AEROSPACE INDUSTRY

Reducing costs and emissions through material expertise

A complex aerospace problem challenged our industry experts to deliver a safe and sustainable solution that was both simple and high performing.

2021 CASE STUDY

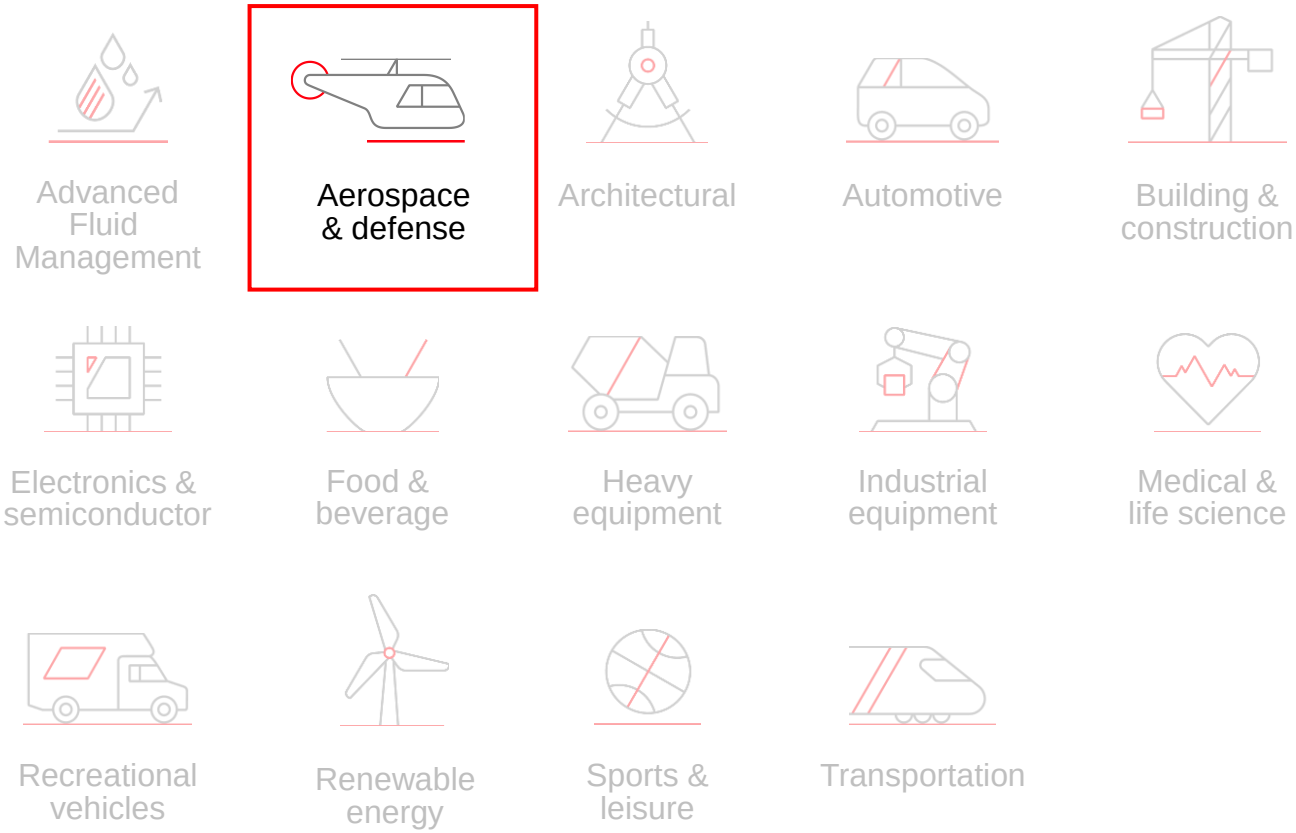
MITSUBISHI CHEMICAL ADVANCED MATERIALS

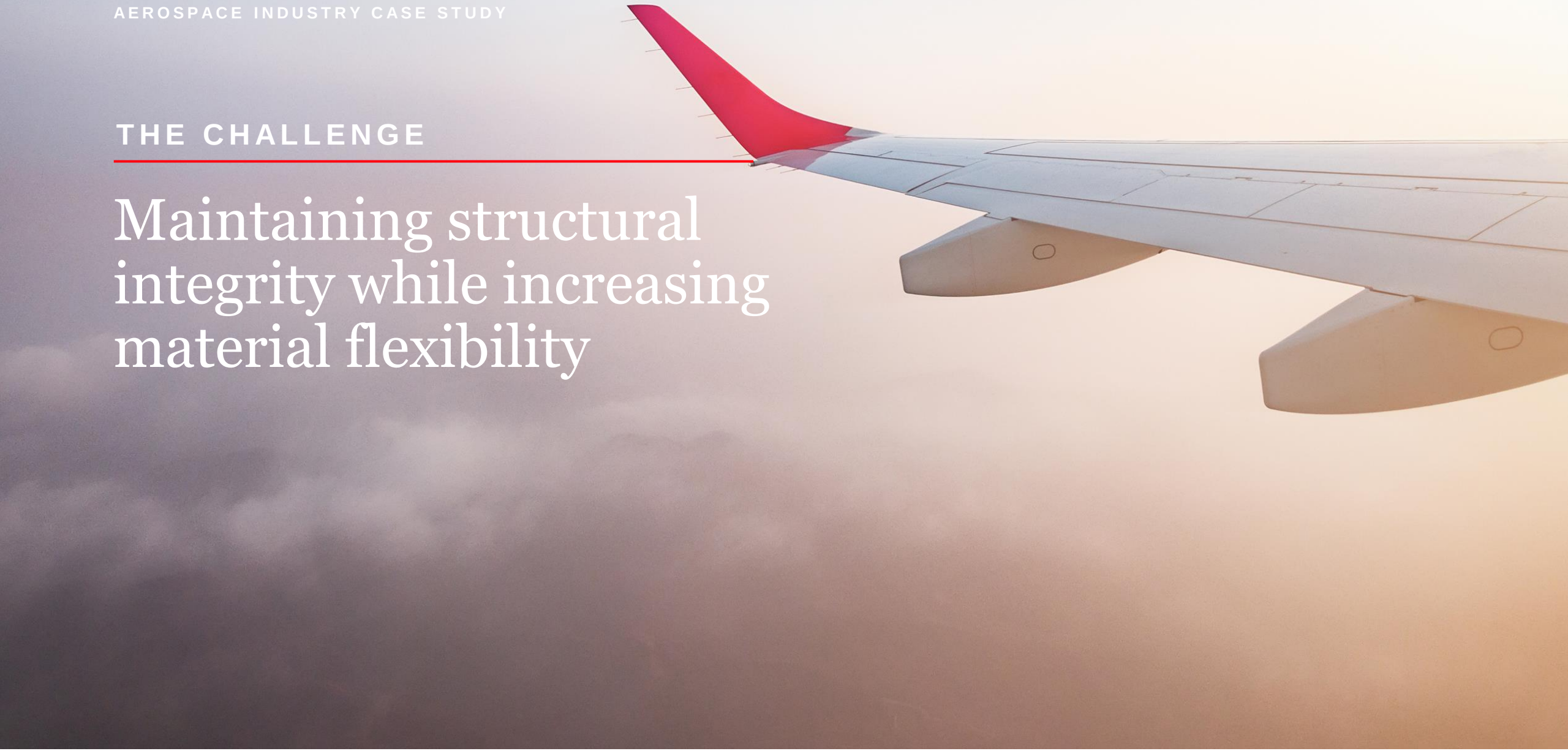
At Mitsubishi Chemical Advanced Materials
we're making ambitious ideas possible
by partnering with our customers to
help get their ideas to market faster,
advancing our industry in ways that
also enhance the world.

Partners in the Aerospace Industry

We're helping our customers future-proof their businesses in the Aerospace industry by meeting their ever-changing safety and efficiency goals with:

- Unparalleled industry expertise and knowledge trends to help drive innovation
- A comprehensive portfolio of high-performance thermoplastics and carbon fibre reinforced technologies
- A vertically integrated supply chain with global reach
- Sustainable, scalable and cost-effective solutions





THE CHALLENGE

Maintaining structural integrity while increasing material flexibility

THE CHALLENGE

A major aircraft OEM was developing a new aircraft using composite wings, which due to their aluminum structure are more flexible and lightweight, and therefore reduced fuel consumption and CO_2 emissions.

Achieving wing flexibility however challenged engineers as this increased the points of friction with other moveable parts, such as wing flaps. To ensure that the wing skin and the structure of the plane remained unmodified, and that passenger safety was maintained, these parts required regular monitoring, lubrication and maintenance.

The OEM was looking to develop a roller-based mechanism which would reduce the pressure on the mating part surfaces and prevent wearing and scratching between these points of friction.

This proposed solution required a highly complex control mechanism to ensure the proper function of the roller bearings involved. The mechanism was also required to function across a wide range of temperatures associated with changing altitudes and be able to withstand exposure to various chemicals used around wing structures.

OUR SOLUTION

Removing friction and complexity

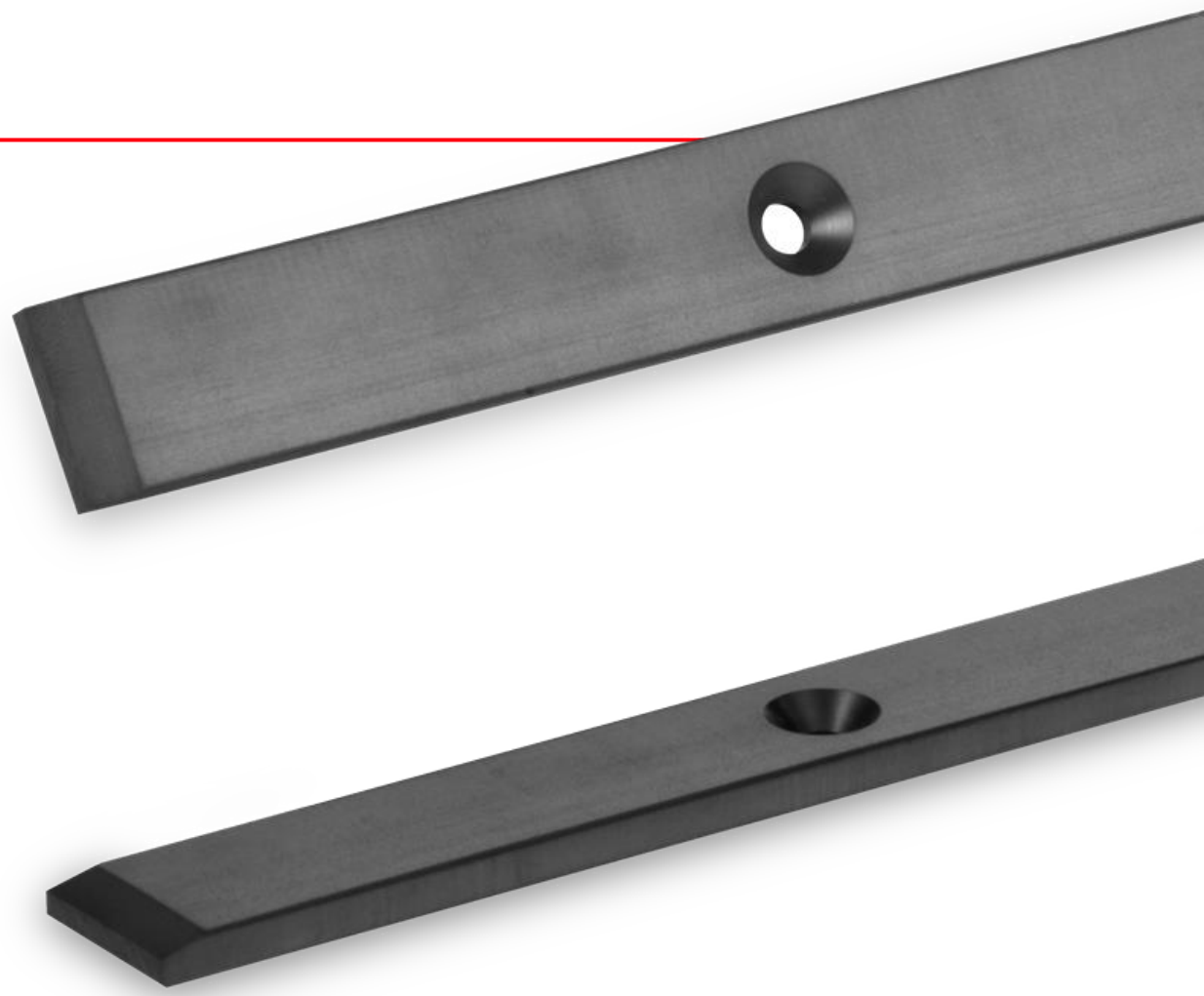
Mitsubishi Chemical Advanced Materials were initially approached to find a suitable material for the roller-based mechanism. However, with the aim of exploring what's possible, we went beyond the initial request to find the right material and instead found an alternative integral solution.

Instead of the proposed roller system, we were able to recommend a single piece of self-lubricating plastic for use in between the mating surfaces, which would not only prevent friction but reduce part complexity and therefore maintenance requirements.

OUR SOLUTION

Working in conjunction with fabrication partners and the OEM's engineers, we ran tests on the proposed single piece of self-lubricating plastic (Duratron® T4301 PAI) to ensure it would provide the necessary flexibility and durability between the mating surfaces of the aircraft.

These tests included exposing the material to temperatures between -60°C and 100°C and monitoring responses to commonly used aircraft chemicals – hydraulic oils and de-icing agents such as formic acid. The identified material passed all of its tests and was authorized for use on aircraft.



THE MCAM DIFFERENCE

While initially tasked with finding a suitable material to deliver to our customer's engineering requirements, we utilized our specialist material knowledge and vast network of expert collaborators to propose an alternative integral solution.

THE CUSTOMER IMPACT

Integrated solutions for safe and sustainable aircraft

Thanks to its simplified design, the single piece of self-lubricating plastic not only delivered to our customer's needs but also resulted in a lighter plane with a lower risk of failure and reduced maintenance requirements. Additionally, this change delivered better fuel efficiency and reduced CO_2 emissions, creating a more sustainable aircraft.

- Lighter aircraft
- Lower risk of failure
- Lower cost of maintenance
- Better fuel efficiency
- Reduced CO_2
- More sustainable aircraft

THE INDUSTRY IMPACT

Integrated solutions for safe and sustainable aircraft

Since its installation and successful performance on our customers' aircraft, the solution has been adopted by other OEMs. This has led to cost reductions and increased sustainability across the aerospace industry.

- Cost reductions
- Increased sustainability

Want to find out what's possible in Aerospace?

Get in touch with our specialist teams.
We're ready to meet your next challenge.

contact@mcam.com

To find out more please visit: **mcam.com**