



Комитет за истрага на воздухопловни несреќи и сериозни инциденти
Aircraft Accident and Incident Investigation Committee

FINAL REPORT
on a Serious Incident
КИНСИВ 008/2025
Airborne Near Mid-Air Encounter
between two aircraft:
Airbus A320 HA-LYS and Cessna 172 Z3-DCL,
in the vicinity of **Skopje International Airport**, at **FL040**,
which occurred on **17 September 2025 at 05:45 UTC**.



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The **Committee for Investigation of Aircraft Accidents and Serious Incidents** (hereinafter referred to as **the Investigation Committee**) was established by a Decision of the Government of the Republic of North Macedonia on the establishment of the Committee for Investigation of Aircraft Accidents and Serious Incidents (*Official Gazette of the Republic of Macedonia* No. 49 of 11 April 2012 and *Official Gazette of the Republic of North Macedonia* No. 73 of 23 April 2018), pursuant to Article 5 of the **Law on Aviation** (*Official Gazette of the Republic of North Macedonia* Nos. 14/24, 224/24, 3/25 and 144/25).

Any occurrence affecting aviation safety shall be subject to a thorough investigation, analysis and classification according to its severity, with the objective of determining the causes, facts and circumstances under which it occurred, and of identifying appropriate measures to prevent the recurrence of occurrences that may adversely affect the safety of civil aviation.

The sole objective of the safety investigation of an accident, serious incident or incident is the improvement of aviation safety through the collection of safety information, the determination of the causes and contributing factors of such occurrences, and the formulation of appropriate measures to prevent their recurrence.

Safety recommendations are issued solely for the purpose of preventing future accidents and incidents. They are not intended to create a presumption of blame or liability in respect of any accident, serious incident or incident.

The Investigation Committee is responsible for conducting safety investigations into accidents and serious incidents involving civil aircraft or parachutes occurring within the territory of the Republic of North Macedonia, as well as accidents and serious incidents involving civil aircraft or parachutes registered in the Republic of North Macedonia.

The Investigation Committee consists of three investigators appointed by the Government of the Republic of North Macedonia, one of whom is appointed as the Chairperson of the Committee.

The **Ministry of the Interior**, the competent courts, the **Public Prosecutor's Office**, and all other authorities involved in the investigation of an accident or serious incident shall provide the investigators with unrestricted access to, and control over, all operational, technical and legal information, evidence and documentation necessary for the conduct of the safety investigation.



Pursuant to the Decision to Open a Safety Investigation into a Serious Incident, Ref. No. 06-115/1 dated 19 September 2025, this Final Report has been prepared by the Committee for Investigation of Aircraft Accidents and Serious Incidents (KINSIV).

This Final Report has been prepared in accordance with the provisions of the Law on Aviation (*Official Gazette of the Republic of North Macedonia* Nos. 14/24, 224/24, 3/25 and 144/25), the Regulation on the Principles Governing the Investigation of Accidents, Serious Incidents, Incidents and Occurrences Involving Civil and State Aircraft, the Procedure for Their Notification, and the Form, Content, Maintenance of Records, and the Issuance and Withdrawal of Official Investigator Identification Cards (*Official Gazette of the Republic of North Macedonia* No. 67 of 27 March 2023), and Annex 13 to the Convention on International Civil Aviation (ICAO).

The sole objective of a safety investigation is the prevention of future accidents and incidents. It is not the purpose of this activity to apportion blame or liability.

Safety investigations are conducted independently of, and separately from, any judicial or administrative proceedings. Their purpose is fundamentally different from that of proceedings intended to determine blame or liability. Accordingly, this Final Report shall not be used as evidence in any judicial proceedings aimed at determining civil or criminal liability.

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List of Abbreviations Used

Кратенка	Значење на англиски јазик	Значење на македонски јазик
ASP	Airspace	Воздушен простор
EXC	Executive Air Traffic Controller	Извршен контролор на летање
PLC	Planning Air Traffic Controller	Планер контролор на летање
ASS	Assistant Air Traffic Controller	Помошник контролор на летање
ATCO	Air Traffic Controller	Контролор на летање
M-NAV	Air Navigation Services Provider “M-NAV”	АД за давање услуги во воздухопловна навигација „М-НАВ“
OPR	Operational Working Position	Операторско работно место
CPA	Closest Point of Approach	Најблиска точка на приод
ACC	Area Control Centre	Обласна контрола на летање
ПГО		
M-FRA	Free Route Airspace	Воздушен простор со слободно планирање на рути
CAA	Civil Aviation Agency	Агенција за цивилно воздухопловство
ACAS	Airborne Collision Avoidance System	Систем за избегнување на воздушни судири
ACC	Area Control Centre	Обласна контрола
AFTN	Aeronautical Fixed Telecommunication Network	Мрежа (на земја) на фиксната служба за воздухопловни телекомуникации
AGL	Above Ground Level	Над нивото на земјата
AIP	Aeronautical Information Publication	Зборник на воздухопловни информации
ALRS	Alerting Service	Служба за тревожење
AMC	Acceptable Means of Compliance	Прифатливи средства за усогласеност
ANS	Aeronautical Navigation Services	Воздухопловни навигациски услуги
APP	Approach	Приод
ATC	Air Traffic Control	Контрола на летање
AWOS	Automated Weather Observation System	Систем за автоматски информации за метеоролошки услови
CPA	Closest Point of Approach	Најблиска точка на приод



Кратенка	Значење на англиски јазик	Значење на македонски јазик
CTA	Control Area	Контролирана област
ENR	Enroute	Рутен
EXC	Executive Controller	Извршен контролор
EXE	Executive Controller	Извршен контролор
FAA	Federal Aviation Administration	Федерална воздухопловна администрација
FIR	Flight Information Region	Регион со информации за летот
FIS	Flight Information Service	Служба за информации за летот
FL	Flight Level	Ниво на лет
FLT	Flight	Лет
FPL	Flight Plan	План за лет
GNSS	Global Navigation Satellite System	Глобален сателитски систем за навигација
ICAO	International Civil Aviation Organization	Меѓународна организација за цивилно воздухопловство
IDS	Information Display System	Систем за прикажување информации
IFR	Instrument Flight Rules	Правила за лет по инструменти
IIC	Investigator in Charge	Главен истражител
KINSIV	Air Incident Investigation Committee	Комитет за истрага на воздухопловни несреќи и сериозни инциденти
KT	Knots	Јазли
KTS	Knots	Јазли
LWSK	Skopje International Airport	Меѓународен аеродром Скопје
METAR	Meteorological Aerodrome Report	Метеоролошки извештај за аеродром
NM	Nautical Miles	Наутички милји
NOSIG	No Significant Weather	Нема значајни метеоролошки појави
PLC	Planning Controller	Контролор за планирање
PLN	Planning	Планирање
RA	Resolution Advisory	Совет за избегнување
RVSM	Reduced Vertical Separation Minimum	Намалени минимуми за вертикална сепарација
SAR	Search and Rescue	Пребарување и спасување

Кратенка	Значење на англиски јазик	Значење на македонски јазик
SERA	Standardized European Rules of the Air	Стандардизирани европски правила за воздухопловство
SSR	Secondary Surveillance Radar	Секундарен надзорен радар
Part-SPO	Specialized Operations	Специјализирани операции
STCA	Short Term Conflict Alert	Краткорочно предупредување за конфликти
TA	Traffic Advisory	Советување за сообраќај
TAF	Terminal Aerodrome/Area Forecast	Прогноза за аеродром/терминална област
TCAS	Traffic Alert and Collision Avoidance System	Систем за предупредување за сообраќај и избегнување судир
TMA	Terminal Control Area	Терминална контролна област
UTA	Upper Control Area	Горна контролна област
UTC	Universal Time Coordinated	Координирано универзално време
VFR	Visual Flight Rules	Визуелни правила за лет
VHF	Very High Frequency	Многу висока фреквенција



Committee for Investigation of Aircraft Accidents and Serious Incidents
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Investigation Report:	КИНСИВ 008/2025
Occurrence Classification:	Serious Incident – TCAS Resolution Advisory (TCAS RA)
Time of Occurrence:	17 September 2025 05:30 UTC
Location: :	In the vicinity of Skopje International Airport, FL040
Aircraft Type 1:	Airbus A320
Aircraft Type 2:	Cessna 172
Persons Involved:	Flight crews of both aircraft and air traffic controllers
Source of Information:	Committee for Investigation of Aircraft Accidents and Serious Incidents of the Republic of North Macedonia



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Summary

On **17 September 2025**, at **04:55 UTC**, the **Cessna 172**, registration **Z3-DCL**, departed from **Štip Airfield (LWST)** to conduct a **fox rabies vaccination flight** along **Route No. 64**. Part of this route was located within the **Skopje International Airport Control Zone (CTR Skopje)**.

Following departure, the flight crew requested clearance from **Skopje Approach** to operate along Route No. 64. Skopje Approach provided information regarding the routes and operating altitudes of the other two aircraft engaged in the same operation and cleared **Z3-DCL** to operate along Route No. 64 at **4,000 ft**.

No instructions were issued to **Z3-DCL**, or to the other two aircraft participating in the operation, to activate their transponders or to select an assigned transponder code. Furthermore, the crew of **Z3-DCL** did not set the transponder to **Code 7000**, the standard conspicuity code for VFR operations. Consequently, the aircraft was not displayed on the **secondary surveillance radar (SSR)** of Skopje Approach and was not detectable by the **Traffic Collision Avoidance System (TCAS)** installed on other aircraft.

On the same day, at **05:25 UTC**, the aircraft operating under the callsign **HALYS** was cleared for take-off and a **visual departure** to **Basel**. Prior to departure, **Skopje Tower** did not provide the flight crew with traffic information concerning the presence of **Z3-DCL**, which constituted essential traffic.

Following take-off, **HALYS** commenced its climb and entered a left turn. After establishing communication with **Skopje Approach**, the crew again did not receive traffic information regarding the presence of **Z3-DCL**.

While rolling out of the climbing left turn, the crew of **HALYS** acquired **Z3-DCL** visually at an estimated distance of approximately **100 metres**, at the same altitude and without any corresponding **TCAS** indication. No avoiding manoeuvre was initiated, as the visual acquisition occurred too late for effective evasive action.

Note: Unless otherwise stated, all times in this report are expressed in **UTC** and are presented in the format **hhmmss**.

Note: Unless otherwise stated, all time intervals in this report are expressed in the format **mmss**.

Note: For ease of reference, the serious incident is hereinafter referred to as **the occurrence**.



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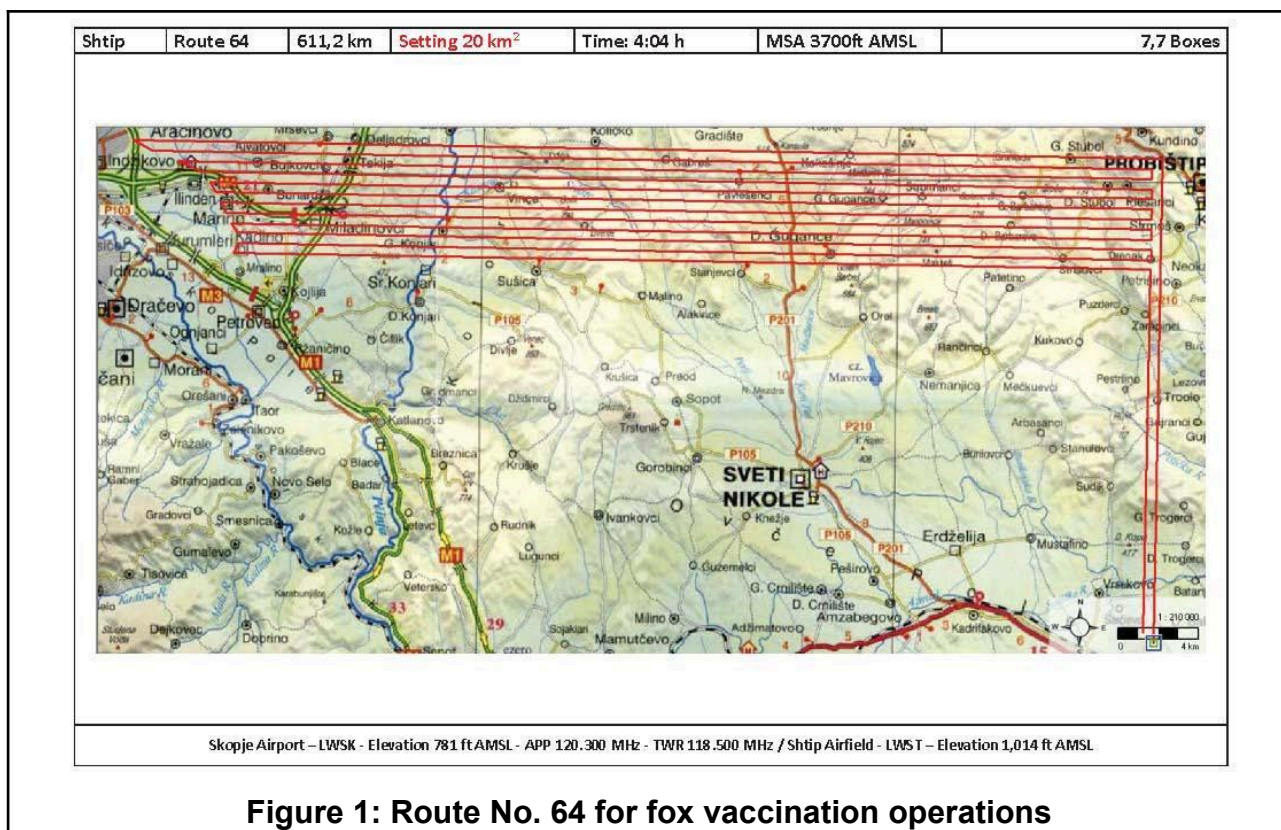


1. General Information

1.1. History of the Flight

On **17 September 2025**, at **04:55 UTC**, the **Cessna 172**, registration **Z3-DCL**, departed from **Štip Airfield (LWST)** to conduct a **fox rabies vaccination flight** along **Route No. 64**. Part of this route was located within the **Skopje International Airport Control Zone (CTR Skopje)**. Following departure, the flight crew requested clearance from **Skopje Approach** to operate along Route No. 64. Skopje Approach provided information regarding the routes and operating altitudes of the other two aircraft participating in the same operation and cleared **Z3-DCL** to operate along Route No. 64 at **4,000 ft**. No instructions were issued to **Z3-DCL**, or to the other two aircraft involved in the operation, to activate their transponders or to select an assigned transponder code. Furthermore, the crew of **Z3-DCL** did not set the transponder to **Code 7000**, the standard conspicuity code for VFR operations. Consequently, the aircraft was not displayed on the **Secondary Surveillance Radar (SSR)** used by Skopje Approach and was not detectable by the **Traffic Collision Avoidance System (TCAS)** installed on other aircraft.

At **05:30 UTC**, **Z3-DCL** was operating along **Route No. 64** within **CTR Skopje**. The aircraft was flying the **second survey track**, on an easterly heading, at an altitude of **4,000 ft**.



On the same day, at **05:25 UTC**, the aircraft operating under the callsign **HALYS** was cleared for take-off and a **visual departure** to **Basel**. Prior to departure, **Skopje Tower** did not provide the flight crew with traffic information regarding the presence of **essential traffic**, namely **Z3-DCL**.

Following take-off, HALYS commenced its climb and entered a left climbing turn. During the climb, the flight crew established communication with **Skopje Approach**; however, no traffic information concerning the presence of **Z3-DCL** was provided.

While rolling out of the climbing left turn, the crew of HALYS visually acquired **Z3-DCL** at an estimated distance of approximately **100 metres**, at the same altitude and without any corresponding **Traffic Collision Avoidance System (TCAS)** indication.

No avoiding manoeuvre was initiated, as the aircraft was visually acquired too late for effective evasive action. Owing to the fact that the **HALYS** aircraft was tracking westbound while **Z3-DCL** was tracking eastbound, the aircraft passed each other without collision.

1.1.1. Sequence of Events

*Based on the Skopje Approach radio communication recordings on frequency **120.300 MHz**. All times are in **local time (LT)**.)*

05:07:56 – A few minutes after departure, **Z3-DCL** established radio communication with **Skopje Approach**.

05:08:04 – The crew of **Z3-DCL** requested clearance to operate **Fox Vaccination Route No. 64**. Skopje Approach requested the intended operating altitude, and the crew advised that the flight would be conducted at **4,000 ft**.

05:08:31 – Skopje Approach cleared **Z3-DCL** to operate along **Route No. 64** at **4,000 ft** and provided traffic information regarding the positions of the other two aircraft participating in the fox vaccination operation. The crew acknowledged receipt of the information.

05:09:02 – Skopje Approach instructed **Z3-DCL** to report upon completion of operations on Route No. 64. The crew acknowledged the instruction.

05:44:47 – A few minutes after departure, **WZZ2JB (HALYS)** established communication with **Skopje Approach**, reporting that it was in a visual climbing left turn towards **GOSTI** (westbound), passing **3,700 ft** while climbing to **10,000 ft**. Skopje Approach advised that the aircraft had been identified on radar and cleared it to climb to **FL240**.



05:45:02 – WZZ2JB reported traffic on its right-hand side at a distance of less than **100 metres**, asking whether Skopje Approach was aware of the traffic. Skopje Approach replied that no such traffic was known and asked whether it had been an aeroplane or a glider.

05:45:20 – WZZ2JB confirmed that the traffic was a **Cessna aircraft**, which had passed at a distance of less than **100 metres**, and that it had been sighted after rolling out of the turn.

05:45:26 – Z3-DCL reported crossing the extended runway centreline and advised that the crew had observed the other aircraft (**HALYS**), stating that it had passed very close to their aircraft.

05:45:35 – Skopje Approach informed **WZZ2JB** that an occurrence report would be submitted and requested that the flight crew submit a report as well.

05:45:40 – Z3-DCL requested a transponder code. Skopje Approach advised that there was no radar return from the aircraft. The crew responded that no transponder code had previously been assigned and again requested a code in order to improve their visibility to other traffic.

05:46:10 – Skopje Approach advised **Z3-DCL** that the aircraft should have been operating east of the area, in the vicinity of **Štip**. The crew replied that they were operating on **Route No. 64**.

05:46:22 – Skopje Approach responded that the aircraft should not have been inside the controlled airspace and apologised to **WZZ2JB**, explaining that the aircraft had been expected to operate close to the ground rather than within the control zone. The controller further advised that the aircraft was operating under **VFR**, should have remained below **100 ft AGL**, and outside controlled airspace.

05:47:09 – WZZ2JB replied that, while acknowledging the explanation, the actual situation had been significantly different. The crew stated that the aircraft had passed extremely close despite initiating the turn towards **GOSTI** almost one nautical mile earlier than normal. The crew advised that the occurrence would be reported and requested that Skopje Approach investigate the traffic, as the occurrence would certainly be reported to Budapest. Skopje Approach confirmed that an occurrence report would also be submitted.

05:48:09 – Skopje Approach assigned transponder code **0006** to **Z3-DCL**. The crew acknowledged the instruction.

05:51:30 – Skopje Approach asked **Z3-DCL** whether the crew had observed the departing traffic. The crew replied that they had not seen the traffic during its departure but had experienced a close encounter with it.

05:51:40 – Skopje Approach reminded **Z3-DCL** that, as a **VFR** flight, the crew was responsible for maintaining vigilance for other traffic. The crew replied that they had not observed the conflicting traffic until the encounter.

1.2. 1.2 Injuries to Persons

No injuries were sustained by the flight crews, passengers, or any other persons as a result of this occurrence.

1.3. Damage to Aircraft

No damage was sustained by the aircraft involved in this occurrence.

1.4. Other Damage

No other damage occurred as a result of this occurrence.

1.5. Information on the Interview Process

During the course of the investigation, the main focus of the Investigation Committee was the examination of **systemic and procedural deficiencies** that allowed an **uncoordinated VFR aircraft** to enter controlled airspace without proper identification and without the knowledge of **Air Traffic Control (ATC)**, thereby creating a high-risk **mid-air collision scenario**.

The investigators of the Investigation Committee conducted interviews with the participants involved in the occurrence, as well as with relevant officials from the aviation sector of the Republic of North Macedonia.

Additionally, statements were obtained from the flight crews of the aircraft involved in the occurrence.



1.6. Information on Flight Crews and Personnel

All flight crew members held valid **flight crew licences** and valid **medical certificates**.

The total number of flight crew members is presented in the following table:

Aircraft	Crew		Passengers
	Flight Crew	Cabin Crew	
Airbus 320	2	No information available	No information available
Cessna 172	1	1	0

According to the Final Report on Occurrence A-013 dated 25 September 2025, the air traffic controllers (Executive Controller (EC), Planning Controller (PC), and Assistant Controller (ACL)) held the appropriate valid licences.

In accordance with applicable rules and regulations, the air traffic controllers had completed all required training conducted within the framework of the competency assessment and maintenance programmes and held valid medical certificates.

1.7. Information on Aircraft

Two (2) aircraft were involved in this occurrence.

1.7.1. Aircraft No. 1 Information

Manufacturer	Airbus
Model	A320
Registration :	HA-LYS
Operator	Wizz Air
Description	A passenger transport aircraft of conventional design, low-wing configuration, powered by two turbofan engines.



Figure 2: Photograph of aircraft HA-LYS

Source: Imre Szabó



1.7.2. Aircraft No. 2 Information

Manufacturer :	Reims Aviation SA-France
Model	Reims Cessna 172M
Registration	Z3-DCL
Operator :	Business Air
Description	A four-seat, high-wing aircraft of conventional design, powered by one piston engine.



Figure 3: Photograph of aircraft Z3-DCL

Source: Agjencinë Telegrafike Shqiptare

1.8. Meteorological Information

The meteorological conditions did not contribute to this occurrence. The event took place under favourable meteorological conditions.

METAR report for the critical period:

Day/VFR	METAR LWSK 170520Z 36012KT CAVOK 19/11 Q1018 NOSIG
	METAR LWSK 170450Z 01013KT CAVOK 19/11 Q1017 NOSIG
	METAR LWSK 170420Z 34011KT CAVOK 19/12 Q1017 NOSIG
	METAR LWSK 170350Z 36013KT CAVOK 20/12 Q1016 NOSIG=

TAF report for the critical period:

Без влијание на настанот.

1.9. Aids to Navigation

Both aircraft were equipped with standard navigation equipment. No damage to the aircraft occurred as a result of this occurrence.

The flights were conducted within **Class D controlled airspace**. For the critical period, no information was available regarding any reported failures of ground-based radio navigation facilities.

1.10. Radio Communication

Communication between **Air Traffic Control (ATC)** and the aircraft was conducted in the **English language**, while communication after the occurrence was conducted in the **Macedonian language**.

Two-way communication between the **Executive Controller (EC)** and the aircraft was conducted on frequency **120.300 MHz**.

Based on the review of the recorded radio communications, it was determined that the communication was conducted normally and that no interruptions or communication failures occurred.



Transkript za nastan A-013

Skopje APP 120.3MHz

17.09.2025

05:07:56 Z3DCL: Skopje APP Z3DCL radio check?

05:08:00 Skopje APP: Z3DCL read you 5, go.

05:08:04 Z3DCL: Z3DCL we will join our route 64 from airport Stip for fox vaccination.

05:08:16 Skopje APP: Z3DCL roger, report altitude and say again the route number?

05:08:22 Z3DCL: Route number is 64 and can we go to climb to 4000 feet?

05:08:31 Skopje APP: Z3DCL 400 feet approved, QNH 1018, route 64 just for information Z3DAW is on route 5 up to 8000 feet and Pentium10 route 6, 4000 feet.

05:08:51 Z3DCL: Copied traffic information, cleared for 400 feet, QNH 1018.

05:09:02 Skopje APP: Z3DCL roger, report mission completed.

05:09:06 Z3DCL: We report mission completed, Z3DCL, thank you.

.....

.....

05:44:47 WZZ2JB: Approach, dobro utro WZZ2JB turning left visually to GOSTI passing 3700 climbing 10000'

05:44:55 Skopje APP: WZZ2JB dobro utro Skopje APP identified climb FL240

05:45:02 WZZ2JB: Climb FL240 WZZ2JB, and on the right we had a traffic less then 100 meters right now, we saw it, are you aware of this traffic or no?

05:45:13 Skopje APP: WZZ2JB, negative sir, confirm it's a airplane or aircraft or glider?

05:45:20 WZZ2JB: It's a Cessna, its aircraft, it was less than 100m now in the turn we saw it.

05:45:26 Z3DCL: Z3DCL crossing centerline of airport traffic in sight was very close to us

05:45:35 Skopje APP: WZZ2JB Roger I'll file a report and please do the same

05:45:40 Z3DCL: Can you give us some squawk

05:45:45 Skopje APP: No squawk on the radar sir

05:45:49 Z3DCL: No, we didn't get any squawk can you give us some squawk for us Z3DCL, to be clear for traffic

05:46:00 Skopje APP: Z3DCL stand by shortly please

05:46:02 Skopje APP: THY7FJ descend 4100'

05:46:07 THY7FJ: descend 4100 THY7FJ

05:46:10 Skopje APP: Z3DCL you should be in the east side near the Shtip sir

05:46:16 Z3DCL: Negative, we are on our route 64 Z3DCL

05:46:22 Skopje APP: But not in the control zone

05:46:41 Skopje APP: WZZ2JB sorry for any inconvenience sir, the airplane should be very low to the ground and not in the control zone

05:46:51 WZZ2JB: it was for WZZ2JB?

05:46:54 Skopje APP: Affirm sir, sorry for the inconvenience, but the airplane is VFR traffic, should be very close to the ground, below 100 feet above ground, below 100meters above ground level and not in the control zone

05:47:09 WZZ2JB: This information is OK, but the realistic it was completely different, this was really, really close, and we make a turn almost 1 mile earlier than usually for the visual to GOSTI, so we will, must report this, please investigate for this traffic because this will go to Budapest for sure, that was really close, but really.

05:47:31 Skopje APP: THY7FJ turn right heading 300 cleared for ILS approach RWY34 report established.

05:47:37 THY7FJ: Turn right heading 300, cleared for ILS and report when established THY7FJ

05:47:45 Skopje APP: WZZ2JB, Roger sir and I will also file a report, no problem



05:47:50 WZZ2JB: Thanks

05:47:52 Skopje APP: WZZ2JB for further instructions contact Skopje Radar 119.375, prijaten let

05:47:58 WZZ2JB: 119.375 Prijatno do slushanje WZZ2JB

05:48:09 Skopje APP: Z3DCL set squawk 0006

05:48:19 Z3DCL: 0006 Z3DCL squawk set and ...

05:48:26 Skopje APP: Z3DCL report position

05:48:30 Z3DCL: We are, wait a moment please

05:49:10 Z3DCL: We are at 4000'

05:49:30 Z3DCL: Radial 0..., 0..., 030 I don't have DME from Skopje VOR

05:49:43 Skopje APP: Z3DCL Roger

05:50:03 THY7FJ: ... THY7FJ established ILS 34

05:50:10 Skopje APP: Station Say again

05:50:13 THY7FJ: THY7FJ established ILS 34

05:50:16 Skopje APP: THY7FJ contact Skopje Tower 118.5 Good day sir

05:50:21 THY7FJ: 118.5 THY7FJ

05:50:26 Z3DCL: Z3DCL 7.5NM by DME from SKJ VOR

05:50:36 Skopje APP: Z3DCL Roger

05:50:40 Pentium10: Skopje priodna za vasa informacija Pentium 10 strumicko pole operira istok zapad 6500 fiti.

05:50:50 Skopje APP: Pentium10 primeno

05:51:30 Skopje APP: Z3DCL dali go vidovte vie soobarkajot na poletuvanje

05:51:34 Z3DCL: Na poletuvanje ne, ali imali smo bliski kontakt, confirm

05:51:40 Skopje APP: Z3DCL vo red, za vasha informacija vie ste VFR soobrakjaj I treba da vnimavate na soobrakjajot

05:51:46 Z3DCL: Copy that Z3DCL but at that moment we didn't see the incoming traffic

05:51:53 Skopje APP: Roger

05:52:08 Z3DCL: Can you see us on transponder Z3DCL

05:52:11 Skopje APP: At this moment yes

05:52:13 Z3DCL: Thank you

05:52:19 Skopje APP: Z3DCL Next time please report before entering control zone Skopje

05:52:24 Z3DCL: Copy that Z3DCL



1.11. Aerodrome Information

The occurrence did not take place at an aerodrome.

1.12. Digital Records

1.12.1. Video Recording of the Executive Controller (EC) Working Position Monitor

During the course of the investigation, the Investigation Committee did not request a video recording from the EC operational working position.

1.12.2. Radar Recordings

During the course of the investigation, radar recordings were not used, as **Z3-DCL** did not have its transponder activated. Consequently, the aircraft was effectively “invisible” to the radar systems operated by **M-NAV**.

1.1.1. GPS Records

During the course of the investigation, the aircraft operators provided the Investigation Committee with GPS records for both aircraft during the critical period.

The GPS data for **Z3-DCL** was provided by **Business Air**, while the GPS data for **HALYS** was provided by **Wizz Air**.

The submitted GPS records were processed and used to determine the **Closest Point of Approach (CPA)** between the two aircraft.

1.1.2. Recordings of the Operational Frequency and Ambient Sound at the Executive Controller (EC) Working Position

During the course of the investigation, **M-NAV** provided the Investigation Committee with recordings of the operational frequency and ambient sound from **Skopje Approach**, with a duration of **01:30 hours**, commencing at **04:30 UTC**.

Additionally, **M-NAV** provided the Investigation Committee with recordings of the operational frequency and ambient sound from **Skopje Tower**, with a duration of **01:00 hour**, commencing at **05:00 UTC**.

1.2. Airspace in Which the Critical Occurrence Took Place

1.2.1. Airspace of the Republic of North Macedonia

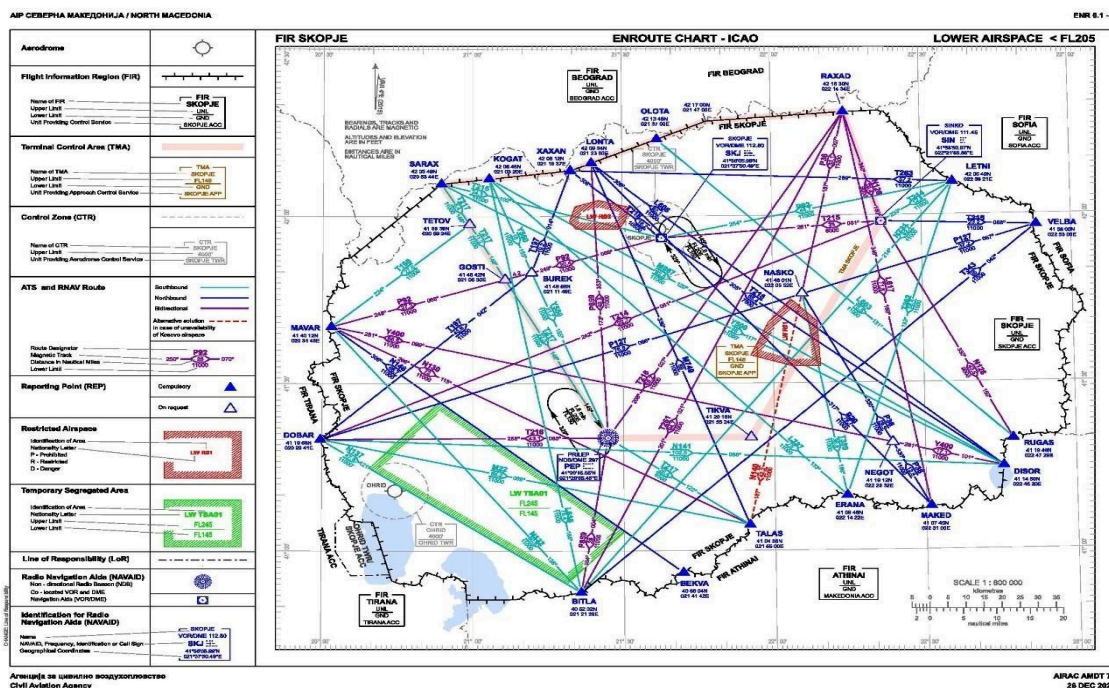


Figure 4: Airspace in Which the Critical Occurrence Took Place

Figure 4 presents the airspace of the Republic of North Macedonia. The critical occurrence took place in the northern sector of CTR Skopje, along the extended northern runway centreline, within the climb-out flight path of Runway 34, at an altitude of 4,000 ft.



1.2.2. Airspace Classification of the Republic of North Macedonia

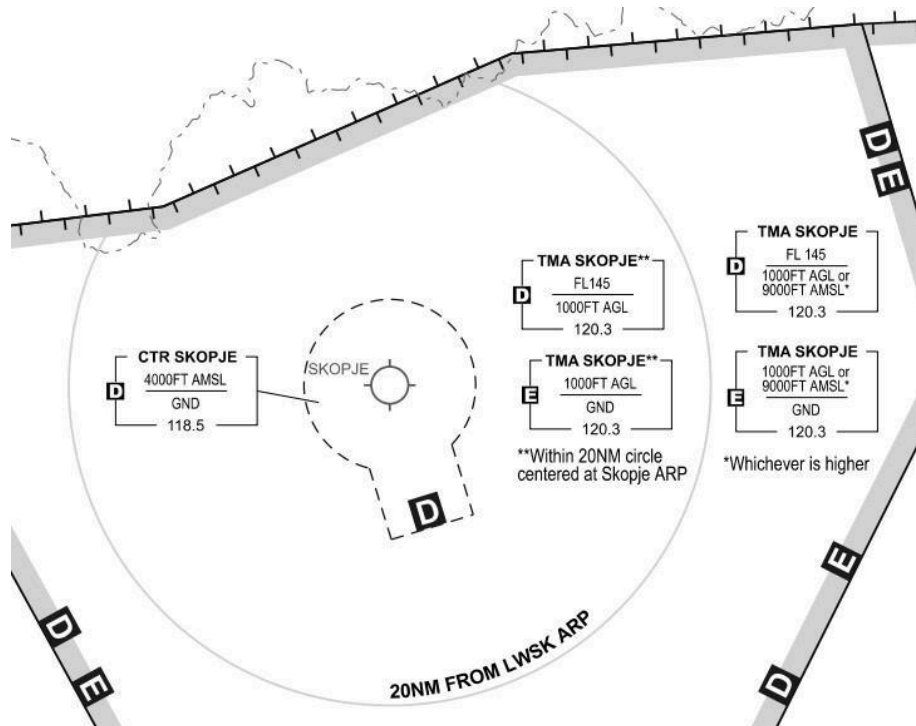
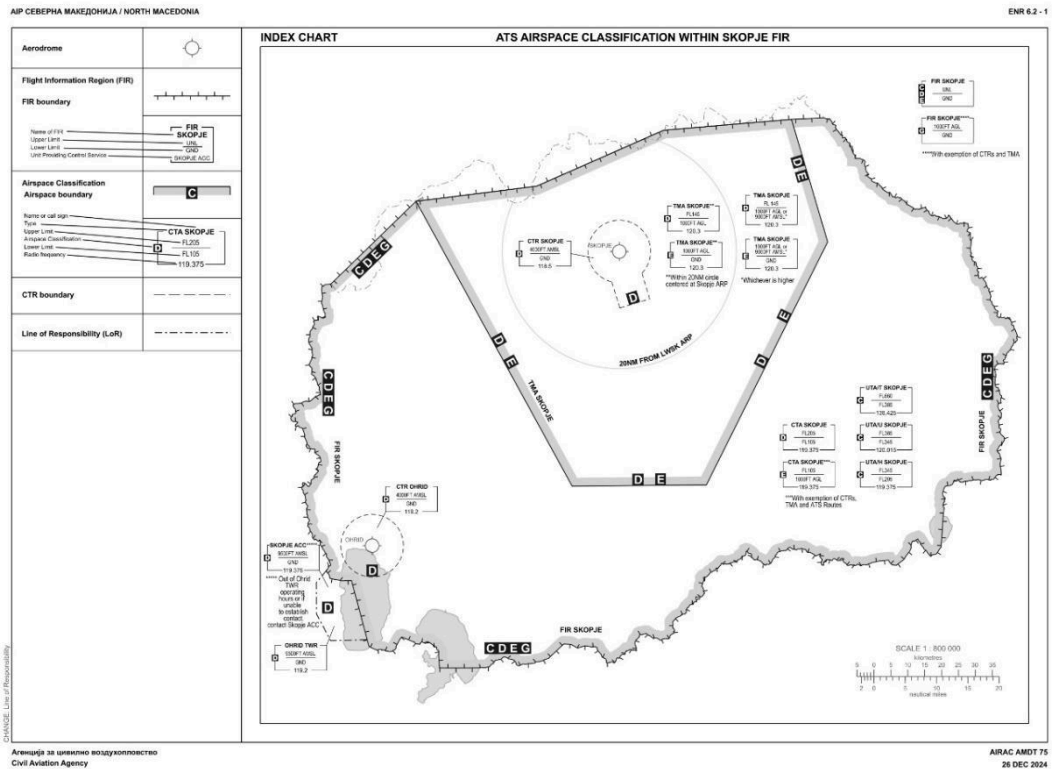


Figure 5: Airspace Classification of the Republic of North Macedonia

The critical occurrence took place within **CTR Skopje**, in **Class D airspace**, at an altitude of **4,000 ft**.

During its flight prior to the critical occurrence, **Z3-DCL** transited from **Class E airspace** into **Class D airspace** and remained within **TMA Skopje** throughout the entire flight.

Immediately after departure, the aircraft **HALYS** entered **Class D airspace** within **CTR Skopje**.

1.2.3. Description of the Airspace in Which the Occurrence Took Place

The **Aeronautical Information Publication (AIP)** of the **Republic of North Macedonia**, under the section **ENR – En-route**, paragraph **1.4.1**, provides a description of the airspace of the Republic of North Macedonia.

The airspace in which the occurrence took place, including its characteristics, is described in the following tables.

Class	Type of flight	Separation provided	Service provided	Radio communication requirement	Subject to an ATC clearance
D	IFR	IFR from IFR	Air traffic control service including traffic information about VFR flights (and traffic avoidance advice on request)	Continuous two-way	Yes
	VFR	Nil	Traffic information between VFR and IFR flights (and traffic avoidance on request)	Continuous two-way	Yes
E	IFR	IFR from IFR	Air traffic control service and traffic information about VFR flights as far as practical	Continuous two-way	Yes
	VFR	Nil	Traffic information as far as practical	No	No

Source: Aeronautical Information Publication (AIP) of the Republic of North Macedonia

Additionally, the **Aeronautical Information Publication (AIP)** of the **Republic of North Macedonia** describes the **vertical limits (lower and upper boundaries)** and the **horizontal limits** of the airspace.



1.4.2.2 Class D – Controlled Airspace

1. Lower Control Area (CTA)

- **Lower limit:** FL 105
- **Upper limit:** FL 205
- For lateral limits, refer to ENR 2.1

3. Terminal Control Area (TMA) – Skopje

- **Lower limit:** 1,000 ft AGL within a radius of 20 NM* from Skopje Airport, or 1,000 ft AGL or 9,000 ft AGL outside this radius (the higher value shall apply)
- **Upper limit:** FL 145
- For lateral limits, refer to ENR 2.1

4. Control Zone (CTR) – Skopje

- **Lower limit:** GND
- **Upper limit:** 4,000 ft AMSL
- Refer to AD 2.17

1.4.2.3 Class E – Controlled Airspace

1. Lower Control Area (CTA), excluding CTRs, TMAs and ATS routes

- **Lower limit:** 1,000 ft AGL
- **Upper limit:** FL 105
- For lateral limits, refer to ENR 2.1

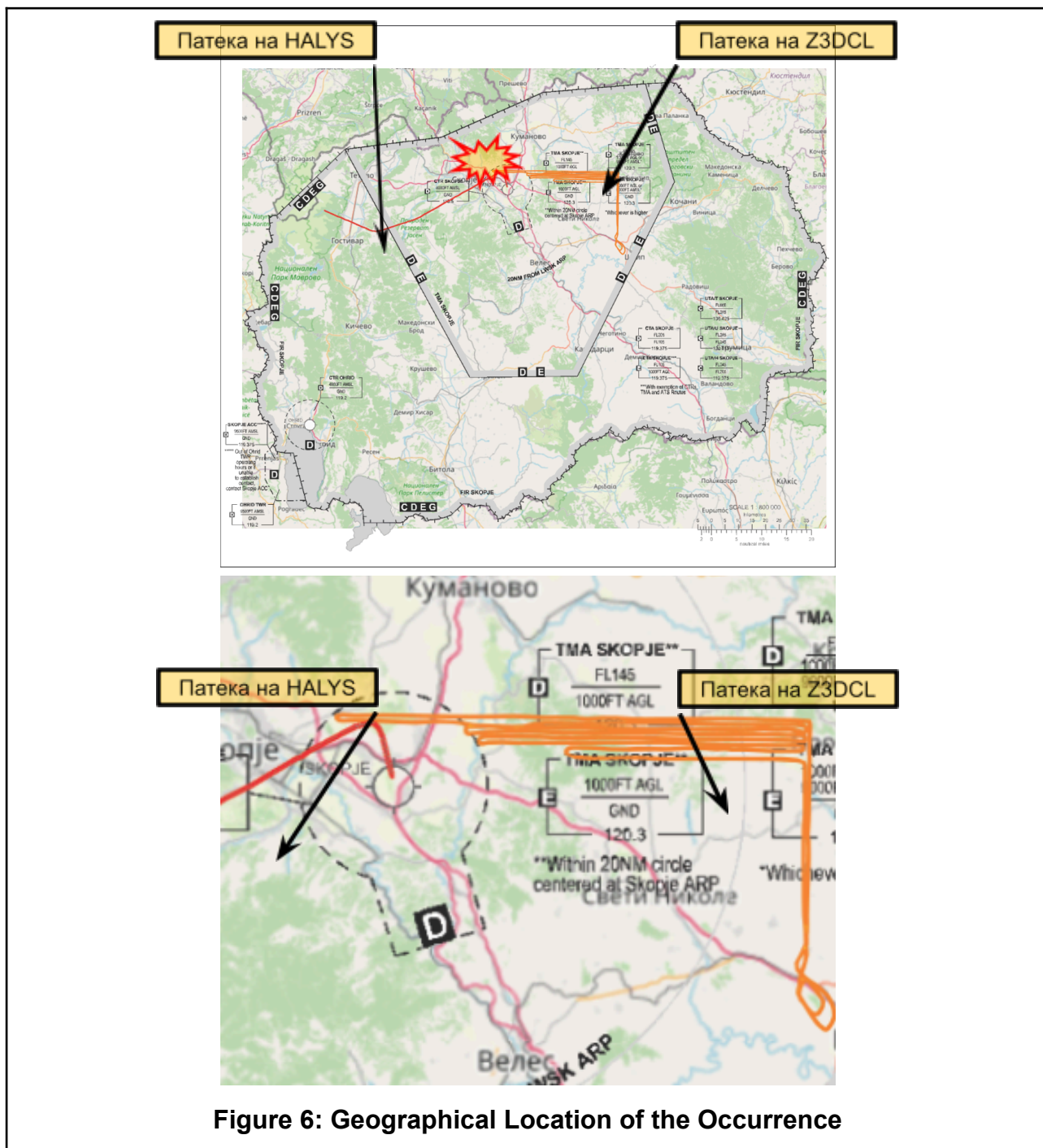
2. Terminal Control Area (TMA) – Skopje

- **Lower limit:** GND
- **Upper limit:** 1,000 ft AGL within a radius of 20 NM* from Skopje Airport, or 1,000 ft AGL or 9,000 ft AGL outside this radius (the higher value shall apply)
- For lateral limits, refer to ENR 2.1

Source: Aeronautical Information Publication (AIP) of the Republic of North Macedonia

1.2.4. Geographical Location of the Occurrence

The critical occurrence took place 6 km north of Skopje International Airport and 12 km northeast of the city of Skopje, at an altitude of 4,000 ft.



The **orange line** indicates the flight path of **Z3-DCL** during its operation along **Route No. 64**. The **red line** indicates the flight path of **HALYS** after departure from **Skopje International Airport**.



1.3. Regulation of Flights Within the Airspace of the Republic of North Macedonia

The operation of aircraft within the **airspace of the Republic of North Macedonia** is regulated in accordance with the following documents:

- **Law on Aviation** (*Official Gazette of the Republic of North Macedonia* Nos. 14/24, 224/24, 3/25 and 144/25);
- **Aeronautical Information Publication (AIP) of the Republic of North Macedonia** (November 2025 edition);
- **Air Traffic Services Provision Manual** (issued by **M-NAV**, January 2022 edition).

1.3.1. Provisions from the Aeronautical Information Publication (AIP) of the Republic of North Macedonia

The **Aeronautical Information Publication (AIP) of the Republic of North Macedonia**, under the **En-route (ENR)** section, chapter **General Rules and Procedures**, states that:

“No aircraft shall be operated in such proximity to another aircraft as to create a danger of collision.”

1.1.7 Avoidance of collisions

Note: It is important that vigilance for the purpose of detecting potential collisions be not relaxed on board an aircraft in flight at any time regardless of the type of flight or the class of airspace in which the aircraft is operating, and while operating on the movement area of an aerodrome.

1.1.7.1 Proximity

1.1.7.1.1 An aircraft shall not be operated in such proximity to other aircraft as to create a collision hazard.

Source: Aeronautical Information Publication (AIP) of the Republic of North Macedonia

Furthermore, **paragraph 1.1.7.2.3** states:

“When two aircraft are converging at approximately the same altitude, the aircraft that has the other aircraft on its right shall give way, and the aircraft on the right has the right-of-way.”

1.1.7.2.3 Converging.

When two aircraft are converging at approximately the same level, the aircraft that has the other on its right shall give way.

Source: Aeronautical Information Publication (AIP) of the Republic of North Macedonia

Under the **En-route (ENR)** section, in the chapter **Radar Services and Procedures**, the **Aeronautical Information Publication (AIP) of the Republic of North Macedonia** describes the radar systems used for



the provision of **air traffic control services** within the airspace of the Republic of North Macedonia, as well as the requirements governing the use of **SSR transponders** within that airspace.

ENR 1.6 Radar Services and Procedures

1.6.1 Primary Surveillance Radar (PSR)

Primary surveillance radar is **not used** by **M-NAV** for the provision of radar air traffic control services.

BR - станица на Бањски рид (PSR и MSSR), 41°57'34"N, 021°38'31"E, опсег PSR 60 NM

Coverage of the **Skopje FIR** by primary surveillance radar is provided by the following station:

- **BR – Banjski Rid Station (PSR and MSSR)**
Coordinates: **41°57'34"N, 021°38'31"E**
PSR range: 60 NM

1.6.2 Секундарен надзорен радар (SSR)

SK – Skopje Airport Station (MSSR)

Coordinates: **41°57'30"N, 021°37'35"E**

Range: 200 NM

BR – Banjski Rid Station (PSR and MSSR)

Coordinates: **41°57'34"N, 021°38'31"E**

PSR range: 60 NM

MSSR range: 200 NM

OH – Gorenička Čuka Station (Mode S)

Coordinates: **41°10'57"N, 020°46'15"E**

Range: 200 NM

Thessaloniki Station (MSSR) – Greece

For further details, refer to the **AIP Greece**.

Vitosha Station (Mode S) – Bulgaria

For further details, refer to the **AIP Bulgaria**.

The above-mentioned **SSR ground equipment**:

- interrogates aircraft operating in **Mode A** and **Mode C** and is capable of decoding all **4,096 SSR codes**;
- automatically displays the emergency codes **7700**, **7600**, and **7500** when selected by a pilot;
- applies an occupied-level criterion of **60 m (200 ft)** for determining whether a flight level is occupied by an aircraft.

1.6.2.1.2 Use of Transponders

- Pilots shall operate the **SSR transponder** and select the appropriate **modes and codes** in accordance with **Air Traffic Control (ATC)** instructions.
- Unless otherwise instructed, the pilot of an **IFR flight** entering the **Skopje FIR** shall continue using the transponder code assigned by the adjacent **ATC unit**.
- The pilot of a **VFR flight** shall operate the **SSR transponder**, where equipped, in **Mode A, Code 7000**, and **Mode C**. This requirement also applies to VFR flights entering the **Skopje FIR**, as well as to flights changing from **IFR to VFR**, unless another transponder code has been assigned in connection with that change.

Source: *Aeronautical Information Publication (AIP) of the Republic of North Macedonia*

According to the above provisions, **an aircraft operating under Visual Flight Rules (VFR) that is equipped with an SSR transponder is required to operate it using Code 7000.**

The same chapter also specifies the **minimum horizontal radar separation** applicable between two aircraft.

1.6.2.1.3 Minimum Horizontal Radar Separation

- The **minimum horizontal radar separation** is **5 NM**.
- Where one or more radar surveillance sources are unavailable, the **minimum horizontal radar separation** may be increased to **10 NM**.

Source: *Aeronautical Information Publication (AIP) of the Republic of North Macedonia*



1.3.2. Provisions of the Air Traffic Services Manual

The **Air Traffic Services Manual**, **Chapter 1 – Air Traffic Services**, **Section 2 – Air Traffic Management**, establishes the conditions and procedures governing the use of **SSR transponders**.

15. Communication Requirements and SSR Transponder – SERA.6005

15.2 Transponder Mandatory Zone (TMZ)

All flights operating within airspace designated by the competent authority as a **Transponder Mandatory Zone (TMZ)** shall be equipped with and operate an **SSR transponder** capable of operating in **Mode A and C** or **Mode S**, unless they comply with alternative provisions established by the **Air Navigation Service Provider (ANSP)** for that specific airspace.

15.2.1. **Class C and Class D airspace** are designated as **Radio Mandatory Zones (RMZ)**, in which the flight crew shall maintain continuous air-to-ground voice communication on the appropriate communication channel and, when required, establish two-way communication with the appropriate **Air Traffic Control (ATC)** unit.

15.2.2. **Class C and Class D airspace** are designated as **Transponder Mandatory Zones (TMZ)** in accordance with the following requirements:

Aircraft conducting **VFR flights** in **controlled Class C airspace** shall be equipped with an **SSR transponder**.

The same requirement applies to all other flights conducted above **5,000 ft MSL** or **3,500 ft above ground level (AGL)**, whichever altitude is higher.

The transponder shall be capable of operating in **Mode A and C** or **Mode S**.

15.2.3. By way of exception to the provisions of paragraphs (1) and (2), the appropriate **Air Traffic Control (ATC)** unit may, on a case-by-case basis, authorize operations without radio equipment and/or a transponder within a control zone, aerodrome traffic at a controlled aerodrome, or aerobatic flights in controlled airspace, provided that the safety of air traffic is not adversely affected.

15.3. Airspace designated as a **Radio Mandatory Zone (RMZ)** and/or **Transponder Mandatory Zone (TMZ)** shall be published in the **Aeronautical Information Publication (AIP)**.

Extract from the Air Traffic Services Manual

Source: M-NAV

According to the above provisions, **Class C and Class D airspace** are designated as **Transponder Mandatory Zones (TMZs)**.

The **Air Traffic Services Manual** (M-NAV, January 2022 edition) prescribes the **minimum vertical and horizontal separation minima** applicable to aircraft operating within the airspace of the Republic of North Macedonia. For the traffic involved in the critical occurrence, the applicable minimum separation minima were:

- **1,000 ft (300 m) of vertical separation; and**
- **5 NM (9.3 km) of horizontal separation.**

8. Vertical Separation

8.1. Vertical separation shall be provided by instructing the pilot to set the altimeter appropriately to ensure that the aircraft maintains the assigned flight level (**Flight Level – FL**) or altitude (**Flight Altitude**).

8.2. Vertical Separation Minima

a) **1,000 ft (300 m)** below **FL 290**;

b) **1,000 ft (300 m)** between **FL 290 and FL 410** for aircraft approved to operate within **Reduced Vertical Separation Minimum (RVSM)** airspace.

Extract from the Air Traffic Services Manual

Source: M-NAV

14. Radar Separation

14.1. Radar separation shall be applied only between **identified aircraft**, provided that there is assurance that aircraft identification will be continuously maintained.

14.2. Except where a **transfer of radar control** is to be effected, the radar controller shall establish **non-radar separation** before an aircraft under radar control enters airspace where non-radar separation is applied, or before the aircraft leaves radar coverage.

14.3. Radar separation shall be provided using **Secondary Surveillance Radar (SSR) responses**, ensuring that the distance between the nearest edges of the SSR response symbols (or between their centres, where authorized by the appropriate aviation authority) is never less than the prescribed minimum.

14.4. The boundaries of radar position symbols shall never touch or overlap unless vertical separation has been established between the aircraft concerned, regardless of the type of radar display or the radar separation minimum being applied.

14.5. For the provision of **air traffic services**, **Secondary Surveillance Radar (SSR)** shall be used for separation purposes only where radar coverage is confirmed and the accuracy and reliability of the radar system have been verified.

14.6. Radar separation shall not be applied between aircraft holding over the same geographical position.

14.7. Minimum Radar Separation Minima within the Skopje FIR

5 NM (9.3 km) within the **Area Control Service (ACC)**; and

5 NM (9.3 km) within the **Approach Control Service (APP)**.

Extract from the Air Traffic Services Manual



Source: M-NAV

1.4. Additional Information

1.4.1. Traffic Collision Avoidance System (TCAS)

The **Traffic Collision Avoidance System (TCAS)** provides flight crews with warnings of nearby aircraft that may present a collision hazard. TCAS operates independently of ground-based air traffic surveillance systems.

For TCAS to function correctly, **both aircraft must be equipped with operating transponders**, and **at least one of the aircraft must be equipped with a TCAS installation**.

TCAS generates two types of alerts:

- **Traffic Advisory (TA)** – A **TCAS Traffic Advisory (TA)** is issued when another aircraft is approaching and may present a potential collision risk. No avoidance manoeuvre is required; however, the flight crew is advised to maintain visual vigilance and, where possible, establish visual contact with the conflicting aircraft.
- **Resolution Advisory (RA)** – A **TCAS Resolution Advisory (RA)** is issued when the collision threat becomes imminent and immediate pilot action is required to maintain safe separation and avoid a collision.

TCAS/ACAS is required to remain **operational throughout all phases of flight**. The system provides both **visual** and **aural** alerts to the flight crew.

During the critical occurrence, **no TCAS alert could be generated**, as the transponder on aircraft **Z3-DCL** was not activated. Consequently, **Z3-DCL** was not only **undetectable by the ground-based Secondary Surveillance Radar (SSR) system**, but was also **not detectable by the TCAS installed on board HALYS**.

1.5. Duties and Responsibilities of Air Traffic Control Positions

2. Standard Departure Clearances

2.1. Where practicable, **standard procedures** shall be established for the **transfer of control** between **Air Traffic Control (ATC) units**, together with **standard departure clearances** for departing aircraft.

2.2. Where standard departure clearances have been established, the **Aerodrome Control Tower (TWR) controller** shall issue the standard departure clearance to departing aircraft **without prior coordination or approval** from the **Approach Control (APP)** or **Area Control Centre (ACC)**.

2.3. Prior coordination shall be required only where it is necessary to deviate from the standard departure clearance or from the standard transfer-of-control procedure for operational reasons.

2.4. Procedures shall be established to ensure that the **Approach Control Unit (APP)** is continuously informed of the **departure sequence** of aircraft and of the **Standard Instrument Departure (SID)** in use.

2.5. Procedures shall be established to ensure that the designators of the approved **Standard Instrument Departures (SIDs)** are displayed at the **Aerodrome Control Tower (TWR)** and at the **Approach Control (APP)** and/or **Area Control Centre (ACC)**, as appropriate.

2.6. A **standard departure clearance** shall include the following elements:

- Aircraft identification;
- Clearance limit, normally the destination aerodrome;
- Designator of the assigned **Standard Instrument Departure (SID)**, where applicable;
- Initial cleared level, unless included in the SID description;
- Assigned **SSR transponder code**;
- Any other necessary instructions or information not contained in the SID, such as frequency change instructions.

Extract from the Air Traffic Services Manual

Source: M-NAV

1.5.1. Duties and Responsibilities of Air Traffic Control Positions

4. Responsibilities and Duties (Air Traffic Services Manual, page 294)

4.1 Executive Approach Controller (APP)

4.1.1 Air Traffic Control (ATS)

The Executive Approach Controller issues clearances, instructions and information to aircraft and coordinates with other services and control sectors in order to ensure the safe, orderly and expeditious flow of air traffic within the airspace under his/her responsibility, with the objective of preventing collisions between aircraft and between aircraft and obstacles within that area of responsibility.

• Where only one controller is assigned to the APP sector, the Executive Approach Controller shall also perform the duties of the Assistant Approach Controller as prescribed in Section 4.2 – **Assistant Approach Controller (APP)**.

• The Executive Approach Controller shall provide separation between aircraft and issue information in accordance with the classification of the airspace (AIP ENR 1.4-1) for which he/she is responsible, applying all separation standards prescribed in **ICAO Doc 4444**, the **Annex to Local Rules and Procedures**, and this Manual.

• **Traffic information** and **traffic avoidance advice** shall be provided to aircraft whenever the controller considers such information necessary for the safety of the aircraft concerned.

• The Executive Approach Controller shall apply a minimum radar separation of **5 NM** within the **Skopje TMA**.

4.1.2. Flight Information Service (FIS)

The Executive Approach Controller shall provide advice and information to all aircraft operating within the area of responsibility of the APP sector, as well as to aircraft expected to enter that



area, where such information is relevant to the conduct of the flight and/or requested by the flight crew.

4.1.3. Alerting Service (ALRS)

Where necessary, the Executive Approach Controller shall initiate **Search and Rescue (SAR)** procedures and provide assistance to the appropriate organizations during SAR operations.

4.2. Assistant Approach Controller (APP)

The Assistant Approach Controller shall coordinate with the **ACC sectors** and the **Tower (TWR)** sector and shall perform other duties as directed by, or in coordination with, the Executive Approach Controller.

4.3. Division of Responsibilities Between the APP Sector and Adjacent Sectors

The APP sector shall provide **Air Traffic Control Service (ATS)** to controlled aircraft during the following phases of flight:

- a) arriving aircraft transferred from the **ACC sector** until they are transferred to the **Tower (TWR)** sector;
- b) arriving aircraft entering the APP area of responsibility from uncontrolled airspace until they are transferred to the **Tower (TWR)** sector;
- c) departing aircraft transferred from the **Tower (TWR)** sector until:
 - the aircraft is transferred to the next ATS sector; or
 - the aircraft leaves the APP area of responsibility and enters uncontrolled airspace;
- d) aircraft transiting through the APP area of responsibility.

5. Description of the Duties of APP Sector Personnel

5.1 Executive Approach Controller (APP)

The Executive Approach Controller shall:

- Provide direct Air Traffic Control (ATC) services by issuing clearances, instructions, information and assistance (SAR) to the flight crews of aircraft operating within the area of responsibility, in accordance with the applicable rules, regulations and standards prescribed in ICAO Doc 4444, the Annex to Local Rules and Procedures, and this Manual.
- Maintain direct radio communication with aircraft flight crews on the assigned operational frequencies, continuously monitoring those frequencies while the sector is in operation.
- Plan air traffic, operate the Alenia Controller Working Position (CWP) terminal, update the Current Flight Plan (Current FPL) (including heading, Cleared Flight Level (CFL), and other relevant parameters), and maintain paper flight progress strips.
- Supervise the operation of the APP sector.
- Coordinate operations with the appropriate personnel of adjacent ACC sectors, the Tower (TWR) sector, neighbouring ATS units, and other operational organizations.
- Provide flight crews with meteorological information and other operational information, including equipment malfunctions and navigation warnings, necessary for the safe and efficient conduct of flights.
- Inform the Supervisor of all significant events related to the operation of the sector, in particular:
 - malfunctions or irregularities affecting equipment and systems;

- deviations from applicable rules and procedures by personnel in ATS sectors or units with which direct coordination is maintained;
- occurrences affecting flight safety, including comments or complaints submitted by pilots or neighbouring ATS units regarding ATC services;
- alerting situations, emergencies, or any abnormal circumstances involving aircraft under the controller's responsibility or aircraft known to require assistance.

Note: Examples of aircraft emergency scenarios, together with the expected actions of pilots and air traffic controllers, are provided in Appendix B of this Manual.

- Comply with all applicable legislation and the provisions of this Manual during both operational duties and rest periods within the working shift, particularly with regard to shift handover procedures and the operation, verification and configuration of equipment and systems.
- Report every safety occurrence in which he/she has been involved or of which he/she has been a witness no later than the end of the duty shift (the list of reportable safety occurrences is provided in Chapter 8 of this Manual). Such reports shall be submitted by completing Form 01 – ATC Occurrence Reporting Form contained in Appendix E of this Manual and forwarding it to the Supervisor in accordance with the reporting and investigation procedures established in the Safety Manual. The controller may also voluntarily report any other safety occurrence considered relevant in accordance with the voluntary reporting procedures contained in the Safety Manual.
- Be accountable to the Supervisor, who may assign additional duties related to the provision of air traffic services.

Excerpt from the Air Traffic Services Manual

Source: M-NAV



1.5.2. Preparatory Electronic Message for the Conduct of Aerial Distribution of Oral Rabies Vaccine Baits

On **15 September 2025 at 13:35 UTC**, the operator of the aircraft conducting aerial distribution flights of oral rabies vaccine baits submitted an e-mail to **M-NAV**.



Figure 7: Preparatory e-mail to M-NAV

In the e-mail, the operator notified M-NAV that aerial distribution flights of oral rabies vaccine baits would commence. Attached to the e-mail were all planned flight routes, **including Route No. 64**, for the purpose of operational coordination with M-NAV.



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2. Review of the Aircraft Flight Paths During the Critical Period

2.1. General

The occurrence took place during the transit of two aircraft (**Z3-DCL** and **HA-LYS**) through the airspace of the Republic of North Macedonia. The location of the occurrence was in the vicinity of **Skopje International Airport**, specifically within the departure climb path for **Runway 34**, at an altitude of **4,000 ft**.

Both aircraft involved in the occurrence were operating within **Class D controlled airspace** under **Visual Flight Rules (VFR)**.

The **Traffic Collision Avoidance System (TCAS)** was installed only on aircraft **HA-LYS**. Aircraft **Z3-DCL** was equipped only with a transponder, which was **not switched on** at the time of the occurrence. Consequently, neither a **TCAS Traffic Advisory (TA)** nor a **Resolution Advisory (RA)** was generated on board **HA-LYS**.

According to the flight crews' statements, the crew of **Z3-DCL** observed **HA-LYS** to their right and initially believed it was performing an avoiding manoeuvre. The crew of **HA-LYS** visually acquired **Z3-DCL** after rolling out of a left turn, at an estimated distance of approximately **100 m**, also to their right.

Due to the significant difference in airspeeds and the inability to establish visual contact before rolling out of the left turn, neither crew carried out an avoiding manoeuvre. Nevertheless, owing to the differing flight vectors of the two aircraft, they passed clear of each other and the occurrence did not further escalate.

2.2. Z3DCL

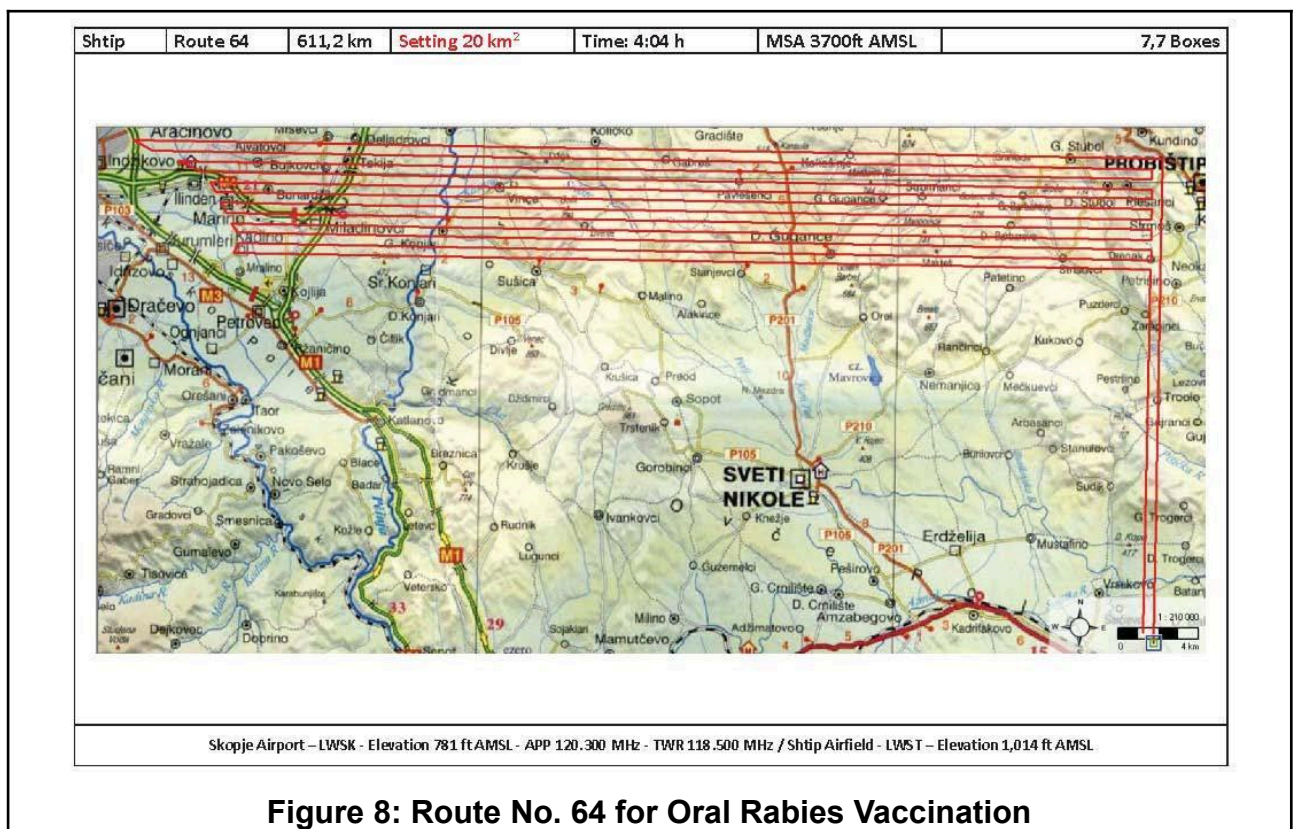
Aircraft **Z3-DCL** was a light piston-engine **Cessna 172** conducting an aerial **oral rabies vaccination** mission along **Route No. 64**.

The aircraft departed **Štip Airport** at **06:55 (local time)**. After departure, the flight crew established communication with **Skopje Approach**.

At **07:08**, the crew requested and received clearance to conduct the rabies vaccination flight along **Route No. 64** at an altitude of **4,000 ft**. The clearance **did not include the assignment of an SSR transponder code**. The crew correctly acknowledged the clearance.

At **07:09**, **Skopje Approach** instructed the crew to report upon completion of the mission.

No further communication with **Skopje Approach** took place until **07:44**, when the crew reported that they were on the **extended runway centreline** and that another aircraft had passed in close proximity.

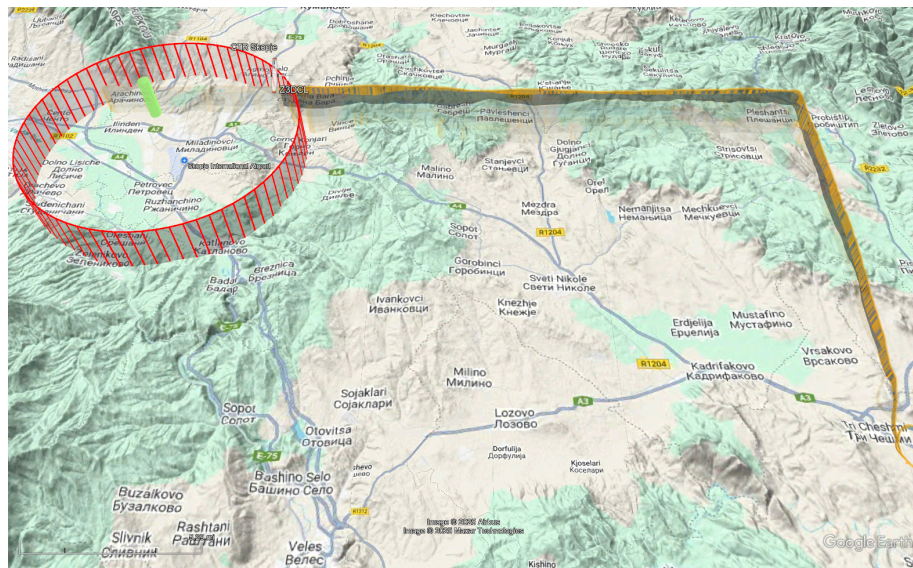


In accordance with the clearance received, the aircraft proceeded to fly **Route No. 64** for the aerial distribution of oral rabies vaccine baits.

The flight commenced along the **eastern/northern track** of the route. The aircraft flew approximately **12 NM northbound** (in the vicinity of **Probištip**) while climbing to an altitude of **4,000 ft**.

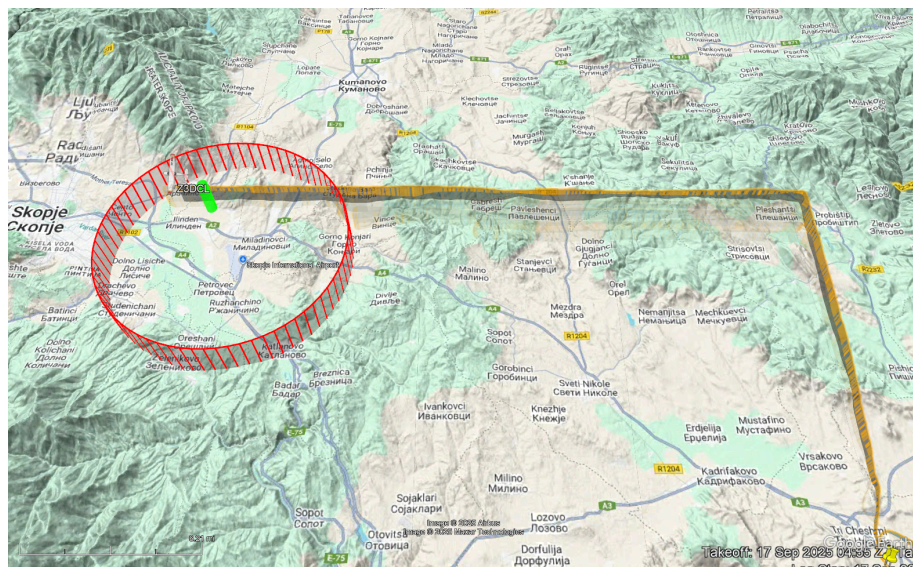
It then executed a **left turn towards the west** and continued along the **northernmost track** of the route for a distance of approximately **27 NM**.

At **07:38 (local time)**, while maintaining an altitude of **4,000 ft**, the aircraft entered the **Skopje CTR** after flying approximately **20 NM** along the same track.



**Figure 9: Position of Z3-DCL Upon Entering Skopje CTR While Flying Westbound
07:38 (Local Time)**

The aircraft continued along the same track towards its western end. At **07:43 (local time)**, it initiated a **180° left turn** to commence the next survey track in an **eastbound** direction.



**Figure 10: Position of Z3-DCL on the Westbound Track
07:43 (Local Time)**

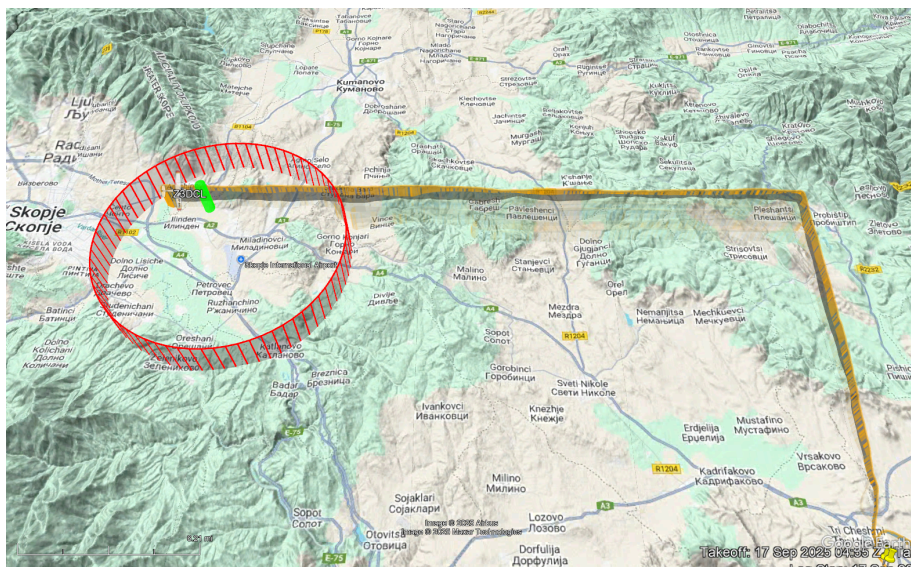


Figure 11: Position of Z3-DCL on the Eastbound Track

07:44 (Local Time)

By **07:44 (local time)**, the aircraft had established on the **eastbound track**, maintaining an altitude of **4,000 ft**. It was approaching the **Closest Point of Approach (CPA)** with the other aircraft. Throughout the flight, **Z3-DCL** remained in radio communication with **Skopje Approach** on frequency **120.300 MHz**.

2.3. HALYS

Aircraft **HA-LYS** was a passenger aircraft, an **Airbus A320**, operating a scheduled flight from **Skopje** to **Basel**, an airport located near the tripoint of **France, Germany, and Switzerland**.

According to the flight plan, after departure the aircraft was planned to follow the **Standard Instrument Departure (SID) GOSTI 2D** towards waypoint **GOSTI**, located in the vicinity of **Gostivar**.

Due to the favourable meteorological conditions, and in order to reduce the departure and flight time, a procedure commonly used when weather conditions permit, the crew was granted, during the initial communication, a **visual departure towards GOSTI** and clearance to climb to **10,000 ft**, followed subsequently by clearance to climb to **FL240**.

This clearance implied that, after take-off and after retraction of the aircraft configuration (**landing gear and flaps**), once reaching a safe altitude, **HA-LYS** would initiate a **left climbing turn towards GOSTI**.



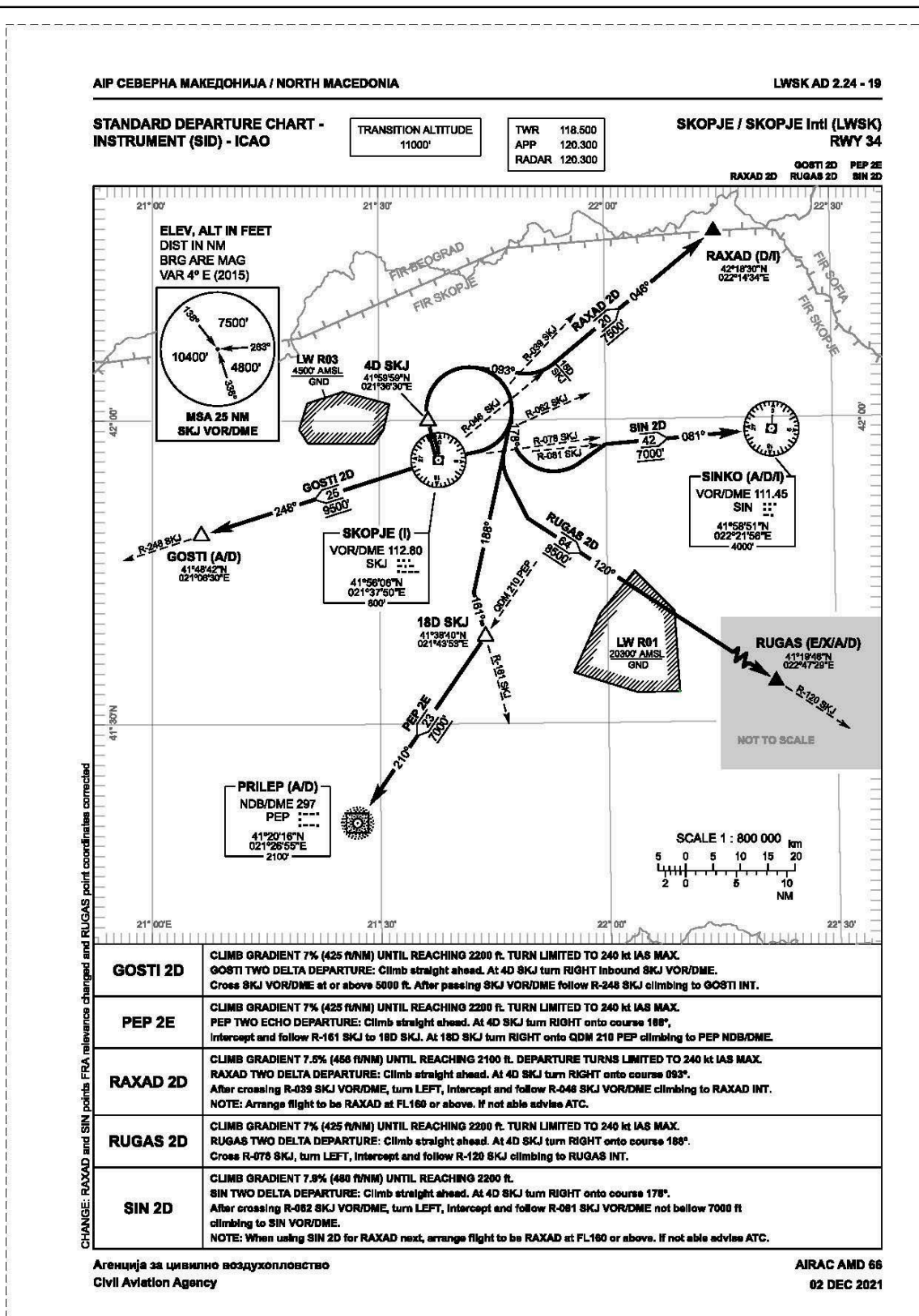


Figure 12: Standard Instrument Departure Chart for Runway 34



At **07:30 (local time)**, while on the **Skopje Tower frequency (118.500 MHz)**, the aircraft received clearance to taxi to **Runway 34** and clearance for the planned route of flight.

At **07:43 (local time)**, the aircraft received take-off clearance from **Runway 34 at Skopje International Airport**.

This moment represented the beginning of the conflict situation that resulted in both aircraft approaching each other at an unsafe distance, creating a real risk of collision.

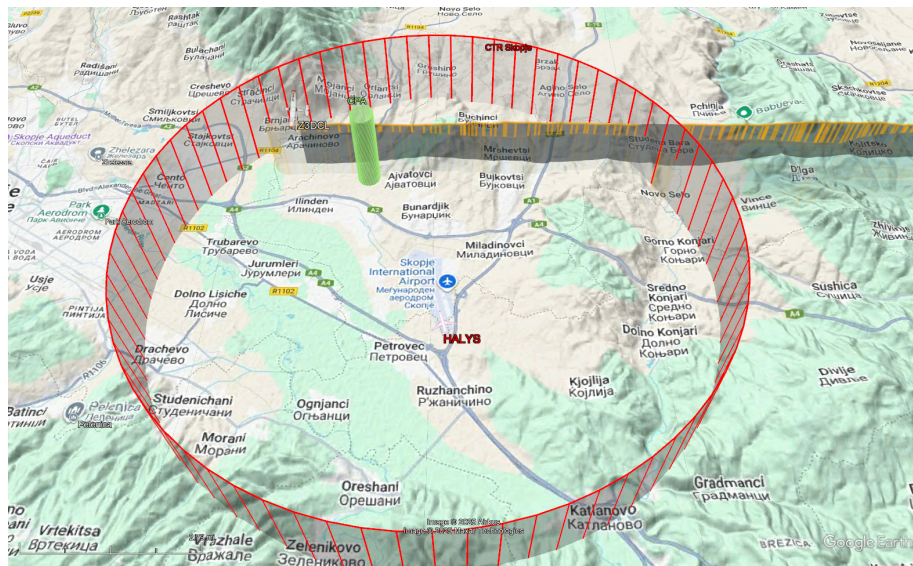


Figure 13: Position of HA-LYS During Take-off

07:43 (Local Time)

At **07:44:47 (local time)**, the aircraft established communication with **Skopje Approach (120.300 MHz)** and reported passing **3,700 ft in climb** and commencing a **left climbing visual turn towards waypoint GOSTI**.

The aircraft continued towards the **Closest Point of Approach (CPA)**. At this moment, both aircraft were converging towards the conflict point with a relative speed of approximately **300 KTS (5 NM/min, 155 m/s, 555 km/h)**.

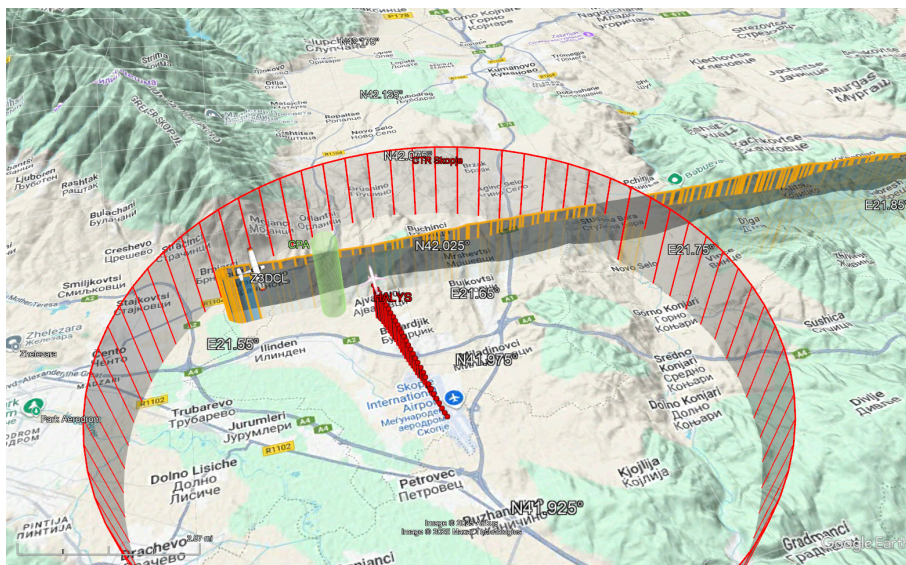
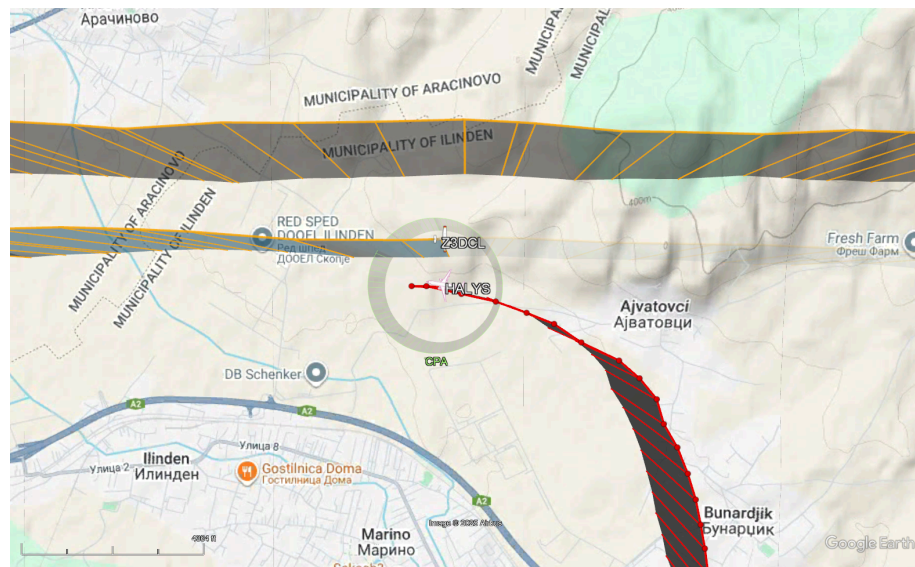
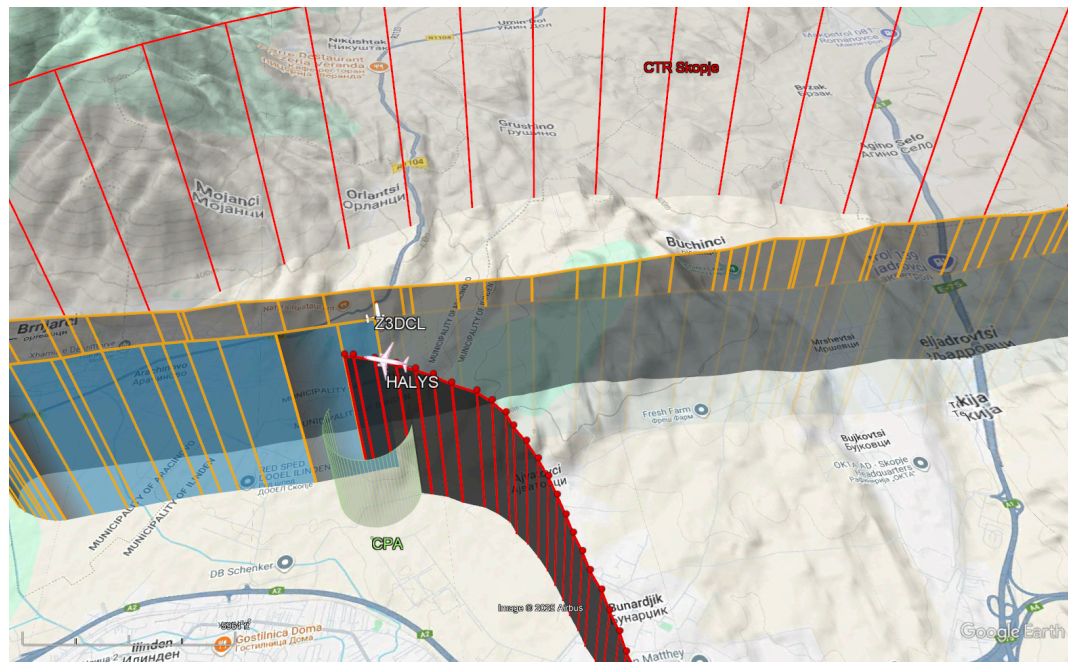


Figure 14: Position of HA-LYS After Take-off, Before Initiating the Left Turn
07:44 (Local Time)

At **07:45:10 (local time)**, both aircraft reached their **minimum horizontal separation distance**, corresponding to the **Closest Point of Approach (CPA)**.



**Figure 15: Positions of Z3-DCL and HA-LYS at the Closest Point of Approach
07:45 (Local Time)**

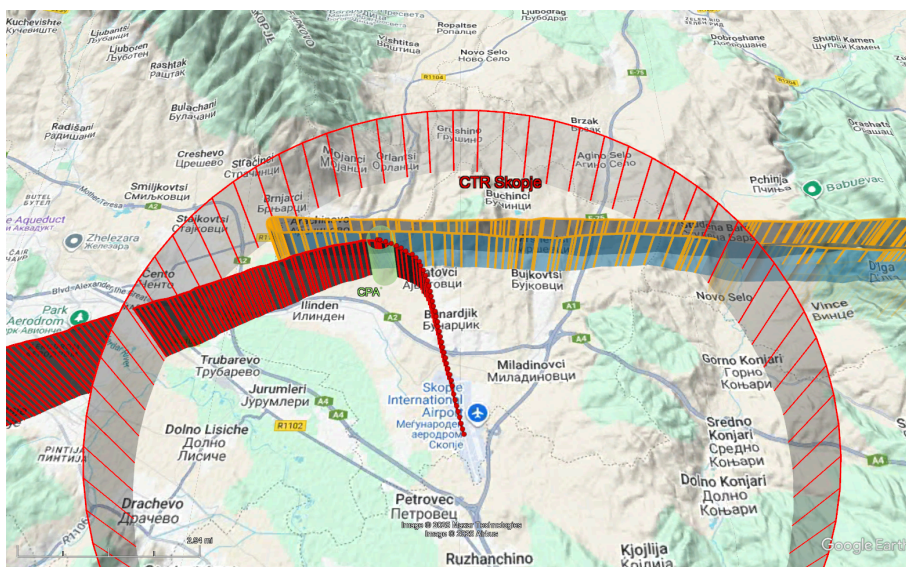


Figure 16: Situation After Passing the Closest Point of Approach and Aircraft Separation

After reaching the **Closest Point of Approach**, the aircraft passed clear of each other and the conflict situation de-escalated.

Aircraft **Z3-DCL** continued its flight **eastbound**, while aircraft **HA-LYS** continued its flight **southwestbound towards waypoint GOSTI**.

All subsequent communication with **Skopje Approach** took place after the conflict situation had been resolved.



2.4. Horizontal and Vertical Distance Between the Aircraft During the Critical Period

For the purpose of analysing the horizontal and vertical distance between the aircraft involved in this occurrence, GPS recordings of the flight paths were provided to the Committee.

Based on the analysis of the obtained recordings, the horizontal and vertical distances between the aircraft during the critical period were determined. All available recordings provided by the aircraft operators were analysed.

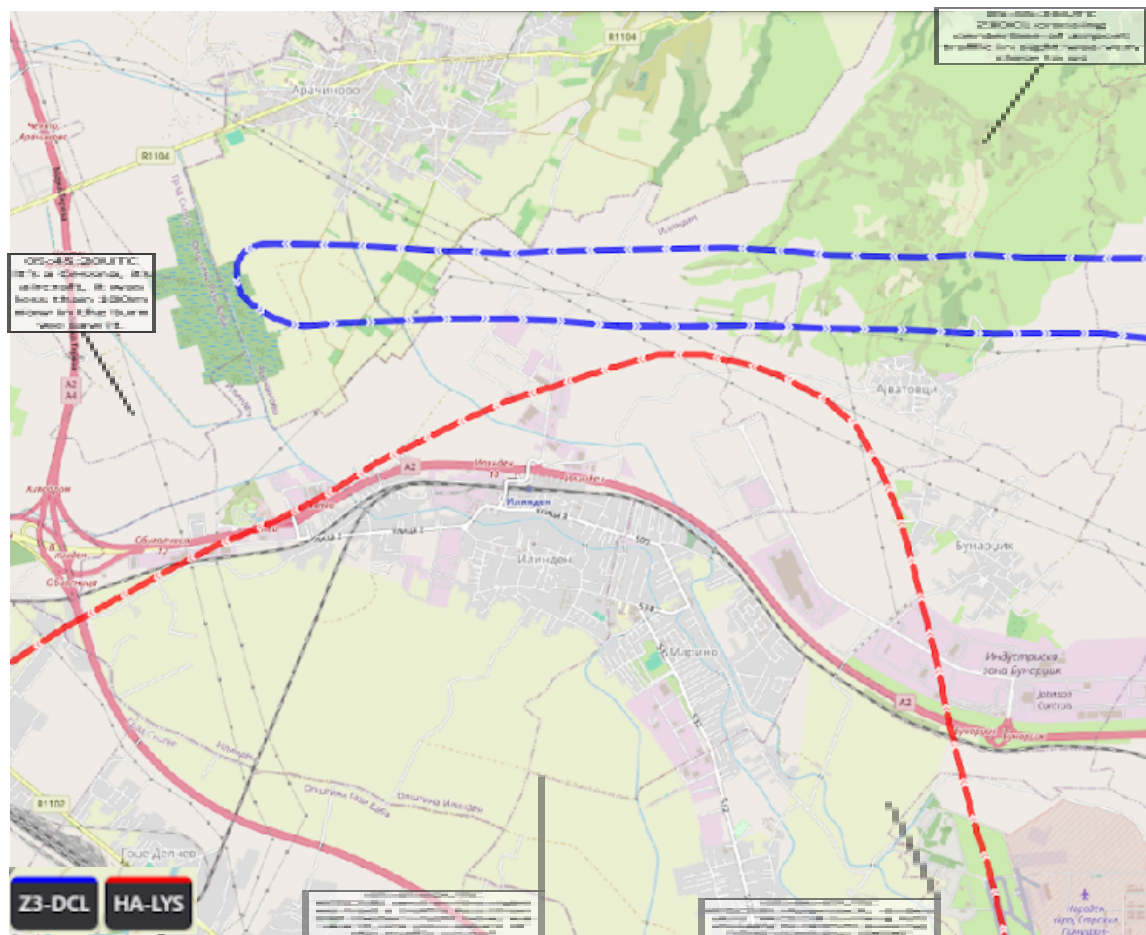


Figure 17: Horizontal representation of the aircraft trajectories

Time (UTC)	Z3-DCL			HA-LYS			Separation		
	Latitude	Longitude	Alt (m)	Latitude	Longitude	Alt (m)	Horizontal km	Vertical meters	Vertical meters
05:44:05	42,00943 4	21,555794	1255	41,98344 0	21,613829	760	5,600	5600	495
05:44:10	42,00960 2	21,558893	1254	41,98675 2	21,612980	805	5,141	5141	450
05:44:18	42,00969 7	21,562679	1249	41,98946 8	21,612082	849	4,661	4661	400
05:44:20	42,00971 6	21,563763	1250	41,99224 1	21,611078	887	4,366	4366	363
05:44:27	42,00987 2	21,567471	1258	41,99437 7	21,610403	915	3,944	3944	344
05:44:34	42,00994 5	21,571150	1258	41,99702 8	21,609386	968	3,471	3471	291
05:44:37	42,00990 3	21,573254	1258	41,99980 2	21,607832	1022	3,070	3070	236
05:44:42	42,00986 5	21,575363	1257	42,00272 0	21,605629	1073	2,624	2624	184
05:44:48	42,00975 8	21,578579	1254	42,00455 1	21,602743	1112	2,079	2079	142
05:44:58	42,00942 2	21,584358	1266	42,00609 2	21,598726	1145	1,244	1244	121
05:44:59	42,00942 2	21,584358	1266	42,00684 0	21,595867	1172	0,993	993	95
05:45:10	42,00937 7	21,590509	1280	42,00748 1	21,591875	1213	0,239	239	67
05:45:20	42,00947 6	21,595709	1284	42,00748 1	21,587730	1241	0,696	696	44
05:45:23	42,00945 7	21,596760	1286	42,00663 8	21,583622	1266	1,130	1130	20
05:45:33	42,00925 1	21,602503	1295	42,00559 6	21,579327	1294	1,958	1958	1
05:45:43	42,00919 0	21,607822	1291	42,00439 8	21,574179	1324	2,830	2830	-34

Слика 18: Преглед на позиции, височини и хоризонтално и вертикално растојание

Based on the analysis of the presented data, it can be concluded that the occurrence developed according to the following sequence:

- 05:44:05: Z3DCL was flying along the track at an altitude of approximately 1250 metres (approximately 4000 feet). HALYS had already departed from Skopje International Airport and was at an altitude of 760 metres. The horizontal distance between the aircraft was 5.6 kilometres.



- 05:44:34: The aircraft were at a horizontal distance of 3.4 kilometres and a vertical distance of 291 metres. They were approaching each other with a relative speed of approximately 300 KTS (5 NM/min, 155 m/s, 555 km/h). There were 36 seconds remaining until the Closest Point of Approach (CPA).
- 05:45:10: The Closest Point of Approach was reached, with a horizontal distance of 239 metres and a vertical distance of 67 metres.
- 05:45:33: At a horizontal distance of 1.9 kilometres, the point was reached where the aircraft were practically at the same altitude, with a vertical separation of only 1 metre.

The prescribed minimum separation values applicable within the Skopje FIR for these two aircraft were infringed from **05:44:00**, shortly after the departure of HALYS, until **05:46:20**, for a total duration of **140 seconds**.



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3. Analysis

For the purpose of determining the causes of this occurrence, the following hypotheses were considered:

- Technical failure of ground systems;
- Technical failure of aircraft systems;
- Errors by the Z3DCL flight crew;
- Errors by the HALYS flight crew;
- Ineffective implementation of procedures prescribed in the Air Traffic Services Manual.

3.1. Hypothesis 1: Technical Failure of Ground Systems

Based on the data obtained during the investigation, it was established that the ground-based radar, navigation and communication systems were operating normally.

Considering the above, the Committee rejects this hypothesis.

3.2. Hypothesis 2: Technical Failure of Aircraft Systems

Based on the data obtained during the investigation, the Committee did not find any information indicating a malfunction of the aircraft onboard systems.

The obtained information confirmed that the ACAS/TCAS system installed on HALYS was functioning in accordance with the applicable specifications, while the transponder installed on Z3DCL, although serviceable, was not switched on.

3.3. Hypothesis 3: Errors by the Z3DCL Flight Crew

Based on the data obtained during the investigation, it was established that the flight crew of Z3DCL did not switch on the aircraft transponder during the flight.

As a result, the aircraft was "invisible" to the radar systems of M-NAV, as well as to the TCAS system installed on HALYS.

Based on the analysed facts, it can be concluded that the failure to activate the transponder represents one of the direct contributing causes of the occurrence.

3.4. Hypothesis 4: Errors by the HALYS Flight Crew

Based on the data obtained during the investigation, it was established that the flight crew of HALYS correctly followed the instructions received from the Executive Air Traffic Controller.

Furthermore, the Committee examined the hypothesis regarding whether the HALYS flight crew could have visually detected Z3DCL before the situation escalated into a critical proximity event. During the moments prior to departure from Runway 34, the HALYS flight

crew performed a visual check of the departure and climb path in accordance with normal operational practice, with the aim of identifying possible obstacles and/or objects that could endanger the take-off path.



Figure 19: View from the cockpit of HALYS during the take-off roll and initial climb, and the probable position of Z3DCL

At that moment, the distance between the aircraft was approximately **9.5 kilometres**. According to the sources consulted by the Committee, the maximum distance at which the human eye can detect an object with dimensions comparable to those of Z3DCL ranges between **7 and 10 kilometres**, provided that the observer knows the direction and the specific sector of the sky in which the observation should be conducted.

Furthermore, the wingspan of Z3DCL is approximately **11 metres**, which at these distances corresponds to an angular size of approximately **2 arc minutes** – a value close to the threshold of human visual perception. Therefore, it can be concluded that the HALYS flight crew would not have been able to visually detect Z3DCL at an altitude of **4000 feet**, even if they had intentionally focused their observation towards the relevant area of the sky.



Figure 20: View from the cockpit of HALYS after take-off, during climb, and the probable position of Z3DCL

Immediately after take-off, HALYS established a climb angle of approximately 15° . With this aircraft attitude, the cockpit structure and the aircraft nose effectively obstructed the area in which Z3DCL was most likely located. As a consequence of this obstruction, visual detection of Z3DCL by the HALYS flight crew was not possible.



Figure 21: View from the cockpit of HALYS during the left climbing turn and the probable position of Z3DCL

Once HALYS initiated the left turn towards the GOSTI waypoint, the cockpit structure again obstructed the most probable position of Z3DCL. From that moment onwards, the possibility of visual detection of Z3DCL by the HALYS flight crew was effectively excluded.

Considering the above, the Committee rejects the hypothesis that the HALYS flight crew had a realistic opportunity to visually detect Z3DCL before the aircraft approached critically close distances.

3.5. Hypothesis 5: Errors in the Implementation of Procedures Prescribed in the Air Traffic Services Manual

During the critical occurrence, two Executive Air Traffic Controllers (Executive ATCOs) were assigned to this sector.

The first Executive ATCO (**ATCO 1**) established communication with Z3DCL at **07:07** and handed over the position to the second Executive ATCO (**ATCO 2**) at **07:16**.

The occurrence took place at **07:45**.

From **07:09** until **07:45** (a total period of **36 minutes**), neither of the Executive ATCOs established communication with Z3DCL.

Communication with ATCO 2 was established only after the critical occurrence and after the aircraft had passed each other, at **07:45**.

Considering the above, this hypothesis will be divided into an analysis of the actions of **ATCO 1** and **ATCO 2**, with the aim of identifying individual deficiencies and determining their influence on the development of the critical occurrence.

ATCO 1

At **07:07**, ATCO 1 accepted the aircraft Z3DCL on his working frequency. He cleared the aircraft to operate along **route 64** at an altitude of **4000 feet**, without issuing an instruction to select a transponder code.

Based on the information collected during the investigation, ATCO 1 did not consult the route chart for **route 64** in order to determine through which airspace the respective route was passing.

According to the ambient recording provided by M-NAV (**Ambient APP-66_5-20250917-051000-0h-10m-0s**, at **04:55** from the beginning of the recording), a conversation between the controller and a neighbouring sector was recorded at **07:14:55**.



When asked whether any of the aircraft conducting aerial distribution of rabies vaccination baits would enter that sector, ATCO 1 replied:

“No, I don’t know their routes, and I was too lazy to check them.”

According to the same ambient recording (**Ambient APP-66_5-20250917-051000-0h-10m-0s**, at **06:50** from the beginning of the recording), during the handover of duties at **07:16:50**, ATCO 1 provided ATCO 2 with incorrect information, stating that:

“all routes are to the east.”

This statement was contrary to the actual situation, as route 64 of Z3DCL was oriented towards the west and passed through **Skopje CTR**.

Such failure in the transfer of information represents a serious deviation from coordination procedures and created a risk to the safety of air traffic.

According to the ambient recording (**same recording: Ambient APP-66_5-20250917-051000-0h-10m-0s**, at **07:25** from the beginning of the recording), at **07:17:25**, during the handover of duties, when ATCO 2 asked whether transponder codes had been assigned to the aircraft conducting aerial distribution of rabies vaccination baits, ATCO 1 replied:

“And the others at 4000 feet, I didn’t even ask if they had one...”

This statement indicates non-compliance with standard procedures for transponder code allocation and insufficient verification of the status of the aircraft under control. This represents a significant deficiency with potential consequences for the safety of air traffic.

ATCO 2

ATCO 2 took over the position at **07:16**.

Based on the information collected during the investigation, there is no evidence that ATCO 2 was aware at that moment that Z3DCL was approximately **7.5 kilometres** from entering **Skopje CTR**.

He did not attempt to establish communication with Z3DCL.

The first contact with Z3DCL was established at **07:45**, after the critical conflict situation had already de-escalated.

Considering the above facts, it can be concluded with a high degree of certainty that the actions of **ATCO 1** represent a sequence of direct and indirect causal factors that contributed to the occurrence and escalation of the critical event.

Furthermore, with the same degree of certainty, it can be determined that, considering the development of events, **ATCO 2 did not have a realistic opportunity to act differently or prevent the development of the conflict situation**, due to the lack of sufficient information regarding the traffic situation within the airspace, as well as due to the inaccurate traffic information transferred to him by ATCO 1 during the handover of duties.



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4. Conclusions

4.1. Findings

Based on the analysis of the available material, the Commission identified the following findings related to this occurrence during the investigation.

4.1.1. Flight with transponder switched off

Chapter ENR, Section 1.6 *Radar Services and Procedures*, item 1.6.2.1.2 *Use of Transponder*, paragraph 3 of the Aeronautical Information Publication of the Republic of North Macedonia, prescribes the obligations and procedures for the use of transponders within the airspace of the Republic of North Macedonia. This section establishes that the pilot of a VFR flight shall use the SSR transponder, if available, in Mode A, Code 7000, and Mode C.

In the occurrence under investigation, the Z3DCL aircraft was equipped with a serviceable transponder; however, the transponder was not switched on, contrary to the provisions established in the Aeronautical Information Publication. This constituted a violation of the applicable provisions.

During the course of the investigation, the Commission established that the Civil Aviation Agency (CAA) had imposed a sanction on the pilot of Z3DCL due to non-compliance with sub-item 1.6.2.1.2 *Use of Transponder* of the Aeronautical Information Publication. The sanction was issued by the CAA through Record of Offence No. 08-1244/1 dated 29.09.2025, due to a violation of Article 124 of the Law on Aviation ("Official Gazette of the Republic of North Macedonia" Nos. 14/24, 224/24, 3/25 and 144/25).

4.1.2. Clearance issued without transponder code instruction

Chapter ENR, Section 1.6 *Radar Services and Procedures*, item 1.6.2.1.2 *Use of Transponder*, paragraph 1 of the Aeronautical Information Publication of the Republic of North Macedonia, prescribes the obligations and procedures for the use of transponders within the airspace of the Republic of North Macedonia. This section establishes that the pilot shall operate the transponder and select modes and codes in accordance with Air Traffic Control instructions.

Additionally, Chapter IV *Approach Control Services*, Chapter 3 *Procedures for Departing Aircraft*, item 2 *Standard Departure Clearances for Aircraft*, sub-item 2.6 of the Air Traffic Services Provision Manual states that standard departure clearances shall include, among other elements, the assigned SSR code (transponder code).

Furthermore, according to the ambient recording (Ambient APP-66_5-20250917-051000-0h-10m-0s), at time 07:17:25, ATCO1 stated that no transponder code instruction had been issued to aircraft Z3DCL.



In the occurrence under investigation, aircraft Z3DCL was issued clearance to perform the requested route at the requested altitude without receiving an instruction regarding the assigned transponder code, contrary to the provisions established in the Aeronautical Information Publication and the Air Traffic Services Provision Manual.

4.1.3. Negligent and Improper Performance of Duties

Chapter 2, Section 2, item 5 *Responsibilities and Duties*, sub-item 5.1.1 of the Air Traffic Services Provision Manual prescribes that: "The ACC Executive Air Traffic Controller shall issue clearances, instructions and information to aircraft and perform coordination with other services and sectors in order to ensure the safe, orderly and expeditious flow of air traffic within the airspace under his/her responsibility, with the objective of preventing collisions between aircraft."

In this occurrence, based on the ambient recording provided by M-NAV (Ambient APP-66_5-20250917-051000-0h-10m-0s, at 04:55 from the beginning of the recording), a conversation between a controller and an adjacent sector was recorded at time 07:14:55. When asked whether any of the aircraft performing aerial distribution of rabies vaccine baits would enter that sector, ATCO1 replied: "No, I do not know their routes, and I was too lazy to check them."

Such conduct by ATCO1 represented a failure to comply with the provisions established in the Air Traffic Services Provision Manual.

4.1.4. Transfer of Operational Responsibility

Chapter 3, Section 2, item 7 *Transfer of Duty* of the Air Traffic Services Provision Manual prescribes that: "The ATCO handing over the executive position, before signing off from the frequency working list, shall provide the ATCO taking over the executive position with, among other things, information regarding:

- Active and planned traffic;
- Expected traffic during the following period;
- Any other information considered important by the ATCO handing over the position for the continuation of operations."

In this occurrence, during the transfer of duty from ATCO1 to ATCO2, ATCO1 failed to provide information regarding aircraft Z3DCL, contrary to the provisions of the Air Traffic Services Provision Manual.

Furthermore, ATCO1 failed to comply with the prescribed procedures by providing ATCO2 with inaccurate and inappropriate information regarding the position and direction of flight of Z3DCL, as established from the ambient recording (Ambient APP-66_5-20250917-051000-0h-10m-0s).

These incorrect and incomplete information exchanges represented a breach of established procedures and, through a chain of causal events, contributed to the escalation of the situation and the close proximity event between the two aircraft involved.

As a result, a potential threat to the safety of air traffic was created, where only a combination of favourable circumstances prevented a collision between the two aircraft.

4.1.5. Distribution of Flight Route Charts for Fox Vaccination Flights

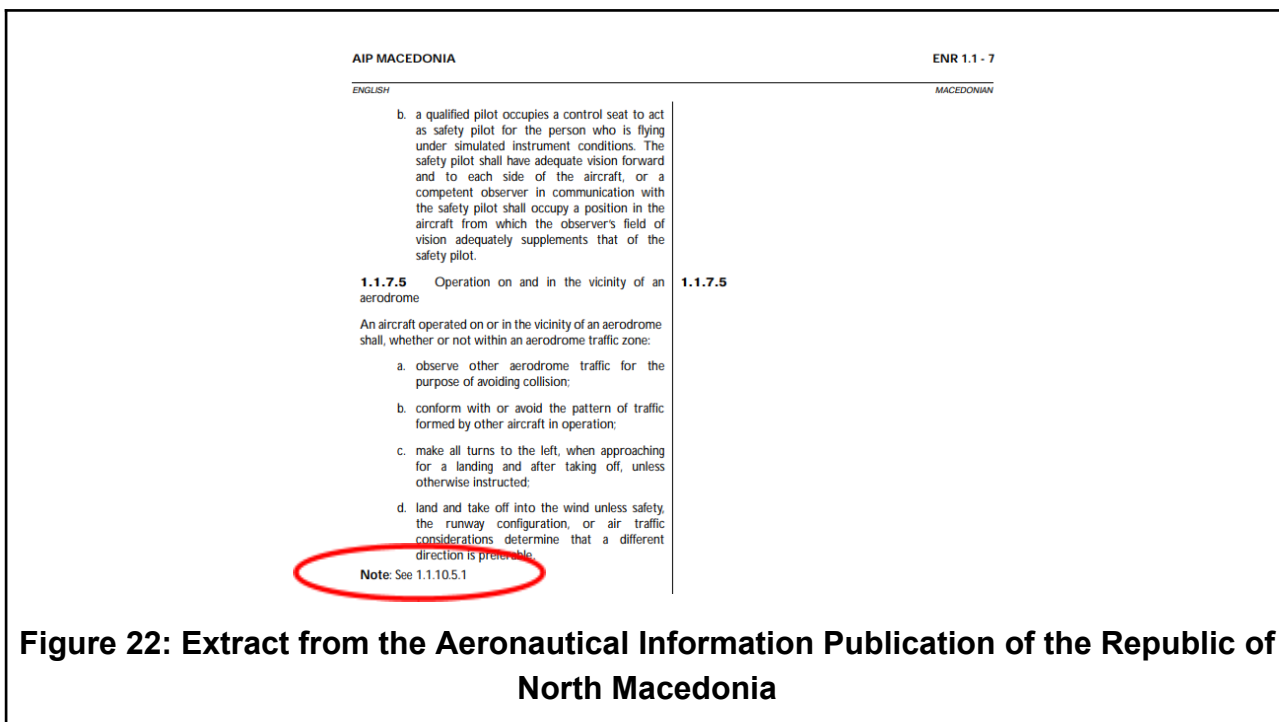
The flight route charts for the aerial distribution of rabies vaccine baits, including the chart for route number 64, were submitted to M-NAV on 15.09.2025 at 13:35, approximately two days prior to the critical occurrence.

A characteristic of this activity is that it covers the entire territory of the Republic, including controlled airspace areas. For the safe conduct of air traffic, it is of essential importance that Air Traffic Controllers are familiar with the route information, their geographical extent, and the necessary coordination requirements for these flights. The operational nature of air traffic services requires rapid and simple accessibility of such charts and information by Air Traffic Controllers.

During the investigation, the Commission was unable to determine whether Air Traffic Controllers had been briefed by their superiors regarding these flights, nor was it possible to establish how the distribution and/or availability of this information had been planned.

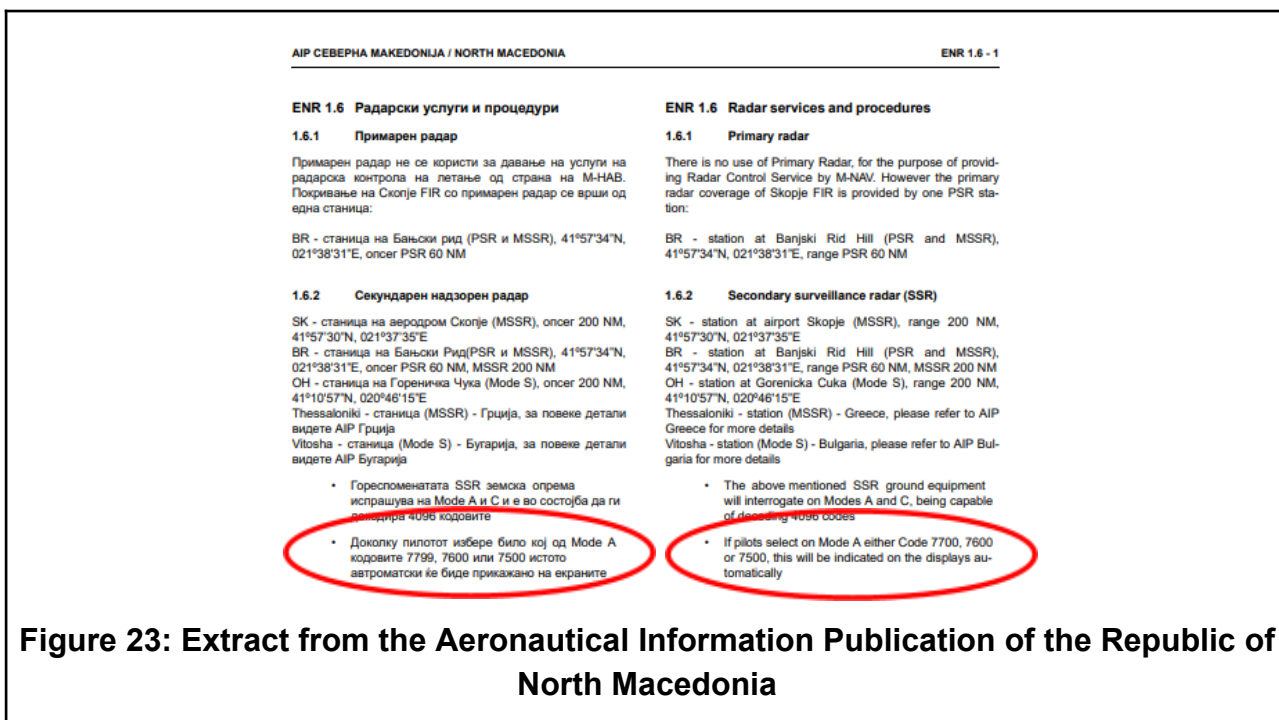
4.1.6. Errors and omissions identified in the AIP

During the investigation, the Commission conducted a detailed review of the relevant sections and excerpts from the Aeronautical Information Publication of the Republic of North Macedonia. During this process, several errors and omissions were identified.



In the above-mentioned extract, it was determined that there is no provision corresponding to the reference indicated as:

- **Note:** See 1.1.10.5.1



In the above-mentioned extract, it was identified that the text in the Macedonian language version does not correspond with the text in the English language version (**7799 ≠ 7700**).

4.1.7. Discrepancies between the AIP and the Manual of Air Traffic Services

Chapter 1, Section 3, paragraph 15, subparagraph 15.3 of the Manual of Air Traffic Services states that: "The airspaces designated as Radio Mandatory Zones (RMZ) and/or Transponder Mandatory Zones (TMZ) shall be published in the Aeronautical Information Publication."

During the investigation and review process, the Commission was unable to identify such provisions in the Aeronautical Information Publication of the Republic of North Macedonia.



4.2. Direct cause of the occurrence

Despite the efforts made during the investigation and analysis, no single direct cause of the occurrence could be determined. All available facts indicate the presence of a combination of two procedural deficiencies:

- **Procedural deficiency by Z3DCL:** failure to switch on the transponder and failure to set the transponder code 7000 prior to entering CTR Skopje, which was an obligation in accordance with AIP ENR 1.6-1; ENR 1.6-2; paragraph 1.6.2.1.2 *Use of Transponder*, and SERA.13001/SERA.13005.
- **Procedural deficiency by ATC:** failure to assign a transponder code when issuing the flight clearance.

Although Z3DCL operated in accordance with the clearance received from ATC, the absence of an assigned transponder code resulted in the aircraft becoming “invisible” to air traffic control systems and to other aircraft operating within the area.

The underlying cause remains the failure of ATC to integrate the route information provided in advance and to ensure appropriate separation between IFR and VFR traffic.

4.3. Indirect causes of the occurrence

The following factors were identified as indirect causes contributing to the development of the occurrence:

- Insufficient or non-existent preparation of ATC personnel regarding the forthcoming campaign for aerial distribution of rabies vaccine baits and familiarization with the planned routes;
- Failure to consult the provided route information; and
- Provision of inaccurate and inappropriate information during the transfer of control responsibility.



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5. Safety Recommendations

Taking into consideration the direct and indirect causes of this occurrence, as well as the findings and information obtained through the analysis of the available materials during the investigation process, the Commission recommends the implementation of the following safety measures:

Note:	In accordance with the Law on Aviation (“Official Gazette of the Republic of North Macedonia” No. 14 dated 22.01.2024) and Article 7, point 3 of the Regulation on the Principles Governing the Investigation of Accidents, Serious Incidents, Incidents and Occurrences Involving Civil and State Aircraft, the Manner of Their Reporting, as well as the Form, Content, Method of Maintaining Records and the Method of Issuing and Revoking Investigators’ Official Identification Cards (“Official Gazette of the Republic of North Macedonia” No. 67 dated 27.03.2023), safety recommendations are not intended to create a presumption of blame or liability for an aircraft accident, serious incident, or incident. Furthermore, the recipient of a safety recommendation shall acknowledge receipt of the safety recommendations and shall inform the Investigation Committee that issued the recommendation of the actions taken or planned to be taken and, where appropriate, of the time required for their completion. If no action is taken, the recipient shall provide the reasons for such decision, in accordance with the conditions specified in Article 18 of the aforementioned Regulation.
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Reference	Description of Safety Recommendation
MK.KINSIV 008/2025/01	The Civil Aviation Agency (CAA) shall require all operators performing such or similar flights within the airspace of the Republic of North Macedonia, whether conducted as Part-SPO or as GAT, to issue a bulletin containing instructions that flight crews shall keep the transponder switched on throughout the entire flight, with transponder code 7000, unless another code has been assigned by Air Traffic Control. Deadline: Immediate

Reference	Description of Safety Recommendation
MK.KINSIV 008/2025/02	The Civil Aviation Agency (CAA) shall implement a bulletin requiring all operators performing such or similar flights within the airspace of the Republic of North Macedonia as Part-SPO to submit to M-NAV, at least 15 days prior to the commencement of operations, charts containing the planned flight routes. The charts shall clearly indicate CTR Skopje, CTR Ohrid, and other relevant areas within the airspace of the Republic of North Macedonia. Deadline: 90 days
MK.KINSIV 008/2025/03	M-NAV shall conduct a seminar with all Air Traffic Controllers (ATCOs) during which the causes and findings of this Final Report shall be discussed. Minutes of the seminar shall be prepared and submitted to KINSIV. Deadline: 60 days
MK.KINSIV 008/2025/04	M-NAV shall conduct a refresher training for all Air Traffic Controllers (ATCOs) regarding the provision of the Manual for the Provision of Air Traffic Services requiring ATCOs to assign transponder codes to all aircraft. Deadline: 30 days
MK.KINSIV 008/2025/05	M-NAV shall conduct a refresher training for all Air Traffic Controllers (ATCOs) regarding the provision of the Manual for the Provision of Air Traffic Services regulating the process of transfer of control duties between ATCOs. Deadline: 30 days
MK.KINSIV 008/2025/06	M-NAV shall ensure that all Air Traffic Controllers (ATCOs) are familiar with upcoming operations involving such or similar flights within the airspace of the Republic of North Macedonia. Deadline: 60 days



Reference	Description of Safety Recommendation
MK.KINSIV 008/2025/07	M-NAV shall ensure that all Air Traffic Controllers (ATCOs) have simple, fast, and timely access to charts provided for the execution of such or similar flights within the airspace of the Republic of North Macedonia. Deadline: 60 days
MK.KINSIV 008/2025/08	M-NAV shall perform standardization of VFR entry and exit points for CTR Skopje and CTR Ohrid and publish them in the Aeronautical Information Publication (AIP). Deadline: 90 days
MK.KINSIV 008/2025/09	M-NAV shall update the Aeronautical Information Publication (AIP) and remove identified errors and omissions. Deadline: 90 days
MK.KINSIV 008/2025/10	M-NAV shall harmonize the Aeronautical Information Publication (AIP) with the Manual for the Provision of Air Traffic Services regarding the provision referred to in point 4.1.6 of this Report, i.e. Chapter 1, Section 3, point 15, sub-point 15.3 of the Manual. Deadline: 90 days
MK.KINSIV 008/2025/11	The Civil Aviation Agency (CAA), during the next regular or unscheduled oversight or inspection, shall verify the content of the Aeronautical Information Publication (AIP) regarding the existence of errors and omissions. Deadline: In accordance with the oversight or inspection implementation plan
MK.KINSIV 008/2025/12	The Civil Aviation Agency (CAA), during the next regular or unscheduled oversight or inspection, shall verify the content of the Aeronautical Information Publication (AIP) regarding the existence of errors and omissions. Deadline: In accordance with the oversight or inspection implementation plan

The Aircraft Accident and Serious Incident Investigation Committee reminds all organizations to which these safety recommendations have been addressed that, pursuant to Article 7, point 3 of the above-mentioned Regulation, they are required to provide written notification to the Aircraft Accident and Serious Incident Investigation Committee regarding the implementation status of the safety recommendations.

Archive Reference No.:		Signature:	Marjan Prposki
Date:			Investigator-in-Charge (IIC)