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| **Title:** | ***Input Filters for L-, S-band applications: "PETIT - Compact High-PErformance Filters for Space applicaTIon based on Dielectric Resonator Technology"*** | | |
| **Contract type** | *ARTES 5.1* | **Budget** *(K€)* | **480 K€** |
| **Company (-ies)** *(including country)* | RF Microtech Srl, Italy (prime)<br>Spacesys Srl, Italy<br>Elital Srl, Italy | | |
| **Team** *(name of the participant in the project)* | Roberto Sorrentino (RF Microtech)<br>Luca Pelliccia (RF Microtech)<br>Fabrizio Cacciamni (RF Microtech)<br>Guido Arista (Elital)<br>Giorgio Perrotta (Spacesys)<br>Ambar E. A. Famiglietti (Spacesys) | | |
| (*) **Speaker (s)** | Luca Pelliccia | **Email** | pelliccia@rfmicrotech.com |
| **Short Speaker Information** *(experience and involvement in this project)* | Luca Pelliccia was born in 1984, Italy. He received the Laurea degree (with distinction) in electronic engineering from the University of Perugia, Perugia, Italy in April 2009. In 2008-2009, he carried out his thesis research with Ericsson AB, Mölndal, Sweden. In November 2012 he received his PhD degree at University of Perugia with a thesis titled "Tunable and Miniaturized Waveguide Filters for Advanced Communication Systems" under the advice of Prof. Roberto Sorrentino. He is currently working at RF Microtech Srl (whose he is now an associate member) as RF and microwave R&D engineer. His research and design activities is focused on microwave filter and diplexers. His research involvement has resulted in the publication of several papers in the proceedings of international microwave conferences and journals. Hi is member of European Microwave Association (EuMA). He has been the technical responsible of the PETIT project. | | |

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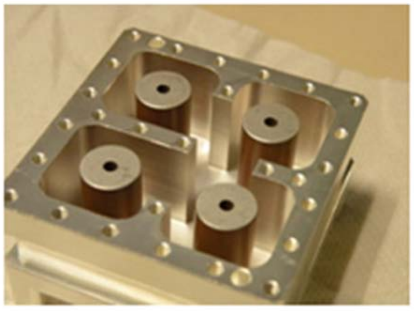
| **Summary of the activity**<br>*(maximum 400 words)* | Goal of the project is to reduce mass and volume of L- and S-band input filters using dielectric resonator technology. Large and bulky coaxial resonators are currently used in the realization of filters for such applications. While dielectric resonators can reduce the filter footprint up to 50%, an optimum trade-off in terms of spurious performance, temperature stability and unloaded Q-factor (Q) must be found. High dielectric permittivity (εr > 30) dielectric resonators operating with TM010 mode represent the best trade-off in terms of volume, spurious-free range and Q-factor. A dielectric 4th order bandpass filter has been designed in S-band to achieve this objective. The fractional bandwidth is 1.5% and the IL is 0.25-0.3 dB, corresponding to an unloaded Q above 4000. The filter dimensions are approximately 50x50x40 mm (including connectors). A stable response over a temperature variation between -10°C and +65°C has been demonstrated and mechanical studies and optimization in ANSYS have been done in order to improve the upper temperature limit. High power Corona and Multipactor tests have been carried out, showing interesting and promising results mainly for TT&C applications. In addition, the full-wave design of an L-band diplexer employing the TM010 dielectric resonators has been proposed.<br><br>a)  b)  <br>**Figure Manufactured filter prototype: open case with silver-plated dielectric rods (a), final version of the filter (b)** |

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