

TOPOGRAPHICAL MAPPING AT 1:50.000 SCALE FROM SATELLITE IMAGERY USING CARTOSAT-1

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High-resolution space-born remote sensing stereo imagery has opened a new era for cartographic applications, especially in topographic maps updating and generating. In this context, the "Institut National de Cartographie et de Télédétection" (INCT), Algeria, in collaboration with the Space Application Center, ISRO, India has developed a process and set up a framework for topographical mapping at 1:50,000 scale using stereo imagery from the Indian Remote Sensing Satellite Cartosat-1. This latter operates in a along track stereo capture mode, and provides stereo data from twin cameras onboard, with 2.5m ground resolution and fixed base to height ratio of 0.62. This project deals with map production and not maps updating, because the area of interest, which is situated in the north western side of Algeria, has never been mapped since the colonial era. Indeed, this area was covered in 1949 using the old cartographic system, the Voirol Datum of 1875 which has discordances with the current cartographic system, the North Sahara 1959.

Within this project, three technical issues were discussed, namely: i) assessment of Cartosat-1 potentialities in topographical mapping in terms of geometric accuracy and feature identification, ii) establishment of an effective mapping process using this imagery, from data preparation and ground control points collection using Differential GPS survey to map creation, iii) visual comparison between contour lines generated automatically with those manually extracted.

Three toposheets of 15'x15', covering the area of interest were produced by applying the process in matter. The field verification has shown that topographical mapping at the above-mentioned scale is possible using this imagery, although it is more costly than using the aerial photos in terms of the necessary time to achieve the field survey. This is mainly due to the difficulties encountered during the extraction of some features, which are either hardly identified, or not visible at all. Actually, it requires collecting some punctual features such as reservoirs, basins, small mosques, Kouba and Marabouts. Moreover, line features such as high and very high voltage electrical networks and very thin unpaved track have to be collected from the field. Also, Muslim cemeteries as surface features need to be identified in the field as well. It is important to notice that most of these features are visible in conventional aerial photo at 1:75,000 scale which is usually used in INCT to produce topographical maps at 1:50,000 scale.