

(expleo)

Transforming energy & utilities with digital twins

Expleo is a global consulting, technology and engineering service provider, partnering with leading organisations to successfully deliver innovations and navigate complex digital transformations.

Leading quality change in energy and utilities

Every day, we help our partners to decarbonise energy, digitise the grid and revolutionise the customer experience in the face of growing demand for renewable resources, regulatory pressures and technology disruptions. By innovating a safe, secure and smarter energy supply, we're contributing to a sustainable future for all.

Expleo in numbers

20+
years'
experience

50+
E&U clients
worldwide

Did you know?



Expleo is involved in three of the UK's largest market-wide change programmes, assisting the transition to Net Zero. Our teams support, assure and lead on Smart Metering, Faster Switching and Market-wide Half Hourly Settlement (MHHS) – as well as EV charging and renewables projects.



Digital twins: innovation will unlock the future

In the race to meet modern consumer expectations with increasingly powerful and convenient technology, manufacturers must respond to – and ideally exceed – societal demand with faster rates of innovation and ever-more reliable operations.

Creating digital twins of products, assets and services is critical for accelerating production, optimising operations, reducing downtime, assuring quality and reliability, and increasing sustainability – all at a more affordable cost than building and running the ‘real thing’.

What exactly is a digital twin?

As the name suggests, a digital twin looks and functions the same as its physical relative, but exists entirely in digital form. Take a wind turbine or water pump, for example. A virtual representation of the asset is powered by data sourced from sensors on its real-world twin, generating a working model that can be assessed across the whole life cycle from conception, design, production, operation, maintenance to recycling and disposal.

The digital twin is effectively given life by the data of its physical counterpart, making it easier for teams to understand how a product works, how it was made, how it’s performing or how it could be improved as customer needs change. Machine learning and AI have poured fresh impetus into digital twins, allowing them to better simulate behaviour and monitor operations for better decisions.

Running a digital thread through your organisation

It stands to reason, therefore, that digital twins are only as effective as the standard of data that feeds them. They depend on a continuous stream of quality data – known as a digital thread – that flows across an enterprise and often extends along its supply and distribution chain too.

This reliance on enterprise-wide data coordination, analysis and visibility can require new ways of working that present both technological and cultural challenges. Organisations can benefit from extensive change management to break down data silos along the product life cycle.

Why digital twin technology is a game-changer for the E&U industry

Digital twins are especially relevant in the energy & utilities industry, as they bring real potential to improve everyday operations, customer satisfaction and future sustainability.

Use cases of digital twins:

CONSTANT VISIBILITY

Monitor the real-time health and performance of energy grids to increase the longevity of assets, reduce lifetime costs and boost operational efficiency.

SAVING MONEY AND CARBON

Digital twins are valuable tools for asset and system optimisation. Infrastructure owners can shine a light on faults, leaks and inefficiency that generate a direct cost in terms of lost finance, carbon emissions and possibly pollution.

RISK AND COST REDUCTION

Run dynamic simulations of a proposed or existing electric grid to accurately predict future power consumption, experiment with load balancing and test for technical faults – without the need to use physical assets.

STAY ONE STEP AHEAD

Predictive analysis of a digital twin will give maintenance teams advance warning of failures and degeneration, allowing engineers to fix and replace parts and systems before they result in costly downtime and disruption.

IMPROVED DECISION MAKING

Machine learning and AI are giving digital twins increased 'thinking power' to crunch different scenarios that will reveal the most efficient, cost-effective and safest ways forward. This fast-tracked innovation gives decision makers the evidence they need to make bold choices and adapt quickly to a changing context.

MITIGATE THE RISK OF ACCIDENTS

Safety is of paramount importance for all energy and utility infrastructure owners, who are turning to digital twins to 'pre-enact' safety situations, including equipment failures and power outages.

HAPPIER, BETTER-INFORMED CUSTOMERS

Digital twins can stretch beyond day-to-day operations, maintenance and production of energy to simulate customer interactions and usage. This powerful data analysis allows for more localised guidance on reducing energy bills and managing disruption, which directly equates to improved customer service, loyalty and retention.

Expleo in Action

Our technicians have used digital twin simulation in:



Engineering

to improve product design



Manufacturing

to improve processes/workflows (e.g. 3D factories)



Maintenance

to predict maintenance costs



Buildings (BIM)

to create 3D models for sustainable construction

Expleo's digital twin case studies

Two months to design a naval drone factory

Expleo was commissioned to design a drone factory to start production as soon as possible. Demonstrating deep knowledge of lean theory and mechanical design engineering, our experts rapidly delivered a 3D model and VR manufacturing flows of the industrial factory using data collected from the client's smaller prototype factory.

Within two months, the client obtained their building permit in response to market demand. The launch of a smart industrial drone factory – that complies with all building, security, and levels of production requirements – boosted their image as a major player in the defence market.

Importantly, close collaboration with Expleo enabled the client to grasp every step of scaling up its production to industrial levels while endorsing an immersive, realistic digital approach fed by 3D and VR tools.



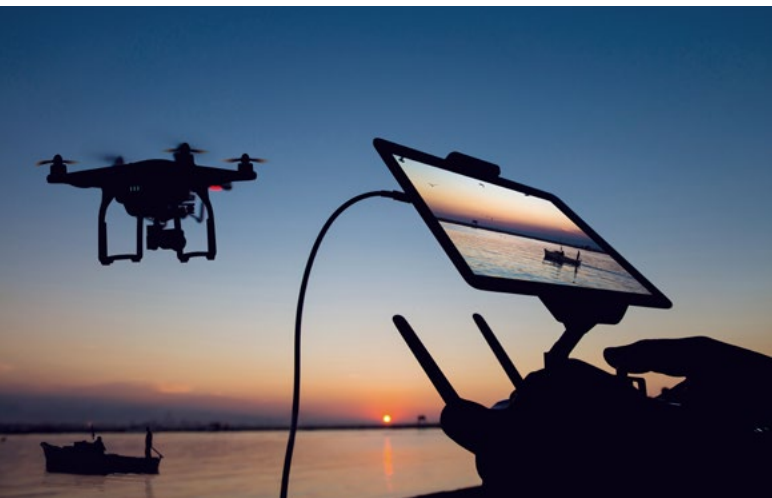
Developing a whole fleet of digital twins

Due to rising costs in the aviation industry, aircraft engine leasing – power by the hour – has become a cost effective alternative to direct ownership. Indeed, the proportion of engines that airline operators lease is forecast to grow by 100%.

The customer support department of a world-leading aircraft engine manufacturer needed to know and predict the maintenance cost of each in-service engine to be competitive in the Maintenance, Repair and Operations (MRO) market.

Expleo was brought in to combine our unique expertise aeronautical engineering know how and mastery of big data projects. Our data project managers and data scientists set about creating a digital twin that covered the full life cycle of each unit.

Today, our client is more competitive in the strategic aircraft engine MRO market. Revenue generated by propulsion systems is now half of our client's total income, while the share of services (including MRO) has risen to two-thirds overall.



Contact us

For further information, or to talk to us about your needs, contact our Global E&U team via our website form.

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