

**UNIVERSITI TEKNOLOGI MARA**

**DETERMINATION QIBLA DIRECTION OF  
BATU KAPAL BASED ON DIGITAL SURFACE  
MODEL BATU KAPAL**

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Thesis submitted in fulfillment  
of the requirements for the degree of  
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**Faculty of Architecture, Planning and Surveying**

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## **AUTHOR’S DECLARATION**

I declare that the work in this thesis/dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is 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 Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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## **ABSTRACT**

The rapid development in the design and production of various types of close range photogrammetry has an influence on a wide range of application and fields. Close range photogrammetry is one of the measurement methods capable of obtaining three dimensional coordinates by processing photos. In most cases archaeological finds and objects remain in the country of origin. Thus, for potential users away from that location, 3D models of archaeological finds and objects form an increasingly important resource since they can be analysed and visualised in efficient databases. This study conducted to determine the qibla direction at the Gunung Jerai, Kedah, and to produce 3D for generated model. Study area obtained that has been chosen is in Geopark Gunung Jerai, Kedah. The aerial photographs were obtained at the surrounding batu kapal area using drone. All the data obtained at the batu kapal area including the established qibla direction from the Kedah's Mufti Department were used to produce 3D model based on digital surface model. The DSM then been used for qibla direction determination and batu kapal direction checking. Each deflection then been tabulated for easier reading and batu kapal then been mapped containing qibla direction with are new value. In conclusion, this study has achieved all the proposed objectives and proves that the UAV system can be used for determine for qibla direction of three dimensional models based on archaeological products.

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