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PwC's aerospace engineering solutions

Throughout its history, aerospace engineering has alternated between phases of rapid software innovation and technological lulls. Many companies in the aerospace and defense sector struggle to adapt modern software and data engineering tools and rely on legacy techniques developed over decades, some originally created for the Apollo program. This approach fails to address many contemporary aerospace design and manufacturing challenges efficiently. More importantly, outdated tools cannot provide the foundation of trusted data that enables AI capabilities to augment innovation. Model-based systems engineering (MBSE) and digital engineering suites have helped by pulling together the "digital thread" across engineering and flight sciences activities. Yet, true power still lies within the data itself.

The problems intrinsic to technological debt and the technical thinking that sustains it may be exacerbated by such factors as:

- Legacy engineering software running on workstations, with files distributed via email and network drives — and inadequate backup strategies

- Algorithmic analyses that depend on human-latent processes

- Siloed or islanded data and applications

- Lack of centralized integration tying activities and data together across systems

- Limited collaboration among engineering and flight sciences teams

- Teams with limited visibility into shared data, sources and analysis progress

The good news is that companies eager to embark on a program of digital modernization can choose from an array of new tools and approaches with unprecedented — even revolutionary — power.

Bringing it all together: A new path forward for aerospace engineering

At PwC, we believe that aerospace engineering finds itself at a critical inflection point, an industry-wide transition in which piecemeal innovation can no longer keep pace. That's why our aerospace engineering capabilities offer comprehensive, state-of-the-art pathways to scalable innovation for aerospace engineering and flight sciences. Our offerings help companies rapidly deploy modern infrastructure while integrating existing analysis models, integrate with digital twin and MBSE software and enable enhanced compute and scalability for HPC (high performance compute) services, resulting in advanced digital engineering, a true digital thread and as close as we have come thus far to actual configuration management.

Companies can help reduce the time to plan, develop and deploy tools and services. Centralized data and model hosting provide a single source of truth, an end-to-end cloud-based solution that continuously evolves to meet your new use cases while addressing regulatory compliance needs. The result? Reduced development cycle timelines, increased data transparency and modular architectures, that promote rapid growth.

PwC's aerospace engineering capabilities offer numerous immediate benefits, including:

- The ability to ingest and analyze large volumes of data

- High-quality data with automated validation at ingestion

- Integration with digital twin, MBSE and digital engineering software applications

- Data pipelines compliant with government cloud regulations

- Accountability and traceability via data lineage

- Reduced human latency through AI augmentation of flight sciences analysis and models

- Increased scale and compute for HPC services including CFD (computational fluid dynamics) clusters

- Generative AI-assisted engineering design, including efficient model generation and development

- Generative AI-enabled parts re-use integrating with existing PLM (parts life-cycle management) systems to reduce and/or eliminate downstream parts proliferation increasing supplier efficiencies

- A machine learning studio that yields a wealth of new insights through multidimensional analytics and ability to ingest existing flight sciences analysis models traditionally run in existing digital engineering software applications

- Fully customizable insights and analytics suite with reporting templates (airframe loads, aerodynamics, flight test and so on)

- Increased collaboration across teams

- Automated deployment of all services into existing cloud environments meeting FedRAMP (Federal Risk and Authorization Management Program), GCC High, ITAR (International Traffic in Arms Regulations), and DoD compliance standards and regulations for government cloud use

Saving time to unleash engineers' creativity

Our capabilities can also help address key challenges in aerospace engineering, delivering measurable time savings in data, modeling and infrastructure. Engineers can:

- Reduce data ingestion time by up to 75% and data analysis time by up to 50% — while automated data quality checks confirm high-fidelity simulation and sensor data

- Decrease model execution time by up to 60% and human-in-the-loop data downselection time by up to 90%

- Decrease infrastructure deployment time by up to 60%, supported by advanced versioning that reduces downtime with fast and secure rollback of changes when needed
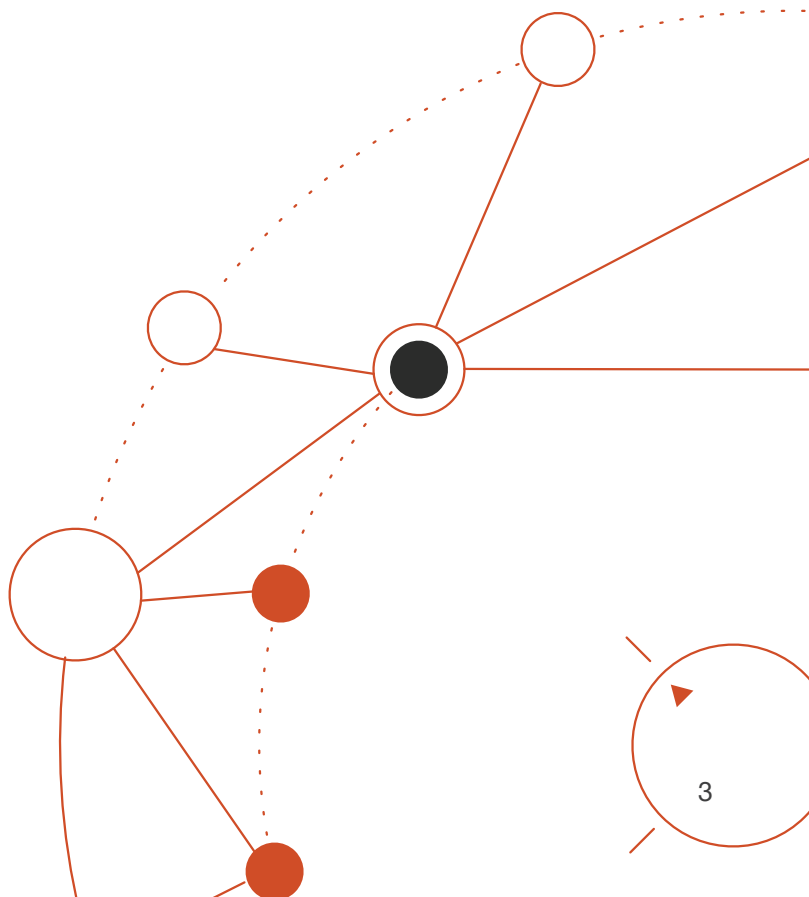
In the crucial build phase of a new client engagement, our team eliminated approximately thirty weeks of project time by automating routine tasks and augmenting process execution. Tightening every phase — from data ingestion through infrastructure standup and quality engineering testing — has freed engineers to focus on imaginative problem solving, which is proving to be one of the key competitive differentiators.

Our capabilities can help add value in every facet of aerospace engineering processes. Our downselect option, for example, offers an entirely new interactive approach, yielding a faster, repeatable process to generate results and analytics. For one client, we augmented the human process of downselecting data out of 600,000 data points collected from both spacecraft and aircraft, shortening the analysis cycle from three months to just three minutes.

And even at these remarkable speeds, our solutions are built with enhanced security in mind. Our reference architecture integrates system and model governance capabilities that include ethics compliance, cost optimization and bias checks to allow for better alignment with client policies, and built-in model monitoring and alert generation.

600,000

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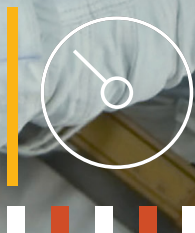
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