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RESEARCH REPORT

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2000

**TIRE PRESSURE MONITORING SYSTEM ENGAGED WITH
THE VEHICLE SAFETY SYSTEM
- SIMULATE BY VHDL**

By
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A project report submitted in partial fulfillment of
the requirements for the award of the degree of
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DEPARTMENT OF PHYSICAL SCIENCE
FACULTY OF SCIENCE AND TECHNOLOGY
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PENGAKUAN DAN PENGESAHAN LAPORAN PITA I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: *TIRE*
PRESSURE MONITORING SYSTEM ENGAGED WITH THE
VEHICLE SAFETY SYSTEM SIMULATE BY VHAL

oleh: *AIMI HAJWANI SAJAN*, no. matrik: *Y.R. 11946*

telah diperiksa dan semua pembedaan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Fizik sebagai memenuhi sebahagian daripada keperluan memperoleh Ijazah *Sam. Sa. Graduan (Fisik, Elektrik & Instrumentasi)* Fakulti Sains dan Teknologi, UMT.

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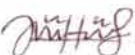
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DECLARATION

I hereby declare that this thesis entitled Tire Pressure Monitoring System Engaged with the Vehicle Safety System - Simulate by VHDL is the result of my own research except as cited in the references.

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ABSTRACT

The road safety still becomes an issue as early as the vehicle has been invented. There are several factors which could lead to the vehicle accidents including driving under the influence of alcohol or other drugs, driving recklessly or dangerously, and the failure of the driver to estimate the distance between vehicles also could lead to the accident. Other factor also included is the driver which usually overlooked the vehicle's condition including the tire pressure of the vehicle. If the vehicle's tire is at improper inflation, and has been driven at quite high speed, the vehicle is exposing to the risk of the accidents since the performance of the braking system is reduce and the worst case scenario which could occur is the tire blow out and cause the vehicle to rollover. Tire Pressure Monitoring System (TPMS) is designed to warn the driver about the tire pressure of their vehicle at the comfort of the driver seat. This conducted study also developed TPMS that is engaged with the Vehicle's Safety System which is Adaptive Cruise Control (ACC) and Electronics Stability Control (ESC). This safety system is believed could assist the driver in controlling the vehicle at critical condition. Simulated by using VHDL, this study has successfully achieved its goal when it could interpret the tire pressure and vehicle's speed at various conditions by sending signals in different color of Light Emitting Diode (LED) and at the most critical situation, the vehicle safety system which is ACC and ESC is then activated.

ABSTRAK

Isu keselamatan jalan raya hangat diperkatakan seawal kenderaan dicipta. Terdapat beberapa faktor yang mengakibatkan kemalangan jalan raya termasuklah pemandu yang memandu kenderaan dibawah pengaruh alkohol atau dadah, memandu secara merbahaya dan cuai, serta kegagalan pemandu untuk menjangka jarak di antara kenderaan. Antara sebab lain juga adalah berpunca dari pemandu kenderaan yang sering mengabaikan keadaan kenderaan mereka termasuklah tekanan udara pada tayar kenderaan. Sekiranya tayar pada sesebuah kenderaan mengalami kekurangan tekanan udara, dan juga pada ketika itu kenderaan dipandu pada kelajuan yang agak tinggi, kenderaan tersebut berpotensi besar untuk terlibat dengan kemalangan jalan raya. Ini kerana pada keadaan tersebut, keupayaan sistem brek pada kenderaan tersebut akan berkurangan dan senario paling dahsyat yang berkemungkinan akan terjadi adalah di mana tayar kenderaan meletup sekaligus menyebabkan kenderaan terbalik. *Tire Pressure Monitoring System (TPMS)* telah direka untuk memberi amaran kepada pemandu mengenai tekanan udara tayar kenderaan mereka pada keselesaan tempat duduk pemandu. Disimulasikan menggunakan VHDL, kajian yang dijalankan ini juga telah membangunkan Sistem Pengawasan Tekanan Udara yang berhubung secara terus dengan Sistem Keselamatan Kenderaan iaitu *Adaptive Cruise Control (ACC)* dan *Electronics Stability Control (ESC)*. Sistem keselamatan ini dipercayai dapat membantu pemandu kenderaan dalam mengawal kenderaan pada keadaan-keadaan kritikal. Kajian ini telah berjaya mencapai objektifnya apabila ia mampu mentafsir di antara kedua-dua tekanan udara dan kelajuan kenderaan pada keadaan yang berbeza-beza dengan menghasilkan isyarat Lampu Diod yang berbeza warna, dan pada keadaan lebih kritikal, kedua-dua Sistem Keselamatan Kenderaan dapat diaktifkan dan berfungsi sebagaimana yang telah direka.