

MINISTRY OF
TECHNOLOGY AND INDUSTRY

TRANSPORTATION SAFETY BUREAU

FINAL REPORT

MOONEY M20M, N999U

Tököl Airport non-public take-off and landing site (LHTL),

28 September 2021

Serious Incident

2021-0436-4

The sole objective of a safety investigation is to find the causes and circumstances of aviation accidents or incidents and to initiate the necessary safety measures; furthermore, to make recommendations in order to prevent similar cases in the future. It is not the objective of an investigation to apportion blame or liability.

Introduction

Synopsis

Occurrence class	Serious Incident	
Aircraft	Model	MOONEY M20M TLS
	Registration	N999U
Occurrence	Date and Time	28 September 2021, 13:00 LT ¹
	Location	Tököl Airport non-public take-off and landing site (LHTL)
Purpose of flight	Private cross-country flight	
Fatalities / Severe Injuries	No one was injured	
Damage to Aircraft	Substantial	

On 28/09/2021, the pilot and two passengers of the type MOONEY M20M aircraft with registration number N999U were on their way from Kyiv to Tököl Airport (LHTL), a non-public take-off and landing site after landing in Debrecen. Before reaching the landing site, the pilot maintained an uninterrupted radio contact with the LHBP FIC, who also informed him about the frequency of LHTL. During the approach to the landing site, the pilot attempted to contact Radio Tököl on 127.560MHz but was unsuccessful. Subsequently, during the approach and landing, the pilot maintained radio contact with the LHBP FIC and received landing information from them. The pilot, thus preoccupied with his radio communication problems, forgot to release the landing gear during the landing and belly-landed the aircraft on the paved runway 32 of the landing site. There were no personal injuries in the occurrence, but the aircraft was substantially damaged.

Based on those above, the IC attributed the occurrence of the incident to the lack of radio equipment with 8.33 kHz channel assignment and human factors related to the pilot (lack of situational awareness, overload).

On the basis of those above, the Investigating Committee of the TSB has not found any circumstances that would justify a safety recommendation, as similar cases can be avoided by following the relevant rules.



Figure 1: The aircraft after the occurrence

¹ LT - Local Time

Definitions and abbreviations

Aerodrome	<i>A defined area (including any buildings, installations and equipment) on land or water or on a fixed offshore or floating structure intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft</i>
AMSL	<i>Above Mean Sea Level</i>
EASA	<i>European Union Aviation Safety Agency</i>
Flight plan	<i>Specified information provided to air traffic service units, relative to an intended flight or portion of flight of an aircraft;</i>
IC	<i>Investigating Committee</i>
ICAO	<i>International Civil Aviation Organization</i>
Kbvt.	<i>Act CLXXXIV of 2005 on the safety investigation of aviation, railway and marine accidents and incidents and other transportation occurrences</i>
LT	<i>Local Time</i>
LHBP FIC	<i>Budapest Flight Information Centre</i>
MIT	<i>Ministry for Innovation and Technology</i>
NFM	<i>Ministry of National Development</i>
TSB	<i>Transportation Safety Bureau</i>
UTC	<i>Coordinated Universal Time</i>
VFR	<i>Visual Flight Rules</i>

General information

All times indicated in this report are in local time (LT). LT at the time of the occurrence: UTC+2 hours.

Geographic locations throughout this document are provided in WGS-84 standard.

Pursuant to point k) Subsection (1) Section 7 of Act CLXXXIV of 2005 on the safety investigation of aviation, railway and marine accidents and incidents, the Draft Report has been written in a form appropriate to the seriousness and nature of the occurrence.

Reports and Notifications

The occurrence was reported to TSB's call center at 14:38 on 28 September 2021 by the on-call officer of Radio Tököl.

TSB of Hungary notified the following organisations:

- Accident Investigation Authority of the State of Registry (NTSB²) on 29/09/2021 at 16:00.
- Accident Investigation Authority of the State of Owner (BFU³) on 29/09/2021 at 15:56.
- EASA⁴ on 29/09/2021 at 15: 51.

Investigation Committee

The Head of TSB appointed the following persons in the investigating committee (hereinafter: IC).

Investigator-in-Charge	Zsuzsanna Nacsa JD	investigator
Member	Kitti Dusnoki	investigator

Overview of the Investigation Process

Receiving event notification, the on-duty manager of the TSB ordered an immediate dispatch to the site.

Pursuant to Article 5 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/ECA the TSB is required to initiate an investigation in the following circumstances:

1. *Every accident or serious incident involving aircraft other than specified in Annex II to Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency (6) shall be the subject of a safety investigation in the Member State in the territory of which the accident or serious incident occurred.*
2. *When an aircraft, other than specified in Annex II to Regulation (EC) No 216/2008, registered in a Member State is involved in an accident or serious incident the location of which cannot be definitely established as being in the territory of any State, a safety investigation shall be conducted by the safety investigation authority of the Member State of registration.*
3. *The extent of safety investigations referred to in paragraphs 1, 2 and 4 and the procedure to be followed in conducting such safety investigations shall be determined by the safety investigation authority, taking into account the lessons it expects to draw*

² NTSB – National Transportation Safety Board (USA)

³ BFU - Bundesstelle für Flugunfalluntersuchung (German accident investigation authority)

⁴ EASA – European Union Aviation Safety Agency

from such investigations for the improvement of aviation safety, including for those aircraft with a maximum take-off mass less than or equal to 2 250 kg.

4. *Safety investigation authorities may decide to investigate incidents other than those referred to in paragraphs 1 and 2, as well as accidents or serious incidents to other types of aircraft, in accordance with the national legislation of the Member States, when they expect to draw safety lessons from them.*

Based on the findings of the site inspection and with regard to Article 5 (1) of Regulation (EU) No 996/2010 of the European Parliament and of the Council, the head of the TSB decided that an investigation is required and will be launched.

In the course of the investigation the IC has taken the following steps:

- took photos;
- interviewed witnesses;
- obtained information on the aircraft and its pilot;
- collected information on the aircraft's operation;
- analysed the data and information available to it.

Investigation Principles

This investigation is being carried out by Transportation Safety Bureau on the basis of the following disciplines.

- 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 (referred to as Kbv. throughout the document),
- NFM (Ministry for National Development) Regulation 70/2015 (XII.1) on safety investigation of aviation accidents and incidents, as well as on detailed investigation for operators,
- In matters not covered by Kbv., 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 legislation,

- Transportation Safety Bureau of Hungary shall investigate aviation accidents and serious incidents.
- Transportation Safety Bureau of Hungary may investigate aviation and incidents which – in its judgement – could have led to accidents of more severe consequences in different circumstances.
- Transportation Safety Bureau of Hungary is independent of any person or entity that may have interests in conflict with the objectives of the investigating body.
- In addition to the aforementioned legislation, TSB of Hungary shall conduct safety investigations in line with ICAO Docs 9756 and 6920 Manual of Aircraft Accident Investigation.
- This Report shall not be binding, nor shall an appeal be lodged against it.

- The original of this report was written in Hungarian.

No conflict of interest has been identified between safety investigators appointed to the IC. No investigator assigned with a safety investigation has been involved as an expert in any other procedure pertaining to the same case and shall not do so in the future.

The IC shall retain all data and information having come to their knowledge in the course of the safety investigation. Furthermore, the IC shall not be obliged to make such data and information available to other authorities, whose disclosure could have been legally refused by their original owner.

This Final Report is based on the Draft Report prepared by the IC and shall be sent to all involved parties for comments, as set forth by the relevant regulations.

No comments on the draft report were received from the interested parties within the legal deadline.

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With the exceptions stipulated by law, this report or any part thereof may be used in any form, provided that context is maintained and clear references are made to the cited source.

Translation

This document has been translated from Hungarian. Although efforts have been made to provide a translation as accurate as possible, discrepancies between the versions might occur. In such eventuality, the Hungarian version shall prevail.

Factual information

Flight History

On 28/09/2021, the pilot and his two passengers took off from Kyiv Pivdeniy Airport (UKBD) in a type MOONEY M20M aircraft with registration number N999U and flew to Rivne International Airport (UKLR) and from there to Debrecen International Airport (LHDC), where the pilot already had problems with radio communication with the airport AFIS service. From Debrecen International Airport, after entry into Hungary, he continued his journey to Tököl non-public take-off and landing site (LHTL) to arrive on time according to his own account, for a business meeting planned in Budapest with two of his companions. The pilot maintained uninterrupted radio contact with LHBP FIC on this route before reaching the LHTL landing site, who also informed him of the LHTL frequency. During the approach to the landing site from a straight-in approach to Runway 32, the pilot attempted to contact Radio Tököl on the 127.560MHz, but was unsuccessful, so returned to the LHBP FIC's frequency. After that, during the approach and landing, the pilot maintained radio contact with LHBP FIC and asked/received the necessary information for landing through it.. Thus, the pilot, who was preoccupied with radio communication problems, forgot to release the landing gear during the landing (which he said was at a relatively high speed and engine power) and belly-landed the aircraft on the paved runway 32 of the landing site, where it came to rest after approximately 350 metres of straight slide. No one was injured during the occurrence, but the aircraft was substantially damaged.

According to the pilot, he used the printed checklist during the landing, but the radio communication problems may have distracted him and he forgot to release the landing gear. He attributed the incident to human factor on his own side.

Aircraft Damage

During the investigation did not reveal any information that the structure or any system of the aircraft had failed prior to the occurrence, thereby contributing to or influencing the occurrence.

During the belly-landing, all three blades of the three-bladed propeller were bent and became deficient in material. The fixed step and the antenna on the underside of the fuselage snapped off, the underside of the fuselage was worn, and the sheet metal covering had holes in it (Figure 2).



Figure 2: Visible substantial damage to the aircraft

Personnel Information

The pilot had the necessary licence, rating and medical certificate to fly the aircraft, and all these were valid at the time of the occurrence. According to him, he was rested and felt fit to fly.

He obtained his private pilot licence on 26/05/2021, and after obtaining his licence he flew 10.9 hours in type C172 aircraft. Subsequently, he flew for the first time on 26/08/2021 with the type of aircraft involved in the accident and passed his test on 09/09/2021. From the first take-off to the date of the occurrence, he flew a total of 24.4 hours with the affected Mooney M20M type. On the day of the occurrence, the pilot flew 3.5 hours from three take-offs until the landing that ended up with the serious incident.

Aircraft Information

The Mooney M20M is a four-seat, low-wing, single-engine, piston-powered, propeller-driven aircraft with retractable tricycle landing gear.

The aircraft was airworthy prior to the occurrence and, according to the available documentation, it had been maintained in accordance with the regulations.

The pre-flight checklist in the aircraft's flight manual includes a check of the landing gear out position (Appendix 1:).

According to the aircraft's flight manual, there are three ways of indicating the landing gear in the landing gear compartment; firstly, in the window in the middle of the floor next to the pilot's seat, secondly, by a red "GEAR UNSAFE" light on the centre console of the instrument panel, and thirdly, by a warning "horn" if the throttle is within $\frac{1}{4}$ inch of the home position and the landing gear is not out and secured.

None of the radio sets on board the aircraft had 8.33 kHz channel spacing, contrary to the requirements set by Commission Implementing Regulation (EU) No 1079/2012 of 16 November 2012 laying down requirements on the channel spacing for voice communications in the single European sky.

Weather Information

The occurrence took place at daytime in good visibility conditions. At the time of the incident, the wind was blowing at 3-4 knots with variable direction. The weather conditions did not contribute to the occurrence and therefore no further details are needed.

Communication

The pilot of the aircraft was able to establish and maintain radio contact with LHBP FIC, but was unable to establish radio contact with Radio Tököl on 127.560MHz even after several attempts. The person on duty with Radio Tököl heard (via a computer system) the LHBP FIC radio communication with the arriving pilot and also that it had been transmitted to him (to the frequency of Radio Tököl), but on the LHTL frequency only two crackles could be heard instead of the aircraft. The person operating Radio Tököl tried to give landing information to the pilot of the aircraft by blind transmission, but the pilot could not hear him. After an unsuccessful attempt to establish contact, the pilot returned to the LHBP FIC's frequency and reported that he was unable to establish radio contact with LHTL. This transmission was also heard by the person operating Radio Tököl and he telephoned LHBP FIC with the airport information (heading, wind, no traffic) required for the aircraft to land, which was relayed to the aircraft.

On the basis of the on-site inspection and the aircraft documentation, the IC found that the aircraft was not equipped with radio equipment capable of using 8.33 kHz channel spacing.

Aerodrome Information

Tököl Airport is a non-public take-off and landing site (LHTL) located north of the city of Tököl. Its elevation is 100 metres (328 ft) above sea level. It has a concrete paved runway with a 14/32 orientation and a grass runway parallel to it to the north-east. The paved runway is 799 metres long and 60 metres wide, taking into account the displaced thresholds, while the grass runway is sized 1100 x 50 metres. The traffic pattern is right-hand for runway 14 and left-hand for runway 32, with an altitude of 1700 feet AMSL.

Traffic and other information about the airport is provided by the Tököl Radio service at the airport at the announced time (also at the time of the occurrence).



Figure 3: Tököl Airport non-public take-off and landing site, as well as the direction and spot of halting of the aircraft concerned at the airport (Source: google.com/map)

According to the aerodrome rules of Tököl Airport take-off and landing site and to the information published on its website, the relevant rule for the aircraft arriving at the landing site was as follows: *“the intention to land on runway 32 from a straight line must be indicated by the pilot to the ATC on the runway axis – at the latest - before the crossing of Road 51 (3 NM, 5.5 km). This is ‘Remote 4’ or the beginning of the ‘long final’.”*

Data Recorders

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

The IC obtained and evaluated the radar and radio traffic data recorded by HungaroControl in connection with the incident, as well as the flight plan filed for the flight.

Analysis

According to information available to the IC, the aircraft was not equipped with radio equipment with the required frequency allocation. This situation created a risk that the pilot would not be able to establish radio contact with the air traffic services involved in his route during the flight, or only partially, or would not be able to access information from other aircraft on the frequencies.

This risky condition (lack of adequate radio equipment) led to radio communication problems in two cases during the flight under investigation. The pilot had already encountered communication difficulties with the AFIS service of Debrecen International Airport (LHDC) (see *Flight History*), but this caused no significant problems there. However, the radio communication problem, which occurred again during the landing at Tököl non-public take-off and landing site, gave the pilot more and presumably different tasks than just the normal landing procedures. The performance of these tasks, taking into account the short time available from the start of the landing to touchdown, was more than normally demanding on the pilot's attention.

Since the landing was not at a controlled airport and was according to visual flight rules (VFR), the pilot was also responsible for maintaining separation, which required additional division of attention.

All of this meant a more than average challenge and workload for a pilot after a long journey – in our case, a 3.5 hour flight – with border crossing.

According to information available to the IC, the pilot of the aircraft obtained his licence four months before the occurrence. He had flown the retractable landing gear aircraft type involved in the incident for the first time one month before the incident but had previously only flown and got experience on the non-retractable landing gear aircraft type C172. On this basis, the IC concluded that the pilot had relatively little experience in general and with retractable landing gear aircraft as well. In the IC's view, the lack of greater practice (habitualisation) may also have contributed to the missed gear release during the increased workload and ultimately to the occurrence of the incident.

The most common reason for a belly landing is that the pilot simply forgets to release the landing gear before landing. In any aircraft with retractable landing gear, landing gear release is part of the pilot's landing checklist which helps prioritising and includes items such as flaps adjustment, propeller and mixture control for landing. Pilots who ritually perform such checklists before landing – as the pilot concerned said he did – are less likely to land with retracted landing gear. Some pilots, however, ignore these checklists and perform the tasks by heart (relying on their memory), increasing the chances of forgetting to release the landing gear. Even experienced pilots may be distracted and forget to complete the checklist or skip items of it because they may be interrupted by another task, such as solving a radio communication problem in this case.

All aircraft with retractable landing gear must have a landing gear status indicator, which is usually a set of lights that change colour from red to green depending on whether the landing gear is in the up, transitional or down position. This will alert the pilot to the current landing gear position and warn them of the need to release the landing gear in certain flight configurations. In cases where the landing gear is in the up position and the throttle is set above the value that triggers the "horn" signal, as is presumably the case here, the signal is useless.

In the IC's view, the radio communication problem that occurred during the landing at the non-public take-off landing site of Tököl, together with the above mentioned factors, had already distracted the pilot (also according to his own account) from controlling the aircraft to such an extent that he had missed the window indicating the landing gear's up position as

well as the red light. And by keeping the engine power high until the flare (also according to his own account), the pilot had ruled out the possibility of the horn sounding. In doing so, he eliminated, though not intentionally, the last safety feature of an otherwise multiple safety system. All of this led to his forgetting to release the landing gear and belly landed.

Conclusions

The pilot had the necessary licence, rating and medical certificate to fly the aircraft, and all these were valid at the time of the occurrence.

The pilot had relatively little experience both in general and with aircraft with retractable landing gear.

The investigation did not reveal any information that the aircraft structure or any of its systems had failed prior to the incident, thereby contributing to or influencing the occurrence of the incident.

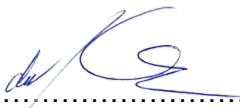
The aircraft was airworthy prior to the incident and, according to the available documentation, it had been maintained in accordance with the regulations.

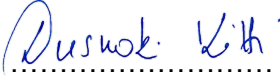
On the basis of the on-site inspection and the aircraft documentation, the IC found that the aircraft was not equipped with radio equipment capable of using the 8.33 kHz channel spacing.

The IC identified the root cause of the incident as the lack of radio equipment with the required 8.33 kHz channel spacing, which led to radio communication problems during the flight. The direct cause of the incident was identified by the IC as human factors related to the pilot (lack of situational awareness, overloading).

On the basis of those above, the Investigating Committee of TSB has not found any circumstances that would warrant a safety recommendation, as such cases can be avoided by observing the relevant rules.

Dated in Budapest, on 19 October 2022


.....
Zsuzsa Nacsa DJ
Investigator-in-Charge


.....
Ms Kitti Dusnoki
Investigator

APPENDICES

Appendix 1:

SECTION IV
NORMAL PROCEDURES

MOONEY
M20M

| NOTE |

Plan descents to arrive at pattern altitude on downwind leg for maximum fuel efficiency and minimum aircraft noise.

~CAUTION~

DO NOT fly in the YELLOW ARC speed range unless the air is smooth.

NORMAL DESCENT - GEAR DOWN

Seats, Seat Belts/Shoulder Harness	ADJUST AND SECURE
Airspeed	DECELERATE to 140 KIAS
Landing Gear	DOWN
Throttle	ABOVE 15 in. Hg. (Keep CHT in Green Arc)
Propeller	2400 RPM
Mixture	Peak TIT
Cowl Flaps	Closed
Cylinder Head Temperature (CHT)	Monitor (250 ° F (121°C) min)
Airspeed	165 KIAS or LESS.

| NOTE |

Using the landing gear as a descent aid will result in a steeper descent rate (greater altitude loss per horizontal distance traveled).

APPROACH FOR LANDING

~CAUTION~

The airplane must be within the allowable weight and balance envelope for landing (REF. SECTION VI). It will require a minimum of one hour of flight before a permissible landing weight is attained when takeoffs are made at maximum gross weight. If a landing at a weight exceeding maximum landing weight (3200 Lbs.)(1452 Kgs.) is required, see OVERWEIGHT LANDING PROCEDURE, SECTION III.

Seats, Seat Belts/Shoulder Harness	ADJUST AND SECURE
Internal/External lights	AS DESIRED
Landing Gear	EXTEND below 140 KIAS
	(Check Gear Down light ON-Check visual indicator)
Mixture	FULL RICH (on final)
Propeller	HIGH RPM (on final)
Fuel Boost Pump	ON
Fuel Selector	FULLEST TANK
Wing Flaps	T/O POSITION
	(FULL DOWN below 110 KIAS)

~CAUTION~

To minimize control wheel forces when entering landing configuration, timely nose-up trimming is recommended to counteract the nose down pitching moment caused by reduction of power and/or extension of flaps.

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