INTRODUCTION

Our processing
The next figure shows the block diagram of the processing. The FLTCMB algorithm consists in filtering the detected targets and selecting some of them by combining results from both channels. The selection stage extracts the targets that are outside the land areas, defined from shape files.

Comparison with SNAP: our detection (left), SNAP detection (right)

RESULTS

Comparison with SNAP
• Red circles: targets detected by both algorithms (20), yellow circles: other targets (only detected by our algorithm (19) or SNAP (1)).
• Additional target detected by SNAP: not a vessel but the harbor.
• Better performance by using spectral coherence and applying CFAR on the spectral coherence products instead of the original intensity image.

TECHNIQUES

Comparison with SNAP data
• Match between detected and AIS targets: when they are close enough considering average speed.
• Output: targets indicated by colored symbols (w.t.t. status (AIS, matching, not matching)) superimposed on the spectral coherence and the intensity images.

Evaluation: comparison with SNAP
• We performed a comparison with the SNAP [5] “Ocean feature” tool (commonly used by the Remote Sensing community, CFAR-based).
• To show the benefit of exploiting spectral coherence, we applied this tool on the intensity image obtained after geo-projection.
• Parameters: window sizes, probability of false alarm (p)
• Conversion between SNAP and our parameters: $p = \frac{1}{\frac{1}{2} \cdot \text{erf}(T/\sqrt{2})}$

CONCLUSIONS

We have presented a processing technique for detecting potential vessels within open sea areas using SAR data. This technique is based on a dual modalities (intensity and spectral coherence) CFAR processor and includes selector to limit detection to open sea surfaces, excluding lands delimited from shapfiles. A comparison with AIS data is also presented. It allows determining the ratio of non-cooperative vessels (or vessels not equipped with AIS) within the area. This technique and the one of the SNAP “Ocean feature” tool, commonly used by the Remote Sensing community, were compared. Experimental results on SAR data acquired on the Libyan Sea show that this processing succeeds in detecting targets. Moreover, results outperformed the ones of the SNAP “Ocean feature” tool. Some processing parts would still need improvements, as the CFAR detection of targets close to the coasts.

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