AIRCRAFT SERIOUS INCIDENT FINAL REPORT

SI 04/22P

Air Accidents Investigation Bureau (AAIB)

Ministry of Transport Malaysia

Serious Incident Involving a Diamond DA42

Registration 9M-HMY

at Langkawi International Airport (WMKL)

on the 8 August 2022

Air Accident Investigation Bureau
Ministry of Transport
No.26, Jalan Tun Hussein, Precinct 4
Federal Government Administrative Centre
62100 PUTRAJAYA
Phone: +603-8892 1072
Fax: +603-8888 0163
E-mail: AAIB@mot.gov.my
Website: http://www.mot.gov.my/en

Issued on 28 July 2023
MOT. (S).600-5/4/90

FINAL REPORT SI 04/22P

AIR ACCIDENTS INVESTIGATION BUREAU (AAIB)
MALAYSIA

SERIOUS INCIDENT REPORT NO.: SI 04/22

OPERATOR	**: HM AEROSPACE**
AIRCRAFT TYPE	**: DIAMOND DA42**
NATIONALITY	**: MALAYSIA**
REGISTRATION	**: 9M-HMY**
PLACE OF OCCURRENCE	**: LANGKAWI INTERNATIONAL AIRPORT (WMKL)**
DATE AND TIME	**: 8 AUGUST 2022 AT 1055 LT**

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

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

INTRODUCTION

The Air Accidents Investigation Bureau of Malaysia

The Air Accidents Investigation Bureau (AAIB) is the air accident and serious incident investigation authority in Malaysia and is accountable to the Minister of Transport. Its mission is to promote aviation safety through the conduct of independent and objective investigations into air accidents and serious incidents.

The AAIB conducts these investigations in accordance with ICAO's Annex 13 to the Chicago Convention, the Civil Aviation Act of Malaysia 1969 and the Civil Aviation Regulations of Malaysia 2016.

It is inappropriate that AAIB reports should be used to assign fault or blame or determine liability, since neither the investigations nor the reporting processes has been undertaken for that purpose.

In accordance with ICAO Annex 13 paragraph 4.1, notification of the serious incident was sent out on 16 August 2022 to the Civil Aviation Safety Investigation Authority, Austria as the State of Design and Manufacture. A copy of the Preliminary Report was subsequently submitted to the Operator on 5 October 2022.

Unless otherwise indicated, recommendations in this report are addressed to the investigating or regulatory authorities of the State having responsibility for the matters with which the recommendations are concerned. It is for those authorities to decide what action is to be taken.

TABLE OF CONTENTS

ABBREVIATIONS

AAIB	Air Accidents Investigation Bureau
AFRS	Airport Fire and Rescue Services
ATC	Air Traffic Control
Avtur	Aviation Turbine
ELT	Emergency Locator Transmitter
GH	General Handling
LT	Local Time
METAR	Meteorological Aerodrome Report
MGW	Maximum Gross Weight
MRO	Maintenance Repair & Overhaul
OEM	Original Equipment Manufacturer
OKTA	Meteorological scale of cloud cover measured in eighths
POB	Persons on Board
RT	Radio Telephony
VHF	Very High Frequency
WMKL	ICAO Code for Langkawi International Airport
UTC	Universal Time Coordinated

SYNOPSIS

On 8 August 2022, a Diamond DA42 from a local flight training academy bearing registration 9M-HMY experienced a runway excursion at Langkawi International Airport (WMKL). The aircraft had 2 persons on board (POB).

9M-HMY which was carrying out circuit and landing exercises had just landed on the runway centreline when it suddenly veered off to the right before coming to a rest on the grass verge of Runway 03. Both the occupants were uninjured.

The AAIB Chief Inspector was notified within the hour and an investigation team was dispatched the next day.

1.0 FACTUAL INFORMATION

1.1 History of the Flight

On 8 August 2022 at approximately 1035 LT, an instructor and his student took off for a General Handling (GH) sortie at a local training area. However, due to adverse weather that was fast approaching the intended training area, a decision was made to carry out circuit work first before proceeding to the area once the adverse weather had passed.

On the final approach during a second circuit, the student at the controls felt that there was a crosswind component of wind from the right. He applied the 'crabbing technique' to correct for the crosswind component according to the training academy procedures that were taught to him.

Just before touchdown the student applied left rudder and managed to land on the centreline but the aircraft began to start veering off to the right even though he had started to apply more left rudder to maintain the aircraft on the runway centreline.

At this moment, the instructor took over the aircraft control realising that the right wing was lower than normal. The instructor immediately switched of both the engines and used the aircraft ailerons to keep the right wing up preventing both the right engine and propeller from contacting the runway. At the same time, the instructor had applied left rudder and brake to assist in the directional control of the aircraft. However, the aircraft continued to veer to the right until it came to a stop on the grass verge at the right-hand side of Runway 03.

The Air Traffic Control (ATC) was immediately informed and two crash tenders were dispatched. Both the instructor and student were uninjured and safely egressed from the aircraft unassisted. Post-flight inspection of the aircraft revealed that only the right-hand main landing gear was damaged.

1.2 Injuries to Persons

Both the occupants of 9M-HMY were uninjured.

Injuries	Crew	Pax
Fatal	-	-
Serious	-	-
Minor / None	2	-

1.3 Damage to Aircraft

The report of damages to the aircraft is provided in the inspection report by the maintenance organisation of the aircraft in **Appendix A**. The preliminary finding of the report states that the most probable cause for this serious incident was the failure of the Right-Hand Main Landing Gear (RH MLG) Trailing Arm.

Images of the RH MLG Trailing Arm are provided in **Appendix B**. Image 1 shows an undamaged RH MLG Trailing Arm from a similar aircraft. Image 2 shows the damaged RH MLG Trailing Arm when viewed from the front of the aircraft (note the clean break in the Trailing Arm0.

Image 3 illustrates the dismantled damaged Trailing Arm with the adjacent piece that had broken off which was once attached to the RH MLG strut assembly.

1.4 Other Damages

There were no other damages to report of other than scratch marks on the runway **(Appendix B,** Image 4**)**.

1.5 Personnel Information

Instructor

Nationality	Pakistan
Age	43
Gender	Male
License Type	CPL 6901
License Validity	30 September 2022
Medical Certificate Validity	30 September 2022
Aircraft Rating Validity	31 August 22
Instructor's Rating Validity	30 April 2024
Instrument Rating Validity	30 September 2022
Flying Hours	Total: 4,198 Hrs

Student

Nationality	Malaysia
Age	21
Gender	Male
License Type	SPL 13722
License Validity	30 November 2022
Medical Certificate Validity	30 November 2022
Flying Hours	Total: 137 Hrs

1.6 Aircraft Information

Aircraft Type	Diamond DA42
Manufacturer	Diamond Aircraft Industries GmbH
C of A Category	JAR 23 - Normal
C of A Issue	21 December 2021
C of A Expiry	20 December 2022
C of R Issue	30 November 2021
C of R Expiry	29 November 2024
Registration	9M-HMY
Serial No.	42.041
Owner	HM Aerospace Sdn. Bhd.
Airframe & Engine Flight Hours	2,636 Hours
Landing Cycles	4,965
Fuel used	Avtur

1.7 Meteorological Information

Attached in **Appendix C** is the METAR for WMKL at the time of the incident. Although the runway in use at the time was Runway 03, the surface wind was from 150° (varying between 100° and 190°) at 8 knots. This corresponded with the statement by the student pilot that he had a slight tailwind from the right during his approach to land. The visibility at WMKL was more than 10 km with slight cloud cover (FEW017 – 1 to 2 oktas of cloud cover at 1,700 ft).

1.8 Aids to Navigation

Not applicable.

1.9 Communications

The aircraft was in constant radio contact with Langkawi Approach frequency on 119.4 MHz. The transcript of the communication between the crew and ATC did not reveal any abnormalities. Although no distress call was made, the instructor had advised Langkawi Approach of the situation of the abnormal landing. The crash alarm was promptly activated by ATC and the Airport Fire and Rescue Services (AFRS) was immediately dispatched to the stricken aircraft.

1.10 Aerodrome Information

Not applicable.

1.11 Flight Recorders

The Diamond DA42 is a light twin-engine utility and trainer aircraft with a Maximum Gross Weight (MGW) of 1,999 kg. It is not equipped with flight recorders nor is it mandated by law to do so.

1.12 Wreckage and Impact Information

Refer to the Inspection Report in **Appendix A**.

1.13 Medical and Pathological Information

The blood and urine samples were obtained from both the pilots on the very same day. The results of blood alcohol and drug toxicology reports was negative for substance abuse.

1.14 Fire

There was no fire.

1.15 Survival Aspects

Both pilots were uninjured and they easily egressed from the aircraft unassisted. The only damage to the aircraft was to the right-hand main landing gear. The Emergency Locater Transmitter (ELT) was not activated.

1.16 Tests and Research

The RH MLG Trailing Arm was sent to the aircraft manufacturer (OEM) for further metallurgical tests and analysis to determine the cause of failure. Unfortunately, despite repeated requests on the outcome of such tests by the OEM, no feedback has been received from the OEM up to the date of the issuance of this Final Report.

1.17 Organisational and Management Information

The operator of the aircraft is a well-established flight training academy. They were very helpful with the on-site investigations and have been very cooperative throughout the investigation of this incident. There is no indication of any regulatory non-compliance nor safety concerns.

1.18 Additional Information

Nil.

1.19 Useful or Effective Investigation Techniques

Nil.

2.0 ANALYSIS

Without the metallurgical tests and analysis results from the OEM, a definitive analysis of the incident will remain pending.

3.0 CONCLUSION

Both the analysis and conclusion of this serious incident will be updated once the metallurgical tests and analysis results from the OEM have been received.

4.0 SAFETY RECOMMENDATIONS

Safety Recommendations will be pending based on the results of the OEM tests and analysis of the failed RH MLG Trailing Arm.

Nonetheless, the operator has since carried out a one-time inspection on all Trailing Arms of their fleet of aircraft.

INVESTIGATOR-IN-CHARGE
Air Accidents Investigation Bureau
Ministry of Transport

11 March 2024

APPENDIX A

INSPECTION REPORT

Incident Details

Aircraft type and model: Diamond DA 42
Aircraft serial no: 42.041
Engine type and model: Technify Motors TAE 125-02-99
Engines serial no: 02-02-05269 (LH), 02-02-05270 (RH)
Propeller type and model: MT Propeller MTV-6-A-CF
Propeller serial no: 06715 (LH), 05243 (RH)

On 8th Aug 2022, at around 1100 hours, a Diamond DA 42 aircraft registration: 9M-HMY was reported as RH MLG collapsed and aircraft veered to the right, after touch down. Aircraft stopped at the side of the runway with all three (03) landing gears on the grassy area. Refer **Picture 01.**

Picture 01. Aircraft stopped at the side of the runway with all three (03) landing gears on the grassy area.

After the incident, the aircraft was relocated to Prima Air Maintenance Hangar 02, cordoned off, and quarantined for further investigation.

Preliminary Inspection

Certificate of Airworthiness due date: 20th Dec 2022.
Certificate of Registration due date: 29th Nov 2024.
Last base maintenance: 100 Hours inspection. Base Maintenance Release issued on 1st July 2022.

After the incident, a thorough visual inspection was carried out on the aircraft. There was no obvious sign of damage to both engines, propellers, wings, fuselage, empennage, LH main landing gear and nose landing gear. Further inspections mainly focused on the RH main landing gear, based on DA 42 AMM Chapter 05-28-50 page 4 para C, as detailed below:

No.	Inspection items	Observation
1	Examine the composite structure to which the main landing gear assembly is attached. Look specially for cracks and delamination.	-Initial Visual inspection didn't find any crack. Will proceed details inspection for crack. -Coin tap test for composite delamination and details inspection will perform later. Refer **Picture 02.**
2	Examine the bearings for the main landing gear assemblies in the center wing. Look specially for play.	- Cannot perform due to limited access and obstruction with the door damage. Will proceed upon get clearance from QA and AAIB team. Refer **Picture 03.**
3	Examine the landing gear legs and trailing arms. Look specially for cracks, deformation, corrosion, and damaged surface protection.	- RH Landing gear leg found rubbing. - RH Trailing arm snapped. Refer **Picture 04.**
4	Examine the hydraulic lines of the brake system for damage, leakage, and loose or defective connectors.	- NIL sign of leakage. Brake hose still attach to the brake caliper assy. Brake hose show deterioration of outer layer. - Found rubbing on screw bleeder and cylinder. Refer **Picture 05.**
5	Examine the main landing gear actuators and hydraulics. Look specially for leakage.	- NIL sign of leakage. Refer **Picture 06.**
6	Examine the damper. Look specially for leakage.	- NIL sign of leakage. Refer **Picture 07.**
7	Examine the main landing gear doors: • Check for damage to the doors. • Check for cracked hinges. • Examine the door operating rods.	- Rubbing, cut and delamination on RH MLG door. - MLG Flap Hinges rear ASSY RH detached and distorted. - DS Bearing 2 LH and RH distorted. - Door opening rod (Coupling Bar MLG Flap) distorted. Refer **Picture 08.**
8	Examine the weight on wheel switch.	- Protective cover broken and soil ingress into protective cover.

Picture 02.

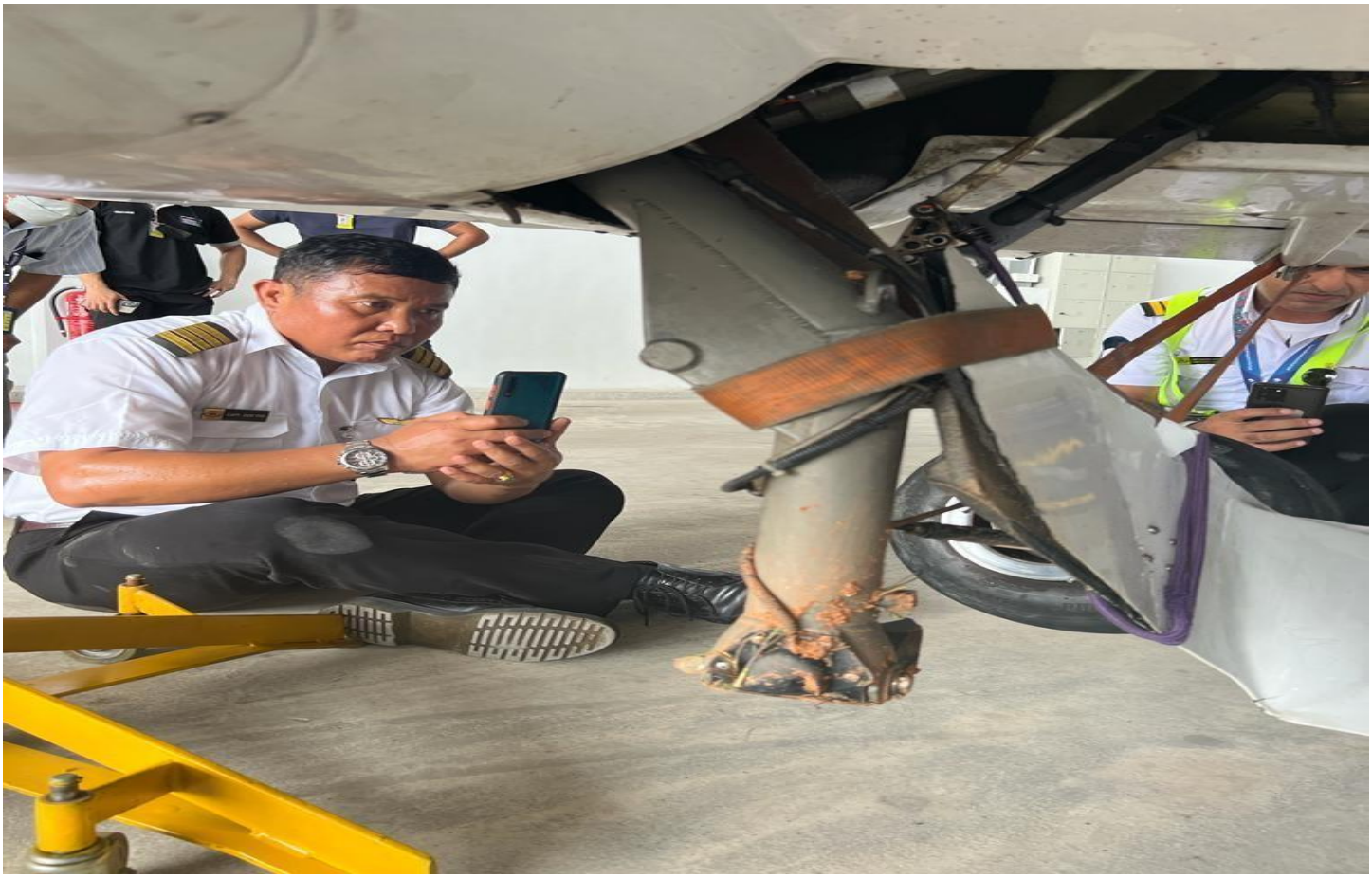
Picture 03.

Picture 04.

Picture 05.

Picture 06.

Picture 07.



Picture 08.

Preliminary finding.

Based on the operating crew entry in the Aircraft Journey Log, the most probable cause for this incident is the snapped trailing arm of RH main landing gear. Further investigation is required to determine exact root cause of the RH MLG trailing arm failure.

- END OF REPORT -

APPENDIX B

IMAGES

IMAGE 1

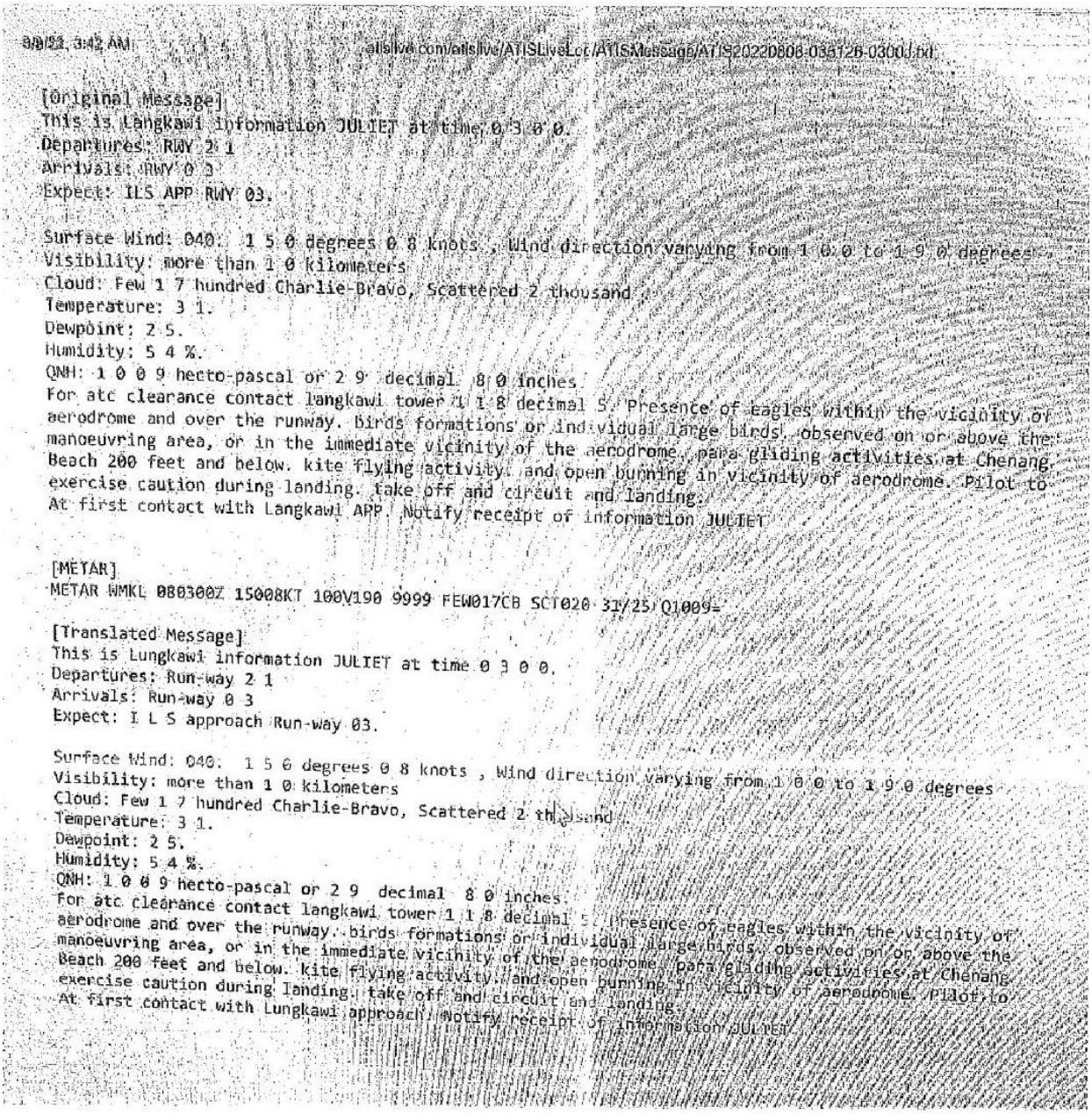
IMAGE 2

IMAGE 3

IMAGE 4

APPENDIX C

METAR



8/8/22, 3:42 AM atislive.com/atislive/ATISLiveLoc/ATISMessage/ATIS20220808-035126-0300.txt

[Original Message]
This is Langkawi information JULIET at time 0 3 0 0.
Departures: RWY 2 1
Arrivals: RWY 0 3
Expect: ILS APP RWY 03.

Surface Wind: 040: 1 5 0 degrees 0 8 knots , Wind direction varying from 1 0 0 to 1 9 0 degrees
Visibility: more than 1 0 kilometers
Cloud: Few 1 7 hundred Charlie-Bravo, Scattered 2 thousand
Temperature: 3 1.
Dewpoint: 2 5.
Humidity: 5 4 %.
QNH: 1 0 0 9 hecto-pascal or 2 9 decimal 8 0 inches
For atc clearance contact langkawi tower 1 1 8 decimal 5. Presence of eagles within the vicinity of aerodrome and over the runway. birds formations or individual large birds observed on or above the manoeuvring area, or in the immediate vicinity of the aerodrome, para gliding activities at Chenang Beach 200 feet and below. kite flying activity. and open burning in vicinity of aerodrome. Pilot to exercise caution during landing. take off and circuit and landing.
At first contact with Langkawi APP. Notify receipt of information JULIET

[METAR]
METAR WMKL 080300Z 15008KT 100V190 9999 FEW017CB SCT020 31/25 Q1009=

[Translated Message]
This is Lungkawi information JULIET at time 0 3 0 0.
Departures: Run-way 2 1
Arrivals: Run-way 0 3
Expect: I L S approach Run-way 03.

Surface Wind: 040: 1 5 0 degrees 0 8 knots , Wind direction varying from 1 0 0 to 1 9 0 degrees
Visibility: more than 1 0 kilometers
Cloud: Few 1 7 hundred Charlie-Bravo, Scattered 2 thousand
Temperature: 3 1.
Dewpoint: 2 5.
Humidity: 5 4 %.
QNH: 1 0 0 9 hecto-pascal or 2 9 decimal 8 0 inches
For atc clearance contact langkawi tower 1 1 8 decimal 5. Presence of eagles within the vicinity of aerodrome and over the runway. birds formations or individual large birds observed on or above the manoeuvring area, or in the immediate vicinity of the aerodrome, para gliding activities at Chenang Beach 200 feet and below. kite flying activity. and open burning in vicinity of aerodrome. Pilot to exercise caution during landing. take off and circuit and landing.
At first contact with Lungkawi approach. Notify receipt of information JULIET

AVIATION WEATHER CENTER
NOAA NATIONAL WEATHER SERVICE

Local Forecast | Go | HOME | ADVISORIES | FORECASTS | OBSERVATIONS | TOOLS | NEWS | SEARCH | ABOUT | USER

METAR Data | METAR Home | Plot | Data | Board | Info

IDs: wmkl wmka wmkp | Format: Raw / Decoded | most recent only | Include TAF | Print | Update

Data at: 0340 UTC 08 Aug 2022

```
WMKL 080300Z 15008KT 100V190 9999 FEW017CB SCT020 31/25 Q1009

TAF WMKL 072300Z 0800/0900 VRB03KT 9999 FEW020
  BECMG 0804/0806 24006KT
  BECMG 0811/0813 VRB03KT FEW026

WMKA 080300Z 18005KT 130V240 8000 FEW020 31/26 Q1009

TAF WMKA 072300Z 0800/0900 VRB03KT 5000 BR FEW020
  BECMG 0802/0804 24006KT 9999 NSW
  BECMG 0811/0813 VRB03KT FEW030

WMKP 080330Z 19010KT 160V230 9000 FEW020 31/24 Q1009 NOSIG

TAF WMKP 072300Z 0800/0900 00000KT 8000 FEW020
  TEMPO 0800/0805 5000 TSRA FEW010 FEW017CB
  BECMG 0803/0805 22008KT 9000
  BECMG 0811/0813 00000KT 8000 FEW025

WMKB 080300Z 15009KT 110V200 7000 FEW020 32/25 Q1008 NOSIG

TAF WMKB 072300Z 0800/0900 10003KT 5000 HZ FEW020
  BECMG 0803/0805 22008KT 7000 NSW
  BECMG 0810/0812 VRB02KT

WMKI 080300Z 18004KT 9000 FEW019 30/23 Q1009

TAF WMKI 072300Z 0800/0900 VRB02KT 9000 FEW020
  BECMG 0804/0806 22005KT
  BECMG 0810/0812 VRB02KT

WMSA 080300Z 15005KT 060V230 9999 FEW018 30/24 Q1010

TAF WMSA 072300Z 0800/0900 VRB02KT 9999 FEW018
  TEMPO 0821/0900 4000 TSRA FEW017CB
```

Page loaded: 03:40 UTC | 08:40 PM Pacific | 09:40 PM Mountain | 10:40 PM Central | 11:40 PM Eastern

ADVISORIES
- SIGMET
- G-AIRMET
- Center Weather

FORECASTS
- Convection
- Turbulence

FORECASTS
- Icing
- Winds/Temps
- Prog Charts
- TAFs
- Aviation Forecasts
- WAFS Forecasts
- Area Forecasts
- Avn Forecast Disc (AFD)

OBSERVATIONS
- Aircraft Reps
- METARs
- Radar
- Satellite

USER TOOLS
- Flightpath Tool
- HEMS Tool
- Text Data Server
- Flight Folder
- Decision Support
- PIREP Submit
- Standard Briefing
- Aviation Testbed
- Aviation Links

ABOUT US
- AWC
- Help
- FAQ
- Contact Us

USA.gov

US Dept of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Centers for Environmental Prediction
Aviation Weather Center
7220 NW 101st Terrace
Kansas City, MO 64153-2371

Disclaimer
Information Quality
Glossary
About Us
Contact AWC

Privacy Policy
Freedom of Information Act (FOIA)
Career Opportunities
Server: IDP-CPRK; 11
Version: v22.07