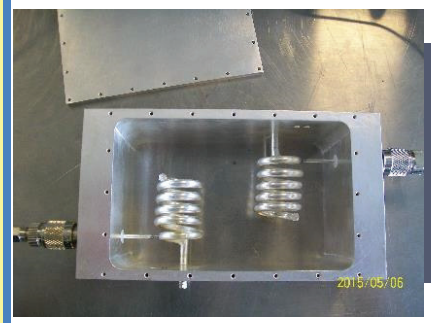
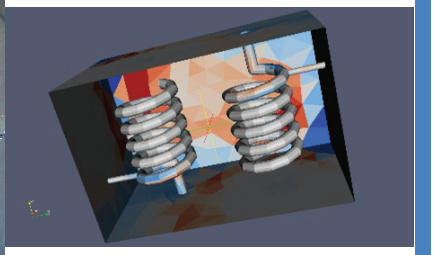
Activity Title:	***Pseudo-elliptic helical resonator filters with improved power handling capability***		
Contract type	**ITI-B**	**Budget** *(k€)*	**150**
Company (-ies) *(including country)*	Space Engineering (Italy), Heriot-Watt University (UK), Polytechnic University of Valencia (Spain)		
Team *(name of the participants in the project)*	SPENG: Dr. S. Kosmopoulos, Mr. Giuseppe Salza, Dr. Nikolas Sidiropoulos HWU: Prof. George Goussetis UPV: Prof. Vicente Boria, Dr. Carlos Vicente,		
(*) **Speaker (s)**	Prof. George Goussetis	**Email**	g.goussetis@ieee.org
Short Speaker Information *(experience and involvement in this project – maximum 60 words)*	Prof. Goussetis has been involved on power handling for spaceborne helical resonator filters since 2007. He has been the originator of this activity and managed the design and prototyping aspects.		
Summary of the activity *(maximum 400 words and 2 pictures)*	The scope of this activity was the exploitation of the large gap approach as means to enhance the power handling of spaceborne helical resonator UHF filters, thereby simplifying manufacturing compared to partial dielectric filling approaches while not compromising on the unloaded quality factor. In earlier activities the capability to increase the power handling of helical resonator filters from sub-Watt levels to about 80W by means of introducing partial filling of the cavity with space qualified Rexolite was experimentally demonstrated. This activity focused on delivering similar power levels but in purely air-filled cavities. The activity commenced by the identification of the most critical region and subsequent application of the large gap approach for that region. For a helical resonator shorted at one end and open at the other, the critical region is the capacitive open end. In order to increase the distance between the top part of the resonator and the host cavity walls, two methodologies were pursued. The former involved helical resonators with modulated radius – so that a conical helix is ultimately obtained. This approach provides increased gap locally. Alternatively, the activity focused on cylindrical helical resonators but hosted in increasingly larger cavities. A range of prototypes was designed and analysed for electrical performance as well as multipactor threshold. The three most promising ones were prototyped and tested. The experimental results proved that power handling of 70 W can be achieved when the dimensions of the host cavity is increased (uniform cylindrical case). Meanwhile as a result of the larger cavity, this approach enables achieving higher unloaded quality factors. When compared with state-of-the-art prior to this activity, it was overall demonstrated that equivalent power handling levels can be achieved as with the partial dielectric filling approach with improved Q-factor at a cost of a slightly larger physical dimensions – together with manufacturing simplification.  		

(*) The speaker needs to do the registration through this website