Synopsis

The 74-year-old pilot in a PA-46 Malibu Mirage, registered as N3975C, encountered visibility below minima on approach to Nyíregyháza Airport, his primary destination and decided to divert to his alternate Debrecen Airport where he landed gear up with 10 degrees of flaps. Neither of the two occupants was injured in the event. The Hungarian Transportation Safety Bureau's Investigating Committee (hereafter referred to as IC) has attributed the cause of this serious incident to human factors and found no grounds to issue a safety recommendation.

Figure 1 – The aircraft before the incident (source: Internet)

Factual Information

Occurrence category		Serious incident			
Date of occurrence		05 Dec 2017, 16:35LT[1]			
Location of occurrence		Debrecen Airport (LHDC)			
Type and registration of aircraft		Piper PA 46-350P, N3975C			
Year of manufacture, serial number		2007, 4636419			
Type and number of engines		Single engine, P&W PT6A-35			
Purpose of flight		Non-commercial (private, cross-country)			
		Crew	**Passenger**		**Other**
People	**Number**	1	1		0
	Injured	None	-		-
Damage to property		**Aircraft:** substantially damaged **3rd party damage:** none			
License and ratings of PIC[2]		PPL(A)[3], IR(A)[4], NVFR[5], SEP(Land)[6] - (EASA)[7] PPL, Single Engine Land, Instrument Airplane, English proficient - (FAA)[8]			
Age and citizenship of PIC		74 years old, German			
Flight experience of PIC		**Total**	**On the type**	**Last 90 days**	**Last 7 days**
	Flight hours	6,351 hours	ca. 1,000 hours	8.93 hours	5.58 hours
Sources of information		Incident Report, supplementary site inspection, witness interviews, recorded radio communication, additional survey, expert statement			

[1] *Local Time*
[2] *Pilot-in-Command*
[3] *Private Pilot Licence*
[4] *Instrument Rating*
[5] *Night Visual Flight Rules rating*
[6] *Single Engine Piston (Land) class rating*
[7] *European Union Aviation Safety Agency*
[8] *Federal Aviation Administration (USA)*

Flight History

According to the pilot's flight log he and his passenger, also a licensed and type rated private pilot, took off from Augsburg Airport (EDMA), Germany at 14:06 for Nyíregyháza Airport (LHNY). After about 2 hours of flying they closed in on their destination and extended the landing gear in preparation for landing, which the pilot aborted due to poor visibility and diverted to his alternate Debrecen Airport (LHDC). Retracting landing gear he climbed to 6,000 feet and arrived at Debrecen in about 10 minutes. As it was getting dark, the pilot dimmed the instrument panel lights and commenced an autopilot coupled ILS[9] approach to runway 05R. The autopilot captured the localizer but, according to the pilot's account, he experienced 'something wrong' about glideslope capture and disengaged autopilot at 2,500 feet in IMC[11], not yet in visual with the ground or the runway, and continued approach manually. He broke out of the clouds at 1,000 feet and adjusted his track for landing. As he recalls, he instructed his passenger to extend the landing gear, but the landing checklist was omitted. It was only in the flair when he realised the landing gear had not been extended.

Site and Wreckage

The aircraft skidded to a halt right of the centreline ca. 400 metres from the threshold. During the skid the underside of the fuselage was damaged and all four Hartzell propeller blades, still spinning, shredded off the hub in full length. The landing gear lever was found in DOWN position during site inspection, but it cannot be determined with certainty whether it was set in the DOWN position before or after the incident. No parts of the landing gear showed any scrape wear against the tarmac or any signs indicating a partially open position. The landing gear was up and locked when the fuselage was jacked up and loaded on a trailer for transport. At a later date when a supplementary inspection was carried out, the landing gear was found unlocked, as in an initial phase of extension. When the aircraft was jacked up again for testing, the landing gear gradually extended by gravity. Subsequent extensive landing gear testing revealed no system malfunction whatsoever; all drive and control elements were found in sound working order.

Figure 2 – The aircraft on the next day

Flight Crew

The pilot had two pilot licences valid at the time of event, a German-issued SEP (Land) class PPL(A) with instrument rating and an FAA[12] licence issued for him in the US that entitled him to fly the incident aircraft. His Class 2 medical certificate issued in Germany was also valid at the time of the event with limitations: a requirement to wear glasses for near vision and a validity restricted for six months. The pilot's flight experience comprised of ca. 6,400 total hours including about 1,000 hours on the PA-46 model. According to documents available to the IC, the pilot had made 6 landings as PIC in the 79 days before the event, which gives an average of one every other week.

The passenger was also instrument rated on her SET(Land)[13] class PPL(A) issued in Germany with a PA-46 type rating. Of her 300 hours total time she logged 180 hours on this model. During the 79 days preceding the event she had 4 flights on her own in the aircraft concerned.

[9] *Instrument Landing System: a radio navigation system that provides short-range centreline and glide path guidance to aircraft for landing, primarily in low visibility*

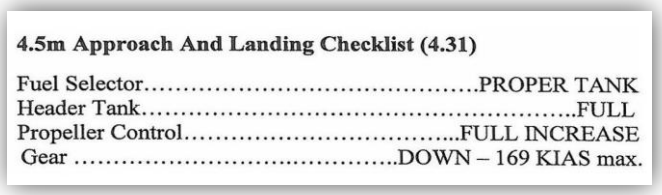
[11] *Instrument Meteorological Conditions: impaired visibility conditions that require pilots to fly primarily by reference to instruments, rather than by outside visual references*

[12] *Federal Aviation Administration: a US federal government agency that regulates all aspects of civil aviation in the country as well as over surrounding international waters*

[13] *Single Engine Turbine class rating*

Aircraft

The incident aircraft is a US-registered Piper PA-46-350P Malibu Mirage, a low-wing, conventional tail, retractable tricycle gear single engine turboprop model that can carry a pilot and five passengers. Early PA-46 models were piston engine designs, but soon enough jet-prop versions also became available. Newer models with both engine types were produced over time and turboprop retrofit options for piston models soon became rather popular on the market. The incident aircraft's original piston engine was also replaced by a PT6A-35 Pratt & Whitney turbine engine in a JetProp DLX retrofit conversion. This pressurised cabin aircraft is capable of cruising at altitudes over 8,000 metres while covering distances as much as 2,000 kilometres at 370 to 460 kph, total load permitting. System and flight information is available on 3 large TFT displays in the cockpit. Instrument panel lighting can be adjusted to ambient light conditions. The aircraft is equipped with an autopilot and full IFR instrumentation for flight in adverse weather conditions. To facilitate safe operation of this fast and complex aircraft, pilot checklists are provided in the operating handbook for each flight phase. An example is shown in *Figure 3*, a landing checklist excerpt that details landing gear extension. The actual landing gear is not directly visible from the cockpit, so green control lights associated with each wheel announce when the gear is down and locked. In case of missed landing gear extension an audio signal warns the crew on condition of more than 10 degrees of flaps extended or engine thrust reduced below a specific threshold. In these conditions the gear horn will be triggered during flight in normal operation (etc. steep descent), which the pilot will by default disregard.


4.5m Approach And Landing Checklist (4.31)

Fuel Selector……PROPER TANK
Header Tank……..FULL
Propeller Control……..FULL INCREASE
Gear ……..DOWN – 169 KIAS max.

Figure 3 – An excerpt from the before-landing checklist

Aerodrome

Debrecen Airport, a major international airport in Eastern Hungary, lies 7 km south of the municipality of Debrecen, at 109 metres AMSL[14]. At the time of the event there was a single 2,500 by 40 m paved runway in use, oriented 05/23. An old and closed, much wider runway of the same length, designated 05L/23R, runs parallel to the new one on the NW side. Since the date of the event runway orientations have changed to 04/22 due to a shift in magnetic variation. Approach aids to runway 05 include runway lights (edge and threshold lights), an ILS and approach light system and a PAPI[15].

In the approach chart issued by HungaroControl, dated 31 March 2016, runway 05R ILS approach decision altitude is 508 feet (155 m). This is 153 feet (47 m) above the runway threshold, which lies at 355 feet (108 m) AMSL.

Weather and Visibility

The serious incident took place at dusk, in typical winter conditions. Local temperature was around freezing point, light southerly wind and about 4 km visibility prevailed. Clouds were broken with low, 60-metre ceiling AGL[17]. Local actual sunset time was 16:42, which was close to the time of the event. The pilot gave account of low level icing while flying in clouds.

Flight Time Log Records

The aircraft concerned is certified for single pilot flying. Despite, flight log books submitted to the IC reveal multiple occasions when the passenger occupying the right seat, otherwise a licensed and type rated pilot, also logged the flight as her own flight time, which is in conflict with relevant EASA regulations.

[14] *Above Mean Sea Level*

[15] *Precision Approach Path Indicator: a visual aid that provides guidance information to help a pilot acquire and maintain the correct glidepath to a runway*

[17] *Above Ground Level*

Analysis

Flight Aspects

The IC takes it that the exertion associated with flying a complex aircraft in a flight stretching over two hours may put a great deal of physical and mental strain on a 74-year-old individual. This situation was further aggravated by the discontinued approach in low visibility and adverse weather on their primary destination, followed by a diversion to alternate stretching into night time. Complications of low level icing exposure and reversion to manual flight due to an alleged, though not confirmed autopilot malfunction represented an additional physical and mental load on the pilot flying in IMC. The IC presumes that the low number of approaches that the pilot had made during the past few months before the event did not keep him up-to-date enough so he could handle the difficulties arising on this flight with ease and routine.

Figure 4 – Landing gear controls in the cockpit

Landing gear control lights in their dimmed position as shown in *Figure 4* are considerably dimmer than in daylight setting and may not be bright enough for easy perception. The pilot also admits in retrospect that being accustomed to this, he missed to pick up when the landing gear lights did not come on during approach.

Flight data and cockpit voice recorders were not mandated for this flight and there were none installed in the aircraft. Without such data the IC cannot determine with certainty the exact chain of events during this flight, but on the basis of information available it appears safe to say that even if the pilot had instructed his passenger to extend the landing gear – which in itself is a breach of rules in a single pilot aircraft –, he certainly missed to double check whether it was down and locked. This error of his was most likely a result of heavy mental overload caused by fatigue from the long flight and multiple issues of adverse factors including missed approach and diversion in bad weather coupled with autopilot disconnection due to a suspected malfunction. To make things worse, a low flap setting at 10 degrees delayed the gear horn which, most probably, only went off in the flare. As discussed above, this warning will sound in normal operation during flight, which might compromise a pilot's sensitivity to the warning. For the successful execution of a go-around, this may prove critical, especially in mental overload conditions.

Flight Time Logging Issues, Single and Multi-Pilot Cockpit Cooperation

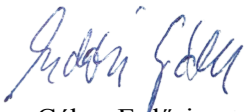
Several members of the owner's family are certified pilots and fly this aircraft on a regular basis. Two of them were involved in the incident flight. Contrasting records in their flight logs submitted to the IC with the aircraft flight logs has revealed a large number of log discrepancies, as well as multiple instances where not only the person actually flying the single pilot certified aircraft logs flight times as PIC hours, but the other family member occupying the right seat as well. Not only does this kind of practice prevent adequate recording and tracking of pilot experience but also misrepresents the FAA required logbook endorsements necessary for pilots to maintain recency in flying complex aircraft, flying at high altitude, flying high performance aircraft, carrying passengers, carrying passengers at night and maintaining instrument currency. In addition to being in breach of relevant EASA regulations, multiple flight logging in this case is also associated with a muddled working environment where the blurred outlines of single and multi-pilot cooperation pose additional aviation hazards according to the following.

Aircraft are certified for single or multi-pilot operation by manufacturers as set forth in the POH[19] and by operators as specified in their Operation Manuals. In single pilot operation all functions and responsibilities are borne by a single pilot. In a multi-pilot environment tasks and responsibilities associated with each crew member and their separate roles in flight preparation and all duties relating to the flight are clearly outlined in the above documents. When a passenger occupying a cockpit seat in a single pilot aircraft is involved in the operation "helping out" the PIC in their flight duties, cockpit cooperation and therefore efficiency gets corrupted on account of missing well-defined guidelines and rules to regulate such cooperation. There are no acknowledged and accomplished protocols these individuals would be proficient in and could follow. Their scope of duty and responsibility is fuzzy, the expectations

[19] *Pilot Operating Handbook*

of the job are based on assumptions and cooperation is incidental. In such an unregulated working environment contributors will almost necessarily make mistakes and omit required steps, which they may miss altogether and in lack of acknowledged protocols may never realise in due course. The case concerned is a typical example of such chain of errors, where both the mistakes and the failure to identify them were largely attributed to individuals working together in an undefined environment rather than follow acknowledged aviation rules and regulations.

The IC therefore identified the causes of the incident as pilot error and found no grounds to issue a safety recommendation, because similar incidents can be avoided by observing relevant rules and regulations.



Gábor Erdősi
Investigator-in-Charge

Ákos Hanczár
IC Member

The sole objective of the safety investigation is to reveal the causes and circumstances of aviation accidents or incidents and to initiate the necessary safety measures and make recommendations in order to prevent similar cases in the future. Safety investigation is not aimed at apportioning blame or liability.

General information

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

- 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 [20] Regulation 70/2015 (XII.1) on safety investigation of aviation accidents and incidents, as well as on detailed investigation for operators,

In 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 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 which may have interests conflicting with the tasks of the investigating body.
- In addition to the aforementioned legislation, 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.

Members of the IC have been in no conflict of interest. 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 all 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.

Translation

The present document is a translation from Hungarian. Although efforts have been made to provide a translation as accurate as possible, discrepancies may occur. In such eventuality, the Hungarian version shall prevail.

[20] Ministry for National Development