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# Micro-UAV radar for monitoring applications

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In recent years, the Micro-Unmanned Aerial Vehicles (UAVs) are arousing a great interest in the field of the remote sensing. In particular, the UAVs represent a valuable alternative to conventional observation platforms, i.e. satellite, manned aircraft and ground based systems. Indeed, they allow the acquisition of high-resolution remote sensing data with high operational [U+FB02]exibility, relatively low cost hardware, manageable operative conditions and great versatility; in particular, they are suitable to cover inaccessible areas on demand [1].

This work aims at presenting the possibility to deploy high frequency radar systems on micro-UAV. In this way, it is possible to pave the way to the pervasive use of this kind of system in several applications from the support to search and rescue operations during crisis events, to the surveys in cultural heritage and agriculture. In particular, the use of miniaturized radar systems, which are already present on the market, and micro-UAV makes it possible to set up cost effective solutions and consider a future vision of swarms of UAV-based radar systems able to image the same scene by exploiting different angle of view.

The imaging capabilities are enhanced by a properly designed data processing strategy that involves a processing step performed in time domain, which accounts for a procedure devoted to compensate flight altitude variation and a Singular Value Decomposition (SVD) based noise filtering approach. After, a focused image of the surveyed scenario is obtained by using a microwave tomographic approach, which integrates data about UAV position and faces the imaging as a linear inverse scattering problem [2, 3]. A feasibility experiment, carried out to test the operational mode of the assembled system, is presented.

References

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