Use of additive manufacturing (AM) for microwave components for space applications up to terahertz frequencies

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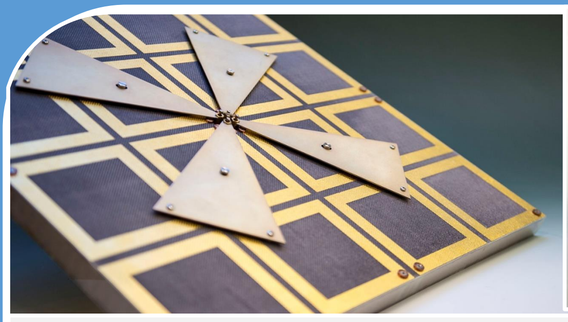
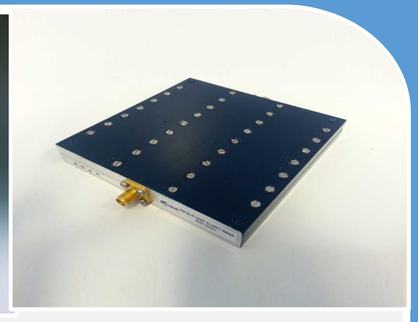
3D printing, the next step in the space industry?

A driven important factor in space communication is the mass of the payload which have a direct impact on the cost of the satellite. As a results new lines of inquiry are required to ease this impact. In this regard, 3D printing or AM provides a possible alternative solution that will allow obtaining components with less mass, and cheaper. More specifically these components play a role in today's communications systems that aims to provide higher throughput. Further investigation about how plastic and other materials react under certain conditions will be carried out. The high flexibility of AM technology will be exploited by creating unconventional new designs that will fulfill the future demands of space communication.

1 Design

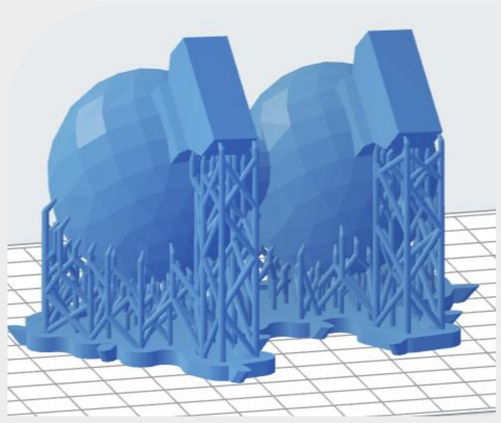




The design of filters and antennas

- Exploring new unconventional geometries that provide high quality responses.
- Study how to obtain better manufactured components taking advantage of the AM.

2 3D Printing & Metallization



CAD file + Manufacture
Pre-manufacture

Metallization for plastics

Electroplating + Electroless

In which ways the component can be improved by the way it's manufactured?

Secondments

Combination of research and industry through secondments to boost the impact of the research

Service company RF microtech: http://rfmicrotech.com/

SERMS

3 Testing

Space is a harsh environment

Testing of components for increasing the satellite lifetime

Important effects for components	Multipactor
	Corona
	Intermodulation

Goals & Expect Impact

- To provide a valuable source of information by means of important publications in regards to the design of high quality components in space applications using additive manufacturing techniques.
- Address the advantages and disadvantages of applying additive manufacturing technique in order to have a useful data that will help to improve some of the issues and make it a viable solution in the future.

TESLA Advanced Technologies for future European Satellite Applications

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