MINISTRY FOR
INNOVATION AND TECHNOLOGY
TRANSPORTATION SAFETY BUREAU

FINAL REPORT

2016-548-4

Incident

29 December 2016

Békásmegyer Area, Budapest

OY-NAY / TB20

and

HA-SJM / Cessna 172

General information

This investigation has been carried out by Transportation Safety Bureau on the basis of

- Regulation (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and repealing Directive 94/56/EC,
- Act XCVII of 1995 on aviation,
- Annex 13 identified in the Appendix of Act XLVI. of 2007 on the declaration of the annexes to the Convention on International Civil Aviation signed in Chicago on 7th December 1944,
- Act CLXXXIV of 2005 on the safety investigation of aviation, railway and marine accidents and incidents (hereinafter referred to as Kbvt.),
- NFM Regulation 70/2015 (XII.1) on safety investigation of aviation accidents and incidents, as well as on detailed investigation for operators,
- In the absence of other relevant regulation in the Kbvt., in accordance with Act CL of 2016 on General Public Administration Procedures.

The competence of the Transportation Safety Bureau of Hungary is based on Government Regulation № 230/2016. (VII.29.) on the assignment of a transportation safety body and on the dissolution of Transportation Safety Bureau with legal succession.

Pursuant to the aforesaid laws,

- Transportation Safety Bureau Hungary shall investigate aviation accidents and serious incidents.
- Transportation Safety Bureau Hungary may investigate aviation and incidents which – in its judgement – could have led to more accidents with more serious consequences in other circumstances.
- Transportation Safety Bureau Hungary is independent of any person or entity which may have interests conflicting with the tasks of the investigating body.
- In addition to the aforementioned laws, the ICAO Doc 9756 and the ICAO DOC 6920 Manual of Aircraft Accident Investigation are also applicable.
- This Report shall not be binding, nor shall an appeal be lodged against it.
- The original of this Report was written in the Hungarian language.

Incompatibility did not stand against the members of the IC. The persons participating in the safety investigation did not act as experts in other procedures concerning the same case and shall not do so in the future.

The IC shall retain the data having come to their knowledge in the course of the safety investigation. Furthermore, the IC shall not be obliged to make the data – regarding which the owner of the data could have refused its disclosure pursuant to the relevant act – available for other authorities.

This Final Report

was based on the draft report prepared by the IC and sent to all affected parties (as specified by the relevant regulation) for comments.

Simultaneously with the distribution of the draft final report, the head of TSB Hungary informed the people involved that they could make their comments within 60 days of receipt.

Comments to the Draft Report were contributed solely by Civil Aviation Authority (Department of Aviation Risk Assessment, Ministry for Innovation and Technology).

The IC prepared the Final Report with regard to those above.

Copyright Notice

Translation

This document is the translation of the Hungarian version of the Final Report. Although efforts have been made to translate it as accurately as possible, discrepancies may occur. In this case, the Hungarian is the authentic, official version.

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Definitions and Abbreviations

ATPL	*Airline Transport Pilot Licence*
CAVOK	*Ceiling and Visibility are OKay (there is no cloud below 5000 ft. above the level of the airport, and visibility exceeds)*
FEW	*Few = 1–2 oktas (clouds)*
FI	*Flight Instructor*
FIC	*Flight Information Service*
FTO	*Flight Training Organization*
ICAO	*International Civil Aviation Organization*
IC	*Investigating Committee*
IR	*Instrument Rating*
Kbvt.	*Act CLXXXIV of 2005 on the technical investigation of aviation, railway and marine accidents and incidents*
kt.	*knot (unit of velocity, 1kt = 1.852km/h)*
LHBP	*The ICAO code of Budapest Liszt Ferenc International Airport*
LT	*Local Time*
MATIAS	*Magyar Automated and Integrated Air Traffic System (Code name of the air traffic system developed by Hungarocontrol Zrt.*
MIT	*Ministry for Innovation and Technology*
MND	*Ministry of National Development*
MRSZ	*Hungarian Aeronautical Association*
MTOM	*Maximum Take-Off Mass*
NOSIG	*No Significant change expected in to the reported conditions within the next 2 hours*
NVFR	*Night Visual Flight Rules*
PPL(A)	*Private Pilot Licence (Aeroplane)*
Student Pilot	*A pilot who can only perform solo flight under supervision of a Flight Instructor*
Time of solo flight	*Time of flight during which the student pilot stays alone on board the aircraft*
Flight plan	*Specified information provided to air traffic service units, relative to an*

	intended flight or portion of flight of an aircraft
RF	*Registered Facility*
SEP	*Single Engine Piston*
TMG	*Touring Motor Glider*
TRI	*Type Rating Instructor*
Transponder	*On-board secondary transponder*
TSB	*(Hungarian) Transportation Safety Bureau*
UTC	*Coordinated Universal Time*
VFR	*Visual Flight Rules*

Introduction

Occurrence class		Incident
OY-NAY Aircraft	Manufacturer	EADS Socata
	Type	TB20
	Registration sign	OY-NAY
	Operator	Flysyn, Denmark
HA-SJM Aircraft	Manufacturer	Cessna Aircraft Corporation
	Type	Cessna 172
	Registration sign	HA-SJM
	Operator	Malév Repülőklub
Occurrence	Date and time	29 December 2016, 11:47 UTC
	Location	Békásmegyer Area, Budapest (Figure 1)
Number of people fatally / seriously injured in the accident:		0 / 0
Extent of damage to the aircraft involved in the occurrence:		Undamaged

Any clock-time indicated in this report is given in Universal Time Coordinated (UTC).

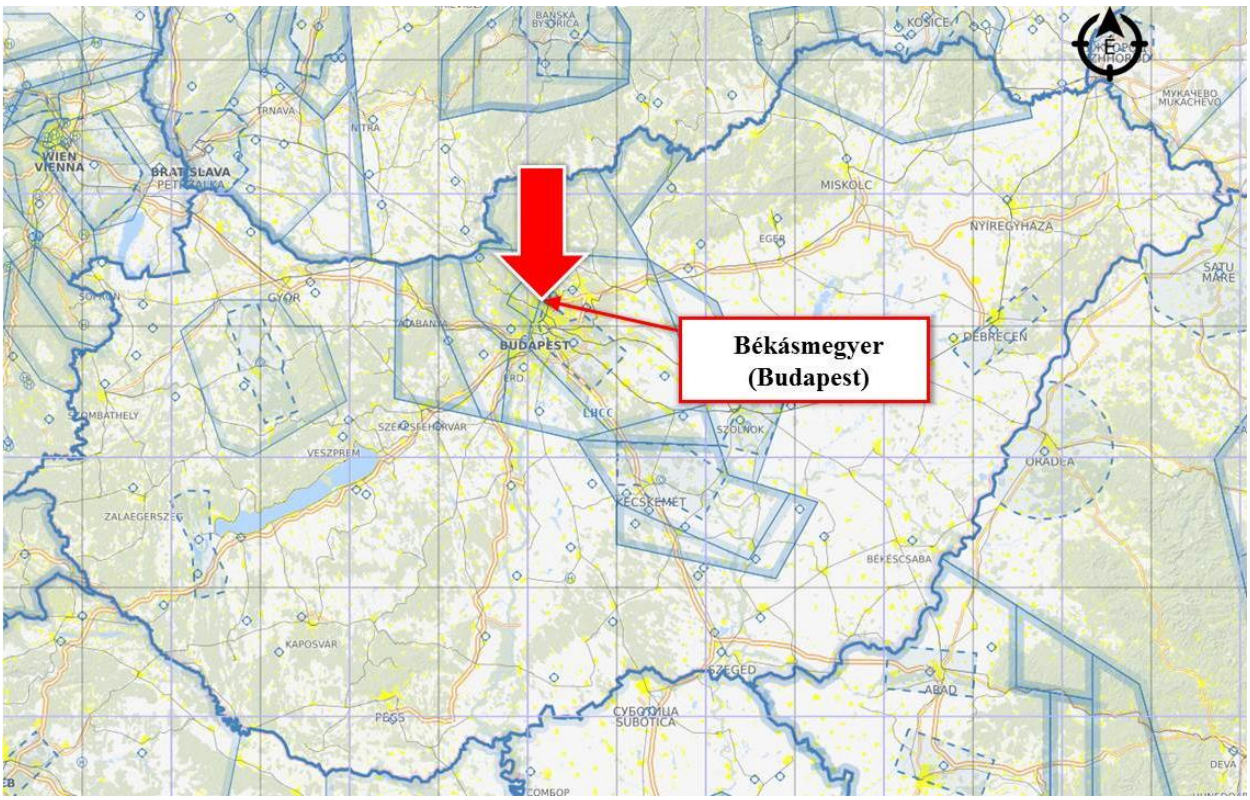


Figure 1: Location of the occurrence in Hungary

Reports and notifications

TSB was informed on the occurrence in writing by a private person on 30 December 2016.

Investigating Committee

The Head of TSB assigned the following investigating committee (hereinafter referred to as the "IC") to the investigation of the case:

Investigator-in-Charge	**István Belső**	Investigator
Member	**Gábor Torvaji**	Investigator

István Belső government official's employment by TSB was terminated during the investigation and Zsuzsanna Nacsa JD investigator was assigned as Investigator-in-charge by the Head of TSB as Member instead of him.

Overview of the investigation process

During the investigation, the IC:

- obtained and analysed radar data recorded by HungaroControl as well as radio communication between the FIS unit involved and the 2 aircraft.
- interviewed the pilots of both aircraft,
- obtained the expert opinion of the aviation expert invited during the proceedings started by the police due to the occurrence,
- attended the simulation based on radar data of the occurrence, and obtained images of the demonstration.

Short summary of the occurrence

The aircraft with the reg. signs OY-NAY and HA-SJM got into a near-collision situation with each other near Békásmegyer during their VFR flights.

The IC attributed the occurrence to the Student Pilot's poor situation awareness and inappropriate task assignment by the Flight Instructor responsible for the training session.

During the investigation, the IC came to the conclusion that the causes of the occurrence were that the Pilot of the aircraft with the call sign HA-SJM had climbed higher, without due circumspection, from the altitude which he had reported and maintained previously, while he had also deviated from the task specified for him.

The Investigating Committee of TSB identified no circumstance which would warrant a safety recommendation.

The Investigating Committee of TSB has drawn lessons from the incident, relating to collision avoidance and flight practices to prevent similar incidents.

1. Factual information

1.1. History of the flights

After taking off from Tököl Airport a pilot was flying the aircraft with reg. sign OY-NAY, in the North, according to its flight plan filed, performing a non-commercial pleasure flight parallel to the line of the river Danube. After take-off, the aircraft climbed to a height of 2.000 feet along its route. At 11:47:21, the Pilot of the aircraft with reg. sign OY-NAY reported to the Flight Information Service that another aircraft had crossed his route in dangerous proximity, to which the response was that, although they (the Service) had information about a flight started from Dunakeszi airfield, they could not see it on the radar. The rest of the flight was uneventful.

The aircraft with reg. sign HA-SJM, flown by the Student Pilot, took off from Dunakeszi airfield, had the transponder code 7000, and informed the Flight Information Service that he was climbing to a height of 1600 feet, and *they "were going"* to take a look around District 3 of Budapest, without any flight plan being filed, and then he climbed to 2000 feet, according to the 1038 hPa barometric pressure value (relative to sea level). On the basis of radio communication, the Pilot of the aircraft with reg. sign HA-SJM saw the oncoming traffic that came dangerously close at a height of 2000 feet. After being informed by the Flight Information Service that his signal was not seen on the radar screen, the Pilot of the aircraft said his transponder had malfunctioned, so he would turn back and return to Dunakeszi airfield where he landed his aircraft safely later on.

1.2. Injuries to persons

There was no personal injury in connection with the occurrence.

1.3. Damage to aircraft

There was no damage to the aircraft involved in the occurrence.

1.4. Other damage

The IC had got no information on other damage by the completion of the investigation.

1.5. Crew data

1.5.1. Data of the Pilot-in-Command of the aircraft with registration sign OY-NAY

Age, nationality, gender		47 years old, Hungarian, male
Licence data	Type	ATPL(A)
	Professional valid until	30/10/2017
	Ratings	B747, SEP, SEP IR, B737 IR, B737 TRI, NVFR
Professional qualifications		Air Traffic Controller Engineer, Pilot-in-Command
Medical class and valid until		Class 1, 11 Jan 2017
Flying hours	In the previous 24 hours	0 hours
	In the previous 7 days	7.7 hours
	In the previous 90 days	152.3 hours

	Total:	13.200 hours
	in the type involved, total:	90 hours
Aircraft types flown:		C152, C172, C210, PA46, C421, LD200, B737 300-800, B747-400, -800;
Pilot Flying / Pilot Not Flying at the time of the occurrence		Pilot Flying
Date of last training		16/09/2016 (B737 IR/LPC)

1.5.2. Data of the Student Pilot in the aircraft with registration sign HA-SJM

Age, nationality, gender		22 years old, Hungarian, male
Licence data	Type	-
	Professional valid until	-
	Ratings	-
Licence data		Motor Glider Pilot, Motor-Powered Aeroplane Student Pilot
Medical class and valid until		Class 2/LAPL, 10 Mar 2019
Flying hours	In the previous 24 hours	3.25 hours
	In the previous 7 days	3.25 hours
	In the previous 90 days	24.1 hours
	Total:	43.5 hours
	in the type involved, total:	18.6 hours
Aircraft types flown:		SF-25, Robin ATL, PA-28, C-172
Pilot Flying / Pilot Not Flying at the time of the occurrence		Pilot Flying

1.6. Aircraft data

1.6.1. General data of the aircraft with registration sign OY-NAY

Class	Fixed wing aircraft (MTOM < 5700kg)
Manufacturer	EADS Socata
Type	TB20
Year of manufacture	1986.
Serial number	578
Registration marks	OY-NAY
State of registry	Denmark
Date of registry	1995
Name of the owner	Private person
Name of the operator	Flysyn Denmark

	Flight hours	Take-offs
Since new	2900 hours	2750

Since last overhaul	30 hours	20
Since last periodical maintenance	12 minutes	2

1.6.2. General data of the aircraft with registration sign HA-SJM

Class	Fixed wing aircraft (MTOM < 5700kg)
Manufacturer	Cessna Aircraft Corporation
Type	Cessna 172
Year of manufacture	1973
Serial number	17261908
Registration marks	HA-SJM
State of registry	Hungary
Date of registry	1993
Name of the owner	MALÉV Repülőklub
Name of the operator	MALÉV Repülőklub

1.6.3. Description and data of malfunctioned system or equipment

No information emerged during the investigation on malfunction of the structure or any system of the aircraft prior to the occurrence, thus contributing to the occurrence or influencing the course of events.

On the basis of the radio communication between FIC and the aircraft with the call sign HA-SJM, the transponder of the aircraft with registration mark HA-SJM had failed. Based on recorded radar data, the signal from the aircraft transponder was uncertain during the flight concerned.

1.6.4. On-board warning systems

The aircraft were equipped with transponders. Neither of the two aircraft had any on-board warning system, as it is not required for the types concerned.

1.7. Meteorological information

The weather of Western, South Western, and Central Europe was shaped by an anticyclone, which resulted in a predominantly sunny weather on the day of the occurrence. There was a strong northern wind, with the exception of the central counties of the country. The highest temperatures were between 1 and 5 degrees.

The METAR telegrams published at Budapest Liszt Ferenc International Airport at the time of the occurrence:

METAR LHBP 291130Z 01009KT340V050 9999 FEW048 04M07 Q1038 NOSIG=
METAR LHBP 291200Z 36008KT 320V040 CAVOK 04/M07 Q1038 NOSIG=

The flight took place at daytime, in good visibility conditions.

1.8. Aids to navigation

The aids to navigation did not influence the course of events, so they need no detailed discussion.

1.9. Communications

Both aircraft were in two-way radio communication with the Flight Information Service. The communication equipment did not influence the course of events, so it needs no detailed discussion.

1.10. Aerodrome information

The aerodrome information did not influence the course of events, so it needs no detailed discussion.

1.11. Flight data recorders

As regards air traffic management equipment, the required data recording systems were at work, and data recorded by them was evaluable.

No data recorder was installed in the aircraft; it is not required for the aircraft type affected.

1.12. Wreckage and impact information

There was no wreckage in connection with the incident.

1.13. Medical and pathological information

There was no evidence that physiological factors or other impediments had affected the legal capacity of the flight crews.

1.14. Fire

The occurrence involved no fire.

1.15. Chances of survival

There was no injury to people.

1.16. Tests and research

On 17 January 2018, the Investigator-in-charge participated in a simulation test where two high-powered computers were used to simulate the occurrence, using radar data (coordinates, time, speed, altitude) provided by HungaroConrtrol Zrt. to the organizers using the simulation software Preper3D of Lockheed Martin. The purpose of the simulation was to understand visibility, from the point of view of the pilot in the aircraft with registration mark OY-NAY.

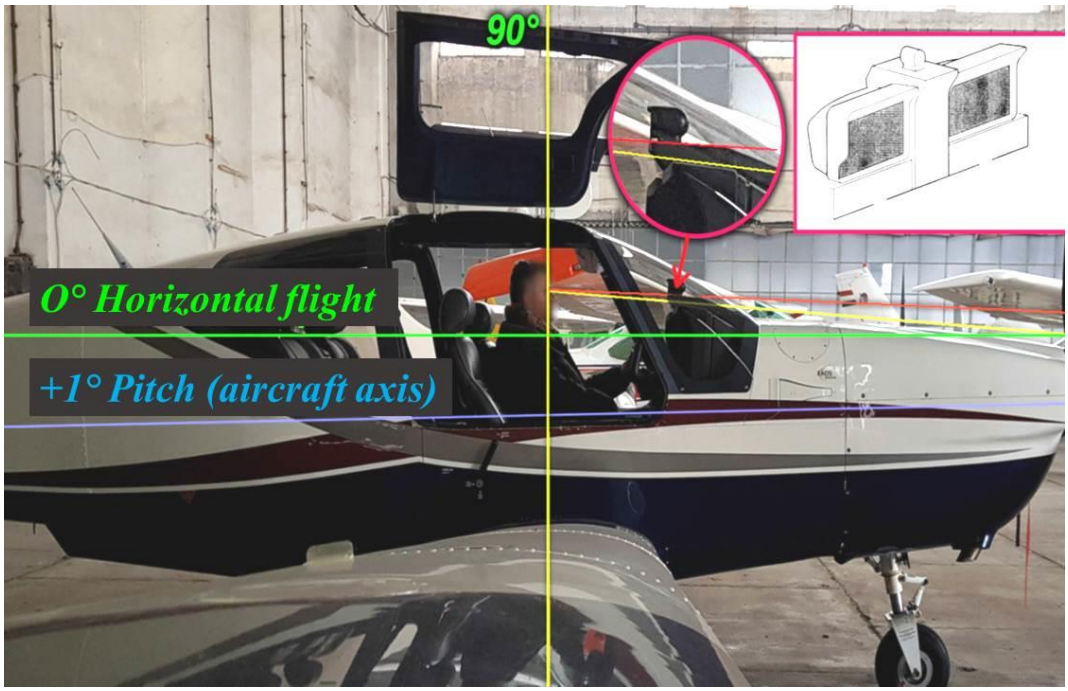
The reconstruction was divided into three main parts: one survey and two spatial simulations. Initially, the technicians involved in the simulation assessed those physical and geometrical characteristics of the aeroplane which affected the pilot's field of vision, and then levelled the Socata TB-2 aircraft on the basis of the repair documentation supplied by the manufacturer.

The inner field vision provided by the type TB20 aircraft was assessed with a 360-degree camera positioned in front of the pilot's eyes *(Figure 2).*

Figure 2: The view out of the LH side seat of the aircraft type TB20 Socata.

From the eye level of the pilot in the normal seating position, the angular subtense is less than 2° below the horizon between 8° and 30° to the right, from where the aircraft with reg. mark HA-SJM was approaching *(Figure 4)*. At a later stage, the blind spot was also examined from camera angles higher than the normal seating position.

The measurement experts measured the angle between the eyes of the pilot of the aircraft with reg. mark OY-NAY and the engine casing (*Figure 3*), as well as the distance of visibility straight ahead and in several different directions to the right, as the aircraft with reg. mark HA-SJM had come from there (*Figure 3* and *Annex 3*). It was found that the pilot of the aircraft with registration mark OY-NAY had had a visibility of only less than 5 km in the forward direction i.e. on the flight path (which was 300 feet lower) of the aircraft with reg. mark HA-SJM.



2. *Figure 2: Measuring the Pilot's angle of view*

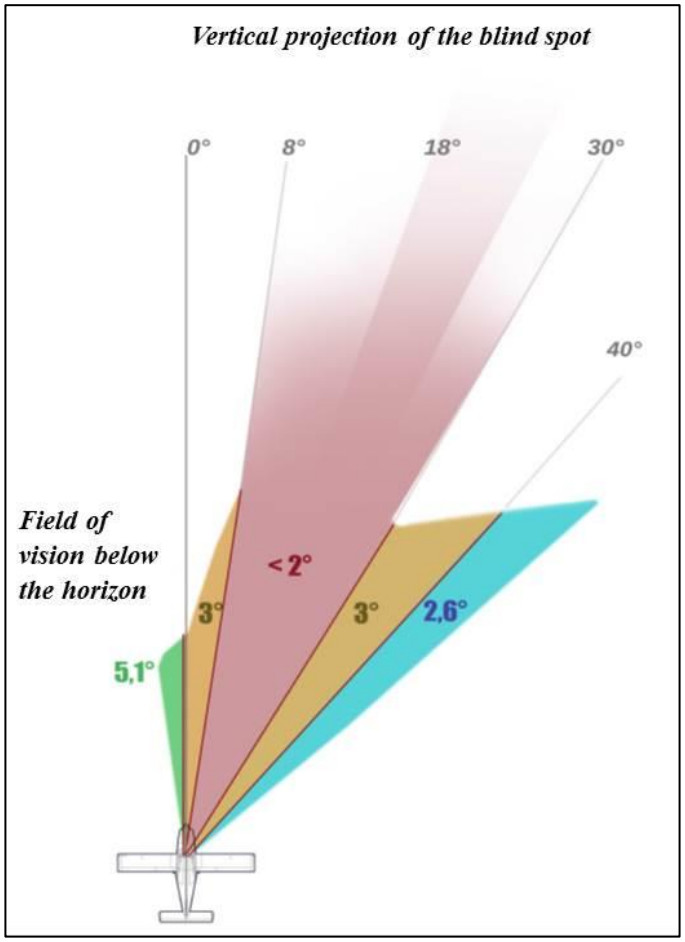


Figure 3: Results of the measurements of the blind spots of the type TB20 aircraft

The speeds and the trajectories of the flight paths show that the two aircraft were approaching each other with 180 to 200 knots. The MATIAS radar image shows that the aircraft with registration mark HA-SJM climbed for 27 seconds before the conflict, having started such climb from a 120-metres-lower altitude (and from a spot 2.7 km back) before becoming visible from the left seat of the type TB20 aircraft.

In addition to radar data, the GPS data on the verified on-board navigation equipment of the type TB20 aircraft were also available for more accurate identification of the location of the occurrence. The simulator experts entered such data on a Google Earth map, similar to the radar positions provided by HungaroControl. These steps then depicted the flight paths of the two planes and the location of the event.

Finally, the radar data of the two aircraft was run on two powerful computers in a simulation (altitudes, speeds, coordinates). For the simulation, the virtual field of vision from the TB20 was set on the simulator to reflect the perspective of the pilot that had been mapped earlier in the real aircraft. The experts ran the same eye level / angle of view / distance test which had been carried out in the hangar. The simulation was also performed in a camera angle, reflecting a 10 cm higher seating position of the pilot of the type TB20 aircraft than during the event. The environment in the simulation was provided by a realistic spatial database of the Earth's surface.

The result of the simulation was that, during the critical period, the aircraft with registration mark HA-SJM was flying within the blind spot of the aircraft with registration mark OY-NAY. The pilot of the aircraft with register mark OY-NAY had the chance to detect the other aircraft when it was only about 0.1 nautical miles (185 metres) ahead, almost at the same altitude, and was moving along an almost opposite route (*Figure 5*).

Figure 5: The HA-SJM enters the field of vision of the pilot of the OY-NAY

1.17. Organisational and management information

The training licence of the training organisation (Hungarian Aeronautical Association) has ceased during the period of the investigation.

1.17.1 Relevant parts of **Regulation № 32/2009. (VI. 30) KHEM on the training and licensing of air crews:**

"GENERAL PROVISIONS

Scope of the Regulation

Section 1*. The scope of this Regulation shall cover aircrew, the organisation which performs the training of the aircrew (hereinafter referred to as "the training organisation"), the language proficiency testing organisation and the aviation authority.*

Interpretative provisions

Section 2. *For the purposes of this Regulation:"….*

*"**48.** authorisation by a flight instructor [FI]): means the activity in which the flight instructor conducts flight instruction on board an aircraft in order to train the student pilot or oversees the student pilot's pre-flight preparation before their flying solo, and monitors the student pilot's flight activity is from the ground during the flight,"*

Activities of the aircrew

Section 3

…

"(3) A student who holds a pilot licence shall perform the sole flight task under the authorisation of a person holding a flight instructor licence and a pilot licence corresponding to the flight task."

Training of the aircrew

Training organisation

…

"Section 23
(1) The training of aircrews shall be carried out by a flight aviation training organisation (hereinafter "FTO") with a training licence issued by the aviation authority.

(2) Training necessary for pilot licences for helicopters, hot air balloons, airships with a volume greater than 4600 m^3, sailplanes, powered lift aircraft, ultralight aircraft, autogiro pilot licences, aeroplane private pilot licences, for the national ratings that may be given with aeroplane pilot licences, for night flight ratings, for the rating for a single-engine single-pilot piston engine aircraft, and for the TMG class rating may be performed by basic training organisations ("RF") which hold a training licence issued by the aviation authority, in addition to FTOs."

1.17.2 The relevant parts of the Training Manual of Hungarian Aeronautical Association are as follows:

„A.6. Training activities which MRSZ – Registered Facility (RF) is authorised to perform pursuant to Regulation № 32/2009. (VI. 30) KHEM.

6.1. In the area of training of pilots for powered aircraft

- PPL(A) – Private pilot licence training
…"

"1.5. Timing"

"Flight tasks" (see Annex 1)

*"**1.7. Safety training***

…

1.7.5. Requirements prior to the first solo flight

…

As a general requirement for the implementation of flight within the limits below, the student pilot shall be required for each flight during the training course:

Altitude ± 150 feet …"

"2.1. Flight task"

…

***Task 15/A:** Check flight before the first solo flight. 3 take-offs, 0.5 hours*
- Approach and landing with different flap configurations,
- Emergency landing tasks from different points of the traffic pattern.

Note: The flight instructor conducting the inspection shall not be the instructor of the student pilot. The student pilot shall not be authorised to fly solo without performing a successful check flight under supervision of an inspecting flight instructor assigned by the operator.
After flying two normal traffic patterns, (landing with the flaps in the landing position and in the take-off position), the instructor should check the student pilot's capabilities during flight at minimum speed (climb, final approach) and simulated emergencies. The student pilot should be able to perform radio communications independently.
The inspecting instructor shall verify the existence of the SPL and type examination.

Task 15: *Solo flight on a traffic pattern. 20 take-offs, 2 hours*
The student pilot's first and second take-offs shall be carried out in the presence of the inspecting flight instructor.
The instructor shall conduct a check flight if:
- more than 6 hours have elapsed since the end of the previous solo flight.
- the runway direction has changed,
- a different aircraft is used
- he/she considers it necessary.
The task shall be carried out on the traffic pattern. If the student has mastered the layout of the standard traffic pattern and can fly it well, the inspecting flight instructor may direct the student pilot by instructions to any point in the traffic pattern, where the Aerodrome Rules allow it.
The student pilot may also practise procedures including standard turns."

"2.2. Reference list of flight tasks" *(see Annex 1)*

"2.3. Layout of the training course" *(see Annex 1)*

1.18. Additional information

1.18.1. Relevant provisions of the KöViM Regulation № 14/2000

"2.2. Prevention of collisions
In the course of the operation of the aircraft in the airspace (irrespective of the airspace class) and during their movement in area of the aerodrome, the air crew shall always keep an eye on traffic in order to identify and prevent possible collision hazards.

2.2.1. Dangerous proximity
An aircraft shall not be operated in such proximity to another aircraft which may result in a collision hazard.

2.2.2. Rules of the right of way
The aircraft that has the right-of-way shall maintain its heading and speed, but this rule does not exempt the pilot of the aircraft from having to do their best to avoid a threatening collision, including the making of the avoidance manoeuvres advised by ACAS equipment.

2.2.2.1. An aircraft that is obliged by the following rules to keep out of the way of another shall avoid passing over, under or in front of the other, unless it passes well clear and takes into account the effect of aircraft wake turbulence.

2.2.2.2. Approaching head-on
When two aircraft are approaching head-on or approximately so and there is danger of collision, each shall alter its heading to the right.
…

2.2.6.1.2. Approaching head-on
An aircraft approaching another aircraft or a vessel head-on, or approximately so, shall alter its heading to the right to keep well clear."

Annex "H"

RULES FOR OPERATING ON-BOARD TRANSPONDERS

"1. A transponder with a C mode setting option must always be operated in that mode unless the ATS units expressly order otherwise.

Note: In the controlled airspaces of Budapest FIR, the tolerance for the altitude information (derived from C Mode) indicated to the ATS units is ± 200 ft. (± 60 m). In other airspaces, it is ± 300 ft. (± 90 m). When such values are reached, or in the event of a discrepancy exceeding such values, the ATS units may request termination of information from C mode. If, as a result of the technical characteristics of the transponder, the disabling of C mode also interrupts the C mode, the pilot of the aircraft must accordingly warn the ATS unit concerned."

…

3. During a GAT flight, the transponder shall be operated continuously.

4. If the pilot of an aircraft is not instructed by the ATS to set up an individual code, then the following codes shall be set:

…

In the case of flights outside the controlled airspace, coding shall be in accordance with the classification of the aircraft category:

Aircraft class	*SSR code*
Aeroplanes	*A/C 7000*
Helicopters	*A/C 7001*
Gliders	*A/C 7002*
Lighter-than-air aircraft	*A/C 7003*

…

7. In-flight malfunction of the on-board transponder

The pilot shall inform the relevant ATS unit of the malfunction via radio.

…

After landing, the pilot-in-command shall arrange for a repair of the transponder as soon as possible."

1.18.2. Provisions of KöViM Regulation № 16/2000

"5.4.2.1.4 The terms in the longitudinal separation minima, such as 'same track', 'reciprocal tracks' and 'crossing tracks', shall mean the following:

…

b) Reciprocal tracks:

Head-on tracks or crossing tracks or sections thereof which close an angle exceeding 135° but less than 225° with each other and the protected airspaces of which overlap" (Figure 6)

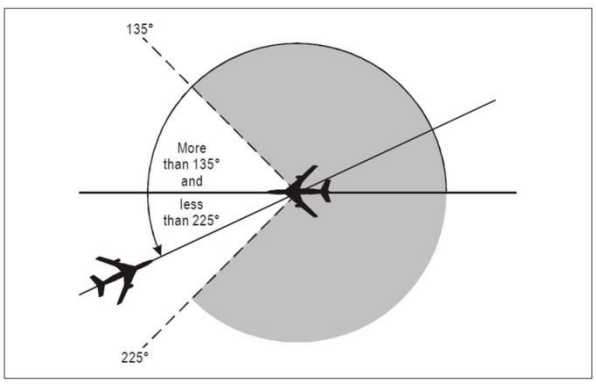


Figure 6: Aircraft on reciprocal tracks

"Annex 3 to KöViM Regulation № 16/2000 (XI. 22.)

DEFINITIONS

…

192. Aircraft proximity

A situation where, in the opinion of a pilot or air traffic services personnel, the distance between aircraft and their relative positions and speed were such that the assessment of the safety of the aircraft concerned could be debatable. Classification of aircraft proximity:

1. Collision hazard - when there was a serious risk of collision,

2. Doubtful security - when the assessment of aircraft safety could be debatable,

3. No collision hazard – when the risk of collision was not present,

4. Not clear danger situation – when there was insufficient information for the determination of danger situation or where the lack of clarity or contradictory evidence precluded the existence of a risk of proximity."

1.18.3. COMMISSION IMPLEMENTING REGULATION (EU) № 923/2012 (*of 26 September 2012*)

Laying down the common rules of the air and operational provisions regarding services and procedures in air navigation and amending Implementing Regulation (EU) No 1035/2011 and Regulations (EC) No 1265/2007, (EC) No 1794/2006, (EC) No 730/2006, (EC) No 1033/2006 and (EU) No 255/2010

"CHAPTER 2

Collision avoidance

…

SERA.3205 Proximity

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

…

SERA.3210 Right-of-way
Approaching head-on. When two aircraft are approaching head-on or approximately so and there is danger of collision, each shall alter its heading to the right."

1.18.4. View out of the aircraft

OY-NAY:

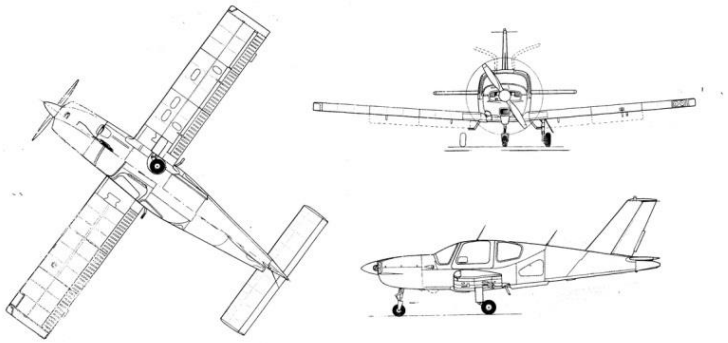


Figure 7: Aircraft 3-view - the aircraft type Socata TB20 (Source: Internet)

The Socata TB20 is a low-wing aircraft with retractable landing gears for 4 persons, which offers its pilot a view out of the aircraft as follows:

During horizontal flight and during climb, in a straight line:

- Up (sideways and ahead): unobstructed,
- Down ahead: limited due to the engine casing,
- Down, to the right: limited due to the position of the pilot's seat,
- Down, to the left: good, but slightly limited due to the wing arrangement.

In turns:

- Sideways: unobstructed,
- Up ahead: unobstructed,
- Down ahead: considerably limited on the RH side, due to the engine casing.

HA-SJM:

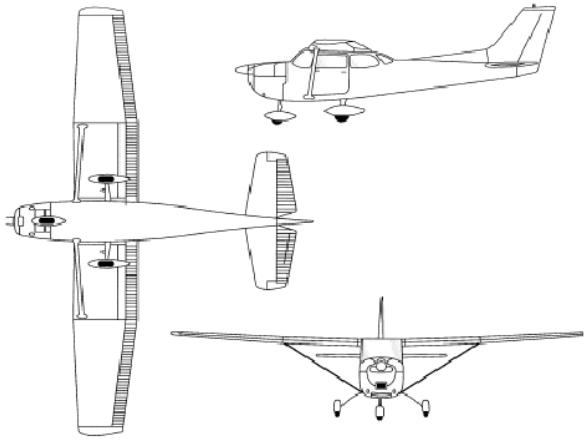


Figure 8: Aircraft 3-view - the aircraft type Cessna C172 (Source: Internet)

The Cessna 172, high-wing aircraft with fixed landing gears for 4 persons, which offers its pilot a view out of the aircraft as follows:

During horizontal flight and during climb, in a straight line:

- Sideways: unobstructed,
- Down ahead: good,
- Down to the right: limited due to the position of the pilot's seat,

- Up ahead: unobstructed,
- Down ahead: considerably limited due to the engine casing.

In turns:

- Limited at the side of the direction of the turn, due to the high-wing design,
- Up ahead: unobstructed,
- Down ahead: limited due to the engine casing.

1.18.5. Training of the Student Pilot, flight task

The Student Pilot started his motor-powered aircraft class rating training at Dunakeszi airfield on 20 September 2016. According to the training logbook, the Student Pilot started his round based preparation with a type Robin ATL aircraft on 10/10/ 2016, which included:

- making familiar with the aircraft (4 hours);
- emergency situation tasks (4 hours);
- preparation for the flight, tasks to do after finishing the flight (4 hours);
- practise taxiing (1 hour);

According to the Student Pilot's flight logbook, subsequently he performed one take-off in a Robin ATL, 37 take-offs in type Piper 28, and the rest of his flights in type Cessna C-172 aircraft.

During his training, the Student Pilot completed his first solo flight on 16 December 2016; on the day of the occurrence, he flew his Task 15, according to the training syllabus *(Chapter 1.16.2)*. According to the Student Pilot, at the time of the event, he set out on a solo flight outside the traffic pattern, which he had consulted with his Flight Instructor prior to the take-off.

The IC found contradictions between the Student Pilot's flight logbook, training logbook, and the flight log of the aircraft with reg. mark HA-SJM.

1.18.6. Related safety materials

The FAA Advisory Circular № AC_90-48D_CHG_1 indicates that the need to move the head during flight should not be forgotten in order to in order to search around the physical obstructions, such as door and window posts (which may cause loss of part of the visual field). The circular stresses that it is the pilot's responsibility during climb or descent (depending on whether it is a high- or low-winged plane) to execute gentle banks left and right at a frequency which permits continuous visual scanning of the airspace about them (Section 4.3.1 of the circular cited).

An NTSB safety alert, which addresses the separation of aircraft operating under visual flight rules, also provides practical advice to the pilots. Of these, the IC considers that the following are of paramount importance:

- For the sake of better perception, it is useful to use available lights of the aircraft;
- Your intentions should be clear during radio communications, and use the required radio terms;
- Prepare for your flight so that you can provide clear information to other participants in the traffic about your situation based on the relevant ground references.
- In addition, the NTSB publication reminds the pilots that under certain circumstances it is more difficult to detect other aircraft.

1.19. Useful or effective investigation methods

The Investigator-in-Charge of the IC took part in a simulation test where two pilots simulated the occurrence with high-performance computers and obtained images and video recordings that were then used in the analysis of the occurrence.

2. Analysis

2.1 Aircraft flight paths, radar data

Based on both pilots' reports and according to radar data, the aircraft were flying head on tracks at the time of the occurrence *(1.17.2)*. In such a case, the pilot of each aircraft would have been obliged to alter their respective heading to the right *(1.17.3)*.

The aircraft with registration mark OY-NAY was heading almost perfectly north, in a straight line, almost parallel to the line of the river Danube, maintaining a 1900 to 2000 ft altitude, following its submitted flight plan.

After its take-off from Dunakeszi airfield, the aircraft with registration mark HA-SJM flew with a continuous left turn above District 3, climbing to a height of 1600 ft *(Figure 9)*, without any flight plan being submitted, according to the information given by the pilot at the time of his check-in with the FIC. On the basis of the signals emitted by the aircraft, that altitude was reached and maintained for some time, but then the aircraft climbed to a height of 2000 ft. The signal of the transponder in the HA-SJM proved to be rather uncertain during the flight, which led to the absence of visibility on the flight information service radar screen at the time of the occurrence. On the basis of the MATIAS radar data recovered later, the flight path was traceable, but a lot of altitude data of the aircraft is missing. According to radar data, the radar signals of the aircraft with registration mark HA-SJM were just *"thrown"* intermittently between 11:46:26 and 11:46:46, actually due to the uncertain operation of its transponder and the proximity of the two aircraft, which resulted in giving inappropriate position data *(Figure 10)*. Immediately before the conflict, the radar signals of the aircraft with registration mark HA-SJM did not represent the actual position, so the IC is of the opinion that it had flown with a continuous deviation from its intended track, to the left.

Air traffic information plays a significant role in the separation of two or more aircraft. According to IC, the pilot of the aircraft with registration mark OY-NAY involved in the event, could reasonably assume an adequate degree of vertical separation, given the reported altitude of the other aircraft.

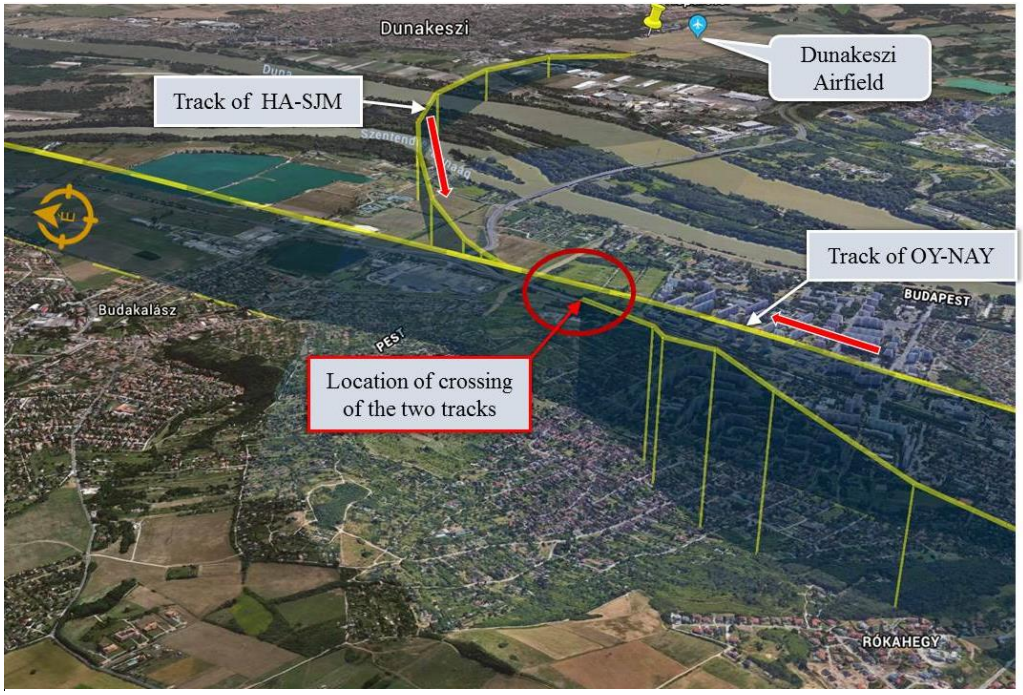


Figure 9: The crossing of the tracks of the two aircraft

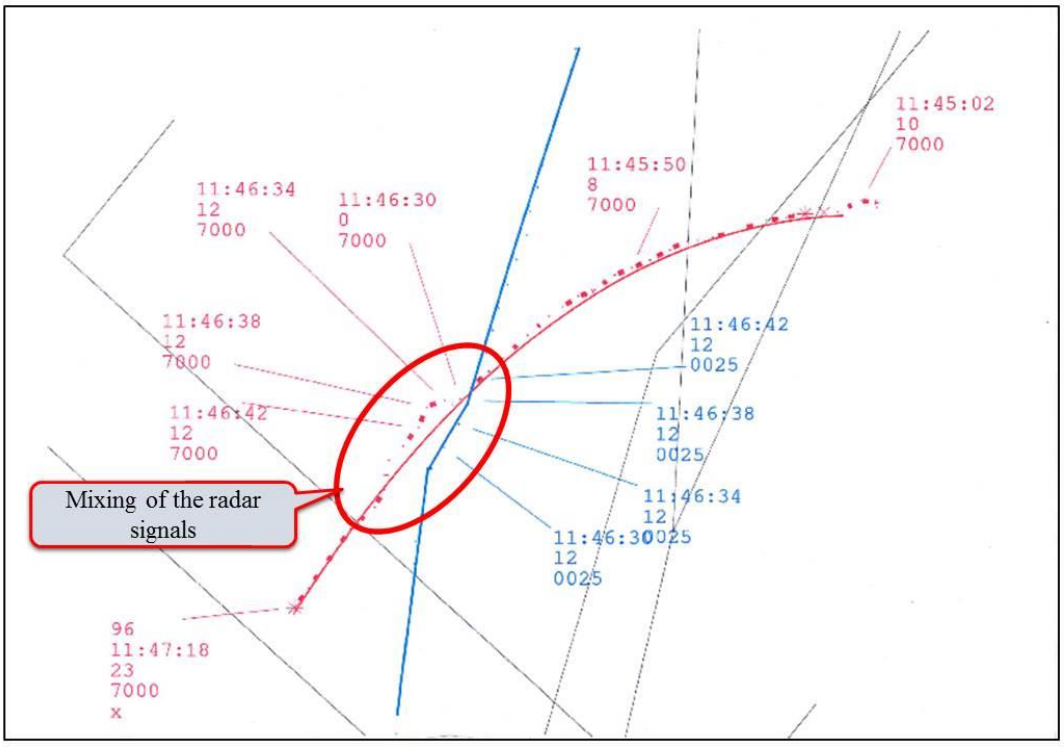


Figure 10: The dots represent the signals, and the solid lines represent the actual flight paths (red - HA-SJM, blue - OY-NAY).

On the basis of radar signals, it cannot be established that any of the pilots involved performed an evasive action during the conflict.

2.2 Visibility

The aircraft with registration mark **OY-NAY** flew on its path as in the submitted flight plan, including its altitude as well. The other aircraft involved in the conflict turned toward it from the right hand side, with a steady turn, 300 to 400 feet below. Due to the position of the Pilot, his view was largely limited slightly to the right, forward and downwards, from where the HA-SJM aircraft was approaching, so the Pilot could not detect traffic. This was demonstrated by the simulation of the occurrence *(Chapter 1.15)*.

The aircraft with registration mark **HA-SJM** reached its reported altitude by a left turn first, then maintained it for some time, and climbed again in the last 25 to 30 seconds to reach its position leading to the conflict. As its flight took place with a continuous left turn, i.e. with a bank to the left, the pilot had a limited view in the left hand direction *(Chapter 1.17.4)*. According to IC, the Student Pilot could hardly, if at all, have been able to detect the aircraft with registration mark OY-NAY flying above it and approaching from the left. During the immediate pre-conflict phase, the flights were already on head-on tracks. The IC's assumption is that at that time the aircraft with registration marked OY-NAY was in a position that it was no longer covered for the pilot of the aircraft with registration mark HA-SJM. According to the simulations performed, the aircraft with registration mark HA-SJM climbed from 1500 feet to above 1900 feet during the event. Due to the 1500 feet altitude previously held, the aircraft got into the blind spot of the other Pilot in the other aircraft flying head-on, 400 feet higher. According to the Student Pilot's report, he noticed the traffic ahead, but the IC has been unable to explain why the Student Pilot had climbed 300 to 400 feet before the conflict, and that the other pilot involved in the conflict stated he had detected head-on traffic by engaging in a left bank.

2.3. Training

According to his Training Logbook, the Student Pilot of the aircraft with the HA-SJM call sign was performing a task called *"Solo traffic pattern flight"* specified in the MRSZ

Training Manual *"2.2 Reference list of flight tasks"* 15. (15B according to the Training Logbook) *(Annex 1).* It says, "*The task shall be carried out on the traffic pattern. If the student has mastered the layout of the standard traffic pattern and can fly it well, the inspecting flight instructor may direct the student pilot by instructions to any point in the traffic pattern, where the Aerodrome Rules allow it."* According to the Training Manual, the student pilot must be required to maintain a height by ± 150 ft. for each control flight. During the student pilot's solo flight, the flight instructor (FI), shall monitor their activity throughout the flight *(Chapter 1.16.1)*. At the time of the dangerous loss of separation, the aircraft with registration mark HA-SJM largely deviated from the traffic pattern *(Annex 2)*, and even he performed radio communication with the Flight Information Service, so it is doubtful that the flight instructor on the ground was able to follow the student pilot's activity if he flew solo. There is contradiction between the on-board logbook of the aircraft with registration mark HA-SJM and relevant entries in the Training Logbook, as the latter indicates the Flight Instructor also in addition to the Student Pilot, and it is also controversial that, during the flight, the Student Pilot uses the plural forms when engaging in radio communication.
On the basis of the foregoing, it is not possible to decide with certainty what task the Student Pilot was performing and how many people were on board.
The IC examined the training system, which identified serious problems and inconsistencies *(Chapter 1.17.5)*. The Student Pilot started his training in an aircraft type Robin ATL, which he had been made familiar with and in which he had also practised, in line with the training syllabus,[1] the basic procedures (such as emergency procedures) required for the operation of the aircraft *(Chapter 1.17.5)*. Later on, the Student Pilot continued his training with other aircraft types. In the course of the investigation, the IC found no evidence to prove that the Student Pilot had acquired the basic knowledge (including, for example, what to do in an emergency situation) of any aircraft type other than the Robin ATL. According to the IC, the lack of acquiring adequate knowledge during the conversion training of the student pilot involved in the event was a serious risk to flight safety.
In the course of his flight, the Student Pilot deviated from the training task required for him, but prior to the task, he agreed the planned route of the actual flight with his Flight Instructor *(Chapter 1.17.5)*. In the course of the investigation, the IC found no explanation as to why the Student Pilot's Flight Instructor had defined and required a training task for the Student Pilot which deviated from the training syllabus. The IC identified such a problem in this action of the Flight Instructor which is inherent in the safety culture of the organisation and which the IC considers as one of the direct causes of the occurrence.

2.4. See and be seen – Avoidability of the occurrence

In un-controlled airspaces and during VFR flights, the principle of "See and be seen" is of great importance in the prevention and avoidance of collisions. For the sake of prevention, the textbooks, the various studies, and, for example, the safety publications of the FAA and NTSB cited in Chapter 1.18.6 also formulate those versions and procedures of this simple principle which need to be used in aviation.

Of these solutions and procedures, there are some which serve visibility such as the basic expectations from the pilot to rotate their head, rely on any passenger or manoeuvre in order to obtain information about the airspace sections they do not access visually. The reports of the pilots involved brought the IC to the conclusion that both pilots tried to scan the airspace by moving their heads.

However, according to the visibility analysis set out in Chapter 2.2 above, the pilots could see each other hardly, if at all, prior to the incident, due to their respective positions and the design of their aircraft. On the basis of the analysis of radio communication, radar

[1] According to the training logbook

data and aircraft flight paths, detailed in Chapter 2.1, the pilot who had submitted a flight plan was flying in accordance with the flight plan, while the pilot of the aircraft without a flight plan changed his heading and altitude relative to information given by him (declared heading and altitude). The Flight Information Service was unable to provide information to for aircraft on the emerging situation because the aircraft with reg. mark HA-SJM was not visible to them (because of the uncertainty of its transponder).

There was no obligation to use a transponder or report position for aircraft in the airspace concerned. However, the position of the IC, which is supported by the safety publications referred to in Chapter 1.18.6, is that, in addition to visual solutions (position lights, etc.), "visibility" can be significantly improved by the use of a properly functioning transponder on board and, in particular, the radio communication (and its accuracy) relating to the position of the aircraft.

In the given circumstances, the aircraft with reg. mark HA-SJM and its deviation from previously declared altitudes and direction and the occurrence of a dangerous situation could only have become "visible" for the Flight Information Service and the pilot of the aircraft with reg. mark OY-NAY if the pilot had provided information on such deviation on a radio frequency used in the airspace.

However, the pilot of the aircraft with reg. mark HA-SJM did not provide information on the change in its declared motion and the information it had previously provided was no longer relevant. As a result, the two aircraft only became visible to each other in the moments of dangerous proximity.

On the basis of the above, in the view of the IC, if the pilot of the aircraft with reg. mark HA-SJM had continued to fly by keeping his declared heading and altitude, or if he had informed the competent flight information service (and thus the aircraft in his vicinity) on the intended change to such flight parameters, then the occurrence could have been avoided.

3. Conclusions

3.1. Findings

At the time of the occurrence, the flight crews had the appropriate licences and ratings as well as adequate experience for the given flight tasks. The pilot of the aircraft with reg. mark OY-NAY had extensive experience, while the pilot of the aircraft with reg. mark HA-SJM had little experience.

The pilot of the aircraft with reg. mark OY-NAY performed his flight in compliance with the standards in effect.

Both aircraft proved to be airworthy. They have been properly equipped and maintained on the basis of their documents and in accordance with the adopted procedures.

The aircraft with reg. mark OY-NAY performed its flight in accordance with the flight plan, while the aircraft with reg. mark HA-SJM flew without a flight plan; both flights took place in at daytime, in good visibility conditions.

No information emerged on the activity of the air traffic management service, the support staff or the characteristics of the aerodrome which could be associated with the occurrence.

The Student Pilot of the aircraft with reg. mark HA-SJM deviated from the task provided for in the Training Manual and included in the Training logbook.

The transponder of the aircraft with registration mark HA-SJM sent uncertain signals at the time of the occurrence.

The distance between the two aircraft concerned was of 0.1 nautical miles (185 m) nearly at the same altitude, on head-on tracks.

3.2. Causes

In its technical investigation, the IC came to the conclusion that the occurrence was caused by:

- The aircraft with the call sign HA-SJM climbed higher from the altitude reported by and previously maintained by its pilot.

The IC identified the following contributing factors:

- The Flight Instructor of the training organisation sent the Student Pilot for a flight task different from the one included in the training syllabus;
- The transponder of the aircraft with reg. mark HA-SJM worked uncertainly,
- The pilot of the aircraft with reg. mark HA-SJM did not provide information on his intent to change direction and altitude by radio on the frequencies to be used in the airspace concerned.

4. Safety recommendations

4.1 Safety recommendation issued on completion of the investigation

The Investigating Committee of TSB identified no circumstance which would warrant the issuance of a safety recommendation.

5. Lessons learnt

In the light of European ambitions to propagate aviation safety culture, and on the basis of its findings and experience gained during the investigation of the incident, the Investigating Committee of TSB wishes to draw attention, without issuing a safety recommendation, to the following significant lessons in order to reduce the identified safety risks:

During the examination of the case, the IC found that stable operation of both aircraft transponders involved would have contributed significantly to the visibility of the aircraft to the flight information service (and through them to other aircraft in the airspace). Such visibility would have contributed to avoiding the risk of collision. The use of transponder equipment (and other positioning devices) is regulated and its safety-enhancing role is evident in air transport. Nevertheless, the IC considers it necessary to join the FAA and NTSB and remind participants in air traffic once again that ***equipping their aircraft with transponders, maintaining serviceability and proper use of such equipment*** will significantly reduce the risk of collision, thus improving flight safety.

During the examination of the case, the IC found that by precisely communicating his intent to change direction and height at the frequency used in the airspace concerned, the pilot of the aircraft with registration mark HA-SJM would have significantly contributed to the avoidance of the hazardous situation, i.e. to the visibility of his aircraft. Therefore the IC deems it necessary to draw the attention of participants in aviation that ***regular position reporting*** and taking into account and applying the cautions worded also by NTSB, namely:

> ***"Your radio communication should clearly reflect your intentions, use the required radio terms, the known ground references, so that you can clearly inform other pilots of your situation."***

will significantly reduce the risk of collision in any airspace, and increase flight safety.

Budapest, " 7. " May 2021

Zsuzsanna Nacsa JD
Investigator-in-Charge

Gábor Torvaji
IC Member

Annexes

Annex 1:

HUNGARIAN AERONAUTICAL ASSOCIATION Training Manual – TM
B.1. PPL(A) – Private Pilot Licence Training
Part 1 – TRAINING PLAN

1.5. Timing

1.5.1. Aviation Syllabus

Timing			Briefing (periods)	Flight hours	Ordinal number of flight task	Number of take-offs
Month 1	Week 1	Day 1.	4		1	
		Day 2	4		1E	
		Day 3	4		2	
		Day 4		0.5	3	2
		Day 5		0.5	3	1
	Week 2	Day 1		0.5	4	1
		Day 2		1	4	2
		Day 3	1		5; 5E	
		Day 4		1	6	2
		Day 5		1	6	2
	Week 3	Day 1		1.5	7	3
		Day 2		1.5	8	3
		Day 3		0.5	9A Inspection; 9	1+1
		Day 4		0.5	10A; 10B	1
		Day 5		1	10A; 10B	2
	Week 4	Day 1		1	11	2
		Day 2		1	11	2
		Day 3		0.5	12	5
		Day 4		1	12	10
		Day 5		1	12; 13	5+5
Month 2	Week 1	Day 1		1	13	10
		Day 2	4	1	12/13E	5
		Day 3		1.5	12/13E	5
		Day 4		1.5	12/13E	5
		Day 5		1.5	12/13E	5
	Week 2	Day 1		1	12/13E	5
		Day 2		1	14A Inspection, 14	3+2
		Day 3		0.8	14	10
		Day 4		0.7	14	8
		Day 5		2	15	4
	Week 3	Day 1		1	15	2
		Day 2		1	16; 17	1
		Day 3		2	16; 17	2
		Day 4		0.9	18A	1
		Day 5		0.9	18A	1
	Week 4	Day 1		1.8	18A	2
		Day 2		0.9	18A	1
		Day 3		0.9	18A	1
		Day 4		2.7	18A	3
		Day 5		0.9	18A	1
Month 3	Week 1	Day 1		1	18B	1
		Day 2		1	18B	1
		Day 3	6	1	18C	1
		Day 4		2	18C	2
		Day 5		1	19	2
	Week 2	Day 1		1	Practising	1
		Day 2	Official skill test			

Original Version
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B.1/Part 1
Page: 3

HUNGARIAN AERONAUTICAL ASSOCIATION Training Manual – TM
B.1. PPL(A) – Private Pilot Licence Training
Part 2 – BRIEFING AND FLIGHT TASKS

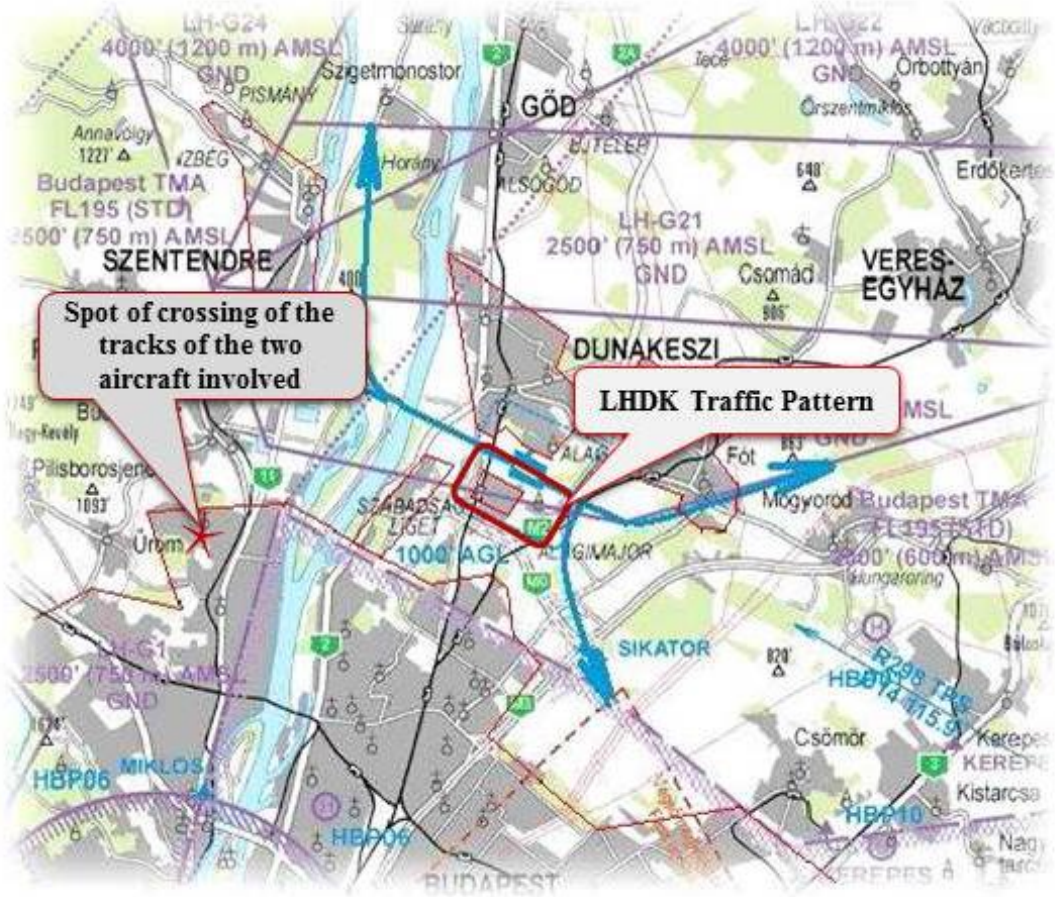
2.2. Reference list of flight tasks

PPL(A) – Private Pilot Licence Training, basic	
Task 1	Ground based preparation – Getting to know the aircraft.
Task 1E	Ground based preparation – Emergency situation tasks.
Task 2	Ground based preparation – Preparation for flight, tasks after finishing a flight.
Task 3	Ground based preparation - Taxiing.
Task 4	Familiarisation flying.
Task 5	The effects of steering units.
Task 6	Straight and level flight, horizontal turns.
Task 7	Climbs and descents.
Task 8	Climbs and descents.
Task 9	Check flight in airspace.
Task 10	Low-speed flight and stalling.
Task 11	Avoiding a spin.
Task 12	Take-off and climb to a specified point on the downwind leg.
Task 13	Circuit pattern flight, approach and landing.
Task 13A	Ground-based preparation - Emergency situations.
Task 13E	Emergency situations.
Task 14	Practise emergency landing with imitated engine failure.
Task 15A	Check flight prior to first solo flight.
Task 15	Solo circuit pattern flight.
Task 16	Turns for advanced pilot students.
Task 17	Emergency landing with serviceable engine.
Task 18A	Navigation.
Task 18B	Navigation problems at low altitudes and in poor visibility conditions.
Task 18C	Ground-based preparation - Use of radio navigation equipment and GPS.
Task 18D	Radio navigation.
Task 19	Fundaments of instrument flight.
Task 20	Practising, preparation for the official test.
Task 21	Official practical skill test.

Annex 2:

DUNAKESZI REPÜLŐTÉRREND

4. sz MELLÉKLET



The traffic pattern of the airfield, showing the paths for entering and exiting

Annex 3:

Numerical results of the blind spot measurement of the type TB20 aircraft:

Height of eye-level above ground (with the aircraft on the ground) 1.61m

0° - (aircraft axis direction):

Vertical projection of minimum visibility: 18 to 20m
Angle of vision downwards: 5.1° or less

7° to 8° to the right

Vertical projection of minimum visibility: 30 to 31m
Angle of vision downwards: 3° or less

8° to 30° to the right - *the angle below the horizon does not apply in the resting position of the aircraft.* At the top of the instrument panel, the protruding central console and the compass obstruct about 22° of the visual field in the line of the horizon.
Here, the lower limit of the angle of vision is also positive, +3° to +5°. Vision of the horizon and downwards to the side can be achieved by bending to the side (viewing behind the console) or by rising in the seat.

Taking this into account:

Angle of vision downwards over the central console: maximum of 1° to 2°

31° to the right

Vertical projection of minimum visibility: 31 to 32m
Angle of vision downwards: 2.9° or less

40° to the right

Vertical projection of minimum visibility: 36 to 37m
Angle of vision downwards: 2.6° or less

Annex 4:

Summary of comments submitted to the Draft Report

This Annex contains a brief summary of the comments submitted to the chapters of the Draft Report (Reference number: 2016-548-4) of the Transportation Safety Bureau.

Comments to the Draft Report were contributed solely by Civil Aviation Authority (Department of Aviation Risk Assessment, Ministry for Innovation and Technology; hereinafter: ITM LKHF).

ITM LKHF Comment 1: to Chapters 1.17.2, 2.3, and 3.2 of the Draft Report.

According to the comment of ITM LKHF, the Draft Report suggests the establishing of liability.

The comment was not accepted by the IC. Both in the Draft Report and in the Final Report, the IC revealed reconstructible circumstances and causes which could be deduced therefrom. In both documents, the IC made findings relating to facts and causes.

As regards point 3.2, ITM LKHF takes the view that *"by the fact that the aircraft with registration mark HA-SJM deviated from its previously reported altitude and OY-NAY did not present a position report, both aircraft had the same effect on the occurrence.*"

In this respect, the IC notes that, according to legislation in force, the aircraft concerned is/was not obliged to issue a position report in an uncontrolled airspace. Furthermore, the position of the IC is of the view that an aircraft which nevertheless provides a position report in such an airspace and then deviates from that altitude may mislead other aircraft using that airspace.

As regards Chapter 2.3, ITM LKHF assumed that the IC had accepted it as a fact that the Flight Instructor had also been on-board the aircraft with registration mark HA-SJM in the course of the flight.

In this Report, the IC merely stated in Chapter 2.3 that it was not possible to conclude with certainty what task the Student Pilot had been doing and how many persons had been on board.

As regards point 1.17.2, ITM LKHF takes the view that, according to the passage quoted in the Training Manual, the Student Pilot flying solo may have performed an orderly flight even by deviating from the traffic pattern.

The IC is of the opinion that, on the basis of the quotation from the Training Manual, the task is to be carried out on a traffic pattern, with the reservation that the Flight Instructor may instruct the Student Pilot to fly to any point in the traffic pattern when the conditions are met[2]. The IC is of the view that, in the course of that task, the Student Pilot should not be in a position far out of the traffic pattern.

[2] According to Task 15, Chapter 2.1 Flight tasks in the Training Manual (see in Chapters 1.17.2 and 2.3 of this Final Report).

ITM LKHF Comment 2: to Chapters 1.16 and 2.1 of the Draft Report.

According to the comment of ITM LKHF, the Draft Report does not reflect an independent investigation conducted with the exclusion of conflicts of interest.

The comment was not accepted by the IC, because the IC considers that it is not only its right but also its obligation to obtain all the data and information relevant to the case, irrespective of its source, and to use such data and information after independent assessment for the purpose of identifying the causes of the occurrences as accurately as possible. In addition to the professional rules, that right and obligation are also worded in Sections 62(2) and (4) of Act CL of 2016 on General Public Administration Procedures as follows:

"Section 62. Clarification of the facts
(1) …
(2) In administrative proceedings all evidence shall be admissible that is suitable for ascertaining the relevant facts of the case.
(3) …
(4) The authority shall be free to define the means and extent of the evidentiary procedure, and shall assess the evidence available at its own discretion."

ITM LKHF Comment 3: to Chapters 1.16 and 1.18.2 of the Draft Report.

According to the comment of ITM LKHF, the Draft Report contains incorrectly calculated data.

The comment was not accepted by the IC because ITM LKHF did not take into account data in Figure 4 and Annex 3 when assessing data and calculations. With regard to that, the IC maintains the results of the calculations.

ITM LKHF Comment 4: to the Draft Report as a whole.

According to the comment of ITM LKHF, the Draft Report failed to take into account a series of safety studies.

The comment was accepted by the IC and the findings of the relevant safety studies were incorporated Chapters 1.18.6, 2.4 and 5.

ITM LKHF Comment 5: to Figure 2 and the related Chapter 1.16 of the Draft Report.

"According to the comment from ITM LKHF, the IC either have published the Draft Report under preparation or, as themselves admit, they used the material of a study prepared by some "close acquaintance" and "friend" for the preparation of the Draft Report.

The comment was not accepted by the IC, because:

1. As defined in the legislation, the parties involved received the Draft Report for comments as provided for in relevant legislation, with the warning in its cover page that: *"This Daft Report does not constitute a final position from a technical point of view and shall not be published."*

2. The results of the test detailed in Chapter 1.16 of the Report were received and used for the technical examination with unchanged contents by the IC.