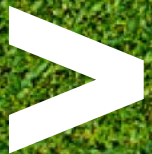


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Beyond flight: Aerospace sets sights on sustainability

If asked to name sustainable industries, aerospace and defense might not be the first to come to mind. However, the industry is evolving and embracing a sustainability agenda that goes far beyond reducing aircraft emissions and extends to reducing environmental impact across the entire value chain.

The pressure is mounting: Over the next three years, nearly 60% of aerospace and defense executives see sustainability as an increasingly crucial topic to be addressed across a complex and highly-orchestrated supply chain. They recognize the need to transform not just aircraft propulsion technologies, but also how their products are designed, manufactured, and serviced.¹ This is bringing increased attention to ensuring that digital investments and product technology are driving deep, broad sustainability benefits across the industry, in everything from energy consumption to resource utilization to recycling of waste or end-of-life assets.

Some aerospace and defense companies are beginning to successfully deploy digital technologies to reduce environmental footprints, but they struggle to measure and message these gains. How can aerospace and defense companies accelerate—and evangelize—their efforts across enormously complex value chains?

Accenture has identified three imperatives that can put sustainability at the heart of every aerospace and defense company's operations and ecosystem: **accelerate the transformation, harness the ecosystem** and **evangelize the progress**.

By focusing on specific, strategic steps within these three areas, companies can improve the environmental performance of their operations, products and services. The opportunity is here and the time to embrace it is now.



1. Accelerate the transformation

Sustainability must be embedded into every part of an organization's strategy—the business agenda and the sustainability agenda are now one and the same.

Indeed, companies across all industries and sectors are already realizing value from integrating sustainability into their operations and products. Between 2013 and 2020, companies with consistently high environmental, social and governance (ESG) performance ratings have outperformed their peers, achieving operating margins 3.7x higher than lower-rated peers and generating 2.6x higher annual total returns to shareholders.²

For aerospace and defense, there is a strong business imperative for making changes sooner rather than later: 72% of aerospace and defense executives surveyed agree that the unintended consequences of industrialization—including pollution, solid waste, e-waste and unsustainable extraction of raw materials—have negatively impacted their business performance.³ These consequences have also intensified the drive to digital, with 40% of respondents saying that sustainability is an important outcome for their company's digital transformation journey.⁴

Profit and purpose are not mutually exclusive, and the companies that recognize it and transform how they source, design, manufacture, distribute and recycle their products will have an advantage.

In fact, **63% of aerospace and defense executives anticipate up to one-third of their revenues coming from more sustainable products or services in next five years,** driven by more efficient designs and new sources of fuel and advanced materials.⁵



To turn anticipation into action, companies will need to adopt fundamentally different strategies to accelerate their operational transformations:

Sustainability, by design

There is huge potential for innovation in design and engineering as design is also where the sustainable value creation starts. Gains can be achieved at this stage by pursuing a more sustainable product as well as by making the design process itself more resource and energy efficient. 69% of aerospace and defense executives are already building innovative solutions to ensure that their design and engineering are resource circular.⁶

Airbus created a lighter, stronger "bionic" partition to separate the passenger compartment from the galley in the A320 aircraft. Installing these bionic partitions across the entire cabins of A320s could reduce up to 500 kg of weight, resulting in CO2 emissions reductions of up to 166 metric tons per aircraft per year.⁷

Sustainability, made to order

At the manufacturing stage, resource and energy management can be significantly improved through the adoption of the connected factory model. For example, IoT-enabled smart meters have the potential to reduce energy consumption in aircraft production by 20%.⁸

According to our commercial aerospace insight survey, 63% of aerospace and defense executives say that IoT technology offers the most potential benefit for sustainability in manufacturing operations.⁹ Digitization of production can take material and energy efficiency to the next level and dynamic and digital production planning and scheduling has been already fully adopted by one in four aerospace and defense companies.¹⁰ Also, in addition to deploying digital technologies such as IoT, utilizing renewable energy at manufacturing facilities helps in lowering the environmental impact of production operations. We found that over half of aerospace and defense executives are already extremely engaged in initiating multiple green initiatives to net-off the emissions made during production.¹¹

Boeing runs its factories in Renton, Washington and Charleston, South Carolina through solar, wind and hydropower and its renewable energy procurements reduced greenhouse gas emissions by 10% in 2020.¹²

Boeing has also implemented a carbon fiber recycling process at 11 of its global manufacturing locations which will support the company's goal to drive a 20% reduction in solid waste going to landfills by 2025.¹³



Sustainability, every step of the way

Technologies such as digital twins—virtual representations of objects or systems—allow for preventative maintenance, minimizing aircraft downtime and substantially increasing environmental performance. Reducing “reactive maintenance” reduces costs, but it also reduces the energy and materials required for repairs. 68% of aerospace and defense executives expect their organization’s investment in intelligent digital twins to increase over the next three years.¹⁴

Rolls Royce has created digital twins of their engines, where the company collects real-time data to assess engine performance, ultimately saving 22 million tons of carbon.¹⁵

The technology also benefits military aircraft by keeping the aircraft mission-ready and avoiding unnecessary time-based scheduling, resulting in sustainable operations and cost saving. For example, the U.S. Air Force reported potential savings of approximately \$42 million annually by using a digital twin.¹⁶

New value is increasingly being discovered at the intersection of digital technologies and sustainability. The companies that integrate sustainability into every phase of the process and every part of the organization will be best-positioned to accelerate their transformations and embrace this opportunity for growth.



2. Harness the ecosystem

“It takes a village” to make this kind of dramatic change, and ecosystem plays offer the opportunity for faster and further scaling of sustainability-based business models, as well as deeper impact.

Indeed, one-third of aerospace and defense executives already generate more than 10% of their revenues through ecosystem business models and recognize its critical importance to their future.¹⁷ And almost all (98%) agree that over the next two years it will be important to engage with and scale sustainability ecosystem partnerships.¹⁸

An extended innovation ecosystem of startups is emerging to accelerate the research and development cycle and move pilots to production at scale and speed. Companies collaborate with their extended ecosystem partners on product performance gains, which provide sustainability benefits across their operations.

Blockchain solutions are an example of a digital technology with sustainability benefits. VeriTx created a digital supply chain solution for aircraft parts using blockchain technology allowing customers like the US Department of Defense to reduce waste by 90% and simultaneously achieve 30% in cost savings.¹⁹



The following strategies can help companies harness the ecosystem to unlock value:

Sustainability, from the source

Aerospace and defense companies must evaluate their sourcing and procurement processes and also their supply chain partners to ensure that sustainable methods and processes are employed in the extraction of the materials as well as their transportation.

64% of aerospace and defense executives say that unsustainable extraction of commodities and materials is one of the impacts of industrialization that is being actively resolved by their company.²⁰ Eco-friendly procurement measures and green sourcing practices can ensure lower energy

consumption. Companies must actively engage with their suppliers to mitigate any environmental risks and improve sustainable product performance.

While sourcing materials for its products, Boeing looks for opportunities to eliminate and recycle chemicals, while developing alternative materials with increased renewable content. For example, Boeing had started using thermoplastics on some parts of the 787 fuselage and wing to replace metal and thermoset composites, resulting in up to a 15% reduction in weight.²¹

Airbus is exploring the use of natural fibers and bio-mass carbon fiber and has partnered with other companies in the BAMCO consortium to develop bio-composite materials for improving the environmental performance of future aircraft.²²



Sustainability, a supply chain reaction

From logistics and network design to the elimination of production waste, to transportation mode selection and beyond, sustainability touches nearly all aspects of the supply chain. 69% of aerospace and defense executives reported that their company faced a moderate to complete supply chain disruption because of COVID-19²³ and digitalization of supply chain remains the key priority for aerospace and defense companies to extract greater efficiencies, reduce risk, enhance visibility and integrate business processes.

Most of these gains not only translate into higher profits, but also reduce waste during production. Extended supply chain control towers that allow to monitor demand volatility and other external factors are already implemented by almost half of aerospace and defense companies.²⁴

Technology solutions can also be deployed to streamline procurement processes and optimize the material flow. Airbus utilizes a joint collaboration platform Airsupply from SupplyOn along with several suppliers connecting their inventory management system resulting in optimization of material flow and saving it over 357 million kilometers of transport.²⁵

Sustainability, start to finish

Aircraft manufacturers estimate that more than 40% of the global fleet will reach end of life in the next two decades and will contribute to a lot of waste in our landfills if not recycled properly. Therefore, dismantling products in a way that maximizes reuse and recycling is key to ensure sustainable end-of-life aircraft management.

Airbus and Tarmac Aerosave have established a proven method for decommissioning, dismantling, and recycling the aircraft in an environmentally sustainable way with up to 90% of aircraft eligible for reuse or recycling.²⁶

Sustainability is truly a team effort and engaging and harnessing the entire ecosystem is essential to success.



3. Evangelize the progress

A sustainability agenda isn't sustainable unless everyone is on board, and communicating results to the workforce, investors, communities and other stakeholders is key. Social media has opened up a floodgate of communication with a broad set of global and local stakeholders. These channels can be leveraged along with traditional company disclosures to communicate progress.

49% of aerospace and defense executives believe that it will be very important for their company to measure, incentivize and communicate sustainability performance three years from now, compared to just 22% today.²⁷ But what constitutes this sustainability performance?

When companies invest in digital solutions to improve efficiency, these have traditionally not been portrayed as sustainability investments: The returns from those digital investments are usually communicated as productivity improvements. Efficiency gains achieved through technology deployments more often than not translate into energy, resource and waste reduction and therefore should be evangelized as such.

Building a framework of sustainability KPIs to measure environmental gains across the value chain—alongside efficiency and revenue gains—is crucial to gain momentum and support to drive further progress. Momentum is building on going from framework concept to mainstream on the horizon. A great example of this movement is the World Economic Forum Stakeholder Capitalism Metrics with a set of core and expanded metrics defined and industry-specific versions are being explored.²⁸



Sustainability, sharing the story

Aerospace and defense executives expect a dramatic near-term shift on what is measured and communicated for sustainability, adding in sustainability alongside the usual financial and customer performance elements. Introducing sustainability-related goals as part of organization's strategy and monitoring the progress on those objectives is expected to be an important criterion for compensation of C-level executives.

Safran has implemented an ambitious "low carbon project" to reduce the carbon footprint of its industrial operations which covers both direct and indirect emissions generated by their products throughout the lifecycle.²⁹ It introduced key performance indicators such as percent of R&D investment focused around environmental efficiency, percent of facilities achieving zero target roadmap set by the company, percent reduction in GHG emissions and has already made progress by completing 20% of the emission reduction actions required to achieve the 2025 targets for these metrics. It also introduced the concept of internal carbon price for its investment projects, to move towards low carbon solutions.³⁰

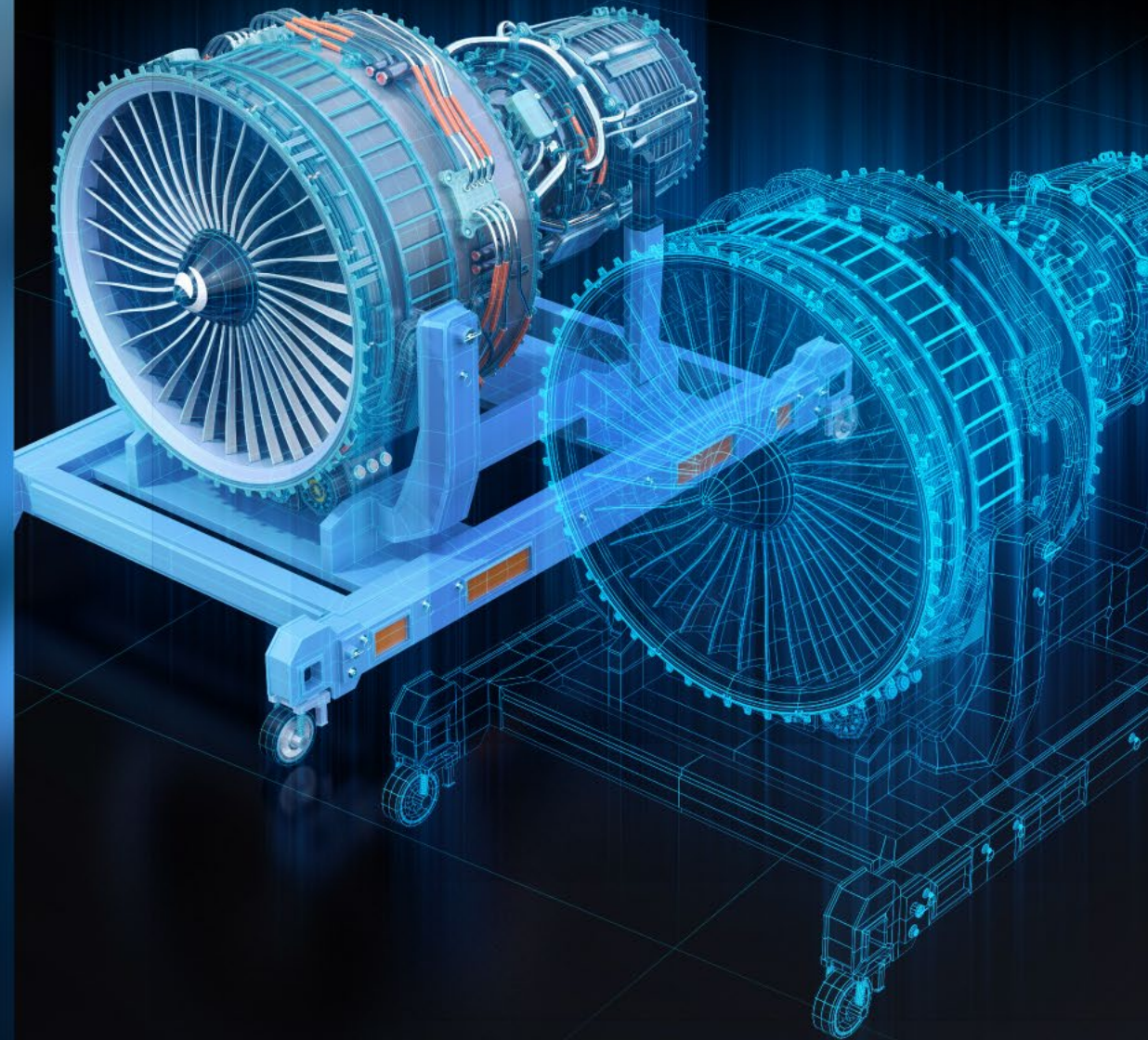


Technology and sustainability: Twin engines powering aerospace

Tomorrow's strongest-performing businesses will be powered by the twin engines of technology and sustainability, working hand-in-hand. And aerospace and defense companies must integrate a thoughtful sustainability strategy into everyday decision-making for both operations and products.

Accelerating the transformation, leveraging ecosystem partnerships to drive broader environmental performance and evangelizing the resulting gains will position aerospace and defense companies for growth as the industry recovers in the post pandemic world.

It's time to take flight.



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