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AEROSPACE & DEFENSE

INSIGHTS AND PERSPECTIVE

CONTEXT

- Spending in the defense industry, globally, is estimated to grow 2.8 percent in 2021, passing \$2T ([Deloitte](#)).
- Defense spending in the United States is expected to remain mostly flat, while growing elsewhere in the world ([Deloitte](#)).
- Seventy-two percent of A&D executives stated that they are investing in improving “supply chain ecosystems” to leverage strategic partnerships ([Deloitte](#)).
- Globally, A&D could see a \$20B increase in value through further expansion into the digital space ([McKinsey](#)).
- The aerospace industry has the lowest rate of spending on innovation, at 4.1 percent ([Linchpin](#)).



TRENDS

1. Supply Chain Management

- Global decline in demand for air transport brought on by larger restrictions on the movement of people and goods heavily impacted the A&D industry.
- With 81 percent of A&D executives agreeing that their business and technology strategies must be interconnected ([Accenture](#)), digitizing supply chain management moves to the front.
- During the pandemic, smaller suppliers lacking agility and flexibility in their supply chains had trouble sustaining the ebb and flow of demand ([Deloitte](#)).
- Companies with supply chains poised to service commercial aerospace and defense should explore reduction of overflow of critical inventory between them through dynamic planning.
- Areas such as onshoring, vertical integration, and cyber defense are strong opportunities for growth towards more resilient supply chains ([Deloitte](#)).
- Utilization of tools in the digital space, such as automation, smart management systems, and data analytics is critical to improving the capabilities of A&D supply chain management.
- One company leveraging the digital space to enhance supply chains is Orbital Insight, who, in a partnership with Unilever, analyzes a variety of data points—from cellphone geolocation to satellite imagery—to assess and improve the effectiveness and integrity of one of Unilever's key product supply chains ([Fast Company](#)).

2. How Mobility Happens

- As companies across industries move towards

more environmentally-conscious changes, A&D are no exception. The innovation needed to reduce carbon emissions also spurs development of new eco-friendly technologies for transportation.

- New methods of propulsion and types of fuel are being tested as viable alternatives to conventional jet fuel; electric propulsion in aircraft has the potential to reduce carbon emissions, while decreasing costs, increasing efficiency, and reducing flight noise.
- Rolls-Royce successfully tested its hybrid M250 turbine in 2019, and plans to integrate it with aircraft and begin experimental flights in 2021 ([Deloitte](#)).
- Hydrogen shows promise as an efficient and responsible fuel alternative with minimal effects on the environment. Hydrogen power for aircraft is in the early stages, with many companies testing it in various use cases.
- Airbus SE is ahead of the curve, developing a zero-emission, hydrogen-powered aircraft (the ZEROe concept) that could enter service as soon as 2035 ([Deloitte](#), [Airbus](#)).
- With moves towards eco-friendliness in mobility come changes in the transportation landscape. NASA, through its Advanced Air Mobility ([AAM](#)) national campaign, seeks to encourage companies in emerging markets to explore new types of air transportation for people and goods, beginning in the urban market ([NASA](#)).

3. The Human-Machine Relationship

- In 2021, the United States' defense budget for the modernization of the armed forces was \$704.6B ([Mordor Intelligence](#)). The next greatest battlefield of A&D lies in mechanical and digital technology and how people use it.

- As AI/ML expands, so do its capabilities across a wide variety of aerospace and defense applications.
- Decision-makers in crucial positions will be less involved in the collection and organization of data, and more involved in the analysis and execution processes.
- AI applications in ISR, command and control, and weapons effectiveness are becoming increasingly valuable ([Mordor Intelligence](#)). Advances in AI-based biometric technologies open up new opportunities for data collection, analysis, and security.
- Automation and robotics in A&D provide new opportunities to increase the efficiency and effectiveness of human-machine relationships.
- Lockheed Martin’s ONYX-powered exoskeleton, offered to customers across military, industrial, and civilian markets, seeks to enhance users’ mobility and wellbeing by improving the ergonomics of walking, carrying, and even climbing ([Lockheed Martin](#)).

4. Contract Availability

- Driven by the global effects of COVID-19, the United States Department of Defense increased spending on contracts to \$445B in 2020, an increase of around 10 percent over the previous year ([Bloomberg Government](#)).
- While the majority of contract spending is allocated to the “big five”—Lockheed Martin, Raytheon Technologies, General Dynamics, Northrop Grumman, and Boeing—the task of innovation and modernization in the defense industry will still rely on new entrants ([Bloomberg Government](#)).
- In 2020, the Pentagon awarded a record number of small contracts and handed out \$1.5B in early funding to over a thousand firms ([Fast Company](#), [SBIR](#)). Cutting-edge ISR technologies, especially those being developed for the Air Force ([Mordor Intelligence](#)) are of high interest.

8PS

Leverage Point	“8Ps” of Strategy	Opportunity for Disruption	Recommended Leverage Points
<u>Position</u>	The customer you are targeting and their need that you seek to fulfill.	4	<ul style="list-style-type: none"> • Are there ways that your current product lineup could be expanded to reach the civilian and industrial market?

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<u>Product</u>	The technologies and services you sell and the characteristics that give them value.	7	<ul style="list-style-type: none"> • How can you integrate AI/ML applications into your technology? • What opportunities do you have to expand into new propulsion and mobility technologies?
<u>Promotion</u>	How you connect and communicate with current and potential customers.	4	<ul style="list-style-type: none"> • How can you broaden general consumer interest in your company and technologies?
<u>Price</u>	How customers pay to get your technology.	6	<ul style="list-style-type: none"> • How do you negotiate for favorable contracts? • How can you structure your pricing model to appeal to multiple markets and types of consumers?
<u>Placement</u>	Where and how customers can view, access, and purchase your technology.	3	<ul style="list-style-type: none"> • Through which channels can customers learn information about your technology?
<u>Physical Experience</u>	How your brand experience meets the needs and expectations of the customer.	5	<ul style="list-style-type: none"> • How do your technologies create a seamless and valuable human-machine experience? • What systems do you have in place to monitor customer satisfaction?

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<u>Processes</u>	<p>How you manage your supply chain.</p> <p>How you manage and use the data and information of customers.</p>	9	<ul style="list-style-type: none"> • What is your plan to move towards more eco-friendly production, processes, and technologies? • How can you develop more dynamic supply chains? • How do you ensure that you can fulfill commercial aerospace and defense contracts simultaneously?
<u>People</u>	The choices you make regarding hiring, organizing, and incentivizing your people and your culture.	4	<ul style="list-style-type: none"> • How does your hiring model contribute to your modernization plan?

OUTTHINKERS



- Raytheon Technologies, formed by a merger of Raytheon Company and United Technologies in 2019, is an aerospace and defense technology company providing a wide portfolio of products to companies in the commercial aerospace and defense industries.
- Through its subsidiary Pratt & Whitney, Raytheon Technologies is essentially the proprietary manufacturer of geared turbofan engines for aircraft, a technology which paid off during the pandemic for its cost effectiveness and other benefits ([Forbes](#)).
- In May 2020, SpaceX became the first privately held company to transport NASA astronauts to the International Space Station, a feat not accomplished on United States soil in nearly 10 years. The company sent another team of astronauts in November, with a third mission scheduled for 2021 ([Fast Company](#)).
- SpaceX stole the show, and continues to do so, through its industry-leading ability to recycle and reuse rockets for different uses and multiple launches. The Falcon 9, used to complete the Starlink satellite constellation, accomplished its seventh successful launch and recovery.

- Raytheon Technologies holds a strong stake in key areas of innovation in the defense industry, such as digital radar, electronic warfare and cyber security, and hypersonic weapons.
- The company plans to accelerate innovation and modernization through its deeply diversified team due to the merger ([Forbes](#)).
- SpaceX's Starlink constellation, comprised of over 7,500 satellites, aims to bring high-speed broadband internet to people in every kind of geographic location.