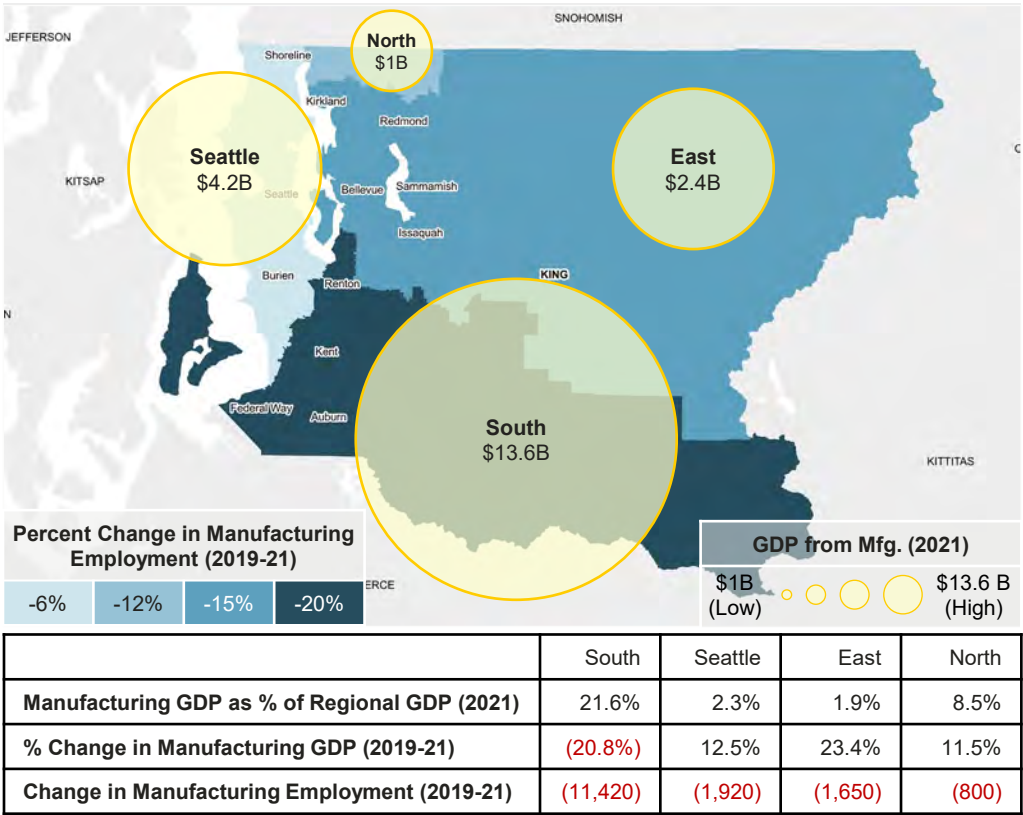
CONCENTRATION IN HIGH-INCOME INDUSTRIES

King County is continuing to concentrate in higher-income, service-providing industries like **Information** and **Professional, Scientific, and Technical Services**. This trend heightens the county's exposure to economic shocks, as more diversified economies are typically better able to withstand these events. Strategies to grow the aerospace sector can therefore focus not only on attracting high-wage careers, but also on strengthening sections of the supply chain that offer middle-wage jobs.

Southern King County is a hub for Manufacturing, but the sector is shifting as new space grows and traditional aerospace manufacturing declines

All four regions in King County – South, Seattle, East, and North – experienced varying degrees of Manufacturing employment decline from 2019-21. By contrast, Manufacturing GDP increased in the Seattle, East, and North regions during the same time period. Southern King County is the only region that saw declines in Manufacturing employment and GDP.

Manufacturing Employment and GDP by Region, 2019-21

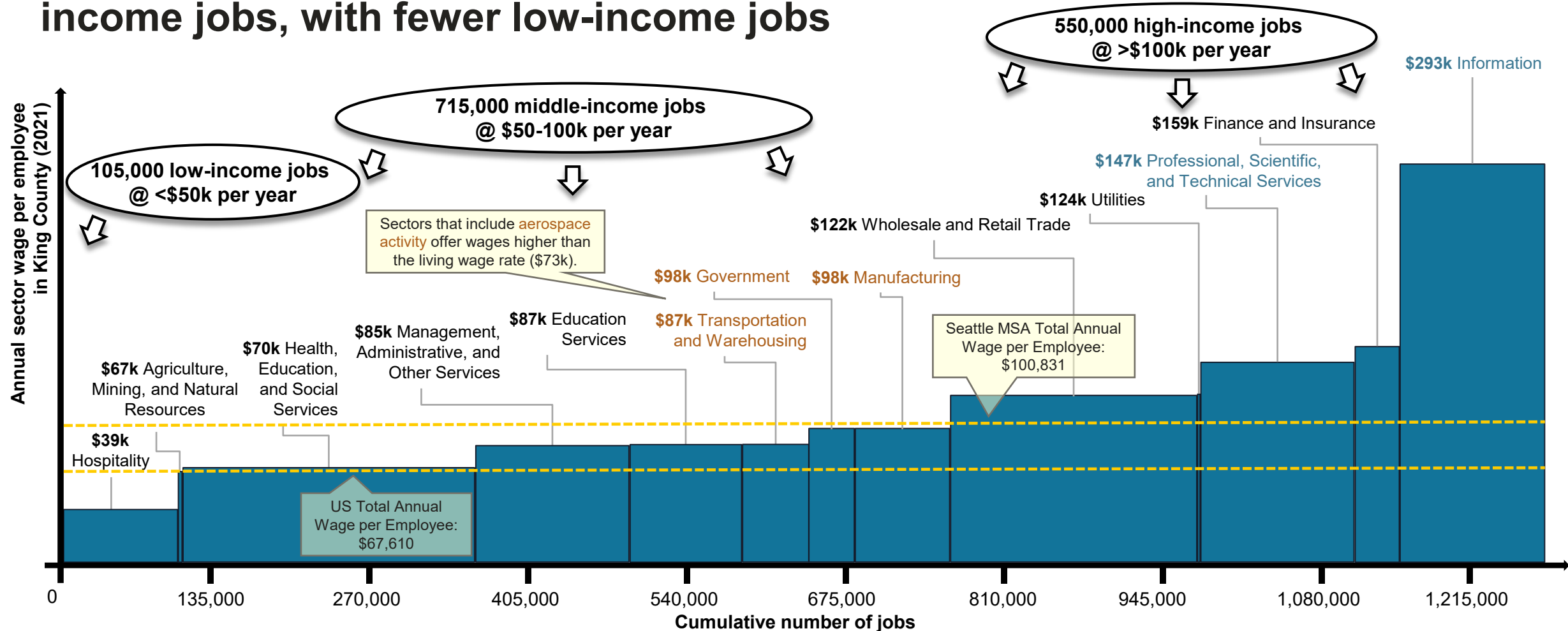


Change in Manufacturing GDP by Region and Industry, 2019-21

Region	Top Growing Industries, 2019-21		Top Declining Industries, 2019-21	
	Manufacturing Industry	Change in GDP	Manufacturing Industry	Change in GDP
South	Guided missile and space vehicle mfg.	\$1,808 M ▲	Aircraft mfg.	\$(5,224) M ▼
	Heavy duty truck mfg.	\$249 M ▲	Other aircraft parts and auxiliary equipment mfg.	\$(215) M ▼
	Canned specialties	\$28 M ▲	Automobile mfg.	\$(105) M ▼
Seattle	Ship building and repairing	\$132 M ▲	Computer storage device mfg.	\$(56) M ▼
	Doll, toy, and game mfg.	\$104 M ▲	Light truck and utility vehicle mfg.	\$(28) M ▼
	Semiconductor and related device mfg.	\$92 M ▲	Sheet metal work mfg.	\$(27) M ▼
East	Electromedical and electrotherapeutic apparatus mfg.	\$181 M ▲	Search, detection, and navigation instruments mfg.	\$(33) M ▼
	Propulsion units and parts for space vehicles and guided missiles mfg.	\$117 M ▲	Toilet preparation mfg.	\$(30) M ▼
	Broadcast and wireless communications equipment mfg.	\$100 M ▲	Electronic computer mfg.	\$(27) M ▼
North	Pharmaceutical preparation mfg.	\$81 M ▲	Sheet metal work mfg.	\$(47) M ▼
	Small arms, ordnance, and accessories mfg.	\$26 M ▲	Audio and video equipment mfg.	\$(14) M ▼
	Wineries	\$21 M ▲	Search, detection, and navigation instruments mfg.	\$(12) M ▼

Sectors that capture new space activity, such as Guided Missile and Space Vehicle Manufacturing, experienced GDP growth in the Southern and Eastern regions from 2019-21. At the same time, traditional aerospace sectors, such as Aircraft Manufacturing, drove Manufacturing GDP decline in the Southern region.

Income distribution in King County is concentrated in middle- and high-income jobs, with fewer low-income jobs

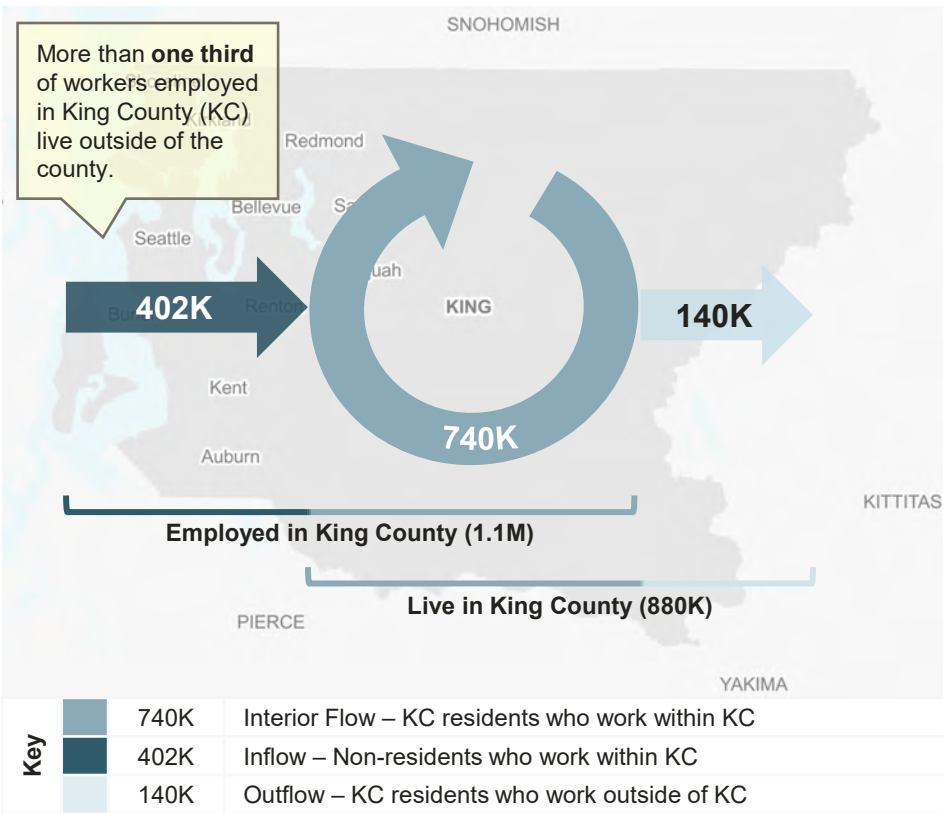


KING COUNTY'S CONCENTRATION OF MIDDLE- AND HIGH-INCOME JOBS CONTRIBUTES TO A HIGHER COST OF LIVING

The average **living wage** in King County, or the hourly rate that an individual must earn to support him or herself and their family, is \$35, or **\$73k annually**. This is 10% higher than the average living wage of \$32, or \$66k annually, in Washington State. King County's relatively high cost of living may expose residents to greater economic hardship in the event of job loss.

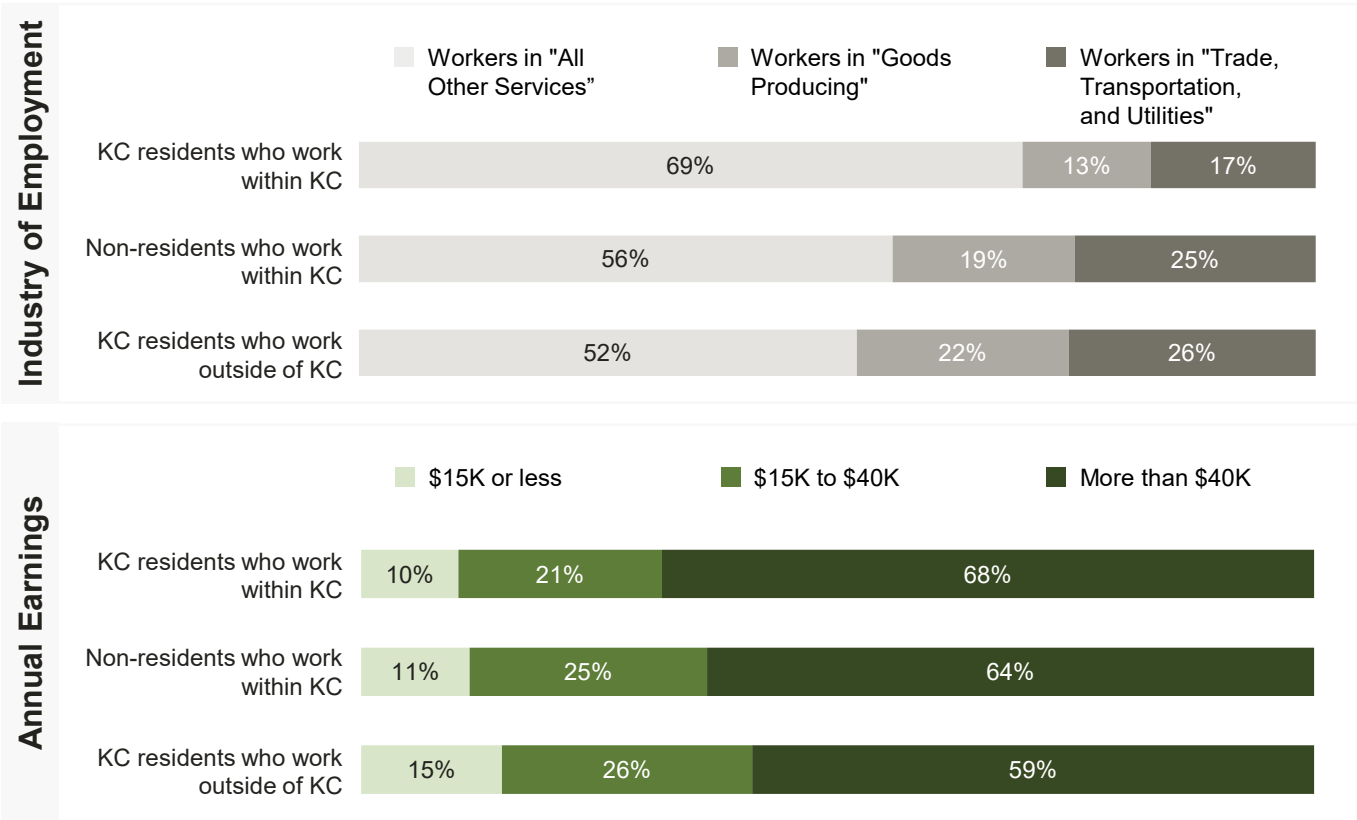
The majority of individuals who live and work in King County are employed in service-providing industries

Inflow/Outflow of Workers in King County, 2019



Note: Overlay arrows do not indicate directionality of worker flow between home and employment locations.

Characteristics of King County Workers and Residents, 2019



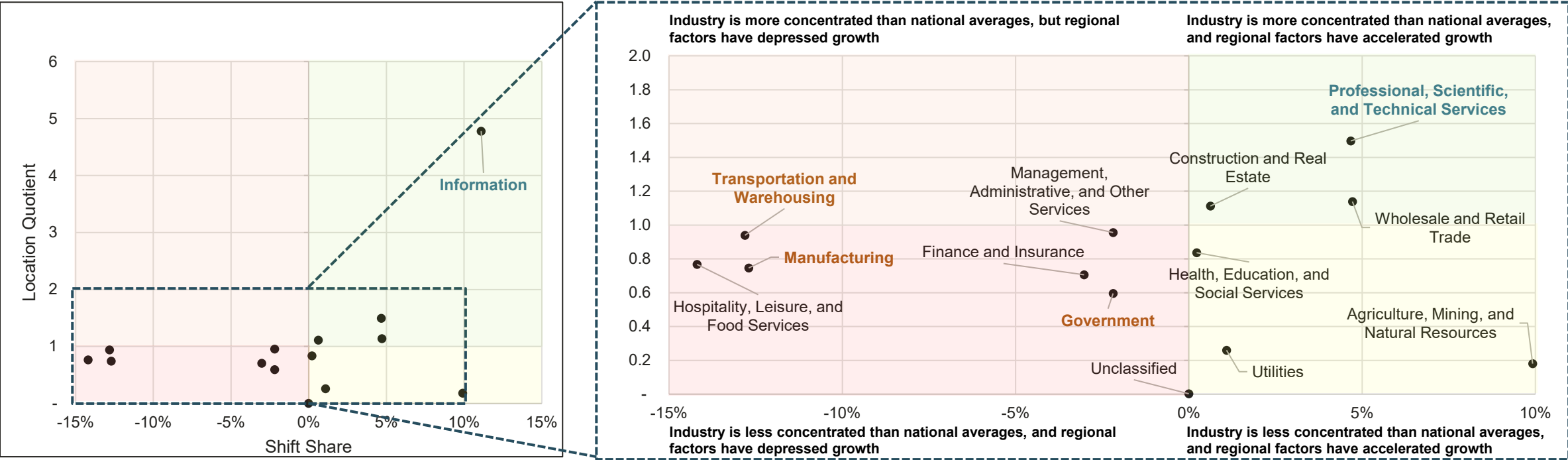
ABOUT 15% OF OUTFLOW WORKERS EARN LESS THAN \$40K/YEAR, IN COMPARISON TO 11% OF INFLOW AND 10% OF INTERIOR FLOW WORKERS

The earning difference may be correlated with Interior Flow employment being more concentrated in higher paying industries within “All Other Services,” which includes industries such as Information, Finance and Insurance, and Professional, Scientific, and Technical Services. Inflow and Outflow workers are more likely to work in “Goods Producing” (e.g., Agriculture, Mining, and Manufacturing) and “Trade, Transportation, and Utilities” industries than Interior Flow workers.

King County’s unique characteristics are driving economic concentration

Shift-share analysis is a model used to identify the causes of industry growth within a region by separating national level economic growth from industry and regional trends. In the chart below, the x-axis depicts the regional competitive effect for King County, i.e., what percent of industry employment growth can be attributed to unique regional characteristics (e.g., policy, competitiveness, geography, population characteristics, natural resources, etc.).

King County NAICS grouped-sector mapping by LQ and regional competitive effect



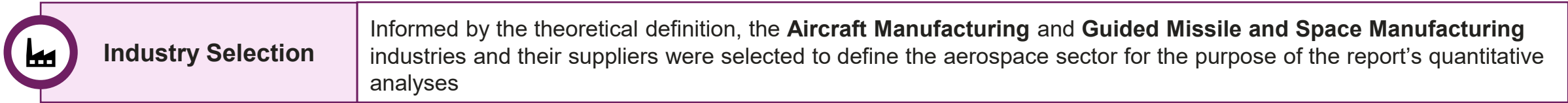
REGIONAL FACTORS ARE DEPRESSING GROWTH IN KEY SECTORS

Growth in the sectors containing core aerospace activities have all been negatively impacted by regional characteristics, while growth of sectors which contain aerospace-related activities have been accelerated by regional factors. Interviews and survey responses will help to identify the regional factors that are depressing or accelerating growth and inform opportunities to increase competitiveness.

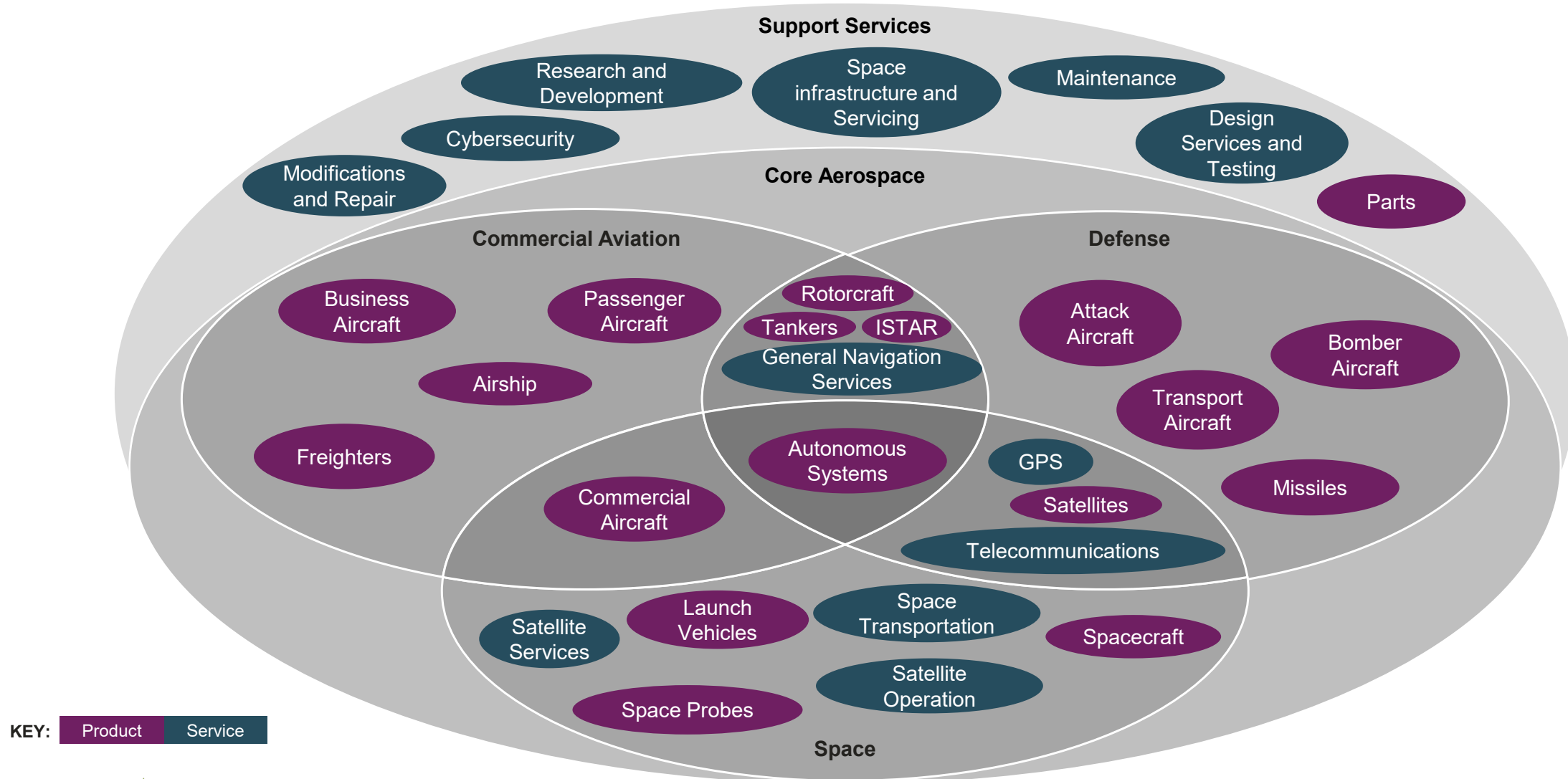
The aerospace sector is comprised of a continuously evolving ecosystem of interconnected products, supply chains, businesses, and industries

The aerospace sector is highly complex and includes a diverse range of military, commercial, industrial, and space applications. The definition of aerospace differs across end-users and suppliers and is rapidly evolving as “new space” continues to disrupt and redefine the sector. To capture this complexity, this report establishes both a theoretical definition to explain the structure of the sector and a selection of industries for the purpose of quantitative analyses.

Theoretical Definition of the Aerospace Sector



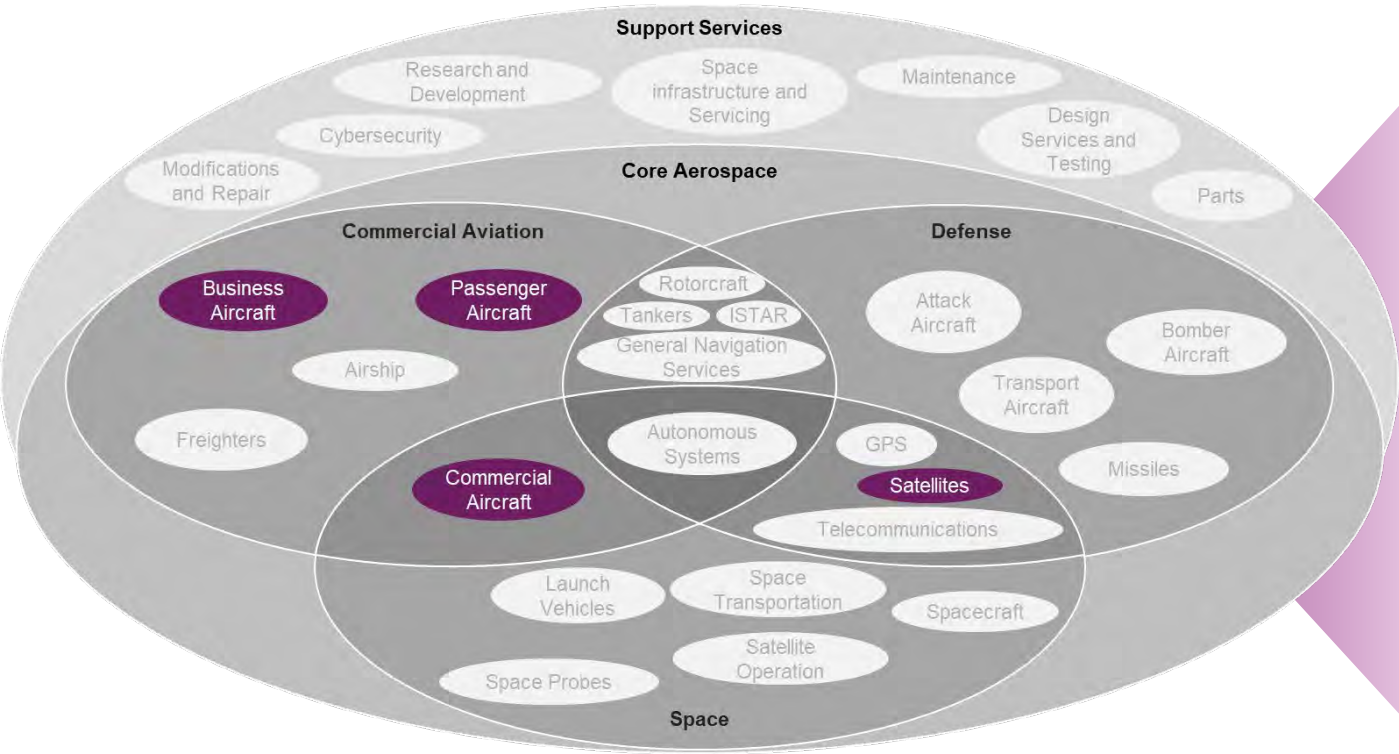
The aerospace sector produces a variety of products and services which support and intersect with a broad range of markets



Final assembly of key products form the backbone of the aerospace sector in King County and the surrounding region

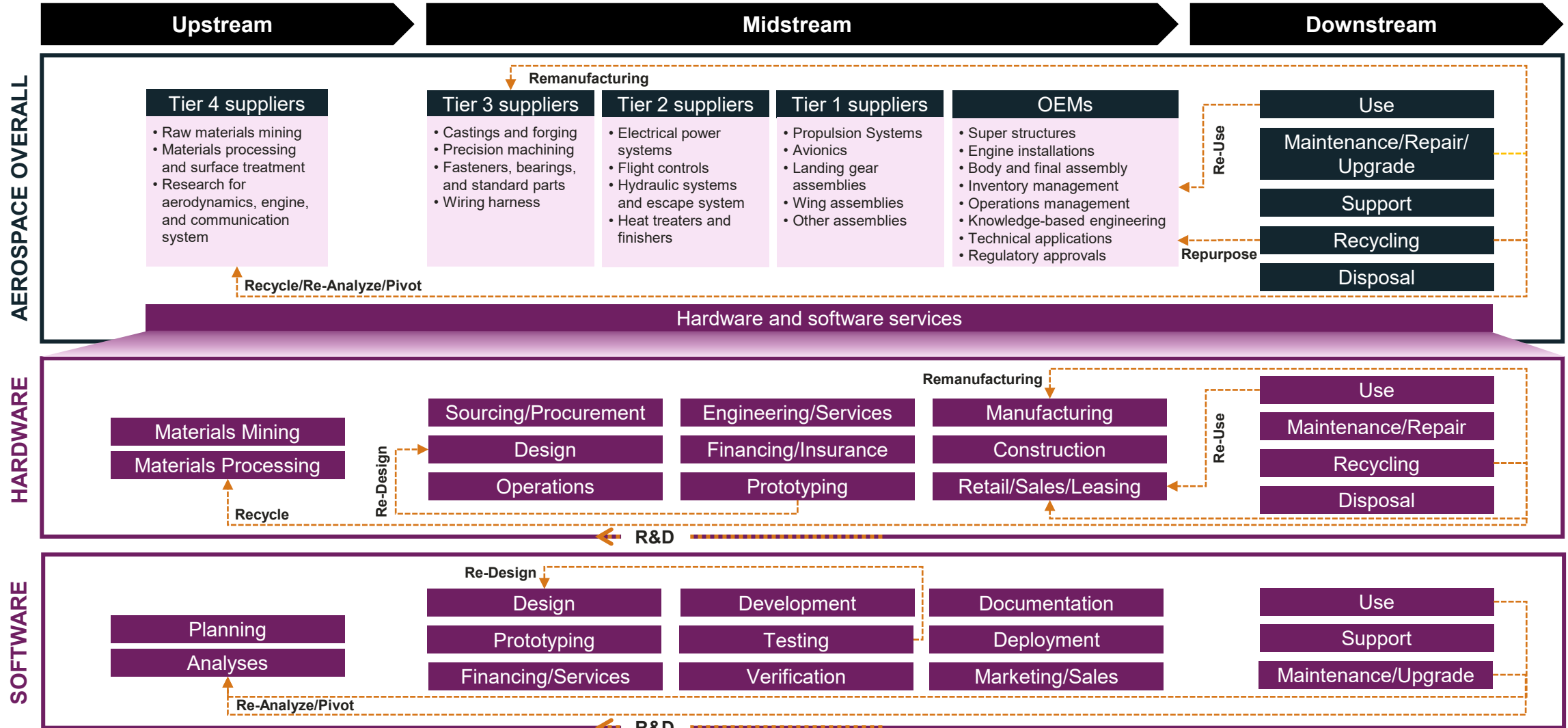
King County is home to the final assembly of multiple air and space final products, including the Boeing 737 MAX aircraft, SpaceX’s Starlink satellites, and the Voshon Ranger R7 aircraft. Although production of some Boeing aircraft has either ceased or been relocated out of the region, Snohomish remains home to the final assembly of two Boeing aircraft and the Eviation Alice electric aircraft. The final assembly of these products creates a concentration of aerospace employers and suppliers in the region and forms the backbone of the aerospace sector.

Aerospace Products Assembled in King County and the Surrounding Region

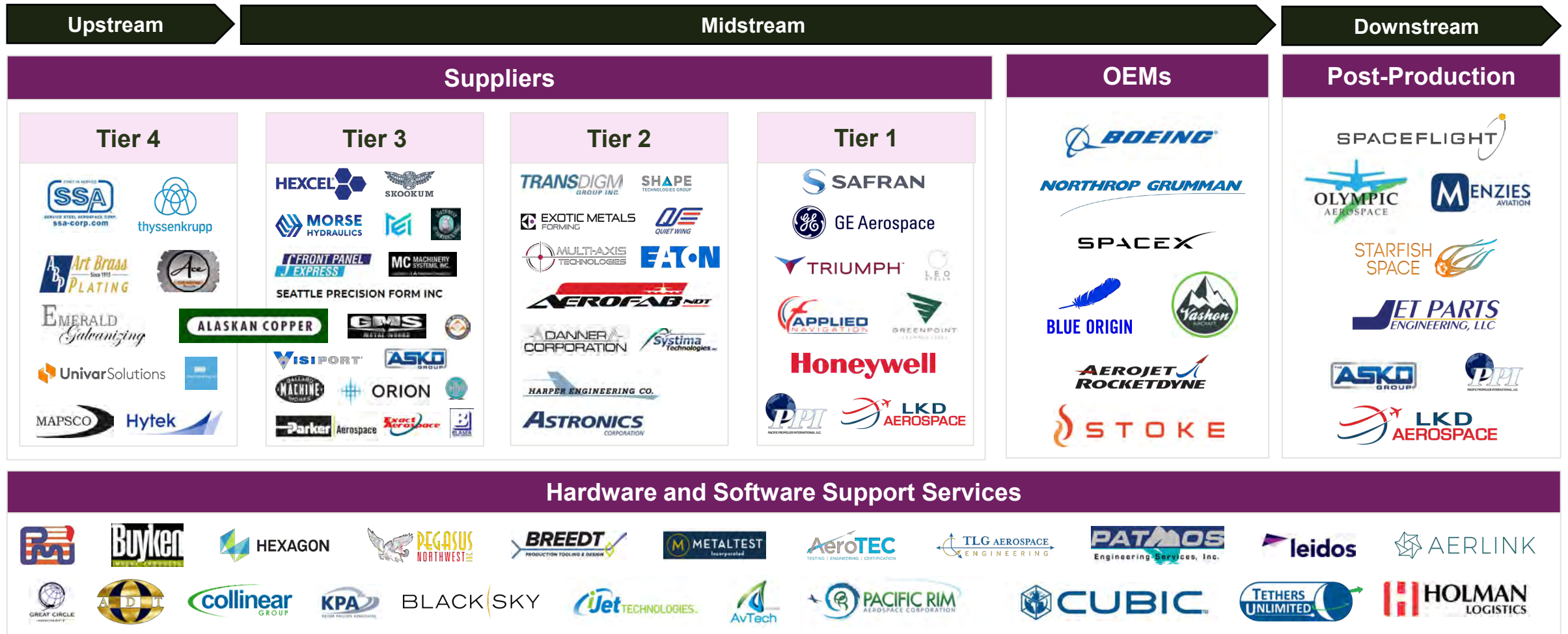


	Producer	Product	Produced	Est. annual production volume	Final assembly location
King County		Boeing 737 MAX	2015 – Present	372	Renton, WA
		Starlink satellites	2018 – Present	130	Redmond, WA
		Ranger R7	2017 – Present	13	Woodinville, WA
Snohomish County		Boeing 747	1967 – 2022	6	Everett, WA
		Boeing 767	1979 – Present	36	Everett, WA
		Boeing 777 and 777x	1993 – Present	36	Everett, WA
		Boeing 787-8 and 787-9	2006 – 2021	60	Everett, WA
		Flagship aircraft	2022 – Present	Prototype, orders placed	Everett, WA

The aerospace supply chain encompasses a wide range of goods and services and integrates hardware and software support services

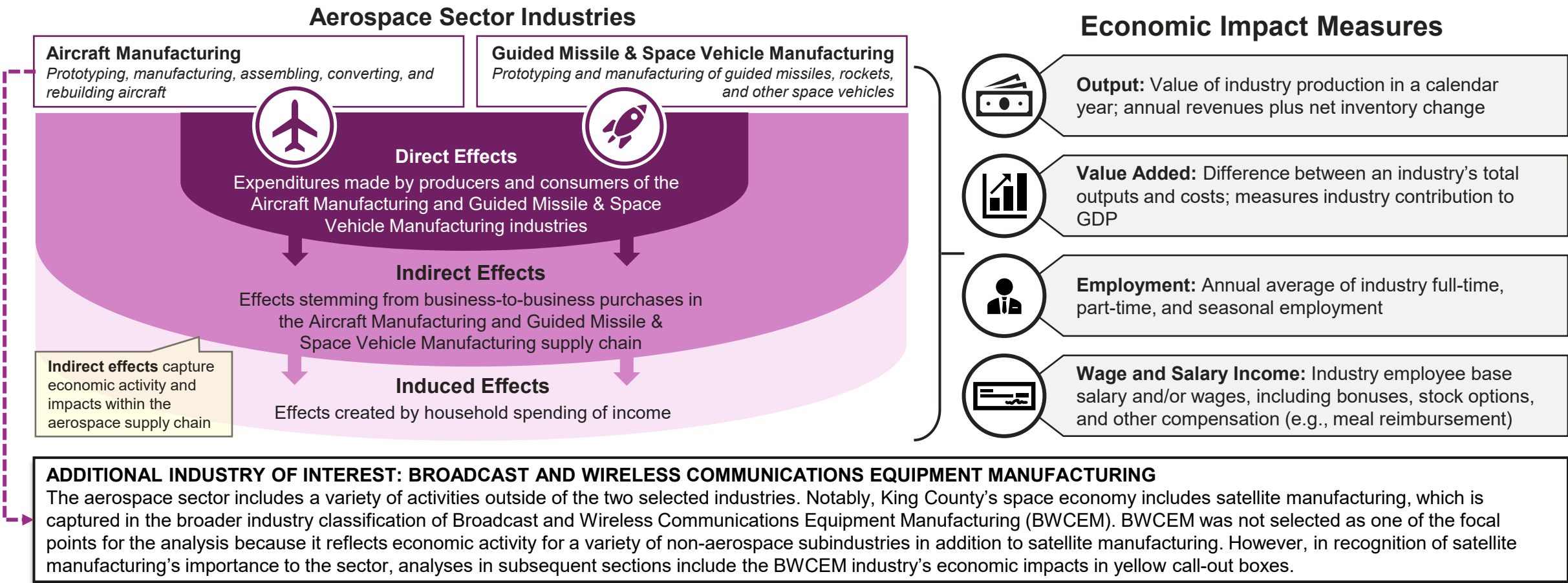


A network of businesses in King County work across the supply chain to create aerospace products and provide full lifecycle support



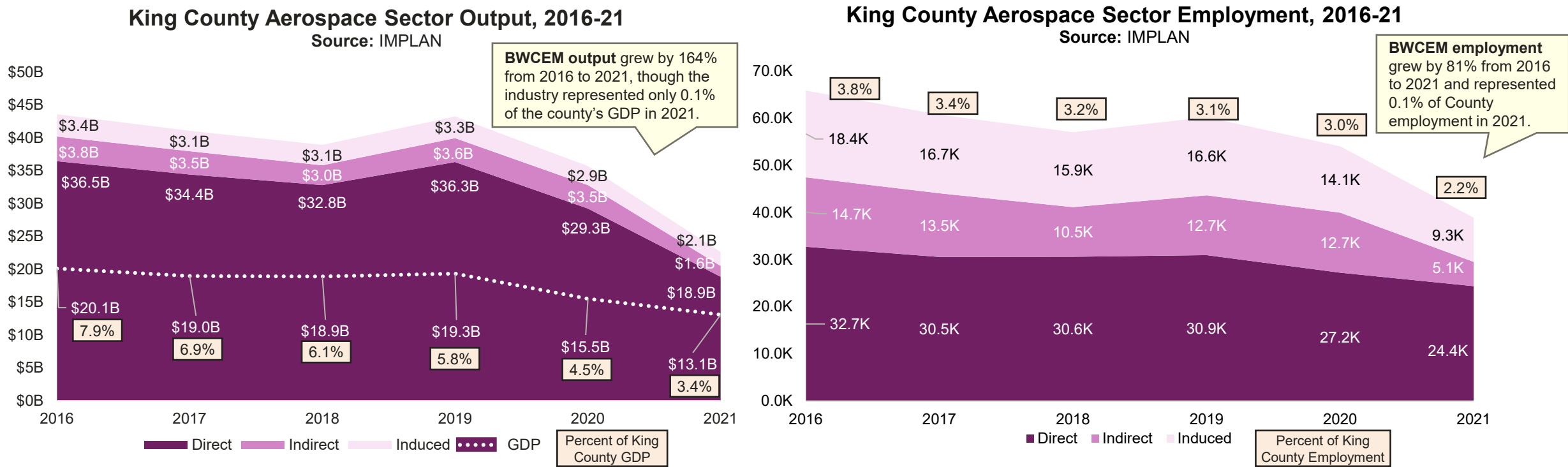
The quantitative analyses of the sector in the following sections focus on the structure and impacts of two key aerospace industries in King County

The remainder of the report explores the impact, structure, and needs of two key industries within the aerospace sector: 1) Aircraft Manufacturing and 2) Guided Missile and Space Vehicle Manufacturing. These industries were chosen as focal points because they align most closely with the OEM portion of the aerospace supply chain. By exploring the effects of these industries, we can understand how the impacts of aerospace OEMs and their suppliers cascade through the economy. Where possible, the impacts of the Broadcast and Wireless Communications Equipment Manufacturing industry (which includes satellite manufacturing) are also captured.



The aerospace sector is critical to King County’s economy; however, its impact in the county is in decline

The aerospace sector is important to King County’s economy, as it generates billions in GDP and creates tens of thousands of direct, indirect, and induced jobs. However, sector-specific and economy-wide challenges such as the loss of large employers and the COVID-19 pandemic have caused steep declines in aerospace sector production and employment.

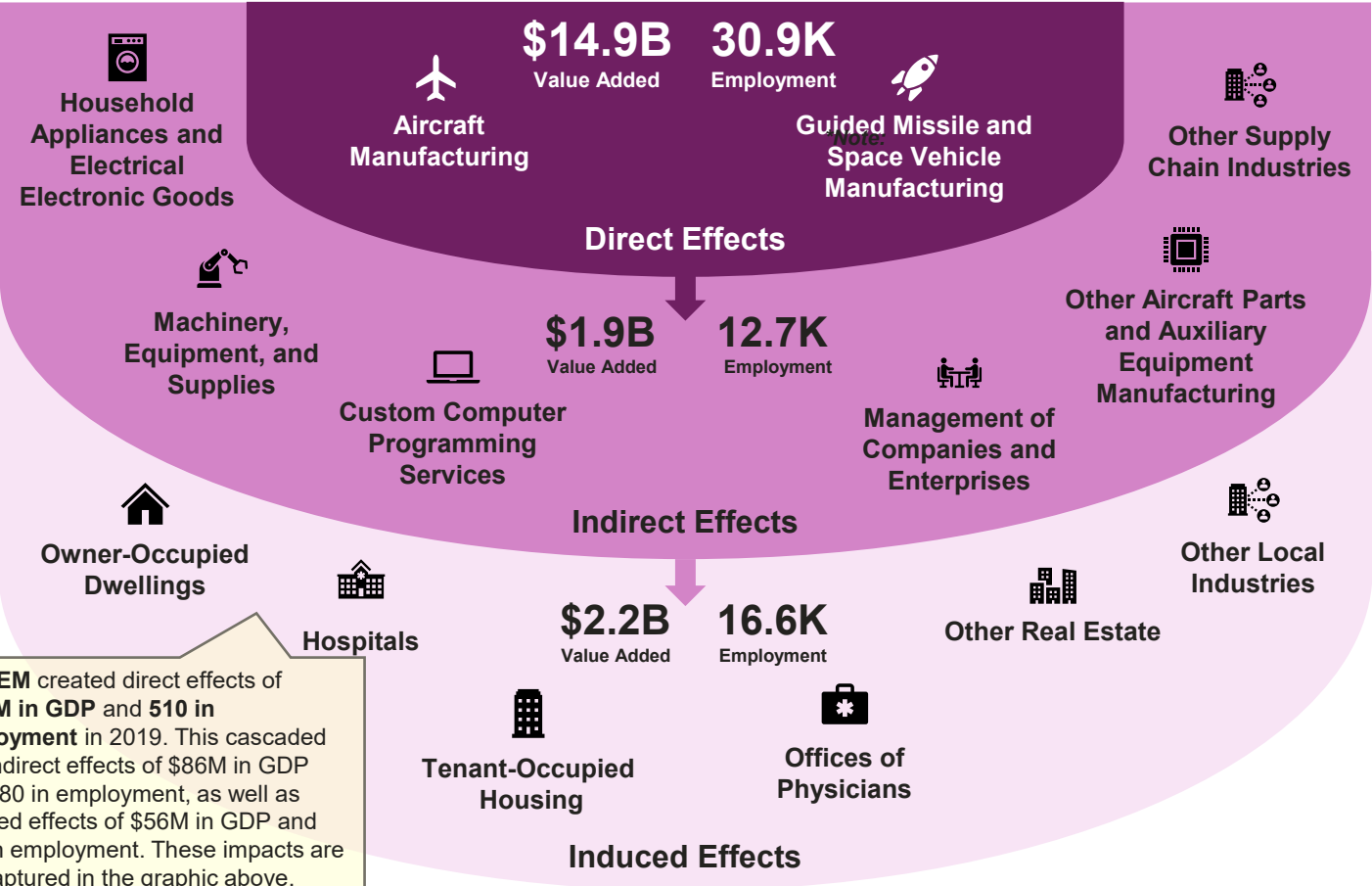


THE AEROSPACE SECTOR IN KING COUNTY IS DECLINING AT AN ACCELERATING RATE

From 2016 to 2021, total aerospace sector annual output fell by 48% and total annual employment fell by 41%. This decline predates the pandemic, as both output and employment shrank in 2017 and 2018. The marginal growth seen in 2019 was quickly reversed in the following year when downward trends were accelerated by COVID-19 and other geopolitical and aerospace industry events. By contrast, Broadcast and Wireless Communications Equipment Manufacturing, which captures satellite manufacturing activity, experienced annual output growth of 164% and annual employment growth of 81% over the same period.

The aerospace sector generates \$19B in GDP and creates a ripple effect through King County’s economy via supply chain activity and local spending

In 2019, the aerospace sector created direct impacts of \$14.9B in GDP and 30.9K in employment. In turn, this resulted in indirect effects of \$1.9B in GDP and 12.7K in employment as OEMs purchased inputs from firms within the aerospace supply chain. Finally, this translated to induced effects of \$2.2B in GDP and 16.6K in employment, generated by household spending of aerospace sector labor income.



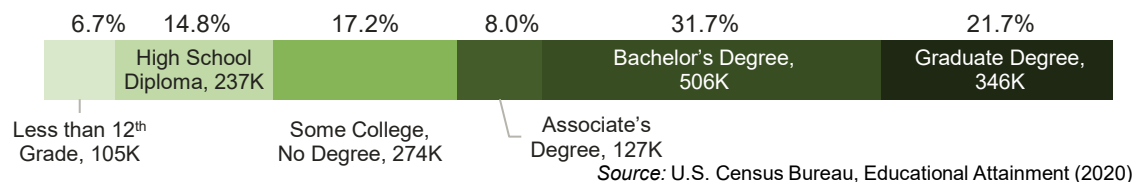
	Industry	Value Added (2019)	Employment (2019)
Direct Effects	Aircraft Manufacturing	\$14.8B	30,690
	Guided Missile and Space Vehicle Manufacturing*	\$96.1M	250
Indirect Effects	Wholesale - Household Appliances and Electrical and Electronic Goods	\$230.3M	620
	Wholesale - Machinery, Equipment, and Supplies	\$213.1M	940
	Custom Computer Programming Services	\$207.7M	1,250
	Management of Companies and Enterprises	\$178.3M	990
	Other Aircraft Parts and Auxiliary Equipment Manufacturing	\$128.6M	930
	All Other Supply Chain Industries	\$1.3B	7,970
Induced Effects	Owner-Occupied Dwellings	\$369.7M	0
	Hospitals	\$116.4M	840
	Tenant-Occupied Housing	\$108.4M	160
	Offices of Physicians	\$93.8M	630
	Other Real Estate	\$71.8M	420
	All Other Local Industries	\$1.5B	14,500

BWCEM created direct effects of \$266M in GDP and 510 in employment in 2019. This cascaded into indirect effects of \$86M in GDP and 280 in employment, as well as induced effects of \$56M in GDP and 280 in employment. These impacts are not captured in the graphic above.

The aerospace sector in King County is dependent on a highly educated workforce

- Approximately 40,000 or 2.2% of King County's workforce work in direct and indirect aerospace sector employment opportunities. This estimate excludes induced employment, as it is intended to capture the immediate employment impacts of the Aircraft Manufacturing and Guided Missile and Space Vehicle Manufacturing industries and their supply chains.
- Of the 40,000 sector employment opportunities, over 18,000 (or 46%) require post-secondary education. This is slightly lower than general educational attainment levels within the county, with ~61.4% of the population holding an Associate's degree or higher.
- King County's post-secondary degree attainment is a competitive advantage for the region, as it is higher than competitor regions such as Los Angeles-Long Beach-Anaheim, CA and Dallas-Fort Worth-Arlington, TX, where 42.6% and 43.1% of the population hold an Associate's degree or higher, respectively.

Educational Attainment of King County Adults 25+, 2020

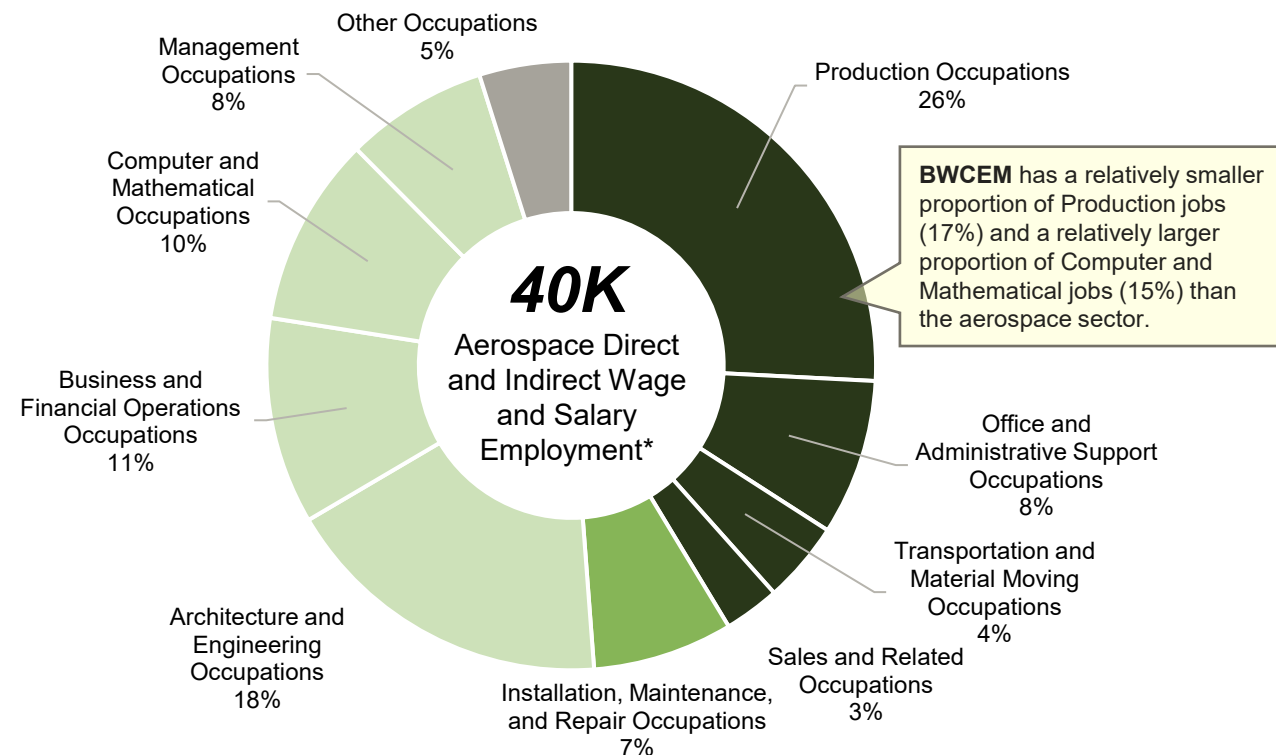


IN-MIGRATION IS AN ENABLER OF THE AEROSPACE SECTOR

Immigrants make up 30% of Washington's STEM workers, but just 15% of its total population. To meet aerospace sector's demand for STEM workers, King County will need to develop and retain local talent while continuing to attract immigrants and out-of-state workers into the region.

Aerospace Sector Employment by Occupation, 2019

Source: IMPLAN Industry Contribution Analysis (2019); Guidehouse Analysis



Occupations requiring post-secondary education

Occupations that generally require a post-secondary degree to be qualified to perform the job

Occupations requiring certificate or some college

Occupations that generally require a post-secondary certificate or some college to learn the skills necessary for the job

Occupations requiring a high school diploma or less

Occupations that generally do not require a post-secondary certificate, Associate, Bachelor's or professional degree

Top occupations in the aerospace sector require a mix of STEM knowledge and soft skills

In order to succeed in the aerospace sector, individuals need a blend of technical knowledge, interpersonal skills, and problem-solving capabilities. The matrices below identify the top 10 in-demand knowledge areas and skills for the sector overall and use heatmapping to illustrate the importance of these knowledge areas and skillsets to the top 5 occupations groups within the sector. Knowledge areas are the subjects, topics, and information that an individual needs to know to be hired into and succeed in the role. Skills are developed capacities that facilitate learning and performance of job activities.

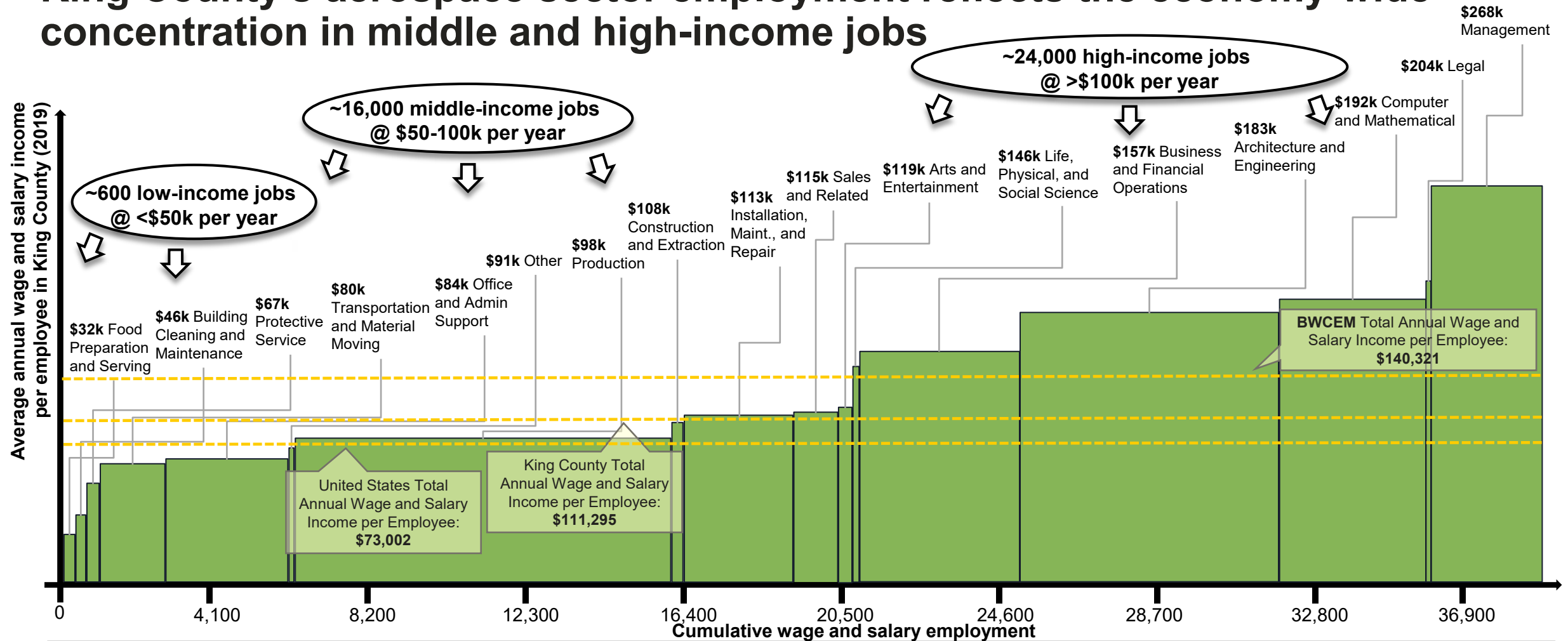
Knowledge Area	Overall Rank	Rank by Occupation Group				
		Production	Architecture and Engineering	Business and Financial Operations	Computer and Mathematical	Office and Administrative Support
Mathematics	1	3	3	4	3	5
Computers and Electronics	2	8	4	5	1	4
English Language	3	4	7	1	2	3
Mechanical	4	1	5	22	20	18
Engineering and Technology	5	7	1	15	4	19
Production and Processing	6	2	8	13	14	8
Customer and Personal Service	7	9	9	2	5	2
Design	8	6	2	18	8	22
Education and Training	9	5	11	8	6	7
Administration and Management	10	10	10	3	7	6

Skillset	Overall Rank	Rank by Occupation Group				
		Production	Architecture and Engineering	Business and Financial Operations	Computer and Mathematical	Office and Administrative Support
Reading Comprehension	1	6	1	1	2	2
Critical Thinking	2	4	2	3	1	4
Active Listening	3	5	3	2	3	1
Speaking	4	8	6	4	5	3
Monitoring	5	3	8	7	6	6
Complex Problem Solving	6	12	4	8	9	13
Writing	7	13	5	5	4	5
Judgment and Decision Making	8	11	10	6	8	11
Coordination	9	9	16	10	16	9
Active Learning	10	16	9	9	12	12

Mathematics is a top five in-demand knowledge area for all top occupation groups.

Critical Thinking and **Active Listening** are top five in-demand skillsets for all top occupation groups.

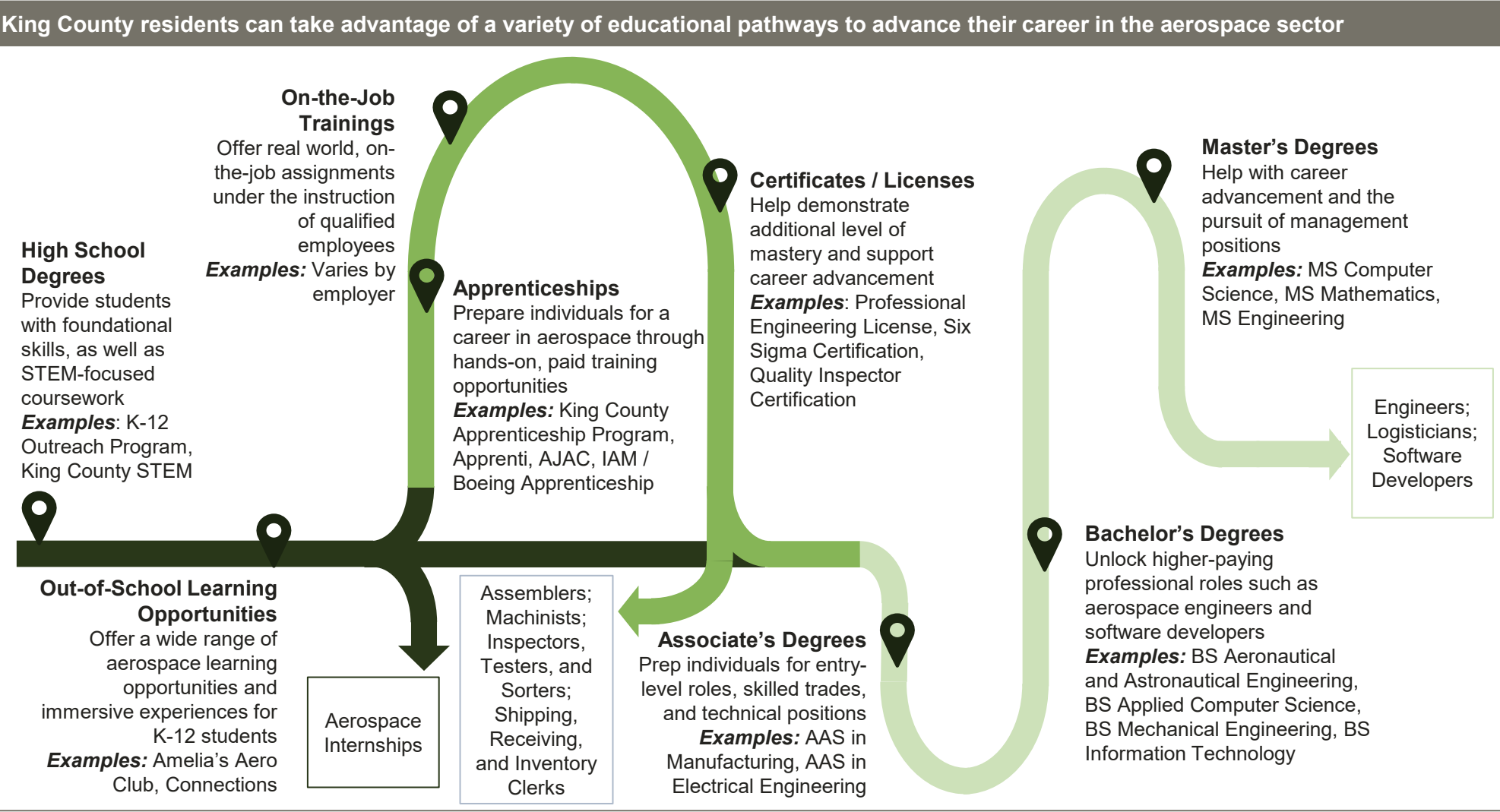
King County's aerospace sector employment reflects the economy-wide concentration in middle and high-income jobs



AEROSPACE JOBS PROVIDE A LIVING WAGE IN KING COUNTY

The majority of King County's aerospace sector jobs pay above the county's living wage of \$35 per hour, or **\$73k annually**. Though the aerospace sector creates over 16,000 middle wage jobs, it is more concentrated in high wage jobs than the county as a whole. Strategies to bolster the sector should consider growing not only high-income occupations, but also middle-income occupations that pay above the living wage in order to grow the shrinking middle class.

Organizations in King County offer various entry points for individuals of all educational levels to pursue a career within the aerospace sector



KEY:

K-12 Institutions
Formal educational curriculum of school districts and learning opportunities for young people provided by a variety of organizations
Apprenticeships, Certificates & On-the-Job Training
Industry-driven learning opportunities, including work experience, classroom instruction, and / or credential programs
Universities and Community and Technical Colleges
Institutions offering postsecondary degrees, including associate's, bachelor's, or master's degrees

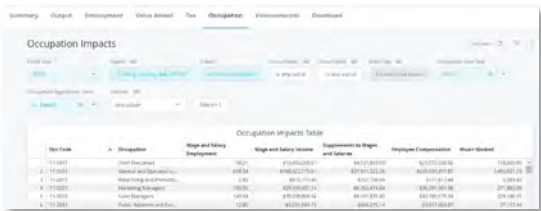
The county’s workforce development landscape was assessed to evaluate its ability to prepare residents for top aerospace occupations

The workforce development landscape was evaluated to identify potential pathways to aerospace employment and understand the current availability of educational programming and opportunities in King County that prepare residents for top aerospace jobs. This assessment was comprised of a 4-step process, described below.

1. Top Occupation Identification

Using 2019 IMPLAN data, the top 10 occupations by wage and salary direct and indirect employment were selected for the aerospace sector (Aircraft Manufacturing and Guided Missile and Space Manufacturing).

IMPLAN Occupation Impacts Report



2. Educational Requirements Review

Educational and training pathways for each occupation were identified using the Occupational Outlook Handbook from the Bureau of Labor Statistics. Each credential was classified as “Typical,” “Helpful,” or “Required.”

Bureau of Labor Statistics Occupational Outlook Handbook



3. University Cohort Development

Based on the National Center for Education Statistics, institutions with greater than 300 degrees conferred were identified as top educational organizations and selected for inclusion in the university cohort.

University Cohort	
University of Washington-Seattle	Lake Washington Institute of Technology
Green River College	Highline College
Bellevue College	North Seattle College
Seattle University	Renton Technical College
University of Washington-Bothell	Cascadia College
Shoreline Community College	City University of Seattle
Seattle Central College	Pima Medical Institute
Seattle Pacific University	South Seattle College
Embry-Riddle Aeronautical University	Northwest University

4. Program Availability Scan*

Educational requirements were cross-referenced with academic catalogs for the university cohort and specialized certification and training providers to determine program availability. Based on the number of programs identified across the county, educational requirements were classified into one of the five categories listed below.

HIGH	MODERATE	LOW
5+ relevant programs identified across King County institutions	3-4 relevant programs identified across King County institutions	1-2 relevant programs identified across King County institutions
NOT AVAILABLE	NOT APPLICABLE	
No relevant program identified across King County Institutions	Data on program availability is not readily accessible	

*Note: The program scan was limited to the identified university cohort and specialized training providers and is not a comprehensive representation of program availability.

King County has high availability of general STEM degree programs and lower availability of more specialized degree requirements

Top Occupation	Occupation Group	King County Employment, 2019	Educational Requirements							
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	Production Occupations	2,280	Required	Typical			Helpful		King County educational institutions offer a strong selection of Engineering, Mathematics, and Computer Technology degrees, which are required or helpful educational requirements for more than half of top occupations.	
			High School Degree	On-the-Job Training	FAA Maintenance School	Military Training	Aviation Maintenance Airframe & Powerplant Certificate			
Software Developers	Computer and Mathematical Occupations	2,230	Typical			Helpful				
			Bachelor's in Mathematics	Bachelor's in Engineering	Bachelor's in Computer and Information Technology	Master's in Mathematics	Master's in Engineering	Master's in Computer and Information Technology		
Industrial Engineers	Architecture and Engineering Occupations	1,600	Required		Typical				Helpful	
			Bachelor's in Industrial Engineering	Bachelor's in Industrial Engineering Technologies	Bachelor's in Manufacturing Engineering	Bachelor's in General Engineering	Bachelor's in Mechanical Engineering	Bachelor's in Electrical Engineering	Professional Engineering License	
Inspectors, Testers, Sorters, Samplers, and Weighers	Production Occupations	1,460	Required	Typical	Helpful					
			High School Degree	On-the-Job Training	Bachelor's in Quality Control Management	Bachelor's in Engineering	Quality Inspector Certification	Six Sigma Certification		
Aerospace Engineers	Architecture and Engineering Occupations	1,390	Typical					Helpful		
			Bachelor's in Engineering	Bachelor's in General Engineering Principles	Bachelor's in Propulsion	Bachelor's in Propulsion, Stability, and Control	Bachelor's in Aerodynamics	Professional Engineering License		
HIGH AVAILABILITY		MODERATE AVAILABILITY		LOW AVAILABILITY		NOT AVAILABLE		NOT APPLICABLE		
5+ relevant programs identified across King County institutions		3-4 relevant program identified across King County institutions		1-2 relevant programs identified across King County institutions		No relevant program identified across King County Institutions		Data on program availability is not readily accessible		

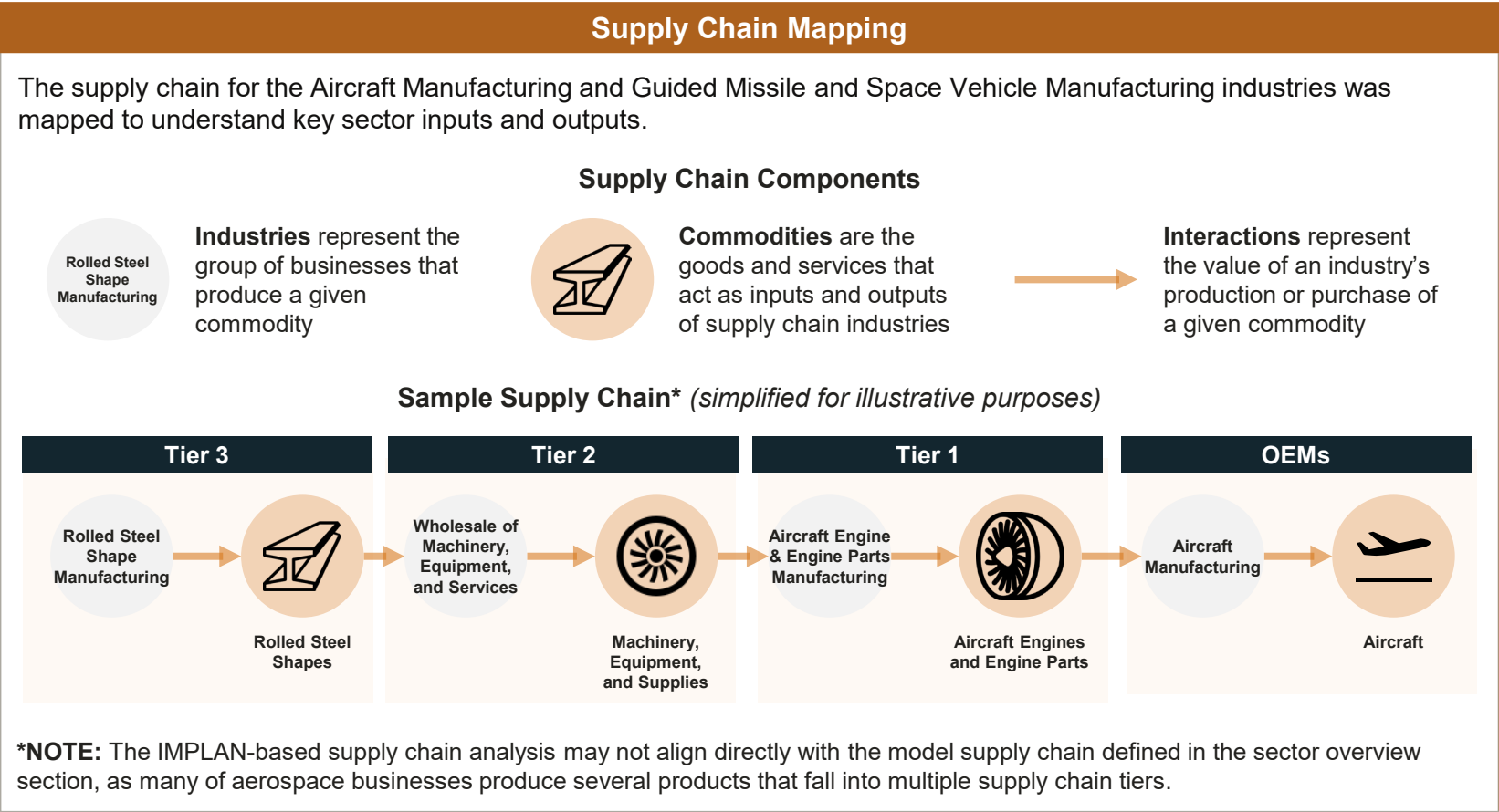
Several top aerospace occupations have lower barriers to entry and offer opportunities for advancement through certifications

Top Occupations	Occupation Group	King County Employment, 2019	Educational Requirements				
Machinists	Production Occupations	1,220	Typical			Helpful	
			High School Degree	On-the-Job Training	Apprenticeship	Community College Degree / Nondegree Certificate Program	Credentials in CNC Machine Operation, CAD/CAM Technology
Aircraft Mechanics and Service Technicians	Installation, Maintenance, and Repair Occupations	1,100	Required	Typical		Helpful	
			Aviation Maintenance Airframe & Powerplant Certificate	Associate's Degree	FAA Maintenance School	Bachelor's in Engineering	Bachelor's in Transportation
Mechanical Engineers	Architecture and Engineering Occupations	950	Typical		Helpful	Individuals who do not hold a college degree qualify for many top production roles. Though the barrier to entry for these roles is low, production jobs pay a living wage of \$82k , on average.	
			Bachelor's in Mechanical Engineering	Bachelor's in Mechanical Engineering Technologies	Professional Engineering License		
Miscellaneous Assemblers and Fabricators	Production Occupations	900	Typical		Helpful		
			High School Diploma	On-the-Job Training	Associate's Degree	Fabricators & Manufacturers Association Certification	Association Connecting Electronics Industries Certification
Project Management Specialists and Business Operations Specialists	Business and Financial Operations Occupations	870	Typical		Helpful		
			Bachelor's in Business	Bachelor's in Project Management	Bachelor's in Engineering	Project Management Professional Certificate	

HIGH AVAILABILITY	MODERATE AVAILABILITY	LOW AVAILABILITY	NOT AVAILABLE	NOT APPLICABLE
5+ relevant programs identified across King County institutions	3-4 relevant program identified across King County institutions	1-2 relevant programs identified across King County institutions	No relevant program identified across King County Institutions	Data on program availability is not readily accessible

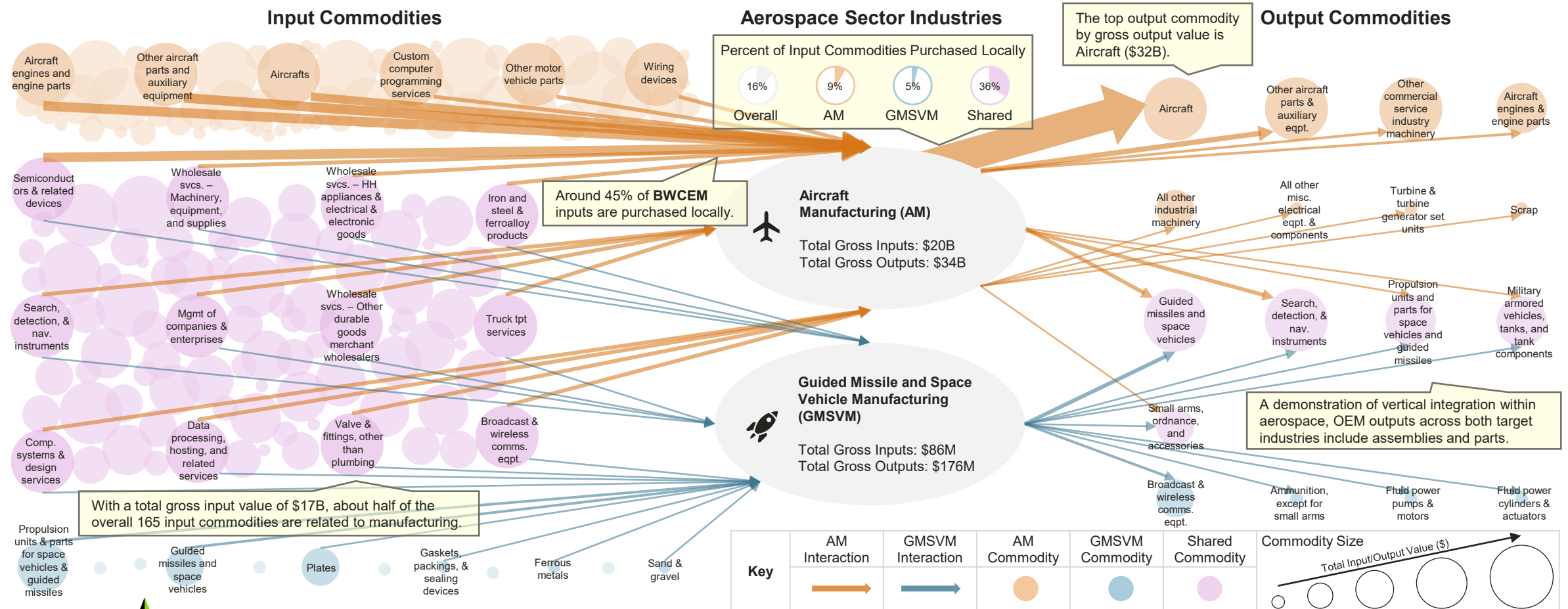
The regional aerospace supply chain was mapped and analyzed to identify gaps and potential focus areas for business growth and attraction

The aerospace supply chain is defined as the sequence of goods and services involved in the production of aerospace products. The regional aerospace supply chain was mapped and analyzed to identify leakage and gaps. Supply chain gaps were then evaluated to understand which commodities and industries could be targets of future business attraction and growth efforts to strengthen the sector.



To produce aerospace products, OEMs in King County utilize a range of commodity inputs sourced locally and from outside the region

The figure below illustrates the 165 input and 17 output commodities of King County's aerospace sector industries – Aircraft Manufacturing and Guided Missile and Space Vehicle Manufacturing. The width of the connecting lines indicate the economic value (input or output value) of interactions between two points, with labels and call-out boxes highlighting top commodities and key economic relationships. The size of each commodity circle indicates its total economic value (input or output value) across both industries. By commodity value, King County accounts for 12% of total inputs and 13% of total outputs of the nation's aerospace sector.



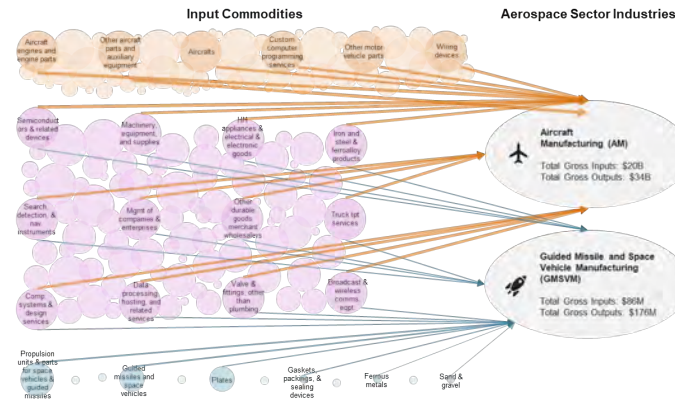
Commodity inputs were analyzed to identify supply chain gaps and assess their potential as a target for business growth and attraction

The first link in the aerospace sector supply chain was evaluated to identify gaps in which the county can grow and attract businesses to strengthen the local aerospace sector. The assessment of commodities was completed using the process described below:

1. Commodity Identification

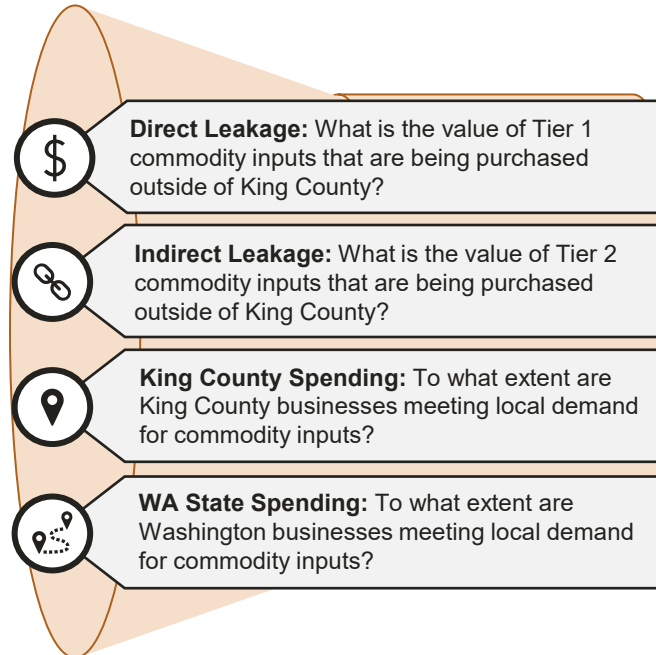
Using IMPLAN, commodity input data was compiled for the two key aerospace sector industries (Aircraft Manufacturing and Guided Missile and Space Manufacturing). Data was then analyzed for each industry to identify top commodity inputs.

Commodity Inputs to the Aerospace Sector



2. Commodity Evaluation

Commodities inputs were evaluated using the following criteria to identify supply chain gaps.

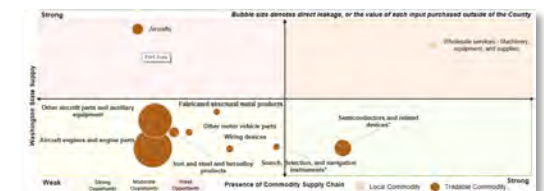


3. Opportunity Commodity Selection

Target commodities were selected for both aerospace sector industries based on how closely they meet the following criteria:

- Present a large economic opportunity for the county, indicated by high **direct leakage**;
- Has strong local supply chain to support the commodity's production, indicated by low **indirect leakage**;
- Is not already being produced by and purchased from King County or WA state suppliers, indicated by low **King County and WA State Spending**.

Matrix for Target Commodity Selection Criteria

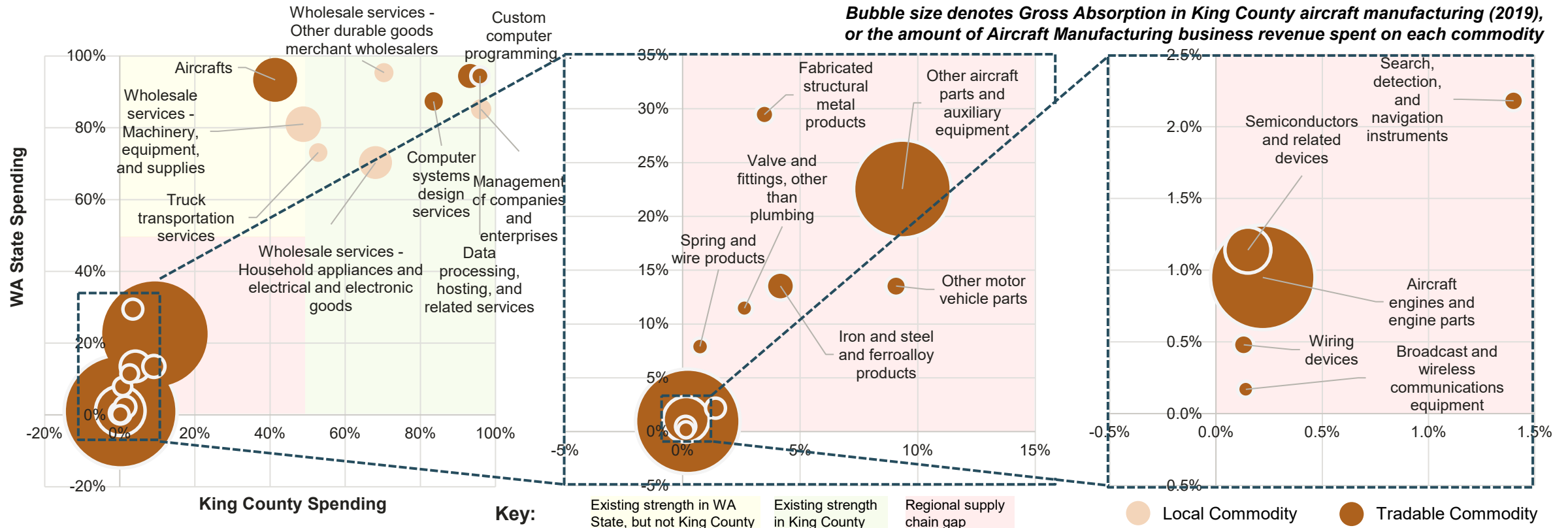


Next Step: Opportunity Exploration

In future phases of Air and Space 2030 strategy development, qualitative analysis will be conducted to further qualify and specify opportunities for business growth and expansion.

The Aircraft Manufacturing supply chain has strengths in information services and gaps in manufactured commodities, such as aircraft parts

A commodity's regional spending is the percent of commodity inputs purchased from suppliers located within a selected region. In the chart below, the x-axis depicts the top 20 Aircraft Manufacturing input commodities' regional spending in King County, and the y-axis depicts regional spending for the state of Washington. A commodity with high spending in both regions represents an existing strength, while low spending in both geographies may represent a gap in the supply chain.

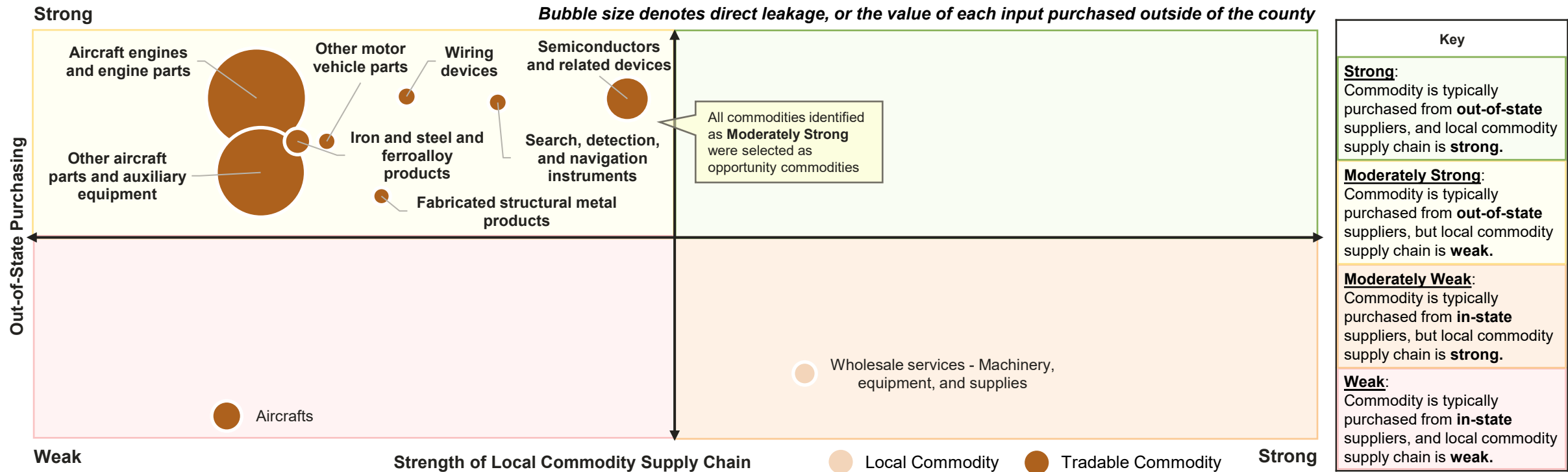


INFORMATION-BASED AND LOCAL COMMODITIES REPRESENT SUPPLY CHAIN STRENGTHS

A local commodity is a good or service that serves the local economy (e.g., transportation services). King County businesses are meeting the aircraft manufacturing industry's demand for local commodities, as well as information-based tradable commodities – an established strength in the region.

The production of complex aircraft components represents a gap in King County’s Aircraft Manufacturing supply chain

Gaps in the supply chain exist where King County producers are not meeting the demand for commodity inputs; however, not every gap presents a strong opportunity for the county. The chart below evaluates the viability of Aircraft Manufacturing input commodities as opportunities for business attraction. A strong target commodity would have high spending outside of the county, an existing supply chain in the county, and demand that is not be met by the WA state economy.

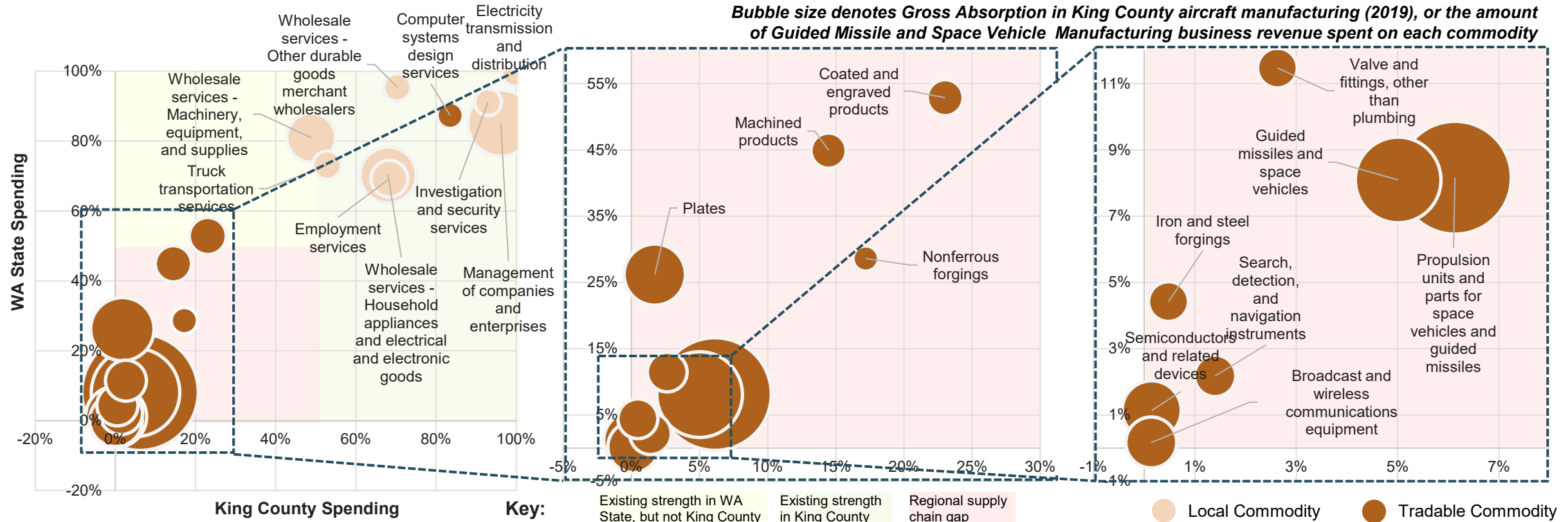


COMPLEX MANUFACTURED COMMODITIES ARE REGIONAL GAPS

The bolded supply chain gaps selected for further analysis are generally tradable, manufactured products in which demand is not being met by producers in Washington state. There is an opportunity to grow existing businesses and/or attract new companies that produce these commodities to bring spending into the region.

The Guided Missile and Space Vehicle Manufacturing supply chain has strengths in local services and gaps in manufactured commodities, such as propulsion units

A commodity's regional spending is the percent of commodity inputs purchased from suppliers located within a selected region. In the chart below, the x-axis depicts top 20 Guided Missile and Space Vehicle Manufacturing input commodities' spending in King County, and the y-axis depicts spending in the state of Washington. A commodity with high spending in both regions represents an existing strength, while low spending in both geographies may represent a gap in the supply chain.

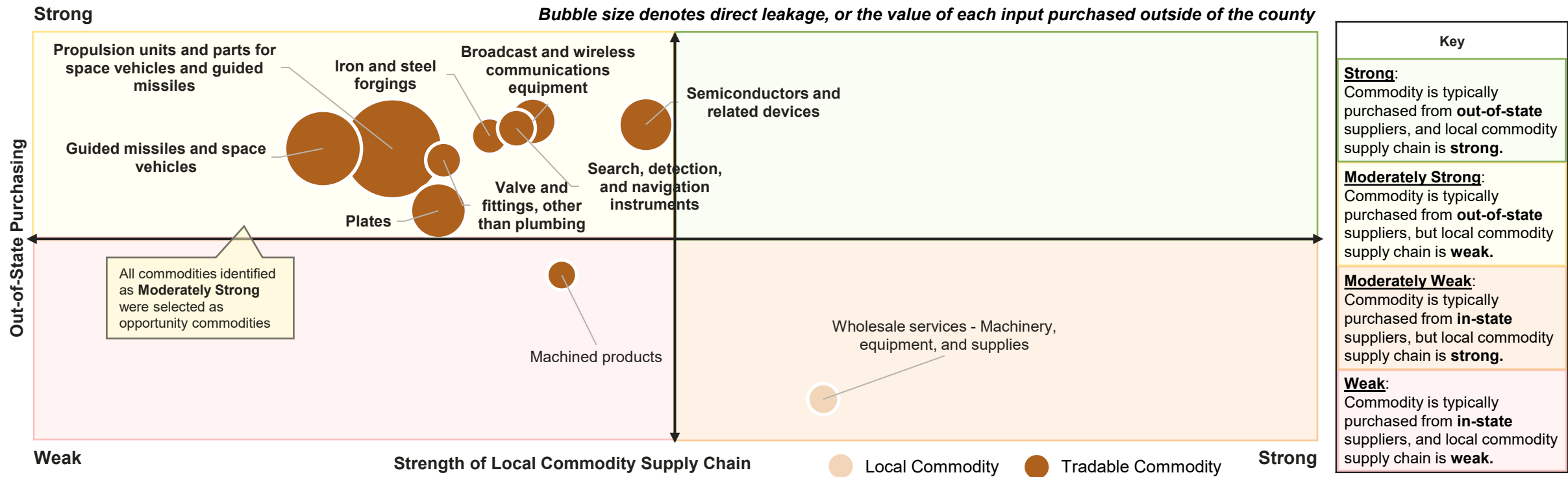


REGIONAL STRENGTHS AND GAPS PARALLEL AIRCRAFT MANUFACTURING

Guided Missile and Spacecraft Manufacturing uses a different set of input commodities than Aircraft Manufacturing, but the two core industries' supply chains have similar strengths in local services and gaps in manufactured commodities.

The production of intricate missile and space equipment represents a gap in the county’s Guided Missile and Space Vehicle Manufacturing supply chain

Guided Missile and Space Vehicle Manufacturing supply chain gaps exist where King County producers are not meeting demand for commodity inputs; however, not every gap presents a strong opportunity for the county. The chart below evaluates the viability of input commodities as opportunities for business attraction. A strong target commodity would have high spending outside of the county, an existing supply chain in the county, and demand that is not be met by the WA state economy.



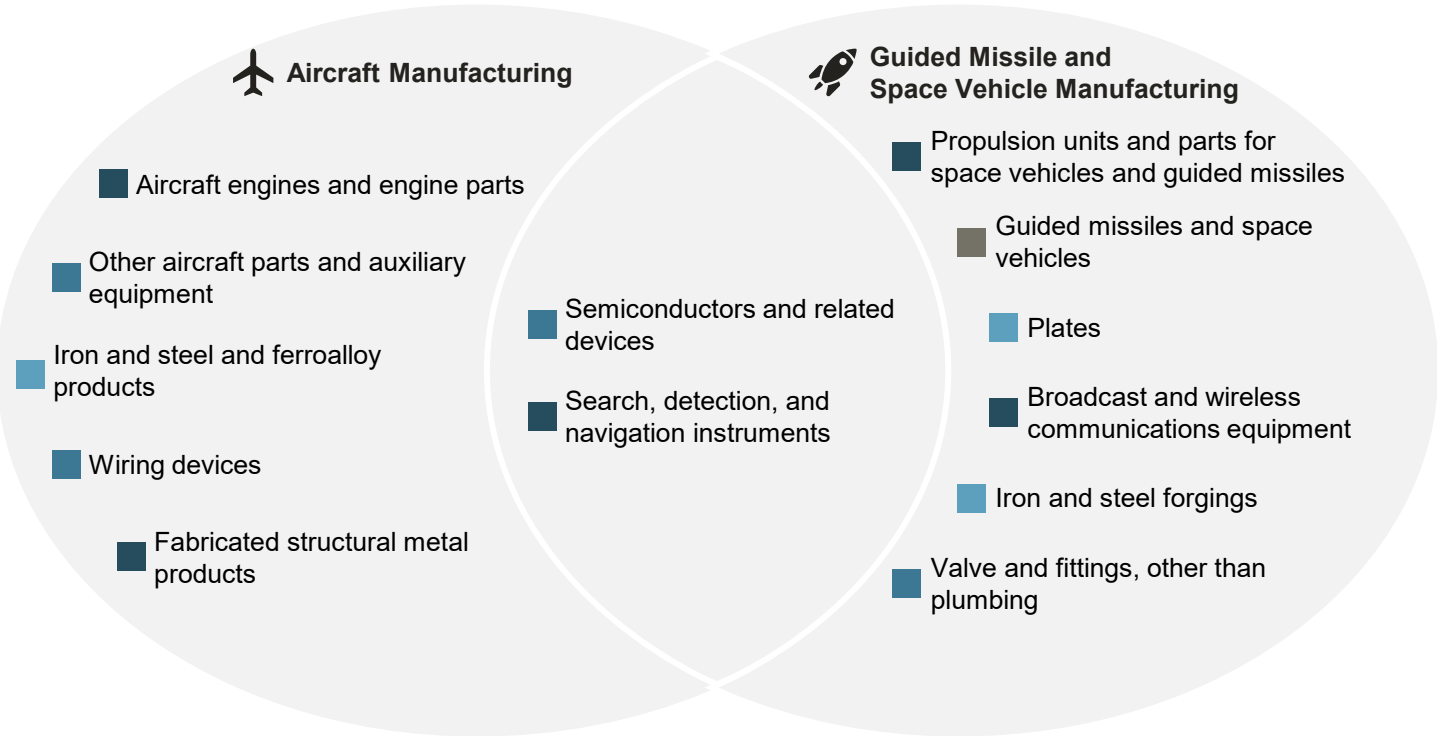
CORE AEROSPACE INDUSTRIES SHARE REGIONAL GAPS

Both Aircraft Manufacturing and Guided Missile and Space Vehicle Manufacturing have supply chain gaps in semiconductors and related devices and search, detection, and navigation instruments. These two commodities therefore present an even stronger opportunity for the county, given their importance across the aerospace sector.

Opportunity commodities for the county’s aerospace sector are manufactured with specialized knowledge, tools, and techniques

The opportunity commodities across both industries span the aerospace supply chain, are highly regulated, and require specialized knowledge to design, manufacture, and use. As such, these commodities are produced in specialized factories with precision engineering and assembly. Future analysis can further investigate the viability of these commodities as targets of business attraction and growth and identify strategies to capture these opportunities.

Opportunity Commodities



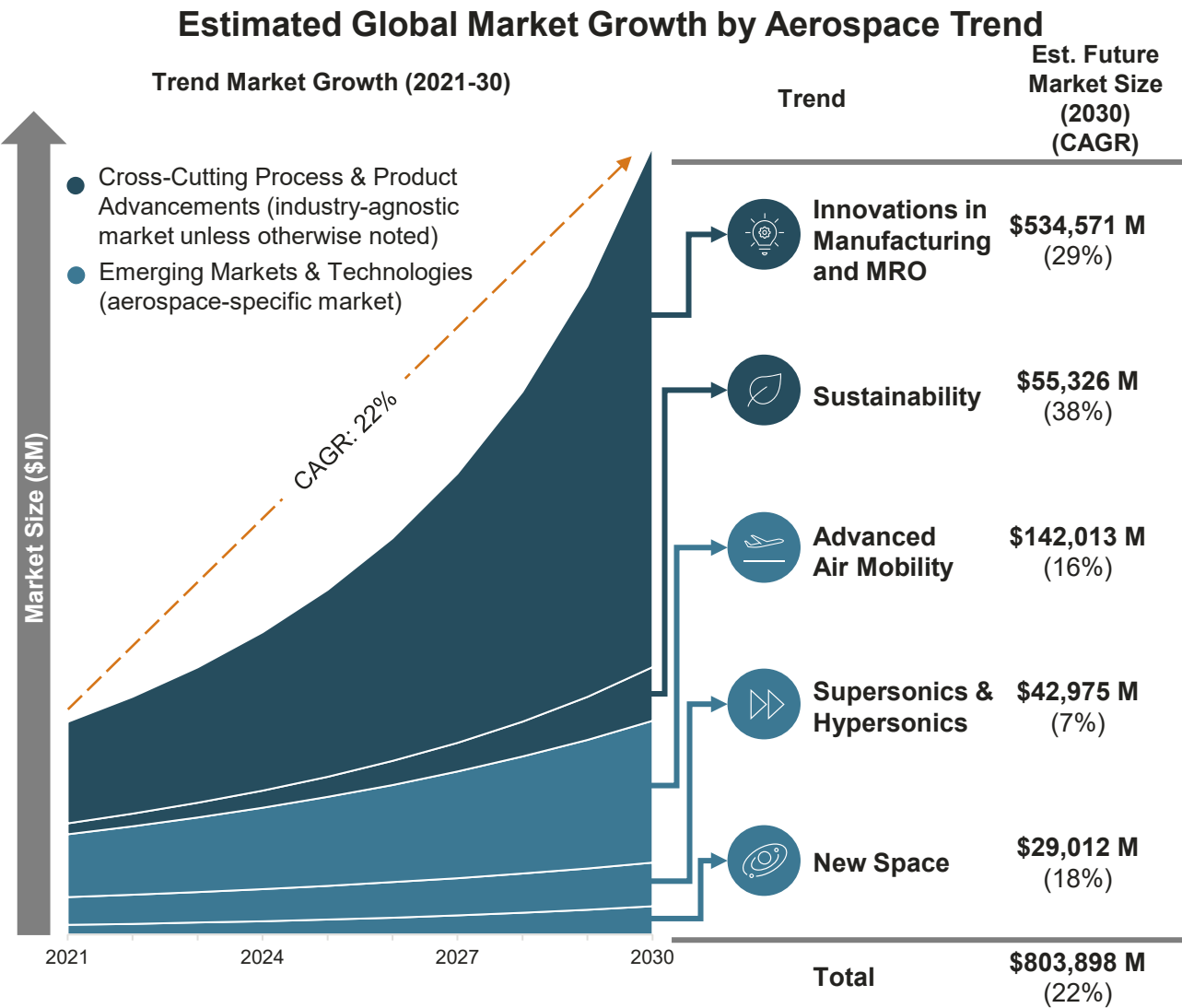
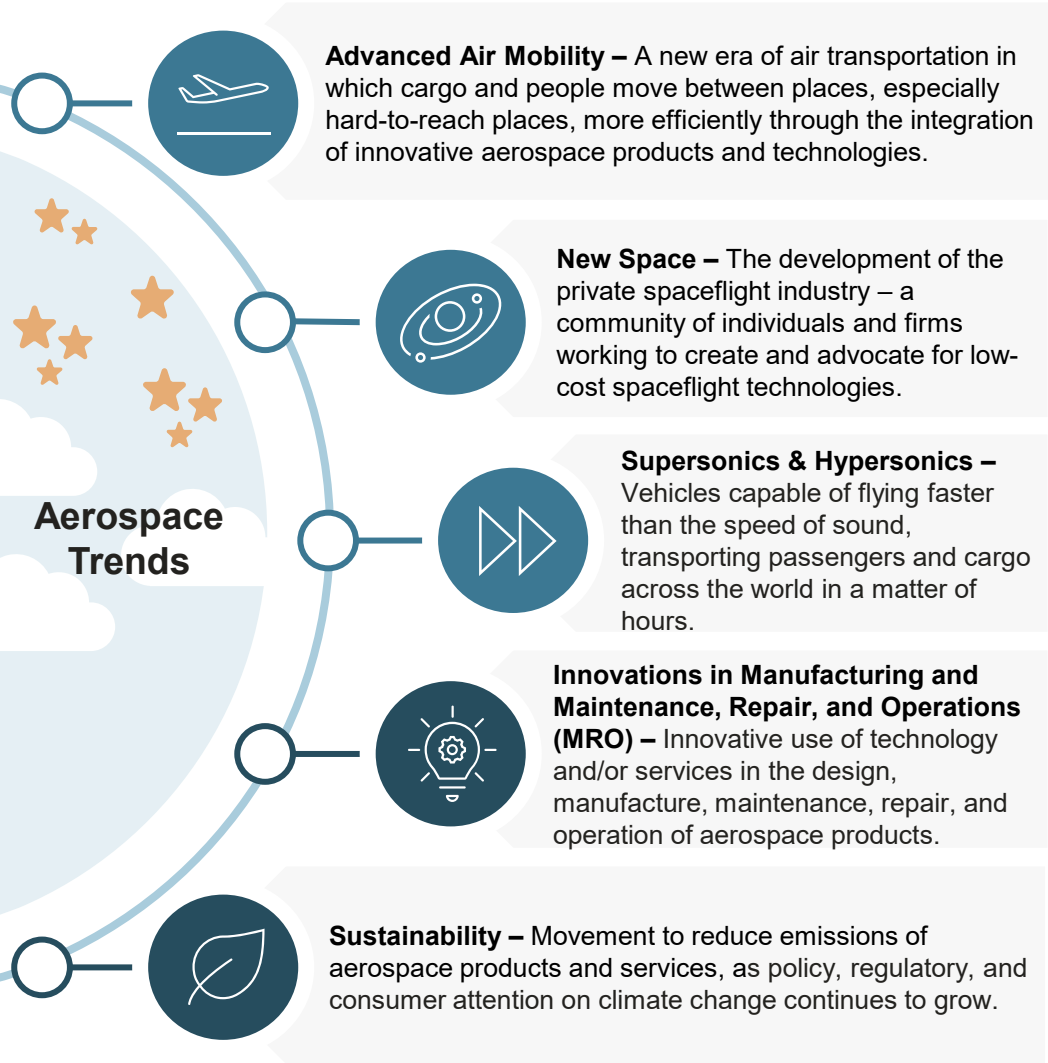
Key	OEMs	Suppliers			
		Tier 1	Tier 2	Tier 3	Tier 4
					

Key Questions for Additional Analysis

- Viability of the opportunity**
- Does King County have the infrastructure and resources needed to produce these commodities?
 - How will industry trends impact the relevance and growth of the opportunity commodities?
 - What organizations or assets can the county utilize to support local production?
- Current producers of these opportunity commodities**
- Where and by who are these commodities currently being produced?
 - What makes current producers of these commodities competitive?
- Workforce impact of these opportunity commodities**
- What are the average and median wages within the industries that produce these commodities?
 - What specific skills or knowledge are required to help produce these commodities?
- How these opportunity commodities can be captured**
- How can the county help induce local production of these commodities?
 - How can local aerospace businesses pivot or expand to produce these commodities?

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Aerospace trends – with a future global market size of \$803B – are poised to create both opportunities and challenges for the King County aerospace sector



Based on King County’s current market readiness, its local economy is best positioned to capture economic opportunities in Sustainability, Innovations in Manufacturing and MRO, and New Space

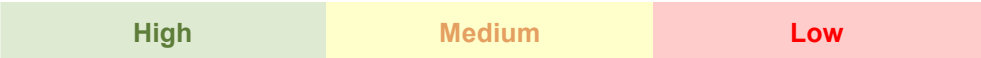
Criteria: King County’s market readiness was evaluated for each of the five key aerospace trends based on the criteria outlined below; readiness ratings were assigned for each sub-criteria.

Assessment: The three most relevant trends were identified based on the county’s market readiness. Pursuit of opportunities in the other two trends (Advanced Air Mobility and Supersonics & Hypersonics) would require development of foundational infrastructure and private investment.

Market Readiness Criteria

Criteria	Sub-Criteria
Related Enterprises	Direct and Supporting Businesses
Physical and Knowledge Capital	Infrastructure
	Research and Development (R&D)
Human Capital	Workforce
	Workforce Development Opportunities
Financial Capital	Public Investment
	Private Investment
Competitive Landscape	National Competitive Advantage
	International Competitive Advantage

Market Readiness Criteria Rating Scale:



Trends of interest based on King County’s current market strengths		Overall Market Readiness Assessment	
King County’s Overall Market Readiness	 Sustainability		Foundation Developed – Strong presence of relevant businesses, R&D programs, and skilled workforce, as well as strong government support
	 Innovations in Manufacturing and MRO		Foundation Developed – Strong presence of relevant businesses, R&D programs, and skilled workforce, as well as strong government support, but site scarcity presents a challenge
	 New Space		Foundation Developed – Strong presence of relevant businesses, R&D programs, and skilled workforce, but lacking financial capital and physical infrastructure compared to other regions
	 Advanced Air Mobility		Requires Development – Strong R&D and presence of skilled workforce, but stronger infrastructure and financial opportunities have created competitive advantages in other regions
	 Supersonics & Hypersonics		Requires Development – Strong R&D and presence of skilled workforce; however, lack of necessary infrastructure and access to private capital may hinder future growth

The three selected trends are expected to create shifts in the aerospace supply chain – industries likely to be impacted include Science & Technology Consulting and Energy

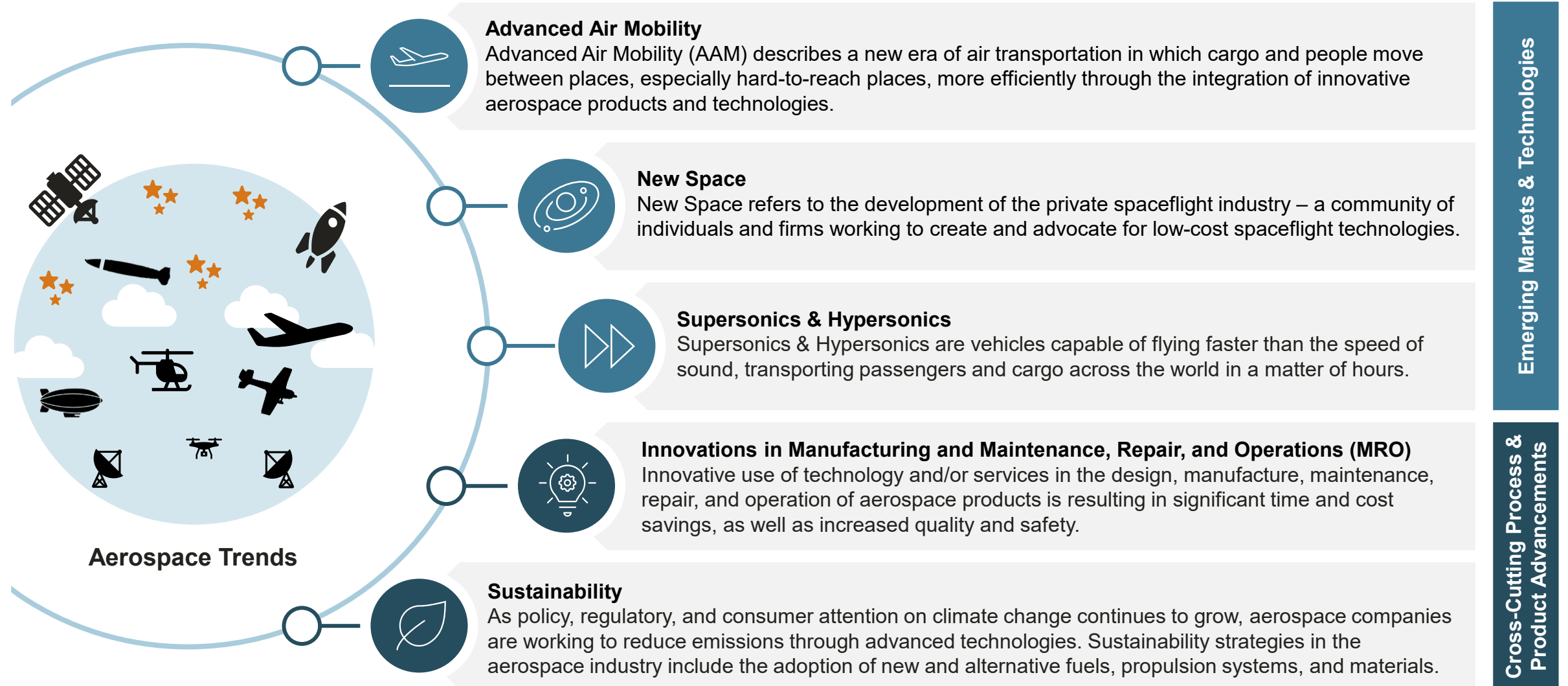
Summary of industries expected to be impacted by selected trends				
Supply chain impact type	Themes informing expected impacts on aerospace supply chain industries			
Expected to decline				
Expected to be disrupted				
Expected to grow				
Leading industries				

The selected trends are also anticipated to drive changes in workforce demand in King County, including increasing the need for software development and management roles

Summary of occupations expected to be impacted by selected trends							
Themes informing expected impacts on aerospace workforce		New Space		Sustainability		Innovations in Manufacturing and MRO	
		Impacted Emp.* (2021)	Avg. Wage (2021)	Impacted Emp.* (2021)	Avg. Wage (2021)	Impacted Emp.* (2021)	Avg. Wage (2021)
Workforce impact type	Expected to decline	N/A – There are no firms operating in King County in the industry expected to decline due to New Space disruptions		710	\$101K	710	\$101K
	Expected to be disrupted	36,590	\$109K	37,590	\$87K	67,865	\$122K
	Expected to grow	287,075	\$192K	90,580	\$163K	113,170	\$259K
	Leading industries	2,525	\$174K	67,010	\$129K	77,720	\$168K
• Technological advancements in New Space, Sustainability, and Manufacturing put relatively few King County jobs at risk		Occupations related to assembly and fabrication, software development and testing, engineering, and management		Occupations related to assembly and fabrication, software development and testing, engineering, and management		Occupations related to assembly and fabrication, software development and testing, engineering, and management	
• Shifts in consumer behavior and preferences drive disruption of occupations related to the movement of people and cargo		Occupations related to customer service, sales, cargo and freight, and operation of planes and trucks		Occupations related to operation of planes and trucks, cargo and freight, customer service, and machinery		Occupations related to management, freight, software development and testing, sales, assembly, and machinery	
• Technological disruption creates changes in production roles related to assembly and machinery		Occupations related to software development and testing, computer systems and support, management, and sales		Occupations related to management, sales, software development and testing, and science		Occupations related to software development and testing, computer systems and support, sales, and management	
• Technological advancements drive growth in occupations related to software development and testing		Occupations related to software development, assembly and fabrication, engineering, and machinery		Occupations related to management, software development and testing, engineering, and assembly		Occupations related to software development and testing, computer systems and support, management, and engineering	
• Growing demand for air and space travel drives growth in occupations related to sales							
• Existing aerospace sector leaders rely on occupations related to engineering and software development and testing							
• Cross-industry collaboration relies on strength in occupations related to management							

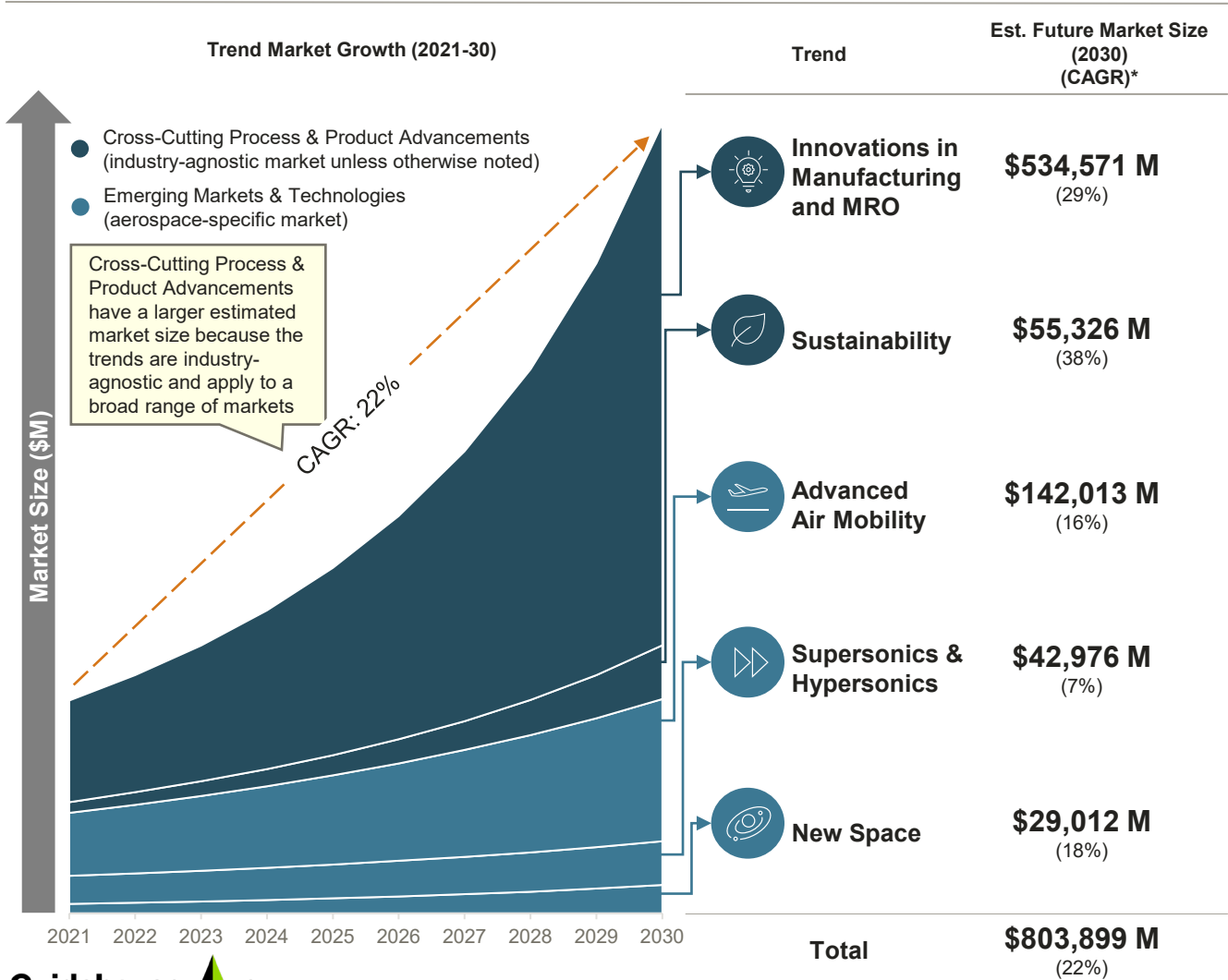
***Note:** Impacted employment (emp.) and associated data reflect the current composition of industries expected to be impacted by the trends. Workforce impacts identify the top occupations within industries expected to be impacted by the trends. Workforce impacts do not project absolute change in the demand for the identified occupations.

The emergence of new markets and technologies will create both opportunities and challenges for the aerospace industry



The global market growth of aerospace trends and sub-trends is driven by emerging economies, rapid technological advancement, and social change

Est. Global Market Growth by Aerospace Trend



Est. Global Market Growth by Aerospace Sub-Trend

Trend	Sub-Trend	Current Market Size (\$M, 2021)	Future Market Size (\$M, 2030)	CAGR
Innovations in Manufacturing and MRO	Digital Engineering	\$6,500	\$125,700	39%
	Robotics	\$42,350	\$120,310	12%
	Manufacturing Intelligence	\$2,963	\$78,744	44%
	Additive Manufacturing	\$13,840	\$76,160	21%
	Space & Aviation Cyber Security (aerospace)	\$25,325	\$61,850	9%
	Blockchain-Enabled Supply Chain Systems	\$376	\$43,376	70%
	Advanced Materials (aerospace)	\$12,851	\$28,431	9%
Sustainability	Vertical Integration (aerospace)	Not yet available		
	Electrification (aerospace)	\$10,910	\$39,610	15%
	Sustainable Fuels (aerospace)	\$219	\$15,716	61%
Advanced Air Mobility	Unmanned Aerial Systems (UAS)	\$56,700	\$106,030	8%
	Electric Vertical Take-Off and Landing Vehicle (eVTOL)	\$6,937	\$30,519	18%
	Unmanned Traffic Management (UTM)	\$880	\$5,464	23%
	Vertical Airports	Not yet available		
Supersonics & Hypersonics	Civil Supersonics	\$23,560	\$30,796	4%
	Hypersonic Vehicles (Civil & Defense)	\$4,980	\$12,180	10%
	Space-based Point to Point Travel	Not yet available		
New Space	Satellite Internet Mega Constellations	\$7,370	\$19,710	12%
	Commercial Space Travel	\$372	\$5,540	35%
	Space Propulsion Technology	\$2,180	\$3,762	7%

*Note: See Appendix for full list of market growth sources.

As an aerospace sector leader, King County has a diversity of businesses involved in or impacted by the aerospace trends

Emerging Markets & Technologies

Advanced Air Mobility



New Space



Supersonics & Hypersonics



Cross-Cutting Process & Product Advancements

Innovations in Manufacturing and MRO



Sustainability



A Market Readiness Assessment was conducted to determine the county’s current ability to capture economic opportunities created by each trend

The following criteria were used to evaluate King County’s current foundation to support growth within each major trend. The assessment is used to understand which economic opportunities are most relevant for the county based on the current market, workforce, and competitive landscape.

Market Readiness Assessment Criteria*				
 Related Enterprises	 Physical and Knowledge Capital	 Human Capital	 Financial Capital	 Competitive Landscape
Direct and Supporting Businesses	Infrastructure	Workforce	Public Investment	National Competitive Advantage
Local concentration of OEMs and suppliers that are directly related to or support the trends	Development of physical structures and facilities related to trends	Availability of local workforce with in-demand skillsets	Availability of government incentives and funds related to the trends	Level of competitive advantage on the national scale
	Research and Development (R&D)	Workforce Development Opportunities	Private Investment	International Competitive Advantage
	Amount of local R&D activity related to trends	Availability of relevant local workforce development opportunities	Availability of private venture capital focused on the trends	Level of competitive advantage on the international scale

Market readiness criteria rating scale:

High

Medium

Low

THE MARKET READINESS ASSESSMENT GROUNDS THE AEROSPACE TRENDS IN KING COUNTY’S ECONOMY
Understanding the county’s market readiness related to each aerospace trend can help inform strategies to stay on the cutting edge of the sector and support aerospace businesses attraction, retention, and growth.

*Note: See Appendix for detailed market readiness assessment criteria.

King County's existing market strengths provide a foundation for growth in Sustainability, Innovations in Manufacturing & MRO, and New Space

	Selected trends of interest based on current market readiness	Related Enterprise	Physical and Knowledge Capital		Human Capital		Financial Capital		Competitive Landscape		Overall Market Readiness Assessment
		Businesses	Infrastructure	Research and Development (R&D)	Workforce	Workforce Development Opportunities	Public Investment	Private Investment	National Competitive Advantage	International Competitive Advantage	
King County's Overall Market Readiness	 Sustainability	High	Medium	High	High	High	High	Medium	Medium	High	 Foundation Developed – Strong presence of relevant businesses, R&D programs, and skilled workforce, as well as strong government support
	 Innovations in Manufacturing and MRO	High	Low	High	High	High	Medium	Medium	High	High	 Foundation Developed – Strong presence of relevant businesses, R&D programs, and skilled workforce, as well as strong government support, but site scarcity presents a challenge
	 New Space	High	Low	High	High	High	Medium	Medium	Medium	High	 Foundation Developed – Strong presence of relevant businesses, R&D programs, and skilled workforce, but lacking financial capital and launch facilities, compared to other regions
	 Advanced Air Mobility	Low	Medium	High	High	High	Medium	Low	Low	High	 Requires Development – Strong R&D and presence of skilled workforce, but stronger infrastructure and financial opportunities have created competitive advantages in other regions
	 Supersonics & Hypersonics	Low	Low	Medium	High	High	Medium	Low	Low	High	 Requires Development – Strong R&D and presence of skilled workforce; however, lack of necessary infrastructure and access to private capital may hinder future growth

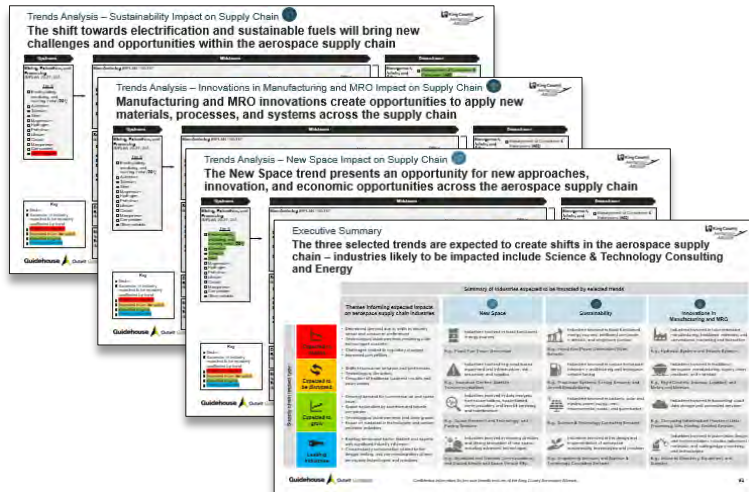
● Cross-Cutting Process & Product Advancements ● Emerging Markets & Technologies

KING COUNTY'S STRENGTHS IN BUSINESS PRESENCE, WORKFORCE, AND R&D PROVIDE A FOUNDATION FOR GROWTH

Based on current market conditions in the county, three of the five key trends present a strong opportunity for future aerospace sector growth. To pursue regional growth in Advanced Air Mobility and Supersonics & Hypersonics, King County may need additional development in areas like infrastructure and private investment.

The Supply Chain and Workforce Impact Evaluations examine how the selected trends are expected to affect the aerospace sector

1. Supply Chain Impact Evaluation

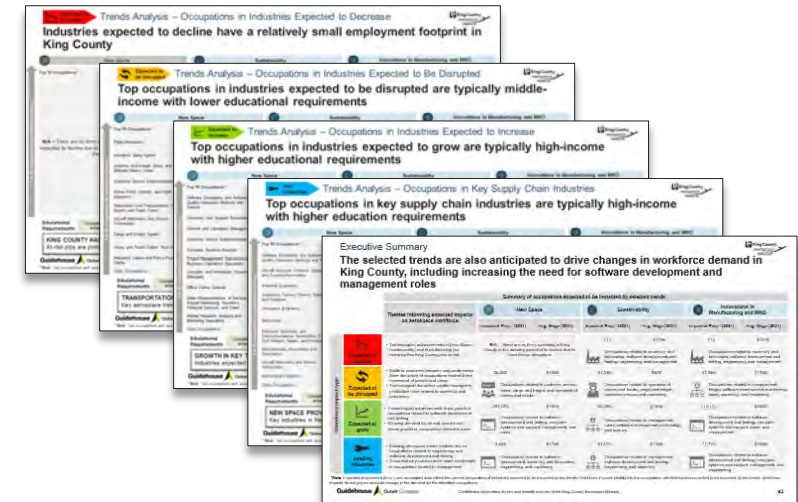


Using qualitative research, the aerospace supply chain was evaluated to identify industries that are expected to be impacted by the trends most relevant to King County (Sustainability, Innovations in Manufacturing and MRO, and New Space). Types of impacts identified include expected growth, disruption, and decline, as well as industries that are expected to lead the future success of the trends.

Impacts to supply chain industries



2. Workforce Impact Evaluation



Using the results of the supply chain evaluation, the aerospace workforce was analyzed to identify top occupations within industries that are expected to be impacted by the trends. These occupations can be considered for targeted workforce development efforts.

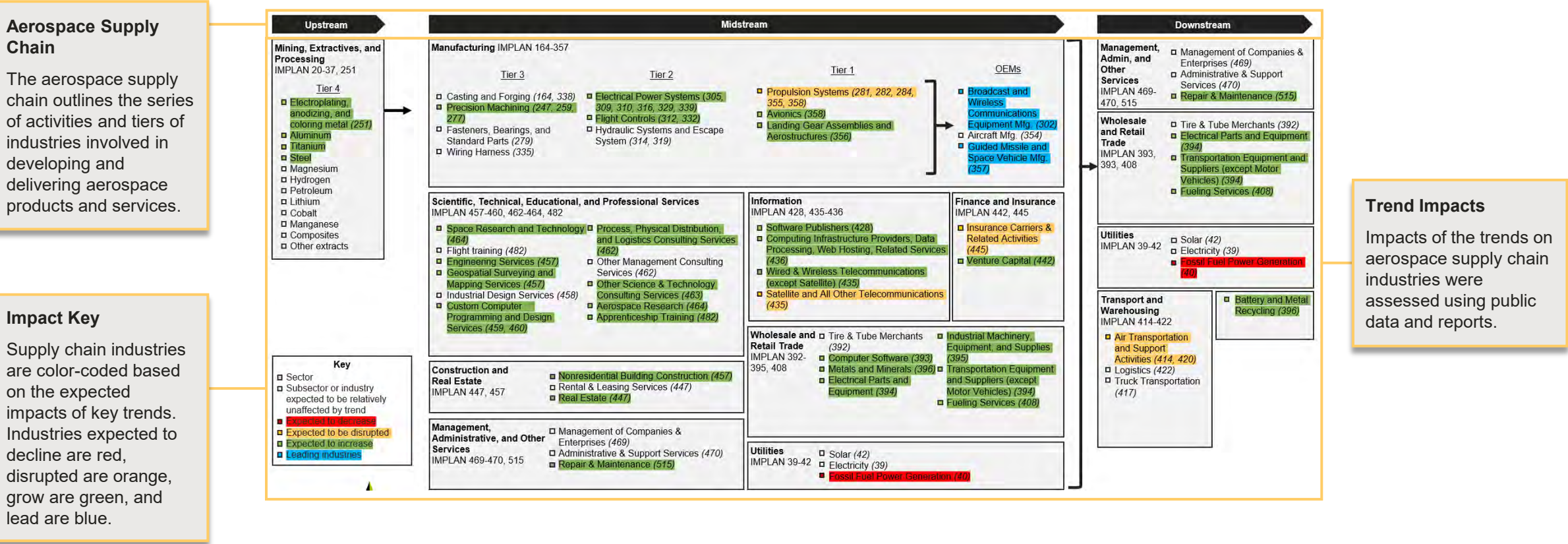
INDUSTRIES IMPACTED WITHIN THE AEROSPACE SUPPLY CHAIN WERE USED TO IDENTIFY AFFECTED OCCUPATIONS

The aerospace supply chain is evolving due to changes in technology, processes, market demand, and regulatory requirements. This evolution creates a need for specific occupations, which have been captured in the workforce impact evaluation.

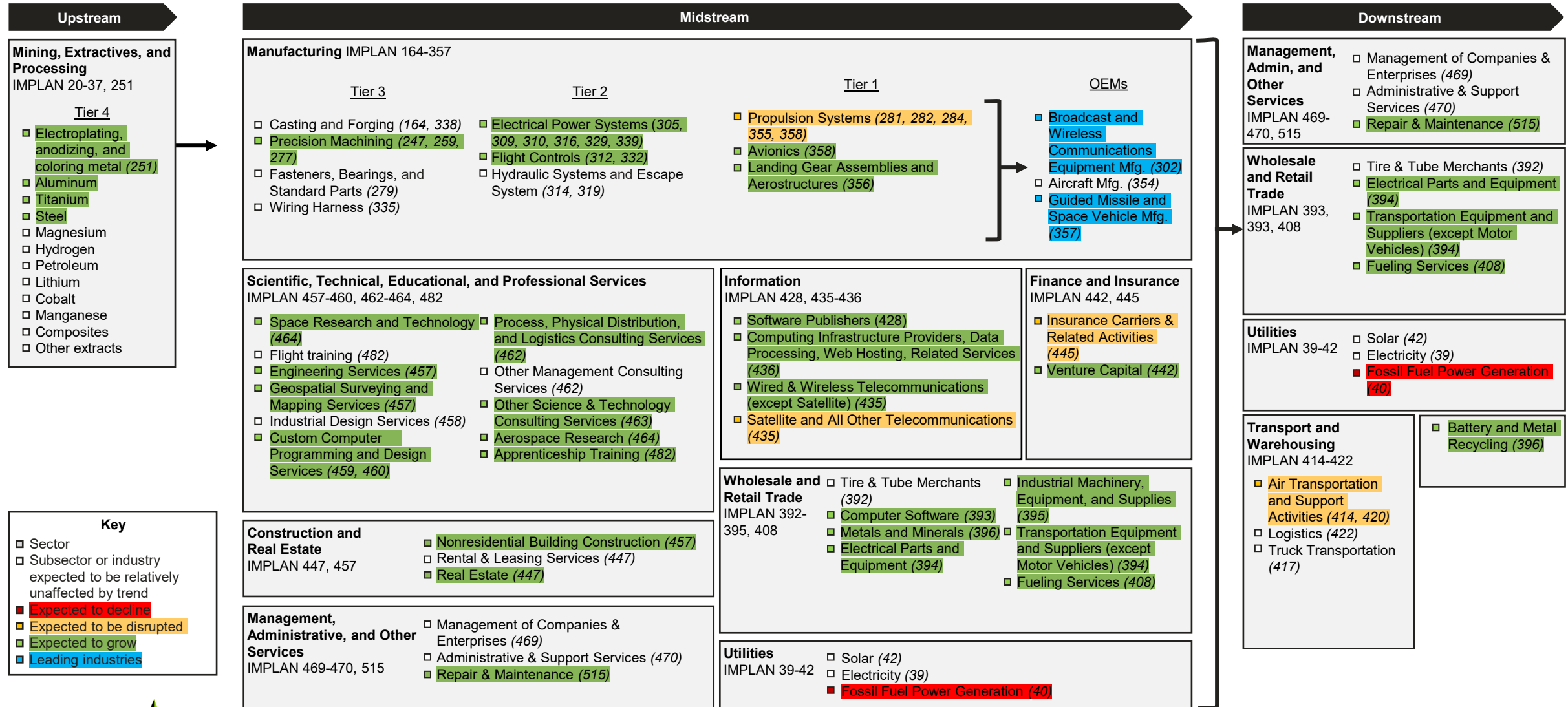
The Supply Chain Impact Evaluation identifies the aerospace supply chain industries expected to be affected by key trends

The Supply Chain Impact Evaluation outlines how trends are expected to drive changes in the aerospace supply chain by identifying which industries are expected to decline, be disrupted, grow, or remain critical. This analysis can be used to inform supply chain recommendations. For example, businesses in industries expected to be disrupted may require additional support in implementing technological advancements. The figure below is a sample of the supply chain analysis for New Space.

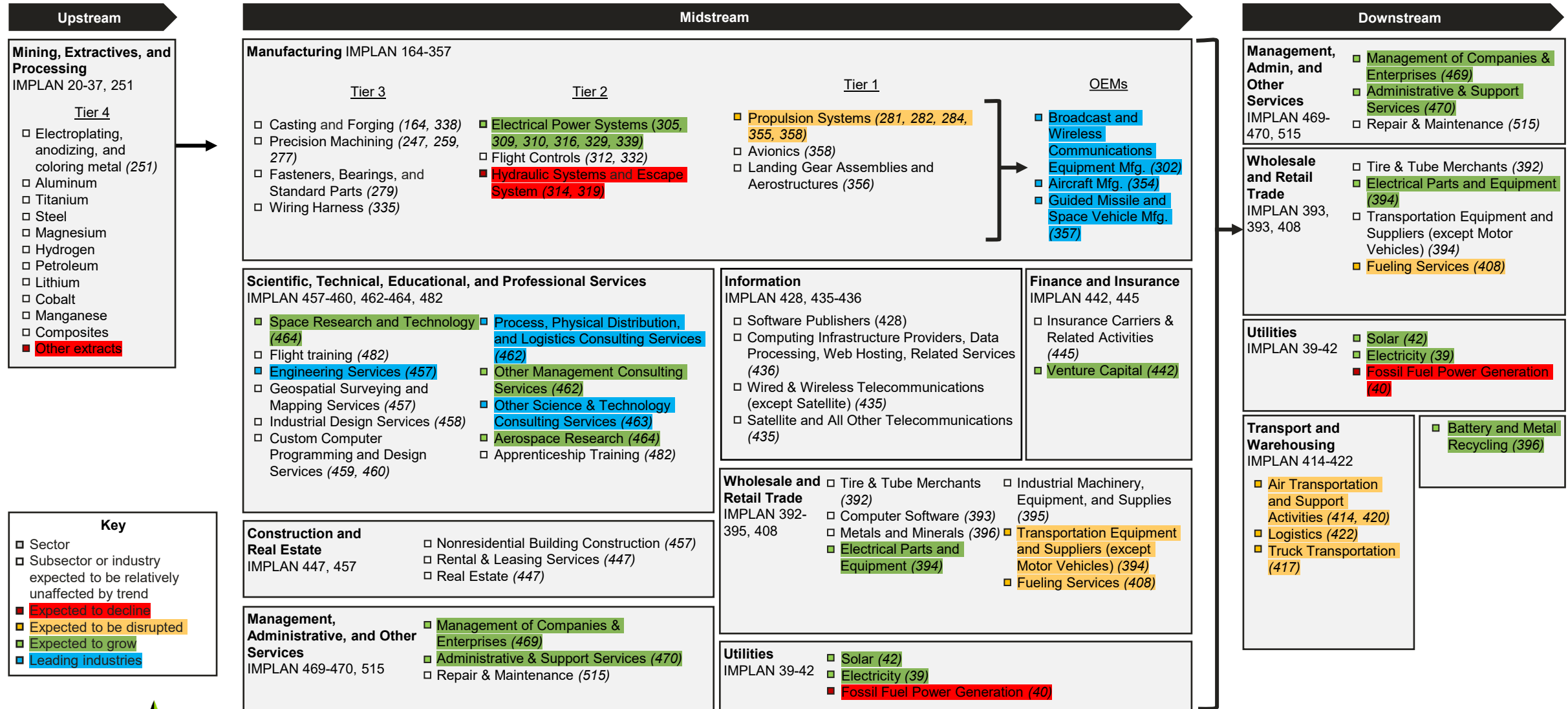
Sample Supply Chain Analysis



The New Space trend presents an opportunity for new approaches, innovation, and economic opportunities across the aerospace supply chain

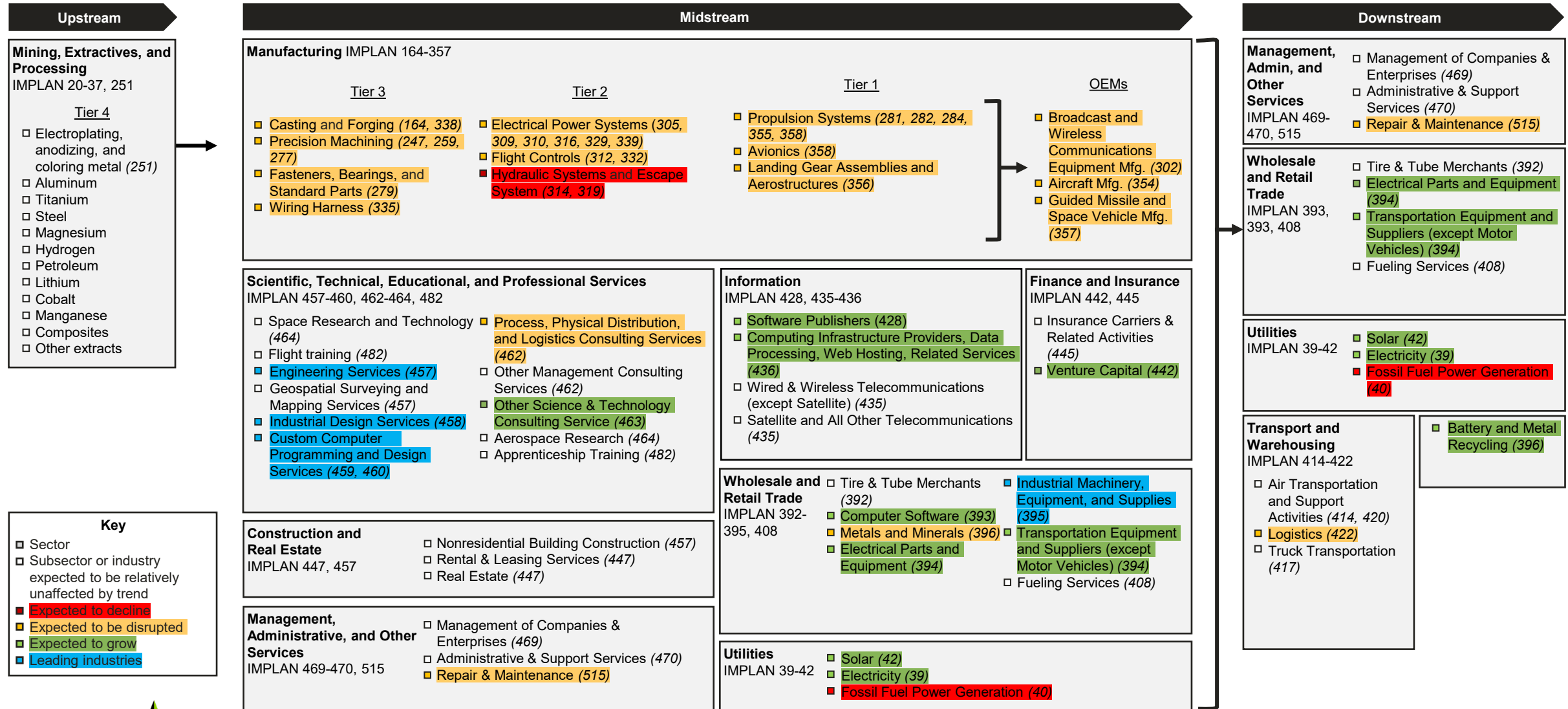


The shift towards electrification and sustainable fuels will bring new challenges and opportunities within the aerospace supply chain





Manufacturing and MRO innovations create opportunities to apply new materials, processes, and systems across the supply chain



The Workforce Impact Evaluation identifies occupations that may be impacted by the key trends

The Workforce Impact Evaluation outlines how trends may drive changes in the demand for jobs in King County by identifying the top occupations in the industries expected to decline, be disrupted, grow, or remain critical. This analysis can help inform workforce development efforts. For example, employees in industries expected to decline or be disrupted because of key trends may require additional support in reskilling or upskilling.

Sample Workforce Analysis

Top 10 Occupations
Top occupations by current employment were identified for the aerospace supply chain industries that are expected to decline, be disrupted, grow, or remain critical due to the impacts of the key trends.

New Space				Sustainability				Innovations in Manufacturing and MRO				
Top 10 occupations by employment (emp.)	Top 10 Occupations*	Emp. (2021)	Typical Entry-Level Education	Avg. Wage	Top 10 Occupations*	Emp. (2021)	Typical Entry-Level Education	Avg. Wage	Top 10 Occupations*	Emp. (2021)	Typical Entry-Level Education	Avg. Wage
	Software Developers and Software Quality Assurance Analysts and Testers	165	Bachelor's degree	\$257K	Management Analysts	3,080	Bachelor's degree	\$169K	Software Developers and Software Quality Assurance Analysts and Testers	11,775	Bachelor's degree	\$218K
	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	145	High school diploma or equivalent	\$110K	Software Developers and Software Quality Assurance Analysts and Testers	2,505	Bachelor's degree	\$186K	Computer Systems Analysts	4,290	Bachelor's degree	\$201K
	Industrial Engineers	115	Bachelor's degree	\$202K	Civil Engineers	2,235	Bachelor's degree	\$131K	Computer User Support Specialists	3,715	Associate's degree	\$115K
	Inspectors, Testers, Sorters, Samplers, and Weighers	105	High school diploma or equivalent	\$116K	Project Management Specialists and Business Operations Specialists, All Other	1,980	Bachelor's degree	\$140K	Computer and Information Systems Managers	2,490	Bachelor's degree	\$328K
	Aerospace Engineers	90	Bachelor's degree	\$224K	General and Operations Managers	1,955	Bachelor's degree	\$244K	General and Operations Managers	2,240	Bachelor's degree	\$289K
	Machinists	80	High school diploma or equivalent	\$102K	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	1,760	High school diploma or equivalent	\$94K	Computer Occupations, All Other	2,195	Bachelor's degree	\$199K
	Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers	80	High school diploma or equivalent	\$97K	Inspectors, Testers, Sorters, Samplers, and Weighers	1,595	High school diploma or equivalent	\$89K	Civil Engineers	2,115	Bachelor's degree	\$129K
	Miscellaneous Assemblers and Fabricators	75	High school diploma or equivalent	\$83K	Mechanical Engineers	1,570	Bachelor's degree	\$149K	Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel	2,070	High school diploma or equivalent	\$150K
	Aircraft Mechanics and Service Technicians	70	Certificate	\$127K	Industrial Engineers	1,510	Bachelor's degree	\$162K	Computer Programmers	1,945	Bachelor's degree	\$184K
Mechanical Engineers	70	Bachelor's degree	\$206K	Market Research Analysts and Marketing Specialists	1,440	Bachelor's degree	\$114K	Project Management Specialists and Business Operations Specialists, All Other	1,855	Bachelor's degree	\$176K	
Other Occupations	1,530	N/A	\$182K	Other Occupations	47,375	N/A	\$120K	Other Occupations	43,035	N/A	\$140K	
Educational Requirements:				Average Wage:				Average Wage:				
Occupations requiring a high school diploma or less				Average wage per employee is < \$50k				Average wage per employee is \$50k - \$100k				
Occupations requiring certificate, some college, or training				Average wage per employee is > \$100k								
Occupations requiring bachelor's or advanced degree												

Typical Entry-Level Education Requirements
Typical educational requirements to obtain entry-level positions were identified for each occupation. This is an indicator of the accessibility of the occupation.

Current Employment
Employment figures in 2021 were identified for the top 10 occupations in industries expected to be impacted by the trends. These figures provide a rough idea of the magnitude of jobs in the county that may be impacted by the trends.

Average Wage
Average wages paid to employees holding the occupation in 2021 were identified for each occupation. This is a rough indicator of the quality of the job. Note that average wage is calculated as total wage and salary income divided by total wage and salary employment. This means that average wage data does not necessarily reflect entry-level wages.



Industries expected to decline have a relatively small employment footprint in King County

New Space				Sustainability				Innovations in Manufacturing and MRO			
Top 10 Occupations*	Emp. (2021)	Typical Entry-Level Education	Avg. Wage	Top 10 Occupations*	Emp. (2021)	Typical Entry-Level Education	Avg. Wage	Top 10 Occupations*	Emp. (2021)	Typical Entry-Level Education	Avg. Wage
N/A – There are no firms operating in King County in the industry expected to decline due to New Space disruptions (i.e., Fossil Fuel Power Generation)				Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers	80	High school diploma or equivalent	\$47K	Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers	80	High school diploma or equivalent	\$47K
				Software Developers and Software Quality Assurance Analysts and Testers	60	Bachelor's degree	\$144K	Software Developers and Software Quality Assurance Analysts and Testers	60	Bachelor's degree	\$144K
				Miscellaneous Assemblers and Fabricators	30	High school diploma or equivalent	\$45K	Miscellaneous Assemblers and Fabricators	30	High school diploma or equivalent	\$45K
				Industrial Engineers	25	Bachelor's degree	\$119K	Industrial Engineers	25	Bachelor's degree	\$119K
				Electrical Engineers	20	Bachelor's degree	\$132K	Electrical Engineers	20	Bachelor's degree	\$132K
				Mechanical Engineers	20	Bachelor's degree	\$121K	Mechanical Engineers	20	Bachelor's degree	\$121K
				Inspectors, Testers, Sorters, Samplers, and Weighers	20	High school diploma or equivalent	\$58K	Inspectors, Testers, Sorters, Samplers, and Weighers	20	High school diploma or equivalent	\$58K
				General and Operations Managers	15	Bachelor's degree	\$207K	General and Operations Managers	15	Bachelor's degree	\$207K
				Architectural and Engineering Managers	15	Bachelor's degree	\$200K	Architectural and Engineering Managers	15	Bachelor's degree	\$200K
				Electrical and Electronic Engineering Technologists and Technicians	15	Associate's degree	\$47K	Electrical and Electronic Engineering Technologists and Technicians	15	Associate's degree	\$47K
				Other Occupations	405	N/A	\$101K	Other Occupations	405	N/A	\$101K

Educational Requirements:	Occupations requiring a high school diploma or less	Occupations requiring certificate, some college, or training	Occupations requiring bachelor's or advanced degree	Average Wage:	Average wage per employee is < 50k	Average wage per employee is \$50k - \$100k	Average wage per employee is > \$100k
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KING COUNTY HAS RELATIVELY FEW INDUSTRIES EXPECTED TO DECLINE DUE TO TREND DISRUPTIONS
At-risk jobs are primarily related to the use of hydraulic systems, which have a relatively small impact on King County's economy.



Top occupations in industries expected to be disrupted are typically middle-income jobs with lower educational requirements

Top 10 occupations by employment (emp.)	New Space				Sustainability				Innovations in Manufacturing and MRO			
	Top 10 Occupations*	Emp. (2021)	Typical Entry-Level Education	Avg. Wage	Top 10 Occupations*	Emp. (2021)	Typical Entry-Level Education	Avg. Wage	Top 10 Occupations*	Emp. (2021)	Typical Entry-Level Education	Avg. Wage
	Flight Attendants	3,400	High school diploma or equivalent	\$75K	Heavy and Tractor-Trailer Truck Drivers	5,385	Postsecondary nondegree award	\$67K	Management Analysts	2,520	Bachelor's degree	\$177K
	Insurance Sales Agents	2,890	High school diploma or equivalent	\$118K	Laborers and Freight, Stock, and Material Movers, Hand	4,195	Training	\$59K	Laborers and Freight, Stock, and Material Movers, Hand	2,460	Training	\$58K
	Laborers and Freight, Stock, and Material Movers, Hand	2,740	Training	\$63K	Flight Attendants	3,400	High school diploma or equivalent	\$75K	Software Developers and Software Quality Assurance Analysts and Testers	2,335	Bachelor's degree	\$189K
	Customer Service Representatives	2,380	High school diploma or equivalent	\$75K	Airline Pilots, Copilots, and Flight Engineers	2,140	Bachelor's degree and training	\$235K	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	2,030	High school diploma or equivalent	\$108K
	Airline Pilots, Copilots, and Flight Engineers	2,140	Bachelor's degree and training	\$235K	Aircraft Mechanics and Service Technicians	1,970	Certificate	\$66K	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	2,005	High school diploma or equivalent	\$89K
	Reservation and Transportation Ticket Agents and Travel Clerks	1,970	High school diploma or equivalent	\$66K	Reservation and Transportation Ticket Agents and Travel Clerks	1,690	High school diploma or equivalent	\$108K	General and Operations Managers	1,975	Bachelor's degree	\$249K
	Aircraft Mechanics and Service Technicians	1,690	Certificate	\$108K	Cashiers	1,260	No formal educational credential	\$31K	Inspectors, Testers, Sorters, Samplers, and Weighers	1,620	High school diploma or equivalent	\$88K
	Cargo and Freight Agents	1,195	High school diploma or equivalent	\$78K	Cargo and Freight Agents	1,230	High school diploma or equivalent	\$78K	Machinists	1,615	High school diploma or equivalent	\$77K
	Heavy and Tractor-Trailer Truck Drivers	1,055	Postsecondary nondegree award	\$77K	Customer Service Representatives	920	High school diploma or equivalent	\$62K	Industrial Engineers	1,580	Bachelor's degree	\$156K
	Insurance Claims and Policy Processing Clerks	995	High school diploma or equivalent	\$82K	Industrial Truck and Tractor Operators	900	Postsecondary nondegree award	\$65K	Project Management Specialists and Business Operations Specialists, All Other	1,570	Bachelor's degree	\$145K
	Other Occupations	16,130	N/A	\$122K	Other Occupations	14,510	N/A	\$92K	Other Occupations	48,155	N/A	\$117K
Educational Requirements:				Occupations requiring a high school diploma or less	Occupations requiring certificate, some college, or training	Occupations requiring bachelor's or advanced degree	Average Wage:	Average wage per employee is < 50k	Average wage per employee is \$50k - \$100k	Average wage per employee is > \$100k		

TRANSPORTATION AND MATERIAL MOVING OCCUPATIONS ARE EXPECTED TO BE DISRUPTED

Key aerospace trends will likely change the way people and goods move from point A to point B, disrupting transportation and logistics occupations as a result.

Top occupations in industries expected to grow are typically high-income with higher educational requirements

New Space				Sustainability				Innovations in Manufacturing and MRO			
Top 10 Occupations*	Emp. (2021)	Typical Entry-Level Education	Avg. Wage	Top 10 Occupations*	Emp. (2021)	Typical Entry-Level Education	Avg. Wage	Top 10 Occupations*	Emp. (2021)	Typical Entry-Level Education	Avg. Wage
Software Developers and Software Quality Assurance Analysts and Testers	35,110	Bachelor's degree	\$296K	General and Operations Managers	3,085	Bachelor's degree	\$302K	Software Developers and Software Quality Assurance Analysts and Testers	20,865	Bachelor's degree	\$350K
Computer User Support Specialists	9,450	Some college, no degree	\$147K	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	2,800	High school diploma or equivalent	\$127K	Computer User Support Specialists	5,190	Some college, no degree	\$175K
General and Operations Managers	8,545	Bachelor's degree	\$323K	Software Developers and Software Quality Assurance Analysts and Testers	2,710	Bachelor's degree	\$217K	Customer Service Representatives	4,715	High school diploma or equivalent	\$114K
Customer Service Representatives	7,710	High school diploma or equivalent	\$99K	Medical Scientists, Except Epidemiologists	2,500	Doctoral or professional degree	\$196K	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	4,230	High school diploma or equivalent	\$160K
Computer Systems Analysts	7,630	Bachelor's degree	\$223K	Customer Service Representatives	2,360	High school diploma or equivalent	\$74K	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific	4,175	Bachelor's degree	\$250K
Project Management Specialists and Business Operations Specialists	6,890	Bachelor's degree	\$213K	Project Management Specialists and Business Operations Specialists, All Other	2,240	Bachelor's degree	\$162K	Market Research Analysts and Marketing Specialists	3,430	Bachelor's degree	\$250K
Computer and Information Systems Managers	6,525	Bachelor's degree	\$409K	Accountants and Auditors	2,115	Bachelor's degree	\$153K	General and Operations Managers	3,310	Bachelor's degree	\$400K
Office Clerks, General	6,420	High school diploma or equivalent	\$66K	Office Clerks, General	2,005	High school diploma or equivalent	\$64K	Computer and Information Systems Managers	3,235	Bachelor's degree	\$497K
Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel	6,105	High school diploma or equivalent	\$164K	Laborers and Freight, Stock, and Material Movers, Hand	1,910	Training	\$66K	Sales Representatives of Services	2,895	High school diploma or equivalent	\$195K
Market Research Analysts and Marketing Specialists	6,070	Bachelor's degree	\$199K	Bookkeeping, Accounting, and Auditing Clerks	1,715	Some college, no degree	\$82K	Project Management Specialists and Business Operations Specialists	2,825	Bachelor's degree	\$283K
Other Occupations	186,610	N/A	\$168K	Other Occupations	67,145	N/A	\$166K	Other Occupations	58,300	N/A	\$234K

Educational Requirements:

Occupations requiring a high school diploma or less

Occupations requiring certificate, some college, or training

Occupations requiring bachelor's or advanced degree

Average Wage:

Average wage per employee is < 50k

Average wage per employee is \$50k - \$100k

Average wage per employee is > \$100k

GROWTH IN KEY TRENDS WILL DEPEND ON OCCUPATIONS RELATED TO SOFTWARE DEVELOPMENT AND INFORMATION TECHNOLOGY

Industries expected to grow currently rely on occupations such as software developers and testers and computer user support specialists.

Top occupations in leading supply chain industries are typically high-income with higher education requirements

New Space			
Top 10 Occupations*	Emp. (2021)	Typical Entry-Level Education	Avg. Wage
Software Developers and Software Quality Assurance Analysts and Testers	165	Bachelor's degree	\$257K
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	145	High school diploma or equivalent	\$110K
Industrial Engineers	115	Bachelor's degree	\$202K
Inspectors, Testers, Sorters, Samplers, and Weighers	105	High school diploma or equivalent	\$116K
Aerospace Engineers	90	Bachelor's degree	\$224K
Machinists	80	High school diploma or equivalent	\$102K
Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers	80	High school diploma or equivalent	\$97K
Miscellaneous Assemblers and Fabricators	75	High school diploma or equivalent	\$83K
Aircraft Mechanics and Service Technicians	70	Certificate	\$127K
Mechanical Engineers	70	Bachelor's degree	\$206K
Other Occupations	1,530	N/A	\$182K

Sustainability			
Top 10 Occupations*	Emp. (2021)	Typical Entry-Level Education	Avg. Wage
Management Analysts	3,080	Bachelor's degree	\$169K
Software Developers and Software Quality Assurance Analysts and Testers	2,505	Bachelor's degree	\$186K
Civil Engineers	2,235	Bachelor's degree	\$131K
Project Management Specialists and Business Operations Specialists, All Other	1,980	Bachelor's degree	\$140K
General and Operations Managers	1,955	Bachelor's degree	\$244K
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	1,760	High school diploma or equivalent	\$94K
Inspectors, Testers, Sorters, Samplers, and Weighers	1,595	High school diploma or equivalent	\$89K
Mechanical Engineers	1,570	Bachelor's degree	\$149K
Industrial Engineers	1,510	Bachelor's degree	\$162K
Market Research Analysts and Marketing Specialists	1,440	Bachelor's degree	\$114K
Other Occupations	47,375	N/A	\$120K

Innovations in Manufacturing and MRO			
Top 10 Occupations*	Emp. (2021)	Typical Entry-Level Education	Avg. Wage
Software Developers and Software Quality Assurance Analysts and Testers	11,775	Bachelor's degree	\$218K
Computer Systems Analysts	4,290	Bachelor's degree	\$201K
Computer User Support Specialists	3,715	Associate's degree	\$115K
Computer and Information Systems Managers	2,490	Bachelor's degree	\$328K
General and Operations Managers	2,240	Bachelor's degree	\$289K
Computer Occupations, All Other	2,195	Bachelor's degree	\$199K
Civil Engineers	2,115	Bachelor's degree	\$129K
Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel	2,070	High school diploma or equivalent	\$150K
Computer Programmers	1,945	Bachelor's degree	\$184K
Project Management Specialists and Business Operations Specialists, All Other	1,855	Bachelor's degree	\$176K
Other Occupations	43,035	N/A	\$140K

Educational Requirements:

Occupations requiring a high school diploma or less

Occupations requiring certificate, some college, or training

Occupations requiring bachelor's or advanced degree

Average Wage:

Average wage per employee is < 50k

Average wage per employee is \$50k - \$100k

Average wage per employee is > \$100k

NEW SPACE PROVIDES HIGH-INCOME EMPLOYMENT OPPORTUNITIES WITH LOWER EDUCATIONAL REQUIREMENTS

Leading industries in New Space create jobs related to assembly, fabrication, and machinery that pay a high average wage and require only a high school diploma.

The county can build its competitive advantage by prioritizing support and investment related to Sustainability, Manufacturing Innovation, and New Space

Overall Market Readiness Assessment		Emerging Recommendation
King County's Overall Market Readiness ↑	 Sustainability	 Market Foundation Developed Invest in and promote the use of sustainable aerospace technologies and practices. This may include encouraging aerospace businesses to adopt sustainable practices through incentives and regulations, partnering with leading academic institutions on aerospace sustainability initiatives, building and upgrading alternative fuel infrastructure, and providing education and training opportunities in aerospace sustainability.
	 Innovations in Manufacturing and MRO	 Market Foundation Developed Offer incentives and resources to support the research, development, and adoption of innovative aerospace manufacturing technologies and practices. This may include investing in advanced manufacturing research by local universities and colleges, establishing partnerships with businesses and local research institutions to facilitate knowledge sharing, and supporting and building advanced manufacturing facilities and technology hubs.
	 New Space	 Market Foundation Developed Offer incentives and resources to support the development of new space technologies. This may include establishing partnerships with leading businesses and local research institutions, supporting the preparation, attraction, and retention of space talent by strengthening the area's education opportunities and quality of life, and building and upgrading infrastructure to support the growth of the space industry, such as research and testing centers.
	 Supersonics & Hypersonics	 Requires Market Foundation Development Develop a platform and infrastructure that supports supersonic and hypersonic vehicle testing and commercialization. This may include investing in infrastructure and research, establishing partnerships with relevant start ups, and creating a supportive regulatory environment. The county can also use its concentration of aerospace businesses and highly-skilled workforce to position itself as a hub for supersonic and hypersonic innovation.
	 Advanced Air Mobility	 Requires Market Foundation Development Foster an ecosystem that supports the development and deployment of advanced air mobility technologies. This may include investing in AAM infrastructure and research, connecting entrepreneurs to funding opportunities, and creating a supportive regulatory environment. The county's strong aerospace industry and highly-skilled workforce also provide a foundation for local growth in advanced air mobility.

● Cross-Cutting Process & Product Advancements ● Emerging Markets & Technologies

THE ABILITY TO INNOVATE, COLLABORATE, AND DIVERSIFY WILL BE CRITICAL IN NAVIGATING THE EVOLVING AEROSPCE LANDSCAPE
Aerospace is constantly evolving due to changes in technology, processes, market demand, and regulatory requirements. By embracing the most relevant related trends, the local aerospace sector can stay competitive, improve efficiency, and capitalize on new opportunities.

The county can also use focused supply chain and workforce strategies to support aerospace businesses and workers through the sector’s evolution

Based on impact assessments using the three selected trends		Recommendations to support aerospace supply chain industries	Recommendations to support aerospace workforce development and reinforcement
Impacts to supply chain industries	 Expected to decline	- Support the diversification of businesses into new markets and products - Promote sustainability by encouraging the adoption of more environmentally friendly practices and technologies, including sustainable fuels and electric propulsion systems - Provide support to overcome regulatory hurdles	- Invest in increasing availability and accessibility of programs focused on reskilling and upskilling employees in declining industries - Provide support for dislocated workers, including connecting workers with on-the-job training opportunities in growing industries
	 Expected to be disrupted	- Encourage and incentivize innovation and entrepreneurship by increasing access to funding, networking opportunities, and mentorship - Support and invest in aerospace research and innovation, e.g., providing funding for universities or research institutions to conduct research on emerging technologies and solutions - Provide support for aerospace businesses to adopt new and advanced technologies and processes (e.g., advanced manufacturing, electrification)	- Provide support to help aerospace businesses reskill and upskill employees - Invest in increasing availability and accessibility of educational and training programs that utilize new and advanced technologies (e.g., advanced manufacturing, electrification) - Provide support for dislocated workers, including connecting workers with on-the-job training opportunities in growing industries
	 Expected to grow	- Develop and invest in testing infrastructure and commercialization support to help meet the growing demand for innovative aerospace products and services - Provide incentives for established aerospace businesses to relocate or expand operations to King County	- Invest in increasing availability and accessibility of workforce development programming in industries expected to grow - Invest in increasing awareness of and interest in industries expected to grow, especially in early education - Support aerospace businesses in recruiting talent in industries expected to grow, especially for occupations that are critical to competing industries (e.g., tech)
	 Leading industries	- Create and facilitate opportunities for industry convening, partnerships, and cross-industry collaboration - Develop and invest in centers of excellence to support private and public collaboration across the design, testing, and commercialization of new aerospace technologies and practices	- Invest in increasing higher education opportunities for socially vulnerable populations to enable equitable access to jobs requiring an advanced degree - Invest in increasing awareness and interest in occupations expected to remain critical, especially in early education - Support aerospace businesses in recruiting talent for occupations expected to remain critical, especially for occupations that are critical to competing industries (e.g., tech)

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Overall, King County's aerospace sector remains competitive but faces some pressing sector, supply chain, and workforce challenges



Summary of SWOT Analysis

	County Economy 	Aerospace Economy 	Aerospace Supply Chain 	Aerospace Workforce 
 S	- Diverse economy with strengths in tradable industries - Low energy costs, a strong supply chain, and access to transportation infrastructure - Proximity to labor markets, including highly skilled talent pool	- Sector provides significant contributions to county GDP and employment - High concentration of aerospace activity - Provides manufacturing jobs in an economy becoming increasingly focused on information and services	- Strong network of businesses across the supply chain, including final assembly of products that form the backbone of the local sector - Strengths in machining, industrial manufacturing, and information	- Aerospace provides both middle- and high-income jobs - Numerous training and education providers in the region - Various entry points to pursue a career in aerospace
 W	- Decline in middle-income, product-based sectors - High cost and difficulty of doing businesses - Labor shortages present a major challenge for businesses	- Lack of collaboration and coordination across aerospace ecosystem players - Lack of available industrial land - Lack of infrastructure for testing and commercialization related to trends (e.g., New Space, Advanced Air Mobility)	- Aircraft and space vehicle manufacturing have supply chain gaps in semiconductors, search/navigation instruments, and other complex manufactured commodities - Partners report additional gaps in exotic materials and electronics manufacturing	- Lack of coordination across workforce development system - Workforce gaps in skilled trades and leadership positions - Misconception or lack of awareness about available aerospace occupations, requirements, and entry points
 O	- Rapid growth in high-income, information-based sectors - Attractive quality of life - Growth in emerging manufacturing industries (e.g., satellite manufacturing) - Strong government support for sustainability and equitable economic development	- Rapid growth of new space businesses - Strong foundation for leadership in Sustainability, Innovations in Manufacturing & MRO, and New Space trends - Interest among aerospace ecosystem players in improving collaboration	- Ability to increase percentage of aerospace inputs purchased locally - Ability to grow competitive advantage in high-tech, complex manufacturing - Diversification of existing businesses into new service offerings and markets	- Opportunity to connect more residents with existing programs and resources - Increased connectivity between businesses and educational institutions - Engagement with youth to build pipeline - Engagement with women and BIPOC communities to diversify pipeline
 T	- Increasing economic concentration increases exposure to national economic shocks and downturns in high-income sectors - Loss of middle-income jobs - High cost of living and lack of affordable housing	- Contribution to the county's GDP and employment has fallen, as traditional aerospace manufacturing declines - Sector vulnerability to downturns and decreased consumer demand - Competition from other regions - Shift towards sustainability may increase costs and create regulatory obstacles for local businesses - Competition for industrial land	- Impacts of disruptive sector trends - Inability of small and mid-size businesses to invest in R&D and technology updates - High cost of doing business and lack of available industrial lands limit expansion and growth	- Competition for talent among sector businesses and across industries - Systemic barriers to sector participation (e.g., lack of affordable housing, childcare, and transportation options) - Insufficient collaboration and systemic solutions limit the impact of workforce development programs - Lack of interest among young people in aerospace and skilled trades

S King County has a well and long-established aerospace sector, whose strength is augmented by robust local Information and service-based sectors

Strengths	
County Economy 	- King County is the most populous and diverse county in Washington and plays a critical role in the regional and state economy.¹ - The county's economy is increasingly concentrated in information and service-based sectors. Employment growth in high-income sectors like Information has outpaced national rates from 2019 to 2021.¹ - The county has low energy costs, a strong supply chain, low transportation costs, and developed infrastructure (i.e., ports, airports, and highways).³ - King County has a legacy of manufacturing competitiveness and proximity to labor markets and customers.³ - King County has access to tech talent and a strong engineering talent pool.^{1,3} - Over 90% of sectors in the county pay \$50k or more in annual wages per employee, and over 40% pay \$100k or more per employee.¹
Aerospace Economy 	- The aerospace sector is critical to King County's economy, generating \$19B in GDP and over 60K jobs, which creates a ripple effect through the county's economy via supply chain activity and local spending.¹ - The aerospace sector helps bolster the county's economic diversity, providing manufacturing jobs in an economy that is becoming increasingly focused on information and services.¹ - The local sector benefits from a high concentration of aerospace businesses and the presence of industry organizations.^{1,3} - The regional sector has one of the highest concentrations of aerospace activity in the country with a high concentration of skilled workers.^{1,3} - Satellite manufacturing activity experienced annual output growth of 164% and annual employment growth of 81% from 2016 to 2021.¹ - There is strong and growing political support for the aerospace sector in King County.³
Aerospace Supply Chain 	- There is a network of businesses across the supply chain that create aerospace products and provide full lifecycle support. The county is also home to the final assembly of multiple air and space final products, creating a concentration of aerospace employers and suppliers in the region and forming the backbone of the local aerospace sector.^{1,2,3} - Supply chain strengths include machining and industrial manufacturing. Information is also a strength in the regional aerospace supply chain.^{1,3} - The Guided Missile and Space Vehicle Manufacturing industry supply chain has strengths in local services.¹ - King County's existing market strengths provide a foundation for growth in all key trends identified, but especially in Sustainability, Innovations in Manufacturing & MRO, and New Space.² - King County has several industries that are expected to either lead change related to the trends or grow in response to the selected aerospace trends (e.g., data analysis and cloud storage).²
Aerospace Workforce 	- The aerospace sector offers a mix of middle- and high-income jobs accessible to individuals with varying levels of educational attainment. The sector is more concentrated in high-wage jobs than the county overall.¹ - There is a wide variety of service and education providers in the region offering workforce development programming and resources. Additionally, King County has high availability of general STEM degree programs.^{1,2,3} - The King County workforce training system provides various entry points to help individuals pursue a career in the aerospace sector (e.g., K-12 institutions, training providers, and universities).^{1,3} - Existing industry-affiliated programs like AJAC and CAMPS are helpful to local businesses in filling workforce gaps.^{2,3} - Individuals who do not hold a college degree qualify for many top production roles. Though the barrier to entry for these roles is low, production jobs pay a living wage of \$82K, on average.¹

W The county's aerospace sector is challenged by changing consumer preferences and strong competition for talent and resources

Weaknesses	
Focus Areas	County Economy  - King County is experiencing increasing economic concentration driven by rapid growth in high-income, information-based sectors and declines in middle-income, product-based sectors, relative to national averages.¹ - From 2019 to 2020, Manufacturing GDP declined by 12% and Transportation and Warehousing GDP declined by ~33%. From 2019 to 2021, the county's decline in middle-income sectors such as Manufacturing outpaced national rates.¹ - All four regions in King County – South, Seattle, East, and North – experienced varying degrees of Manufacturing employment decline from 2019-21; however, the decline in manufacturing varied across County regions. Manufacturing employment in the South and East regions experienced a sharper decline compared to the North and Seattle regions.¹ - Industry partners report that high costs of doing business and heavy regulatory burdens are a downside to locating in King County.³ - Hiring and labor shortages are currently seen as major challenges for businesses in King County.³
	Aerospace Economy  - The aerospace sector is critical to King County's economy; however, the economic impact of traditional aerospace manufacturing in the county is in decline. The aerospace sector's contribution to the county's GDP fell from 8% to 3% between 2016 and 2021.¹ - Employment in the Aircraft Manufacturing and Guided Missile & Space Vehicle Manufacturing industries is also in decline in the county. From 2019-21, the combined industries experienced a 36% decrease in employment.¹ - Aerospace businesses report difficulty navigating permitting processes, regulatory fatigue, and inconsistent signals from government (e.g., some support from state and local political leaders, but also some policy proposals that would increase sector costs, such as a state carbon tax).³ - Aerospace businesses note that there is a lack of available industrial space available for rent and purchase that meets the needs of aerospace manufacturers.³ - King County has a low concentration of Advanced Air Mobility and Supersonic and Hypersonic leading businesses compared to other regions and lacks related infrastructure for flight testing and commercialization (e.g., spaceports).²
	Aerospace Supply Chain  - Aerospace supply chain gaps include complex manufactured commodities, such as aircraft parts and propulsion units.¹ - Some industry partners report additional supply chain gaps in exotic materials (e.g., 3D printing of exotic materials) and electronics manufacturing.³ - Certain industries are expected to decline in King County as a result of aerospace sector trends, such as Fossil Fuel Power Generation and Hydraulic Systems and Escape Systems; however, these industries do not have a significant presence in the county.²
	Aerospace Workforce  - The high concentration of aerospace activity in the region translates to steep competition for talent across aerospace businesses.³ - Recruiting efforts are challenged by the lack of affordable housing, affordable childcare, and efficient transportation. It can be difficult for county businesses to attract talent from places like South or East King County, as the commute is not realistic.³ - Aerospace businesses report workforce gaps in skilled trades, specialized roles, and aerospace leadership positions.³ - Educational institutions report challenges recruiting and retaining aerospace educators, as qualified professionals can often make more working in industry.³ "Last-mile training" is a challenge for some small and mid-size businesses that cannot afford to train workers in specialized skillsets.³ - The regional workforce development system is siloed, resulting in duplication of efforts and ineffective spending. The lack of coordination and clarity within the workforce development system can lead to a lack of awareness and underutilization of the resources – particularly for technical training.³ - King County has a lower supply of specialized degree programs than general STEM and engineering programs.¹ - There are fewer education institutions and opportunities in Southern King County than other parts of the county.³

The local aerospace sector is well-positioned to advance its leadership in emerging and complex aerospace technologies and innovative practices

Opportunities	
County Economy 	- King County is continuing to concentrate in higher-income, service-providing industries like Information and Professional, Scientific, and Technical Services, which provide livable wages to County residents.¹ - Manufacturing GDP increased in the Seattle, East, and North regions from 2019-21.¹ - Businesses noted that the county's quality of life, access to green space and recreation, and availability of amenities and cultural experiences help them attract and retain top talent.³ - Federal, state, and local governments are making substantial investments in sustainability and equitable economic development.^{2,3} - To make the region more competitive, King County could lower the tax burden for businesses, increase awareness of and incentives around joining the manufacturing industry, and increase messaging that King County is a manufacturing hub and will remain that way.³
Aerospace Economy 	- Sectors that capture new space activity, such as Guided Missile and Space Vehicle Manufacturing, experienced GDP growth in South and East King County from 2019-21.¹ - The presence of relevant businesses, R&D programs, and workforce in King County, as well as strong government support, provide a strong foundation for growth in Sustainability, Innovations in Manufacturing & MRO, and New Space.² - A variety of aerospace ecosystem players (e.g., businesses, industry alliances, educational institutions) expressed an interest in renewing efforts to improve coordination and collaboration across the sector.³
Focus Areas Aerospace Supply Chain 	- King County's core aerospace sector industries (i.e., Aircraft Manufacturing and Guided Missile and Space Vehicle Manufacturing) currently purchase over 80% of their inputs from suppliers located outside of the county. Therefore, there is a large economic opportunity to grow and attract businesses to fill supply chain gaps and increase spending on local suppliers.¹ - High-tech, complex manufacturing represents a strong business attraction opportunity for the county, as the region's engineering workforce and existing network of manufacturers and tech businesses create a competitive advantage and a compelling value proposition for new businesses.³ - Semiconductors and related devices and search, detection, and navigation instruments present potential growth opportunities in both the Aircraft Manufacturing and Guided Missile and Space Vehicle Manufacturing supply chains.¹ - Since the aerospace sector produces a variety of products and services which support and intersect with a broad range of markets, there are many potential opportunities for diversification and cross-industry collaboration.^{1,3} - The county could offer incentives and resources to support the research and development of innovative aerospace manufacturing technologies and processes, as well as the development of new space and sustainable aerospace products and technologies.² - Building testing facilities related to key trends (e.g., new space) could drive down production costs for local businesses and attract new businesses and entrepreneurs to the region.²
Aerospace Workforce 	- The county can capitalize on the strong availability of existing aerospace-related programs and resources by helping to connect residents and businesses to workforce development opportunities, increasing advertising, and supporting the development of career pathways that demonstrate how education programs connect to career opportunities.³ - There is an opportunity to improve the connection between industry and educational institutions through programming, funding, mentorship, and career opportunities.³ - The aerospace ecosystem can invest in youth engagement and education to help build the pipeline, including through STEM education programs, exposure to aerospace and manufacturing facilities, and investments in overall education quality (e.g., teachers, afterschool programs, quality lunches, and school transportation).³ - Aerospace ecosystem players in the region can capitalize on federal funding and co-investment opportunities to catalyze workforce development efforts. Investments could help increase program enrollment, provide new equipment to improve training opportunities, or focus on supporting the long-term sustainability of existing programs.³ - Nationwide layoffs at major tech companies may present an opportunity to bring recently unemployed talent into the aerospace industry.³ - The aerospace ecosystem can prioritize outreach to underrepresented populations (e.g., women, BIPOC individuals, immigrants) to grow and diversify the pipeline.³

T Increasing competition, rising costs, and workforce challenges threaten the strength of the local aerospace sector

Threats	
Focus Areas	County Economy  - Increasing economic concentration in high-income sectors heightens the county's exposure to national economic shocks. The county is also becoming increasingly vulnerable to economic downturns in Information and service providing sectors due to this economic concentration.^{1 3} - Increasing economic concentration could also lead to uneven economic growth, limited diversity in job opportunities for residents, reduced competition, and dependence on a few dominant businesses.^{1 3} - Employment in some middle-income industries (e.g., Manufacturing, Transportation and Warehousing) declined during the COVID-19 pandemic, widening income gaps.¹ - High regional costs of living and a lack of affordable housing hinder worker recruitment and retention efforts and limit residents' ability to build wealth.³
	Aerospace Economy  - The aerospace sector is susceptible to economic downturns and decreased consumer demand (e.g., decrease in demand to COVID-19).^{1 3} - Other regions present similar aerospace strengths with lower costs (e.g., TX, AL, GA), which may lead to business relocation.² - Other regions and states have instituted incentives to attract businesses within the key aerospace sector trends (e.g., Florida's space transportation tax incentives), which could threaten King County's leadership within the sector.² - Shifts towards sustainability may create additional costs and regulatory hurdles for local aerospace businesses (e.g., carbon tax).² - Aerospace businesses expressed concerns that e-commerce and logistics businesses are occupying an increasing number of industrial properties in King County and crowding out aerospace manufacturing.³ - Businesses indicated that inflation and supply chain shortages are threatening their future growth.³
	Aerospace Supply Chain  - Sector trends (e.g., Innovations in Manufacturing and Maintenance, Repair, and Operations) may create disruption and decline across some aerospace supply chain industries. Impacted industries may include Hydraulic Systems, Fossil Fuel Generation, and Traditional Manufacturing.² - Some supply chain businesses have been in operation for decades and made legacy investments in technologies that are now out-of-date. Small and mid-size businesses in particular may face financial barriers when updating these legacy technologies.³ - High cost of doing business (e.g., taxes and fees, high labor costs) and a lack of industrial lands limit aerospace businesses' ability to expand and grow.³
	Aerospace Workforce  - Aerospace businesses face competition for talent both among the sector and with other industries. Small suppliers shared that it is challenging for them to compete with the salary and benefit offerings of larger companies and other industries (e.g., tech).³ - A lack of collaboration across the workforce development system and barriers to pursuing system-wide solutions limits the impact of workforce development spending.³ - Industry skill demand is changing faster than educational programming, leading to skill gaps.³ - Industry partners reported a lack of interest in aerospace education and careers among the regional workforce, particularly in manufacturing and skilled trades. The lack of interest may be caused by misconceptions about aerospace manufacturing jobs (e.g., manufacturing jobs are dirty and there are not opportunities for career advancement).³ - BIPOC and low-income individuals face systemic barriers to aerospace education and employment in the region, including high housing costs and lack of affordable, accessible childcare options. For example, aerospace businesses reported that some parents are unable to fill aerospace manufacturing roles because they cannot find childcare during late shifts.³ - Lack of access to early career opportunities (e.g., internships) can prevent socially disadvantaged populations from accessing in-demand aerospace careers.³ - Students reported a lack of interest in pursuing aerospace careers because of a perceived lack of prestige and a lack of awareness of the range of available sector opportunities.³ - Contact losses or role changes during COVID-19 have caused breakdowns in communication between industry and educational institutions.³

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Alignment of zip codes to King County region

Region	ZIP Codes Included		
Seattle	98101	98118	98155
	98102	98119	98158
	98103	98121	98164
	98104	98122	98166
	98105	98125	98168
	98106	98126	98177
	98107	98133	98178
	98108	98134	98188
	98109	98136	98195
	98112	98144	98198
	98115	98146	98199
	98116	98148	
	98117	98154	
South	98001	98031	98056
	98002	98032	98057
	98003	98038	98058
	98010	98042	98070
	98022	98047	98092
	98023	98051	
	98030	98055	

Region	ZIP Codes Included		
North	98011	98072	
	98028	98077	
East	98004	98027	98052
	98005	98029	98053
	98006	98033	98059
	98007	98034	98065
	98008	98039	98074
	98014	98040	98075
	98019	98045	98224
	98024	98050	98288

REGIONS WERE CONSTRUCTED TO MATCH KING COUNTY GEOGRAPHICAL DEFINITIONS

As noted on King County’s website, “North Region includes the areas of Bothell, Cottage Lake, Kenmore, Lake Forest Park, Shoreline, and Woodinville. East Region includes Bellevue, Carnation, Duvall, Issaquah, Kirkland, Medina, Mercer Island, Newcastle, North Bend, Redmond, Sammamish, and Skykomish. South region contains Auburn, Burien, Covington, Des Moines, Enumclaw, Federal Way, Kent, Maple Valley, Normandy Park, Renton, Tukwila, SeaTac, White Center/Boulevard Park, and Vashon Island.”

Source: King County Department of Public Health

Commodity inputs for the Aircraft Manufacturing and Guided Missile and Space Vehicle Manufacturing industries (1/3)

No.	Commodity	Aircraft Manufacturing	Guided Missile and Space Vehicle Manufacturing	Total Input Value
1	Aircraft engines and engine parts	\$6.3B	--	\$6.3B
2	Other aircraft parts and auxiliary equipment	\$5.5B	--	\$5.5B
3	Semiconductors and related devices	\$1.2B	\$4.9M	\$1.2B
4	Aircrafts	\$953.8M	--	\$953.8M
5	Wholesale services - Machinery, equipment, and supplies	\$632.0M	\$3.1M	\$635.1M
6	Wholesale services - Household appliances and electrical and electronic goods	\$538.2M	\$4.1M	\$542.3M
7	Iron and steel and ferroalloy products	\$445.2M	\$292.0K	\$445.5M
8	Custom computer programming services	\$285.5M	--	\$285.5M
9	Other motor vehicle parts	\$231.8M	--	\$231.8M
10	Wiring devices	\$228.3M	--	\$228.3M
11	Search, detection, and navigation instruments	\$221.0M	\$2.4M	\$223.4M
12	Management of companies and enterprises	\$203.3M	\$5.8M	\$209.1M
13	Fabricated structural metal products	\$190.7M	--	\$190.7M
14	Wholesale services - Other durable goods merchant wholesalers	\$180.6M	\$969.9K	\$181.5M
15	Truck transportation services	\$170.4M	\$1.0M	\$171.5M
16	Computer systems design services	\$165.8M	\$881.0K	\$166.7M
17	Spring and wire products	\$158.0M	--	\$158.0M
18	Data processing, hosting, and related services	\$156.0M	\$861.1K	\$156.8M
19	Valve and fittings, other than plumbing	\$149.8M	\$2.2M	\$152.0M
20	Broadcast and wireless communications equipment	\$141.8M	\$3.6M	\$145.4M
21	Watches, clocks, and other measuring and controlling devices	\$135.4M	\$18.8K	\$135.4M
22	Other plastics products	\$128.0M	\$774.0K	\$128.7M
23	Noncomparable imports	\$107.4M	--	\$107.4M
24	Printed circuit assemblies (electronic assemblies)	\$105.2M	--	\$105.2M
25	Carpets and rugs	\$92.9M	--	\$92.9M
26	Fluid power pumps and motors	\$76.9M	\$622.8K	\$77.5M
27	Other communication and energy wires	\$72.9M	--	\$72.9M
28	Fluid power cylinders and actuators	\$71.3M	\$294.6K	\$71.5M
29	Electricity transmission and distribution	\$53.5M	\$905.7K	\$54.4M
30	Securities and commodity contracts intermediation and brokerage	\$54.1M	\$22.1K	\$54.1M

No.	Commodity	Aircraft Manufacturing	Guided Missile and Space Vehicle Manufacturing	Total Input Value
31	Software publishers	\$51.3M	\$259.2K	\$51.5M
32	Specialized design services	\$48.6M	\$385.6K	\$49.0M
33	Motor vehicle seating and interior trim	\$46.0M	--	\$46.0M
34	Other miscellaneous chemical products	\$39.8M	\$50.4K	\$39.8M
35	Advertising, public relations, and related services	\$39.3M	\$337.1K	\$39.6M
36	Wholesale services - Professional and commercial equipment and supplies	\$37.7M	\$288.3K	\$38.0M
37	Paperboard containers	\$36.2M	\$181.4K	\$36.4M
38	Leasing of nonfinancial intangible assets	\$34.8M	\$14.7K	\$34.8M
39	Architectural, engineering, and related services	\$33.7M	\$273.0K	\$33.9M
40	Other computer related services, including facilities management services	\$33.1M	\$167.1K	\$33.2M
41	Wholesale services - Motor vehicle and motor vehicle parts and supplies	\$31.4M	\$11.8K	\$31.4M
42	Hardware	\$30.3M	--	\$30.3M
43	Marketing research and all other miscellaneous professional, scientific, and technical services	\$30.0M	\$10.7K	\$30.0M
44	Carbon and graphite products	\$29.7M	--	\$29.7M
45	Employment services	\$26.8M	\$1.8M	\$28.5M
46	Other electronic components	\$27.2M	\$4.3K	\$27.2M
47	Other real estate services	\$26.6M	--	\$26.6M
48	Turned products and screws, nuts, and bolts	\$25.3M	\$73.5K	\$25.4M
49	Legal services	\$23.6M	\$161.1K	\$23.8M
50	Machined products	\$20.7M	\$1.7M	\$22.4M
51	Compounded resins	\$21.9M	\$212.7K	\$22.2M
52	Wholesale services - Other nondurable goods merchant wholesalers	\$18.9M	\$163.1K	\$19.1M
53	Electronic connectors	\$18.7M	\$2.2K	\$18.7M
54	Propulsion units and parts for space vehicles and guided missiles	--	\$18.0M	\$18.0M
55	Paints and coatings	\$16.2M	--	\$16.2M
56	Business support services	\$15.2M	\$879.4K	\$16.0M
57	Wholesale services - Wholesale electronic markets and agents and brokers	\$16.0M	\$55.0K	\$16.0M
58	Balls and roller bearings	\$15.4M	--	\$15.4M
59	Investigation and security services	\$14.2M	\$928.0K	\$15.1M
60	Motors and generators	\$14.6M	\$242.2K	\$14.8M

Commodity inputs for the Aircraft Manufacturing and Guided Missile and Space Vehicle Manufacturing industries (2/3)

No.	Commodity	Aircraft Manufacturing	Guided Missile and Space Vehicle Manufacturing	Total Input Value
61	Air transportation services	\$14.1M	\$19.1K	\$14.2M
62	Retail services - Motor vehicle and parts dealers	\$13.5M	--	\$13.5M
63	Wired telecommunications	\$13.2M	\$182.4K	\$13.4M
64	Other support services	\$12.4M	\$840.6K	\$13.3M
65	Iron and steel forgings	\$10.7M	\$2.2M	\$12.9M
66	Rail transportation services	\$12.8M	\$35.1K	\$12.8M
67	Accounting, tax preparation, bookkeeping, and payroll services	\$11.8M	\$317.5K	\$12.1M
68	Aluminum sheets, plates, and foils	\$11.5M	--	\$11.5M
69	Rolled, drawn, extruded, and alloyed copper	\$10.7M	--	\$10.7M
70	Guided missiles and space vehicles	--	\$10.3M	\$10.3M
71	Monetary authorities and depository credit intermediation	\$10.3M	\$12.1K	\$10.3M
72	Scales, balances, and miscellaneous general purpose machinery	\$8.8M	--	\$8.8M
73	Commercial and industrial machinery and equipment rental and leasing services	\$7.8M	\$152.9K	\$7.9M
74	Abrasive products	\$7.9M	--	\$7.9M
75	Wireless telecommunications (except satellite)	\$7.2M	\$70.0K	\$7.3M
76	Facilities support services	\$6.7M	\$453.3K	\$7.2M
77	Natural gas distribution	\$6.7M	\$106.5K	\$6.8M
78	Insurance agencies, brokerages, and related services	\$6.8M	--	\$6.8M
79	Services to buildings	\$6.2M	\$110.5K	\$6.4M
80	Hotels and motel services, including casino hotels	\$6.2M	--	\$6.2M
81	Automotive equipment rental and leasing services	\$6.0M	\$114.2K	\$6.1M
82	Fiber optic cables	\$5.9M	--	\$5.9M
83	Full-service restaurant services	\$5.2M	\$42.5K	\$5.3M
84	Plates	--	\$5.3M	\$5.3M
85	Nonferrous forgings	\$4.3M	\$894.2K	\$5.2M
86	Dry-cleaning and laundry services	\$5.1M	--	\$5.1M
87	Electroplated, anodized, and colored metal	\$4.6M	\$367.1K	\$5.0M
88	Other insurance	\$4.2M	\$765.8K	\$5.0M
89	Capacitors, resistors, coils, transformers, and other inductors	\$4.8M	\$0.7K	\$4.8M
90	Other nonmetallic minerals	\$4.6M	\$0.6K	\$4.6M

No.	Commodity	Aircraft Manufacturing	Guided Missile and Space Vehicle Manufacturing	Total Input Value
91	Nondepository credit intermediation and related activities	\$4.4M	--	\$4.4M
92	Warehousing and storage services	\$3.9M	\$142.9K	\$4.1M
93	Wholesale services - Petroleum and petroleum products	\$4.0M	\$9.2K	\$4.0M
94	Paperboard from pulp	\$3.9M	\$62.1K	\$4.0M
95	Limited-service restaurant services	\$3.8M	--	\$3.8M
96	Management consulting services	\$3.6M	\$10.1K	\$3.6M
97	Coated and engraved products	\$1.7M	\$1.8M	\$3.5M
98	Refined petroleum products	\$3.4M	\$32.8K	\$3.4M
99	Waste management and remediation services	\$3.3M	\$120.0K	\$3.4M
100	Landscape and horticultural services	\$3.0M	\$52.5K	\$3.0M
101	Transit and ground passenger transportation services	\$2.9M	--	\$2.9M
102	Heat treated products	\$2.6M	\$160.0K	\$2.8M
103	Maintained and repaired nonresidential structures	\$2.7M	\$82.3K	\$2.7M
104	Retail services - Nonstore retailers	\$2.6M	--	\$2.6M
105	Commercial and industrial machinery and equipment repair and maintenance	\$2.4M	\$65.8K	\$2.5M
106	Petroleum lubricating oil and grease	\$2.3M	--	\$2.3M
107	Water transportation services	\$2.0M	\$9.1K	\$2.0M
108	Other fabricated metals	\$1.7M	\$211.1K	\$1.9M
109	Cutting tool and machine tool accessory	\$1.9M	--	\$1.9M
110	Other basic organic chemicals	\$1.2M	\$598.2K	\$1.8M
111	Other financial investment services	\$1.7M	--	\$1.7M
112	Other household nonupholstered furniture	\$1.6M	--	\$1.6M
113	Automotive repair and maintenance, except car washes	\$1.6M	\$41.7K	\$1.6M
114	Nonferrous metal (exc aluminum) smelting and refining	\$1.6M	--	\$1.6M
115	Nonferrous metals	\$1.5M	\$8.0K	\$1.5M
116	Other products and services of Local Govt enterprises	\$1.3M	--	\$1.3M
117	Aluminum products	\$774.1K	\$555.7K	\$1.3M
118	Water, sewage and other systems	\$1.2M	\$90.3K	\$1.3M
119	Satellite, telecommunications resellers, and all other telecommunications	\$1.3M	\$64.3K	\$1.3M
120	Crowned and stamped metals	\$1.3M	\$30.9K	\$1.3M

Commodity inputs for the Aircraft Manufacturing and Guided Missile and Space Vehicle Manufacturing industries (3/3)

No.	Commodity	Aircraft Manufacturing	Guided Missile and Space Vehicle Manufacturing	Total Input Value
121	Cutlery, utensils, pots, and pans	\$1.2M	--	\$1.2M
122	Handtools	\$1.2M	--	\$1.2M
123	Independent artists, writers, and performers	\$1.2M	--	\$1.2M
124	Photographic films and chemicals	\$1.1M	--	\$1.1M
125	Retail services - General merchandise stores	\$1.0M	--	\$1.0M
126	Rolled, drawn, and extruded aluminum	\$973.2K	--	\$973.2K
127	General and consumer goods rental services except video tapes and discs	\$942.0K	\$16.5K	\$958.5K
128	Metal cans	\$941.2K	\$8.9K	\$950.1K
129	Metal barrels, drums and pails	\$930.2K	\$11.3K	\$941.5K
130	All other petroleum and coal products	\$918.9K	--	\$918.9K
131	Electronic and precision equipment repair and maintenance	\$852.5K	\$38.9K	\$891.4K
132	All other food and drinking place services	\$881.7K	--	\$881.7K
133	Secondary processing of other nonferrous metals	\$625.6K	\$182.7K	\$808.2K
134	Laminated plastics plates, sheets (except packaging), and shapes	\$780.8K	--	\$780.8K
135	Car washes	\$755.6K	\$19.7K	\$775.3K
136	Environmental and other technical consulting services	\$739.7K	--	\$739.7K
137	Custom roll formed metals	\$669.4K	--	\$669.4K
138	Nonferrous metal, except copper and aluminum, shaping	\$476.2K	\$139.1K	\$615.3K
139	Industrial process variable instruments	\$591.1K	--	\$591.1K
140	Motor vehicle steering, suspension components (except spring), and brake systems	\$548.2K	--	\$548.2K
141	Paper bags and coated and treated paper	\$534.6K	\$9.8K	\$544.4K
142	Wholesale services - Grocery and related product wholesalers	\$536.7K	--	\$536.7K
143	Air conditioning, refrigeration, and warm air heating equipment	\$477.4K	--	\$477.4K
144	Fitness and recreational sports center services	\$401.3K	--	\$401.3K
145	Coal	\$361.3K	--	\$361.3K
146	Performing arts	\$319.4K	--	\$319.4K
147	Computer storage devices	\$317.7K	--	\$317.7K
148	Commercial sports except racing	\$293.0K	--	\$293.0K
149	Ophthalmic goods	\$282.4K	--	\$282.4K
150	Other amusement and recreation	\$272.5K	--	\$272.5K

No.	Commodity	Aircraft Manufacturing	Guided Missile and Space Vehicle Manufacturing	Total Input Value
151	Retail services - Building material and garden equipment and supplies stores	\$265.9K	--	\$265.9K
152	Office administrative services	\$260.0K	--	\$260.0K
153	Motor vehicle transmission and power train parts	\$250.2K	--	\$250.2K
154	Personal and household goods repair and maintenance	\$229.3K	--	\$229.3K
155	Gaskets, packings, and sealing devices	--	\$176.9K	\$176.9K
156	Other commercial service industry machinery	\$95.4K	--	\$95.4K
157	Other products and services of State Govt enterprises	\$72.5K	--	\$72.5K
158	Ferrous metals	--	\$8.0K	\$8.0K
159	Sand and gravel	--	\$8.0K	\$8.0K
160	Video tape and disc rental services	--	\$4.3K	\$4.3K
161	Bare printed circuit boards	--	\$1.8K	\$1.8K
162	Potash, soda, and borate mineral	--	\$1.0K	\$1.0K
163	Other clay, ceramic, refractory minerals	--	\$0.6K	\$0.6K
164	Other chemical and fertilizer mineral	--	\$0.4K	\$0.4K
165	Phosphate rock	--	\$0.1K	\$0.1K
151	Retail services - Building material and garden equipment and supplies stores	\$265.9K	--	\$265.9K
152	Office administrative services	\$260.0K	--	\$260.0K
153	Motor vehicle transmission and power train parts	\$250.2K	--	\$250.2K
154	Personal and household goods repair and maintenance	\$229.3K	--	\$229.3K
155	Gaskets, packings, and sealing devices	--	\$176.9K	\$176.9K
156	Other commercial service industry machinery	\$95.4K	--	\$95.4K
157	Other products and services of State Govt enterprises	\$72.5K	--	\$72.5K
158	Ferrous metals	--	\$8.0K	\$8.0K
159	Sand and gravel	--	\$8.0K	\$8.0K
160	Video tape and disc rental services	--	\$4.3K	\$4.3K
161	Bare printed circuit boards	--	\$1.8K	\$1.8K
162	Potash, soda, and borate mineral	--	\$1.0K	\$1.0K
163	Other clay, ceramic, refractory minerals	--	\$0.6K	\$0.6K
164	Other chemical and fertilizer mineral	--	\$0.4K	\$0.4K
165	Phosphate rock	--	\$0.1K	\$0.1K
Total		\$20.1B	\$86.1M	\$20.2B

Commodity outputs of the Aircraft Manufacturing and Guided Missile and Space Vehicle Manufacturing industries

Aircraft Manufacturing

No.	Commodity	Commodity Production Value	Regional Market Share
1	Aircrafts	\$32.1B	97.86%
2	Other aircraft parts and auxiliary equipment	\$1.1B	42.53%
3	Search, detection, and navigation instruments	\$282.4M	33.30%
4	Guided missiles and space vehicles	\$277.9M	60.24%
5	Other commercial service industry machinery	\$66.9M	35.81%
6	Aircraft engines and engine parts	\$49.0M	74.05%
7	Propulsion units and parts for space vehicles and guided missiles	\$9.9M	10.18%
8	Military armored vehicles, tanks, and tank components	\$3.2M	36.07%
9	All other industrial machinery	\$1.6M	1.58%
10	Small arms, ordnance, and accessories	\$636.7K	17.46%
11	Turbine and turbine generator set units	\$636.7K	8.47%
12	All other miscellaneous electrical equipment and components	\$636.7K	0.74%
13	Scrap	\$318.4K	0.11%
Total		\$34.0B	

Guided Missile and Space Vehicle Manufacturing

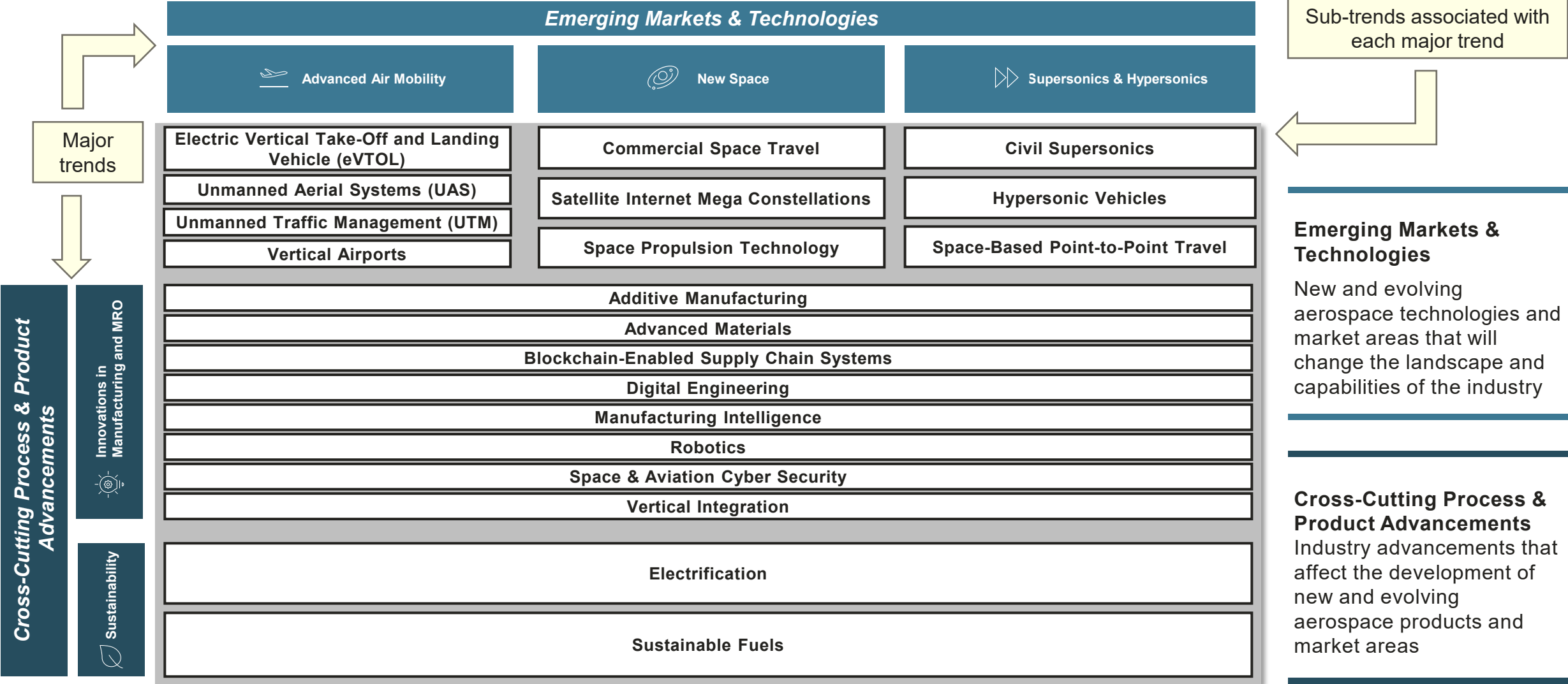
No.	Commodity	Commodity Production Value	Regional Market Share
1	Guided missiles and space vehicles	\$154.2M	33.43%
2	Broadcast and wireless communications equipment	\$10.5M	4.09%
3	Propulsion units & parts for space vehicles & guided missiles	\$6.6M	6.79%
4	Military armored vehicles, tanks, and tank components	\$4.6M	52.46%
5	Ammunition, except for small arms	\$139.0K	5.69%
6	Small arms, ordnance, and accessories	\$129.1K	3.54%
7	Fluid power pumps and motors	\$90.7K	0.96%
8	Fluid power cylinders and actuators	\$63.9K	0.08%
9	Search, detection, and navigation instruments	\$20.6K	0.00%
Total		\$176.4M	

Key: ■ \$100M+ ■ \$10M+ ■ \$1M+ ■ Less than \$1M

Source: IMPLAN, Regions Industry Commodity Production IMPLAN report, 2019

Regional Market Share represents the portion of all local commodity production that can be attributed to an individual industry (i.e., Aircraft Manufacturing or Guided Missile and Space Vehicle Manufacturing). For example, the low Regional Market Share figure for "Turbine and turbine generator set units" indicates that industries other than Aircraft Manufacturing are creating most of the turbines produced in King County.

Each major trend is comprised of a set of sub-trends that are expected to shape the future of the aerospace sector





Advanced Air Mobility sub-trends are shaping the future of mobility and transportation networks

Advanced Air Mobility helps address the challenges of urban transportation such as traffic congestion, emissions, and noise pollution and is expected to improve accessibility, reduce travel time, and increase safety.

Sub-trends within the grouping

Electric Vertical Take-Off and Landing Vehicle (eVTOL)

eVTOL vehicles are electric aircraft with large omnidirectional fans that help the aircraft move in any direction and takeoff vertically. While designs vary between developers, most resemble the form of a drone.

Unmanned Aerial Systems (UAS)

UAS are air vehicles and associated equipment that do not carry a human operator, but instead are remotely piloted or fly autonomously. UAS are used for a variety of functions and take a variety of forms, including consumer drones and large surveillance platforms.

Unmanned Traffic Management (UTM)

UTM is a "traffic management" ecosystem for uncontrolled operations separate from, but complementary to, Air Traffic Management (ATM) system. UTM will be required for eVTOL and small UAS aircraft due to their inability to communicate over voice, which is the basis of the current air traffic control system.

Vertical Airports

The Vertical Airport concept takes the traditional airport layout and turns it 90 degrees. Its design is expected to work complimentary to the eVTOL, as they will need to take off and land in specially prepared spaces due to security, logistics, and availability concerns.

Case Study: Boeing's unmanned aircraft carrier, the MQ-25



Boeing is bringing the future of unmanned aircraft carrier aviation to the U.S. Navy with the MQ-25, which brings a combination of refueling, autonomy, and seamless carrier deck integration to meet the U.S. Navy's goals. In 2021, the MQ-25 T1 test asset was successfully integrated into the carrier environment, where a demonstration aboard the USS George H.W. Bush confirmed the functionality, capability, and handling qualities of the unmanned aircraft's deck handling system. The MQ-25 industry team includes:

Zaitech Defense Systems

Astronics

BAE Systems

Collins Aerospace

Cox & Company

Crane Aerospace & Electronics

Cubic

Curtiss-Wright Defense Solutions

GE

Harris Corporation

Héroux-Devtek

Honeywell

Innovative Power Solutions

L3 Commercial Aviation

Moog Aircraft Group

Parker Hannifin

Raytheon

Rolls-Royce

Triumph Group



Supersonics & Hypersonics sub-trends are unlocking high-speed air and space travel

New high-speed vehicles and technologies are enabling flight faster than the speed of sound. Associated sub-trends have the potential to greatly reduce travel time for long-distance flights, making travel more efficient and convenient.

Sub-trends within the grouping

Civil Supersonics

Civil Supersonics are airplanes that enable high-speed transportation, flying faster than the speed of sound. The next generation of supersonic airliners and business jets promise to dramatically improve fuel costs, sound concerns, and profitability over the now-retired Concorde.

Hypersonic Vehicles

Hypersonic vehicles, particularly hypersonic cruise missiles, are seen as the future of long-range military strike capabilities. These weapons, traveling more than 5x the speed of sound and exceptionally long-range, can strike targets around the world on extremely short notice with high accuracy. As widely reported in the media, the US, Russia, and China are currently in a race to develop hypersonic missile technologies.

Space-Based Point-to-Point Travel

Space-based point-to-point travel is a category of spaceflight in which a spacecraft provides high-speed transport between terrestrial destinations. The successful development of the reusable orbital and suborbital rocket designs from SpaceX and Blue Origin has sparked renewed interest in space-based travel. This has included USAF/USSF interest in fast-reaction cargo delivery to critical locations on earth on short notice. Rockets are not the only proposed vehicle type for this concept. Other vehicles under consideration include hypersonic aircraft and spaceplanes.

Case Study: Boom providing civil supersonics to major airlines



Boom Supersonic is transforming air travel with Overture – the world’s fastest airliner, optimized for speed, safety, and sustainability. Serving both civil and government markets, Overture will fly at twice the speed of today’s airliners and is designed to run on 100% sustainable aviation fuel (SAF). Symphony™, a Boom-led collaboration with industry leaders, is the propulsion system that will power Overture. Boom Supersonic claims that Overture can fly from Miami to London in just under five hours.

Overture’s order book, including purchases and options from American Airlines, United Airlines, and Japan Airlines stands at 130 aircraft. Boom is also working with Northrop Grumman for government and defense applications of Overture. Suppliers and partners collaborating with Boom on the Overture program include Collins Aerospace, Eaton, Florida Turbine Technologies, a business unit of Kratos Defense & Security Solutions, Inc., GE Additive, Safran Landing Systems, StandardAero and the United States Air Force. Boom plans to roll out Overture in 2025, with the goal of carrying passengers by 2029.



New Space sub-trends are transforming the space industry and creating new economic opportunities

The space industry is rapidly evolving, driven by advancements in technology, changes in market demand, and increased private sector investment. Sub-trends are expected to reduce the costs of accessing space, increase the frequency of launches, and make space activities more accessible and sustainable.

Sub-trends within the grouping

Commercial Space Travel

Commercial space travel refers to the activity of traveling into space for recreational purposes. It covers spaceflights that are suborbital, orbital, and beyond Earth orbit.

Satellite Internet Mega Constellations

Satellite internet mega constellations are systems utilizing hundreds to tens of thousands of satellites in Low Earth Orbit (LEO) to deliver low latency broadband data services anywhere on the planet.

Space Propulsion Technology

Technological advancements (e.g., solar electric propulsion) are making space propulsion more efficient, sustainable, and suitable for long distances. For example, in-space propulsion devices for small spacecraft are rapidly increasing in number and variety (e.g., chemical, electric, propellant-less).

Case Study: Space Travel and Rockets by Blue Origin



Blue Origin, headquartered in Kent, Washington, is an aerospace manufacturer and spaceflight services company. The company is developing a variety of technologies and systems to enable commercial human space travel, with the goal of making space travel more affordable, accessible, and sustainable.

One of Blue Origin's key projects is the New Shepard spacecraft, which is designed to take paying customers on suborbital spaceflights. The spacecraft consists of a capsule that can carry up to six passengers, and a reusable rocket booster that propels the capsule to space.

Blue Origin has also developed the BE-4 rocket engine, which is designed to power the New Glenn reusable rocket. Blue Origin anticipates that the New Glenn will be able to put payloads into orbit by the end of the decade.

Blue Origin also has plans for lunar landers. For example, Blue Moon is a lunar lander that will deliver various payloads, including rovers, to the surface of the moon. The company is also developing technologies for in-orbit servicing and satellite manufacturing.



Innovations in Manufacturing & MRO are increasing the efficiency, safety, and quality of aerospace products, services, and processes (1/2)

Innovative technologies are improving efficiency, cost-effectiveness, and precision in the manufacturing of aircraft and spacecraft parts and components. New technologies and process improvements are expected to advance the overall performance, maintenance, and longevity of aerospace vehicles.

Sub-trends within the grouping

Additive Manufacturing (AM)

AM is the process of creating an object by building it one layer at a time. Within the context of aerospace, it can be used for modeling, prototyping, tooling, light weighting, and fabrication of complex or low-volume parts. Leveraging AM allows for the introduction of new metallic alloys, lower material costs, and faster production times.

Advanced Materials

Advanced materials are new materials with enhanced properties that are designed for superior performance. They can be used in a wide variety of applications from lighter, more agile aircraft and emerging hypersonic systems, to personal protection equipment and hostile environments where risks can be reduced using protective solutions.

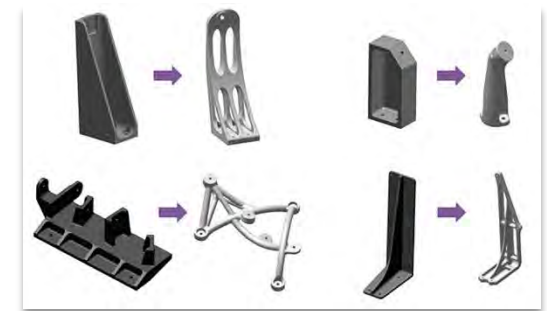
Blockchain-Enabled Supply Chain Systems

Using blockchain in the supply chain has the potential to improve supply chain transparency and traceability as well as reduce administrative costs. In the future, part authenticity and chain of custody could be more easily verified through blockchain technology.

Digital Engineering

Digital engineering (e.g., digital twinning) is the use of computer models to support the development of complex products and systems. Digital engineering uses data, model-based approaches, and integrated analytical tools to create fully connected digital ecosystems. This enables full domain awareness, repeatable processes, dynamic simulation environments, and real-time testing and implementation.

Case Study: Boeing's Center of Additive Manufacturing Excellence (CoAME)



In September 2022, Boeing formally opened the Center of Additive Manufacturing Excellence (CoAME), a new additive manufacturing facility in Auburn, Washington. The center leverages 3D printing technology in the design and manufacturing of tools and parts for commercial airplanes, helicopters, spacecraft, and satellites.

The CoAME is focused on advancing the use of additive manufacturing techniques, such as 3D printing, to produce aerospace-grade parts such as engine components, structural parts, and landing gear. This center also aims to explore new materials and techniques that can be used to improve the performance and reduce the weight of aircraft, while also reducing the cost and lead time of production.



Innovations in Manufacturing & MRO are increasing the efficiency, safety, and quality of aerospace products, services, and processes (2/2)

Innovative technologies are improving efficiency, cost-effectiveness, and precision in the manufacturing of aircraft and spacecraft parts and components. New technologies and process improvements are expected to advance the overall performance, maintenance, and longevity of aerospace vehicles.

Sub-trends within the grouping

Manufacturing Intelligence

Manufacturing Intelligence refers to the processes and supporting tools that pull together data from diverse sources across a manufacturer's operations to produce reports, analysis, dashboards, and other useful tools that enhance manufacturing performance. Manufacturing Intelligence enables aerospace businesses to implement predictive maintenance by tracking possible faults and forecast repair times.

Robotics

Robots are used in a wide variety of applications in the aerospace sector, from the manufacturing of components to the delivery of finished goods to end users. Their precision, reliability, and speed reduce operating costs and remove human involvement in potentially hazardous processes.

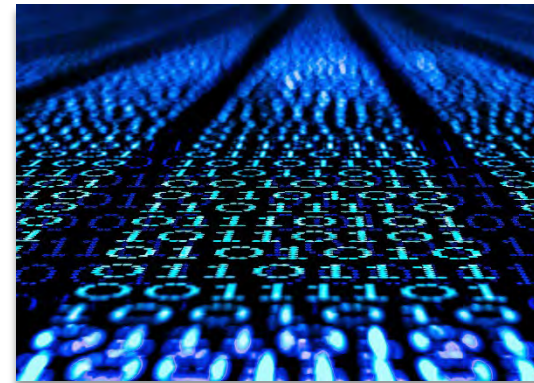
Space & Aviation Cyber Security

The growing connectivity of aviation and space systems has increased their vulnerability to cyber attacks. Mega constellations, particularly SpaceX's Starlink, were recently the victims of cyberattack during the war in Ukraine. Space & Aviation Cyber Security is focused on maintaining safe, secure, and resilient computer systems.

Vertical Integration

Vertical integration is a strategy in which a company takes ownership of various stages of the production of an end product. Vertical integration is becoming increasingly common in aerospace, as it provides greater control of intellectual property and prevents delays and/or cost overruns from supply chain issues.

Case Study: Cybersecurity and Infrastructure Security Agency (CISA)'s Space Systems Critical Infrastructure Working Group



The critical infrastructure on which the United States depends relies on space systems. Increasing the security and resilience of space systems is essential to supporting the American people, economy, and homeland security.

The Cybersecurity and Infrastructure Security Agency (CISA) – part of the Department of Homeland Security – focuses on protecting individuals and national infrastructure from cyberattacks. Seattle is home base for CISA's Region 10, a zone that spans 918,630 square miles and covers Alaska, Idaho, Oregon, Washington, and 271 Tribal nations.



In 2021, CISA announced the formation of a Space Systems Critical Infrastructure Working Group that brings together space system critical infrastructure stakeholders and develops strategies to minimize risks to space systems. The Working Group's members represent government and industry organizations from the communications, critical manufacturing, defense industrial base, information technology, and transportation sectors, including leading-edge satellite and space asset infrastructure firms with expertise in emerging technologies.



Sustainability sub-trends are aimed at decreasing the carbon emissions and environmental impacts of aerospace products and services

The adoption of electrification and sustainable fuels is quickly growing and expected to help aerospace companies meet regulatory and consumer expectations related to climate change.

Sub-trends within the grouping

Electrification

Adoption of electrification in aerospace is mostly seen in electric aviation propulsion (EAP), which is the use of electric motors to power aircraft. Although EAP has gained momentum, it is an emerging field due to the energy density and weight of existing battery technology.

Sustainable Fuels

Sustainable aviation fuels (SAFs) are biofuels used to power aircraft. Biofuels are made from renewable biomass and waste resources and have the potential to deliver the performance of petroleum-based jet fuel with a fraction of its carbon footprint. Examples of SAFs include specially-blended "green" gas as well as hydrogen fuel cells.

Case Study: Magnix Moves to King County



Australia-founded MagniX is an aerospace company that designs, develops, and manufactures electric propulsion systems for aircraft. The company recently announced it will be moving its headquarters to Everett in King County, Washington. MagniX's decision was made with the desire to be closer to its customers, primarily Eviation (Everett) and Harbour Air (Vancouver).

The company will be located in King County's Innovation Triangle, an area that is being developed as a hub for advanced manufacturing and clean technology. MagniX's move to King County will also bring new opportunities for the regional aerospace industry and help to establish the area as a leader in the field of electric propulsion systems.

Sources for global market growth by aerospace sub-trend

Type of Trend	Major Trend	Sub Trend	Aerospace Specific	Current Market Size (\$M, 2021)	Future Market Size (\$M, 2030)	CAGR over period	Published Date	Published By
Emerging Markets & Technologies	Advanced Air Mobility	Unmanned Aerial Systems (UAS)	Yes	\$56,700	\$106,030	8%	November 2022	AstuteAnalytica India Pvt. Ltd.
		Electric Vertical Take-Off and Landing vehicle (eVTOL)	Yes	\$6,937	\$30,519	18%	September 2022	Acumen Research and Consulting
		Unmanned Traffic Management (UTM)	Yes	\$880	\$5,464	23%	October 2022	Market Research Future®(Part of WantStats Research And Media Pvt. Ltd.)
	New Space	Satellite Internet Mega constellations	Yes	\$7,370	\$19,710	12%	December 2022	Grand View Research, Inc.
		Commercial Space Travel	Yes	\$372	\$5,540	35%	July 2022	Precedence Research
		Space Propulsion Technology	Yes	\$2,180	\$3,762	7%	January 2023	Verified Market Research
	Supersonics & Hypersonics	Civil Supersonics	Yes	\$23,560	\$30,796	4%	January 2023	ReAnIn
		Hypersonic Vehicles (Civil & Defense)	Yes	\$4,980	\$12,180	10%	September 2021	Allied Market Research
Cross-Cutting Process & Product Advancements	Innovations in Manufacturing and MRO	Digital Engineering	No	\$6,500	\$125,700	39%	July 2022	Allied Market Research
		Robotics	No	\$42,350	\$120,310	12%	January 2023	Emergen Research
		Manufacturing Intelligence	No	\$2,963	\$78,744	44%	July 2022	Acumen Research and Consulting
		Additive Manufacturing	No	\$13,840	\$76,160	21%	October 2022	Grand View Research, Inc.
		Space & Aviation Cyber Security	Yes	\$25,325*	\$61,850	9%	January 2023	Market Research Future
		Blockchain-enabled Supply Chain Systems	No	\$376	\$43,376	70%	May 2021	Quince Market Insights
		Advanced Materials	Yes	\$12,851	\$28,431	9%	May 2022	Research and Markets
	Sustainability	Electrification	Yes	\$10,910*	\$39,610	15%	December 2022	Market Research Future
		Sustainable Fuels	Yes	\$219	\$15,716	61%	January 2023	MarketsandMarkets Research

*Note: Derived using provided future market size (2030) and CAGR in given time period

Sources for market readiness assessment (1/3)

Type of Trend	Major Trend	Criteria	Source Published By
Emerging Markets & Technologies	Advanced Air Mobility	Related Enterprises	Choose Washington
		Physical and Knowledge Capital	Federal Aviation Administration
			William E. Boeing Department of Aeronautics & Astronautics College of Engineering
			South Seattle College
			The Center Square
		Human Capital	Alliance Velocity
			Advanced Manufacturing Apprenticeships
			Washington State University
			University of Washington
		Financial Capital	Aviation Week
			TNMT
			Mckinsey and Company
	New Space	Competitive Landscape	NASA
			Sherrod Brown U.S. Senator For Ohio
			Simple Flying
			City of Orlando
			Deloitte
		Related Enterprises	Choose Washington
			Alliance Velocity
			Pudget Sound Regional Council
		Physical and Knowledge Capital	Federal Aviation Administration
			NASA
			Washington State Department of Transportation
			The Joint Center for Aerospace Technology Innovation
			William E. Boeing Department of Aeronautics & Astronautics College of Engineering
			South Seattle College
			The Center Square
		Human Capital	Alliance Velocity
			Advanced Manufacturing Apprenticeships
			Washington State University
			University of Washington
		Financial Capital	Newspace Index
		Competitive Landscape	Go Astronomy

Sources for market readiness assessment (2/3)

Type of Trend	Major Trend	Criteria	Source Published By
Emerging Markets & Technologies	Supersonics & Hypersonics	Related Enterprises	Mordor Intelligence
		Physical and Knowledge Capital	The Joint Center for Aerospace Technology Innovation William E. Boeing Department of Aeronautics & Astronautics College of Engineering South Seattle College
		Human Capital	The Center Square Alliance Velocity Advanced Manufacturing Apprenticeships Washington State University University of Washington
		Financial Capital	Deloitte
		Competitive Landscapes	NC Governor Roy Cooper NASA Mordor Intelligence
		Related Enterprises	Emergen Research Global Newswire Fortune Business Insights
		Physical and Knowledge Capital	William E. Boeing Department of Aeronautics & Astronautics College of Engineering Washington State University The Joint Center for Aerospace Technology Innovation
		Human Capital	South Seattle College The Center Square Alliance Velocity Advanced Manufacturing Apprenticeships Washington State University University of Washington
		Financial Capital	Washington State University Innovation Cluster Accelerator Crunchbase
		Competitive Landscape	Emergen Research GlobalNewswire Fortune Business Insights
Cross-Cutting Process & Product Advancements	Innovations in Manufacturing and MRO	Related Enterprises	Emergen Research Global Newswire Fortune Business Insights
		Physical and Knowledge Capital	William E. Boeing Department of Aeronautics & Astronautics College of Engineering Washington State University The Joint Center for Aerospace Technology Innovation
		Human Capital	South Seattle College The Center Square Alliance Velocity Advanced Manufacturing Apprenticeships Washington State University University of Washington
		Financial Capital	Washington State University Innovation Cluster Accelerator Crunchbase
		Competitive Landscape	Emergen Research GlobalNewswire Fortune Business Insights
		Related Enterprises	Emergen Research Global Newswire Fortune Business Insights
		Physical and Knowledge Capital	William E. Boeing Department of Aeronautics & Astronautics College of Engineering Washington State University The Joint Center for Aerospace Technology Innovation
		Human Capital	South Seattle College The Center Square Alliance Velocity Advanced Manufacturing Apprenticeships Washington State University University of Washington
		Financial Capital	Washington State University Innovation Cluster Accelerator Crunchbase
		Competitive Landscape	Emergen Research GlobalNewswire Fortune Business Insights

Sources for market readiness assessment (3/3)

Type of Trend	Major Trend	Criteria	Source Published By
Cross-Cutting Process & Product Advancements	Sustainability	Related Enterprises	Earth.org
		Physical and Knowledge Capital	Port of Seattle
			Washington State Department of Transportation
			Advanced Hardwood Biofuels Northwest
			Ascent
			The Joint Center for Aerospace Technology Innovation
			William E. Boeing Department of Aeronautics & Astronautics College of Engineering
			Washington State University
		Human Capital	South Seattle College
			The Center Square
			Alliance Velocity
			Advanced Manufacturing Apprenticeships
			Washington State University
			University of Washington
		Financial Capital	US Department of Energy
			Washington State University
			Innovation Cluster Accelerator
		Competitive Landscape	Crunchbase
			Washington State University
			Washington State University
			Earth.org

The following criteria were used to conduct the Market Readiness Assessment

Criteria		Definition	Market Readiness Assessment Rating Scale		
			High	Medium	Low
Related Enterprises	Direct and Supporting Businesses	Local concentration of directly related and supporting OEMs and suppliers	Strong concentration of directly related and supporting OEMs and suppliers	Moderate concentration of directly related and supporting OEMs and suppliers	Low concentration of directly related and supporting OEMs and suppliers
Physical and Knowledge Capital	Infrastructure	Development of physical structures and facilities	Well developed infrastructure (e.g., specialized and mature infrastructure)	Moderately developed infrastructure (e.g., mature infrastructure)	Undeveloped infrastructure for trend (e.g., unspecialized and immature infrastructure)
	Research and Development (R&D)	Amount of local research and development (R&D) activity	Strong amount of R&D activity (i.e., more than six research institutions or programs)	Moderate amount of R&D activity (i.e., two to six research programs)	Weak amount of R&D activity (i.e., less than two research programs)
Human Capital	Workforce	Availability of local workforce through development and attraction	Talent supply available to meet local demand	Talent supply available to meet local demand with some challenge	Talent supply does not meet local demand or does so with great challenge
	Workforce Development Opportunities	Availability of local workforce development opportunities	Strong availability (i.e., more than six programs)	Moderate availability (i.e., four to six programs)	Weak availability (i.e., three or less programs)
Financial Capital	Public Investment	Availability of government provided incentives	Strong availability (e.g., many federal and/or local tax exemptions, grants, and/or decreased tax rates)	Moderate availability (e.g., some federal and/or local tax exemptions, grants, and/or decreased tax rates)	Weak availability (e.g., few to no federal and/or local tax exemptions, grants, and/or decreased tax rates)
	Private Investment	Availability of private venture capital	Strong availability (i.e., many locally headquartered venture funds, partnerships, and/or special purpose acquisition companies)	Moderate availability (i.e., some locally headquartered venture funds, partnerships, and/or special purpose acquisition companies)	Weak availability (i.e., few to no locally headquartered venture funds, partnerships, and/or special purpose acquisition companies)
Competitive Landscape	National Competitive Advantage	Level of competitive advantage on the national scale	Strong competitive advantage (i.e., three or less well-established competitor regions/states)	Moderate competitive advantage (i.e., between four to six well-established competitor regions/states)	Weak competitive advantage (i.e., seven or more well-established competitor regions/states)
	International Competitive Advantage	Level of competitive advantage on the international scale	Strong competitive advantage (i.e., three or less well-established competitor countries)	Moderate competitive advantage (i.e., between four to six well-established competitor countries)	Weak competitive advantage (i.e., seven or more well-established competitor countries)

Aerospace trends market readiness assessment: Evaluating King County's ability to capture associated economic opportunities (1/2)

Emerging Markets & Technologies	Related Enterprise	Physical and Knowledge Capital		Human Capital		Financial Capital		Competitive Landscape	
	Businesses	Infrastructure	Research and Development (R&D)	Workforce	Workforce Development Opportunities	Public Investment	Private Investment	National Competition Advantage	International Competition Advantage
 Advanced Air Mobility	Low concentration of Advanced Air Mobility (AAM) leading businesses compared to other states (e.g., California and Florida)	- Lack of spaceports and dedicated testing facilities - Local infrastructure (e.g., airports) has potential to support AAM, but will require investment and expansion	University of Washington and Washington State University have > 6 research programs directly relating to AAM and the future of mobility	- Strong STEM workforce - Strong presence of coalitions	- Strong STEM programs in local universities and colleges - Large amount of apprenticeship and training programs - Numerous development and outreach events (e.g., hackathons, conferences)	- Presence of existing federal funding through \$25M in FAA-approved grants to support infrastructure readiness for advanced air mobility - Potential to incorporate sustainability-related state-level incentives, but lack of direct AAM related incentives	Low percentage of existing AAM private investors are based in King County	- Other states such as Ohio, California, and Florida are currently further progressed with AAM businesses - Other states such as Florida have local and/or state funding opportunities available	Global competition is tight with the United States being one of the leading countries
 New Space	Strong presence of industry leaders and key suppliers when compared to other states	Lack of spaceports and dedicated space testing facilities	University of Washington and Washington State University have > 6 research programs directly related to New Space	- Strong STEM workforce - Strong presence of coalitions	- Strong STEM programs in local universities and colleges - Large amount of apprenticeship and training programs - Numerous development and outreach events (e.g., hackathons, conferences)	- NASA's budget (which includes New Space R&D) has increased to ~\$24B ~\$800B of federal funding allocated to the DoD which includes investments for space technologies - No identified state or local funding directly tied to New Space	WA has the third largest amount of New Space private investors	Other states such as California, Pennsylvania, Texas and Florida also have strong New Space hubs	Global competition is tight with the United States being one of the leading countries
 Supersonics & Hypersonics	Low concentration of Supersonic and Hypersonic businesses compared to other states (e.g., Virginia, North Carolina)	Lack of supersonic test flight areas and spaceports	- University of Washington has < 6 research programs directly related to supersonics and hypersonics - Washington State University does not have any existing research programs directly related to supersonics and hypersonics	- Strong STEM workforce - Strong presence of coalitions	- Strong STEM programs in local universities and colleges - Large amount of apprenticeship and training programs - Numerous development and outreach events (e.g., conferences)	~\$800B of federal funding allocated to the DoD which includes investments for supersonics and hypersonics - No identified local or state funding directly tied to supersonics and hypersonics	Low availability of private investors identified in King County	Low progression of growth in King County compared to other states that benefit from proximity to DC, land availability, and local government support (e.g., Virginia, North Carolina)	- Global competition is tight with the United States being one of the leading countries - US defense budget, which includes supersonic and hypersonic investments, is largest in the world

Aerospace trends market readiness assessment: Evaluating King County's ability to capture associated economic opportunities (2/2)

Cross-Cutting Process & Product Advancements	Related Enterprise	Physical and Knowledge Capital		Human Capital		Financial Capital		Competitive Landscape	
	Businesses	Infrastructure	Research and Development (R&D)	Workforce	Workforce Development Opportunities	Public Investment	Private Investment	National Competition Advantage	International Competition Advantage
 Innovations in Manufacturing and MRO	Strong presence of industry leaders as well as key suppliers	Limited availability of manufacturing and MRO sites creates challenges for businesses looking to locate and expand in King County	University of Washington and Washington State University have > 6 research programs relating to innovations in manufacturing and MRO	- Strong STEM workforce - Strong presence of coalitions	- Local universities and colleges offer strong STEM programs - Large amount of apprenticeship and training programs - Numerous development and outreach events (e.g., hackathons, conferences)	Available policy incentives for sustainability can be applied towards innovations in manufacturing and MRO (e.g., Advanced materials), but none directly tied to Innovations in Manufacturing and MRO were identified	Middle-tier availability of private investors	Large number of companies leading in this trend have a location a King County	Global competition is tight with the United States being one of the leading countries
 Sustainability	Strong presence of industry leaders as well as key suppliers	A study was conducted identifying airports in King County that have the ability to store biofuels	University of Washington and Washington State University have > 6 research programs relating to sustainability	- Strong STEM workforce - Strong presence of coalitions	- Local universities and colleges offer strong STEM programs - Large amount of apprenticeship and training programs - Numerous development and outreach events (e.g., hackathons, conferences)	- Many state and local grants 40+ grants available at the federal level 5 innovation clusters with a sustainability purpose	Middle-tier availability of private investors	- Two major producers of SAF are located in Washington - Washington has a strong presence of OEMs adopting sustainability practices	- Three of the four leading SAF companies are located in the United States - Federal policy is galvanizing corporate action

Recommendation references and resources (1/3)

Rec Type	Recommendation	Reference / Resource	Reference / Resource Type
Aerospace Sector	S1. Improve collaboration across the regional aerospace ecosystem	The Aerospace Alliance	Case Study
		Midlands Aerospace Alliance	Case Study
		Metropolitan Policy Program Rethinking Cluster Initiatives	Research Report
		Northwest Aerospace Alliance	Case Study
		European Cluster Collaboration Platform, Matchmaking Event	Case Study
	S2. Increase the availability and accessibility of industrial land for aerospace manufacturing	PSRC Industrial Land Analysis Report	Report
		PSRC Vision 2050	Strategy
		Brownfields Funding Opportunities in Washington State	List of Funding Opportunities
		New York City Industrial Development Loan Fund (IDLF)	Case Study
	S3. Improve permitting processes and regulatory support	Washington State Governor's Office for Regulatory Innovation and Assistance	Relevant Resource
		MSRC Streamlining Local Permit Review Procedures	Website
		Washington State Auditor's Office Local Government Performance Center	White Paper
		Los Angeles County Permitting Assistance	Case Study
	S4. Increase access to capital for aerospace businesses	Urban Institute State and Local Governments and Impact Investing	Report
		United States Treasury CDFI Fund	Website
		Puget Sound Regional Council: Regional Economic Strategy	Strategy
		Florida First Capital Finance Corporation and Space Florida Partnership	Case Study
		United States Department of Treasury New Markets Tax Credit Program	Website
	S5. Build and market infrastructure that catalyzes innovation and supports sector growth	Brookings Rise of Innovation District	Article
		PSRC The Washington State Space Economy: 2022 Update	Research Report
		Oklahoma City Innovation District	Website
		Johns Hopkins Applied Physics Laboratory	Website

Recommendation references and resources (2/3)

Rec Type	Recommendation	References and Resources	Resource Type
Supply Chain	SC1. Attract and grow businesses that fill supply chain gaps bottlenecking production	Greater Seattle Partners' Economic Partnership Charter	Charter
		European Regional Development Fund (ERDF)'s Aerospace Unlocking Potential (Aerospace UP)	Case Study
		Florida's Space Transportation Incentives	Case Study
		Brookings Metropolitan Policy Program's Rethinking Cluster Initiatives	Paper
	SC2. Grow existing businesses and build the resiliency and performance of the supply chain	Innovation Cluster Accelerator Program	Website
		Forward Together Job Creation and Business Growth	Website
		Rhode Island Commerce Corporation Innovation Voucher Program	Case Study
		Washington State Small Business Guidance Business Loan Programs	Website
		West Midlands Innovation Programme PIVOT Pilot	Case Study
		New York City Economic Development Corporation (NYEDC)'s Futureworks NYC	Case Study

Recommendation references and resources (3/3)

Rec Type	Recommendation	References and Resources	Resource Type
Workforce	W1. Provide resources to support industry-led technical training	King County Green Jobs Strategy	Website
		Aerospace Industries Association 2022 Aerospace and Defense Workforce Study	Report
		Workforce Development Council of Seattle-King County	Website
		Scotland's Flexible Workforce Fund	Website
		Scotland's Flexible Workforce Fund Report	Report
		California Apprenticeship Initiative	Website
	W2. Invest in aerospace educators and equity-based enrichment programs	King County Diversion and Reentry Services	Website
		King County Immigrant and Refugee Program	Website
		King County Disability Equity Network	Website
		King County Best Start for Kids	Website
		Forward Together: An Economic Recovery Framework for Greater Seattle	Strategy
		King County Strategic Plan for Public Transportation 2021 – 2031	Strategy
		National Equity Atlas: Advancing Workforce Equity in Seattle	Report
		Forward Together: An Economic Recovery Framework for Greater Seattle	Strategy
		Virginia Department of Aviation	Website
		Seattle Youth Employment Program	Website
		Workforce Development Council of Seattle-King County	Website
		King County Green Jobs Strategy Report	Strategy Report
		NextGen Climate Intern Job Listing	Website
		Singapore's Skillsfuture Programme	Case Study
		The American Institute of Aeronautics and Astronautics' Students to Launch Initiative	Case Study
	W3. Increase awareness about industry opportunities and entry points	Washington State STEM	Website
		STEM by the numbers: King County	Report
		Map your Career	Career Planning Tool
		University of Washington Off-Campus Employer Guide	Guide
		Virginia Department of Aviation's Teacher Grants	Case Study
		South Carolina Aerospace: 2019 – 2022 Strategic Plan	Case Study

Recommendation S4.1: List of Community Development Financial Institutions

List of Certified Community Development Financial Institution (CDFIs) in King County

Organization Name	Type	City	State	ZIP Code	Address	Organization Website
Evergreen Business Capital Community Finance	Loan Fund	Tukwila	WA	98168--571	13925 Interurban Ave S, STE 100	None given
Express Credit Union	Credit Union	Seattle	WA	98134--162	1930 6th Ave S, Ste 104	http://expresscu.org/
HomeSight	Loan Fund	Seattle	WA	98118--192	5117 Rainier Avenue South	www.homesightwa.org
Impact Capital	Loan Fund	Seattle	WA	98101	701 Pike Street #1645	www.impactcapital.org
New Roots Fund	Loan Fund	Seattle	WA	98144--211	1610 South King Street	http://dioceseroseattle.org
Northwest Access Fund	Loan Fund	Shoreline	WA	98155	PO Box 55759	http://www.nwaccessfund.org
Rainier Valley Community Development Fund	Loan Fund	Seattle	WA	98118--354	6951 Martin Luther King Jr Way S, Ste 225	http://www.rvcdf.org
Seattle Economic Development Fund d/b/a Business Impact NW (BIN)	Loan Fund	Seattle	WA	98144--202	1437 S. Jackson Street	www.businessimpactnw.org
Seattle Metropolitan Credit Union	Credit Union	Seattle	WA	98134	1521 1st Ave S Ste 500	www.smcu.org
Ventures	Loan Fund	Seattle	WA	98144	2100 24th Avenue S., Suite 380	www.venturesnonprofit.org
Washington Community Reinvestment Association	Loan Fund	Seattle	WA	98101--310	1200 Fifth Avenue, Suite 1406	www.wcra.net