MINISTRY OF HUMAN RESOURCES

HRD CORP
HUMAN RESOURCE DEVELOPMENT CORPORATION

IndSF | INDUSTRIAL SKILLS FRAMEWORK

DRONE TECHNOLOGY

FIRST EDITION 2023

In collaboration with:

MAIA
Malaysia Aerospace Industry Association

MRANTI
Malaysian Research Accelerator for Technology & Innovation

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PREFACE

In an era characterised by rapid technological advancements, drone technology has emerged as a transformative force with the potential to revolutionise industries across the globe. Drones, or Unmanned Aerial Vehicles (UAVs), have transcended their initial military applications to become integral tools in sectors ranging from agriculture and construction to filmmaking and environmental monitoring. The versatility and ubiquity of drones have paved the way for the growth of a dynamic and promising industry that demands specialised skills and expertise.

The Industrial Skills Framework in Drone Technology for Malaysia has been developed to recognise the profound impact of drone technology on various sectors of the Malaysian economy. This framework aims to serve as a comprehensive guide and roadmap for individuals, educators, and industry stakeholders looking to navigate and harness drone technology's potential effectively.

The Industrial Skills Framework in Drone Technology has been meticulously designed to address the evolving needs of this burgeoning industry. It outlines the knowledge, competencies, and proficiencies required to excel in the drone technology sector, taking into account the unique Malaysian context, regulations, and industry trends. This framework not only supports the development of a skilled and knowledgeable workforce but also fosters innovation and sustainability within the drone industry ecosystem.

ACKNOWLEDGEMENT

SUBJECT MATTER EXPERTS

We would like to thank all subject matter experts (SMEs) who have contributed to the development and enhancement of the Industrial Skills Framework document for Drone Technology.

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CHIEF EXECUTIVE

HRD CORP

As the custodian of Malaysia's human capital development efforts, HRD Corp has always been committed to ensuring that every Malaysian talent and member of the workforce is given the chance to develop their skills and knowledge. Our levy programme and strategic initiatives have been geared towards providing skills training, placement and income-generation opportunities to all Malaysians. This is because we believe these are the fundamentals that can help them grow personally and professionally.

Beyond that, we work closely with our registered employers, businesses and industry players to ensure they have the right training and development pathways to support their employees' career journeys, all while creating avenues to make it easier for them to invest in their workforce. At the same time, we collaborate with Malaysian trainers and training providers to strengthen the country's training and development ecosystem, ensuring that the training community can offer high-quality, industry-relevant current and future work skills

Given our far-reaching impact and engagement, HRD Corp regularly receives requests for feedback from individuals, businesses, industries and the Government on the status and potential of Malaysia's skills development landscape. We are also often tapped to provide counsel and recommendations on what industry players can do to address skills gaps within their respective industries and provide relevant and high-quality training programmes for their talents.

For these reasons, I am immensely proud to introduce to you the Industrial Skills Framework, a visionary initiative that not only answers the above-mentioned requests, but is also a comprehensive document designed to empower the workforce of today and tomorrow. This remarkable framework is a testament to HRD Corps' unwavering commitment to drive excellence in the industry.

The Industrial Skills Framework serves as a comprehensive guide that not only identifies the critical skills demanded by industries but also outlines the pathways to acquire and enhance these skills. It is a roadmap for individuals seeking to thrive in the modern industrial landscape, and for organisations aiming to remain competitive by nurturing a skilled workforce.

On behalf of HRD Corp, I thank our industry partners and collaborators for their effort and commitment in making the IndSF a reality. I also hope that the IndSF will continue to be the main source of reference for all talents, professionals and leaders as they seek new opportunities and work together to elevate their respective industries.

DATUK WIRA DR HAJI RAIS HUSSIN

CHIEF EXECUTIVE OFFICER

MALAYSIAN RESEARCH ACCELERATOR FOR TECHNOLOGY & INNOVATION (MRANTI)

Dear Respected Stakeholders,

It is our distinct pleasure to introduce the Industrial Skills Framework in Drone Technology, a collaborative initiative between agencies like HRD Corp, Malaysian Research Accelerator for Technology & Innovation (MRANTI) and Malaysia Aerospace Industry Association (MAIA) and is supported by industry partners. In today's rapidly evolving industrial landscape, the assimilation of cutting-edge technologies is vital, and the drone industry stands as a testament to this paradigm shift.

Based on the Malaysia Drone Technology Action Plan 2022-2030 (MDTAP30), the drone industry in Malaysia is poised to make a substantial impact on Malaysia's economy, generating an accumulative RM 50.71 billion in GDP contribution and facilitating the creation of approximately 100,000 high-value job opportunities by 2030.

At MRANTI, we acknowledge the pivotal role that drone technology plays in reshaping industries, enhancing operational efficiency, and unlocking new possibilities in data analytics and surveillance. This framework underscores our commitment to nurturing a skilled workforce capable of harnessing the potential of drones for the benefit of various sectors.

Our partnership with HRD Corp and MAIA exemplifies the strength of collaboration in driving innovation and meeting the dynamic needs of our workforce. Together, we aspire to create a comprehensive and dynamic skills framework aligned with industry demands, ensuring that individuals are well-equipped with the knowledge and expertise required to excel in the field of drone technology.

As we embark on this transformative journey, I extend my sincere gratitude to all stakeholders involved, whose dedication and vision have brought this initiative to fruition. Together, let us shape a future where our workforce not only adapts to technological advancements but also leads the way in defining the future of industries.

NAGUIB MOHD NOR

PRESIDENT

MALAYSIA AEROSPACE INDUSTRY ASSOCIATION (MAIA)

In a world increasingly shaped by technological advancements and dynamic industrial landscapes, the significance of a proficient, adaptable, and future-ready workforce cannot be overstated. As the President of the Malaysia Aerospace Industry Association (MAIA), I am both humbled and honoured to provide this Foreword for the Industrial Skills Framework (IndSF) document.

The aerospace industry stands at the forefront of innovation, and its rapid evolution necessitates an equally agile skills framework. To meet this imperative, we have meticulously aligned the aerospace skills framework within this document with today's shopfloor requirements. This attention to detail is not a mere academic exercise but a practical endeavour to facilitate a clear understanding and fulfilment of industry needs by companies and training organisations alike.

The inspiration for this precise and pertinent framework emanates from globally recognised standards such as ONET and Skills Future Singapore. Their pioneering work in defining skills and competence requirements for the 21st century serves as a beacon, guiding our efforts to shape a curriculum resonant with present and future demands.

ONET's comprehensive database and Skills Future Singapore's initiatives have become instrumental in delineating competencies that not only fit today's industrial landscape, but also envision future trends. Drawing from their methodology and insights, we have crafted an aerospace skills framework within IndSF that emphasises practical application, adaptability, and industry readiness.

Our commitment to nurturing a workforce equipped with the requisite skills transcends mere documentation. It embodies a collective pursuit of excellence, a roadmap that navigates the complex terrains of industrial transformation. By aligning the aerospace sector's unique demands with globally acknowledged competence models, we are ensuring that Malaysia's aerospace industry remains competitive, innovative, and resilient.

This document is more than a statement of intent; it is a commitment to action, a testament to our dedication to fostering a skilled, adaptable, and future-ready workforce. Together, we embark on this transformative journey, confident in our shared vision and relentless in our pursuit of excellence.

I invite all stakeholders to participate actively in this endeavour. Together, we can shape a future that reflects our ambitions, values, and unwavering commitment to industry and human development.

GUIDELINES

01

This document serves as a guide for individuals, employers, and training providers on knowledge, experiences, and skills mastery required in the Drone Technology industry.

02

The job matrix serves as a reference for career progression within the industry.

03

The Industrial Skills Framework for Drone Technology Industry will FOCUS ON Level 4 of the Malaysian Skill Certification (or its equivalent) and above.

04

This document focuses on JOB DESCRIPTIONS, SKILLS AND TRAINING NEEDED in the Drone Technology Industry.

05

It is a COMPLEMENTARY DOCUMENT to existing references developed by the National Occupational Skills Standard (NOSS) and Malaysian Qualifications Framework (MQF).

06

The Industrial Skills Framework document is not exhaustive and may be reviewed from time to time for continuous improvement, parallel with the latest changes within the industry.

About HRD Corp & IndSF

HRD CORP
HUMAN RESOURCE DEVELOPMENT CORPORATION

ABOUT HRD CORP

Human Resource Development Corporation (HRD Corp) was established in 1993. As an agency under the Ministry of Human Resources, it is responsible for the collection of levy from key industries and the disbursement of training grants to registered employers through its internal mechanisms known as the Human Resources Development Fund (HRDF). Today it has expanded its role to include training and development programmes for all Malaysian talents and employers, as well as providing income-generating opportunities to all communities in need.

IndSF | INDUSTRIAL SKILLS FRAMEWORK

ABOUT IndSF

HRD Corp Industrial Skills Framework (HRD Corp-IndSF) is developed by Human Resource Development Corporation (HRD Corp) with the aim of supporting industry needs to acquire skilled workforce that posses the types and levels of competencies needed by the industry. In tandem with this, HRD Corp acts as an ADVISOR TO THE EMPLOYERS in identifying the suitable training programmes that meet the emerging needs of their businesses and bring positive impact to the industry.

Principle

- Meet the competency requirements of sectors currently covered under the PSMB Act 2001
- Accommodate the needs of in-services industry
- Developed together with the industry and bench-marked against successful framework model(s)
- Focus mainly on Level 4 Malaysian Skill Certification, or equivalent, and above
- Built upon the National Occupational Skills Standard (NOSS)

SKILLS INFORMATION
DRONE TECHNOLOGY

In the 2023 Drone Readiness Index (DRI), Malaysia's drone industry ranked in the top spot for Southeast Asia. The Malaysian government claims the country has tremendous potential to become a significant player in the global drone market and is expected to reach USD 127 billion by 2025.

Drones are widely used in the country's agriculture and security sectors. Palm oil plantations and fruit farms use drones with mapping and data imaging functions to perform real-time soil and field analysis. This approach helps farmers grow the healthiest crops by identifying which plot of land is best for planting, irrigation, and fertilisation. Drones equipped with near-infrared light can detect pests and plant diseases.

The National Security Council and the Royal Malaysia Police also employ drones to regulate citizen movement for public safety. Drones can perform aerial mapping of populations during emergencies. In 2021, Malaysia experienced one of its worst floods ever recorded. Food and medicine supplies were then delivered by drones to displaced victims.

Government agencies such as the Malaysia Digital Economy Corporation (MDEC) have taken on the task of leading the country's drone industry. MDEC's MyDroneTech Initiative aims to increase the adoption of drone tech in Malaysia by assisting drone companies in testing products, advocating for supportive policies, and developing tech talent to analyse drone-captured data.

The Malaysian Research Accelerator for Technology & Innovation (MRANTI), the secretariat for Malaysia Drone Technology Action Plan 2022–2030, also launched Area57, a centre of excellence to boost the drone industry in Malaysia. Additionally, the Civil Aviation Authority of Malaysia (CAAM) unveiled the C-UAS certification and crewed eVTOL national regulatory sandbox earlier this year to spur industry innovation while ensuring public safety.

SKILLS INFORMATION
BUSINESS OUTLOOK

Demographic Information on Drone Technology Under HRD Corp

	TOTAL
No. of Registered Employers	91
Total Levy Claim (RM)	819,315
Financial Assistance (RM)	3,036,779
Training Places	1,321

SKILLS INFORMATION
BUSINESS OUTLOOK

Top 5 Skill Areas as of May 2023

2023

1. Engineering
2. Regulation and Safety
3. Operation Management
4. Scientific, Technical or Statistics
5. Productivity

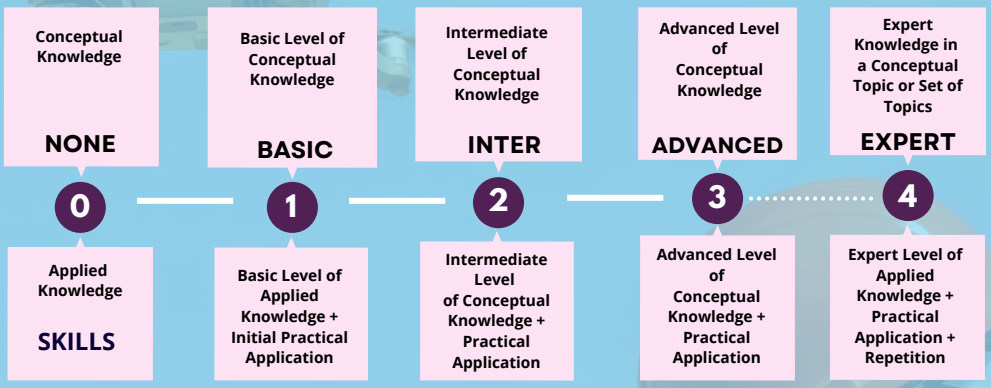
2022

1. Operation Management
2. Digitalisation
3. Engineering
4. Safety
5. Regulation and Safety

2021

1. Engineering
2. Safety
3. New or High Technology
4. Digitalisation
5. Aviation

Required Competency Level (RCL)



LEVEL	INDICATOR	DESCRIPTION
0	None	Denotes a lack of competence in a specific area or topic.
1	Basic	Denotes an understanding of fundamentals and some initial practical application.
2	Intermediate	Denotes a solid conceptual understanding and some practical application.
3	Advanced	Denotes significant conceptual knowledge and practical experience in performing a competency to a consistently high standard.
4	Expert	Denotes extensive knowledge, refined skills and prolonged experience in performing a defined competency at the highest standards.

INDSF DRONE TECHNOLOGY
INTRODUCTION

HRD Corp, an agency overseen by the Ministry of Human Resources (MOHR), has collaborated with MAIA and MRANTI to create IndSF Drone Technology for skills-based industries. In this inaugural edition, eight job positions have been identified and are listed below. The documents were then developed based on the job and skills description, considering the training programme needs for each job position.

Job Positions Covered

1. Drone Pilot
2. Drone Engineer
3. Drone Programmer
4. Drone Controller
5. Drone Technician
6. Drone Consultant
7. Drone Video Analyst
8. Drone Racer

Furthermore, the Required Competency Level (RCL) has been utilised to categorise competency levels for both soft and technical skills. This document is intended to serve as a national reference for individuals, employers, and training providers regarding the skills and competencies in demand. Its purpose is to enhance the employability rate in the industry.

The training programmes listed herein are carefully curated recommendations derived from the expertise of our Subject Matter Experts (SMEs), denoted by an asterisk (*).

DRONE PILOT

JOB DESCRIPTION

- Operate unmanned aerial vehicles (UAVs) safely and proficiently as per project requirements, including performing pre- and post-flight checks.
- Conduct thorough analysis to optimise drone performance, endurance, and reliability under various conditions.
- Create prototypes and conduct extensive testing to validate design concepts.
- Troubleshoot and resolve issues identified during testing phases.
- Work closely with cross-functional teams, including mechanical engineers, software developers, and project managers.
- Collaborate with software engineers to integrate control algorithms, navigation systems, and automation features into drone software to ensure seamless communication between hardware and software components.
- Stay abreast of industry regulations and ensure drone designs comply with local and international aviation standards.
- Work with regulatory bodies to obtain necessary certifications for drone products.
- Provide ongoing maintenance and support for drones, including developing maintenance schedules, performing preventive maintenance, and documenting maintenance activities.
- Generate detailed engineering documentation, including specifications, schematics, and test reports.
- Maintain accurate records of design changes and improvements.

PRE-REQUISITE

- Degree in Mechanical Engineering, Aerospace Engineering, Electrical Engineering, Computer Science, or a related field.
- Master's Degree preferred.

SKILLS & COMPETENCIES

Table A & B:

Lists of soft skills and technical skills required by drone engineers to meet the Required Competency Level (RCL) (Refer to page 11) followed by the training recommendation for each item.

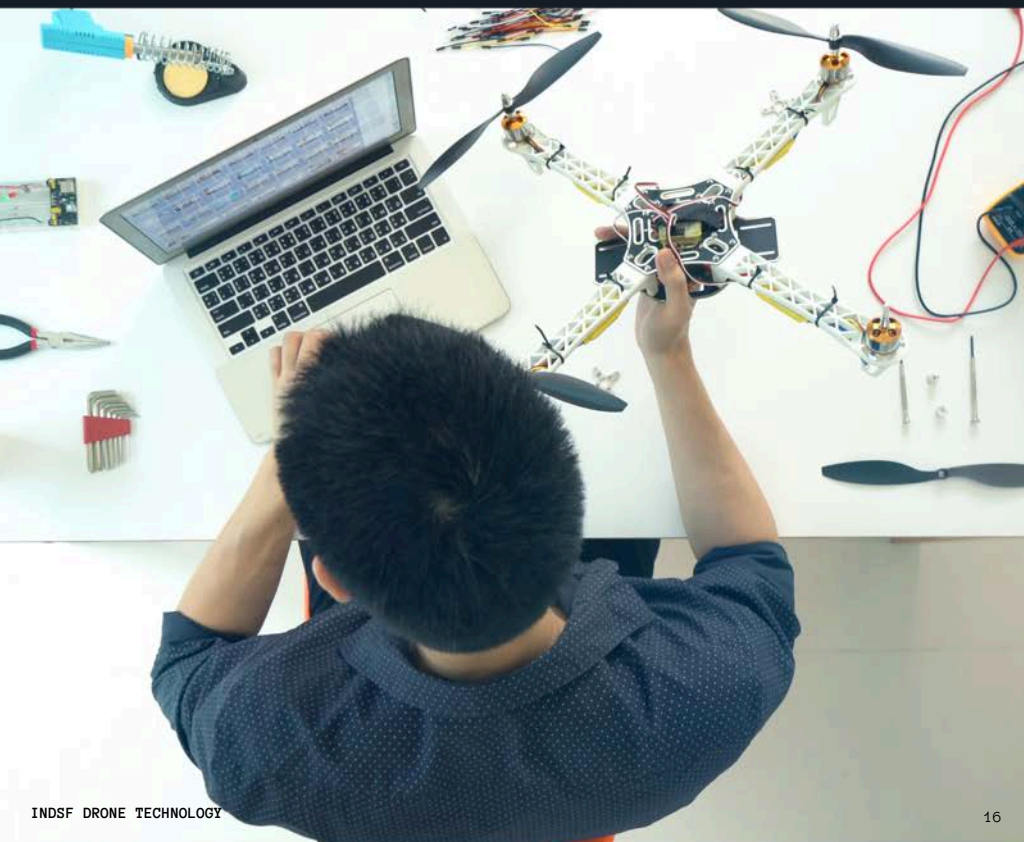
TABLE A: SOFT SKILLS

Soft Skills	Competency Level	Recommended Training
Communication	2	• Basic communication training
Teamwork	2	• Team building
Problem-solving	3	• Decision-making and conflict solution training
Time management	2	• Time management training

TABLE B: TECHNICAL SKILLS

Technical skills	Competency Level	Recommended Training
Basic maintenance	3	• SKM 2 Certificate of Maintenance*
Basic piloting skills	3	• CAAM RCoC-B* • Private Pilot Licensing (PPL)*
Safety and health	3	• Health and safety courses*
Safety and health management (first responder)	2	• First aid training*
Microsoft Office applications	3	• Basic Microsoft Office course*

DRONE ENGINEER



JOB DESCRIPTION

- Operate unmanned aerial vehicles (UAVs) safely and proficiently as per project requirements, including performing pre- and post-flight checks.
- Develop flight plans considering weather conditions, airspace restrictions, and safety measures.
- Ensure the accuracy and reliability of data collected during drone operations.
- Adhere to all aviation regulations, local laws, and company policies while staying updated with industry trends, regulations, and emerging technologies.
- Implement safety protocols to mitigate risks and prevent accidents during drone operations.
- Perform routine maintenance checks on drones and related equipment.
- Troubleshoot and address technical issues to ensure the proper functioning of equipment.
- Maintain accurate records of flight logs, mission details, and equipment maintenance.
- Report any incidents or accidents promptly and accurately.
- Maintain effective communication with team members, project managers, and clients.
- Provide regular updates on mission progress and address any concerns or issues promptly.
- Participate in ongoing training programmes to enhance skills and knowledge.

PRE-REQUISITE

- Minimum of 2 years continuous experience as a drone pilot or similar role with a minimum of 50 flying hours.
- Possession of a valid drone pilot license or certification is preferred.

SKILLS & COMPETENCIES

Table A & B:

Lists of soft skills and technical skills required by drone engineers to meet the Required Competency Level (RCL) (Refer to page 11) followed by the training recommendation for each item.

TABLE A: SOFT SKILLS

Soft Skills	Competency Level	Recommended Training
Problem-solving and troubleshooting skills	3	• On-the-job training / Train the trainer*
Strong communication and collaboration abilities	2	• Communication skills training
Attention to detail and a commitment to quality	2	• On-the-job training
Knowledge of regulatory requirements and safety standards for drone operations	2	• Safety courses*
Ability to analyse and interpret data from sensors and make informed decisions based on the results	3	• Analytical skills training

SKILLS & COMPETENCIES

TABLE B: TECHNICAL SKILLS

Technical Skills	Competency Level	Recommended Training
Strong knowledge of aerodynamics, robotics, control systems, and electronics	2	• Degree in Electric and Electronics*
Proficiency in programming languages such as C++, Python, and MATLAB	3	• Programming language courses*
Experience with drone hardware components, sensors, and flight controllers	3	• Drone maintenance courses*
Familiarity with software development for drones, including firmware, navigation algorithms, and data processing	2	• Specific technical training from distributor / manufacturer

DRONE PROGRAMMER

JOB DESCRIPTION

- Design, develop, and implement software systems for controlling and navigating drones.
- Collaborate with cross-functional teams to define software requirements and specifications.
- Develop and optimise flight control algorithms to ensure stability, accuracy, and safety in drone operations.
- Implement sensor fusion techniques for precise navigation and obstacle avoidance.
- Design and implement communication protocols for seamless interaction between drones and ground control systems.
- Ensure robust and secure data transmission for real-time monitoring and control.
- Implement computer vision and machine learning algorithms for object detection and recognition to enhance drone capabilities.
- Optimise software and algorithms for efficient resource utilisation, minimal power consumption, and real-time performance.
- Conduct thorough testing of drone software to identify and resolve bugs, ensuring reliability and performance.
- Collaborate with quality assurance teams to implement effective testing procedures.
- Interface with hardware components such as sensors, cameras, and actuators to ensure seamless integration with software systems.
- Collaborate with hardware engineers to optimise the overall drone system.
- Create and maintain comprehensive documentation for all software development processes, including code, algorithms, and system architecture.
- Keep abreast of the latest developments in drone technology, software engineering, and related fields.
- Propose and implement innovative solutions to enhance drone capabilities.

PRE-REQUISITE

- Bachelor's or Master's degree in Computer Science, Electrical Engineering, or a related field.

SKILLS & COMPETENCIES

Table A & B:

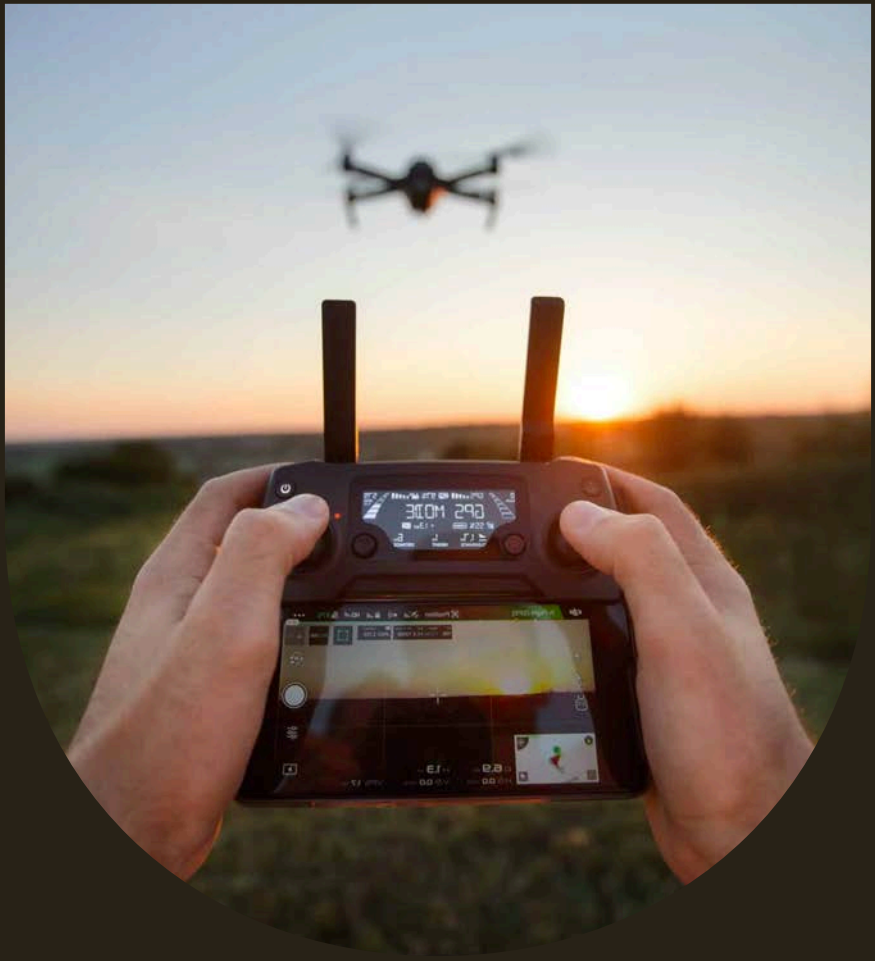
Lists of soft skills and technical skills required by drone engineers to meet the Required Competency Level (RCL) (Refer to page 11) followed by the training recommendation for each item.

TABLE A: SOFT SKILLS

Soft Skills	Competency Level	Recommended Training
Problem-solving and troubleshooting skills	3	• Critical thinking and problem-solving methodologies
Strong communication and collaboration abilities	2	• Communication skills training
Eagerness to stay updated on the latest advancements in drone technology, regulations, and industry trends	3	• On-the-job training

TABLE B: TECHNICAL SKILLS

Technical Skills	Competency Level	Recommended Training
Proficiency in programming languages such as C++, Python, and MATLAB	4	• CODEX Drone Robotics Workshops* • Robot Operating System (ROS) for Aerial Robotics*
Experience with drone software development kits (SDKs) and application programming interfaces (APIs), such as DJI SDK, PX4, or ArduPilot	4	• DIY Multicopter Drone Design, Build & Flying Workshop*
Familiarity with software development methodologies, version control systems (e.g., GIT), and issue tracking tools	4	• Specific technical training form distributor / manufacturer
Strong understanding of drone hardware components and their interactions with software systems	3	• CODEX Drone Robotics Workshops* • Robot Operating System (ROS) for Aerial Robotics* • DIY Multicopter Drone Design, Build & Flying Workshop*



DRONE CONTROLLER

JOB DESCRIPTION

- Meet with clients to understand their requirements, goals, and challenges by assessing their current operations and identifying areas where drone technology can provide value.
- Design and develop tailored drone solutions that address clients' specific needs.
- Stay updated on drone regulations and guidelines applicable to the client's industry and geographical location.
- Advise clients on legal requirements and help them obtain necessary licenses and permits for drone operations.
- Develop safety protocols and standard operating procedures to ensure compliance with industry standards.
- Conduct training sessions for clients and their staff members on drone operation, maintenance, and troubleshooting.
- Guide data collection, analysis, and interpretation using drone technology.
- Oversee the implementation of drone projects, ensuring they are delivered on time, within budget, and meet the client's objectives.
- Assist clients in analysing and interpreting data collected by drones by generating comprehensive reports and insights to support decision-making and process improvements.

PRE-REQUISITE

- Over 4 years of experience.
- Degree in Mechanical, Electrical and Electronics, Mechatronic and Aviation, or Aerospace.

SKILLS & COMPETENCIES

Table A & B:

Lists of soft skills and technical skills required by drone engineers to meet the Required Competency Level (RCL) (Refer to page 11) followed by the training recommendation for each item.

TABLE A: SOFT SKILLS

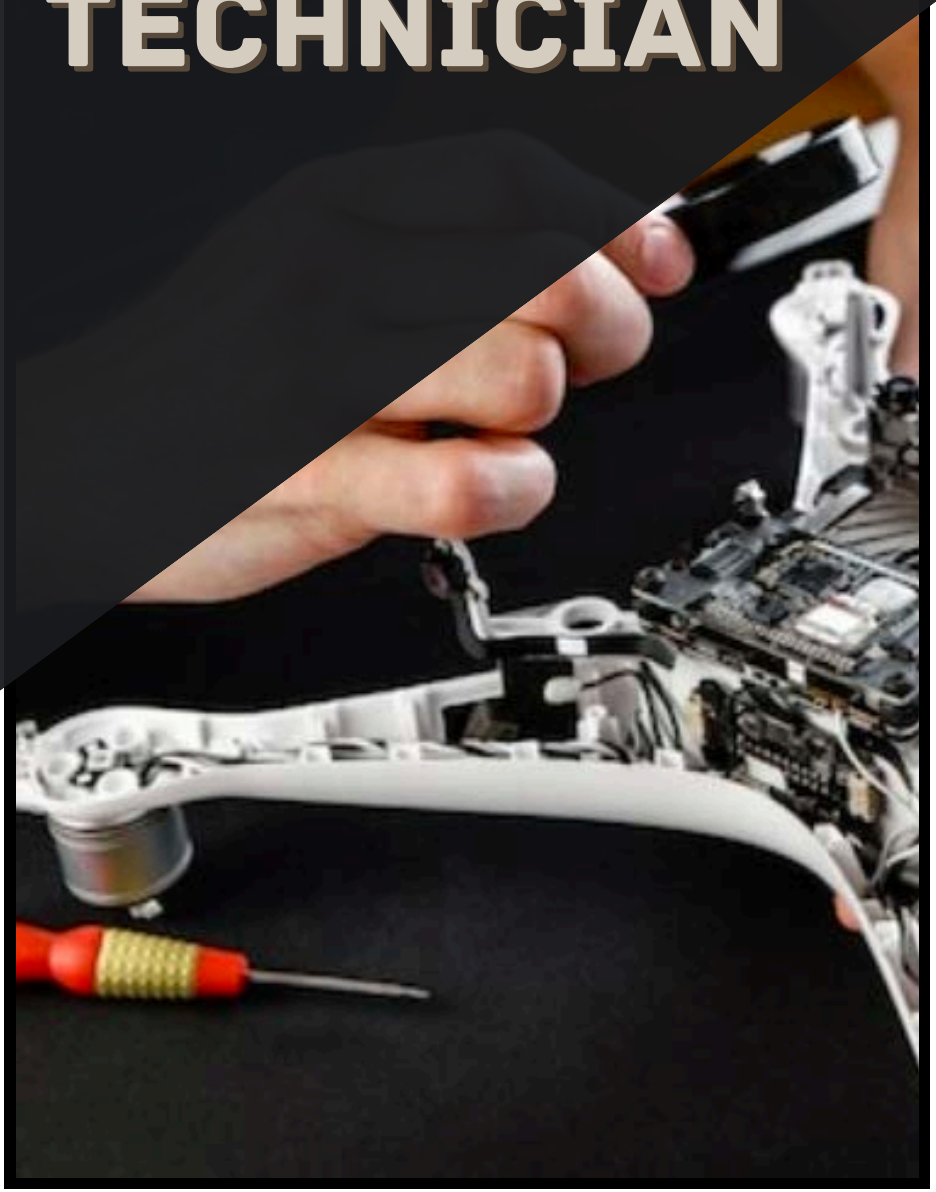
Soft Skills	Competency Level	Recommended Training
Communication	4	• Communication and business work ethics
Teamwork	4	• Team building
Meticulous scientific mindsets to test new solutions	4	• Kaizen and work improvement* • Analytical and problem solving
Able to read, speak, write, and understand English and Bahasa Malaysia	4	• Advanced English / Malay speaking and writing*
Able to learn quickly and operate with minimal oversight	4	• Critical and analytical skills
Prioritise and plan work activities	4	• Project management*

SKILLS & COMPETENCIES

TABLE B: TECHNICAL SKILLS

Technical Skills	Competency Level	Recommended Training
Knowledge of Mechanical / Aviation, Aerospace / Electrical and Electronics / Mechatronic	4	• Degree in Mechanical / Aviation, Aerospace / Electrical and Electronics / Mechatronic*
Safety and health management	4	• Advanced first aid training*
Mid-level or higher understanding of Microsoft Office applications	4	• Advanced Office 365 application*
Able to read, understand and interpret technical, mechanical, electronics and radio communication documentation	4	• Degree in Mechanical / Aviation, Aerospace / Electrical and Electronics / Mechatronics.
Able to write and verify technical reports	4	• Technical report writing*
Able to do resource planning for financial and manpower	3	• Basic budgeting • Resource planning
Performance assessment	3	• Performance assessment training

DRONE TECHNICIAN



JOB DESCRIPTION

- Conduct regular inspections and preventive maintenance on drones to ensure optimal performance.
- Diagnose and repair hardware and software issues promptly.
- Keep accurate records of maintenance activities and report any recurring problems.
- Investigate and resolve technical issues related to drone functionality, sensors, cameras, and communication systems.
- Collaborate with other technical teams to address complex problems and implement effective solutions.
- Stay abreast of industry regulations and industry advancements.
- Perform software updates and ensure that all drones run the latest firmware.
- Calibrate sensors, GPS, and other components to maintain accuracy and reliability.
- Implement quality control measures to ensure all drones meet industry standards.
- Conduct pre-flight and post-flight checks to verify proper functioning.
- Train drone operators on proper usage, troubleshooting techniques, and safety protocols.
- Develop and maintain comprehensive documentation for drone maintenance procedures.
- Work closely with engineering and development teams to provide drone design and performance feedback.
- Collaborate with logistics and operations teams to optimise drone deployment schedules.

PRE-REQUISITE

- Diploma in Mechanical Engineering, Aerospace Engineering, Electrical Engineering or a related field. Bachelor's degree is preferred.

SKILLS & COMPETENCIES

Table A & B:

Lists of soft skills and technical skills required by drone engineers to meet the Required Competency Level (RCL) (Refer to page 11) followed by the training recommendation for each item.

TABLE A: SOFT SKILLS

Soft Skills	Competency Level	Recommended Training
Communication	2	• Work organisation
Teamwork	2	• Team building
Meticulousness	2	• Kaizen and work improvement*
Able to read, speak, write, and understand English and Malay	2	• Basic English / Malay speaking and writing*
Able to learn quickly and operate with minimal oversight	2	• Critical and analytical skills

TABLE B: TECHNICAL SKILLS

Technical Skills	Competency Level	Recommended Training
Knowledge of Mechanical/Aviation, Aerospace / Electrical and Electronics / Mechatronic	2	• Diploma in Mechanical / Aviation, Aerospace / Electrical and Electronics / Mechatronic or SKM Level 2 Technology Electric*
Safety and health management	2	• Kaizen and work improvement*
Basic Microsoft Office applications	2	• Office 365 application*
Knowledge of electrical principles, using hand tools and measuring instruments	2	• Diploma in Mechanical / Aviation, Aerospace / Electrical and Electronics / Mechatronic or SKM Level 2 Technology Electric*

DRONE VIDEO ANALYST

JOB DESCRIPTION

- Analyse video footage captured by drones using specialised software and tools.
- Identify and track objects, patterns, anomalies, and other relevant data points within the video data.
- Extract valuable insights and observations from the video footage.
- Interpret video analysis results and translate them into meaningful and actionable information.
- Prepare clear and concise reports summarising key findings and observations.
- Collaborate with stakeholders to ensure that the insights derived from the video data are effectively communicated and understood.
- Work closely with drone operators, data scientists, and software engineers to optimise the video capture process and data collection methods.
- Collaborate with data analysts and domain experts to integrate drone video analysis into broader data analysis initiatives.
- Provide technical expertise and guidance to internal teams regarding best practices and technologies for video analysis.
- Keep abreast of advancements in video analysis techniques, drone technology, and regulatory requirements in the drone industry.
- Explore and evaluate emerging technologies and tools to improve drone video analysis capabilities.
- Ensure the accuracy and reliability of drone video analysis through quality control measures.
- Identify opportunities for process improvement and propose innovative solutions to enhance efficiency and effectiveness.

PRE-REQUISITE

- Trained in the basics of drone technology, including the components of a drone (frame, motors, flight controller, camera, etc.) and flight and video capture.

SKILLS & COMPETENCIES

Table A & B:

Lists of soft skills and technical skills required by drone engineers to meet the Required Competency Level (RCL) (Refer to page 11) followed by the training recommendation for each item.

TABLE A: SOFT SKILLS

Soft Skills	Competency Level	Recommended Training
Communication	3	• Communication and interpersonal problem-solving courses
Teamwork	2	• Team building
Meticulous and attention to detail	2	• Kaizen and work improvement*
Critical thinking and problem-solving skills	2	• Critical thinking and problem-solving courses
Adaptability	3	• Critical and analytical skills
Time management	3	• Time management courses*
Sportsmanship and integrity	3	• On-the-job training
Passion and enthusiasm	4	• On-the-job training
Perseverance and resilience	3	• On-the-job training

SKILLS & COMPETENCIES

TABLE B: TECHNICAL SKILLS

Technical Skills	Competency Level	Recommended Training
Video editing and analysis software	3	• Davinci Resolve editing training
Drone operation and technology	3	• UAV / UAS training programmes* • Professional drone pilot certification programmes* • Aviation and aerospace engineering courses* • Flight simulation training*
Computer vision and image processing	3	• OpenCV courses
Data analysis and interpretation	3	• Statistics and statistical analysis courses* • Data visualisation courses* • Data interpretation courses* • SQL and database courses
GIS and mapping tools	3	• Drone mapping courses
Data management and storage	3	• Data warehousing courses • Data storage and management courses • Data governance courses
Sensor fusion and integration	3	• Sensor fusion and designing courses

DRONE CONSULTANT

JOB DESCRIPTION

- Engage with clients to understand their business objectives and assess their requirements and constraints thoroughly.
- Assess the feasibility and potential benefits of integrating drone technology into their operations.
- Identify areas where drone technology can improve efficiency, reduce costs, or enhance safety.
- Stay abreast of local and international drone regulations.
- Advise clients on compliance requirements and assist in obtaining necessary permits.
- Develop safety protocols and standard operating procedures to ensure compliance with industry standards.
- Keep up to date with the latest advancements in drone technology.
- Evaluate and recommend appropriate drone platforms, sensors, and software solutions based on client needs.
- Develop project plans and timelines for drone implementation.
- Coordinate with internal and external teams to ensure successful project execution.
- Provide training sessions to clients on drone operation, maintenance, troubleshooting and data analysis.
- Create educational materials to enhance client understanding of drone technology.
- Oversee data collection using drones and analyse the obtained data for actionable insights.
- Generate comprehensive reports for clients detailing the impact of drone technology on their operations.

PRE-REQUISITE

- Bachelor's degree in a relevant field (e.g. Aerospace Engineering, Robotics, Computer Science, Geospatial Sciences).
- Proven experience in drone technology, including piloting and applications in various industries.
- In-depth knowledge of drone regulations and compliance requirements.

SKILLS & COMPETENCIES

Table A & B:

Lists of soft skills and technical skills required by drone engineers to meet the Required Competency Level (RCL) (Refer to page 11) followed by the training recommendation for each item.

TABLE A: SOFT SKILLS

Soft Skills	Competency Level	Recommended Training
Problem-solving and troubleshooting skills	3	• Critical thinking and problem solving methodologies
Communication and collaboration abilities	3	• Interpersonal business communication and teamwork
Attention to detail and a commitment to quality	3	• Quality assurance and quality control*
Knowledge of regulatory requirements and safety standards for drone operations.	4	• CAAM RCoC-B*
Experience in managing drone projects from initiation to completion	4	• Project management*
Knowledge of industry-specific challenges and requirements	4	• Industry-specific drone courses
Ability to build and maintain strong relationships with clients, vendors, and stakeholders	3	• Procurement management courses

SKILLS & COMPETENCIES

TABLE B: TECHNICAL SKILLS

Technical Skills	Competency Level	Recommended Training
In depth understanding of drone platforms, sensors, software and their application across various industries	4	• **Specific technical training from distributor / manufacturer**
Proficiency in programming languages such as C++, Python, and MATLAB	**1**	• **Programming language***
Experience with drone hardware components, sensors, and flight controllers	**3**	• **Specific technical training from distributor / manufacturer** • **CAAM RCoC-B***
Familiarity with software development for drones, including firmware, navigation algorithms, and data processing	**3**	• **Specific technical training from software distributor / manufacturer**

DRONE RACER

JOB DESCRIPTION

- Utilise advanced piloting skills to control racing drones, manoeuvre through racecourses, and execute challenging aerial manoeuvres with precision and speed.
- Prepare racing drones for competition by configuring flight controllers, optimising performance, and ensuring all equipment is in top working condition.
- Develop and execute effective race strategies, including selecting optimal racing lines, taking advantage of track features, and making split-second decisions to maximise speed and performance.
- Quickly identify and address technical issues with racing drones, including troubleshooting flight control systems, motors, and other components to maintain peak performance during races.
- Continuously improve skills through regular training and practice sessions, experimenting with different racing techniques, and staying updated with the latest trends and innovations in drone racing.
- Adhere to safety protocols and regulations during races to ensure the well-being of other racers, spectators, and property. Follow local aviation regulations and guidelines for drone operation.
- Participate in local, regional, national, and international drone racing events, representing a team and competing with a focus to achieve top rankings and podium finishes.
- Perform regular maintenance and repairs on racing drones, including replacing damaged components, updating firmware, and ensuring the equipment's overall reliability and performance.
- Engage with the drone racing community by attending events, collaborating with other racers, sharing knowledge and experiences, and promoting the sport through social media or other channels.
- Establish relationships with sponsors, promote their brands through racing activities, and represent sponsor's interests professionally.

PRE-REQUISITE

- Experience in flying remote-controlled (RC) aircraft and controlling a vehicle in three-dimensional space is crucial.
- Trained in handling basic components of a drone, including frame, motors, propellers, flight controller, and electronic speed controllers (ESCs).
- Basic understanding of aerodynamics and how it applies to drone flight.
- Understand how FPV systems work. This includes the FPV camera, video transmitter, receiver, and goggles. Trained in the different frequency bands and channels used in FPV racing.

SKILLS & COMPETENCIES

Table A & B:

Lists of soft skills and technical skills required by drone engineers to meet the Required Competency Level (RCL) (Refer to page 11) followed by the training recommendation for each item.

TABLE A: SOFT SKILLS

Soft Skills	Competency Level	Recommended Training
Communication	3	• Communication and interpersonal problem solving courses
Teamwork	2	• Team building
Meticulous and attention to detail	2	• Kaizen and work improvement*
Critical thinking and problem-solving skills	3	• Critical thinking and problem-solving courses
Adaptability	3	• Critical and analytical skills
Time management	3	• Time management courses*
Sportsmanship and integrity	3	• On-the-job training
Passion and enthusiasm	4	• On-the-job training
Perseverance and resilience	3	• On-the-job training

SKILLS & COMPETENCIES

TABLE B: TECHNICAL SKILLS

Technical Skills	Competency Level	Recommended Training
Drone piloting	4	• Drone racing licenses*
Flight controller configuration	4	• UAV / Drones training programmes* • Aviation and aerospace engineering programmes*
Drone tuning	4	• UAV / Drones training programmes*
Propeller selection	4	• UAV / Drones training programmes* • Aviation and aerospace engineering programmes*
Battery management	3	• Drone pilot certification programmes* • DIY electronics and drone building courses • Manufacturer-specific resources
Video transmission systems	3	• UAV / UAS training programmes* • Professional drone pilot certification programmes. • Digital imaging and signal processing courses*
Technical troubleshooting	3	• Electronics and electrical engineering courses* • Manufacturer-specific training • General troubleshooting courses • DIY drone building and repair workshops
Racing software and timing systems	4	• Sports event management courses • Timing system Manufacturers • Networking and IT courses • DIY electronics and Arduino / Raspberry Pi projects
Knowledge of racing regulations	3	• Aviation law courses*

ABBREVIATIONS & SYMBOLS

- **(*)** Certification Programmes
- **CAAM RCoC-B** CAAM Remote Pilot Certificate of Competency Basic
- **PPL** Private Piloting License
- **ROS** Robot Operating Systems
- **CODEX** Programming Language
- **UAV / UAS** Unmanned Aircraft System
- **SQL** Structured Query Language

SOURCES

- **Internal Data by HRD Corp, 2022 - 2023.**
- **https://www.trade.gov/market-intelligence/malaysia-aerospace-and-defense-drone-market-taking**