Jamming detection using geometric signatures in weather radar images

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Jamming is an increasing phenomenon in weather radar images. It usually affects specific directions, but has effects varying in time, figure and intensity. The algorithms proposed search and detect specific geometric signatures characterising jammed radar rays in a single polar radar image. This detection don't use quantitative values of radar pixels, but only a binary coding of the pixels values (i.e. 1=returns/0=no returns). So these algorithms could be used with reflectivity images, rain rate images, or other parameters, and for strong or small jammed pixels values. They may constitute a complementary (and independent) approach of others techniques using analysis of quantitative values of reflectivity, pulse-to-pulse variability of reflectivity, Doppler signal, noise level. For example, we plan to use these algorithms complementarily with an estimation of the noise level for each radar ray.

This communication presents three different algorithms for three kind of signatures. Results and limits are detailed for French radar images produced for the ODYSSEY data hub and compositing centre producing OPERA radar composites. Finally, a first detection application has been tested on a set of such images, and some performance criterions are presented.