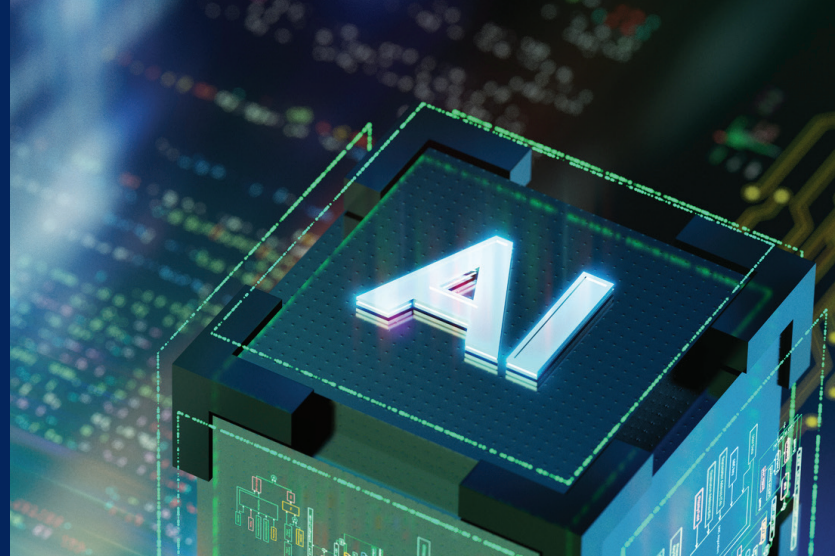# GE Aerospace

AI @ GE Aerospace

Artificial intelligence (AI), applied responsibly, has potential to help the aerospace industry create safer, more sustainable skies, enhance quality, support a strong national defense, and take operational excellence to the next level.

Across GE Aerospace today, AI is very much a Lean + Digital exercise. GE Aerospace applies a lean mindset to identify the best opportunities for improvement and then design the right digital solutions using AI to deliver the desired business outcomes. We have been actively using AI for nearly a decade. Today, we're driving new advancements in AI to:

ENHANCE QUALITY

As the demand for services continues to ramp up with air travel reaching and now exceeding pre-pandemic levels, the premium on quality, reliability, and efficiency has never been greater. To help meet this increased workload, GE Aerospace engineers are intelligently integrating AI into its services processes to increase aircraft utilization, improve the efficiency of contract service agreement (CSA) workflows leveraging generative AI capabilities, and enhancing vital inspection processes tied to higher safety and quality.

USE CASE: AI-enabled Blade Inspection Tool (BIT)
In our Maintenance, Repair, and Operations (MRO) Shops, we routinely inspect engine blades that run in the hot section of our aircraft engines. Similar to how AI is used to help doctors review X-rays of patients to spot lung cancer, GE Aerospace's AI-enabled Blade Inspection Tool (BIT) guides the selection of Stage 1 and 2 High Pressure Turbine engine blade images in our GEnx commercial engine for technicians to inspect for faster, more accurate inspections. This helps in obtaining consistent images, a key input to building predictive models. The BIT reduces the processing time from 3 to 1.5 hours vs. the standard Borescope Inspection (BSI).

USE CASE: AL/ML Models for Engine for 24×7 Engine Monitoring
We monitor our commercial engines 24×7 and use digital insights to help identify predictive maintenance measures we can take to enhance the quality of service. To support this effort, we're using advanced AI and machine learning (ML) driven models to increase the number of conditions that can be monitored with even greater accuracy. This has enabled us to achieve a 60 percent earlier lead time in identifying preventative maintenance recommendations, a 45 percent increase in detection rates, and cut the number of false alerts in half over the past decade.

PROMOTE SUSTAINABILITY

GE offers a suite of software technologies powered by AI that are giving airlines and pilots a better line of sight to reduce carbon emissions while improving their overall flight operations.

USE CASE: Fuel Insight
GE Aerospace's Fuel Insight software solution seamlessly integrates an aircraft's original flight data with the airline's operational data. Using a powerful suite of analytics and reporting tools, it provides airline operators with trends and actionable insights to optimize their fuel efficiency.

SUPPORT A STRONG NATIONAL DEFENSE

GE Aerospace, through its central research hub in Niskayuna, NY, has been working closely with defense agencies like the Defense Advanced Research Projects Agency (DARPA) for more than a decade on various programs to advance the fundamental capabilities of AI. A major focus has been pushing what DARPA describes as the Third Wave of AI, or contextual adaptation, where systems can acquire new knowledge through generative contextual and explanatory models.

Toward that end, GE Aerospace researchers have performed on a few different DARPA programs to advance Third Wave AI capabilities. In 2019, DARPA granted funding through the agency's Grounded Artificial Intelligence Language Acquisition (GAILA), to study a computer's ability to acquire language and understanding based on visual and contextual cues in a manner similar to children. This project was followed by another through DARPA's Context Reason for Autonomous Teaming (CREATE) program, in which GE Aerospace AI scientists expanded on their work on GAILA to study how AI agents could mimic human intuition and how people interact and cooperate with one another.

USE CASE: Demonstrating AI with child-like learning capabilities
GE Aerospace researchers have successfully integrated generative AI with computer vision to demonstrate AI with child-like learning capabilities. GE Aerospace's AI technology, funded through DARPA's Environment-Driven Conceptual Learning (ECOLE) program, could help push AI beyond pattern recognition that draws inferences from large datasets of millions of images to understand concepts like children using just a handful of images. ECOLE's goal is to enable human-machine collaborative analysis of image,

video, and multimedia documents during time-sensitive, mission-critical DoD analytic tasks, where reliability and robustness are essential.

The views, opinions and/or findings expressed herein are those of the author and should not be interpreted as representing the official views or policies of the Department of Defense or the U.S. Government.

RAISE THE BAR IN OPERATIONAL EXCELLENCE

GE Aerospace is applying AI across its operations to support fleet analytics for increased aircraft utilization, to improve the efficiency of contract service agreement (CSA) workflows leveraging Chat GPT capabilities, and to engage in advanced scenario planning for long-range industry forecasting. We're also deploying AI-enabled software that is airlines and their pilots are using to gain safety and operational insights from their flight data to take operational excellence to new heights.

USE CASE: Part prediction for MRO delivery
Quite often, MRO organizations face escalations in the scope of work for engines that come in for service. This has an impact on material availability, engine routings optimization, and labor allocation. By using AI-based digital twin model of our engines, we're able to forecast final work scopes and parts required to do a repair months before an engine's induction date.

USE CASE: Brilliant Pricing to Accelerate Defense Proposal Response
When proposing on major Defense contracts, one of the most time-consuming aspects is estimating the cost of labor and material. This often requires 6+ month intensive effort that is highly labor intensive across multiple parts of the supply chain to arrive at a cost forecast. GE Aerospace is working to put in place an AI/ML tool that draws from historical cost data to generate forecasts that automates the process and reduces the time to proposal / contract award.

GUIDING PRINCIPLES FOR RESPONSIBLE AI USE

As we evaluate, develop, and explore new applications of AI, we follow three guiding principles:

1. The data must be trusted. We take a very methodical, structured approach to select the right data to train models.

2. The AI must be fully transparent, so that we always have a full understanding and view of an AI model's insights and actions.

3. There must always be a human in the loop. AI systems are enabling faster decisions, but the decisions are still being made by humans with help/insights from the AI models.