Aerospace Mega Trends Driving 3D Printer Usage

by Charles Goulding | Mar 21, 2018 | 3D Printing, Aerospace 3D Printing, Business |

Aerospace mega trends that should drive 3D printer usage in the aerospace industry include 1. forward momentum from 3D print success; 2. large increases in US defense budgets; 3. original equipment manufacturers' interest in lower-tier parts businesses; 4. pricing pressure on lower-tier suppliers; as well as 5. Industry 4.0 and digitalization.

Machine shops, engineering firms, and aerospace contractors engaged in new and improved product design including the creation of new sub components utilizing 3D printers may be eligible for R&D tax credits.

The Research & Development Tax Credit

Enacted in 1981, the now permanent Federal Research and Development (R&D) Tax Credit allows a credit that typically ranges from 4%-7% of eligible spending for new and improved products and processes. Qualified research must meet the following four criteria:

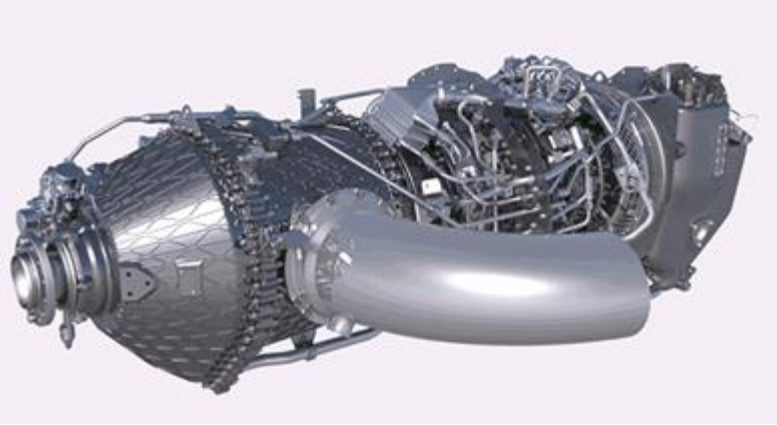
- Must be technological in nature
- Must be a component of the taxpayer's business
- Must represent R&D in the experimental sense and generally includes all such costs related to the development or improvement of a product or process
- Must eliminate uncertainty through a process of experimentation that considers one or more alternatives

Eligible costs include US employee wages, cost of supplies consumed in the R&D process, cost of pre-production testing, US contract research expenses, and certain costs associated with developing a patent.

On December 18, 2015, President Obama signed the PATH Act, making the R&D Tax Credit permanent. Beginning in 2016, the R&D credit can be used to offset Alternative Minimum tax for companies with revenue below $50MM and for the first time, pre-profitable and pre-revenue startup businesses can obtain up to $250,000 per year in payroll taxes and cash rebates.

Forward Momentum from 3D Print Success

Nothing breeds further success like broadly recognized demonstrated success. The aerospace industry has a been a first mover with 3D printing due to the need for new product designs, weight reduction and high costs. All of the major jet engine builders including Rolls Royce, GE and United Technologies have made extensive use of 3D printers. Likewise ship builders, helicopter manufacturers and space contractors are considerably increasing their use of 3D printers.



GE's 3D Printed advanced turboprop (ATP) aircraft engine [Image: GE Reports]

Large Increase in U.S. Defense Budgets

The newly approved US defense budget provides additional 75 billion over the next two years, which is expected to translate into greater Pentagon spending on aircraft, missiles, ships, and tanks. The following graph, originally published by the *Wall Street Journal*, presents additional Pentagon spending for 2019.

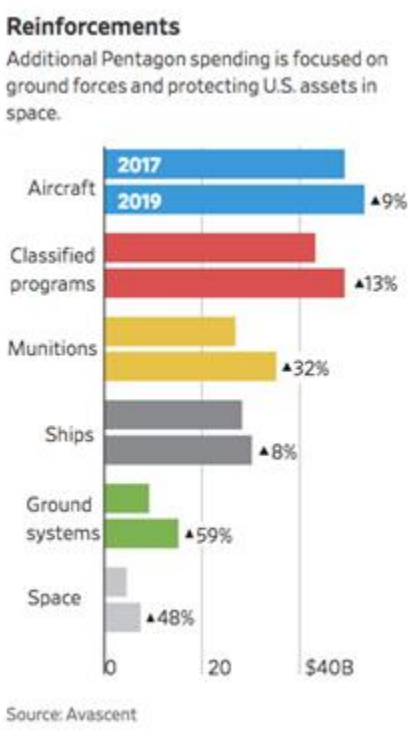
Rolls-Royce jet engine developments in their Additive Manufacturing facility

Original Equipment Manufacturers (OEM) Covet Lower-Tier Parts Businesses

With their typically lower overall margins, the large OEMs have long coveted the lower-tier, generally higher-margin component suppliers. 3D printers enable large OEMs to take their design drawings and manufacture their own components.

Pricing Pressure on Lower-Tier Suppliers

Lower-tier aerospace contractors have long confronted relentless price pressure requiring them to continually reduce cost while simultaneously innovating. This is a daunting task. Developing 3D printing and hybrid 3D machine technologies should help suppliers reduce design costs, produce new and innovative products, and eventually handle at least some production volumes more effectively.



Digitization and Industry 4.0

The new overall innovation goal for manufacturing is industry 4.0. Commonly referred to as the fourth industrial revolution, industry 4.0 is defined as the current trend of automation and data exchange in manufacturing technologies. It includes cyber-physical systems, the Internet of Things, cloud computing and cognitive computing. 3D printing is universally recognized as an integral part of industry 4.0. and the smart factory of the future.

Conclusion

Overall mega trends for the aerospace industry are quite favorable. Although there will be fighting and jockeying for position between the larger OEMs and the lower-tier suppliers a rising tide generally raises all ships. 3D printing has the opportunity to rise with all aerospace tiers and R&D tax credits can help them do it.

Charles Goulding and Andressa Bonafé of R&D Tax Savers discuss 3D printing in the aerospace industry.