

WHITE PAPER | MAY 2024



LIFE CYCLE ASSESSMENT (LCA)

Accelerating a more circular and sustainable future for aviation

The critical role of life cycle assessment
in the future of sustainable aviation



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As Collins Aerospace continues to deliver innovative sustainable technologies to help meet the aviation industry’s net-zero goals by 2050, the company recognizes that life cycle assessment (LCA) has become an important tool for measuring and reducing the environmental impact of its products. Implementing a life cycle framework allows Collins Aerospace to deploy eco-design processes and optimize its manufacturing, operations and supply chain to reduce environmental impact – resulting in the delivery of more sustainable products and solutions to our customers.

BACKGROUND

LCA is a methodology that is widely used across various industries to assess the environmental impact of a product, service, or process. At its most basic level, LCA measures and quantifies the environmental impacts, starting from raw material extraction and ending at the end-of-life of the products, commonly referred to as cradle-to-grave analysis.

LCA can be applied in the aerospace industry to gain valuable insights into environmental impacts and identify

areas for improvement in product design, manufacturing operations and logistics. A hierarchical LCA approach – where smaller components and systems carry out individual LCAs with a set of agreed-upon principles, scope and assumptions has the most value for aerospace.

A standardized method specifically for the aerospace industry’s sustainability requirements would accelerate our collective work for a more sustainable future in aviation.

COLLINS CONTRIBUTIONS TO LCA ADOPTION

In recent years, Collins Aerospace launched several pilot programs conducting simplified LCAs of its products to gain insights into how design choices impact the environmental impact of a product driving towards an eco-design mentality.

These LCA pilots provided valuable insights, including:

- Confirmation that the operational phase of aerospace products is the most impactful in terms of greenhouse gas (GHG) emissions.
- Demonstrating that LCAs can provide quantifiable guidance on design choices and their environmental impact.

- A cradle-to-grave approach to LCAs is most valuable to avoid unintended consequences of design choice.
- The impact of supply chain logistics on the environment can be large but has a large degree of uncertainty, especially for design studies.

Information obtained from these pilot programs made it clear that significant challenges remain when conducting aerospace product LCAs. The lack of an aerospace industry standard, a set of common assumptions and guidelines to reduce data variation, make conducting LCAs more challenging for our industry.

MOVING TOWARDS A MORE CIRCULAR AND SUSTAINABLE FUTURE

Collins is involved with the International Aerospace Environmental Group (IAEG) effort to develop a voluntary aerospace industry standard framework for LCAs that reflects the environmental priorities for aerospace, improves process consistency and stakeholder confidence, and accelerates progress towards the aviation industry environmental goals. This collaborative approach is at the core of how we are leading the way to a more circular and sustainable future in aviation.

To learn more, go to collinsaerospace.com/sustainability