



USM UNIVERSITI
SAINS
MALAYSIA



**SCHOOL OF AEROSPACE ENGINEERING
UNIVERSITI SAINS MALAYSIA**



**POSTGRADUATE
PROGRAMS
2025/26**

CONTENT

Background	1
The Management	2
Program Overview	3
Program Educational Objectives	4
Program Learning Outcomes	5
Research Field	7
Graduation Requirements	8
Laboratories and Facilities	9
Postgraduate @Aero	20
Contact	21





BACKGROUND

The School of Aerospace Engineering at Universiti Sains Malaysia (USM) has its roots in the School of Applied Science, established in 1972 at the main campus in Penang. Initially offering basic engineering fields, the school underwent a major restructuring in 1984, leading to the creation of specialized schools and the expansion of USM's engineering programs. To accommodate the growing demand for space, the engineering faculties were relocated to the newly established USM Perak Branch Campus in Seri Iskandar, Perak, marking the foundation for future engineering schools, including Aerospace Engineering. In 1998, the USM Aerospace Engineering Unit was officially formed, and by March 1999, it was elevated to the School of Aerospace Engineering, reflecting USM's commitment to advancing engineering education. The relocation of USM's engineering faculties continued, and in 2001, the Engineering Campus was moved back to Penang, now situated in Seri Ampangan, Nibong Tebal. This move solidified USM's reputation as a hub for engineering studies in Malaysia. USM's recognition as one of the top research universities in 2007 and the subsequent attainment of APEX status in 2008 highlighted its ambition to become a global leader in higher education. The university's strategic plan, aimed at transforming its operations for sustainable development, focuses on nurturing talent, enhancing resources, and fostering supportive governance to achieve its goal of ranking among the world's top universities.

VISION

The School of Aerospace Engineering strives to be the best and leading provider of aerospace engineering education and research in Malaysia.

MISSION

1. To provide quality and innovative teaching and maintain accreditation for all its degree programmes.
2. To achieve research excellence.
3. To establish and enhance the collaboration with industries for education and research.
4. To serve the society and country by providing the latest knowledge and technology.



DEAN

Assoc. Prof. Dr. Elmi Abu Bakar,
MIEEE



DEPUTY DEAN

Research Innovation & Industry -
Community Engagement

Assoc. Prof. Dr. Norizham
Abdul Razak



DEPUTY DEAN

Academic, Career and
International

Ir. Dr. Hussin Mamat

THE MANAGEMENT

PROGRAM CHAIRMAN

Dr. Mohd Shukur Zainol Abidin



**CORPORATE
COORDINATOR**

Ir. Dr. Ahmad Faizul Hawary



**QUALITY & STUDENT
DEVELOPMENT
COORDINATOR**

Dr. Aslina Anjang Ab Rahman



PROGRAM OVERVIEW

The School offer postgraduate studies by research in various fields of Aerospace Engineering, leading to the Degree of M.Sc. These programmes are offered either in full-time or part-time basis.

The research programmes at the school specialise in the areas of Aerodynamics, Computational Fluid Dynamics, Aerospace Structures, Aerospace Composite Technology, Propulsion, Aerospace Control and Astronautics.

The degree can be pursued under the supervision of at least one academic staff of the School, in which the candidate is required to complete the research study within a stipulated time period.

RESEARCH FIELD

01

FLUIDS

02

SYSTEM DESIGN

03

MATERIAL & STRUCTURE

04

SPACE SYSTEM

PROGRAM EDUCATIONAL OBJECTIVES (PEO)

	M.Sc	PhD.
PEO 1	Capable of integrating concepts, theories, methods, and current knowledge to conduct high-quality and impactful research for the well-being of local and global communities. (PLO1 - Knowledge, PLO3 - Cognitive).	Capable of integrating concepts, theories, methods, and current knowledge to conduct high-quality and impactful research for the well-being of local and global communities. (PLO1 - Knowledge, PLO3 - Cognitive).
PEO 2	Graduates who are skilled in critically and accurately analyzing problems and capable of exploring creative and innovative solutions through the latest digital platforms. (PLO2 - Practical, PLO10 - Digital, PLO11 - Numeracy).	A field expert skilled in critically and accurately analyzing problems and capable of exploring creative and innovative solutions through the latest digital platforms. (PLO2 - Practical, PLO10-Digital, PLO11 - Numeracy).
PEO 3	Practice professional, sustainable, and ethical values in fulfilling responsibilities to employers, society, and the nation. (PLO6 - Ethics & Professionalism, PLO9 - Leadership and Responsibility)	A field expert who practices professional, sustainable, and ethical values in fulfilling responsibilities to employers, society, and the nation. (PLO6 - Ethics & Professionalism, PLO9 - Leadership and Responsibility)
PEO 4	Possess effective communication skills and confidence in conveying knowledge both orally and in writing. (PLO4 - Communication).	Possess effective communication skills and confidence in conveying knowledge both orally and in writing. (PLO4 - Communication).
PEO 5	Capable of exploring new knowledge and engaging in cross-disciplinary collaborations that contribute to the socio-economic development and sustainability of society and the nation. (PLO5 - Interpersonal, PLO7- Personal).	Capable of generating new knowledge through high-performance research and cross-disciplinary collaborations that contribute to the socio-economic development and sustainability of society and the nation. (PLO5-Interpersonal, PLO7- Personal).

PROGRAM LEARNING OUTCOMES (PLO)

M.Sc

PhD.

PLO 1 Knowledge and Understanding

Demonstrate in-depth and frontier knowledge in the related field.

Integrate significant knowledge by using appropriate approaches to address current critical issues and generate original and impactful contributions to the relevant fields.

PLO 2 Cognitive Skills

Apply knowledge critically and integratively to manage and solve complex problems using various techniques, tools or skills for the purpose of producing new ideas or innovative solutions.

Critically analyze and synthesize new, complex, and abstract ideas and solve contemporary issues through advanced research methods to produce original contributions that meet international standards.

PLO 3 Practical Skills

Demonstrate effective and innovative research skills by utilizing specialized research methods and the latest investigative techniques in the relevant field with minimal supervision.

Develop original, complex, and specialized research methods and techniques to address emerging problems and create high-quality solutions in the relevant fields with minimal supervision.

PLO 4 Interpersonal Skills

Demonstrate the ability to collaborate cogently with various parties in carrying out research.

Demonstrate the ability to collaborate cogently with various parties in carrying out research.

PLO 5 Communication Skills

Present research findings, ideas, issues and solutions clearly, confidently and effectively to the research community, peers and society.

Present knowledge, skills, ideas and research findings clearly using appropriate methods to various parties.

PLO 6 Digital Skills

Utilize appropriate digital technology and software to analyze and enhance research findings

Utilize digital technologies and appropriate software to support, enhance, and justify research findings.

PROGRAM LEARNING OUTCOMES (PLO)

PLO 7 Numerical Skills

Use appropriate methods to analyze and evaluate data for the purpose of solving problems.

Validate findings by using analysis that is appropriate to the research methods to ensure that conclusions are accurate and impactful.

PLO 8 Leadership, Autonomy & Responsibility

Demonstrate leadership qualities and be responsible when collaborating with others in managing research

Exhibit intellectual leadership qualities and skills in managing research and related resources.

PLO 9 Personal Skills

Demonstrate commitment to lifelong learning and personal development in the relevant field.

Demonstrate commitment to lifelong learning and personal development in shaping future directions within the related field.

PLO 10 Entrepreneurial Skills

Apply entrepreneurial skills to identify opportunities and implement projects related to the field of research.

Apply entrepreneurial skills to identify opportunities and implement innovative projects in related research.

PLO 11 Ethics & Professionalism

Comply with safety rules and instructions, and demonstrate principles, professionalism, ethics, and sustainable practices in conducting research.

Comply with safety rules and instructions, ethics and professionalism, and sustainable practices as well as identify the related issues for research advancement in the field and their impact to society.



RESEARCH FIELD AND SPECIALIZATION



FLUID

Aerodynamics
Computational Fluid Dynamics (CFD)
Thermodynamics
Nano Fluids
Propulsion



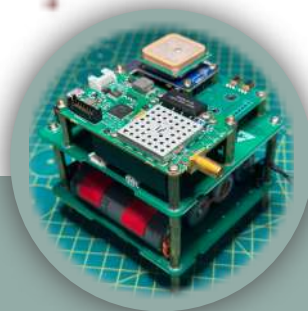
SYSTEM DESIGN

Autonomous System
Drone System
Artificial Intelligence (AI) & Machine Learning
Internet of Thing (IoT)
Control System



MATERIAL & STRUCTURE

Composite
Finite Element Analysis (FEA)
Fluid Structure Interaction (FSI)
Fatigue



SPACE SYSTEM

Spacecraft Design
Satellite Communication
Radar
Mission Analysis
Space Physics and Earth Electromagnetism

Information for expertise: <https://experts.usm.my/>

Any inquiry related to postgraduate study: pg_aero@usm.my

GRADUATION REQUIREMENTS

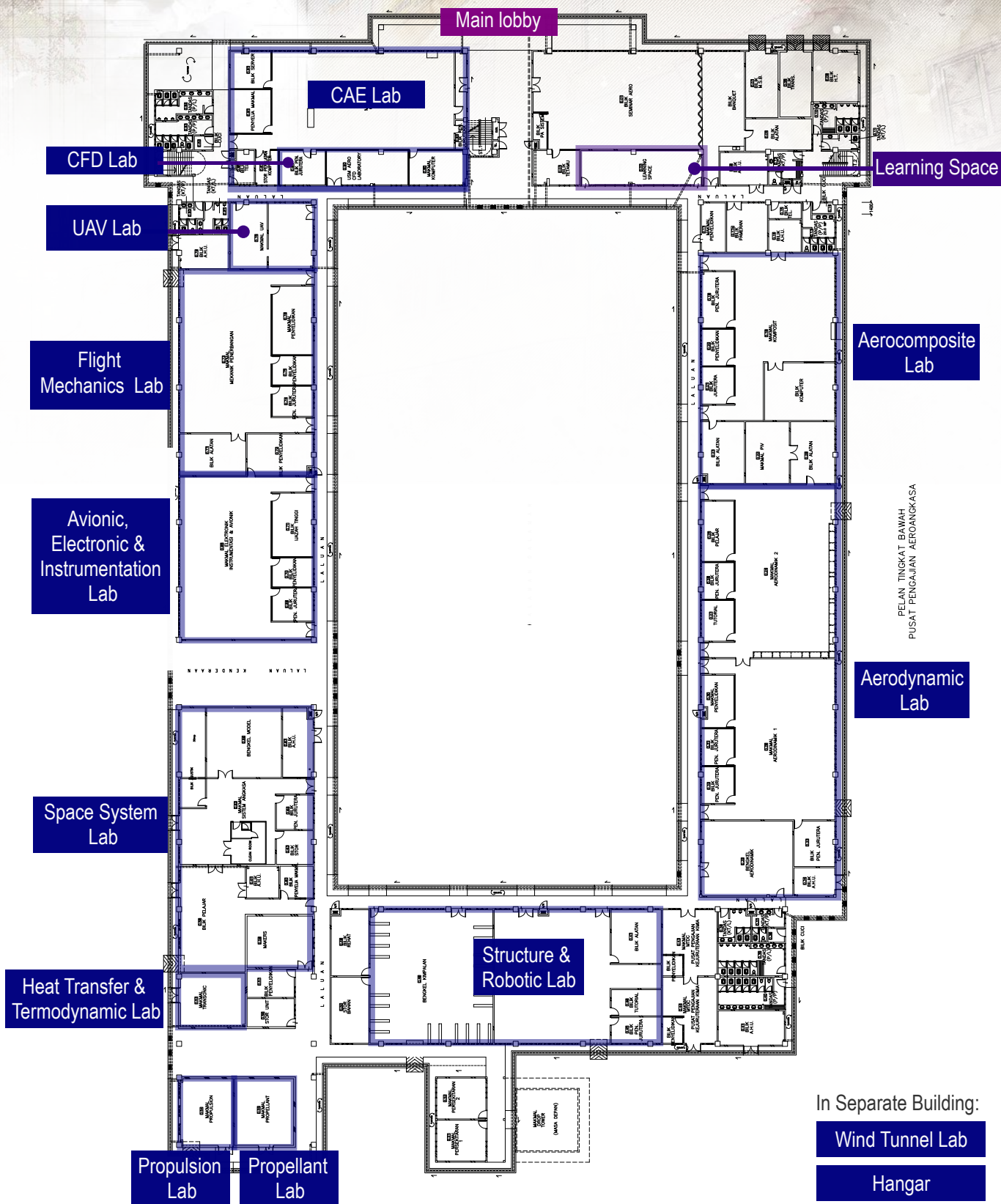
A Research Mode student must comply with the following graduation requirements:

1. Fulfil the minimum duration of candidature.
2. Pass the pre-requisite courses (if any) as determined by the School/Centre/Institute.
3. Malaysian Culture and Malay Language (LKM 111) is compulsory for all international students. Minimum grade C must be obtained prior to graduation.
4. Pass the Research Methodology course.
5. Fulfilled the publication requirements as above.

	MSc.	Ph.D
Engineering	At least One (1) article journal, accepted OR Published in journals / proceedings indexed by WoS / SCOPUS	One (1) article journal, accepted by or published in a journal indexed by WoS in Q1 / Q2 OR At least two (2) articles journal, accepted or published in journals indexed by WoS / SCOPUS
Authorship	Publications accepted must be published with the supervisor(s). The candidate must be the first student author. Only the first student author is allowed.	
Plagiarism	Plagiarism article will not be accepted for graduation requirement.	
Topic of Publications	Publications accepted must be related to his/her thesis/dissertation	
Affiliation	Publications accepted must carry USM affiliation	



LABORATORIES & FACILITIES

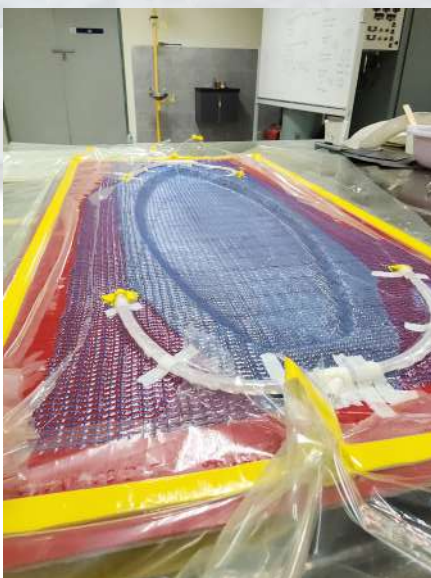


AEROCOMPOSITE LAB



EQUIPMENT

- Wet Cutter Machine
- Weight Balance
- Analytical Balance
- Universal Testing Machine
- Vacuum Curing Oven
- Vacuum Pump
- Water Wall
- Microscope



A wide-angle photograph of an aerodynamics laboratory. The room features a polished wooden floor with a grid pattern. In the foreground, a white metal frame stands on a black stool. To the right, a large blue closed-circuit wind tunnel is visible, along with various workbenches and equipment. The background shows more laboratory equipment and a green wall.

AERODYNAMICS LAB

EQUIPMENT

- Open Circuit Wind Tunnel
- Closed Circuit Wind Tunnel (1m x 1m)
- 6 DOF Force Torque Sensor
- Particle Image Velocimetry (PIV)
- Pressure Transducer (16 Channels)
- Laser Doppler Anemometer (LDA)
- Hot Wire Anemometer (HWA)





STRUCTURE & ROBOTIC LAB

EQUIPMENT

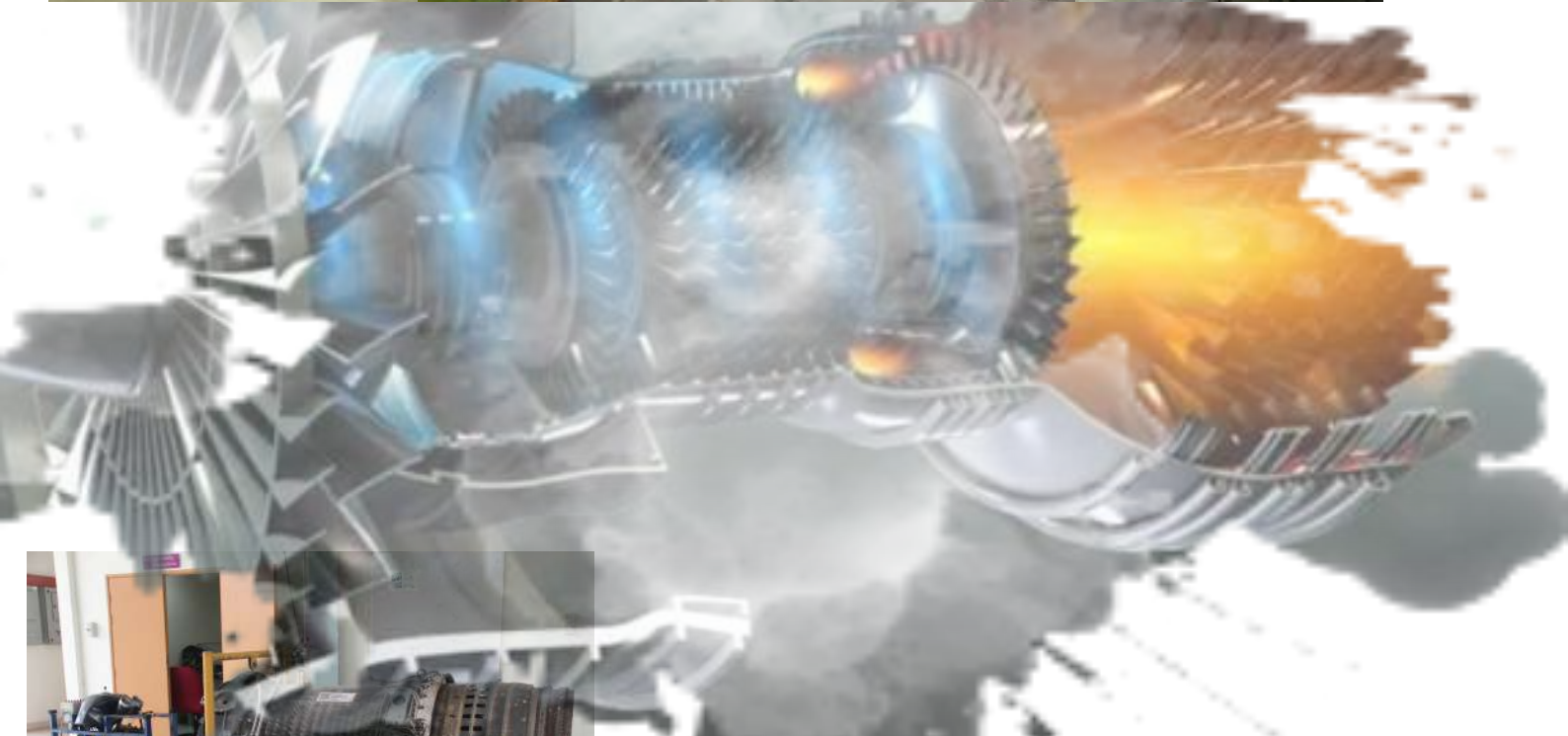
- CNC Milling Machine
- CNC Turning Machine
- CNC Machine
- MIG Machine
- Arc Machine
- Shearing Machine
- Band Saw Machine
- Lathe Machine
- Milling Machine
- Table Drilling Machine
- Table Grinder
- Manual Cutting Machine
- Roller Machine
- Banding Machine



PROPELLANT LAB

EQUIPMENT

Rocket Thrust Measurement
Solid Propellant



PROPULSION LAB

EQUIPMENT

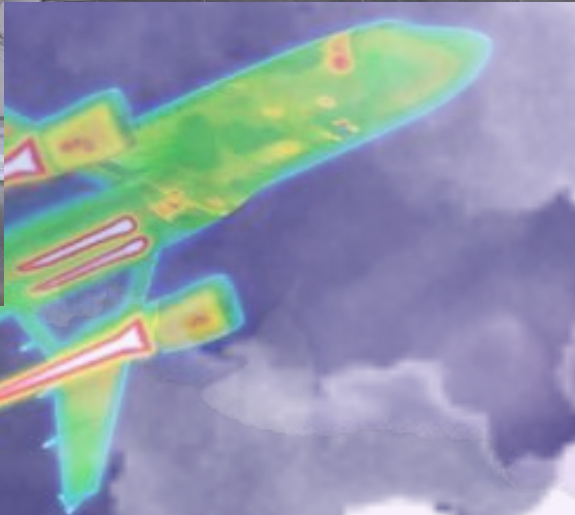
Micro Jet Turbine
Emission Sensor Analyser
Magnetic Stirrer

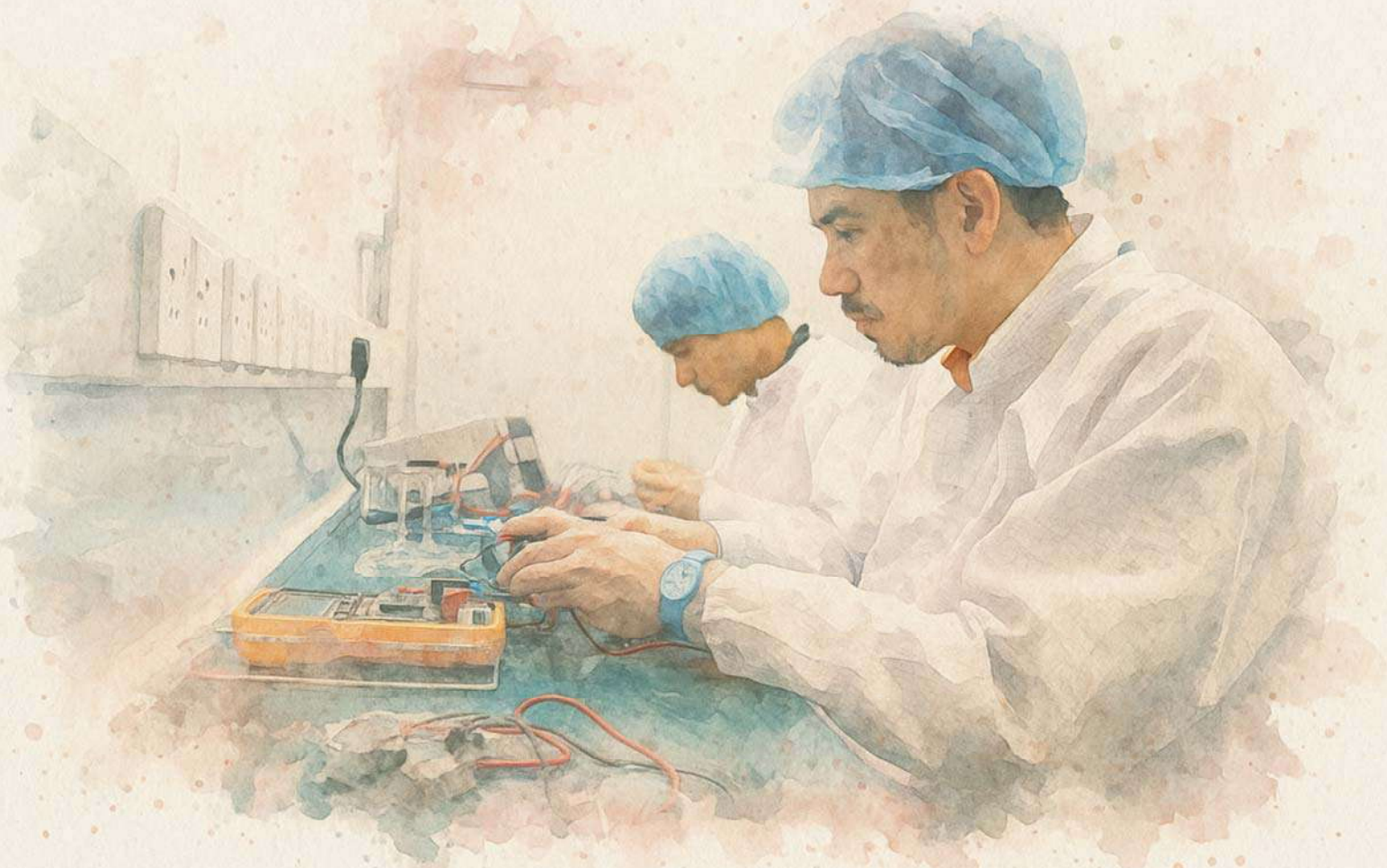


HEAT TRANSFER & THERMODYNAMIC LAB

EQUIPMENT

- Industrial Chiller
- Hot Water Generator
- Comparison of Various Heat Exchanger
- Change of State of Gases
- Ultrasonic Processor

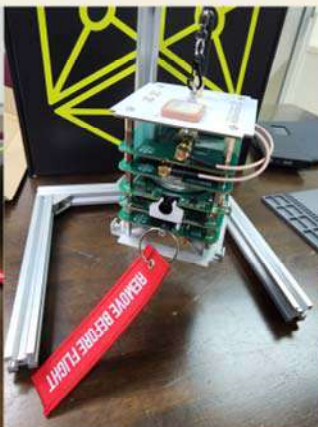




SPACE SYSTEM LAB

EQUIPMENT & FACILITY

- 1U & 2U Satellite Kit
- IoT Set
- GNSS Simulator
- High Performance Computer
- Magnetometer
- Multimeter
- 100K Clean Room
- Ground Station
- SID Antenna



AVIONICS, ELECTRONICS & INSTRUMENTATION LAB

EQUIPMENT

Signal & System
Non-Destructive Testing (NDT) Unit
Electronics & Communications System
3D printer



UAV LAB

EQUIPMENT

Micro Air Vehicle
Computer Running Visual Simulation
Local Positioning Sensors



FLIGHT MECHANIC LAB

EQUIPMENT

Unmanned Aerial System
Laser Printer
Flight Controller System
PLC Edu Kit



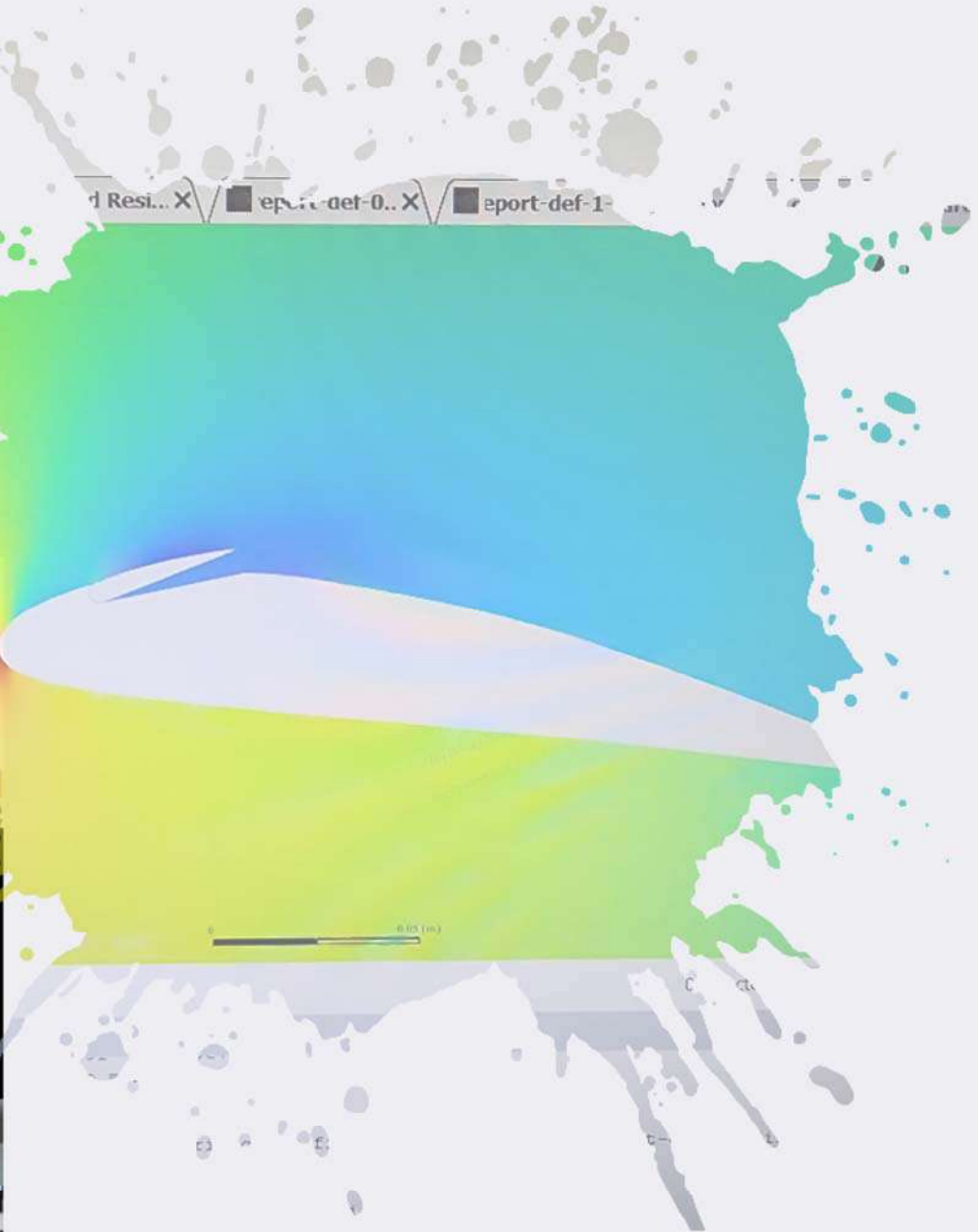
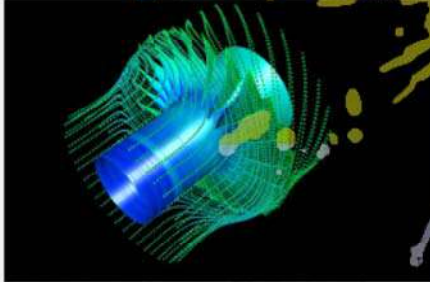
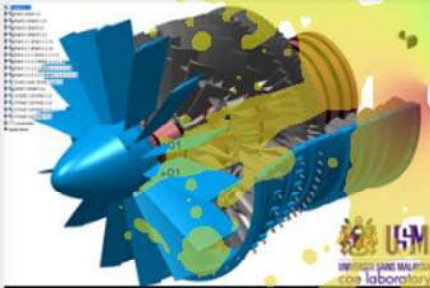
COMPUTER AIDED ENGINEERING (CAE) LAB

EQUIPMENT

High Performance Computer

Software:

- CATIA
- SolidWorks
- ANSYS Academic
- Matlab
- Fluent



EQUIPMENT

High Performance Computer

COMPUTATIONAL FLUID DYNAMICS (CFD) LAB

HANGAR



POSTGRADUATE @AERO

During my postgraduate studies, I worked on numerical method development for shallow water equations. The research environment was quiet and focused, which really helped with productivity. My supervisor and everyone was friendly and supportive, making the experience enjoyable.

Living costs were low since the school is outside the busy city, but the nearby small town had everything we needed. Overall, it was a great place to study and do research. - Dr Chan Wei Shyang



CONTACT

**SCHOOL OF AEROSPACE ENGINEERING
UNIVERSITI SAINS MALAYSIA
ENGINEERING CAMPUS
14300 NIBONG TEBAL, PULAU PINANG
MALAYSIA**

TELEPHONE NO: +604 599 5901

EMAIL : pg_aero@usm.my

