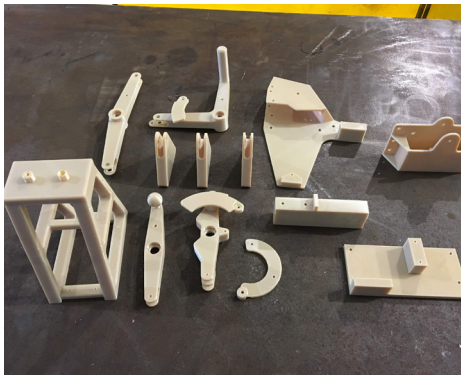
Boom Supersonic

Use Case – Flight Control Test Rig

Customer Profile

Boom Supersonic is redefining what it means to fly. As builder of Overture, the world's fastest commercial airliner, Boom's vision is to make the world dramatically more accessible through supersonic travel. Boom is currently developing the XB-1, a one-third scale demonstrator to prove key technologies for safe, efficient supersonic travel. XB-1 will help refine the design and engineering of Overture.

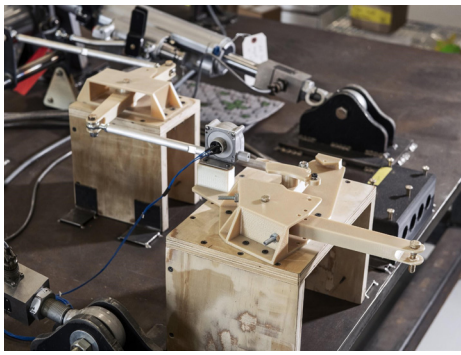


Challenge

Kinematic tests of the horizontal tail actuator control system are required before the XB-1's first flight. To accomplish this, engineers needed to create a functional test rig to evaluate the system's design. Although the parts used for the test will not be flight hardware, they allow engineers to evaluate the performance of this complex system.

Manufacturing the test rig components by traditional means would require individually machining each part. This process poses several drawbacks:

- Long lead time for fabrication (9 weeks)
- Material waste associated with machining
- Higher material costs



Solution

Instead of machining, Boom used additive manufacturing to make the parts with ULTEM™ 9085 resin, a high-strength PEI thermoplastic. This solution offered the following benefits:

- Significantly reduced lead time
- Lower material cost
- Greater design freedom
- High-strength, high-performance material

Additive manufacturing (AM) gave Boom the ability to quickly make the test rig parts by avoiding the typical machining backlog queue and machine setup. Material cost was reduced because AM uses only the amount of material needed to build each part. This contrasts with the high percentage of material waste associated with CNC machining. AM also eliminated design-for-manufacturability constraints inherent with machining, allowing engineers the freedom to achieve the optimal part designs.

Material Cost Savings

91%

Lead Time Savings

90%

Impact

FDM® additive manufacturing let Boom fabricate the test rig parts in 36 hours. Traditional manufacturing would have taken nine weeks. Additionally, total cost amounted to only $600 vs. $7,000 for conventional machining, a 91% savings.