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# Feasibility study of real-time correction of geometric distortion in side scan sonar images; Case study: EdgeTech 4200FS side scan sonar image

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This paper presents a developed algorithm to rectify the geometric distortions usually observed in side scan sonar images. The side-scan sonar images usually suffer some geometric distortions as a result of motion instabilities of the towfish. These instabilities of motion include 3 lateral and 3 rotational movements namely roll, pitch and yaw. As a result of these movements, the sonar images can appear to be distorted with inaccurate coordinates. All the recent attempts to rectify survey distortions focus on the offline processing of images from the attitude data of the towfish. Specifically this may be because: (1) Geophysicists prefer to see the undistorted images, (2) Difficulty of real time processing due to high sized sonar data, (3) Dispensability of high accurate coordinates of objects in sonar images. My objective is to produce a 'geo-referenced on-line photo map' from sonar images of objects with highly accurate coordinates, leading me to seek an algorithm for actual real time image geometric corrections. The first step in this study involves collecting minimum data to form a new on-line image and navigational data sourced and extracted from towfish recorded sonar data. Following that, a 3D online transformation will be applied on each reflected ping of sonar to rectify the distortions and transform the coordinates from the towfish reference frame to the geo-reference system via an I/O program. As a case study, a selection of EdgeTech FS4200 side scan sonar images is included in my paper. These images were recorded during the actual recent post-lay survey project in South Pars Gas Field, Persian Gulf. A presentation of the theoretical details and results of this case study

follow.