

## Surat Tugas/ Letter of Appointment

Nomor/  
Number ST/THS2/MME-0903/AAO/III/2020 - FdI

Tanggal/  
Date 9 Maret 2020/ 9 March 2020

### Penugasan Sebagai Pembimbing Utama/Pendamping Skripsi Mahasiswa S2 Semester Even 2019/2020 Appointment of Thesis Advisor/Co-Advisor for Master's Degree Student(s) in Even Semester 2019/2020

Dekan Fakultas Teknik dan Teknologi Informasi, Universitas Swiss German/  
The Dean of Engineering and Information Technology Faculty of Swiss German University,

Menimbang/Considering:

1. Perkuliahan S2 semester 3 yg telah berakhir/*The lectures for semester 3 have finished.*
2. Persyaratan untuk mencapai gelar kesarjanaan/*Requirements for Master's Degree graduation.*

Memperhatikan/Referring to:

Hasil penunjukan Dekan Fakultas Teknik dan Teknologi Informasi/*The appointment by the Dean of Engineering and Information Technology Faculty.*

Memutuskan/Has Reached the Decision:

1. Dengan ini menugaskan kepada dosen yang tercantum pada lampiran, sebagai Pembimbing Utama/Pendamping skripsi program Strata Dua (S2) mahasiswa yang tercantum pada lampiran dengan masa penugasan 9 Maret 2020 sampai dengan 29 Juni 2020/*Herewith gives the task to the lecturers as listed on the attachment to become Thesis Advisor/Co-Advisor for the Master's student(s) listed on the attachment with period of task starting from 9 March 2020 until 29 June 2020.*
2. Dosen yang bersangkutan harus melaksanakan tugas dan tanggung jawab sebaik-baiknya, sesuai dengan petunjuk pembimbingan skripsi dari SGU/*The appointed lecturer shall accomplish the task in responsible ways in line with the thesis guidelines and other regulations given by SGU.*

Terima kasih atas perhatian dan kerjasama Saudara/*Thank you for your attention and cooperation.*

Dekan/Dean,



Dr. Maulahikmah Galinium, S.Kom, M.Sc.  
Dekan Fakultas Teknik dan Teknologi Informasi/  
Dean of Engineering and Information Technology Faculty

Lampiran/Attachment:

Daftar Nama Pembimbing Utama, Pendamping dan Mahasiswa pada Semester Genap 2019/2020  
*List of the Thesis Advisor, Co-Advisor and the Student in the Even Semester 2019/2020.*

1. Lampiran 1/*Attachment 1: Program Studi Magister Teknik Mekatronika/Study Program of Master of Mechanical Engineering*

Attachment 1 to the Appointment Letter of Thesis Advisor/Co-Advisor Number: ST/THS2/MME-0903/AAO/III/2020 – FdI  
Lampiran 1 Surat Tugas Pembimbing Utama/Pendamping Skripsi Nomor: ST/THS2/MME-0903/AAO/III/2020 – FdI

*List of The Thesis Advisor/Co-Advisor Master's Degree Program, Study Program of Master of Mechanical Engineering, Faculty of Engineering and Information Technology, in Even Semester 2019/2020*

Daftar Nama Pembimbing Utama/Pendamping Skripsi Pada Program Pasca Sarjana, Program Studi Magister Teknik Mekatronika, Fakultas Teknik dan Teknologi Informasi, pada Semester Genap 2019/2020

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			Sutiawan	21952006	DESIGN AND ANALYSIS OF WARNING SYSTEM FOR AIRCRAFT WINGTIP PROXIMITY TO HANGAR COLUMN USING ULTRASONIC SENSOR
2.	Dr. Hanny J. Berchman	Home Base Lecturer/ Dosen Tetap	Jeremiah Hakim	21652003	DESIGN AND DEVELOPMENT LOW COST DATA ACQUISITION SYSTEM FOR SOLAR PV POWER PLANT MONITORING
			Yohanes Acep Nanang Kardana	21952005	OPTIMIZING FUEL CONSUMPTION DURING OPERATION AT KOMATSU EXCAVATOR PC 200-8M0 USING ADAPTIVE ENGINE SPEED CONTROL
3.	Dr. Cuk Supriyadi Ali Nandar, ST., M. Eng	Part Time Lecturer/ Dosen Tidak Tetap	Daniel Christianto	21952002	DEVELOPMENT OF CENTRIFUGATION STRAINING CONTROL SYSTEM FOR GREEK YOGURT PRODUCTION BASED ON WEIGHT OF WHEY DRAIN
			Sri Sadono	21952004	MODELING, SIMULATION, AND ANALYSIS OF AUTO WARMING UP AND OVERHEAT PREVENTION SYSTEM IN KOMATSU HYDRAULIC EXCAVATOR PC200-8
4.	Dr. Ir. Widi Setiawan	Part Time Lecturer/ Dosen Tidak Tetap	Tri Randi Utama	21852007	REAL TIME FACE TRACKING ROBOTIC ARM TO TAKE PICTURE FOR SECURITY SYSTEM

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The Thesis Advisor of Study Program of Master of Mechanical Engineering in Even Semester 2019/2020 in total are 4 persons/  
*Jumlah Pembimbing Utama Skripsi Studi Program Magister Teknik Mekatronika pada Semester Genap 2019/2020 adalah 4 orang*

The Thesis Co-Advisor of Study Program of Master of Mechanical Engineering in Even Semester 2019/2020 in total are 6 persons/  
*Jumlah Pembimbing Pendamping Skripsi Studi Program Magister Teknik Mekatronika pada Semester Genap 2019/2020 adalah 6 orang*

Dean,  
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DIESEL ENGINE COOLING SYSTEM USING AN ULTRASONIC FLOW METER

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.



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**MONITORING OF THERMOSTAT PERFORMANCE IN HEAVY  
EQUIPMENT DIESEL ENGINE COOLING SYSTEM USING AN  
ULTRASONIC FLOW METER**

By

Setyo Haryadi  
21952003

MASTER'S DEGREE  
in

MASTER OF MECAHNICAL ENGINEERING  
ENGINEERING AND INFORMATION TECHNOLOGY



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July 2020

## ABSTRACT

### MONITORING OF THERMOSTAT PERFORMANCE IN HEAVY EQUIPMENT DIESEL ENGINE COOLING SYSTEM USING AN ULTRASONIC FLOW METER

By

Setyo Haryadi

Dena Hendriana., BSc., M.Sc., Ph.D, Advisor

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Heavy equipment is a production equipment, where most of the heavy equipment uses diesel engines as the main power source. Heavy equipment damage is something that is avoided by heavy equipment owners. One of the damage that often occurs in diesel engines is the overheat condition of the diesel engine. One reason is the failure of the work of the thermostat. Diagnosis of the thermostat when a problem occurs in the diesel engine cooling system requires a long time. This study aims to determine the condition of the coolant flow rate and monitor thermostat performance without component overloading, so that machine breakdown time can be minimized. This research was conducted by developing an ultrasonic flow meter that is used as a coolant flow rate monitoring tool on the diesel engine cooling system. The results showed a significant relationship between the coolant flow rate and the performance of the thermostat. From this research it is known that when the thermostat conditions are normal, then when the coolant reaches temperature 80 it will be detected that the coolant flow rate from the engine block to the radiator increases significantly.

*Keywords: ultrasonic flow meter, thermostat, cooling system, diesel engine, heavy equipment.*

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## **DEDICATION**

I dedicated this research for My Family & UT School – PT United Tractors Tbk.



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I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.



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(Thesis Co-Advisor)

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**DESIGN AND ANALYSIS OF WARNING SYSTEM  
FOR AIRCRAFT WINGTIP PROXIMITY TO HANGAR COLUMN USING  
ULTRASONIC SENSOR**

By

Sutiawan  
21952006

MASTER'S DEGREE  
in

MECHANICAL ENGINEERING – MECHATRONICS CONCENTRATION  
FACULTY OF ENGINEERING AND INFORMATION TECHNOLOGY



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June 2020

## ABSTRACT

### DESIGN AND ANALYSIS OF WARNING SYSTEM FOR AIRCRAFT WINGTIP PROXIMITY TO HANGAR COLUMN USING ULTRASONIC SENSOR

By

Sutiawan

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In the aircraft maintenance organization, they used hangar as a house of aircraft with high activity aircraft movement in or out. The movements is tow and pushback, where in the process has a hazard area that is the wingtip can collide with hangar column. In this research, warning system for aircraft wingtip proximity has designed for attached in column and hangar area. The system using ultrasonic sensor and camera wirelessly connected as Internet Of Things system to warn personnel incase object present. The analyzing dimension and position of 2 types aircraft wingtip is done to get column effective area monitored. The speed of tow car will affect driver time owned to response and take action. Result of calculation in experimental, the warning system is have enough time to take response.

*Keywords: Warning system, Ultrasonic, Proximity, Internet Of Things, Collision*

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## **DEDICATION**

I dedicated this works for all people in GMF AeroAsia with concern in Aircraft  
Maintenance process to be great safety warrior.

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Praise and great gratitude to Almighty God submitted by the author to the Allah SWT for blessings and help to complete this thesis on time, also sholawat and salam to Rasulullah Muhammad saw. This thesis is arranged to fulfill the requirements for obtaining master's degree, in Mechanical Engineering (Mechatronics) Study Program, Faculty of Engineering and Information Technology, Swiss German University. On this occasion with great humility, I would like to thank you to all of those who have given me help and guidance so that this thesis can be finished. Completion of writing of this thesis, the author would like to thank to:

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2. Dena Hendriana, B.Sc., M.Sc., Ph.D. as the Deputy Head of Master Mechanical Engineering Department.
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Final words, the author say thank you so much indeed for all for those who I can not mentions the names. Hopefully this thesis can be useful for us and become the input for the parties in need.

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