

**UNIVERSITI TEKNOLOGI MARA**

**HYBRID GEOID MODELLING  
USING TANDEM DEM**

**AHMAD HAFIZUL ZARIQ BIN AHMAD HALMI**

**2016490722**

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of the requirements for the degree of  
**Surveying Science and Geomatics (Honours)**

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## AUTHOR'S DECLARATION

I declare that the work on this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Undergraduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student : Ahmad Hafizul Zariq bin Ahmad Halmi  
Student I.D. No. : 2016490722  
Programme : Bachelor of Surveying Science & Geomatics (Hons) – AP220  
Faculty : Architecture, Planning and Surveying  
Thesis : Hybrid Geoid Modelling Using TandemX DEM

Signature of Student :  
.....

Date : July 2019

## ABSTRACT

This study was conducted in conjunction with development of Peninsular Malaysia hybrid geoid model using new method called Least Square Modification of Stoke's formula with Additive Corrections (LSMSA) or simply KTH method. The model were develop using latest terrestrial with airborne gravity information provided by Department of Survey & Mapping Malaysia (DSMM), newly established digital elevation model TanDEM90 GDEM, GOCO01S global geopotential model (GGM), marine gravity anomalies from DTU10 Global Gravity Field with additional ship-track gravity data and Earth's gravity anomalies from WGM2012. Primary objective of this study is to assess how far the chosen GDEM could provide any difference towards geoid modelling computation. As for comparison purpose, another geoid model based on SRTM30 GDEM also being computed in this study. After that, the gravimetric geoid model developed will be fit to Malaysia NGVD surface to establish a hybrid geoid model of Peninsular Malaysia. Both models derived then being assessed with GNSS/Levelling data for geoid height comparison. For gravimetric geoid model, SRTM30-based model shown better RMSE than TanDEM90-based model. SRTM30-based model achieves RMSE of 0.357m before fitting and 0.068m after fitting while TanDEM90-based model reach RMSE of 0.356m before fitting and 0.074m after fitting. For hybrid geoid model, the difference occurs with TanDEM90-based model shown slightly better result than SRTM30-based model with external RMSE of 0.070m and 0.077m, respectively.

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