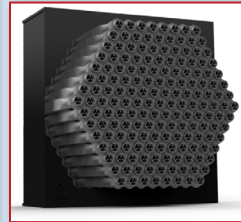
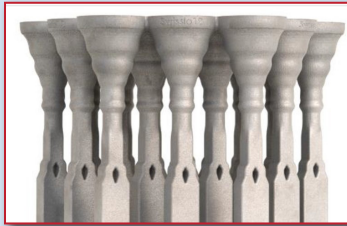


# FAB S and LAB S

## CAES Gets Additive RF



Waveguide components have been made the same way for decades, but new additive manufacturing techniques have been developed to bring innovation to these products. In April of 2021, CAES announced a strategic alliance to bring additive manufacturing and 3D printing technology to U.S. customers with an exclusive license to SWISSto12's patents, trade secrets and product designs. A year later, CAES celebrated the opening of its state-of-the-art RF additive manufacturing (AM) operations in Exeter, N.H. The facility is 3500 square-feet and the largest 3D printing facility for RF in the U.S. The laboratory is outfitted with state-of-the-art equipment dedicated to 3D printing of RF technology and has been identified as a leading facility to provide AM services by top U.S. aerospace and defense prime manufacturers.

The proprietary printing and metal finishing offers the highest achievable RF performance on the market for AM. The SWISSto12 process has been qualified for space applications (ESA) and provides improved RF performance, with a post processing technique that improves the surface roughness (reduces loss) to realize 5x better performance than unprocessed pieces.

The operations consist of dedicated equipment for 3D-printed RF technology design and manufacturing, including a qualified laser powder bed fusion machine, associated process support equipment, proprietary metal finishing and plating line and complete RF testing capability. Full environmental testing facilities are also available on site.

The Additive Manufacturing Room currently has one EOS M290 printer and can accommodate future printer expansion. The low volume AM Post processing/plating line has a small setup using the SWISSto12 CAES proprietary post processing and plating IP for prototyping. The full Produc-

tion AM post processing/plating line is under construction and expected to be installed in September 2022. These lines are currently producing prototype and demonstrator hardware and expected to be qualified in November 2022. Outside printing services, taking advantage of larger powder bed formats and various materials, have also been qualified for maximum flexibility and higher volumes.

CAES and SWISSto12 primarily work with Al alloys (Al-Si10Mg and AlSi7Mg) but also have experience with Titanium and INVAR along with a strong SWISSto12 heritage with plated plastics (PEEK and PEK). Parts can currently be made as large as 31 x 16 x 20 in. The tolerances can be controlled down to 1 mil so products can operate up to V-Band frequencies. Lead times can be reduced by about 50 percent, with full design to delivery in about three months compared to traditional manufacturing.

AM provides maximum design flexibility in achieving shapes that traditional manufacturing techniques cannot make and can significantly reduce the number of connections/parts, size and weight. Parts can be designed to provide multiple functions in a single assembly. In most cases, AM manufactured parts can provide greater integrated functionality in a monolithic structure while reducing system complexity, providing a higher level of performance, reduced number of parts and mass reduction of 20% to 50%. CAES also has the capability to add active components to the assemblies to create a complete integrated subsystem or system design.

CAES has a long history of innovation and now their AM facility opens an era in designing and producing high performance RF structures that will revolutionize the way aerospace parts are constructed. AM offers the A&D markets improved system performance plus reduced size, weight and time to market.

<https://caes.com>