7 CONCLUSIONS

The aim of the project was to automate the SMIGOL Sim simulator so as to batch process raw data acquisition files from the SMIGOL Reflectometer to create soil moisture and topography maps. For this purpose, new automation algorithms have been implemented, limiting human intervention to the selection of raw data files at the beginning. The rest of the processing is done automatically by the simulator.

In the initial step, it was demanded that the notch position be found in every Interference Pattern plot automatically. This was done successfully by the implementation of curve fitting algorithms and proper notch definition in the program. In the previous version of the simulator, before the work realised in this PFC, the notch was found using a simple algorithm, but which did not work accurately for all the Interference Pattern plots and had to be adjusted manually for each of them.

The second part consisted in producing a theoretical signal envelope, from the theoretical soil moisture models, which had to fit the measured signal correctly. The algorithm was successfully implemented using an iterative process, adjusting the envelope to the measured signal at each step by continuously varying a number of parameters affecting the form of the envelope, to minimize the distance error between the two curves. Before this improvement, creating the envelope was a rather long manual process, which was not accurate enough.

Finally, from the above theoretical envelopes, topography and soil moisture maps had to be created automatically, by assembling data from all satellites during a given observation day.

On the whole, the new simulator – SMIGOL SimV2 – successfully automated the whole process of soil moisture retrieval.