



DUTCH
SAFETY BOARD

Investigations

Within the Aviation sector, the Dutch Safety Board is required by law to investigate occurrences involving aircraft on or above Dutch territory. In addition, the Board has a statutory duty to investigate occurrences involving Dutch aircraft over open sea. Its investigations are conducted in accordance with the Safety Board Kingdom Act and 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. If a description of the events is sufficient to learn lessons, the Board does not conduct any further investigation.

The Board's activities are mainly aimed at preventing occurrences in the future or limiting their consequences. If any structural safety shortcomings are revealed, the Board may formulate recommendations. The Board's investigations explicitly exclude any culpability or liability aspects.

Quarterly Aviation Report

October - December 2021

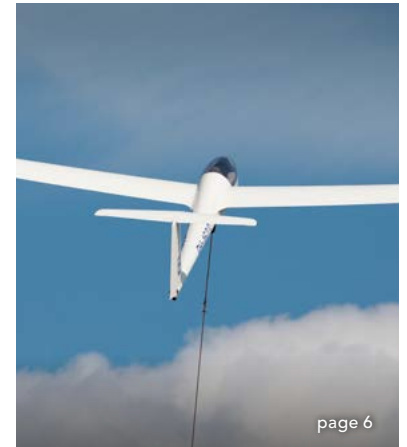


Once again in 2021, the global COVID-19 pandemic had a major impact on commercial aviation. 2021 saw 44% fewer flight movements from and to the large airports in the Netherlands, as compared with 2019. Nonetheless, the number of reports received by the Dutch Safety Board in 2021 from commercial aviation was not much lower than in previous years. The vast majority of reported occurrences took place in general aviation.

Last year, for example, the Dutch Safety Board received a series of reports about motorised aircraft flying over or near airfields where at the same moment, glider activities were taking place. Such situations result in a risk of potential collision between a motorised aircraft and a glider, or with a winch cable. For that reason, the Dutch Safety Board has called for attention and alertness at the locations of glider activities during flight preparations and flight operation.

At the request of the Minister of Infrastructure and Water Management, the Dutch Safety Board conducted a follow-up investigation into the aircraft accident in Faro, in 1992. The investigation focused specifically on maintenance of the landing gear of the commercial aircraft. During the investigation, no evidence was found of non-conformities or any exceeding of maintenance periods and inspections. The aircraft satisfied all maintenance requirements, and upon departure from Amsterdam for the flight to Faro was airworthy.

Jeroen Dijsselbloem
Chairman Dutch Safety Board



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Retrospective on reports and investigated occurrences in 2021

Once again in 2021, the global COVID-19 pandemic had a major impact on commercial aviation. There was a partial but sustained recovery in the number of flight movements in Europe, from -64% in January to -22% in December as compared with the same month in 2019. 2021 saw approx. 345,000 flight movements (departure/arrivals) in the Netherlands; 44% fewer than in 2019. Of the European airports, Amsterdam Airport Schiphol saw most flight movements in 2021 (arrival and departure), namely 767 per day.¹

The Dutch Safety Board is legally mandated to investigate all serious incidents and all accidents involving civilian aircraft in the Netherlands. In 2021, eleven accidents and sixteen serious incidents were reported to the Safety Board. The Safety Board launched an investigation into all 27 occurrences. Four of these occurrences involved a commercial air transport aeroplane; these were serious incidents. A Boeing 747 cargo aircraft lost a panel on the underside of the aircraft's fuselage, after taking off from Amsterdam Airport Schiphol, during the climb to cruising altitude. Another cargo aircraft, also a Boeing 747, experienced problems with an engine shortly following take-off from Maastricht Aachen Airport, and lost parts of this engine above the village of Meerssen. The crew of a Boeing 737 experienced problems with incorrect altitude and speed indications shortly following take-off from Rotterdam The Hague Airport, and during final approach to Amsterdam Airport Schiphol, the crew of an Embraer 190 observed a drone at an estimated separation of 60 metres.

During the past calendar year, the Dutch Safety Board offered and/or provided assistance on ten occasions to investigations by foreign investigation agencies.² These were investigations into occurrences with Dutch involvement, such as an aircraft with Dutch registration and/or of Dutch manufacture. Two of these occurrences involved a Fokker 50 and three a Fokker 100. The Dutch Safety Board itself also launched an investigation into a serious incident with a Dutch registered Embraer

190, which occurred in Germany.³ In the pre-take-off performance calculation, the crew had assumed a longer runway (length) than was actually available. Including this investigation, the total number of investigations launched by the Safety Board in 2021 into occurrences involving aircraft amounted to 28.

In 2021, in addition to the Quarterly Aviation Reports, the Dutch Safety Board published four other aviation reports. These were the reports 'Crashed after banner pick-up, Breda International Airport', 'Loss of control after interrupted winch launch, Gilze-Rijen Air Base', 'Near collision between two taxiing aircraft' and 'Mid-air collision between two Piper Super Clubs, near Oudemolen'. The Dutch Safety Board also published the report 'Safe flight routes - Responses to escalating conflicts' outlining findings from a second follow-up investigation into the safety of flight routes above conflict zones.

At the request of the Minister of Infrastructure and Water Management, the Dutch Safety Board conducted a follow-up investigation into the accident during the landing of a McDonnell Douglas DC-10-30F at Faro airport in Portugal in 1992. The investigation was focused specifically on the maintenance of the aircraft's landing gear. During the investigation, no evidence was found of non-conformities or any exceeding of maintenance periods and inspections. The aircraft satisfied all maintenance requirements, and upon departure from Schiphol for the flight to Faro was airworthy. In November 2021, the chairman of the Dutch Safety Board sent a letter to the Minister of Infrastructure and Water Management to inform her of the findings of the investigation.

¹ EUROCONTROL, *Aviation Intelligence Unit, Think Paper #15 – 1 January 2022, 2022.*

² Australia (3x), Finland (1x), Ghana (1x), Italy (1x), Panama (1x), Spain (2x) and the United Kingdom (1x).

³ The German Bundesstelle für Flugunfalluntersuchung (BFU) delegated the investigation to the Dutch Safety Board.

Retrospective on reports and investigated occurrences in 2021

On 3 June 2021, the Dutch Safety Board issued an interim warning for airlines returning their aircraft to use following temporary decommissioning. The aim of this warning by the Dutch Safety Board was to alert airlines and maintenance companies to the safety risks that can arise when aircraft are recommissioned, following a period of mothballing.

On 30 December 2021, the Dutch Safety Board published an interim warning as a means of sharing with the aviation sector the findings of the investigation carried out on the engine of a Cessna 208B. The aircraft, with a pilot and seventeen parachutists on board, had made an emergency landing on 25 June 2021, following the loss of engine power.

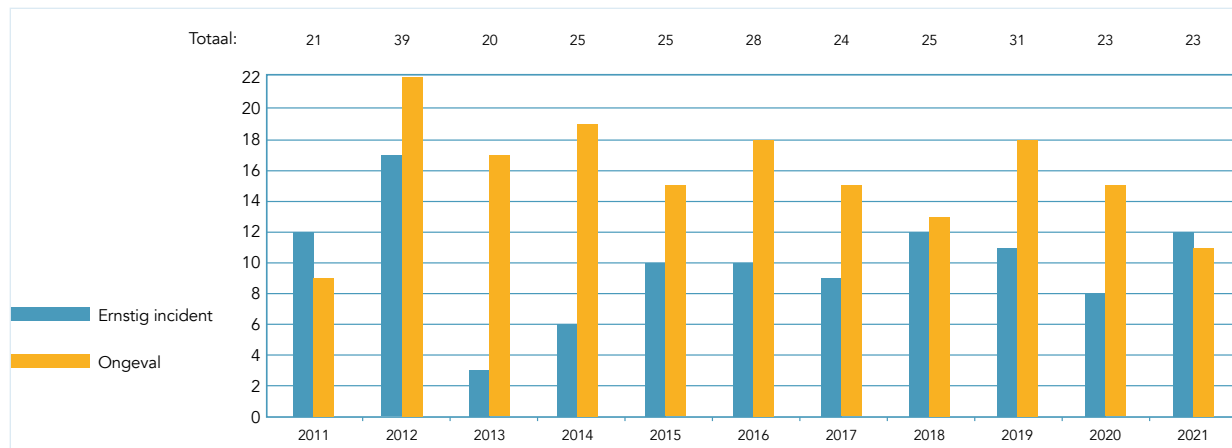
General aviation reports

Within general aviation, a wide variety of aircraft are flown: from powered paragliders through to turbine-engined aircraft. The number of serious incidents and accidents reported to the Dutch Safety Board in general aviation, in the Netherlands, has fluctuated around 25 per year, since

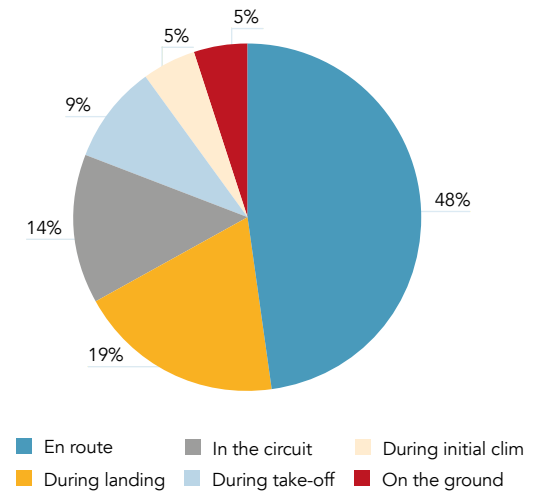
2014. In 2021, the number remained the same as in the previous year, at 23.⁴

In 2021, one pilot lost his life in an aircraft accident in the Netherlands; he lost control over his aircraft, a microlight aircraft, and crashed near Kornhorn. In another occurrence, a child suffered injuries; on the beach in Katwijk, the pilot lost control of a model aircraft, as a result of a sudden gust of wind. The aircraft subsequently collided with the child's head. One person suffered minor injuries after being hit by an unmanned aircraft system, after the pilot had lost control of the aircraft system.

Of the serious general aviation incidents and accidents reported to the Dutch Safety Board in 2021, 48% took place en route, 19% during landing, 14% in the circuit (including VFR departure/arrival routes), 9% during take-off, 5% during initial climb and 5% on the ground (during engine starting).



Number of serious incidents and accidents in general aviation in the Netherlands reported to the Dutch Safety Board.



The flight stages in which general aviation occurrences took place in 2021.

⁴ The reports in 2021 included one occurrence with an unmanned aircraft system operated by the police.

Of the occurrences classified as serious incidents or accidents by the Dutch Safety Board, just like in 2020, the airprox was the most frequent type of occurrence reported (on eight occasions). An airprox is an event whereby, in the opinion of a pilot or an air traffic controller, both the separation between aircraft and their direction and speed of flight were such that the safety of the aircraft in question may have been at risk. It is then the task of the Dutch Safety Board to classify the occurrence. Seven of the reported airproxes occurred near an aerodrome, and one airprox occurred en route. The Focus chapter in this quarterly report discusses the risk of collision during flights over glider airfields.

2021 saw four emergency landings. In Epse, the pilot of a Piper J3C made an emergency landing after experiencing problems with the aircraft's steering equipment. The crew of a Cessna 550 observed smoke in the cockpit and cabin, during the flight. The pilot deviated to Groningen Airport Eelde. The pilot of a Cessna 208B made an emergency landing in a field, after the aircraft had lost engine power shortly after take-off. The engine of a Stampe SV-4 shut down, causing the pilot to make an emergency landing in the Westerschelde river.

Three accidents took place after the pilot lost control of the aircraft.⁵ An Aerospool Dynamic crashed near Kornhorn, whereby the pilot lost his life. At Hilversum airfield, during the landing, an instructor lost control of his Cessna 177, which eventually came to a standstill in a field next to the runway, after completing a ground loop. In The Hague, an unmanned aircraft system failed to respond to the pilot's input and crashed, hitting a crew member on the ground, who suffered minor injuries.

Two aircraft took off from an out-of-use runway (Hilversum Airfield and Breda International Airport⁶) and one aircraft took off from a taxiway (Midden Zeeland Airfield).

Two gliders collided with an obstacle during final approach. At Venlo glider airfield, an ASK 21 hit a treetop during final approach, after which the aircraft made a hard landing. At Volkel Air Base, an LS4-b collided with a marker sign shortly before landing.

5 Loss of Control In-flight (LOC-I) occurrences.

6 The occurrence at Breda International Airport is classified as an incident. The Dutch Safety Board conducted a limited investigation into the occurrence.

Collision risk during flights above glider airfields

During the course of the past year, the Dutch Safety Board received eight reports of motorised aircraft flying above or near aerodromes, where glider activities were taking place. In some of these occurrences, which took place at six different locations, there was a (potentially) dangerous situation. The Dutch Safety Board has classified and investigated two of these occurrences as serious incidents. The other occurrences, of which one was investigated, have been classified as incidents; the investigated incident is described in detail at the end of this chapter.

The risk of flying above glider airfields is that a motorised aircraft could collide with a glider or a winch cable. Gliders can be winched to altitudes of around 2,000 feet.⁷ In addition, a steel or Dyneema synthetic winch cable represents an almost invisible obstacle. A collision with a winch cable can result in severe damage to the motorised aircraft, with potential fatal consequences for the occupants.

In a number of cases, members of the gliding club saw the motorised aircraft as it approached, and temporarily halted winch operations. In one case, the pilot of the glider uncoupled the winch cable early, in order to prevent a possible collision with the motorized aircraft.

In the Netherlands, a total of 575 gliders⁸ are registered⁹ as well as 30 aerodromes where gliders take off and/or land.¹⁰

These are glider airfields, airfields where other aviation activities take place (such as motorised flights or parachute jumping) or air bases. In the vicinity of these sites there is

heavy glider traffic, in particular in the weekends during the period March through to October. However, there are also glider airfields, including Terlet, where gliders are actively flown on weekdays. It is therefore essential that other airspace users be aware of the locations of these aerodromes and the altitudes up to which gliders can be winch launched.¹¹



Winch launch. (Source: A. Vrieze)

In order to reduce the risk of a collision or an airprox between a motorised aircraft and a glider above or near a glider airfield, it is recommended that the locations where gliders can be winch launched (and/or tow launched) and their immediate vicinity be avoided, and not overflown (under all circumstances not below the vertical limits of the aerodrome indicated in the AIP).

It is essential that during flight preparations, in determining the route, aviators are aware of locations with glider activities. NOTAMs¹² can provide valuable information. Glider airfields are marked on flying charts with the letter G.¹³

- 7 The launch of a glider by a motorised aircraft generally takes place up to altitudes of around 1,300 to 2,000 feet, but sometimes also to 3,300 feet.
- 8 451 gliders, 88 powered sailplanes – non-self-launching (turbo, electric, jet) and 36 self-launching, no touring motor gliders.
- 9 Human Environment and Transport Inspectorate, *Dutch Civil Aircraft Register*, 7 February 2022.
- 10 LVNL, *Aeronautical Information Publication The Netherlands*, ENR 5.5 2 Glider activities (consulted on 6 December 2021).

- 11 LVNL, *Aeronautical Information Publication The Netherlands*, ENR 5.5 2 Glider activities, see second column in table (consulted on 6 December 2021).
- 12 A NOTAM (Notice to Airmen) is a report distributed by telecommunication, containing information about the layout, condition or alterations to an aviation facility, service, procedure or hazard, timely knowledge of which is of essential importance for personnel involved in flight operations.
- 13 The G is the abbreviation for glider site.

Table: Overview of reports received by the Dutch Safety Board.

Date	Location	Brief description of occurrence
24 April 2021 ¹⁴	Noordkop glider airfield	As a glider was being winch launched, the Piper PA 46-350P was flying over the glider airfield at an altitude of 1,400 feet, lower than the altitude at which the winch cable was uncoupled. The Piper took evasive action.
30 May 2021 ¹⁵	Gilze-Rijen Air Base	The Reims Aviation S.A. F172P was flying at an altitude of 1,200 feet over the air base. Winch operations were halted, as soon as the motorized aircraft was observed.
14 August 2021	Soesterberg glider airfield	The motorized aircraft flew over the take-off runway at low altitude. Winch operations were halted, as soon as the motorized aircraft was observed.
16 September 2021	Salland glider airfield	The pilot of the glider uncoupled the winch cable at an altitude of approx. 1,200 feet because of the approaching Socata TB 20 and then completed an evasive manoeuvre. The motorized aircraft was flying on a converging course at a lateral separation of 900 metres, to the south of the glider airfield.
19 September 2021	Axel glider airfield	A helicopter flew over the take-off location at an altitude of approx. 120 metres, and completed a 360 degree turn across the circuit, while glider operations continued.
25 September 2021	Axel glider airfield	A motorized aircraft passed a glider which was flying near and above the glider airfield at an altitude of approx. 1,000 feet. The vertical separation between the two aircraft was estimated at approx. 350 feet.
11 October 2021 ¹⁶	Biddinghuizen glider airfield	The Cessna 172M was flying close to the circuit starting point ¹⁷ of the glider airfield, beneath a glider, at a short distance. The pilot of the Cessna completed an evasive manoeuvre.
23 October 2021	Gilze-Rijen Air Base	The Robin DR401 was flying at an altitude of approx. 1,500 feet over the winch path, while a winch launch was taking place. The motorized aircraft passed the glider in the opposing direction and was flying below the altitude at which the winch cable was uncoupled.

¹⁴ Classified as a serious incident and published in the Quarterly Aviation Report 2021-3.

¹⁵ This occurrence, classified as an incident, is described in more detail at the end of this chapter.

¹⁶ Classified as a serious incident. This occurrence will be published in a future quarterly report.

¹⁷ A glider circuit starts at a distance of 500 metres adjacent to the winch; the circuit starting point is the start of the downwind leg.

During the flight itself, the use of a programme for VFR flight planning and navigation, that permanently indicates the precise position of the aircraft, is an effective tool. The proactive use of the available air traffic services also contributes to safe flight operations. (VFR) air traffic information can for example be obtained by contacting Amsterdam Information or Dutch Mil Info while flying in airspace classes C, D and E.¹⁸ However, there is as yet no guarantee that that information will actually be provided. In other words, the captain remains fully responsible for maintaining sufficient separation from other aircraft.

In the Netherlands, there are a number of aerodromes with an aerodrome traffic zone (ATZ).¹⁹ An ATZ is a section of airspace of defined dimensions, positioned around an aerodrome to protect aerodrome traffic. An ATZ is primarily reserved for use by aircraft participating in the activities at the aerodrome. VFR traffic is strongly advised to remain outside an ATZ, which is active during the opening hours of the aerodrome. During the weekend, glider activities can also take place at air bases, when closed for military traffic. In the past, an ATZ around an air base represented a form of protection for aerodrome traffic. At air bases, the ATZs have now disappeared and

¹⁸ This service is provided in class E airspace as far as practical.

¹⁹ Budel, Schinveld, Teuge, Twente, Valkenburg, Veendam (Source: LVNL, *Aeronautical Information Publication*, ENR 5.1 6 Aerodrome Traffic Zones (ATZ). Consulted on 6 December 2021).

control zones (CTR) around air bases have become radio mandatory zones (RMZ) outside the opening hours of the CTR. When entering an RMZ, in flight, contact must be made with the responsible air traffic control service, in this case Dutch Mil. Here, too, there is no guarantee that traffic information will be provided.



Glider sites. (Source: Zweefportaal.nl)

The Dutch Safety Board conducted an investigation into a flight by a Reims Aviation S.A. F172P over the winch path at Gilze-Rijen Air Base, while the gliding club was actively involved in winch operations. Below is a description of the occurrence (including analysis) which is exemplary for the collision hazards when flying over a glider site.

Flight over winch path, Reims Aviation S.A. F172P, PH-DKF, Gilze-Rijen Air Base, 30 May 2021

The motorized aircraft, with the pilot and one passenger on board, was completing a flight from Eindhoven Airport on Sunday 30 May 2021. Prior to departure, the pilot had among others planned the route, and checked the NOTAMs. The content of one NOTAM report read as follows:

M1125/21 - GLIDER FLYING WILL TAKE PLACE AT EHGR AD (EHGR ARP RADIUS 2NM BTN GND/2000FT AGL) AFTER OPERATING HOURS AND DURING UDP. REQUEST TO AVOID AREA. GND - 2000FT AGL, DAILY 1500-SS PLUS15, 22 APR 15:00 2021 UNTIL 22 JUL 19:58 2021. CREATED: 21 APR 10:50 2021

The return leg of the route planned by the pilot travelled via the radio mandatory zones (RMZs) of the air bases at Woensdrecht and Gilze-Rijen. The pilot was aware of possible glider activities at these locations. He subsequently stated that prior to entering the Woensdrecht RMZ, he had contacted Dutch Mil Info for clearance to cross both RMZs, which clearance was provided. As well as constantly remaining on the lookout for other air traffic, the pilot occasionally used an application to determine whether there were glider activities on his route. On the application, he observed glider activities near Woensdrecht Air Base, and therefore decided to avoid the air base and the area around Breda International Airport. Subsequently, at an altitude of 1,200 feet, he flew over Gilze-Rijen Air Base, where glider operations were underway at that moment. As members of the gliding club heard the motorized aircraft approaching, from the ground, winching activities were temporarily halted, at the moment that the aircraft flew over the winch path.

The pilot stated that he had read the above-mentioned NOTAM, in which it was requested to avoid the area around Gilze-Rijen Air Base (EHGR) from the ground to 2,000 feet AGL. He had flown over Gilze-Rijen Air Base in the assumption that there were no flying activities taking place at the time. Having registered with Dutch Mil Info,

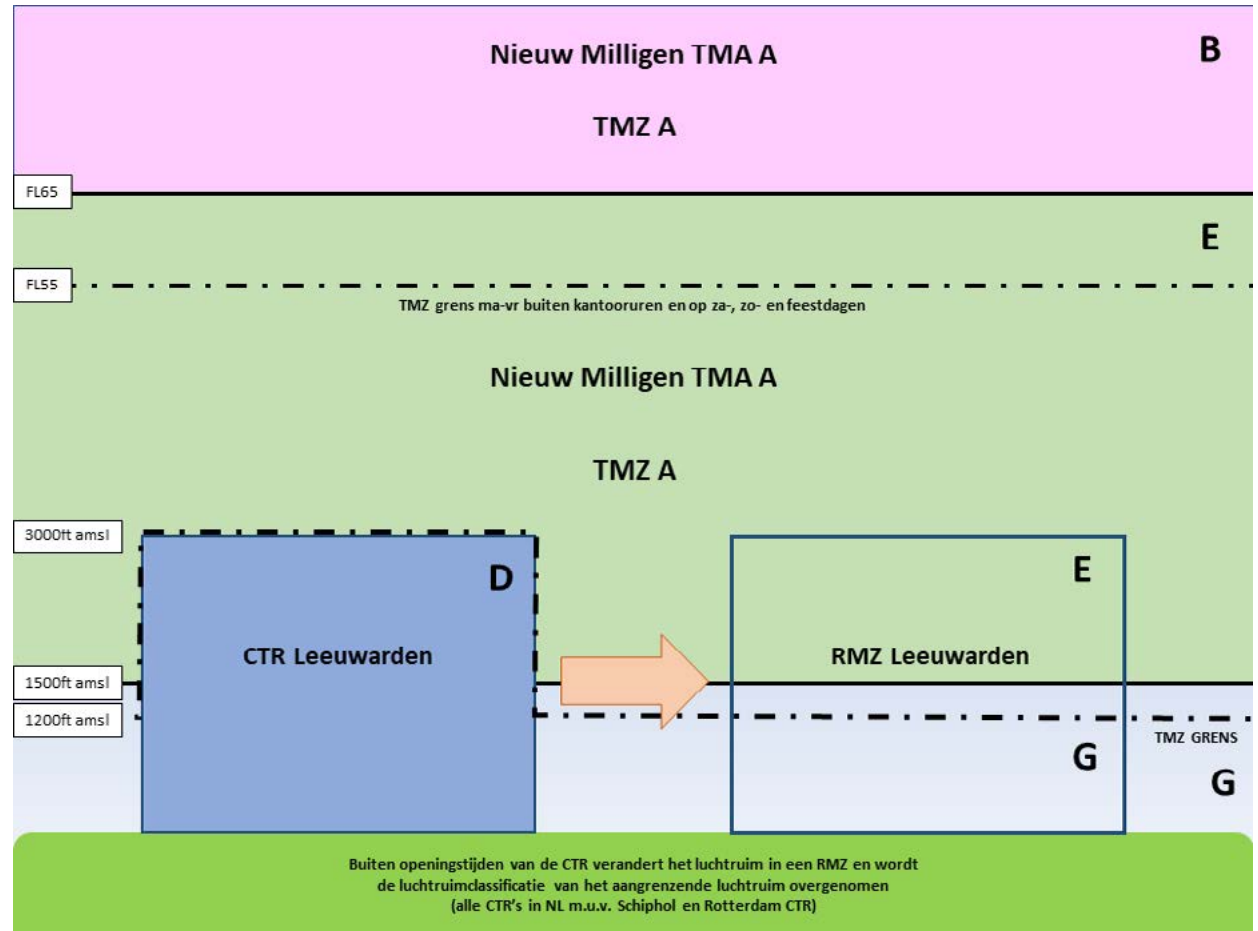
he had expected to be informed of any gliding activities. The pilot suggested that he was reticent about requesting information from Dutch Mil, based on the assumption that they were already busy enough, anyway.

The dimensions of the RMZ Gilze-Rijen are identical to those of the Gilze-Rijen control zone (CTR). An RMZ operates outside the opening hours of the CTR and adopts the airspace classification of the surrounding airspace. From the ground to 1,500 feet AMSL, the RMZ Gilze-Rijen has an airspace classification G and from 1,500 feet to 3,000 feet AMSL, classification E. Prior to entering an RMZ, an initial call must be made on the appropriate radio frequency, in this case that of Dutch Mil. While in the RMZ, this frequency must be continuously monitored.

The CTR was not open as the F172P approached the airspace above the air base; in other words, the RMZ was active. The aircraft was flying at 1,200 feet, therefore in airspace with classification G. This is uncontrolled airspace, which may be flown in without clearance, and in which pilots are personally responsible for separation with other aircraft.²⁰ Flight Information Service is available but is only issued at the request of the pilot.

The Aeronautical Information Publication (AIP) under Gliding Activities (ENR 5.5) for Gilze-Rijen Air Base specifies a vertical limit of 2,300 feet AAL. This is the altitude up to which gliders can be winch launched, whereby both the glider and the winch cable, which is almost invisible, can represent a risk to other overflying air traffic.

In this case, there was no risk of collision, because the gliding club had temporarily suspended winch operations. There was however an undesirable and potentially dangerous situation.



Example of change from CTR to RMZ. (Source: KNVvL, Aviation legislation, zweefvliegopleiding.nl)

The Safety Manager of the flying club in question conducted an investigation into the cause of the occurrence and shared the results with the Dutch Safety Board. The Safety Board included these results in its investigation.

Classification: Incident
Reference: 2021048

²⁰ The pilot stated that he had requested and received clearance to cross the RMZs at Woensdrecht and Gilze-Rijen. This is not in accordance with the procedures.

Occurrences into which an investigation has been launched

Emergency landing after engine failure, Stampe SV-4, Westerschelde, 8 October 2021

The pilot made a flight from Antwerp International Airport (Belgium) to Midden Zeeland airfield. Over the Westerschelde the engine failed. The pilot made an emergency landing on water, after which the aircraft nosed over. The pilot was unharmed.

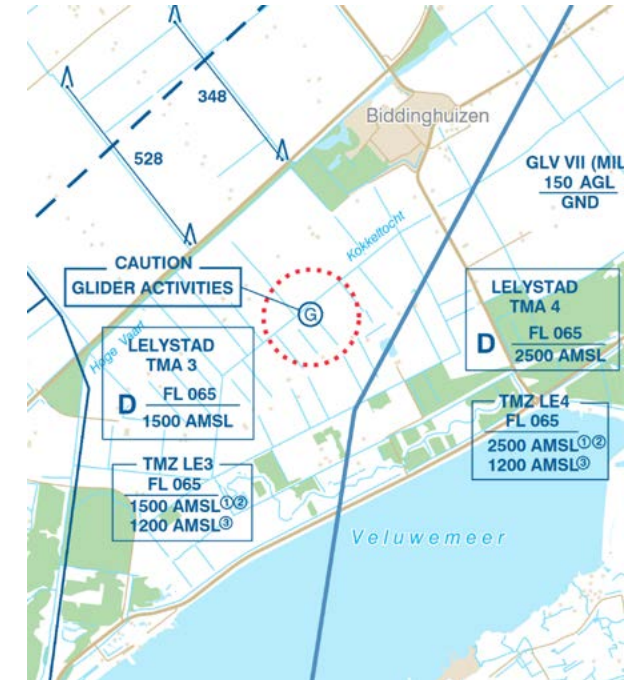


The Stampe after the salvage. (Source: Dutch Aviation Police)

Classification: Accident
Reference: 2021111

Airprox, Alexander Schleicher ASK 21 and Cessna 172M Skyhawk, near Biddinghuizen, 11 October 2021

The pilot on board the two-seater glider made an evasive manoeuvre near glider site Biddinghuizen to avoid a collision with a single-engine aircraft. At the same time, the pilot of the single-engine aircraft also made an evasive manoeuvre. Both aircraft continued their flight without further reported irregularities.



Location glider airfield Biddinghuizen. (Source: AIP)

Classification: Serious incident
Reference: 2021116

Child injured by model aeroplane, beach at Katwijk, 31 October 2021

On the beach of Katwijk, a person lost control of a model aeroplane due to a gust of wind. The aeroplane then hit the head of a child, who was injured as a result.

Classification: Accident
Reference: 2021121

Fly-away shortly after take-off, DJI M210 v2, The Hague, 12 November 2021

Shortly after take-off, the unmanned aircraft system (UAS, or drone) did not respond to input of the pilot and flew uncontrolled in the direction of the crew. Only seconds later, the UAS crashed. As it fell to the ground, the UAS hit a crew member. The crew member suffered minor injuries. The UAS was substantially damaged.



The crashed UAS. (Source: Police, Team Unmanned Aircraft)

Classification: Accident
Reference: 2021124

Fire during engine start, Reims Aviation S.A. F172M, Lelystad Airport, 26 November 2021

A fire started when the engine was started, which was extinguished by the airport fire brigade. The pilot was unharmed.

Classification: Accident
Reference: 2021135

Occurrences abroad with Dutch involvement into which an investigation has been launched by a foreign authority

Collision with obstacle during take-off, Cameron A-210, Como (Italy), 11 October 2021

During take-off, the Dutch-registered hot-air balloon, with ten occupants on board, collided with an obstacle (part of a historical building). The occupants remained unharmed. The basket suffered minor damage.

The Italian Agenzia Nazionale per la Sicurezza del Volo (ANSV) launched an investigation into this occurrence. The Dutch Safety Board offered its assistance.

Classification: Serious incident
Reference: 2021125

Approach continued in low visibility conditions, Fokker F28 Mk 0100, Paraburdoo Aerodrome (Australia), 22 November 2021

During the RNA approach²¹ to Runway 06 at Paraburdoo airfield, the Fokker 100 found itself flying too high, at which point the crew conducted a missed approach. The crew also conducted two missed approaches to Runway 24 due to low visibility. During the third approach to Runway 24, the crew decided to continue to land regardless of IMC conditions at minima due to low fuel.

The Australian Transport Safety Bureau (ATSB) launched an investigation into the occurrence. The Dutch Safety Board offered its assistance.

Classification: Serious incident
Reference: 2021127

Problem with left-hand engine during take-off, Fokker F27 Mk 0050, Helsinki Airport (Finland), 25 November 2021

During take-off, the Fokker 50 with 34 occupants experienced problems with its left-hand engine at the moment that the aircraft lifted off from the runway. The crew subsequently returned to the airport, where they completed a safe landing.

The Safety Investigation Authority Finland (SIAF) launched an investigation into the occurrence. The Dutch Safety Board offered its assistance.



Archive photo Fokker 50. (Source: T. Pesonen)

Classification: Serious incident
Reference: 2021128

²¹ Area navigation

Crash following loss of control, UAS Acecore Zoe 8X, Burnley, Lancashire (United Kingdom), 14 December 2021

From an altitude of approximately 40 metres, the Dutch designed and manufactured unmanned aircraft system (UAS) began an uncontrolled descent. The UAS crashed into the ground, suffering serious damage.

The Air Accidents Investigation Branch (AAIB) launched an investigation into this occurrence. The Dutch Safety Board offered its assistance.

Classification: Accident
Reference: 2021133

Emergency landing following technical problems, Fokker F27 Mk 0050, 14 NM northwest of the Island of Bocas (Panama), 19 December 2021

During a passenger flight from Albrook International Airport to Changuinola International Airport, smoke was observed inside the Fokker 50. The crew made an emergency call and carried out an emergency landing at Bocas del Toro International Airport. The 45 passengers and 3 crew members remained unharmed.

The Panamanian Oficina de Investigación de Accidentes Aéreos Autoridad Aeronáutica Civil launched an investigation in response to this occurrence. The Dutch Safety Board offered its assistance.



Archive photo Fokker 50. (Source: E. Kehler)

Classification: Serious incident
Reference: 2021134

Emergency descent following symptoms of hypoxia, Fokker F28 Mk 0100, 28 NM south-southwest of Mount Magnet Aerodrome (Australia), 27 December 2021

During cruise flight on board the Fokker 100, the first officer and a member of the cabin crew experienced mild symptoms of hypoxia. The flight crew donned oxygen masks and carried out an emergency descent. The oxygen masks for the passengers were manually activated.

The Australian Transport Safety Bureau (ATSB) launched an investigation into the occurrence. The Dutch Safety Board offered its assistance.

Classification: Serious incident
Reference: 2022002

Published reports

Mid-air collision between two Piper Super Cubs, PH-RED and PH-VCY, near Oudemolen, 21 June 2019

At approximately 12.20 hours, two aircraft collided while practicing formation flying at 500 feet above mean sea level nearby the village of Oudemolen. The formation leader was a PA-18-125 Super Cub (PH-RED) and the wingman was a PA-18-95 Super Cub (PH-VCY). The formation team was practicing a familiar formation display with the addition of a new manoeuvre.

The mid-air collision had severely damaged PH-VCY, causing the aircraft to become uncontrollable and to crash. The pilot and passenger of PH-VCY were fatally injured. PH-RED was substantially damaged; however, the pilot was able to make an emergency landing in a field nearby. The pilot of PH-RED suffered minor injuries, the passenger remained unharmed.

The Dutch Safety Board investigated the mid-air collision to answer the following questions. What was the cause of the mid-air collision? And, to what extent were technical and operational factors contributing to the accident?

The investigation revealed that during the rejoin of the new formation manoeuvre, the wingman (PH-VCY) closed in from behind at the right side with a higher airspeed, before colliding with leader (PH-RED). It was determined that technical factors did not contribute to the cause of the accident. Both pilots had a valid pilot licence, display authorization and medical certificate.

The formation team practiced a new formation manoeuvre that had the inherent risk for the pilots of not being able to adequately keep each other in sight during the rejoin phase of the manoeuvre. Even though the hazard of losing sight was recognized by the two pilots who were proficient in formation flying, the mitigating measure consisting of a fixed altitude separation of 100 feet was not effective to ensure the safety of the formation during the rejoin. Even with an applied altitude separation as a measure to avoid a mid-air collision, the new formation manoeuvre was by its design unsafe to perform.



Archive photo PH-RED. (Source: H. Ranter)



Archive photo PH-VCY. (Source: H. Ranter)

The Dutch Safety Board published the [report](#) on 21 October 2021.

Decisive conclusions airworthiness of landing gear of PH-MBN, aircraft accident Faro (1992)

At the request of the Minister of Infrastructure and Water Management, the Dutch Safety Board has conducted a follow-up investigation into the aircraft accident in Faro in 1992. The investigation focused specifically on the maintenance of the landing gear of the aircraft PH-MBN. During the investigation, no evidence was found of non-conformities or any exceeding of maintenance periods and inspections. The aircraft satisfied all maintenance requirements, and upon departure from Schiphol for the flight to Faro was airworthy.

Request from the minister

In the Portuguese accident investigation at the time, it was already concluded that upon departure from Amsterdam, the aircraft had been airworthy. According to the Portuguese investigation into the accident, upon landing, the impact on the landing gear was so considerable that the landing gear failed when the design limits were exceeded. Following the broadcasting of the TV news programme EenVandaag on 16 January 2016, doubts arose about the maintenance of the landing gear. It was alleged that due to the wrongfully granting of permission to postpone the compulsory exchange of the landing gear, the aircraft was not airworthy. The then State Secretary for Infrastructure and the Environment requested the Safety Board to investigate whether these claims were accurate. At that time, a second-opinion investigation was underway, commissioned by the District Court of The Hague. The Safety Board therefore considered it inopportune to launch its own supplementary investigation. This second-opinion investigation confirmed the Portuguese investigation, also concluding that the aircraft was airworthy. Following the court judgement in 2020, the Minister of Infrastructure and Water Management again requested the Safety Board to investigate whether the broadcast by EenVandaag in 2016 had revealed any new facts.

Investigation concluded

The Safety Board subsequently conducted an investigation into the maintenance of the landing gear of the aircraft involved in the accident. As part of this investigation, the investigators visited the archives in the Netherlands and Portugal, and spoke to persons directly involved. During the investigation, no evidence was found of non-conformities or any exceeding of maintenance periods and inspections. There was also no indication of any necessity to postpone the exchange of the landing gear. The final conclusion once again confirmed that the aircraft satisfied all maintenance requirements and upon departure from Amsterdam was airworthy.

The COVID-19 restrictions during the visits to the archives in the Netherlands and the archive in Portugal delayed the investigation by more than six months. The Minister of Infrastructure and Water Management has been informed of the findings in a [letter](#) (Dutch only).

Safety alert for air safety investigation 'Emergency landing following loss of engine power'

The Dutch Safety Board is currently investigating an occurrence whereby on 25 June 2021, a Cessna 208B with a pilot and 17 parachutists on board was forced to make an emergency landing following loss of engine power. During the investigation, a technical defect in the engine was identified. This type of engine is in use worldwide. The Dutch Safety Board has decided to share its findings with the aviation sector by issuing a safety alert.

On 30 December 2021, the Dutch Safety Board published the [safety alert](#).

Reports published by foreign investigation authorities

Emergency landing following engine problems, Cessna 210F, HA-SZE, Csesztreg (Hungary), 10 April 2016

The Cessna 210, which in the past had been registered in the Netherlands, experienced engine problems during the flight from Kaposvar, forcing the pilot to make an emergency landing. The pilot completed the landing with the landing gear raised. The two occupants were unharmed. The aeroplane sustained minor damage. An examination of the engine revealed that the crankshaft in the combustion engine had broken off as a result of excessive engine use. The actual operating hours for the engine had exceeded the time between overhauls specified by the manufacturer²² by more than 20%.



The Cessna following the emergency landing. (Photograph: Hungarian TSB)

The Hungarian Transportation Safety Bureau published the report.

Classification: Accident
Reference: 2016064

Bird strike, Boeing 777-300ER, PH-BVK, Kotoka International Airport, Accra (Ghana), 3 September 2021

During the take-off from Runway 03 at Kotoka International Airport, the Boeing 777, operated by a Dutch airline²³, suffered a bird strike, at which point the crew broke off the take-off. Two tyres were punctured, and two other tyres suffered damage due to wear.

The Aircraft Accident and Incident Investigation and Prevention Bureau of Ghana published the report.

Classification: Incident
Reference: 2021100

²² TBO (time between overhauls).

²³ Also registered in the Netherlands.

Occurrences that have not been investigated extensively

Engine overheat, Aquila A-211, G-GAED, Midden Zeeland Airport, 29 June 2019

At 18.30 hours, an Aquila-A211 aircraft departed from Breda International Airport for a pleasure flight. It was the fourth flight of the day. On board were the pilot and a passenger.

About half an hour into the flight, the pilot noticed unusual engine vibrations. After initial troubleshooting the pilot advanced the throttle to full open. Shortly thereafter the cylinder head temperature indication increased above the red line limit. At the same time, the oil temperature increased and the oil pressure decreased. Both the pilot and the passenger started smelling exhaust gases after which the pilot reduced the throttle to the minimum power required for level flight and decided to perform a precautionary landing at nearby Midden Zeeland Airport. The pilot declared an urgency (Pan Pan call) and informed Midden Zeeland Airport authorities of his intentions to land on Runway 09. After a normal landing, the pilot vacated the runway and shut down the engine on the taxiway due to the high temperatures. Initial engine inspection by an engineer revealed a very low coolant level. The pilot stated that, during the pre-flight inspection, he checked the coolant level of the overflow bottle as prescribed in the Pilot's Operating Handbook.

The aircraft was equipped with a Rotax 912 S3-01 engine. At the time of the incident, the aeroplane had accumulated 2,453 hours and the engine 982 hours since new. The engine had operated for 84 hours since its last inspection. The engine cooling system consists of a radiator, an expansion tank fitted with a pressure cap and an overflow bottle. A pump sucks coolant from the expansion tank through the radiator to provide cooling to the cylinder heads. Scheduled maintenance inspections of the coolant system required a visual inspection of its parts. This required the removal of the pressure cap.

Inspection after the incident revealed the coolant level to be very low in the expansion tank and high in the overflow bottle. No leaks were found in the cooling system. This suggests that a higher than normal amount of coolant had exited through the pressure cap on the expansion tank into the overflow bottle. The low level of coolant in the system caused the engine temperatures to rise above their normal limits.

At the time the aircraft experienced high engine temperatures, it was flying at an altitude of approximately 600 feet, where the outside air temperature was around 31 degrees Celsius. The relatively high intake air temperature also contributed to the engine running at higher than normal temperatures.

During teardown examination of the engine, significant knocking²⁴ damage was found on the cylinder #2 piston. The exhaust system of the aircraft was tested by the engine manufacturer and it revealed the system produced exhaust backpressure above the 200 millibar limit as specified in the engine manufacture's installation manual. The measured backpressure was highest at cylinder #2.

²⁴ Knocking occurs when combustion of some of the air/fuel mixture in the cylinder does not result from propagation of the flame front ignited by the spark plug, but one or more pockets of air/fuel mixture explode outside the envelope of the normal combustion front.

Occurrences that have not been investigated extensively

The higher backpressure increased the air/fuel mixture temperature and contributed to self-igniting behaviour ('knocking') inside the already hotter than normal engine. A small crack was found on the exhaust manifold connected to cylinder #4. This cylinder is located on the same side of the engine as cylinder #2 and the leaking of high-temperature exhaust gases may have further contributed to the overheating of the engine.

Conclusion

The combination of the aforementioned factors (low coolant level, high outside air temperature, high exhaust backpressure and crack in manifold) led to the engine temperature exceedances, as experienced by the pilot during the incident flight. Further investigation revealed actions have been taken after the occurrence by the engine- and aircraft-manufacturer to prevent similar incidents from reoccurring:

- The inspection of the pressure cap fitted on the cooling system expansion tank, as outlined in the aircraft maintenance manual, was modified to include a procedure to pressurize the cooling system and verify that the relief pressure of the cap falls within specified limits.
- A certification process of a new exhaust muffler system has been initiated. The newly designed exhaust should produce backpressure values below the 200 millibar limit.



The Aquila after the precautionary landing. (Source: Breda Aviation)

Classification: Incident

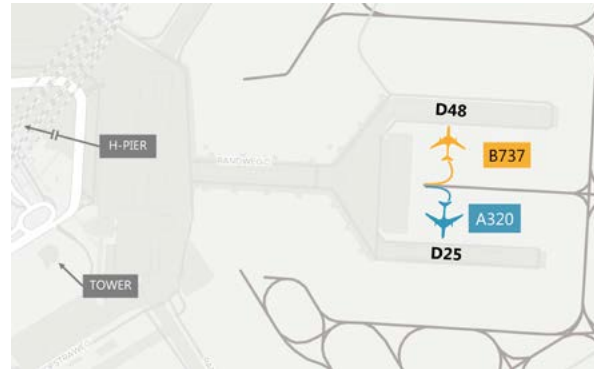
Reference: 2019082

Ground collision during simultaneous pushback, Boeing 737-800, PH-BXH and Airbus A320, OE-IVQ, Amsterdam Airport Schiphol, 9 July 2019

At 07.10 hours, the ground controller cleared the Airbus A320 (A320), parked at gate D25, for a pushback and start-up. Shortly after, the ground controller cleared the Boeing 737-800 (B737), parked behind the A320 at the opposite gate D48, for a pushback and start-up. The controller assumed that the A320 was parked at the H-pier.

Upon receiving the pushback clearance, the flight crew of the A320 informed the pushback truck driver that they were cleared for pushback.²⁵ The driver started to push the aircraft backwards. He was aware of a B737 at D48 that had its rotating beacon light off, indicating that it had not yet been cleared for a pushback. Further, the B737 was not moving, therefore he continued pushing the A320 and turned it counter clockwise.

Shortly after, the flight crew of the Boeing 737 informed their pushback truck driver that they were cleared for the pushback. The driver visually checked the area left and right of the aircraft for obstacles and pushed the B737 in a straight line backwards. At the point where he wanted to turn the aircraft clockwise onto the taxi line, he saw that the A320 was moving backwards towards his aircraft and immediately braked the pushback truck.



The position of the A320 and B737 just moments before the pushback collision.

The ground controller observed that the A320 at D25 was moving towards the B737 he just had cleared for pushback. As a collision between both aircraft was imminent, the ground controller ordered the B737 to hold position. While this was occurring, the outbound planner²⁶ positioned close to the ground controller, warned him that there was a conflicting situation on the D-apron.

Then, the ground controller tried to stop the A320 by calling Apron Control²⁷, who are located on another floor in the control tower, to ask them to stop the A320. He assumed that the A320 was towed under the control of Apron Control. The interventions taken by the ground controller could not prevent both aircraft from colliding with each other. The B737's left-hand horizontal stabilizer and the left-hand wing of the A320 came into contact. The aircraft were substantially damaged and required major repair.

The investigation revealed that the ground controller was convinced that the A320 was located at the H-pier, when its flight crew requested the clearance for pushback and start-up. Normally the majority of the operator's aircraft is positioned over there. The controller visually checked the H-pier area, noticed several A320 aircraft from the same operator and saw that there was no conflicting traffic. Therefore, he granted the clearance for pushback.

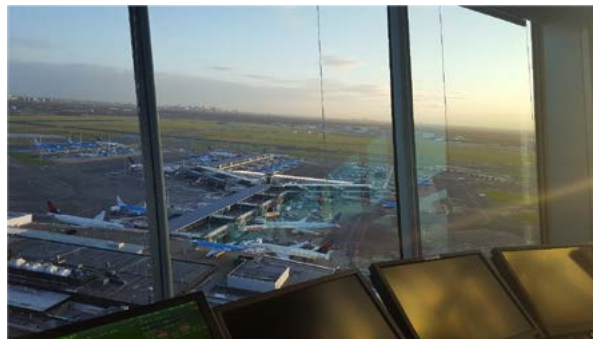
Directly after the pushback clearance for the A320, the B737 reported ready on the D-apron. The first assessment of the ground controller was that the position of the B737 would not interfere with any other traffic on the D-apron and he instructed a standard pushback to the B737's flight crew.

²⁵ The pushback truck driver has no contact with the ground controller. Instructions from the controller to the truck driver have to be communicated through the cockpit crew.

²⁶ The outbound planner will visually check whether there is a pushback truck connected, all doors are closed, and there are no conflicting items directly around the aircraft. The flight will be activated in the air traffic control system and put in a start-up sequence depending on the present traffic situation. After this, the aircraft is transferred to the ground controller, responsible for the area in which the aircraft is parked.

²⁷ The handling of tow traffic is a task which is delegated by Air Traffic Control the Netherlands to Apron Control (APC, part of Amsterdam Airport Schiphol). APC gives permission to pushback truck drivers to enter the manoeuvring area. APC does not need to obtain an approval from Ground Control to enter the manoeuvring area, but tow movements will be coordinated between APC and GC when there is any uncertainty concerning the route of a tow movement.

Occurrences that have not been investigated extensively



Ground controller's view toward D-pier. (Source: ISMS Schiphol)

Just after the moment he had cleared the B737 at D48, the ground controller saw the A320 that was parked opposite to the B737, starting a push back. He was convinced that the A320, which then started moving backwards, was a different aircraft than the A320 he had just cleared and was towed under the control of Apron Control. However, this was the aircraft that he had just cleared for pushback. His attempt to relay the stop message to the A320 via Apron Control was futile.

From the above it is concluded that 'expectation bias' was a contributing factor to the occurrence. Expectation bias is a strong belief or mind-set towards a particular outcome. For the ground controller the A320 was parked at the H-pier; the action he took in an attempt to prevent the collision can be understood from this viewpoint. He mostly relied on the 'normal' situation and his visual cues. He did not actively consult related electronic flight strip information to confirm the parking spot of the aircraft.

A pushback clearance is the responsibility of the ground controller. He is responsible for the assessment of the taxiway behind the aircraft. The responsibility of the truck driver for a conflict-free pushback is within the physical limits of the parking area. The ability of the truck driver to observe obstructions or conflicts beyond the parking area is reduced by the aircraft he is pushing and his focus on adhering to the taxi line to perform the pushback.

Flight crews have a limited rearward view from the cockpit that does not allow visual detection of conflicts during pushback. The communication between parties which operate on the same manoeuvring area is vulnerable for losing time, especially when immediate action is required.

The sector organisations involved in this occurrence conducted a joint investigation within the framework of the joint sector Integral Safety Management System (ISMS). The findings of the investigation were shared with the Dutch Safety Board.

The following measures have been taken with regard to the identified safety issues:

- The Electronic Flight Strip System has been modified for the presentation of strip information in Ground Control's 'pending bay'. Due to this change, the strip in the 'pending bay' has the same layout as strips in the 'active bay'. This allows a ground controller to see more quickly what the parking position of an aircraft is.
- The main findings/lessons learned/follow-up of the collisions in February²⁸ and July 2019 have been distributed and widely discussed within the operational staff of the tower.
- The most important findings/lessons learned/follow-up have been part of safety training during Ground Control refresher training.

²⁸ On 13 February 2019, during pushback at Amsterdam Airport Schiphol, a Boeing 747-400 collided with a Boeing 787-9 standing on the taxiway before taxiing out.



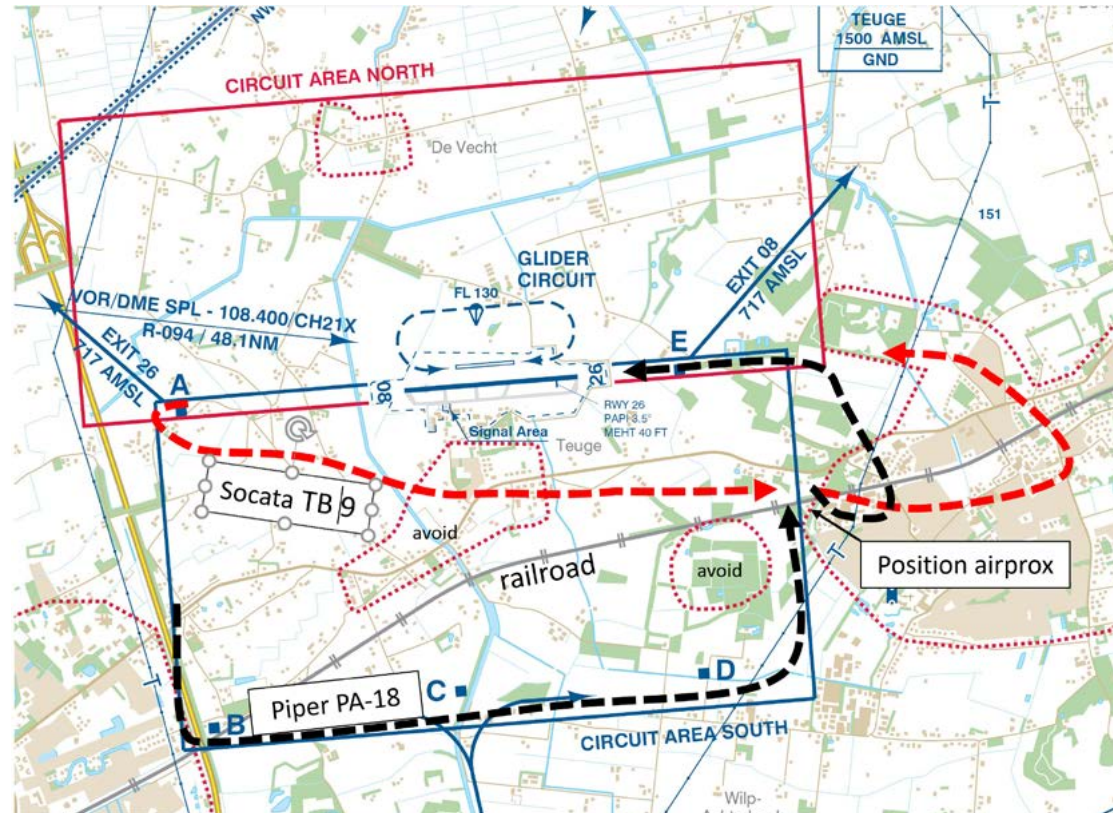
The collision. (Source: Amsterdam Airport Schiphol)

Classification: Accident
Reference: 2019059

Airprox, Piper PA-18-135 Super Cub, PH-ZVC and Socata TB 9 Tampico, PH-IIS, Teuge International Airport, 17 July 2020

PH-IIS, a Socata TB 9 Tampico, took off from Lelystad Airport at 12.32 hours, for a navigation flight under visual flight rules (VFR) to Teuge International Airport (hereinafter: Teuge airfield). The aircraft was flown by a trainee pilot from a flying school, who was completing a solo flight.

Around the same time, at Teuge airfield, PH-ZVC, a Piper PA 18-135 was practising circuits; Runway 26 was in use. On board the aircraft were an instructor and a trainee pilot. The surface wind at Teuge airfield was 260 degrees, 4 knots, visibility more than 10 kilometres, and in rain showers 5 to 8 kilometres. The cloud base was at 2,500 feet below which there were several cloud layers within a base of 1,800 feet. Several light rain showers crossed the airfield.



The flight paths and position of the airprox of both aircraft in the VFR circuit at Teuge airfield. (Source: LVNL, edited by Dutch Safety Board)

Occurrences that have not been investigated extensively

En route to Teuge airfield, the trainee pilot was flying lower than the planned altitude of 1,500 feet AMSL, due to the low cloud. He flew between an altitude of 700 and 1,000 feet AMSL. Following arrival in the circuit at Teuge airfield, the trainee pilot flew a number of circuits for Runway 26. He thereby made use of the railway line to the south of the airfield to determine the downwind position (see figure).

When the trainee pilot in the Socata started his third circuit following a touch-and-go, from the take-off leg, he turned almost immediately onto the downwind leg (see figure). As a consequence, the aircraft flew to the north of the railway line. At that moment, the Piper was following the circuit marked in the figure. After the Piper had completed the turn to the base leg, the instructor observed almost immediately that the Socata was flying right in front of his aircraft and was approaching rapidly. To avoid a collision, the instructor took over control and initiated a sharp downward turn to the right. The trainee pilot in the Socata failed to observe the Piper at that moment. After the instructor in the Piper had made a call on the radio, the trainee pilot saw the Piper. The two pilots then reoriented themselves. The trainee pilot completed a touch-and-go on Runway 26 before returning to Lelystad Airport. The instructor continued the flight in the circuit at Teuge airfield.

The investigation revealed that the Socata had approached the Piper from an unexpected angle, because the Socata had failed to follow the specified circuit for Teuge airfield. During this circuit and the previous two circuits, the trainee pilot had failed to use the turning point signs on the ground, to follow the contours of the circuit. Instead, he had followed the railway line. As a consequence, not only did he overtake the Piper, but also overflew the areas within the contours of the circuit which should have been avoided (see figure). The circuit at Teuge airfield offers insufficient space for alternative flight paths and must be strictly complied with.

While flying the third circuit, the trainee pilot had estimated that the weather conditions were sufficient to meet the minimum weather requirements for a solo navigation flight. The minimum weather conditions as specified by the flying school are at least 5 kilometres visibility and a minimum cloud base of 1,200 feet. The instructor at Lelystad Airport, who supervised the trainee pilot's flight preparations, declared that the weather bulletin for small aviation satisfied the minimum weather conditions for a solo flight, for the Teuge airfield area. The images from the weather radar show light rain showers crossing the airfield. It can also be concluded from the statement by the instructor in the Piper that visibility probably no longer satisfied the minimum requirements of 5 kilometres for a solo flight.

The limited flying experience of the trainee pilot probably played a role in his inability to follow the VFR traffic circuit procedures and to maintain sufficient separation from other aircraft. It may have also played a role in assessing whether the current weather conditions still satisfied the minimum requirements for his solo flight. The trainee pilot had approximately 66 flying hours experience, of which approximately 36 hours solo flight.

The flying school at Lelystad Airport, where the trainee pilot was undergoing training, investigated the occurrence and shared its findings with the Dutch Safety Board. The Safety Board included these findings in its investigation.

Classification: *Serious incident*

Reference: 2020058

Runway excursion, APEX Aircraft DR 400/140 B, PH-NSC, Rotterdam The Hague Airport, 31 October 2020

Together with one passenger, the pilot had completed a local flight in the DR 400. During approach to Runway 24 at Rotterdam The Hague Airport, which was achieved stably, the wind was from the south at a speed of 14 knots. Almost immediately following touchdown, with the flaps in the landing position, the aircraft swung suddenly. The right wing tip touched the runway. The aircraft then veered to the left, off the runway onto the grass, at which point the left wing tip hit a module of the Precision Approach Patch Indicator (PAPI). The right wing tip, the left wing and the PAPI module were damaged during the occurrence.

The aircraft in question was one of the six APEX Aircraft DR400 (formerly Robin aircraft) of the local flying club. The Dutch Safety Board carried out no technical examination of the aircraft. The flying club itself conducted an investigation into the occurrence, the findings of which were shared with the Safety Board.

Since 2008, there have been 23 occurrences at the flying club involving a DR400, whereby the pilot lost control during roll-out after landing. A thematic investigation by the French BEA²⁹ in 2006 into runway excursions revealed that these are more common with this aircraft type than with other aircraft (22 of the 30 runway excursions investigated involved a Robin).³⁰

One of the outcomes of the investigation by the flying club was that their aircraft were often flown with a relatively high approach speed and with an incomplete flaring procedure, which meant that the aircraft often landed too flat. In addition, during roll-out, the stick was not always held in the fully back position, as a result of which pressure continued to be applied to the nose wheel. This landing

technique can result in what is known as wheelbarrowing. In this phenomenon, most or all of the weight of the aircraft is applied to the nose wheel. This increased weight makes it more difficult to steer the aircraft; as a result, the aircraft tends to easily rotate around the nose wheel. This results in a change of direction of the aircraft. However, an unintended change of direction can also be caused by a malfunction in the nose wheel locking mechanism or the unintended use of the brakes while steering with the rudder pedals.

The flying club has adjusted the correct landing technique in close cooperation with the aircraft manufacturer and brought it to the attention of its members.



The aircraft after the runway excursion. (Source: Airport authorities Rotterdam The Hague Airport)



Damage to the left wing. (Source: Dutch Aviation Police)

Classification: Accident
Reference: 2020079

²⁹ Le Bureau d'Enquêtes et d'Analyses pour la sécurité de l'aviation civile.

³⁰ BEA, *Etude, Maîtrise technique lors de l'atterrissage et connaissance de soi, Analyse de sorties de piste en 2006 en aviation générale*, 2006.

Occurrences that have not been investigated extensively

Lost access door, Boeing 747-406ERF, PH-CKC, Amsterdam FIR, 16 January 2021

The Boeing 747 departed around 22.20 hours for a cargo flight from Amsterdam Airport Schiphol (hereafter Schiphol) to Jomo Kenyatta International Airport in Kenya. During the climb to cruising altitude – at around 12,000 feet - the flight crew heard a thump. Thereafter they noticed a low humming sound in the cockpit and the cabin. According to the flight crew, all Engine Indicating and Crew Alerting System (EICAS) indications were normal. After consultation with the airline, the flight crew decided to continue the flight. Upon arrival in Kenya, during a walk around check, it was found that an air conditioning access door on the underside of the aircraft's fuselage had broken off. Part of the door was still attached to the aircraft by means of the door hinges; the other part of the door was lost. The departing door parts caused minor damage to the aircraft.



The broken door. (Source: the operator)

Before departure, while the aircraft was standing on the platform, a team of ground engineers performed several maintenance tasks. The team started working on the aircraft two hours after its arrival, which was later than normal. They first performed the daily inspection and the pre-flight inspection. After these inspections they started to repair recorded defects. One of the repair tasks was the change of a turbine bypass valve on air conditioning pack 3, located behind the access door in question. When the assigned engineer to this task opened the door, he assessed it was not possible to finish the work before the scheduled departure time.

The engineer consulted with maintenance control about the shortage of time and it was decided to replace the valve another time and to take the valve on board of the aircraft in case it would be needed at an outstation. As the other two air conditioning packs were functioning, the aircraft could be released according to the Minimum Equipment List (MEL) and the flight could be carried out. Thereafter, the engineer started to close the access door of air conditioning pack 3. However, while doing this, he was interrupted by a fellow engineer. As a result the engineer stopped his activity on the door.

As the engineer's routine to close the air conditioning access door was interrupted, the latches on the aft side of the door probably were left unlocked. The engineer stated that there were a lot of different activities that evening, whereby you regularly change tasks or help colleagues. The engineer indicated that this is a fairly normal characteristic of the work environment of this ground engineering team. He stated that the team was sufficiently staffed to perform the work on the aircraft. The engineer also noted the dark (night time) conditions may have contributed to the fact that the (probably) unlocked latches were not seen by him at a later stage or by his colleagues who performed the pre-departure service just before the aircraft left the platform.

Furthermore, the maintenance organisation performed a technical investigation on the remaining door parts, that showed signs of an overload failure. This type of failure indicates a fast break off and departure of segments of the door. It is likely that the flight crew had noticed this breakage of the door, as they heard a thump-like noise while the aircraft was on the departure from Schiphol. Therefore, it is likely that during the climb, the door opened as it was not entirely latched and the airstream caused the door to break off. The technical condition of the latching mechanism could not be determined, as the latches and other parts of the door were not recovered.

In the past years, the Boeing 747 air conditioning access doors or parts of the doors have departed in flight or became unlatched upon landing. These door departures were primarily caused by improperly secured or worn door latch mechanisms. Therefore, on the 27th of February, 2017, the manufacturer of the aircraft issued a service bulletin³¹ to provide instructions for the inspection of the air conditioning access doors with latches and the application of warning stickers to the doors. Following these requirements from the service bulletin, the maintenance organisation had inspected the latches for signs of corrosion at the recommended interval times. No repairs were carried out on the specific air conditioning access door and no other technical abnormalities were found during the last maintenance inspection. Therefore, a technical cause for the opening of the door in-flight is seen as unlikely.

The planned time for the inspections and the repair of PH-CKC was reduced because of extended work on another aircraft. When the engineer assessed that the amount of time required to replace the valve was more than had been planned, the replacement of the valve was postponed. From the interviews with engineers and the staff of the operator and maintenance organisation, the impression was given that it is common for these ground engineers to manage their tasks and to coordinate with maintenance control as necessary to get work accomplished. Also voiced was that the engineers perform their work in a frequently changing environment

such as changes of tasks and time available. In all, the working conditions before, during and after the attempt to replace the valve could be considered as normal for this team of ground engineers.

Conclusions

The air conditioning access door partially broke off during flight, most probably because it was not closed properly after maintenance. Interruption and distraction from the normal work routine of closing the door likely contributed to this occurrence.

The maintenance organisation investigated the occurrence. Recommendations were made to, amongst others, consider improvements of the pre-departure service check through improving the checklist and/or walk around and to continue to communicate about the hazards of distraction.

Classification: *Serious incident*
Reference: 2021001

Airprox, Cirrus SR20, N264CD and Saab 91D, PH-RLB, approx. 10 km north of Medemblik, 6 March 2021

The Cirrus (N264CD) was on a cross country VFR-flight from Texel with a pilot and two passengers on board. When leaving the corridor over the Wadden Sea and after passing Den Oever, the pilot initiated a descent from 2,500 feet to 1,400 feet AMSL in order to fly below the Schiphol terminal control area (Schiphol TMA 1) towards Lelystad. The pilot of the Cirrus established radio contact with Dutch MIL Info. The aircraft was flying with a course of approximately 150 degrees, see figure. During the descent, one of the passengers out of interest asked the pilot information about the aircraft's instruments. The pilot replied and at the same time noticed an aircraft closely passing below.

The Saab (PH-RLB) was on a cross country VFR-flight from Breda International Airport to Texel aerodrome with a pilot and co-pilot on board. Coming from below the airspace of Schiphol TMA 1, the Saab had just left the radio frequency Amsterdam Information as the boundary for the service provision of en-route communication between Amsterdam Information and Dutch MIL Info lies just north of Medemblik. The Saab had not established radio contact with Dutch MIL Info, nor were they listening to the frequency, as the pilots considered it just a short flight towards Texel airport. The aircraft was flying at an altitude of approximately 1,400 feet AMSL along the shore of the IJsselmeer. Suddenly, both crew members noticed an aircraft on a head-on course passing closely above.

The near mid-air collision occurred at 12.07 hours in VMC conditions at the border of class G and Class E airspace.³²

³¹ Boeing Commercial Airplanes, SB 747-53-2897. *Fuselage - Air Conditioning Access Doors - Inspection of Latches and Application of Warning Stencils*, 2017.

³² The Nieuw Milligen TMA A is Class E airspace from 1,500 feet up to Flight Level 065. Below is Class G airspace.

Occurrences that have not been investigated extensively

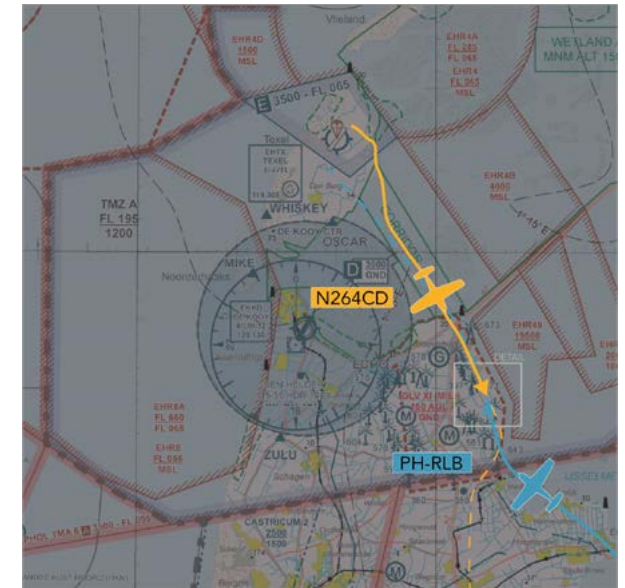
Radar data indicates that the aircraft were on a head-on course and passed each other at an approximate distance of 20 meter horizontally and 0-200 feet vertically³³, see figure.

See and avoid

In airspace classes E and G no separation is provided by air traffic control (ATC) for and between VFR-flights. Pilots of VFR-flights are responsible for maintaining separation and avoid collisions by applying the see-and-avoid principle. This principle has limitations, amongst others because of physical limits to human perception.^{34,35} For example, motion or contrast is needed to attract the eyes' attention. An approaching aircraft on a steady head-on course will be observed as a small target until a short time before the (near) collision because of the high closing speed. In this occurrence, based on the ground speeds, both aircraft had a closing speed of approximately 250 kts. In addition, the view of the pilot of the Cirrus the direction of the Saab was limited as a result of the position of the wing (low wing) and the passenger.

According to the weather report of the Royal Netherlands Meteorological Institute (KNMI), the weather was mostly dry with a small chance of isolated light rain showers. The visibility around the time of the occurrence was good (more than 10 km, in light rain showers 5-8 km). There were scattered to broken clouds at 3,000-4,000 feet, with cloud tops at 5,000 feet. The azimuth of the sun was around 152 degrees and 28 degrees above the horizon, which meant that from the perspective of the Cirrus the sun was behind the Saab. The glare of the sun may therefore have contributed to the pilot of the Cirrus not seeing the other aircraft.

- 33 The radar data indicates a vertical separation of 100 feet. As 100 feet is also the accuracy of the radar, the vertical separation can only be expressed in a range taking into account this accuracy.
- 34 Australian Transport Safety Bureau, *Limitations of the See-and-Avoid Principle*, 1991, reprinted 2004. (<https://www.atsb.gov.au/publications/2009/see-and-avoid/>)
- 35 Collision avoidance – methods to reduce the risk, Safety promotion leaflet GA1, EGAST (https://www.easa.europa.eu/sites/default/files/dfu/EGAST_Leaflet_Collision-Avoidance.pdf)



Above: Flight tracks and airspace lay-out. (Source: Aeronautical chart ICAO 1:500,000, LVNL)

Below: Airprox. (Source data: LVNL)

Communications

The responsible service provider for en-route communications in and below TMA A, is the military ATC center MILATCC (Dutch MIL Info). In both airspace class E and G, there is no requirement to establish two-way radio contact. For VFR-flights in airspace Class E, Dutch MIL Info may provide, as far as practical, traffic information regarding other traffic in the vicinity. In relation to this specific occurrence, Dutch MIL Info did not provide traffic information to the Cirrus regarding the Saab.

Conclusions

Both aircraft approached each other on a head-on course with a relatively high closing speed resulting in a near mid-air collision. None of the pilots noticed the other aircraft until both aircraft passed each other at close range. The lack of perceptible motion due to the head on course, and possibly also the glare of the sun, limited the applicability and effectiveness of the see-and-avoid principle. In addition, the pilot of the Cirrus was distracted by a passenger, which may have contributed to him not seeing the other aircraft.

The Safety Board notes that the airspace design (military areas, CTR De Kooy, corridor over the Wadden Sea) and the location of several airfields (with associated local traffic) in this part of the Netherlands lead to condensed VFR traffic flows along the IJsselmeer shore. Recent developments such as the placement of wind turbines and the relocation of glider airfield Noordkop in 2018 have intensified the convergence of VFR-traffic patterns going to and coming from Texel. A mid-air collision is more likely to occur where aircraft are concentrated.³⁶

36 EASA, *European Plan for Aviation Safety (EPAS 2021-2025) Volume II*, chapter 8.1.4 Preventing mid-air collisions, 2021. <https://www.easa.europa.eu/domains/safety-management/european-plan-aviation-safety>.

Dutch MIL Info did not provide traffic information to the Cirrus regarding the Saab. The AIP states³⁷ that pilots are requested to report their position at first radio contact with Dutch MIL Info. This gives the impression that the position report is used by ATC to check the position, in relation to other traffic. However, traffic information in Class E airspace is only provided as far as practicable, in the opinion of ATC. Nevertheless, establishing radio contact with the appropriate air traffic service provider is considered a good practice as it provides for the possibility to be informed about other traffic.

On-board devices for conflict detection are safety nets that may assist the pilot in detecting conflicting traffic. None of the involved aircraft had such devices on board. Both flight crews indicated they were considering or had purchased surveillance tools following the near miss. However, for affordable devices to be more widely available and permitted for use, increased (inter)national efforts are needed, which have also been initiated, partly by EASA. The potential risks for other systems in the same frequency range (as that of on-board devices for conflict detection), such as other transponders, must first be clear. The Dutch government follows European policy in this area. A large-scale roll-out of (non-certified) systems and transponders before European policy and rules have been established, is not expected in the Netherlands.

Classification: *Serious incident*
Reference: 2021012

37 LVNL, *Aeronautical Information Publication (AIP) The Netherlands*, ENR 1.2 Visual Flight Rules, 7.5 Reporting position at first radio contact MILATCC Schiphol.

Airprox, DG Flugzeugbau DG-1000s, PH-1432 and HOAC DV-20, PH-MFT, Hilversum Airfield, 20 March 2021

PH-1432, a DG-1000s, was winch-launched from the winch path adjacent to Runway 25 at Hilversum Airfield, to an altitude of approx. 200 metres AAL, for a local instruction flight. On board were an instructor and a trainee pilot. Shortly afterwards, PH-MFT, a HOAC DV-20, took off from Runway 25 for a local instruction flight. On board were an instructor and a trainee pilot. The surface wind was 260 degrees at 4 knots, visibility more than 10 kilometres, with occasional clouds and a cloud base of 1,800 feet.

After the trainee pilot in the DG-1000s had uncoupled the winch cable, he started his orientation in relation to the airfield and other gliders. In this process, he first made a turn to the right in a northerly direction and then to the left, in a south-easterly direction. This meant he was flying towards the circuit area of Runway 07/25 (see figure). In the meantime, the DV-20 had taken off and was flying along the line of Runway 25. The DG-1000s approached the DV-20 almost head on, with a short separation, at an altitude of approximately 500 feet AMSL, 800 metres southwest of Runway 25. To avoid a collision, the instructor of the DG-1000s took over control from the trainee pilot, and completed an evasive manoeuvre. The instructor and trainee pilot of the DV-20 were unaware of the position of the DG-1000s and had failed to observe the hazardous situation - the airprox. After the airprox, both aircraft continued their flight.

Occurrences that have not been investigated extensively

The two aircraft came within close proximity because during manoeuvring the DG-1000s had flown the VFR circuit of Runway 25, at the moment when the DV-20 was climbing from that runway. This airprox underlines the importance of awareness of the aircraft's own position in relation to areas of an increased risk of interaction with other air traffic, and effective scanning for other traffic.

Classification: Serious incident

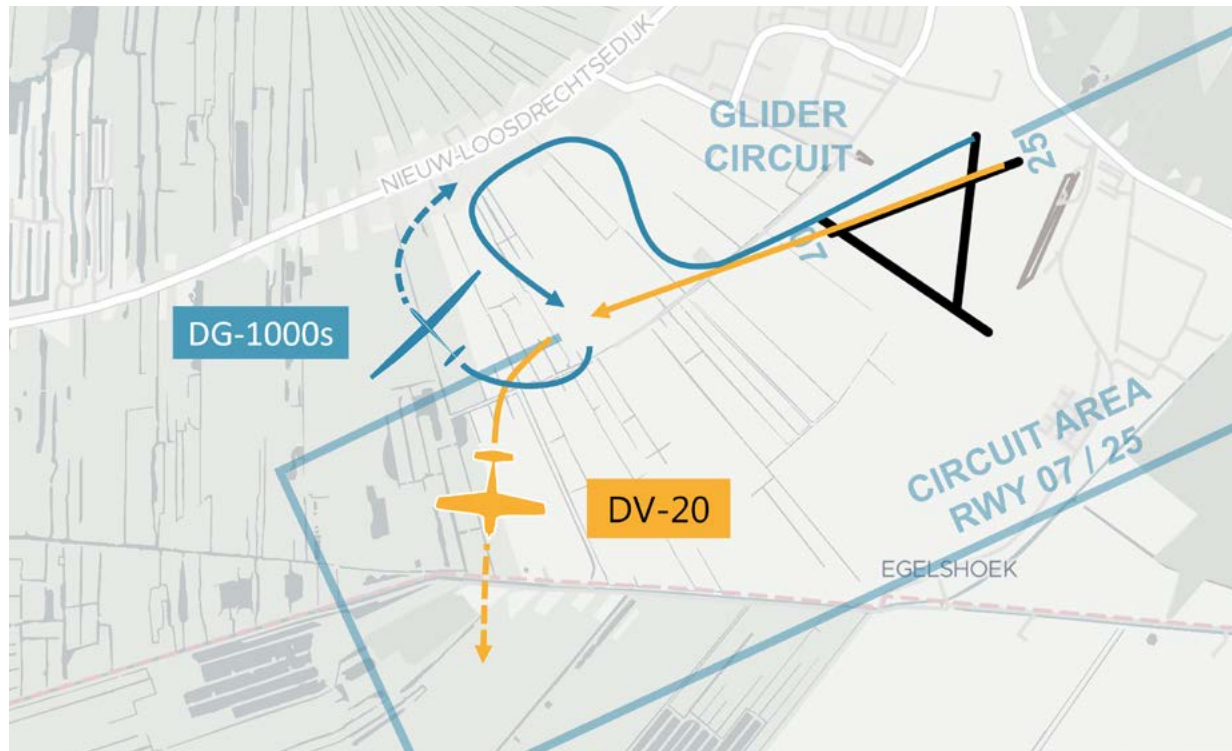
Reference: 2021013

Airprox, K8C, D-8614 and Discus bT, D-KWNW, Terlet glider airfield, 31 March 2021

The K8C completed a winch launch from Runway 22L. The pilot of the K8C stated that at that moment, a glider was flying from east to west over the winch path, at an estimated altitude of between 300 and 400 metres. In response, the pilot of the K8C uncoupled the winch cable, at about the same altitude, and completed an evasive manoeuvre to the left, in order to avoid a collision between the two gliders. He estimated the distance between the two aircraft to be approximately 30-50 metres and subsequently continued the flight without further event. The pilot of the other glider, a Discus, did not change course during the crossing of the winch path.

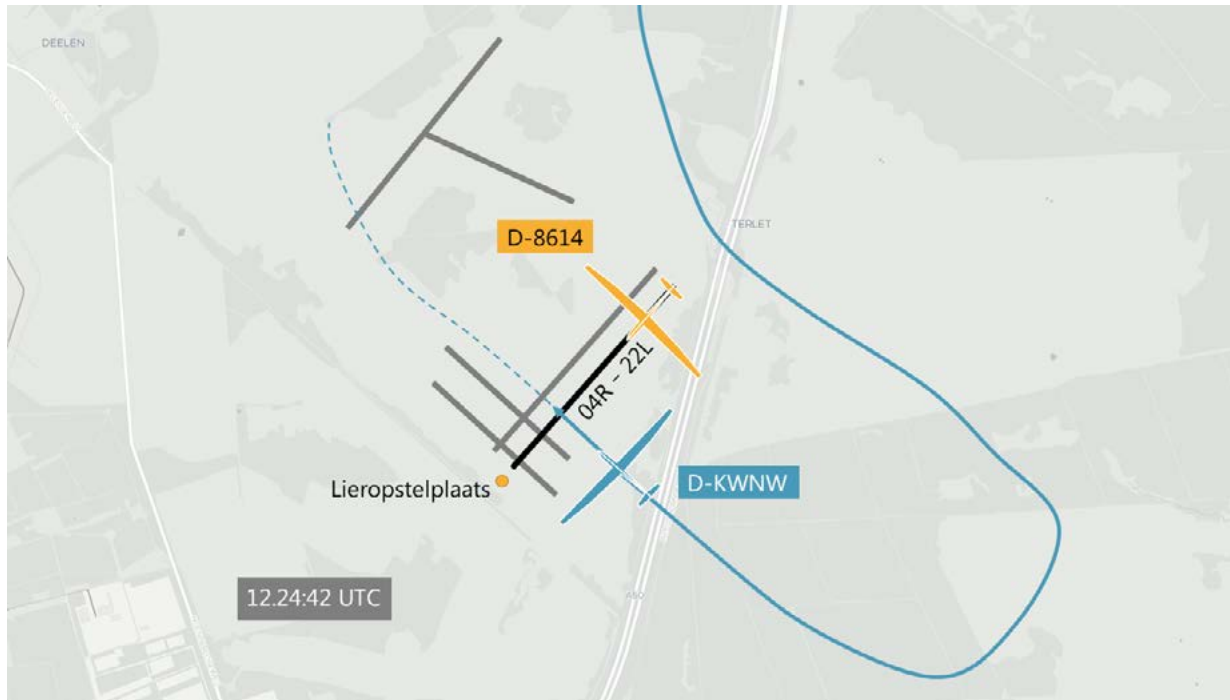
Radar data revealed that the Discus had flown over the winch path of Runway 22L. These data also revealed that the aircraft was flying at an altitude of approximately 450 metres AGL.³⁸

The pilot of the Discus stated that during the crossing/overflying of winch path 22L, no FLARM warnings had been generated. In addition, no (glider) aircraft detected by FLARM were visible on his FLARM display. The K8C was equipped with FLARM.



Estimated position of airprox between DG-1000s and DV-20. (Source: Flight paths based on the flight logger software of both aircraft)

³⁸ QNE 1450 feet. The QNH of EHDL was 1021.0 hPa at that moment. Field height EHTL where the airprox took place, 56 metres (Up-to-date height model of the Netherlands, <https://www.ahn.nl/ahn-viewer>).



The flight path of the Discus (D-KWNW). (Source of data: LVNL)

Classification: Serious incident

Reference: 2021024

Take-off from wrong runway, Reims Aviation S.A. F152, PH-ACH, Breda International Airport, 11 May 2021

A trainee (hereinafter: the solo trainee) was flying solo circuits in an Aquila AT01-100 with registration PH-BAG. Runway 24 was in use. After the solo trainee had completed two go-arounds in connection with the wind, which had changed direction to such an extent that he had been forced to land with a tail wind, the airport operations manager decided to switch the runway direction from 24 to 06. As a result of an area of showers crossing the airport, the wind direction was variable, with a speed of between 3 and 15 knots. Prevailing visibility on the ground was more than 10 km, with the cloud base (FCT) at around 4,000 feet.

At that moment, the Reims F152, with registration PH-ACH, also a training flight, was taxiing, on its way to the start of Runway 24. On board were an instructor and a trainee. After the airport operations manager had announced the runway change to Runway 06 via the radio, he left the building to change the ground markings. The instructor responsible for the solo trainee remained in the airport operations building, so he could continue to communicate with his trainee, via the radio. The instructor once again announced via the radio to PH-ACH that the runway direction had been switched. PH-ACH then announced that it was taxiing towards Runway 24 for take-off from that runway. In the meantime, the solo trainee (PH-BAG) had left the circuit to rejoin the circuit for Runway 06. PH-ACH failed to comply with the request from the instructor from the airport operations building to wait for line-up, and took off from Runway 24, following brief radio communication. The instructor then instructed his solo trainee to make a turn to the left, and to extend the downwind leg in order to avoid a potential conflict with PH-ACH. Following take-off, PH-ACH also diverted left, before completing a turn and leaving the circuit on the northern side. PH-BAG landed on Runway 06 without problems.

Occurrences that have not been investigated extensively

Throughout, both aircraft had been able to see each other, and there was no immediate risk of a collision. The instructor of PH-ACH indicated that he had been informed by the airport operations that Runway 24 was in use. He was already taxiing towards Runway 24, and was keen to take off before the approaching cloud reached the airfield. The instructor declared that he had not heard the call from the airport operations manager, but he had heard the radio communication from the instructor of the solo trainee. According to his assessment, PH-BAG had not yet entered the circuit, when he started his take-off from Runway 24 and there was sufficient space to take off from this runway, without coming into conflict with the other aircraft. The instructor stated that he had at all times communicated clearly about his intentions.

At any airport, the take-off and landing runway in use must always be used, and the current air traffic circuit followed. At the moment that it was communicated by radio that Runway 06 was in use, the solo trainee in PH-BAG changed the circuit, thereby expecting that from that moment onwards, Runway 06 was in use. Because PH-ACH subsequently took off from Runway 24 (in the opposing direction), a situation was created whereby both aircraft were forced to carry out a manoeuvre, in order to avoid a conflict situation.

Classification: *Incident*
Reference: 2021041

Suspected aiprox between drone and Embraer E190, OH-LKG, Amsterdam Airport Schiphol, 23 May 2021

At approximately 17.20 hours, during the approach for Runway 18R at Amsterdam Airport Schiphol, the flight crew of an Embraer, that had departed from Helsinki, observed a drone. The estimated distance was about 60 metres (200 feet) left of the flight path and the flight crew informed air traffic control about it.

In practice it turns out to be very difficult to trace the operators, when they fly in areas prohibited for drones, even when air traffic control calls the police immediately as it sometimes does. The latter was not the case this time and furthermore it appeared that the Royal Netherlands Air Force, which has a special system to detect drones, could not confirm the observation of the flight crew when reviewing its recorded data.

Based upon crew observation only, the Dutch Safety Board classified the event as a serious incident. In view of the above and partly due to the fact the notification reached the Dutch Safety Board on 13 July 2021 (almost two months later), he decided not to conduct further investigation due to insufficient possibilities to obtain useful information.

Classification: *Serious incident*
Reference: 2021073

Collision with signpost on final, Rolladen-Schneider LS 4-b, PH-1392, Volkel Air Base, 6 June 2021

Due to work on the system of runways at the air base, the gliding club was not using its usual section of grass runway for its take-off location and the target landing field. During final approach, the pilot of the glider made a mistake in estimating the location of the target landing field. As a result, the final approach was low, and the left wing of the glider collided with a signpost marker stood in high grass. The pilot had failed to observe the signpost during the final approach. The aircraft suffered damage to the left wing. The pilot was unharmed. The gliding club involved investigated the accident, and shared the results of its investigation with the Dutch Safety Board.

Flying on 'automatic', the pilot had aimed for the taxiway positioned at right angles to the final approach leg, as he would ordinarily have done in the normal situation. This taxiway is located further ahead of the landing field that was in use due to the work on the airfield. As a result, the pilot made a low final approach.



The signpost. (Source: gliding club)

Classification: Accident

Reference: 2021051

The Dutch Safety Board in three questions

1

What does the Dutch Safety Board do?

Living safely, working safely, safety. It seems obvious, but safety cannot be guaranteed. Despite all knowledge and technology, serious accidents happen and disasters sometimes occur. By carrying out investigations and drawing lessons from them, safety can be improved. In the Netherlands the Dutch Safety Board investigates incidents, safety issues and unsafe situations which develop gradually. The objective of these investigations is to improve safety, to learn and to issue recommendations to parties involved.

2

What is the Dutch Safety Board?

The Dutch Safety Board is independent of the Dutch government and other parties and decides for itself which occurrences and topics will be investigated.

The Dutch Safety Board is entitled to carry out investigations in virtually all areas. In addition to incidents in aviation, on the railways, in shipping and in the (petro-)chemical industry, the Board also investigates occurrences in the construction sector and healthcare, for example, as well as military incidents involving the armed forces.

3

Who works at the Dutch Safety Board?

The Board consists of three permanent board members under the chairmanship of Jeroen Dijsselbloem. The board members are the public face of the Dutch Safety Board. They have extensive knowledge of safety issues. They also have extensive administrative and social experience in various roles.

The Safety Board's bureau has around 70 staff, two-thirds of whom are investigators.

Visit the website for more information www.safetyboard.nl.



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This is a publication of the Dutch Safety Board. This report is published in the Dutch and English languages. If there is a difference in interpretation between the Dutch and English versions, the Dutch text will prevail.

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Photos

Photos in this edition, not provided with a source, are owned by the Dutch Safety Board.

Source photos cover:

Photo 1: A. Vrieze

Photo 2: Hungarian TSB

Photo 3: The operator