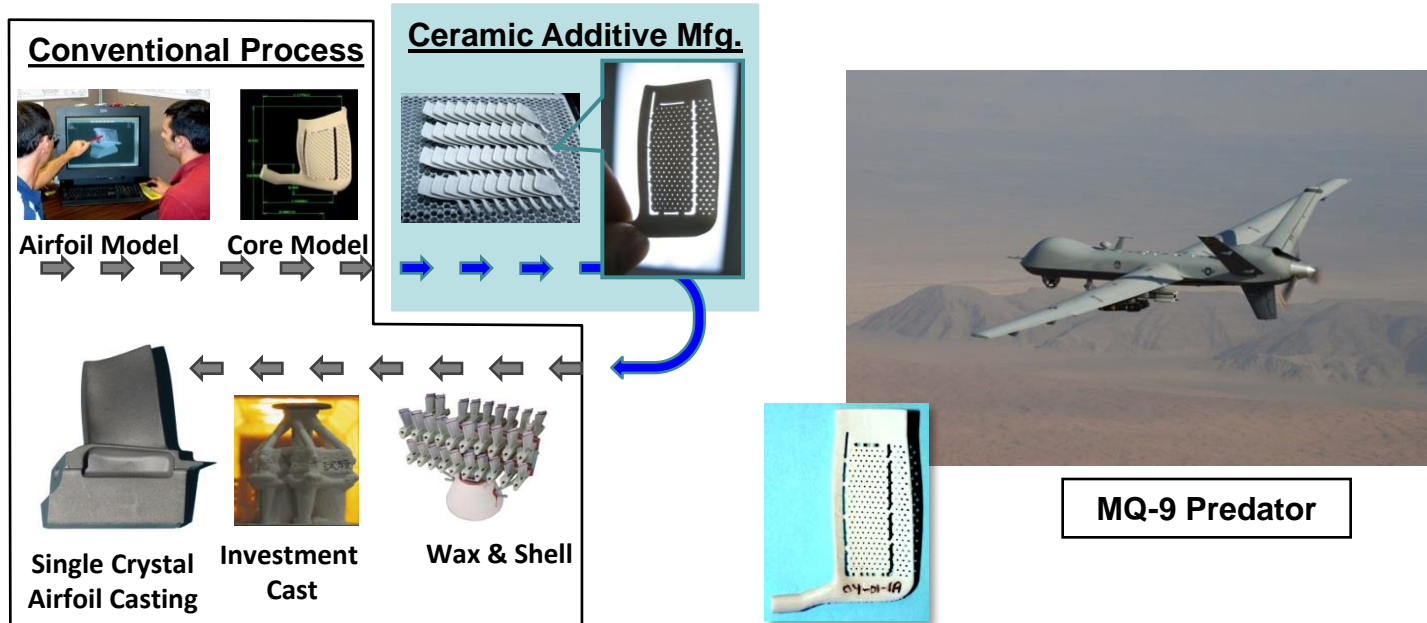


## ManTech Develops Production Capability of Casting Cores for Engine Airfoils

### The Challenge:

High Pressure Turbine (HPT) airfoils, i.e. blades and vanes, are typically the pacing item for turbine engines, adding 3 to 12 months to a new product launch, upgrade or part replacement. This is especially a problem for legacy parts that have not been manufactured for a while or when the tooling has been lost, such as the turbine blades of the Auxiliary Power Unit (APU) of the B-2 Bomber whose tooling was scrapped 10 years ago. The HPT airfoil core dies have a far longer lead time than all other airfoil tooling, adding cost and time to manufacturing these parts.



### ManTech Response:

- Building on work initiated by the Air Force Research Lab (AFRL) in 2008, DLA's Casting R&D program is working with Honeywell and their sub TA&T to refine the use of Ceramic StereoLithography (CSL) to directly "Print" the casting cores for blades and vanes used in HPT.
- Work involves optimizing the Additive Manufacturing process, such as Ceramic content, etc.
- DLA purchases an average of 147,000 (\$37M in sales) airfoils (Blades & Vanes) per year.
- DLA ManTech is investing \$0.892M on a Cost Share contract with Honeywell who's contributing an additional \$0.157M in direct contributions and in-kind support.
- Demonstrated on the engine for the MQ-9 Predator UAV, pictured above.

### Impact:

- Raising the Technology Readiness Level (TRL) of CSL from a 4 to 6.
- Faster affordable upgrades and legacy and obsolete part replacement
- Reduced tooling lead time and cost:
  - Reduce Production Lead Times by three months
  - Eliminate time and cost of core tooling

**33-50% Cost Savings for Casting Core Tooling**

### Participants:

Defense Logistics Agency (DLA) ManTech; Honeywell; Technology Assessment & Transfer, Inc; Precision Castparts Corp.