SWISS GERMAN UNIVERSITY

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,*

SWISS GERMAN UNIVERSITY SGU ACADEMIC ADMINISTRATION OFFICE

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*

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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

List of Advisor

Nr.	The Advisor Name/ *Nama Pembimbing*	Status Dosen/ *Lecturer's Status*	Student's Name/ *Nama Mahasiswa*	Student's ID/ *NIM*	Thesis Title/ *Judul Skripsi*
1.	Dena Hendriana, BSc., S.M., Sc.D	Full Time Lecturer/ Dosen Tetap	Setyo Haryadi	21952003	ANALYSIS OF THERMOSTAT PERFORMANCE IN THE KOMATSU DIESEL ENGINE COOLING SYSTEM THROUGH MEASUREMENT OF COOLANT VOLUME FLOW RATE USING AN ULTRASONIC FLOW METER
			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 Uetama	21852007	REAL TIME FACE TRACKING ROBOTIC ARM TO TAKE PICTURE FOR SECURITY SYSTEM

List of Co-Advisor

Nr.	The Advisor Name/ *Nama Pembimbing*	Status Dosen/ *Lecturer's Status*	Student's Name/ *Nama Mahasiswa*	Student's ID/ *NIM*	Thesis Title/ *Judul Skripsi*
1.	Dena Hendriana, BSc., S.M., Sc.D	Full Time Lecturer/ Dosen Tetap	Sri Sadono	21952004	MODELING, SIMULATION, AND ANALYSIS OF AUTO WARMING UP AND OVERHEAT PREVENTION SYSTEM IN KOMATSU HYDRAULIC EXCAVATOR PC200-8
2.	Dr. Hanny J. Berchman	Home Base Lecturer/ Dosen Tetap	Sutiawan	21952006	DESIGN AND ANALYSIS OF WARNING SYSTEM FOR AIRCRAFT WINGTIP PROXIMITY TO HANGAR COLUMN USING ULTRASONIC SENSOR
3.	Dr. Cuk Supriyadi Ali Nandar, ST., M. Eng	Part Time Lecturer/ Dosen Tidak Tetap	Setyo Haryadi	21952003	ANALYSIS OF THERMOSTAT PERFORMANCE IN THE KOMATSU DIESEL ENGINE COOLING SYSTEM THROUGH MEASUREMENT OF COOLANT VOLUME FLOW RATE USING AN ULTRASONIC FLOW METER
			Yohanes Acep Nanang Kardana	21952005	OPTIMIZING FUEL CONSUMPTION DURING OPERATION AT KOMATSU EXCAVATOR PC 200-8M0 USING ADAPTIVE ENGINE SPEED CONTROL
4.	Edi Sofyan, B.Eng., M.Eng., Ph.D.	Part Time Lecturer/ Dosen Tidak Tetap	Tri Randi Uetama	21852007	REAL TIME FACE TRACKING ROBOTIC ARM TO TAKE PICTURE FOR SECURITY SYSTEM

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List of Co-Advisor

Nr.	The Advisor Name/ *Nama Pembimbing*	Status Dosen/ *Lecturer's Status*	Student's Name/ *Nama Mahasiswa*	Student's ID/ *NIM*	Thesis Title/ *Judul Skripsi*
5.	Dr. Ir. Gembong Baskoro, M.Sc.	Full Time Lecturer/ Dosen Tetap	Jeremiah Hakim	21652003	DESIGN AND DEVELOPMENT LOW COST DATA ACQUISITION SYSTEM FOR SOLAR PV POWER PLANT MONITORING
6.	Dr. Ir. Widi Setiawan	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

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,
Dekan,

Dr. Maulahikmah Galinium, S.Kom, M.Sc.

STATEMENT BY THE AUTHOR

Name of Student	:	Setyo Haryadi
Student ID	:	21952003
Faculty	:	Engineering & Information Technology
Study Program	:	Master of Mechanical Engineering
Date of Defense	:	17 July 2020
Thesis Title	:	MONITORING OF THERMOSTAT PERFORMANCE IN HEAVY EQUIPMENT 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.

Setyo Haryadi
(Name of Student)

Approved by:
Date: 31 July 2020

Dena Hendriana, B.Sc., S.M., Sc.D.
(Thesis Advisor)

Dr. Cuk Supriyadi Ali Nandar, ST., M. Eng
(Thesis Co-Advisor)

Acknowledged by:
Date: 31 July 2020

Dr. Maulahikmah Galinium, S.Kom, M.Sc.
(Dean of Faculty of Engineering & Information Technology)

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

SWISS GERMAN UNIVERSITY
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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
Dr. Cuk Supriyadi Ali Nandar, Co-Advisor

SWISS GERMAN UNIVERSITY

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.

DEDICATION

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

ACKNOWLEDGEMENTS

I Would like to thank to Mr. Dena Hendriana., BSc., M.Sc., Ph.D and Mr. Dr. Cuk Supriyadi Ali Nandar and all Lecturers who have guided me while studying in Swiss German University. And also to Mr. Edhie Sarwono and Mr. Teguh Setiono and the management of PT United Tractors Tbk. who gave me the opportunity to take a master's degree.

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STATEMENT BY THE AUTHOR

Name of Student	:	Sutiawan
Student ID	:	21952006
Faculty	:	Engineering & Information Technology
Study Program	:	Master of Mechanical Engineering
Date of Defense	:	17 July 2020
Thesis Title	:	DESIGN AND ANALYSIS OF WARNING SYSTEM FOR AIRCRAFT WINGTIP PROXIMITY TO HANGAR COLUMN USING ULTRASONIC SENSOR

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.

Sutiawan
(Name of Student)

Approved by:
Date: 31 July 2020

Dena Hendriana, B.Sc., S.M., Sc.D.
(Thesis Advisor)

Dr. Ir. Hanny J. Berchmans, MT.
(Thesis Co-Advisor)

Acknowledged by:
Date: 31 July 2020

Dr. Maulahikmah Galinium, S.Kom, M.Sc.
(Dean of Faculty of Engineering & Information Technology)

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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

SWISS GERMAN UNIVERSITY
The Prominence Tower
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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
Dena Hendriana, B.Sc., S.M.Sc.D, Advisor
Dr. Ir. Hanny J.Berchmans, M.Sc., Co-Advisor

SWISS GERMAN UNIVERSITY

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

DEDICATION

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

ACKNOWLEDGEMENTS

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:

1. Dr. Ir. Gembong Baskoro, M.Sc. as the Dean of Engineering and Information Technology Faculty.

2. Dena Hendriana, B.Sc., M.Sc., Ph.D. as the Deputy Head of Master Mechanical Engineering Department.

3. My best gratitude to Mr. Dena Hendriana, B.Sc., M.Sc., Ph.D. as my advisor in completing this thesis through the guidance and direction as well as the encouragement that are very useful and helpful for the preparation and writing of this thesis.

4. I also gratitude to Mr. Dr. Ir. Hanny J.Berchmans, M.Sc. as my co advisor in guidance and direction as well as encouragement for preparation and writing of this thesis.

5. All lecturers in Master of Mechanical Engineering Department, especially in Mechatronics Study Program, thanks for the teaching during this time.

6. All the administration staffs of Engineering and Information Technology Faculty that gave helping during arrangement of thesis.

7. The biggest thanks especially to my parents and sisters as the best person to support and always pray for me and all family.

8. I say thanks to all of my collegues in my company for giving material I need and supporting me so I can finished this well. I can not mention them one by one here but I always remember and pray for them for all those who support and pray for me. I do not forget also to say great thanks to my supervisors in my company for always support and pray in other I can finished my thesis. Thanks for all.

9. Wonderful thank for all my greatest friends in class MME that I can mention their names one by one as well as the junior and senior in Engineering and Information Technology Faculty thanks for your support.

   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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