AIRCRAFT ACCIDENT

FINAL REPORT

A 05/25

Air Accident Investigation Bureau (AAIB)

Ministry of Transport, Malaysia

Accident Involving Airbus Helicopter AS355N,
Registration 9M-PHG, at Sungai Pulai, Gelang Patah, Johor
on 10 July 2025

Air Accident Investigation Bureau
Ministry of Transport
No.26, Jalan Tun Hussein, Precinct 4
Federal Government Administrative Centre
62100 PUTRAJAYA
Phone: +603-8892 1072
Hotline: +603-8892 8080
E-mail: AAIB@mot.gov.my
Website: http://www.mot.gov.my/en

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AIR ACCIDENT INVESTIGATION BUREAU (AAIB)
MALAYSIA

FINAL REPORT NO: A 05/25

OPERATOR	**: ROYAL MALAYSIAN POLICE**
AIRCRAFT TYPE	**: AIRBUS HELICOPTER AS355N**
STATE OF REGISTRATION	**: MALAYSIA**
REGISTRATION	**: 9M-PHG**
PLACE OF OCCURRENCE	**: SUNGAI PULAI, GELANG PATAH, JOHOR**
DATE AND TIME	**: 10 JULY 2025 AT 1015 LT (0215 UTC)**

The sole objective of the investigation is the prevention of accidents and incidents. In accordance with Annex 13 to the Convention on International Civil Aviation, it is not the purpose of this investigation to apportion blame or liability.

*** Note: All times in this report are Local Time (LT) unless stated otherwise.**
LT is Coordinated Universal Time (UTC) + 8 hours.

INTRODUCTION

The Air Accident Investigation Bureau (AAIB) is the authority responsible for investigating air accidents and incidents in Malaysia, operating under the Ministry of Transport. The AAIB's mission is to promote aviation safety through independent and objective investigations into air accidents and serious incidents.

All investigations by the AAIB are conducted in accordance with Annex 13 to the Convention on International Civil Aviation (ICAO Annex 13) and the Civil Aviation Regulations 2016. It is important to note that AAIB reports are not intended to apportion blame or determine liability, as neither the investigations nor the reporting processes are designed for those purposes. The sole objective of this investigation and the Final Report is the prevention of accidents and incidents.

In accordance with ICAO Annex 13, the accident was notified to ADREP ICAO, CAAM and Bureau d'Enquêtes et d'Analyses pour la sécurité de l'aviation civile (BEA) as the State Design and Manufacture, on 12 July 2025. The Preliminary Report was submitted on 14 August 2025 to ADREP, CAAM, the aircraft operator and the BEA. The Draft Final Report was sent on 25 May 2026 to these organisations, inviting significant and substantiated comments.

The AAIB extends its deepest appreciation to Airbus Helicopter Malaysia and Safran Helicopter Engines for their valuable technical assistance in the investigation of this accident.

Unless otherwise indicated, recommendations in this report are addressed to the investigating or regulatory authorities of the State responsible for the matters concerning the recommendations. It is up to those authorities to decide what actions to take.

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ABBREVIATIONS

AAIB	Air Accident Investigation Bureau
AD	Airworthiness Directives
ADREP	Accident/Incident Data Reporting
AMO	Approved Maintenance Organisation
AOC	Air Operator Certificate
ATC	Air Traffic Controller
BEA	Bureau d'Enquêtes et d'Analyses pour la sécurité de l'aviation civile
CAAM	Civil Aviation Authority of Malaysia
CAD	Civil Aviation Directive
CAR	Civil Aviation Regulations of Malaysia
C of A	Certificate of Airworthiness
C of R	Certificate of Registration
CPL	Commercial Pilot License
CRM	Crew Resource Management
CRS	Certificate of Release to Service
CVR	Cockpit Voice Recorder
FDR	Flight Data Recorder
FTX	Field Training Exercise
ICAO	International Civil Aviation Organisation
JHB	Johor Bahru / Senai International Airport IATA Code
LALT	Low Altitude / Terrain-related occurrence
LLA	Layang-Layang Aerospace Sdn. Bhd.
LT	Local Time
MEDEVAC	Medical Evacuation
MITSATOM	Multilateral Nuclear Security Detection Exercise
MMEA	Malaysian Maritime Enforcement Agency
MOR	Mandatory Occurrence Reporting
MOT	Ministry of Transport
MRO	Maintenance, Repair and Overhaul
PGU	*Pasukan Gerakan Udara*
PIC	Pilot in Command

PLPGU	*Pangkalan Latihan Pasukan Gerakan Udara*/PGU Training Centre.
RMP / PDRM	Royal Malaysia Police / *Polis Diraja Malaysia*
SAR	Search and Rescue
SB	Service Bulletins
Sdn. Bhd.	*Sendirian Berhad*
SIC	Second-in-Command
SMS	Safety Management System
SOP	Standard Operating Procedures
SR	Safety Recommendation
UTC	Coordinated Universal Time
VMC	Visual Meteorological Conditions
WMKJ	Senai International Airport ICAO Code

SYNOPSIS

On 10 July 2025, at approximately 0225 UTC, a Royal Malaysia Police (RMP) Airbus Helicopters AS355N, registration 9M-PHG, was involved in an accident during an aerial demonstration for the MITSATOM 2025 Field Training Exercise (FTX). The aircraft departed from Tanjung Kupang Police Station under Visual Meteorological Conditions (VMC). During the final phase of the display near Muara Laut Jetty, the helicopter executed a pitch-up and 180-degree steep turn, descending rapidly into the water.

The aircraft sustained substantial structural damage and sank. All five occupants (three crew and two passengers) were rescued with serious injuries and transported to Hospital Sultanah Aminah. The main wreckage was recovered on 17 July 2025.

The aircraft operator submitted a Mandatory Occurrence Report (MOR) to the Civil Aviation Authority of Malaysia (CAAM) and the Air Accident Investigation Bureau, Malaysia (AAIB). The AAIB investigation team was deployed on 10 July 2025 and is investigating to determine the cause of the accident in accordance with ICAO Annex 13 protocols.

1.0 FACTUAL INFORMATION

1.1 History of the Flight

An RMP Airbus Helicopters AS355N Écureuil II (registration 9M-PHG, serial number 5620), operated by the Pasukan Gerakan Udara (PGU) Semenanjung Base, in Subang, was tasked with conducting an aerial demonstration as part of the FTX for the MITSATOM 2025, held from 8 July to the culminating event on 10 July 2025. The demonstration took place near the Malaysian Maritime Enforcement Agency (MMEA) Muara Laut Jetty, Sungai Pulai, Gelang Patah, Johor.

The planned flight profile involved coordinated aerial manoeuvres simulating operational deployment scenarios in support of the exercise, forming the concluding segment of the display sequence. A partial rehearsal was conducted on 8 July, followed by two full rehearsals on 9 July 2025.

On 10 July 2025, the helicopter departed Tanjung Kupang Police Station under visual meteorological conditions (VMC) and proceeded to the designated demonstration area over Sungai Pulai. The aircraft executed a series of manoeuvres, including low-level passes and coordinated positioning with participating vessels.

At approximately 0225 UTC, during the final phase of the display, the helicopter pitched up more than 60 degrees, executed a 180-degree steep turn and nose-down descent in preparation for the concluding manoeuvre. This specific manoeuvre was not planned or briefed and was initiated with insufficient airspeed, altitude and energy. The aircraft entered an over-vertical climb, followed by a yaw rotation at low airspeed and subsequently an unrecoverable descent.

The impact caused substantial structural damage to the fuselage, resulting in the detachment of several panels and components which were subsequently recovered by police personnel. The main fuselage sank rapidly with only minor debris remaining visible.

The helicopter was carrying five occupants: two pilots, one air crew member and two police personnel. All were promptly rescued by nearby vessels participating in the exercise but there was a significant delay in transferring to Hospital Sultanah Aminah, Johor Bahru for medical treatment due to no ambulance physically present at exercise area.

Loose components recovered from the site have been preserved for investigation. The main wreckage which remained submerged for seven days, was later salvaged.

1.2 Injuries to Persons

Injuries	Crew	Passengers	Others	Total
Fatal	NIL	NIL	NIL	NIL
Serious	03	02	NIL	05
Minor/None	NIL	NIL	NIL	NIL

1.3 Damage to Aircraft

A general visual inspection was carried out to assess and identify the damage to the aircraft after the salvage operations. The helicopter was destroyed due to impact on water (Refer to Figure 1).

Windshield Frame

Door and Composite Fairings

Fuselage Panels

Seats and Composite Fairings

Figure 1: Debris (Windshield Frame, Seats, Fuselage Panels and Composite Fairings) detached and recovered floating within 30 to 40 metre radius of the primary impact point.

1.4 Other Damage

No damage was sustained to any objects other than the aircraft.

1.5 Personnel Information

1.5.1 Pilot 1

Status	Pilot in Command (PIC)
Nationality	Malaysian
Age	46 years old
Gender	Male
License Type	CPL 5806/H
License Validity	Valid until 28 February 2026
Aircraft Rating	AS355N
Instrument Rating	Nil
Total Hours on Type	1430.0 hrs
Total Flying Hours	1525.5 hrs
Rest Period Since Last Flight	More than 12 hours
Medical Certificate Class	1
Medical Expiry Date	17 February 2026

1.5.2 Pilot 2

Status	Second in Command (SIC)
Nationality	Malaysian
Age	46 years old
Gender	Male
License Type	CPL 3577/H
License Validity	Valid until 30 June 2026
Aircraft Rating	AW139 and AS355N
Instrument Rating	Valid until 30 Nov 2025 (AW139)
Total Hours on Type	1716.4 hours
Total Flying Hours	2120.0 hrs
Rest Period Since Last Flight	More than 12 hours
Medical Certificate Class	1
Medical Expiry Date	16 June 2026

Both pilots hold a valid license. Neither pilot had flown for more than 43 days before the occurrence.

1.6 Aircraft Information

Aircraft Type	Airbus Helicopter
Manufacturer	Airbus
Year of Manufacture	1996
Owner	Royal Malaysia Police (PDRM)
Registration No.	9M-PHG
Aircraft Serial No.	5620
C of A Expiry Date	01 February 2026
C of R Expiry Date	15 June 2026

The aircraft is an Airbus AS355N, manufactured in 1996 and owned by the RMP. It was in active service with 7,895 total hours. Maintenance records indicate it was

maintained according to regulations by Layang-Layang Aerospace (LLA). Critically, the aircraft flight manual states it is **not certified for aerobatic flight**.

1.7 Meteorological Information

The weather was reported to be cloudy with cloud base at 1500 feet during the time of accident took place. Nevertheless, no adverse weather was reported, and weather conditions were not considered contributory to the occurrence.

1.8 Aids to Navigation

Not applicable.

1.9 Communications

All communication frequencies were operating normally.

1.10 Aerodrome Information

The flight operation was conducted outside the aerodrome vicinity. The nearest airport to the operational area is Senai International Airport, located approximately 13 nautical miles from the site of operation.

Airfield	Senai International Airport
Runway	16 / 34
Length	3,800 meters (12,467 feet)
Width	45 meters, plus 15-meter paved shoulders
ICAO Designator	WMKJ
IATA Designator	JHB
Elevation	41 meters (135 feet) above mean sea level

1.11 Flight Recorders

No onboard data recording system was installed on the helicopter to determine the flight control inputs and their corresponding effects during the accident.

1.12 Wreckage and Impact Information

1.12.1 Accident Site Overview and Surrounding

As illustrated in Figure 2, the accident area was located within the Sungai Pulai waterway, approximately 150 metres southwest of the Muara Laut Jetty at the MMEA Gelang Patah base. The site, marked by the broken yellow line, lies within the MMEA Gelang Patah vicinity indicated by the thick yellow line. The surrounding environment comprises a tidal river channel approximately 250–300 metres wide, flanked by mangrove shorelines to the north and south.

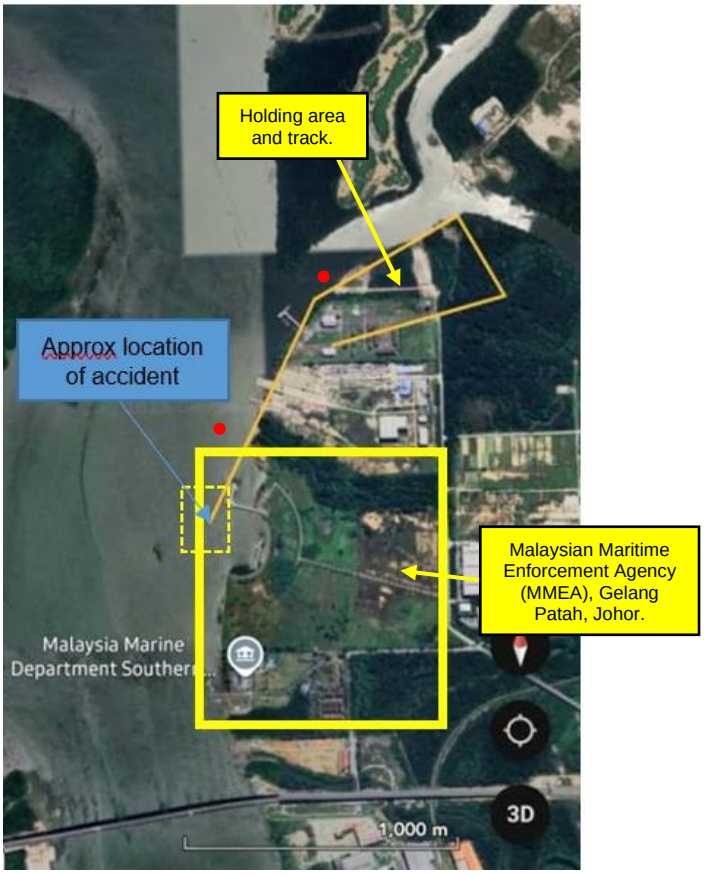


Figure 2: Accident site and MMEA vicinity in Sungai Pulai, Gelang Patah, Johor.

(Source: Google Earth)

The helicopter's final flight path during the demonstration brought it over the river, aligned roughly east-west, at low altitude. The impact occurred during the concluding manoeuvre with the aircraft in forward flight, pitch up and descending.

1.12.2 Impact Dynamics and Wreckage Distribution

The main fuselage struck the water surface at a shallow angle and forward speed, creating a primary impact depression in the water. Due to the fluid nature of the surface, no lasting "impression" marks remained but debris dispersion and floating panel locations indicated the point of initial contact.

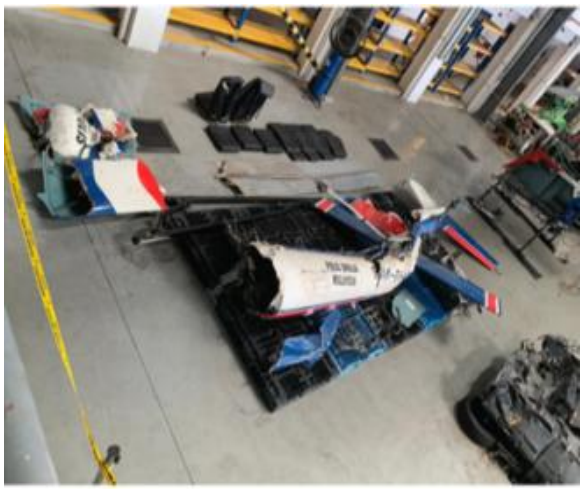
Upon impact, the helicopter's structure sustained substantial damage:

i) Several seats, fuselage panels and composite fairings were detached and recovered floating within a 30 to 40 metre radius of the primary impact point.

ii) The main wreckage sank almost immediately after impact and came to rest fully submerged at an estimated depth of between 14 and 17 metres, depending on tidal conditions (ranging from 14 metres at low tide to 17 metres at high tide).

iii) Recovered debris included seats, fuselage skin panels, access hatches and minor fairing components.

Main wreckage



Tail boom

Instrument panel

Centre pedestal

Figure 3: The main airframe and flight instrument panel recovered from Sungai Pulai during salvage operations on 17 July 2025.

1.13 Medical and Pathological Information

Following the accident, both pilots, crew and passengers were transported to Hospital Sultanah Aminah, Johor Bahru, where they received immediate medical treatment, including the administration of medication. Due to the urgency of the medical intervention, the standard post-accident toxicology screening was inadvertently not performed. As a result, no toxicology data or associated laboratory results are available for inclusion in this investigation report.

No other relevant post-accident medical findings have been reported to the investigation team.

1.14 Fire

There was no evidence of fire before or after the impact.

1.15 Survival Aspects

The helicopter impacted the water during recovery from manoeuvre at low height and insufficient speed. The impact resulted in substantial structural damage and serious injuries to all five occupants (two pilots, one aircrew member and two police personnel).

Evidence indicated that none of the crew members or passengers was wearing life jackets at the time of the accident. Although life-saving jackets were available onboard, inspection revealed that the life jackets were found to have exceeded their mandatory servicing intervals. While all occupants were promptly rescued by nearby participating vessels, the subsequent transfer to Hospital Sultanah Aminah, Johor Bahru, was delayed because no ambulance was stationed at the exercise site.

1.16 Tests and Research

No tests or additional technical analyses were conducted.

1.17 Organisational and Management Information

1.17.1 Aircraft Operator

The PGU Semenanjung Base, in Subang, is the Royal Malaysia Police's (RMP) principal air operations unit for Peninsular Malaysia. It provides aerial support for law enforcement, including surveillance, search and rescue (SAR), medical evacuation (MEDEVAC), disaster response and rapid deployment of personnel and special missions across Malaysia. Operating a mixed fleet of helicopters and fixed-wing aircraft, the unit plays a key role in enhancing national security and emergency response capabilities.

At the time of the occurrence, helicopter 9M-PHG was temporarily deployed to operate from the Tanjung Kupang Police Station in support of the MITSATOM 2025, an FTX coordinated under the Atomic Energy Department (Malaysia).

PGU's operations are conducted in accordance with the Civil Aviation Regulations of Malaysia (CAR 2016) where applicable, complemented by the RMP's internal operational directives and manufacturer-recommended procedures. Maintenance of PGU aircraft is undertaken by Layang-Layang Aerospace Sdn. Bhd. (LLA), an Approved Maintenance Organisation (AMO), in full compliance with regulatory requirements and manufacturer specifications.

While the aircraft is operated by the RMP for law enforcement and national security missions, it is currently held under civil registration.

According to **Article 3 of the Chicago Convention**, aircraft used in police services are classified as **State Aircraft**: The use of a civil regulatory framework (CAR 2016) for an aircraft performing state functions created a gap where the mission requirements (tactical displays) were not supported by the governing civil regulations.

1.17.2 Maintenance Operator

LLA serves as the appointed Maintenance, Repair and Overhaul (MRO) organisation responsible for the continued airworthiness of helicopter 9M-PHG under the operational control of PGU. As an AMO, LLA's role and responsibilities include:

i) Scheduled Maintenance - Performing inspections, servicing and component replacements at intervals prescribed by the aircraft manufacturer, the Civil Aviation Regulations of Malaysia (CAR 2016) and the approved maintenance programme.

ii) Unscheduled Maintenance - Addressing technical defects, rectifications and troubleshooting activities arising from operational use to ensure the aircraft is returned to service in a safe and airworthy condition.

iii) Regulatory Compliance: Ensuring all maintenance activities are executed in accordance with Malaysian Civil Aviation Authority (CAAM) requirements, applicable Airworthiness Directives (ADs), Service Bulletins (SBs), and manufacturer's instructions.

iv) Record Keeping: Maintaining complete, accurate and up-to-date maintenance records, including work orders, logbooks and inspection reports to establish traceability and demonstrate regulatory compliance.

v) Airworthiness Release: Certifying the aircraft as serviceable and airworthy upon completion of maintenance tasks through the issuance of a Certificate of Release to Service (CRS) by appropriately licensed personnel.

vi) Coordination with Operator Liaising with PGU to schedule maintenance events, provide technical recommendations and ensure that operational availability requirements are met without compromising safety. Through these responsibilities, LLA ensures that 9M-PHG remains airworthy, compliant with all regulatory standards and fit for operational deployment.

1.18 Additional Information

1.18.1 Torque Turn Manoeuvre and Operational Factor.

Video evidence indicates the helicopter performed an advanced aerobatic manoeuvre, assessed to be a torque turn. A torque turn is an advanced manoeuvre to quickly complete a 180° change in direction of flight. The manoeuvre begins with a pitch upwards to reduce forward airspeed followed by an application of power to increase altitude. As airspeed decreases, aerodynamic stability is reduced, and the increased torque induces yaw. This yaw is used to initiate the turn which continues until the helicopter is facing the opposite direction. Once the turn is complete, the pilot regains airspeed, eases out of the dive and resumes level flight in the new direction.

Based on visual interpretation of the available video, the accident sequence was initiated at a remarkably low altitude and differed from previously rehearsed flight profiles. The pilot executed a steep pull-up that resulted in an over-vertical climb and a rapid depletion of forward airspeed. At or near the apex of the climb, with minimal forward speed, the aircraft completed a yaw rotation of up to 180 degrees and subsequently entered a steep descent. A recovery was attempted; however, the helicopter possessed insufficient height and kinetic energy to arrest the descent and regain airspeed prior to impact.

Torque turns operate at the margins of the helicopter’s performance envelope and carry a high degree of risk if entered with inadequate height or energy. The

investigation noted that torque turns were outside the scope of the operator's training syllabus, meaning there were no formalized procedures defined in the training materials for conducting them. The absence of a defined procedure places the reliance on the pilot to become the risk control.

In this case there was an increase in risk as the manoeuvre was conducted at a height that reduced the available safety margin and limited the opportunity for recovery when the helicopter entered an undesired state. By contrast, if the manoeuvre had been initiated at a higher altitude, the increased height would have provided more time for the pilot to identify, intervene and recover from the undesired aircraft state.

In addition, the aircraft was not certified for aerobatic flight, and the operation was conducted in non-compliance with CAAM Civil Aviation Directive 2 – Rules of the Air.

1.18.2 Non-Compliant Survival Equipment Servicing Status

Below is the list of survival equipment carried on board 9M-PHG during the accident at Sungai Pulai on 10 July 2025 that had exceeded its mandatory servicing intervals:

NO	ITEM	PART NUMBER	DATE OF LAST SERVICE	DATE DUE FOR NEXT SERVICE	REMARKS
1	LIFE JACKET	A323100a00 (1118854)	Nov 2023	Nov 2024	-
2	LIFE JACKET	A323100a00 (1118004)	Nov 2023	Nov 2024	-
3	LIFE JACKET	A323100a00	Nov 2023	Nov 2024	Part number not visible due to wear and tear
4	LIFE JACKET	A323100a00	Nov 2023	Nov 2024	This life jacket was not returned to the Flight Readiness Store.

1.19 Useful or Effective Investigation Techniques

The investigation relied on multiple visual sources, including videos recorded by witnesses at the scene, footage provided by the event organiser, and aerial imagery

captured by the Royal Malaysia Police (RMP), which offered a comprehensive bird's-eye view of the crash site.

These materials were systematically reviewed and analysed, enabling investigators to reconstruct the sequence of events and accurately identify the manoeuvre executed by the pilot in command. The combined perspectives provided enhanced situational awareness, allowing for a more precise assessment of the aircraft's flight path, altitude profile, and handling prior to impact.

2.0 ANALYSIS

The purpose of this analysis is to identify contributing factors and underlying causes, and to propose safety recommendations aimed at reducing the likelihood of recurrence and mitigating human error in future operations.

2.1 Sequence of Events

The accident resulted from the execution of an 'advanced aerobatic manoeuvre' (torque turn) initiated with insufficient airspeed, altitude and total energy, leaving inadequate safety margins for the subsequent flight path. The steep pull-up into an over-vertical climb caused rapid depletion of forward airspeed and placed the helicopter in a low-energy regime where aerodynamic control effectiveness, particularly yaw authority, was significantly reduced. The subsequent 180-degree yaw rotation was conducted under these degraded conditions, after which the aircraft entered a descent with insufficient height and energy available for recovery.

Contributing to the loss of control was a deviation from previously rehearsed manoeuvre profiles, suggesting differences in energy management and control inputs compared to practiced sequences. The operation of a helicopter not certified for aerobatic flight, together with non-compliance with applicable regulatory requirements, further compounded the risk by placing the aircraft outside its approved operating envelope. Collectively, the combination of inadequate entry conditions, high-risk manoeuvre execution in a low-energy state and insufficient recovery margins led to an unrecoverable situation.

2.2 Aircraft Performance and Certification Considerations

The Airbus Helicopters Airbus Helicopters AS355N Écureuil II is not certified for aerobatic flight, and aerobatics are explicitly prohibited under PGU SOP for AS 355N/F2, Chapter 7, Paragraph 16(ii) - (Refer to Appendix E). Despite this, the manoeuvre conducted exceeded the aircraft's certified flight envelope, requiring performance margins beyond its design limitations.

Operating outside these limitations significantly reduced safety margins for energy management and recovery. Once the aircraft entered a low-energy state, the lack of available performance reserves severely limited the ability to regain controlled flight or arrest the descent, substantially increasing the risk of loss of control and making recovery unlikely.

2.3 Handling Proficiency and Recency

Both pilots had not flown for more than 43 days prior to the occurrence, which was not in accordance with the requirements stipulated in PGU Training Manual Part 3, Section 1, Paragraph 1.8 (Refer to Appendix D). This lapse in flying activity indicates a loss of currency, rendering both pilots not current and therefore requiring a check flight with a qualified type-rated aircraft captain before resuming operational duties.

Additionally, both pilots were staff officers and not permanently based at the PGU Semenanjung Base, which may have further limited their recent exposure to unit-specific flying practices and operational flying tempo. The combination of lapse recency and limited routine operational flying is likely to have degraded handling proficiency and fine motor control. In this context, the excessive pull-up into an over-vertical attitude is consistent with "rusty handling," resulting in overcontrol in pitch, accelerated airspeed decay, and deviation from the intended manoeuvre profile, thereby reducing overall control margins during a critical phase of flight.

2.4 Human Factors Analysis

2.4.1 Lack of Communication

The accident was further influenced by deficiencies in decision-making, planning and crew coordination. The manoeuvre was neither planned nor briefed and deviated from previously rehearsed profiles, reflecting inadequate operational judgement and risk assessment. The absence of a proper crew briefing prevented the SIC from effectively monitoring or intervening during the manoeuvre, resulting in a breakdown of shared situational awareness among the crew. Consequently, the helicopter entered an uncontrolled attitude without the full awareness or coordinated response of the remaining crew members.

2.4.2 Complacency

The unplanned and unbriefed manoeuvre is indicative of a complacent attitude towards safety protocols. This is supported by video footage from the preceding day showing a different running-in profile, suggesting that the crew may have underestimated the risks associated with the operating environment.

2.4.3 Lack of Knowledge

The pilot’s execution of a low-level lateral pull-up indicates an inadequate appreciation of the risks associated with a torque turn at low height, particularly where entry height is insufficient. This lack of specific technical and risk awareness is considered to have contributed to the inappropriate control inputs applied during the attempted recovery.

2.4.4 Lack of Teamwork

Deficiencies in crew coordination and Crew Resource Management (CRM) contributed to the occurrence. The unbriefed manoeuvre and lack of communication between the pilots prevented the establishment of shared situational awareness, agreed parameters and effective monitoring by the SIC. Consequently, essential CRM defences, including mutual cross-checking, challenge-and-response and timely

intervention, were not effectively applied, reducing the crew's ability to detect and arrest the progression of the unsafe manoeuvre.

2.4.5 Fatigue

Both pilots were medically fit and had obtained more than eight hours of rest prior to the flight. Accordingly, fatigue is not considered a contributing factor in this occurrence.

2.4.6 Lack of Resources

The presence of an untrained, ad hoc Ground Controller called at the last minute meant there was no adequately qualified authority to effectively monitor or coordinate the flying activity from the ground or to enforce safe operating procedures. This lack of appropriate supervisory competence reduced the ability to identify and intervene in unsafe practices, allowing them to persist unchecked.

2.4.7 Pressure

The nature and requirements of the event did not impose any operational pressure on the pilot to execute the manoeuvre. Accordingly, pilot pressure is not considered a contributing factor in this occurrence.

2.4.8 Lack of Assertiveness

Proceeding with an unbriefed, unplanned torque turn manoeuvre at low entry speed reflects a lack of pilot assertiveness in enforcing safe operating limits. Rather than rejecting or aborting the manoeuvre when minimum energy and height criteria were not met, the pilot continued despite clear performance shortfalls. This misjudgement reduced the window for corrective action, leaving insufficient altitude and energy for recovery and significantly increasing the risk of an uncontrolled descent.

2.4.9 Lack of Awareness

The accident involved a degradation of situational awareness and energy management during an unbriefed torque turn conducted with insufficient airspeed and height. The continuation of the manoeuvre despite deteriorating conditions is consistent with plan continuation bias, reflecting misjudgement of the aircraft's energy state and recovery margins. The absence of defined parameters and escape criteria removed key safeguards, forcing real-time decision-making in a high-workload environment. As airspeed decayed and altitude reduced, the crew had insufficient time and margin to recognise or recover from the developing energy deficit, leading to an unrecoverable descent.

2.4.10 Norms

The inconsistent flying profile observed during rehearsals the day prior to the occurrence suggests a normalisation of deviance, where deviations from Standard Operating Procedures (SOPs) had gradually become accepted practice, as indicated by witness statements. This erosion of procedural compliance reflects operational drift, resulting in weakened safety discipline and reduced adherence to established safeguards.

Consequently, when a flight control deviation occurred during the accident sequence, the lack of strict SOP compliance and disciplined operational conduct reduced the crew's capacity to effectively recognise, manage, and recover from the developing situation, ultimately contributing to the undesired outcome.

2.5 Operational, Organisational and Regulatory Factors

Several operational, organisational and regulatory weaknesses were identified.

2.5.1 Regulatory Non-Compliance

From a regulatory perspective, the aircraft registered as 9M-PHG was operated in non-compliance with paragraph 3.7.1 to CAAM Civil Aviation Directive 2 - Rules of the Air, which stipulates that acrobatic flight shall only be conducted under prescribed

conditions and with appropriate authorisation and/or air traffic clearance. In this occurrence, there was no evidence that the manoeuvre was authorised or that the required conditions and approvals were met, constituting a breach of regulatory requirements and removal of a key safety barrier.

i) **Misalignment of Aircraft Status**: The investigation finds that operating 9M-PHG under a civil registration - while it performed the functions of a State Aircraft as defined by the Chicago Convention - contributed to the lack of specialised oversight.

ii) **Regulatory Oversight Gap**: Because the aircraft was not registered as a State Aircraft, there was no dedicated **Civil Aviation Directive (CAD)** tailored to police tactical missions. This led to the pilot executing manoeuvres that exceeded civil flight envelopes without the appropriate state-level risk assessment or authorization.

iii) The aircraft, being civil registered (9M-PHG), was operated in non-compliance with CAAM Civil Aviation Directive 2 - Rules of the Air during this occurrence.

iv) The ‘advanced’ manoeuvre was conducted without evidence of:

a. Approval from the appropriate authority.
b. Required conditions being met.
c. Relevant air traffic services clearance.

2.5.2 Pre-Event Planning

From a pre-event planning perspective, no dedicated and proper mass briefing was conducted despite the involvement of both an aircraft and vessels, resulting in reduced hazard awareness and coordination among participants.

2.5.3 Operational Control

From an operational control perspective, the manoeuvre was neither part of a briefed flight profile nor an approved exercise as stipulated in PGU SOP for AS 355N/F2, Chapter 7, Paragraph 16(ii). In addition, there was inadequate enforcement of the aircraft's non-aerobatic operational limitations.

2.5.4 Safety Management System

From safety management system perspective, the absence of a fully implemented SMS across all bases of PGU, with implementation currently limited to the Training Centre in Ipoh represents a significant gap in alignment with ICAO Annex 19 safety requirements. The absence of SMS coverage at other operational bases reduces the organisation's ability to systematically identify hazards, assess and manage risks, and ensure consistent enforcement of SOPs and operational limitations.

This gap weakens safety oversight and standardisation across units, leading to variability in practices and reduced control of operational risk. Consequently, it increases exposure to operational drift, normalisation of deviance and ineffective hazard reporting, thereby constraining the organisation's overall safety assurance and continuous improvement capability.

2.5.5 Rehearsal Deviation

The deviation from previously rehearsed manoeuvre profiles removed a key risk mitigation barrier that would normally provide consistency in control inputs, energy management, and recovery actions. Rehearsed profiles help stabilise crew expectations and reduce cognitive workload by ensuring predictable execution under high-risk conditions. In this accident, departing from those established parameters increased variability in manoeuvre execution and required greater real-time decision-making under high workload.

This loss of procedural consistency likely degraded situational awareness and reduced the crew's ability to accurately anticipate aircraft behaviour and manage energy state

effectively. It also weakened cross-checking and coordination, increasing the likelihood of control misjudgement during a critical phase of flight. Overall, the absence of a standardised, rehearsed profile reduced safety margins and contributed to the progression toward an unstable and unrecoverable flight condition.

2.6 Barrier Analysis

The occurrence involved the breakdown of multiple safety barriers across several layers of the system. These included:

i) Regulatory barrier due to non-compliance with CAAM Civil Aviation Directive 2 - Rules of the Air requirements for acrobatic flight.

ii) Certification barrier as the aircraft was not approved for aerobatic operations.

iii) Operational barrier reflecting insufficient oversight and enforcement of applicable limitations.

iv) While the human performance barrier was weakened by reduced pilot recency and associated degradation in handling proficiency.

v) A further safety assurance barrier was also compromised due to expired safety equipment onboard.

vi) The deviation from previously rehearsed profiles further eroded system defences by removing an important layer of operational consistency and risk mitigation.

3.0 CONCLUSION

3.1 Findings

The findings of the investigation are as follows:

3.1.1 Operational and Organisational

i) Both pilots were qualified and medically fit.

ii) Both pilots had not conducted any flight operations for more than 43 days prior to the occurrence (with their last flights recorded on 26 May 2025 and 22

May 2025, respectively). This was not in accordance with the requirements stipulated in PGU Training Manual Part 3, Section 1, Paragraph 1.8.

iii) Both pilots reported no abnormalities or malfunctions of the helicopter on the day of the occurrence.

iv) The manoeuvre was unplanned, unbriefed, and performed in an aircraft not certified for aerobatics.

v) The manoeuvre was initiated with insufficient energy (airspeed and altitude) for safe completion.

vi) No mass briefing was conducted for all exercise participants (aerial and maritime).

vii) There was no evidence of operational control measures to prevent unauthorised aerobatic manoeuvres by PGU.

viii) Onboard safety equipment had exceeded servicing validity.

ix) The civil registration status was not fully aligned with the specialised nature of the flight profiles conducted.

x) Toxicology screening for substance abuse and blood alcohol content analyses were not conducted.

xi) There was no effective crew coordination, as the manoeuvre was not briefed.

xii) The maintenance records indicated that the aircraft is equipped and maintained in accordance with existing regulations and approved procedures except for survival equipment.

3.1.2 Maintenance Operator

The maintenance operator, LLA, is a CAAM-approved MRO organisation. LLA is authorised to provide comprehensive aircraft and component maintenance, as well as airworthiness-related services.

3.1.3 Safety Equipment

Safety equipment was available onboard; however, all the life jackets had exceeded their servicing validity, indicating deficiencies in safety management and oversight processes.

3.1.4 Regulatory Compliance: Misalignment of Aircraft Status

The investigation finds that operating 9M-PHG under a civil registration - while it performed the functions of a State Aircraft as defined by the Chicago Convention - contributed to the lack of specialised oversight.

3.1.5 Regulatory Oversight Gap:

i) As the aircraft was not classified as a State Aircraft, no dedicated Civil Aviation Directive (CAD) existed for police tactical or operational missions. Consequently, manoeuvres exceeding the civil flight envelope were conducted without the necessary state-level authorisation or formal risk assessment.

ii) The aircraft, being civil registered (9M-PHG), was operated in non-compliance with CAAM Civil Aviation Directive 2 - Rules of the Air during this occurrence.

iii) The 'advanced' manoeuvre was conducted without evidence of:

a. Approval from the appropriate authority.
b. Required conditions being met.
c. Relevant air traffic services clearance.

3.1.6 Safety Management System

As PGU aircraft are civil-registered, the limited implementation of an SMS, currently confined to the Training Centre in Ipoh, indicates non-alignment with ICAO Annex 19 requirements.

3.2 Cause/Contributing Factors

3.2.1 Cause

Execution of an unplanned 'advanced' manoeuvre with insufficient airspeed, altitude, and energy, leading to an unrecoverable descent.

3.2.2 Contributing Factors

Based on the circumstances described in the occurrence, the contributing factors reflect a combination of human performance limitations, operational breakdowns and systemic deficiencies that collectively reduced available safety margins.

i) **Degraded handling proficiency due to lack of recency** was a significant human factor. Both pilots had not flown for more than 43 days prior to the occurrence, resulting in reduced psychomotor currency and diminished precision in high-workload manoeuvring. This degradation likely contributed to overcontrol during the steep pull-up phase, leading to an excessive pitch attitude and accelerated energy loss at a critical stage of flight.

ii) **Deviation from rehearsed profiles** further compounded the situation. Although a similar manoeuvre had been practised during rehearsals, the profile executed during the occurrence differed in execution parameters. This removed the stabilising effect of procedural familiarity and increased variability in pilot input, reducing predictability and increasing the likelihood of exceeding safe flight margins.

iii) **Lack of crew coordination and briefing** significantly weakened crew resource management. The manoeuvre was unplanned and not briefed to all crew members, limiting shared situational awareness and eliminating opportunities for challenge, cross-checking or intervention. This reduced the effectiveness of the multi-crew safety net during a high-risk manoeuvre.

iv) **Conduct of manoeuvre outside aircraft certification limits** introduced a fundamental performance constraint. The aircraft, an Airbus Helicopters AS355N Écureuil II, is not certified for aerobatic flight. As such, the manoeuvre was executed beyond the aircraft’s approved flight envelope, reducing structural and aerodynamic safety margins and increasing susceptibility to loss of control during low-energy flight conditions.

v) **Regulatory non-compliance** further removed an essential layer of safety control. The operation was not in compliance with CAAM Civil Aviation Directive 2 – Rules of the Air, which requires prescribed conditions and appropriate authorisation for acrobatic flight. The absence of evidence of such approval indicates that a critical regulatory barrier intended to control high-risk manoeuvres was not in place.

vi) **Inadequate operational oversight** contributed to the occurrence by allowing an unapproved manoeuvre to be conducted without effective intervention or enforcement of operational limitations. This reflects weaknesses in supervision and the absence of effective controls to ensure adherence to approved flight profiles.

vii) **Deficiencies in safety management** were evident. These included inadequate assurance that safety-critical constraints were being observed and weaknesses in ensuring readiness of safety equipment, which was found to be beyond servicing validity. Collectively, these deficiencies indicate that organisational safety processes were insufficient to detect, prevent or mitigate the unsafe conditions that developed.

3.2.3 Occurrence Category

The accident is coded as **Low Altitude / Terrain-related occurrence (LALT)**.

4.0 SAFETY RECOMMENDATIONS

A safety recommendation is for the purpose of preventive action and shall in no case create a presumption of blame or liability.

4.1 It is recommended that the Civil Aviation Authority of Malaysia (CAAM), in coordination with Pasukan Gerakan Udara (PGU), formalize the operational framework of PGU aircraft performing state functions in accordance with Article 3 of the Chicago Convention. CAAM should establish clear regulatory mechanisms—potentially utilizing Civil Aviation Directive (CAD) 6004—to define, authorize, and oversee specialized flight envelopes required for tactical and operational state

missions, ensuring they are subject to dedicated risk control boundaries distinct from standard civil constraints. (AAIB Recommendation SR A05/25-1).

4.2 It is recommended that CAAM develop and implement a mandatory 'Special Authorization' framework for all low-level aerial displays and tactical demonstrations conducted within civil-controlled airspace. This process must explicitly mandate the submission of a comprehensive, documented safety risk assessment—aligned with CAD 19 (Safety Management)—establishing strict entry parameters, minimum energy/altitude criteria, and pre-briefed escape manoeuvres prior to flight.
(AAIB Recommendation SR A05/25-2).

4.3 It is recommended that Pasukan Gerakan Udara (PGU) systematically expand and fully implement its Safety Management System (SMS) across all operational bases, moving beyond its centralization at the Ipoh Training Centre. This implementation must focus on standardizing hazard identification, mitigating the normalisation of deviance in flight profiles, and ensuring uniform adherence to operational limitations unit wide. (AAIB Recommendation SR A05/25-3).

4.4 It is recommended that PGU upgrade its internal safety assurance and oversight infrastructure to strictly comply with CAD 19 and CAD 6801 (Continuing Airworthiness of Aircraft). PGU must establish a foolproof, digitally logged tracking system for all onboard life-saving and survival equipment to guarantee that mandatory inspection, servicing, and replacement intervals are strictly monitored, preventing expired safety critical gear from being deployed on active aircraft.
(AAIB Recommendation SR A05/25-4).

4.5 It is recommended that PGU implement an absolute operational gatekeeper system within its flight scheduling operations. This system must automatically flag and aircrew members who exceed the 28-day recency threshold stipulated in the PGU Training Manual, strictly mandating a formalized check flight with a qualified type-rated aircraft captain before the individual can be assigned to act as operating crew.
(AAIB Recommendation SR A05/25-5).

5.0 COMMENTS TO THE REPORT AS REQUIRED BY ICAO ANNEX 13 PARAGRAPH 6.3

As required by ICAO Annex 13, paragraph 6.3, the draft Final Report was sent to the State of Occurrence (CAAM), State of Registry/Operator (PGU) and State of Manufacture/Design (BEA), inviting their significant and substantiated comments on the report. The following is the status of the comments received: -

States/Organisations	Status of Significant and Substantiated Comments
CAAM	No comments.
PGU	Report received and no Comments.
BEA	Report received and no comments.

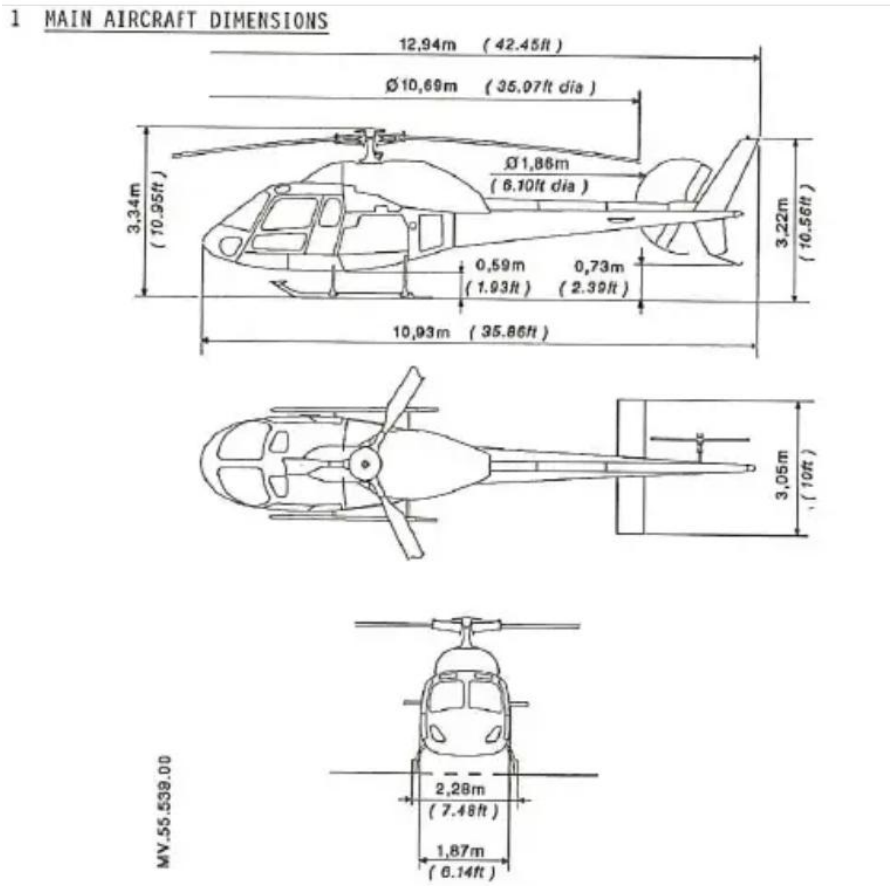
CONCLUDING STATEMENT

This report presents the findings of the investigation into the accident involving 9M-PHG, with a primary focus on identifying safety factors and areas for improvement. It is emphasized that these findings and recommendations are not intended to assign blame or liability to any individual or organisation but to enhance safety and prevent recurrence. By addressing the identified issues and implementing the proposed recommendations, stakeholders can strengthen operational safety, improve system reliability, and uphold the highest standards of aviation safety.

INVESTIGATOR IN-CHARGE
Air Accident Investigation Bureau
Ministry of Transport Malaysia

APPENDIX A

AIRCRAFT AS 355N GENERAL DIMENSION



Overall dimensions of helicopter

- Overall length, rotor turning	12.94 m	42.45 ft
- Main rotor diameter	10.69	35.07
- Height to top of fin, high type L/G*	3.22	10.56
- Length, blades folded	10.93	35.86
- Width, blades folded	3.05	10.01
- Height to rotor head, high type L/G*	3.34	10.96
- Ground clearance below cabin, high type L/G*	0.59	1.93
- Width of landing gear (high type)	2.28	7.48
- Width of landing gear (low type)	2.17	7.12
- Length of fuselage	10.93	35.86

* Less 0.20 m (0.65 ft) when aircraft equipped with low type L/G

APPENDIX B

CERTIFICATE OF AIRWORTHINESS 9M-PHG

PIHAK BERKUASA PENERBANGAN AWAM MALAYSIA
CIVIL AVIATION AUTHORITY OF MALAYSIA

PERAKUAN KESELAMATAN TERBANG
CERTIFICATE OF AIRWORTHINESS

Tanda-Tanda Kenegaraan Dan Pendaftaran *Nationality and Registration Marks*	Pembuat dan Nama Sebutan Kapal Udara *Manufacturer and Manufacturer's Designation of Aircraft*	Nombor Siri Kapal Udara *Aircraft Serial Number*
9M-PHG	EUROCOPTER FRANCE AS355 N	5620

Kategori *Category*: **PART 27- NORMAL CATEGORY ROTORCRAFT**

Perakuan Keselamatan Terbang ini dikeluarkan menurut Konvensyen Penerbangan Awam Antarabangsa bertarikh 7 Disember 1944 dan Akta Penerbangan Awam 1969 dan peraturan-peraturan yang dikeluarkan di bawahnya, untuk kapal udara yang tersebut di atas yang didapati layak untuk terbang jika disenggarai dan dikendalikan menurut peraturan-peraturan yang tersebut, dan had-had penerbangan yang bersabit.

This Certificate of Airworthiness is issued pursuant to the Convention on International Civil Aviation dated 7 December 1944 and with the Civil Aviation Act 1969 and regulations issued thereunder, in respect of the above-mentioned aircraft, which is considered to be airworthy if maintained and operated in accordance with the foregoing regulations and the pertinent operating limitations.

Tarikh dikeluarkan *Date of issue*: **02-Feb-2025**

Tarikh Tamat Tempoh *Date of Expiry*: **01-Feb-2026**

AIR 13
DATO' CAPTAIN NORAZMAN BIN MAHMUD
b/p Pihak Berkuasa Penerbangan Awam Malaysia
for Civil Aviation Authority of Malaysia

Tiada apa-apa jua tulisan atau catatan boleh dibuat dalam Perakuan ini kecuali oleh Pihak Berkuasa Penerbangan Awam Malaysia.
No entries or endorsement may be made in this Certificate except by Civil Aviation Authority of Malaysia.

MALAYSIA
NOISE CERTIFICATE

Document Number: **NC/2023/46**

Nationality and Registration Marks	*Manufacturer and Manufacturer's Designation of Aircraft*	*Aircraft Serial Number*
9M-PHG	**AIRBUS HELICOPTERS AS 355 N**	**5620**

Engine Type/ Model	*Propeller Type/ Model*
SAFRAN HELICOPTER ENGINES / ARRIUS 1A	**N/A**

Maximum Take-Off Mass	*Maximum Landing Mass*	*Noise Certification Standard*
2,600 KG	**2,600 KG**	**CHAPTER 8 (8.4.1)**

Additional modifications incorporated for the purpose of compliance with the applicable noise certification Standards

NIL

Lateral/ Full-Power Noise Level	*Approach Noise Level*	*Flyover Noise Level*	*Overflight Noise Level*	*Take-Off Noise Level*
N/A	**92.9 EPNL**	**N/A**	**86.7 EPNL**	**89.0 EPNL**

Remarks **AS PER TCDSN EASA.R.146 ISSUE 4 (EASA RECORD. D78)**

This noise certificate is issued pursuant to Volume 1 of Annex 16 to the Convention on International Civil Aviation and regulation 44 of Civil Aviation Regulations 2016, in respect of the above-mentioned aircraft, which is considered to comply with the indicated noise Standard when maintained and operated in accordance with the relevant requirements and operating limitations.

Date of Issue
01 DEC 2023

AIR 12
DATO' CAPTAIN NORAZMAN BIN MAHMUD
for CIVIL AVIATION AUTHORITY OF MALAYSIA

Tiada apa-apa jua tulisan atau catatan boleh dibuat dalam Perakuan ini kecuali oleh Pihak Berkuasa Penerbangan Awam Malaysia.

APPENDIX C

CERTIFICATE OF REGISTRATION 9M-PHG

CAAM/AW/7101-00 250423

PIHAK BERKUASA PENERBANGAN AWAM MALAYSIA
CIVIL AVIATION AUTHORITY OF MALAYSIA

No. Perakuan / *Certificate No.*: AR/17/163

PERAKUAN PENDAFTARAN
CERTIFICATE OF REGISTRATION

1. Tanda-Tanda Kenegaraan dan Pendaftaran *Nationality and Registration Marks*	2. Pembuat dan Nama Sebutan Kapal Udara *Manufacturer and Manufacturer's Designation of Aircraft*	3. Nombor Siri Kapal Udara *Aircraft Serial Number*
9M-PHG	EUROCOPTER FRANCE AS355 N	5620

4a. **Dikeluarkan Kepada:** / *Issued To:* KETUA SETIAUSAHA KEMENTERIAN DALAM NEGERI

Asas Pendaftaran: / *Basis of Registration:*

- ☒ **Pemilikan Kapal Udara** / *Ownership of Aircraft*
- ☐ **Pengendali Kapal Udara** / *Operator of Aircraft*
- ☐ **Lain-lain (Nyatakan):** / *Other (Explain):*

4b. **Alamat Pemegang Perakuan:** / *Address of Certificate Holder:*
KEMENTERIAN DALAM NEGERI
(BAHAGIAN BEKALAN F), TINGKAT5, BANGUNAN AMDB
NO. 1, JALAN LUMUT, BEG BERKUNCI 11042
50400
W.P. KUALA LUMPUR
MALAYSIA

5. **Nama dan Alamat Pemunya, Jika Berbeza dengan Pemegang Perakuan:**
Name and Address of Owner, If Different from Certificate Holder:

6. **Adalah dengan ini diperakui bahawa kapal udara yang diperihalkan di atas telah dimasukkan ke dalam Daftar Kapal Udara menurut Konvensyen Penerbangan Awam Antarabangsa bertarikh 7 Disember 1944 dan Akta Penerbangan Awam 1969, dan peraturan-peraturan yang dikeluarkan di bawahnya.**

It is hereby certified that the above described aircraft has been duly entered on the Aircraft Register in accordance with the Convention on International Civil Aviation dated 7 December 1944 andwith the Civil Aviation Act 1969 and regulations issued thereunder.

AIR 14
CAPTAIN NORAZMAN BIN MAHMUD
bip Pihak Berkuasa Penerbangan Awam Malaysia
for Civil Aviation Authority of Malaysia

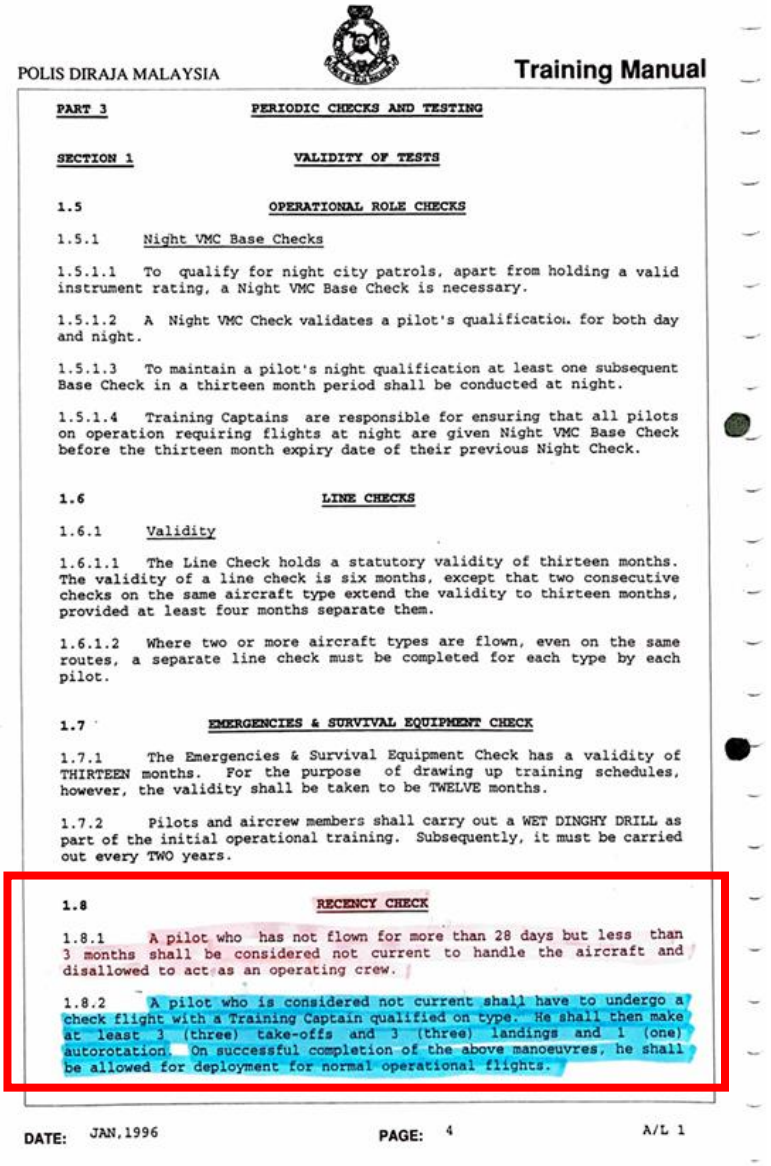
Tarikh Dikeluarkan: / *Date of Issue:* 02-JUN-2023
Tempoh Sah Laku: / *Validity Period:* 16-JUN-2023 — 15-JUN-2026

7. **Catatan:** / *Remarks:* NIL

Tiada apa-apa jua tulisan atau catatan boleh dibuat dalam Perakuan ini kecuali oleh Pihak Berkuasa Penerbangan Awam Malaysia
No entries or endorsement may be made in this Certificate except by Civil Aviation Authority of Malaysia

APPENDIX D

PGU TRAINING MANUAL
REGARDING PILOT FLYING CURRENCY



POLIS DIRAJA MALAYSIA

Training Manual

PART 3 PERIODIC CHECKS AND TESTING

SECTION 1 VALIDITY OF TESTS

1.5 OPERATIONAL ROLE CHECKS

1.5.1 Night VMC Base Checks

1.5.1.1 To qualify for night city patrols, apart from holding a valid instrument rating, a Night VMC Base Check is necessary.

1.5.1.2 A Night VMC Check validates a pilot's qualification for both day and night.

1.5.1.3 To maintain a pilot's night qualification at least one subsequent Base Check in a thirteen month period shall be conducted at night.

1.5.1.4 Training Captains are responsible for ensuring that all pilots on operation requiring flights at night are given Night VMC Base Check before the thirteen month expiry date of their previous Night Check.

1.6 LINE CHECKS

1.6.1 Validity

1.6.1.1 The Line Check holds a statutory validity of thirteen months. The validity of a line check is six months, except that two consecutive checks on the same aircraft type extend the validity to thirteen months, provided at least four months separate them.

1.6.1.2 Where two or more aircraft types are flown, even on the same routes, a separate line check must be completed for each type by each pilot.

1.7 EMERGENCIES & SURVIVAL EQUIPMENT CHECK

1.7.1 The Emergencies & Survival Equipment Check has a validity of THIRTEEN months. For the purpose of drawing up training schedules, however, the validity shall be taken to be TWELVE months.

1.7.2 Pilots and aircrew members shall carry out a WET DINGHY DRILL as part of the initial operational training. Subsequently, it must be carried out every TWO years.

1.8 RECENCY CHECK

1.8.1 A pilot who has not flown for more than 28 days but less than 3 months shall be considered not current to handle the aircraft and disallowed to act as an operating crew.

1.8.2 A pilot who is considered not current shall have to undergo a check flight with a Training Captain qualified on type. He shall then make at least 3 (three) take-offs and 3 (three) landings and 1 (one) autorotation. On successful completion of the above manoeuvres, he shall be allowed for deployment for normal operational flights.

DATE: JAN,1996 PAGE: 4 A/L 1

APPENDIX E

PGU STANDARD OPERATING PROCEDURES FOR HELICOPTER AIRBUS AS 355N

14 ELECTRICAL AND HYDRAULIC POWER SYSTEMS LIMITATIONS

14.1 Hydraulic system

14.1.1 Fluid use

Specifications ---------- MIL-H-83282 (recommended)

---------- MIL-H-5606 (AIR3520)

14.1.2 Hydraulic System Pressure

14.1.2.1 Nominal pressure---------- 35 bar

14.1.2.2 Low pressure warning light comes on at ------ 24 bar

In flight the warning light must be off

14.2 Electrical System

14.2.1 Maximum voltage ---------- 32V

14.2.2 Maximum current ---------- 150 A per generator

15 LANDING AND STOPPING LIMITATIONS ON SLOPES

i. Nose-up ----------10"

ii. Nose-down ---------- 6"

iii. Sideways ---------- 8"

16 RESTRICTIONS

The following are prohibited

i. Flying in icing conditions

ii. Aerobatics

iii. Intentional landing in full autorotation

17 MINIMUM CREW

One pilot, in starboard seat.

18 TRANSPORT OF PERSONNEL

Number of persons carried 6 maximum (pilot included)

19 OPTIONAL EQUIPMENT LIMITATIONS

If optional equipment items are installed they may involve additional, specific limitations (See Section SUPPLEMENTS).