

DIGITAL ELEVATION MODEL BATHYMETRY MAPPING OF SEAFLOOR
USING QINSy QLOUD

AUWAL GARBA ABUBAKAR

A project report submitted in partial fulfilment of the
requirements for the award of the degree of
Master of Science (Geomatic Engineering)

Faculty of Geoinformation and Real Estate
Universiti Teknologi Malaysia

JUNE 2014

I humbly dedicated this project to my entire family especially my brother Alhaji Rabi'u Abubakar who supported me financially to study overseas (Malaysia), may the Almighty Allah Subhanahu Wataala reward him and protect him against the evil.

Ameen !

ACKNOWLEDGEMENT

All thanks be to Allah the creator of all kinds and master of the day of judgment day, who gave us a little out of His knowledge to make this world habitant to all humans. I wish to express my happiness and gratitude to my supervisor Prof. Dr. Mohd Razali Mahmud in which through his wonderful lectures on Hydrographic Survey that geared me to choose this topic, Digital Elevation Model Bathymetry mapping of Seafloor using QINSy QLOUD and also his guidance, suggestions, comments, and corrections to my project. I really appreciate his patience and guidance. I would like to extend my appreciation to Mr Mohd Hilmi Abdullah, Mrs Nor'ainah Amat, Mr Ghazalli Khalid, and the rest of the hydro research team for their cooperation.

Special thanks to my lecturers who thought me on various subjects and also my classmates for their usual cooperation, help, and advise whenever a problem arises.

ABSTRACT

Digital elevation model of seafloor mapping is one of the most active modern underwater acoustics domains to produce near real visualization of the underwater terrain, attracting the attention and knowledge exploration in many branches of science and technology. This study takes interests on the three dimensional (3D) geometrical description of the seafloor topography as well as to have idea on dynamic behaviour of seabed morphology and its material properties. The aims of this study are to generate 3D digital elevation model of the seafloor, visualize and interpret the 3D model and analyse the effect of data duplication on depths where the main source of the data is multibeam echo sounder. The multibeam bathymetry technique has an unlimited range of application in the marine data acquisition and underwater investigation. The recent technological advancement and development on the multibeam bathymetry technique has led to the improvement of underwater mapping and study of seafloor classification. This Project described step by step approach and methodology adopted which focusing on the application of high resolution multibeam, RESON SeaBat8124. When the 3D bathymetric model produced is compared to Surfer and ArcMap software, the 3D model show the same topographical shape and the 3D model look similar. The shape produced by QINSy QLOUD is also the same.

ABSTRAK

Model elevasi digital tiga dimensi (3D) bagi pemetaan dasar laut adalah salah satu moden domain akustik bawah air yang paling aktif untuk menghasilkan berhampiran gambaran sebenar rupa bumi di bawah air, menarik perhatian dan penerokaan ilmu dalam pelbagai cabang sains dan teknologi. Kajian ini menarik minat kepada penerangan geometri tiga dimensi (3D) topografi dasar laut dan juga untuk memahami tingkah laku morfologi dasar laut yang dinamik dan sifat bahannya. Tujuan kajian ini adalah untuk menjana model elevasi digital 3D dasar laut, menggambarkan dan mentafsirkan model 3D tersebut dan menganalisis kesan pertindihan data pada kedalaman di mana sumber utama data adalah pemerum gema berbilang alur. Teknik pengukuran pemerum gema berbilang alur mempunyai aplikasi yang tidak terhad dalam perolehan data marin dan penyiasatan dasar laut. Kemajuan teknologi dan pembangunan terhadap teknik pengukuran *pemerum gema berbilang alur* baru-baru ini yang telah membawa kemajuan terhadap pemetaan bawah laut dan kajian pengelasan dasar laut. Projek ini menerangkan satu per satu pendekatan dan metodologi yang digunakan yang mana tertumpu kepada penggunaan pemerum gema berbilang alur beresolusi tinggi, RESON SeaBat8124 Apabila model batimetri 3D yang dihasilkan dibandingkan kepada perisian Surfer dan ArcMap, model 3D menunjukkan bentuk topografi yang sama dan model 3D kelihatan sama. Bentuk yang dihasilkan oleh QINSy QLOUD juga sama dan serupa.