



DUTCH
SAFETY BOARD

Airproxes near Lelystad Airport



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The Hague, February 2022

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The Dutch Safety Board

When accidents or disasters happen, the Dutch Safety Board investigates how it was possible for these to occur, with the aim of learning lessons for the future and, ultimately, improving safety in the Netherlands. The Safety Board is independent and is free to decide which incidents to investigate. In particular, it focuses on situations in which people's personal safety is dependent on third parties, such as the government or companies. In certain cases the Board is under an obligation to carry out an investigation. Its investigations do not address issues of blame or liability.

Dutch Safety Board
Chairman: J.R.V.A. Dijsselbloem
S. Zouridis
E.A. Bakkum

Secretary Director: C.A.J.F. Verheij

Visiting address: Lange Voorhout 9
2514 EA The Hague
The Netherlands

Postal address: PO Box 95404
2509 CK The Hague
The Netherlands

Telephone: +31 (0)70 333 7000

Website: safetyboard.nl

E-mail: info@safetyboard.nl

N.B:

This report is published in the English language, a summary is available in the Dutch language. If there is a difference in interpretation between the Dutch and English versions, the English text will prevail.

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Lelystad Airport is an important airport for general aviation in the Netherlands. Currently there is a mix of commercial and non-commercial flights. Of the small airports (for general aviation), Lelystad Airport is the largest in terms of the number of air transport movements. In order to be able to accommodate commercial air traffic¹ in the future, preparations are made, commissioned by the Ministry of Infrastructure and Water Management. One of these preparations involved the transition of Lelystad Airport from an uncontrolled to a controlled airport with control zones and terminal control areas.² Such a transition is something unique. Since 7 November 2019, Air Traffic Control the Netherlands (LVNL) and the Royal Netherlands Air Force Command (CLSK) have been jointly responsible for handling air traffic at and near Lelystad Airport. LVNL provides tower control and CLSK approach control.

In the control zone of Lelystad Airport, which has airspace classification D, LVNL provides aerodrome control service, flight information service, and alerting advice. As per ICAO³ airspace classification, LVNL does neither provide separation between visual flight rules (VFR) traffic, nor between VFR and instrument flight rules (IFR) traffic. This means that VFR pilots themselves are responsible for maintaining sufficient separation from other aircraft. As of 7 November 2019, there have been departure and arrival routes in the control zone for VFR traffic to separate these from each other. The traffic circuit has moved from the south side to the north side of the airport.

After the transition from an uncontrolled to a controlled airport on 7 November 2019, the Dutch Safety Board received six notifications concerning airproxes that occurred in November 2019. In most of these occurrences VFR traffic came in close proximity to each other, resulting in potentially dangerous situations. This was a sudden increase in the number of reported airproxes, compared to the period before 7 November 2019. The Board classified three of these airproxes as serious incidents⁴ and three as incidents and started an investigation into the direct and underlying causes and possible common factors of these occurrences.

In addition, the Board requested the Human Environment and Transport Inspectorate (ILT) to provide reports and any supplementary information of occurrences, in the period from 7 November 2019 to 7 June 2020, that had been reported to them. The Board assessed this information and requested additional information from the ILT about two occurrences, that took place in November 2019, which are also analysed in this

1 Jetliners, such as the Boeing 737 and Airbus A320, and turboprop-powered regional airliners.

2 A controlled airport has air traffic control and is surrounded by airspace (control zone) that is also controlled.

3 International Civil Aviation Organization.

4 The Dutch Safety Board is required by law to investigate serious incidents (and accidents), involving aircraft on or above Dutch territory.

investigation. The Board has classified these occurrences as serious incidents. This investigation therefore comprises a total of eight airproxes.

Based on the experiences during the first month after the introduction of air traffic control at Lelystad Airport, LVNL and CLSK have taken temporary and permanent measures to improve the procedures and working methods. These measures took effect on 7 December 2019. They were aimed at making the VFR routes in the control zone less complex, and at reducing the congestion at the tower frequency. One of the measures was the separation of the routes of incoming and outgoing traffic.

This investigation answers the following questions:

1. How could it happen that several airproxes took place in the control zone of Lelystad Airport, shortly after the introduction of air traffic control and corresponding procedures on 7 November 2019?
2. What measures were taken on 7 December 2019 in response to the occurrences that took place in the first month after the introduction of air traffic control? What has the effect of these measures been on flight safety?

This report does not cover air traffic in the Lelystad terminal control areas, for which CLSK is solely responsible, as all investigated airproxes occurred in the Lelystad control zone.

The Board emphasises that the investigation does not extend to the political decision-making process with regard to the preparation and opening of the airport for commercial air traffic. On the basis of its legal obligation, the Board has investigated eight occurrences, which are the focus of this investigation.⁵ The Board considered the VFR departure and arrival routes and the results of the safety analysis of the operational design of services to be provided by LVNL⁶, after the introduction of air traffic control, as a given at the start of the investigation.

The Board came to the following conclusions. First, it was found that, whilst acknowledging LVNL and CLSK had taken a number of actions to inform general aviation pilots about the upcoming changes at Lelystad Airport, the unique transition from an uncontrolled to a controlled airport was a major transition, especially in the initial period, for the pilots and air traffic controllers involved. The new situation was something that all parties involved had to get used to. The pilots who had been flying to Lelystad Airport for a long time had to unlearn old habits. The present situation requires in any case more extensive flight preparation.

Furthermore, the investigation has revealed that the following factors played a role in the development of the eight airproxes:

- The convergence of departure and arrival routes for visual flight rules traffic;
- Frequency congestion on tower frequency;

⁵ Three occurrences were classified as an incident. The Dutch Safety Board is not required by law to investigate incidents, but is allowed to do so

⁶ The safety analysis was performed by LVNL in the period prior to the introduction of air traffic control at Lelystad Airport.

- Non-compliance by, and unfamiliarity among pilots with procedures applicable in controlled airspace (with classification D);
- Late or non-detection by air traffic control of pilots deviating from procedures.

After 7 December 2019, the Dutch Safety Board received one report of an airprox that took place in the Lelystad control zone.⁷ In addition, a high level study of occurrences reported to the Human Environment and Transport Inspectorate (ILT) has shown that the number of airprox occurrence reports has decreased after 7 December 2019. Based on these findings, the measures taken on 7 December 2019 appear to have had a positive effect on the number of airproxes in the Lelystad control zone.

After the arrival of commercial air traffic in the future, strict adherence to the procedures then becomes even more important. Irrespective of any changes to procedures or routes, reducing the number of airproxes requires commitment and continuous monitoring and adjustment from all parties involved.

⁷ On 5 March 2021. The investigation into this occurrence was still pending at the time of publication of this report. The Board will publish the results of it in its Quarterly Aviation Report.

ABBREVIATIONS

AAL	Above aerodrome level
AIP	Aeronautical information publication
AMSL	Above mean sea level
AOPA	Aircraft Owners & Pilots Association Netherlands
ATC	Air traffic control
ATIS	Automatic Terminal Information Service
CBS	Centraal Bureau voor de Statistiek
CLSK	Royal Netherlands Air Force Command
CTR	Control zone
EHLE	Lelystad Airport
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILT	Human Environment and Transport Inspectorate
IMC	Instrument meteorological conditions
KNVvL	Royal Netherlands Aeronautical Association
LARSA	Lelystad Airport Runway Scheduling application
LVNL	Air Traffic Control the Netherlands
NACA	Netherlands Association of Commercial Aviation
NM	Nautical mile
NSA	National Supervisory Authority
VEMER	Safety, efficiency and environmental impact report
VFR	Visual Flight Rules

1 INTRODUCTION

Six occurrences that took place within a short period of time in the control zone of Lelystad Airport (EHLE), and in particular in the circuit area, were reported to the Dutch Safety Board. The occurrences took place in November 2019 after the unique⁸ transition from an uncontrolled to a controlled airport. Lelystad Airport was converted to a controlled airport to accommodate commercial air traffic from Amsterdam Airport Schiphol in the future. These occurrences concerned aircraft proximities, in which VFR traffic came close to each other, resulting in potentially dangerous situations. The Board classified three of these airproxes as serious incidents and three as incidents. Based on the experiences gained during the first month of the 'adjustment period'⁹ at Lelystad Airport, Air Traffic Control the Netherlands (LVNL) and Royal Netherlands Air Force Command (CLSK) have taken temporary and permanent measures to improve the procedures and working methods. These measures took effect on 7 December 2019.

An aircraft proximity, often abbreviated as airprox, is a situation in which, in the opinion of a pilot or air traffic services personnel, the distance between aircraft as well as their relative positions and speed have been such that the safety of the aircraft involved may have been compromised.¹⁰

Because the occurrences took place within a short period of time following the introduction of air traffic control (ATC), the Board started an investigation into the direct and underlying causes and possible common factors, that may have contributed to these occurrences.

The aim of this investigation is to determine whether, and to what extent the changes in the context of the transition at Lelystad Airport (procedures, routes), introduced on 7 November 2019, have contributed to the reported airproxes. The following questions were central to the investigation:

1. How could it happen that several airproxes took place in the control zone of Lelystad Airport, shortly after the introduction of ATC and corresponding procedures on 7 November 2019?
2. What measures were taken on 7 December 2019 in response to the occurrences that took place in the first month after the introduction of ATC? What has the effect of these measures been on flight safety?

⁸ Unique, because of the combination of location and circumstances.

⁹ During the adjustment period, experiences and reports from airport users and air traffic controllers were evaluated at specific times by LVNL and Lelystad Airport, in order to subsequently determine whether certain procedures needed to be adjusted. The adjustment period continues until the arrival of commercial air traffic at Lelystad Airport.

¹⁰ ICAO Doc 4444: PANS-ATM.

Scope of the investigation

This investigation comprises six occurrences, reported to the Dutch Safety Board, that took place in the control zone of Lelystad Airport between 7 November 2019 and 7 December 2019. In order to determine the effect of the measures that were introduced on 7 December 2019, the Board assessed reports and supplementary information of occurrences reported to the Human Environment and Transport Inspectorate (ILT). For this, the Board extended its scope to cover the period up till 7 June 2020. The Board requested additional information from the ILT about two occurrences¹¹, that took place in November 2019, which are also analysed in this investigation (see Chapter 2.2 and 3.2). The investigation therefore comprises a total of eight airproxes, which are the focus of this investigation.

The political decision-making process with regard to the preparation and opening of the airport for commercial air traffic¹² is not included in the investigation. Also, environmental aspects¹³, the process of design of the VFR departure and arrival routes and corresponding procedures (and its changes as of 7 December 2019), the airspace and the routes for connection to the upper airways are not the focus of the investigation. The Board considered the VFR departure and arrival routes and the results of the safety analysis, performed by LVNL in the period prior to the introduction of air traffic control at Lelystad Airport, of the operational design of services to be provided by LVNL, after the introduction of air traffic control, as a given at the start of the investigation.

¹¹ The Dutch Safety Board classified those occurrences as serious incidents.

¹² Jetliners and turboprop-powered regional airliners.

¹³ Environmental impact assessment, nitrogen deposition by aviation, et cetera.

2 FACTUAL INFORMATION

2.1 Lelystad Airport routes and procedures

Lelystad Airport is an important airport for general aviation in the Netherlands. Currently there is a mix of commercial and non-commercial flights. Lelystad Airport is the largest of the small general aviation airports in terms of the number of air transport movements. More than 97,000 aircraft movements took place here in 2019. By comparison, the average number of aircraft movements in 2019 at the uncontrolled airports (for general aviation) in the Netherlands was approximately 32,000. In the same year, the number of aircraft movements at regional airports controlled by air traffic control was approximately 52,000 for Rotterdam The Hague Airport, approximately 14,000 for Maastricht Aachen Airport, approximately 41,000 for Eindhoven Airport and approximately 32,000 for Groningen Airport Eelde.¹⁴

Lelystad Airport has one paved runway (05/23), which can be used in both directions for both departing and landing traffic. In the period before 7 November 2019, the airspace around Lelystad Airport was uncontrolled with classification G, up to 1,500 feet AMSL. There was one arrival route at 700 feet AAL via point BRAVO for fixed wing traffic. For helicopters there was a separate arrival route at 500 feet AAL via point Hotel. Departing traffic did not have to leave the area around the airport via a mandatory reporting point after take-off. See Figure 1. The circuit was on the south side of the runway.

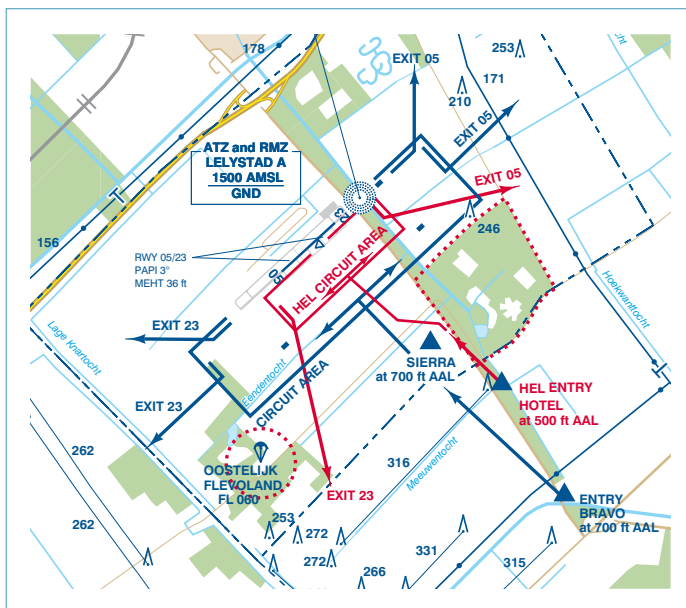


Figure 1: The arrival and departure routes of Lelystad Airport before 7 November 2019.

(Source: AIP Netherlands)

14 Statistics Netherlands (CBS).

Lelystad Airport is being prepared to accommodate commercial air traffic in the future. In preparation for this, Lelystad Airport has been transformed from an uncontrolled to a controlled airport with a control zone. Before the introduction of air traffic control at the airport, Air Traffic Control the Netherlands (LVNL) performed a safety analysis of the operational design of its services to be provided, including a risk assessment (see Paragraph 2.3). On 12 March 2019, the National Supervisory Authority (NSA)¹⁵ approved the introduction of air traffic control at Lelystad Airport, subject to a number of conditions to be fulfilled prior and after implementation.¹⁶

Before the introduction of ATC at Lelystad Airport, LVNL and the Royal Netherlands Air Force Command (CLSK) issued a brochure¹⁷ and made films of the VFR routes¹⁸ for the airport, as part of an awareness campaign for pilots. The goal of said campaign was to inform the pilots about the new VFR routes, procedures and airspace changes. In addition, information meetings (local/regional) were held for pilots. Relevant information for pilots was also made available on the websites of Lelystad Airport and LVNL.

To efficiently distribute the available capacity at Lelystad Airport to all users within the set opening times of the airport and capacity frameworks of LVNL, Lelystad Airport introduced a flight scheduling software system, called LARSA (Lelystad Airport Runway Scheduling application). All pilots shall make runway reservations using LARSA.¹⁹ Due to the voluntary nature of the LARSA tool, LVNL's air traffic controllers regulate departing, arriving and circuit traffic. They do this, among other things, by applying a start-up interval (3 to 5 minutes), keeping traffic outside the CTR or stopping circuit traffic.

Since 7 November 2019, LVNL and CLSK have been jointly responsible for handling air traffic at and near Lelystad Airport. LVNL provides tower control and CLSK provides approach control. This report does not cover air traffic in the Lelystad terminal control areas, for which CLSK is solely responsible, as all investigated airproxes occurred in the Lelystad control zone 2.

Since 7 November 2019, there have been separate departure and arrival routes in the control zone²⁰ for VFR traffic to separate departing and arriving traffic from each other. The departure and arrival routes for IFR²¹ traffic are not available yet for commercial air transport, awaiting the political decision on opening up to trade.²²

15 The NSA, which is housed at the ILT, monitors compliance with the legal framework for Air Traffic Management. In particular, the NSA is responsible for certifying and supervising the air navigation service providers, including LVNL.

16 Beschikking, ILT-2019/298.

17 "Krijgt u mij aan de lijn vanaf 7 november 2019?". Luchtverkeersleiding op Lelystad Airport. VFR: Luchtruim, routes en procedures. https://www.lvnl.nl/media/2810/brochure-vfr-vliegen-lelystad-airport-12_herdruk.pdf

18 <https://www.lvnl.nl/lelystad/vfr-routes>

19 AIP, the Netherlands: EHLE AD 2.20 LOCAL AERODROME REGULATIONS, 2 RUNWAY RESERVATIONS.

20 Lelystad CTR 2.

21 Instrument Flight Rules: rules and regulations, established to govern flight under conditions in which flight by outside visual reference is not safe. IFR flight depends upon flying by reference to instruments in the cockpit, and navigation is accomplished by reference to electronic signals.

22 <https://www.lvnl.nl/lelystad>

Presently, a delivery frequency is used for obtaining start-up clearance, and a tower frequency for taxiing, taking off and landing traffic and all other aircraft movements in the Lelystad control zone. In the tower at Lelystad Airport, radar data can be consulted via a monitor. However, it may only be used by the air traffic controller for flight path monitoring of flights on final approach and in the vicinity of the airport and for providing navigation support to VFR flights.²³ It shall not be used for maintaining separation between VFR flights (and between VFR and IFR flights). The latter is the responsibility of the pilots themselves.

As of 7 November 2019, new departure and arrival routes run via the ('old') point BRAVO and via point MIKE (near Lelystad). The circuit was moved to the north side of the runway. As of this date, traffic arriving via MIKE starts the arrival route at 1,500 feet AMSL; traffic departing via MIKE has to climb to 1,500 feet AMSL. Traffic arriving via BRAVO starts the arrival route at 1,300 feet AMSL; traffic departing via BRAVO has to climb to 1,000 feet AMSL. See Figure 2.

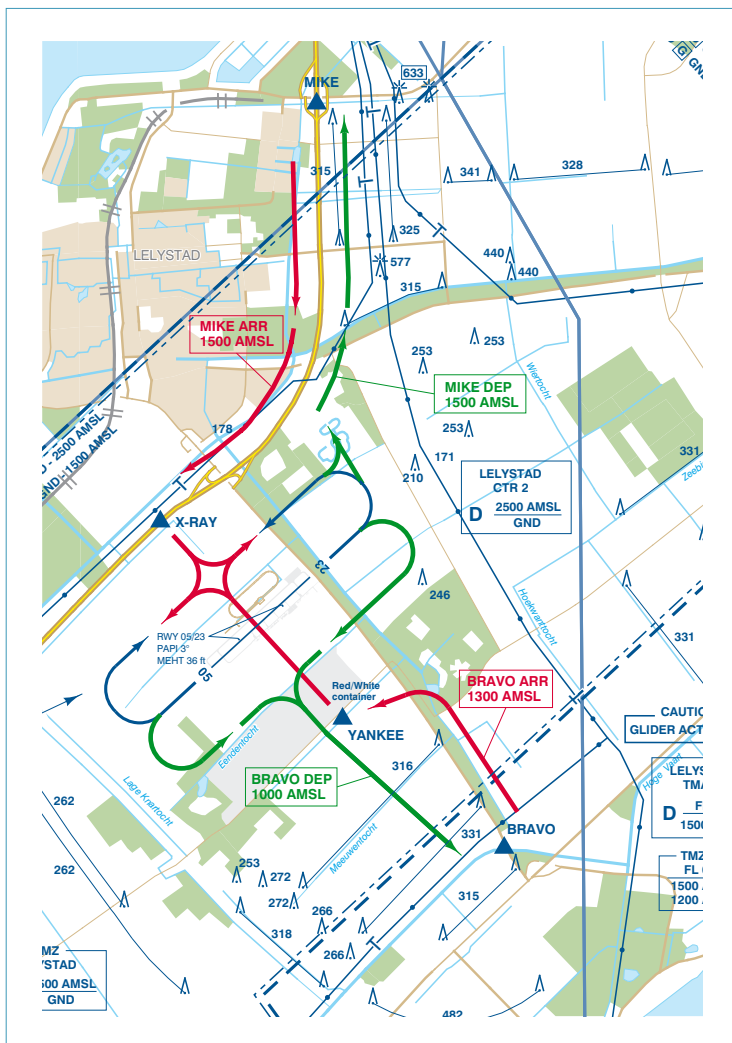


Figure 2: VFR arrival and departure routes and VFR circuits as of 7 November 2019. (Source: AIP Netherlands)

23 OM LE TWR-APP, 2.03 Gebruik radar, 7 November 2019.

The standard circuit altitude is 1,000 feet AMSL for inbound VFR traffic. The standard altitude for the VFR training circuit is 500 feet AMSL. The controlled airspace²⁴ around Lelystad Airport has classification D, in which LVNL provides the following services to VFR traffic: aerodrome control service, flight information service, and alerting advice. Continuous two-way air-ground voice communication is required and VFR flights are subject to an ATC clearance. ATC does not provide separation between VFR traffic, nor between VFR and IFR traffic; this means that VFR pilots themselves are responsible for keeping sufficient distance from other aircraft. IFR traffic, on the other hand, is separated from other IFR traffic.

A VFR flight may only be carried out in airspace classification D²⁵ when flight visibility is equal to or greater than 5 km and the distance of aircraft from clouds is equal to or greater than 1,500 metres horizontally and 300 metres (1,000 feet) vertically.

Inside the circuit, pilots have to report downwind, after which they receive a sequence number from ATC, so the pilot knows how many aeroplanes are in the circuit ahead of him. Then the pilot must decide for himself when to turn to the base leg, thereby maintaining sufficient separation from the traffic in front of him.

2.2 Occurrences

2.2.1 Introduction

The factual information presented in this section is based on occurrence reports from pilots and air traffic controllers, (radar) data and radio transmissions provided by Air Traffic Control the Netherlands (LVNL) and interviews with pilots, air traffic controllers and other ATC staff.

Six of the eight occurrences presented in this report were reported to the Dutch Safety Board. These occurrences involved VFR traffic and took place in November 2019 after the introduction of ATC at Lelystad Airport. In addition, the Board requested and obtained an overview of occurrences at and near Lelystad Airport in the period from 7 November 2019 to 7 June 2020 from the ILT. Individual entries in this overview contain limited information, for example the date on which the occurrences took place, a headline, the occurrence categorisation and classification. The Board requested additional information for two of these occurrences, which took place in the first month after the introduction of ATC. They have been classified by the Board. In total five of the eight occurrences presented in this report were classified as serious incidents and the remaining three as incidents. In the following paragraphs each of the occurrences will be described.

²⁴ Lelystad control zone 2 (GND – 2,500 feet AMSL).

²⁵ Altitude band: at and below 3,000 feet (900 metres) AMSL, or 1,000 feet (300 metres) above terrain, whichever is the higher.

2.2.2 Occurrence 1: Cessna 172P (PH-WVO) and Blackshape Gabriel (I-EASA), final Runway 05, 15 November 2019.

Special VFR conditions²⁶ were in effect. It was busy on the tower frequency. The pilot of the Blackshape reported on downwind for Runway 05, to which ATC replied to expect a late clearance due to traffic on the runway. The pilot replied with 'copy'. The Cessna, with an instructor and student on board, flew an extended downwind for Runway 05. There were two other aircraft (Socata TB 10 (PH-DFE) and Socata TB 9 (PH-AIS)) on final in front of the Cessna. The air traffic controller used the same sounding abbreviations for the call signs of the Blackshape (ISA) and the Socata TB9 (AIS). When the Cessna flew on final and was still maintaining 500 feet, ATC cleared the aircraft, being number one, for a touch-and-go. At the moment the crew wanted to descend, the Blackshape had turned to base leg and crossed underneath the Cessna. The Blackshape's pilot reported: 'Proceeding straight ahead, traffic on final in sight.' The instructor, on board the Cessna, estimated the vertical separation between both aircraft to be 200 feet. As an evasive manoeuvre, the Blackshape continued his heading in a south-easterly direction. The Cessna made a touch-and-go. See Figure 3.

The Dutch Safety Board classified this occurrence as a *serious incident*, because there was an acute risk of collision between the two aircraft and one of the pilots had to make an evasive manoeuvre.

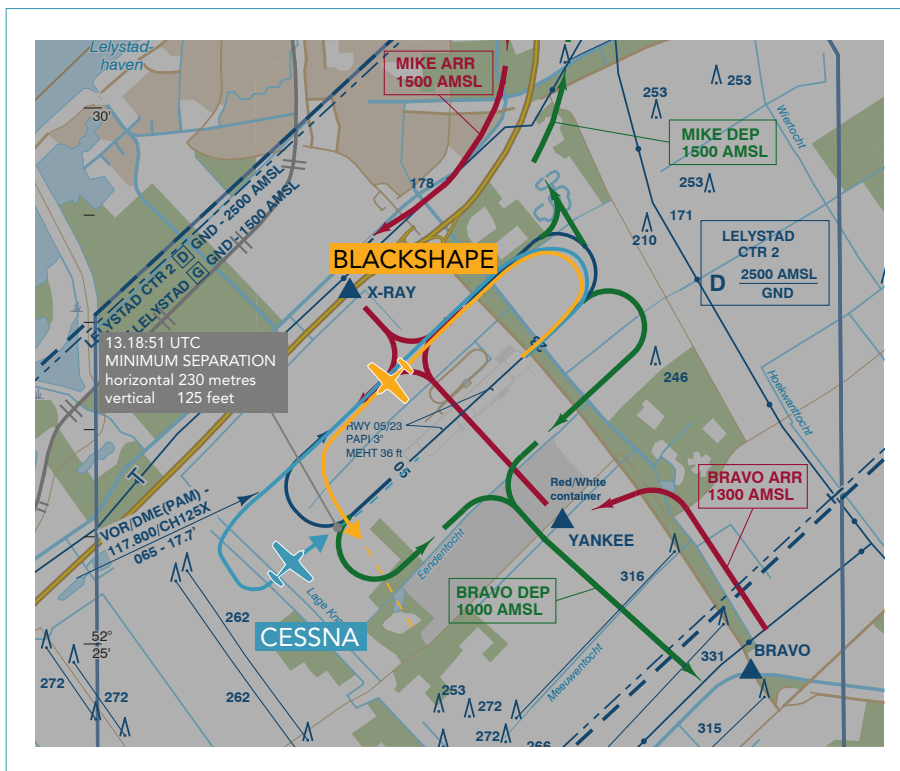


Figure 3: Occurrence 1, on final Runway 05. (Source chart: AIP Netherlands)

26 Special VFR flight is a VFR flight cleared by ATC to operate within a control zone in meteorological conditions below visual meteorological conditions, so-called special VFR conditions.

2.2.3 Occurrence 2: Piper PA-28 (G-BJSV) and Mooney M20 (D-EKSS), left and right base leg, Runway 23, 16 November 2019.

Runway 23 with a right-hand circuit was in use. Both aircraft were cleared for the BRAVO arrival route. The Piper, flying in front, flew via point YANKEE over the runway and flew the prescribed right-hand circuit (see orange line in Figure 4), as cleared. The Mooney started its descent from 1,300 to 1,000 feet between BRAVO and YANKEE. Then it made a right turn immediately after point YANKEE and flew a left-hand circuit (see blue line). The next part of a radio call was partially blocked: '(...) traffic who is opposite me on same altitude also on downwind²⁷.' At the moment ATC observed the Mooney on final, it was instructed to make an orbit over right. Other traffic on downwind was then instructed to make a left-hand orbit. The Piper's pilot reported he was turning to base leg. He mentioned that the Mooney was flying towards him in the opposite direction, made an evasive manoeuvre and decided to leave the circuit and set course to BRAVO. The Mooney continued on final and made a safe landing. The minimum horizontal separation between both aircraft was approximately 200 metres at an almost equal height.

The Dutch Safety Board classified this occurrence as a *serious incident*, because there was an acute risk of collision between the two aircraft and one of the pilots had to make an evasive manoeuvre.

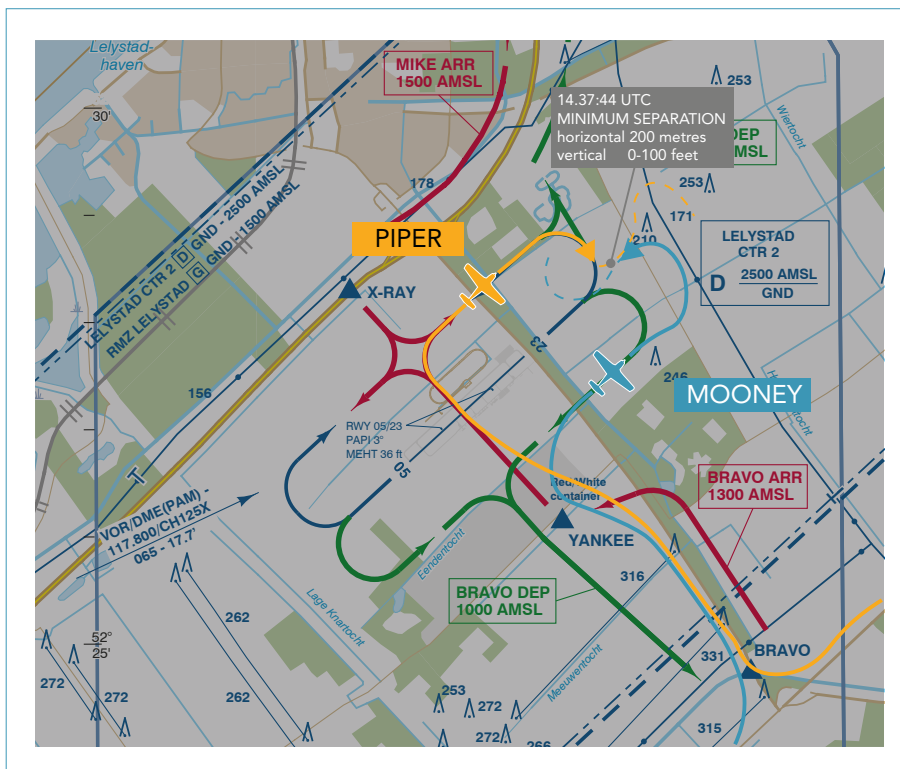


Figure 4: Occurrence 2, on final Runway 23. (Source chart: AIP Netherlands)

²⁷ The pilot in question (of the Mooney) meant an aircraft, that was flying the BRAVO departure route.

2.2.4 Occurrence 3: Diamond DA 40 (PH-USL) and Reims Aviation S.A. F172N (PH-FLE), intersection MIKE and BRAVO arrival, 22 November 2019.

Runway 23 with a right-hand circuit was in use. The Diamond entered the control zone via the MIKE arrival route (see orange line in Figure 5) and the Reims via the BRAVO arrival route (see blue line). The Reims's pilot reported overhead YANKEE and received a clearance to cross in the middle and join a right-hand downwind for Runway 23. The pilot then descended to the circuit altitude of 1,000 feet. The Diamond's pilot reported overhead point X-RAY. Then the Diamond's pilot started a descending left-hand turn towards downwind, but the pilot noticed the Reims approaching in the opposite direction and decided to make a right turn and fly a 360 degrees orbit, near point X-RAY. When he reported that he was overhead X-RAY (for the second time) and making one orbit over the right for oncoming traffic, he was cleared to join the right-hand downwind for Runway 23.

The Dutch Safety Board classified this occurrence as an *incident*, because the horizontal distance between the two aircraft was approximately 2.3 kilometres when the Diamond started the orbit. There was no immediate risk of collision between the two aircraft.

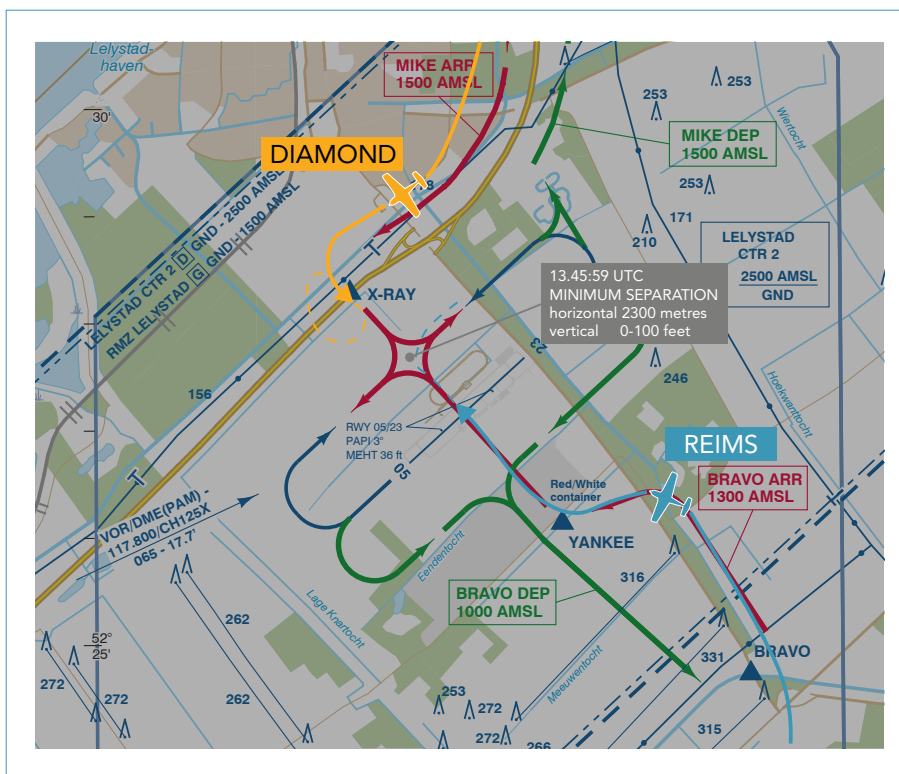


Figure 5: Occurrence 3, intersection MIKE and BRAVO arrival. (Source chart: AIP Netherlands)

2.2.5 Occurrence 4: Diamond DA 42 (PH-DTS), Diamond HK 36 TTC (PH-1466) and Cessna 172 (PH-ALW), intersection MIKE and BRAVO arrival, 24 November 2019.

Runway 23 with a right-hand circuit was in use. The DA 42 (orange line in Figure 6) flew the MIKE arrival route and the Cessna (blue line) flew the BRAVO arrival route. The HK 36 was flying in the training circuit at an altitude of 500 feet. ATC cleared the DA 42 to join a right-hand downwind from point X-RAY. The Cessna received the instruction from point YANKEE to 'cross in the middle' and join a right-hand downwind for Runway 23. The Cessna also received traffic information about the DA 42, which was flying in an opposite direction. The Cessna's pilot had visual contact with the DA 42 and got the instruction to follow that aircraft. The pilot made a left turn to position himself behind the DA 42. The pilot of the DA 42 observed the Cessna making this turn and thought it was making an evasive manoeuvre to avoid a collision.

The Dutch Safety Board classified this occurrence as an *incident*, because the aircraft flew at different heights at sufficient distance from each other and therefore there was no risk of collision between the aircraft.

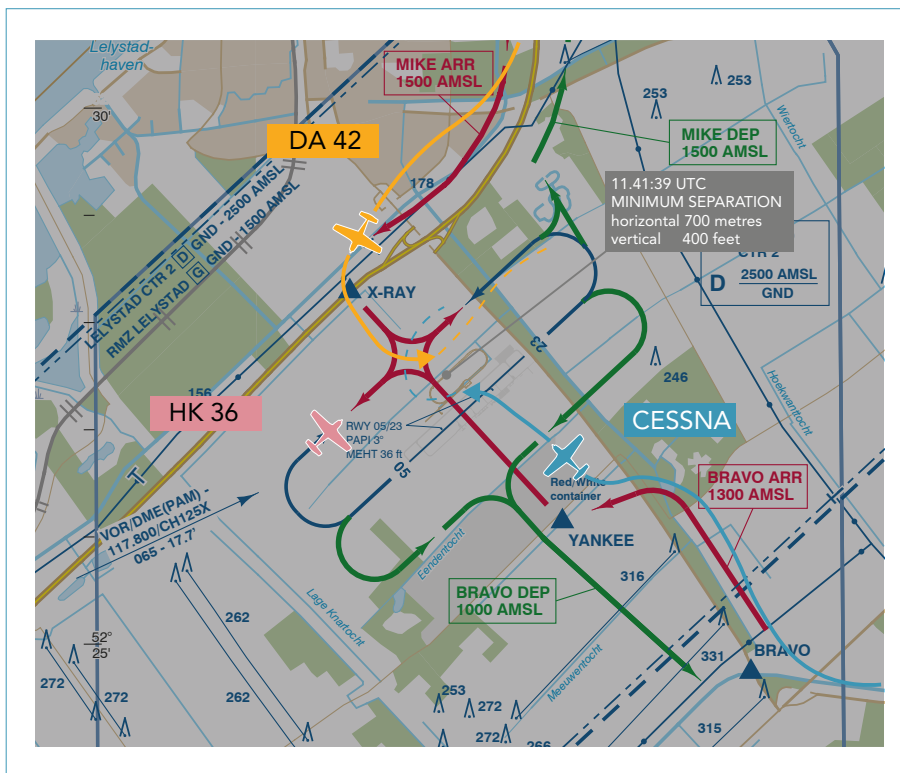


Figure 6: Occurrence 4, intersection MIKE and BRAVO arrival. (Source chart: AIP Netherlands)

2.2.6 Occurrence 5: Cessna FRA 150L (G-BCVH), Reims Aviation S.A. F172M (PH-ALW), Diamond HK 36 TTC (PH-1466), final Runway 23, 24 November 2019.

Runway 23 with a right-hand circuit was in use. All aircraft flew in the circuit. The Cessna and Dimona flew at the training circuit altitude of 500 feet. The Dimona flew in front, followed by the Reims and then the Cessna. The Reims's pilot reported he was flying at 1,300 feet for better visibility conditions. At the request of ATC, the Reims and the Cessna both extended downwind and the Cessna made a left-hand 360 degrees orbit (see orange line in Figure 7). Thereafter, ATC reported to the Cessna: 'number 3 behind Katana... correction C172 at 2 NM final', which was read back by the pilot. Because the visibility had deteriorated on the extended downwind leg and the cloud base had dropped, the Cessna's pilot then turned right and joined base leg. The pilot reported that the end of extended downwind was all IMC.²⁸ When the Cessna flew on final, ATC instructed the Reims, who was also flying on final (see blue line) and above the Cessna, to make a go-around. Both aircraft came close to each other.

Automatic Terminal Information Service (ATIS)²⁹ information, which was valid at the time of the occurrence, mentioned a visibility of 8 kilometres and no significant clouds.

The Dutch Safety Board classified this occurrence as a *serious incident*, because there was an acute risk of collision between the Cessna and Reims.

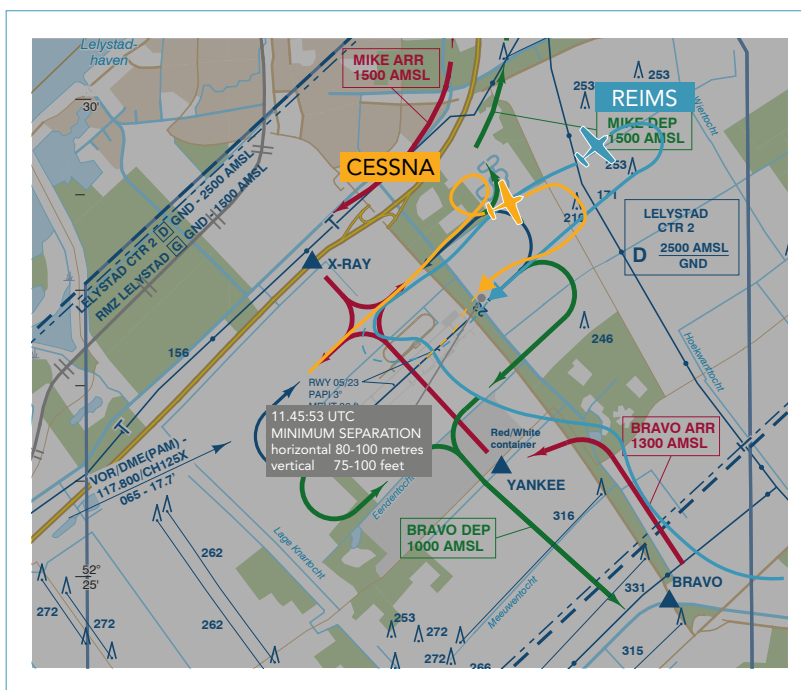


Figure 7: Occurrence 5, on final Runway 23.³⁰ (Source chart: AIP Netherlands)

- 28 IMC stands for instrument meteorological conditions. Those conditions are not suitable to fly visually.
- 29 The automatic provision by means of continued and repetitive voice broadcasts of current, routine information to arriving and departing aircraft.
- 30 The Diamond HK-36TTC Super Dimona is not shown in this figure, because it did not play a direct role in the occurrence.

2.2.7 Occurrence 6: Schweizer 300C (D-HMIM) and Diamond DA 42 (PH-DTS), intersection MIKE and BRAVO arrival, 29 November 2019.

Runway 23 with a right-hand circuit was in use. The Diamond (orange line in Figure 8) flew the MIKE arrival route and the Schweizer helicopter (blue line) flew the BRAVO arrival route. The Diamond flew from point X-RAY to a right-hand downwind and the Schweizer flew in an opposite direction from point YANKEE to a right-hand downwind. Both aircraft should be following traffic that was already flying on the downwind leg. ATC determined in terms of sequence that the Diamond should follow the Schweizer on the downwind leg. When the Diamond's pilot was informed, he asked for confirmation, which was then given by ATC. Moments later, the Diamond's pilot asked a second time for confirmation. At this point, ATC reversed the sequence and informed the pilot that he was now number two (number one was other traffic at the end of the downwind leg) and the opposite flying Schweizer would follow him. The Diamond's pilot replied that this was not possible anymore. He crossed the runway and made a left-hand 180 turn above the field to end up behind the Schweizer.

The Dutch Safety Board classified this occurrence as an *incident*, because there was no acute risk of collision between the aircraft. Both pilots had the other aircraft in constant sight.

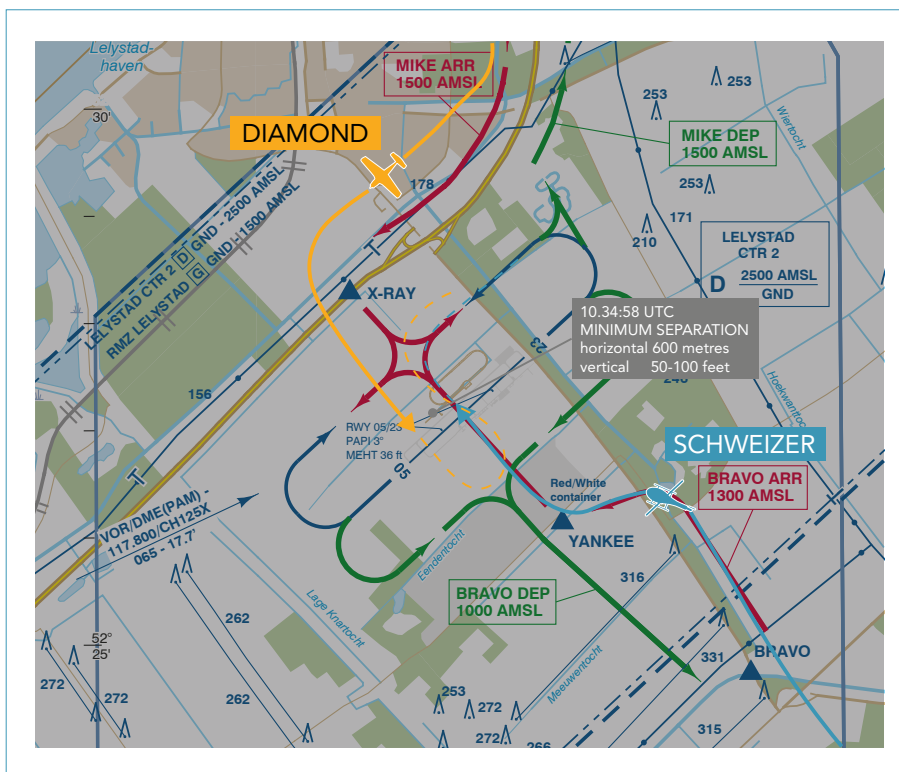


Figure 8: Occurrence 6, intersection MIKE and BRAVO arrival. (Source chart: AIP Netherlands)

2.2.8 Occurrence 7: Blackshape S.p.A. Prime BS100 (PH-4N3) and Cirrus SR22 (LN-ELG), final Runway 05, 29 November 2019.

The Blackshape, with an instructor and student on board, had departed from Runway 05 for the training circuit at 500 feet. The Cirrus's pilot, who was inbound via the MIKE arrival, had reported X-RAY. ATC instructed the Cirrus to join a left-hand downwind for Runway 05. The Blackshape reported mid-downwind for Runway 05 for a touch-and-go, after which ATC informed them that they would be number one. Both aircraft turned to base leg and subsequently to final. The Cirrus's pilot had reported final and a few seconds later the Blackshape reported final for a touch-and-go. The instructor on board of the Blackshape estimated the position of the Cirrus at that time 5 metres above and 20 metres in front of their aircraft. ATC then instructed the Cirrus to climb to 500 feet and join the circuit and the Blackshape to make a full stop landing. See Figure 9.

The Dutch Safety Board classified this occurrence as a *serious incident*, because there was an acute risk of collision between the two aircraft.

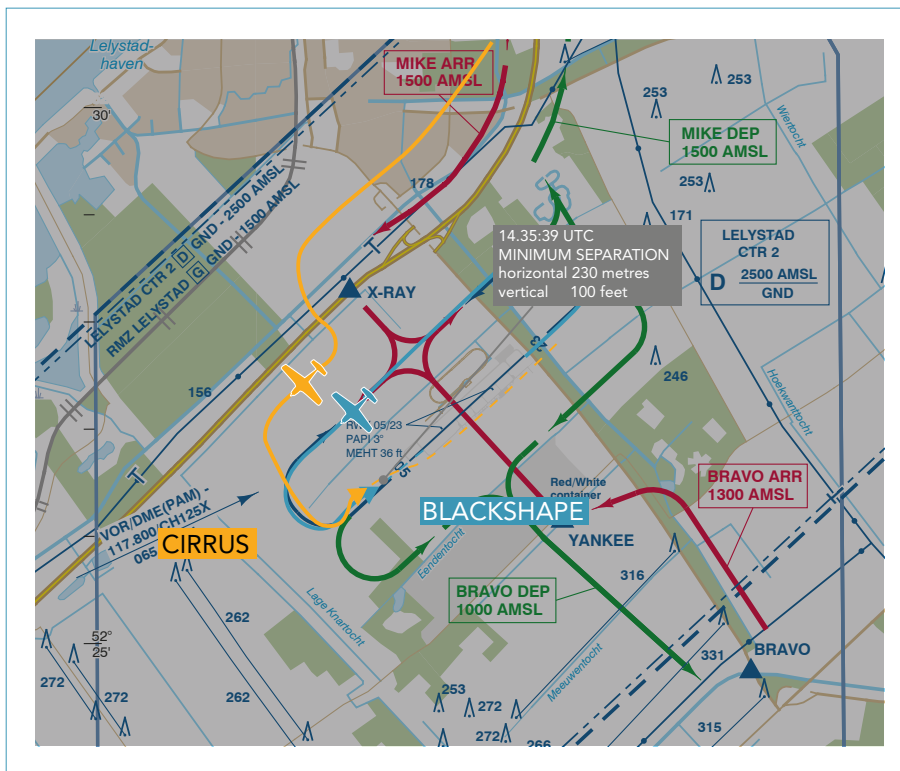


Figure 9: Occurrence 7, on final Runway 05. (Source chart: AIP Netherlands)

2.2.9 Occurrence 8: Diamond DA 20 (D-EFZW), Piper PA-28 (G-OBFS) and Guimbal Cabri G2 (PH-HCF), intersection MIKE departure and arrival, 30 November 2019.

Runway 23 with a right-hand circuit was in use. The Diamond and Guimbal helicopter were inbound traffic and the Piper was outbound traffic. The Diamond and the Guimbal both flew a MIKE arrival. The Guimbal helicopter was flying in front. ATC provided both pilots with traffic information regarding the Piper that had departed and followed the MIKE departure (see blue line in Figure 10). After the Diamond's pilot reported that he was approaching point X-RAY, ATC instructed him to keep following the helicopter and to join a high right-hand downwind for Runway 23 at 1,500 feet (see orange line). The Guimbal's pilot reported that he just passed point X-RAY and was also maintaining 1,500 feet for a right-hand downwind. ATC replied in the affirmative and passed on traffic information about the Piper on his right side. The Guimbal's pilot reported to have the traffic in sight. ATC provided the Piper traffic information that two aircraft (of which one helicopter) were joining in front of him at 1,500 feet. The Piper's pilot descended to 1,300 feet and reported to have both aircraft in sight. Then ATC provided traffic information to the Diamond, whereupon the Diamond's pilot replied that he was already climbing and maintaining 1,700 feet.

The Dutch Safety Board classified this occurrence as a *serious incident*, because the flight paths of both aircraft crossed each other and the aircraft were flying at the same altitude initially. There was a risk of collision.

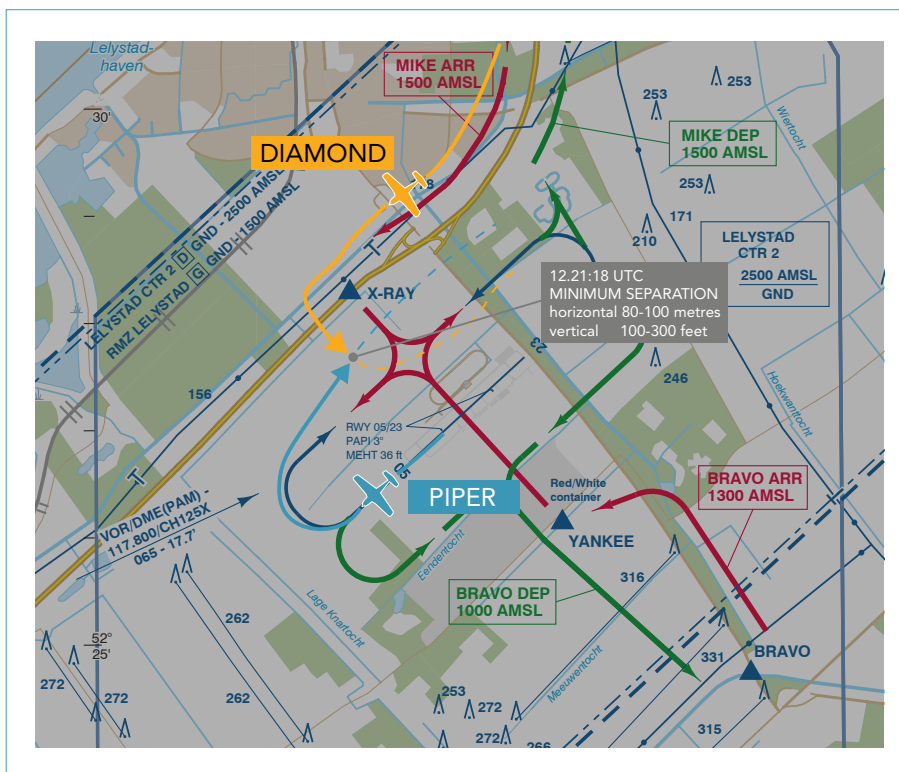


Figure 10: Occurrence 8, intersection MIKE arrival and departure.³¹ (Source chart: AIP Netherlands)

³¹ The Guimbal Cabri G2 is not shown in this figure, because it did not play a direct role in the occurrence.

2.2.10 Other occurrences after 7 November 2019

After the introduction of ATC, several users of the airport complained about the situation that had arisen. Some flight schools and other aviation companies at Lelystad Airport temporarily halted their flight operations, because they did not consider the situation to be safe.³² According to these companies, the unsafe situations were largely caused by the new VFR route design. According to those involved, there have been dozens of other incidents, where traffic has come close to each other. The Board has not investigated which of these occurrences were reported to the ILT.

2.2.11 Occurrences after 7 December 2019

The Board received one report regarding an airprox³³ in the Lelystad control zone after 7 December 2019.³⁴ However, a series of occurrences were reported to the ILT.

As mentioned before, the ILT provided the Board with an overview of the reported occurrences that took place at and near Lelystad Airport in the period from 7 November 2019 to 7 June 2020. In particular, the Board reviewed the occurrences reported after 7 December 2019 to see whether the temporary and permanent measures had an effect and, if so, what effect.^{35,36}

2.3 Operational design of services

LVNL performed a safety analysis, in the period prior to the introduction of air traffic control at Lelystad Airport, of the operational design of its services to be provided, including a risk assessment. LVNL has shared the resulting report (VEMER³⁷) with the Board. The report describes the expected performance in terms of safety, efficiency and the environment with regard to the introduction of ATC at Lelystad Airport and the handling by LVNL of air traffic to and from Lelystad Airport.

The safety analysis concludes that the operation is safe on the basis of the final design by applying correct control measures whereby the residual risk is acceptable. For example: ensure that a scheduling mechanism is in place to schedule VFR traffic to fit within the established hourly capacity; develop an awareness campaign for pilots in the upcoming controlled Lelystad CTR with the aim of making them aware of the consequences of the transition to a controlled airport in advance. It cannot be ruled out that unforeseen irregularities will occur after the preparation. It is therefore recommended to ensure that the Lelystad Airport operation for readiness is integrated into LVNL's safety management system, so that rapid action can be taken in case of irregularities.

32 Piloten vinden vliegveld Lelystad onveilig na komst luchtverkeersleiding: 'Vliegen is hier gevaarlijk', De Stentor, 2019. <https://www.destentor.nl/flevoland/piloten-vinden-vliegveld-lelystad-onveilig-na-komst-luchtverkeersleiding-vliegen-is-hier-gevaarlijk-af515c53/>

33 On 5 March 2021.

34 Up to the date of publication of this report.

35 On the day of publication of this report, the temporary measures were still in effect.

36 There were no airproxes among these, that the Board classified as serious incidents.

37 Air Traffic Control the Netherlands, *VEM Effect Rapportage Luchtverkeersleiding op Lelystad*, D/S&P 18/218, version 1.0, 13 December 2019.

During the adjustment period, experiences and reports from airport users and air traffic controllers are being evaluated at specific times by LVNL and Lelystad Airport, in order to subsequently determine whether certain procedures need to be adjusted.

2.4 Measures taken by LVNL

Both before and after the introduction of ATC at Lelystad Airport several actions have been taken by LVNL, as part of the continuous monitoring and review process³⁸, to support a gradual and safe introduction of ATC at the airport. In this chapter, among others, the temporary and permanent measures that took effect on 7 December 2019, are described.

2.4.1 Temporary measures

In the period directly following the introduction of ATC, frequency congestion occurred regularly, making it difficult for pilots to make a call on this frequency. This was partly caused by the mandatory reporting points, but also because aircraft that taxied and, for example, only wanted to refuel, had to communicate on the tower frequency. As a result, pilots sometimes had to make a 360-degree turn at a reporting point, like X-RAY, while approaching the airport, because they had not yet received a clearance to fly past this point. This may be detrimental to flight safety, because it disrupts the traffic flow to the airport, especially during periods of high traffic. Due to a busy tower frequency, the air traffic controller may also sometimes be unable to provide timely traffic information to all pilots, at times when it is desired.

Based on the experiences during the first month of the 'adjustment period' at Lelystad Airport, LVNL and CLSK have taken temporary and permanent measures to improve the procedures and working methods. These measures took effect on 7 December 2019. They were aimed at making the VFR routes in the control zone less complex. All approaching traffic was now routed via MIKE and all departing traffic via BRAVO; see Figure 11. So, the MIKE departure route and BRAVO arrival route were closed to VFR traffic.³⁹ These measures have been approved by the ILT, prior to its introduction.

³⁸ On 1 May 2020, a first evaluation by LVNL took place. The second evaluation took place on 1 November 2020.

³⁹ These new measures ended simultaneous approaches to the airport from both sides (via BRAVO and MIKE).

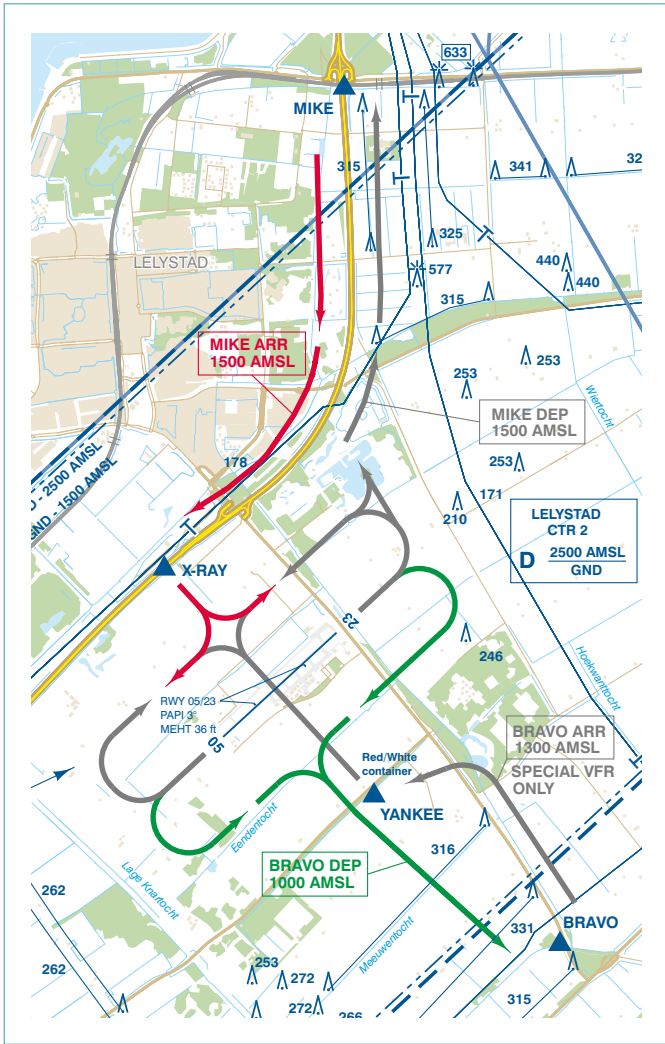


Figure 11: Situation as of 7 December 2019. (Source: AIP The Netherlands)

2.4.2 Other measures

Since March 2020, LVNL has allowed direct routings in the CTR, if the traffic situation permits, and has given attention to radiotelephony standardisation on the tower frequency. LVNL and CLSK published a handbook specific to Lelystad Airport.⁴⁰ The handbook is intended as a reference for the concise and literal radiotelephony that pilots have to use and can expect from ATC, and at reducing the congestion at the tower frequency. The handbook is supplemented with points of attention and a brief explanation. For example, passing point YANKEE on the BRAVO departure route and 'switching off' on the parking position no longer need to be reported and shortening of the initial call before entering the control zone.⁴¹

In the spring of 2020, LVNL organised an awareness campaign and the users of Lelystad Airport (flying clubs, flight schools et cetera) were able to discuss these adjustments

⁴⁰ LVNL en Koninklijke Luchtmacht, "Krijgt u mij aan de lijn?", *Luchtverkeersleiding op Lelystad Airport, RT: communicatie tussen luchtverkeersleider en vlieger.*

⁴¹ These are examples of permanent measures.

during several meetings. The new situation with regard to the VFR routes will remain active for the time being. In 2020, LVNL organised several internal team sessions to increase the clarity of the working methods of tower and delivery.

In November and December 2020 and in March and May 2021, LVNL organised online meetings for pilots where they were given the opportunity to ask questions about the procedures to air traffic controllers.

2.4.3 Review with umbrella organisations

On 7 October 2020 the umbrella organisations (Aircraft Owners & Pilots Association Netherlands, Royal Netherlands Aeronautical Association and the Netherlands Association of Commercial Aviation) and LVNL reviewed the past summer period. The purpose of this evaluation was to track the performance (safety and capacity) of the Lelystad Airport operation, to provide information for setting, monitoring, refining and/or cancelling the (temporary) measures and to provide information to expand or focus the awareness campaign.

The umbrella organisations agreed that steps forward were taken by LVNL over the last summer period. The pilots experienced that the operation was smoother than in the initial period; air traffic control has become more flexible to accommodate user requests and thinks along with the pilots.

One point of attention from the umbrella organisations concerned radiotelephony. The organisations expressed their concerns about the (high) occupancy on the radio frequency of the tower. Among others, students find it difficult to monitor a busy frequency and to make radio calls themselves. According to the umbrella organisations, this implies a safety risk. LVNL indicated that it monitors the occupation of the frequency on a daily basis. LVNL stated that no anomalous values were observed (apart from 7 and 8 November 2019) and that the measures taken (shorten the call when entering the control zone, reduce non-standard radiotelephony et cetera) have reduced frequency congestion.⁴² In determining the acceptable radio occupancy of the tower frequency, the umbrella organisations asked LVNL to take into account that Lelystad Airport is an airport that is often used for training flights.

In addition, the users of the airport requested a second radio frequency (ground) at Lelystad Airport with the aim of reducing the occupation of the tower frequency. LVNL indicated that a study into the use of a second radio frequency already took place in the spring of 2020, initiated as an outcome of the expert sessions held with companies at the airport. LVNL concluded that a second radio frequency has many operational and financial consequences and has a long lead time. It was expected that adding a separate ground frequency could actually be detrimental to safety, as the tower controller would now have to coordinate with a ground controller. With a taxi track that is close to the runway, this was deemed undesirable. On the other hand, LVNL states that adding a

⁴² The averages for the occupancy of the tower frequency for blocks of time of 20 minutes in the time period from 07.00 to 17.00 hours is 4.43, for the period from 7 November to 7 December 2019. This value is 3.49 for the period from 7 December 2019 to 7 February 2020.

separate ground frequency would only lead to a marginal gain in the occupation time of the frequency. The results of this study were fed back to the users of the airport.

LVNL has brought the occurrences that have been taking place in the circuit of Lelystad Airport to the attention of the organisations. LVNL's investigations have shown that pilots should pay more attention to reporting their position on downwind. When done so, the tower controller can issue a sequence number to the aircraft. LVNL also asked pilots to indicate their intentions succinctly. This should lead to an improved situational awareness among other pilots and allows air traffic control to plan and anticipate. LVNL indicated to include this point in future awareness campaigns.

2.4.4 Integral safety review

An integral safety review by LVNL with the flying community took place on 28 January 2021. Several control measures were then discussed, including LVNL immediately contacting pilots (or safety managers) after an occurrence, mutual understanding of each other's operation (air traffic controllers and pilots) and targeted awareness campaigns.

LVNL's concern was the degree of flight preparation/skills and safety awareness of (particularly) recreational pilots at Lelystad Airport.

2.5 Measures taken by the ILT

One of the conditions for the National Supervisory Authority's (NSA) acceptance of the change to the functional system of LVNL (as a result of setting up controlled airspace with ATC) was to carry out an intensive information campaign. At the time, the NSA attended a number of LVNL's information sessions.

When several airproxes took place in the adjustment period, after the introduction of ATC, the ILT carried out an inspection at Lelystad Airport. Until March 2020, the ILT intensified its oversight. The ILT is still actively involved and attention is still being paid to the situation at Lelystad Airport through several participations (Aviation committee, users consultation EHLE, airspace infringements taskforce and LVNL/ILT company inspector consultations).

3.1 Introduction

The Dutch Safety Board analysed eight occurrences that took place in the control zone of Lelystad Airport in November 2019, after the introduction of ATC. This was a sudden increase in the number of reported airproxes, compared to the period before 7 November 2019. Based on the analysis of the occurrences, the Board has identified common factors that played a causal role in the occurrences. The Board has also identified at which locations in the control zone there are risks for the development of an airprox. The Board also assessed additional reports and any supplementary information of occurrences⁴³, in the aforementioned period, with an extension to 7 June 2020, reported to the Human Environment and Transport Inspectorate (ILT) and provided to the Board.

Finally, the Board analysed if the measures that were taken on 7 December 2019, in response to the occurrences that took place in the first month after the introduction of ATC, have been effective.

3.2 Occurrences

In this paragraph, eight occurrences that took place in November 2019 in the control zone of Lelystad Airport are analysed. Note that factual information about these occurrences is presented in Chapter 2.2.

3.2.1 Occurrence 1

After the Blackshape's pilot had reported his position on downwind, ATC told him to expect a late clearance due to traffic on the runway. ATC had not given him a sequence number yet. The pilot subsequently turned to base leg, without clearance, and crossed final, in front of the Cessna. ATC did not notice in time that the Blackshape had turned to base leg. The pilot of the Blackshape also did not notice in time that he had turned to base leg in front of another aircraft that was preceding his flight.

The same-sounding abbreviations, used for the call signs of the Blackshape (ISA) and the Socata TB9 (AIS), which flew in front of the Cessna 172P, may have confused the Blackshape's pilot, causing him to turn in too early.

⁴³ Requested by the Board.

The Blackshape's pilot turned to base leg, without clearance, and ended up in front of the Cessna on final. This was not immediately detected by ATC.

3.2.2 Occurrence 2

The pilot of the Mooney, flying the BRAVO arrival, stated that he reported over the mandatory reporting point YANKEE. However, this call was not audible in the recorded communications on the tower's frequency. Subsequently, ATC did not provide the pilot with a clearance to fly over the runway and join a right-hand downwind for Runway 23. On his own accord, the pilot flew via a left-hand downwind and base leg towards final for Runway 23. ATC did not react on the partially blocked radio call ('(...) traffic who is opposite me on same altitude also on downwind'), made by the Mooney's pilot. The controller only observed the Mooney on final and then instructed the pilot to make a right-hand orbit. The Piper and Mooney then flew straight towards each other, after which the Piper's pilot diverted and flew back towards point BRAVO. Both pilots were of the opinion that the air traffic controller was hard to understand.

The Mooney's pilot had not read a NOTAM, effective as of 7 November 2019, which stated that the BRAVO arrival procedure had been changed. The control zone had now to be entered at 1,300 feet AMSL. The pilot passed point Bravo, which is located just outside the control zone, at 1,300 feet AMSL, but then began to descend to 1,000 feet AMSL. Then he passed point YANKEE, without a clearance, and subsequently flew the left-hand circuit for Runway 23, that was no longer in use.

The Mooney's pilot deviated from the prescribed procedures. He entered the control zone and started to descend to 1,000 feet, passed point YANKEE and flew a left-hand circuit, which was no longer in use as the circuit had been moved to the north side of the runway.

The air traffic controller did not notice in time that the Mooney was flying an incorrect circuit, and his actions subsequently resulted in the two aircraft coming close to each other.

3.2.3 Occurrence 3

It was busy on the tower frequency with inbound, outbound and circuit traffic. The air traffic controller had to repeat and confirm several calls to the pilots. Pilots called through the calls from other pilots: 'request landing time' or 'request taxi', after someone else had just reported a mandatory reporting point.

The Reims's pilot, flying the BRAVO arrival, acted in accordance with the procedures. When the Diamond's pilot reported overhead point X-RAY for the first time, he was not immediately instructed by ATC to join the right-hand downwind for Runway 23. Then ATC just issued a take-off clearance to another aircraft, while in the meantime other pilots called on the tower frequency. The Diamond's pilot started a descending turn to downwind at X-RAY and noticed opposite traffic. Then he decided to make a right-hand

orbit over X-RAY to avoid an airprox. The Diamond's pilot was of the opinion that he was allowed to pass point X-RAY, as he was cleared for the MIKE arrival. However, when cleared for a MIKE arrival, a subsequent clearance is required at the compulsory reporting point X-RAY to be allowed to join downwind.

The Diamond's pilot deviated from the prescribed procedure by passing point X-RAY and starting a descending turn to downwind, without ATC clearance.

Frequency congestion was a contributing factor.

3.2.4 Occurrence 4

In the perception of the DA 42's pilot, the Cessna made an evasive manoeuvre when both aircraft flew opposite of each other. However, the Cessna's pilot made this turn to position himself behind the DA 42, as instructed by ATC. ATC had not passed traffic information to the DA 42's pilot about the Cessna and the instruction it gave to this aircraft. ATC is not obligated to provide this information. The pilot of the DA 42 had not heard the air traffic controller's instruction to the Cessna. Both aircraft maintained sufficient separation from each other. The HK 36 flew at a lower altitude in the circuit and did not play a role in this situation.

The DA 42's pilot thought that the Cessna, flying straight at him, was making an evasive manoeuvre. However, this was a turn as instructed by ATC. The DA 42's pilot had not heard this instruction.

3.2.5 Occurrence 5

In the extension of downwind of Runway 23, the weather conditions had deteriorated. In order to prevent flying into the clouds, the pilot of the Cessna decided to turn to the right, after he was told that he was number three in the circuit. By doing so he was unable to maintain sufficient separation with the preceding Reims (number two in the circuit). ATC instructed the Reims, that was now flying above the Cessna, to go-around and thereby increase the separation between both aircraft. The weather conditions made it difficult for ATC to keep a clear view of the traffic situation.

ATIS information, which was valid at the time of the occurrence, mentioned a visibility of 8 kilometres and no significant clouds. It appears that at that time the ATIS was not representative of the weather situation in the area in the extension of the downwind leg of Runway 23.

ATC was not aware of the deteriorating weather conditions at the extended downwind leg at an early stage. Neither was the Cessna's pilot. ATC instructed the pilot to extend downwind, which caused the Cessna to enter those deteriorated weather conditions. Subsequently, the pilot was forced to turn right early. This caused him to get too close to the aircraft that was flying in front of him, forcing ATC to instruct this aircraft to make a go-around.

3.2.6 Occurrence 6

ATC initially determined that the Schweizer helicopter would join the downwind leg in front of the twin-engined Diamond. In retrospect, this sequence turned out not to be feasible due to the speed differences between both aircraft. The wind may have played a role in this. As a result, the Diamond's pilot was forced to fly over the runway first, and then make a 180° turn to position himself behind the helicopter.

The sequence of both aircraft, initially devised by ATC, turned out not to be feasible in practice because of the speed differences between the two aircraft, which the air traffic controller had not foreseen.

3.2.7 Occurrence 7

The Cirrus's pilot did not report his position on downwind and therefore did not receive a sequence number from ATC. He subsequently turned to base leg, without clearance, and positioned himself in front of the Blackshape when turning to final. ATC did not notice that the Cirrus had turned to base leg in time.

The Cirrus's pilot did not report his position on downwind, although this should have been done according to the procedure, and turned without clearance to base leg. This was not immediately detected by ATC, which subsequently brought both aircraft into close proximity of each other.

3.2.8 Occurrence 8

The flight paths of the departing Piper and the arriving Diamond crossed near point X-RAY. The Piper deviated from the departure route and flew toward the bend in the highway, northeast of X-RAY. Both pilots felt uncomfortable with the situation. The Diamond's pilot decided to climb, while the Piper's pilot decided to descend, in order to create separation.

The emergence of the situation was partly due to ATC's timing to give the clearances to both aircraft to take-off respectively join the circuit. An additional factor was the Piper's pilot, who deviated from the departure route.

3.3 Common factors

Before the introduction of ATC at Lelystad Airport, airproxes already occurred in and near the circuit area. With the transition from uncontrolled to controlled airport, the routes and procedures have changed in such a way that airproxes from before and after cannot really be compared. However, the 'see-and-avoid' principle⁴⁴ is still applicable, since pilots of VFR flights in the current airspace class D are still responsible for maintaining separation from other aircraft.

In three of the occurrences⁴⁵, the convergence of the MIKE and BRAVO arrival routes on the downwind leg played a role. These occurrences were classified as incidents. In one case, a pilot passed point X-RAY and started the descend to circuit altitude, without ATC clearance. In the other two cases, ATC's actions (not passing traffic information⁴⁶ and the sequencing of aircraft) played a role.

Table 1: Common factors: operational factors and locations in the Lelystad control zone

Occurrence	Operational factor				Location			Class. Incident / serious incident
	ATC role	Pilot role	Frequency congestion	Not observed in time by ATC	On final	Intersection MIKE and BRAVO arrival	Intersection MIKE departure and arrival	
1		X		X	X			SI
2	X	X		X	X			SI
3		X	X			X		I
4	X	X				X		I
5	X	X			X			SI
6	X					X		I
7		X		X	X			SI
8	X	X					X	SI

When aircraft used the departure and arrival routes on the north or south side of the runway simultaneously, they could sometimes come close to each other, as these routes were close to each other on both sides. For example, the MIKE departure and arrival routes, situated on the north side of the runway, had to be flown at the same height and were separated from each other by the width of a motorway. This played a role in occurrence 8. The convergence of departure and arrival VFR routes played a causal role in some occurrences. However, the Board considered the VFR departure and arrival

⁴⁴ See-and-avoid' is the combination of seeing conflicting air traffic in time, and avoiding the traffic in an appropriate manner, following the rules of the air of ICAO Annex 2 (EASA, *Research Project EASA.2011/07, Scoping Improvements to 'See And Avoid' for General Aviation (SISA)*, December 2012).

⁴⁵ Occurrences 3, 4 and 6.

⁴⁶ ATC is not obligated to provide this information.

routes as a given at the start of the investigation and therefore did not investigate their design further.

In four occurrences⁴⁷, two aircraft came close to each other on final. In one case deteriorated weather conditions at one side of the circuit played a role. ATC did not prevent the aircraft from ending up in these weather conditions, which is a task of the air traffic controller, if he is aware of it. In the other three occurrences, pilots did not adhere to the procedures. In two cases the pilot turned to base leg without having obtained a sequence number and in the third case the pilot flew the 'old' left hand circuit for Runway 23, which was not in force anymore.

All occurrences involved aircraft approaching the airport or flying into the circuit. Only one occurrence⁴⁸ involved a departing aircraft.

It appears that the amount of VFR traffic, in combination with the congestion of the tower frequency, sometimes was and still is a challenge for ATC and pilots involved. In one occurrence, frequency congestion played a role. Pilots who were not used to flying from controlled airports needed to get used to strictly following the procedures and the accompanying radio calls. Not all VFR pilots seemed to be aware that in controlled airspace with class D, they themselves are responsible for the separation with other VFR traffic. Flying in airspace, controlled by ATC, can thus create a false sense of safety. All in all, it can be said that the unique transition from an uncontrolled airport to a controlled airport was something that all parties involved had to get used to. The pilots who had been flying to Lelystad Airport for a long time had to unlearn old habits. The current situation requires a more extensive flight preparation.

The following factors played a causal role in the occurrences:

- Transition to a controlled airport, which all parties involved had to get used to;
- The convergence of departure and arrival VFR routes;
- Frequency congestion on tower frequency;
- Non-compliance by and unfamiliarity among pilots with procedures applicable in controlled airspace (with classification D);
- Late or non-detection by ATC of pilots deviating from procedures.

In order to prevent pilots from being unfamiliar with the current situation and procedures in the circuit area, preparation is essential. Pilots should always prepare their flight well in order to strictly adhere to the procedures, such as reporting their position on downwind, use concise and correct radiotelephony and to monitor other traffic in the circuit area.

⁴⁷ Occurrences 1, 2, 5 and 7.

⁴⁸ Occurrence 8.

3.4 Actions taken by LVNL

This section analyses the actions and measures taken by LVNL and CLSK to inform pilots about the upcoming changes, in the process of introducing ATC at Lelystad Airport. Furthermore, the effect of the measures taken on 7 December 2019 in response to the occurrences that took place in the first month after the introduction of ATC, was analysed.

3.4.1 Before 7 November 2019

LVNL and CLSK started providing information, in addition to the information through standard channels like the Aeronautical Information Publication, Notices To Airmen et cetera, to pilots about the new routes, procedures and airspace structure well before the introduction of ATC at Lelystad Airport. The information was presented on LVNL's website and an awareness campaign, including information meetings (local/regional), was started to inform pilots about the upcoming changing procedures, routes and airspace structure. During the meetings, there was the opportunity for pilots to ask questions to LVNL. It may be expected of a pilot to review and apply all available information, with regard to the routes, procedures and airspace structure of Lelystad airport, relevant to a safe flight operation.

LVNL and CLSK had taken a number of actions to inform general aviation pilots about the upcoming changes at Lelystad Airport. Despite all those actions, all parties involved had to get used to the unique and major transition from an uncontrolled to a controlled airport, especially in the initial adjustment period.

3.4.2 Effectiveness of measures, as of 7 December 2019

After the change of procedures and routes on 7 December 2019, no more occurrences that were caused by the convergence of departure and arrival VFR routes, were reported to the Board and the ILT. This is an expected finding, given that the BRAVO arrival and MIKE departure routes have not been used anymore for VFR traffic since the 7 December modification. Four of the eight occurrences, investigated by the Board (and presented in Chapter 2.2), took place around such intersection points. The remaining four events investigated, occurred on final.

The frequency has become less congested as of 7 December 2019, although there are reports from the sector that it is sometimes still perceived as high, especially at peak times of traffic. This remains a concern, as it is an undesirable situation if for example pilots on the ground block the frequency for pilots in the air. The non-compliance by and unfamiliarity among pilots with procedures applicable in the control zone of Lelystad Airport have diminished. The Board concludes that this was a result of pilots becoming more accustomed to the current situation; the latter also applies to air traffic controllers.

Based on the decrease in the number of airprox reports, received by the Board and ILT, the measures taken on 7 December 2019 appear to have had a positive effect on the number of airproxes in the Lelystad control zone.

The non-compliance by and unfamiliarity among pilots with procedures applicable in the control zone of Lelystad Airport have diminished, because they became more accustomed to the current situation.

Airproxes reported to the ILT after 7 December 2019

In principle, only serious incidents and accidents are reported to the Board. In order to obtain a complete picture of all occurrences that took place within the control zone of Lelystad Airport and to gain insight into the development in the number of occurrences, the Board requested an overview of all incident reports that were filed to the ILT between 7 December 2019 and 7 June 2020.⁴⁹

Apart from the date, classification and categorisation, the list of occurrences, requested by the Board from the ILT, was limited to a headline containing a limited description of every occurrence. Hence, the nature of the data did not allow the Board to perform an in-depth analysis. The data were only studied at the aggregate level. In order to draw conclusions from the individual occurrences, further examination is required. However, the Board did not carry out further investigation into the occurrences after 7 December 2019, as this is beyond the scope of this investigation.

The data provided by the ILT was further narrowed down by only selecting airproxes and similar occurrences.⁵⁰ The resulting overview is presented in Figures 12 to 14. Figure 12 shows the progression of the number of airproxes that occurred between 7 November 2019 and 7 June 2020. Of the seventeen incidents in November, eight have been analysed in this report. The other nine have been classified as an incident (and were thus not reported to the Board). Of the number of airproxes that took place in December 2019, one happened before the implementation of measures on 7 December. Figure 13 shows the number of airproxes grouped by the location in the circuit area, where they took place. When only considering airproxes that occurred after the changes on 7 December, the location of the airproxes in the circuit area is distributed as depicted in Figure 14.

⁴⁹ Data was also available for the period before 7 November 2019. However, these data were not considered, because the changed situation with respect to the circuit area, as of 7 November 2019.

⁵⁰ Because of the limited information available, it was not possible for every event to clearly identify whether an actual airprox happened. Based on the information available, the Board identified certain events as airproxes. It may well be possible that some occurrences, that have been categorized as airproxes, will not be considered as such anymore after further investigation.

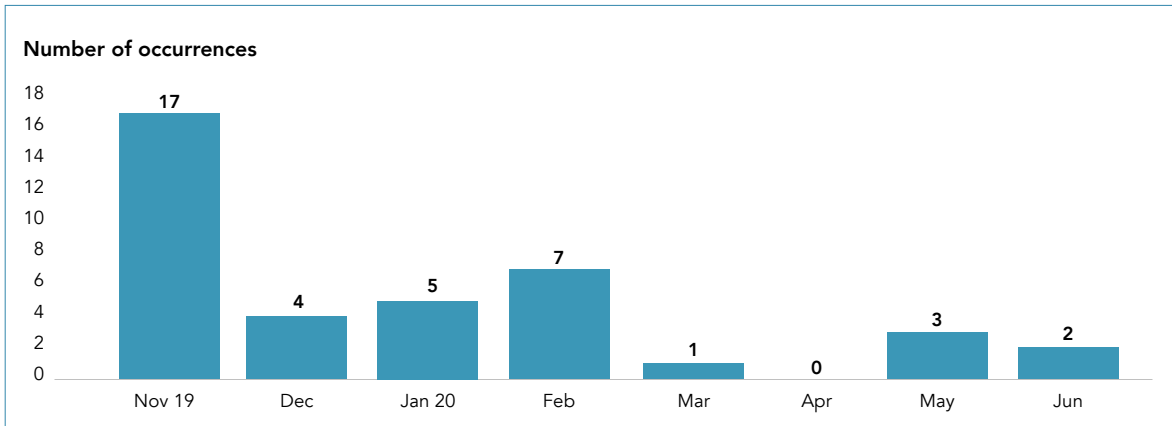


Figure 12: Number of airproxes that took place in the Lelystad CTR between 7 November 2019 and 7 June 2020. (Source: Dutch Safety Board, based on data provided by the ILT)⁵¹

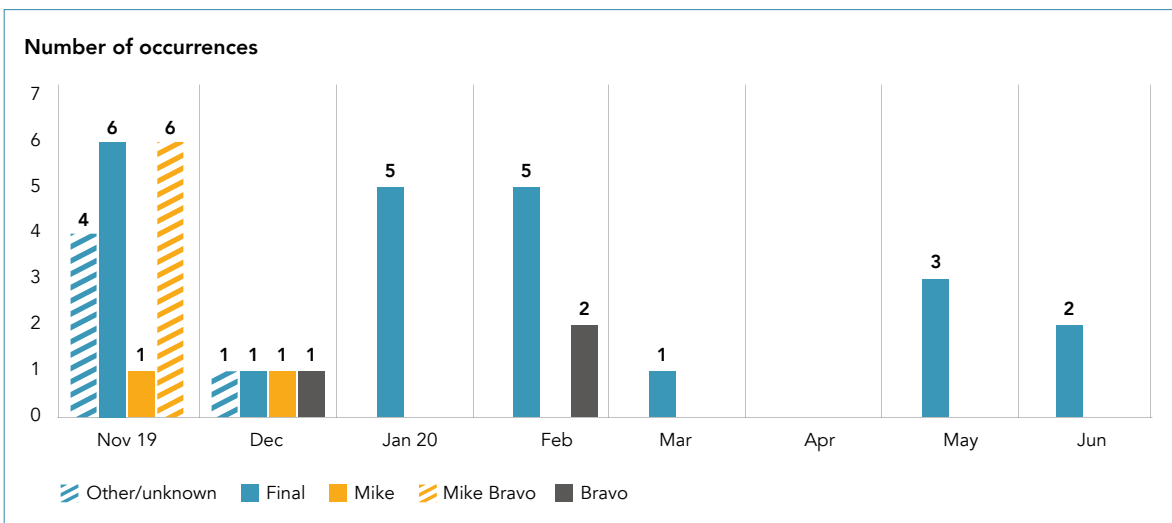


Figure 13: Number of airproxes grouped by location in the circuit area per month, between 7 November 2019 and 7 June 2020. (Source: Dutch Safety Board, based on data provided by the ILT)

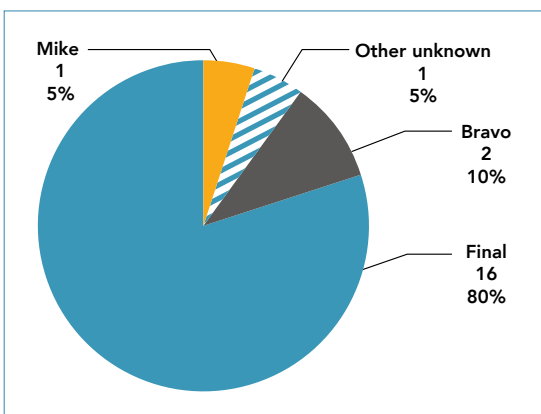


Figure 14: Location in the circuit area of airproxes between 7 December 2019 and 7 June 2020. (Source: Dutch Safety Board, based on data provided by the ILT)

⁵¹ In April 2020, less general aviation flights took place as a result of COVID restrictions. From May 2020, the number of general aviation flights returned to pre-COVID restrictions levels (based on CBS data, see <https://opendata.cbs.nl/statline/#/CBS/nl/dataset/60058ned/table?ts=1634721259946>)

From the figures, it becomes evident that the vast majority of occurrences reported after 7 December 2019 took place on final. The Board did not analyse these occurrences in-depth, because they did not concern serious incidents or accidents. However, on the basis of the headlines of the reports (limited description of the event) the Board concludes that the occurrences can be divided into two types. First, occurrences whereby pilots who turn into base leg early and position themselves in front of traffic on final. Second, occurrences whereby traffic on final is coming too close to preceding traffic on final.

The Board received a notification of an occurrence that took place in the circuit area of Lelystad Airport on 5 March 2021. An aircraft turned to base leg and ended up in front of an aircraft on final. The occurrence, which is classified as a serious incident, is still under investigation by the Board⁵² and the results of it will be published in its Quarterly Aviation Report. It confirms the above conclusion, that since 7 December 2019, airproxes mainly have taken place on final.

From the overview of occurrence reports provided by the ILT, it becomes evident that air proximity events still occurred in the circuit area of Lelystad Airport after 7 December 2019. The majority of these occurrences took place on and near the final leg of the circuit.

⁵² At the time of publication of this report.

4 CONCLUSIONS

Several airproxes took place in the control zone of Lelystad Airport, in which traffic flying under visual flight rules (VFR) came in close proximity to each other, shortly after the introduction of air traffic control at the airport and the corresponding new procedures, routes and airspace structure on 7 November 2019. This was a sudden increase in the number of reported airproxes, compared to the period before 7 November 2019.

Air Traffic Control the Netherlands and Royal Netherlands Air Force Command had taken a number of actions in advance to inform general aviation pilots about the upcoming changes at Lelystad Airport. Despite all those actions, all parties involved had to get used to the unique and major transition from an uncontrolled to a controlled airport, especially in the initial period. The pilots who had been flying to Lelystad Airport for a long time had to unlearn old habits. The present situation requires a more extensive flight preparation.

Investigation of the eight occurrences, in the first month after the introduction of air traffic control at Lelystad Airport, included in this report has revealed that the following factors played a causal role:

- The convergence of departure and arrival routes for visual flight rules traffic;
- Frequency congestion on tower frequency;
- Non-compliance by and unfamiliarity among pilots with procedures applicable in controlled airspace (with classification D);
- Late or non-detection by air traffic control of pilots deviating from procedures.

Based on the experiences during the first month following the introduction of air traffic control at Lelystad Airport, Air Traffic Control the Netherlands and Royal Netherlands Air Force Command have taken temporary and permanent measures to improve the procedures and working methods. These measures took effect on 7 December 2019. They were aimed at making the routes for visual flight rules traffic in the control zone less complex and at reducing the congestion at the tower frequency. Since then, the routes of incoming and outgoing traffic have been separated.

After 7 December 2019, the Dutch Safety Board received one report of an airprox that took place in Lelystad control zone. In addition, a high level study of occurrences reported to the Human Environment and Transport Inspectorate has shown that the number of airprox occurrence reports has decreased after 7 December 2019. Based on these findings, the measures taken on 7 December 2019 appear to have had a positive effect on the number of airproxes in the Lelystad control zone. The non-compliance by and unfamiliarity among pilots with procedures applicable in the control zone of Lelystad Airport have diminished, because they became more accustomed to the current situation. However, from the overview of occurrence reports provided by the Human Environment and Transport Inspectorate, it also becomes evident that air proximity events still have

been occurring in the circuit area of Lelystad Airport after 7 December 2019. The majority of these occurrences took place on and near the final leg of the circuit.

After the arrival of commercial air traffic in the future, strict adherence to the procedures then becomes even more important. Irrespective of any changes to procedures or routes, reducing the number of airproxes requires commitment and continuous monitoring and adjustment from all parties involved.

Responses to the draft report

In accordance with the Dutch Safety Board Act, a draft version (without recommendations) of this report was submitted to the parties involved for review. The following parties have been requested to check the report for any factual inaccuracies and ambiguities:

- Air Traffic Control the Netherlands
- Aircraft Owners & Pilots Association Netherlands
- European Union Aviation Safety Agency
- Human Environment and Transport Inspectorate
- Lelystad Airport
- Ministry of Infrastructure and Water Management
- Pilots involved
- Royal Netherlands Air Force Command

The responses received, as well as the way in which they were processed, are set out in a table that can be found on the Dutch Safety Board's website (www.safetyboard.nl). The responses received can be divided into the following categories:

- Corrections and factual inaccuracies, additional details and editorial comments that were taken over by the Dutch Safety Board (insofar as correct and relevant). The relevant passages were amended in the final report.
- Not adopted responses; the reason for this decision is explained in the table.



Visiting address
Lange Voorhout 9
2514 EA The Hague
The Netherlands
T +31 (0) 70 333 70 00

Postal address
PO Box 95404
2509 CK The Hague
The Netherlands

www.safetyboard.nl