



PRECISION  
MACHINING

Unrivalled Expertise. Unparalleled Results.



## MACHINED POLYMER COMPONENTS TAKE A LOAD OFF AIRCRAFT INTERIORS

### REDUCING COSTS FOR AIRCRAFT OPERATORS

#### Situation

Fuel costs represent the highest of all operating costs for aircraft, so it's unsurprising that in the past decade, the demand for more technologically advanced and fuel-efficient commercial aircraft has risen drastically.

Although engine technology and aerodynamic enhancements provide for vast fuel savings, weight reduction continues to deliver the ultimate payoff for aircraft fuel efficiency. A heavier aircraft requires additional lift and thrust to fly no matter how efficient or aerodynamic the engines and airframe.

So significant is the effect of weight on fuel costs that the American Society of Mechanical Engineers estimated in 2013, "companies can expect to achieve an overall cost savings of **25% to 50%** by converting to plastic parts."\*

In fact, we now know that **weight savings of up to 60%** can be achieved by using plastics instead of aluminum in aerospace applications, sharply cutting energy consumption in the process.\*\*

**WEIGHT**  
*SAVINGS*  
**of up to** **60%**



## Challenge

It's clear that the unsung hero in aircraft weight reduction is the promotion of polymer and composite materials for aerospace applications.

This sounds like a simple adjustment for aircraft manufacturers to make, but those who keep up with the aerospace industry know that there have been numerous aircraft delivery delays. Some are related to the manufacturing challenges of delivering custom complex polymer components in short lead times.

Typical manufacturing processes for polymer components tend to center around injection molding or additive manufacturing. Injection molding requires expensive and long lead tooling, while additive manufacturing currently provides limited materials as well as poor aesthetic and dimensional quality.

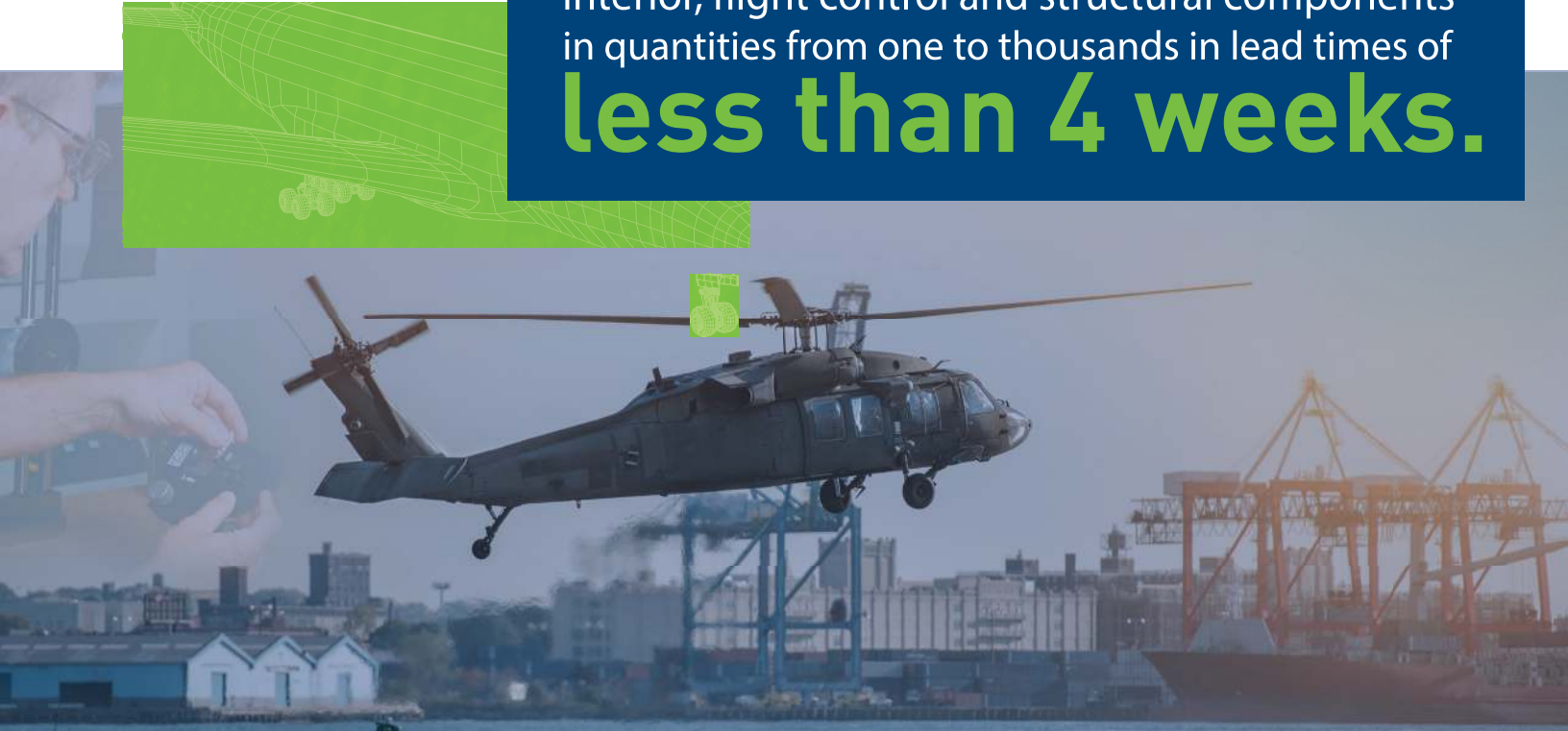
## Solution

AIP has found that the often-overlooked solution is machined polymer and composite components from aerospace grade materials such as; PEEK 450G, ULTEM, TOLRON and RADEL.

There is a broad range of polymer and composite materials readily available for machining. With over 35 years of technical expertise in the aerospace market, we were able to help specify "off-the-shelf" materials which can meet FDA approval, as well as the structural requirements and interior flame and smoke certification to FAR 25.853.


We have all heard about the use of composites in fuel-efficient aircraft such as, the Airbus A350 and the Boeing 787, but what is less commonly discussed is how machined polymer and composite components are replacing traditional metal components all over these same aircraft, including:

- **Electrical Components**
- **Cargo Areas**
- **Galleys**
- **Lavatories**
- **Wiring Harnesses**
- **Cockpit**
- **Passenger Seating Components**
- **Fuel System Components**
- **Flight Control Wear Components**
- **Engine Components**



AIP specifies, machines, polishes and paints various aircraft interior, flight control and structural components in quantities from one to thousands in lead times of

# less than 4 weeks.



The introduction of machined polymers to these parts—along with numerous other structural and mechanical components—results in a step change in aircraft weight, meaning lower operating costs and increased aircraft range. Time to market is everything in the product development cycle. In the aerospace market, any component delivery delay only ends up delaying the path to certification, which is quite time consuming in and of itself. By utilizing AIP's experience and technology for machining custom polymer and composite components, we discovered that the OEM or sub-tier supplier will be able to bring their product to market faster, in turn beating out the competition with a far more mission-capable aircraft.

Below are some examples of RADEL R5500, Polycarbonate, ULTEM and PEEK machined aircraft interior components.



From concept to completion,  
**AIP can help find the solution to your challenge.**

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